WESTERN GRAY WHALE ADVISORY PANEL **WGWAP 2/3**
2nd Meeting **15-18 April 2007**
St. Petersburg, Russia

REPORT OF THE WESTERN GRAY WHALE ADVISORY PANEL AT ITS SECOND MEETING

CONVENED BY IUCN - THE WORLD CONSERVATION UNION

CONTENTS

1 INTRODUCTION

The second meeting of the Western Gray Whale Advisory Panel (WGWAP, hereafter called the Panel) was held at the Park Inn, St. Petersburg, Russia, from 15-18 April 2007 under the chairmanship of R.R. Reeves.

In addition to the full Panel (Annex 1), the meeting was attended by representatives of the following organizations:

Sakhalin Energy Investment Company Ltd The World Conservation Union – IUCN WWF – Russia Sakhalin Environment Watch Pacific Environment	Export Import Bank International Fund for Animal Welfare (IFAW) – Japan UK Export Credits Guarantee Department Japan Bank for International Cooperation AEA Technology (consultant acting on behalf of potential international lenders)

At the request of the Panel, David Weller participated in the meeting as an Associate Scientist. Julian Roberts of IUCN facilitated meeting preparations and logistics with assistance from Vladimir Moshkalo of IUCN-Russia. Sarah Gotheil of IUCN served as meeting rapporteur. We appreciate their efforts in support of the Panel's work.

2 BACKGROUND

Subsequent to the first WGWAP meeting in Switzerland in November 2006 (WGWAP 1), it was decided that a subset of the Panel would attend a briefing by Sakhalin Energy in Vladivostok in February 2007. This inter-sessional briefing was informal, with the Panel represented by Reeves, Tsidulko, Vedenev and Yablokov and IUCN by Roberts. The timing and venue of the briefing were determined by the fact that it would come immediately after the company's normal annual meeting with its contract researchers and co-funders (Exxon Neftegas Ltd) to check progress towards their preparation of annual reports to the Russian Ministry of Natural Resources.

As a result of the Vladivostok briefing, the Panel developed a series of recommendations that were sent to IUCN, for forwarding to Sakhalin Energy, on 8 March 2007. These are available at http://www.iucn.org/themes/marine/sakhalin/index.htm and in (WGWAP 2/INF 1). Previous WGWAP recommendations that remain open or unresolved and that are not superseded by new recommendations in the present report are listed in Annex 7.

3 ADOPTION OF AGENDA AND REPORTING PROCEDURES

The final agenda (Annex 2) was adopted with one major change in the timetable resulting from a failed airline connection for a Sakhalin Energy representative who had been expected to make a presentation on the company's mid- and long-term work/construction programme (see section 7). The meeting adjourned after lunch on Day 1 and began earlier than planned on Day 2, with a truncated, substitute presentation on the Sakhalin Energy 2007 work/construction programme. Documents submitted to the Panel are listed in Annex 3.

The panel met to work on its report each afternoon after the plenary session, and some panel members continued their work on report preparation for several days after the meeting.

4 BENTHIC MONITORING

Prior to the meeting Sakhalin Energy provided a detailed report (WGWAP 2/INF.2) on benthic monitoring activities in the Sakhalin II project area during the 2006 field season. Valeriy Fadeev gave a verbal synopsis of the report and was complimented by the Panel for the comprehensive data set and the effort it reflects. The 2006 data collection activities focused on the Piltun and Offshore feeding areas, and sampling effort, collection methods, and post-sampling analyses were similar to those of previous years. For the first time the benthos was also sampled in the vicinity of Chayvo Lagoon, following observations of feeding gray whales there.

The Panel is particularly interested in two findings of the 2006 work:

Firstly, lower overall biomass and densities of benthic amphipods were reported in the Piltun feeding area in 2006 when compared to 2005. The authors suggested that the reported difference could have been responsible for increased use of the Offshore feeding area and the first observed use of habitat near Chayvo Lagoon by feeding gray whales in 2006. However, understanding the causes of the difference in biomass density is complicated by the fact that, as a result of factors beyond the control of researchers, 2006 samples were collected later in the field season than those collected in 2005.

Secondly, the authors suggested that whales in the northeastern part of the Piltun feeding area in 2004 and 2005 were consuming sand lance (*Ammodytes hexapterus* Pallas, 1814), a forage fish species that burrows in sand when at rest. The speculation that whales were feeding on sand lance was considered as a possible explanation for the whales' more easterly (farther offshore) foraging distribution in the northern part of the Piltun area in those years. The authors believed that this was supported by the large difference in biomass of sand lance prior to and after whales were observed feeding in the northeastern Piltun area. Also, they cited previous observations of sand lance in the diet of eastern gray whales in the Chukotka region as support for the suggestion that gray whales feed on sand lance off Sakhalin. However, the Panel is sceptical about the importance of sand lance in the diet of western gray whales. Large differences in biomass of sand lance are not sufficient by themselves to infer dietary significance. Sand lance may be capable of avoiding capture by foraging gray whales, and known presence of sand lance in whales' diet (e.g. off Chukotka) may be a consequence of incidental ingestion rather than focused consumption.

The Panel **recommends** that Sakhalin Energy's scientists take into account the Panel's recommendations from WGWAP 1 (November 2006) in the planning and execution of 2007 benthic fieldwork (see WGWAP 2/INF 1). The Panel **attaches particularly high priority** to the recommended incorporation of benthic ecosystem data into a GIS-type database in order to facilitate two types of investigation: (1) a more thorough understanding and appreciation of spatial and temporal patterns in the benthos, and (2) evaluation of quantitative relationships among benthic data and data from other aspects of the study of western gray whales in the area. For example, benthic ecosystem data should be included among the variables incorporated in analyses of noise effects (see Annex 4) [WGWAP 2/001]. In addition, recognising the practical difficulties that occurred last year, the Panel **recommends** that timing of sampling of benthos be standardized within month among years, to the maximum extent practicable [WGWAP 2/002]. The Panel also **recommend**s that Sakhalin Energy's scientists attempt field collections of fecal matter from foraging whales, to the extent practical and with minimal disturbance of foraging whales, to search for hard-part remains of sand lance and to assess the frequency and significance of sand lance in the whales' diet [WGWAP 2/003].

5 BEACH SURVEYS

As noted in the report of the Interim Independent Scientists Group (IISG, April 2006, Vancouver): "A regular surveillance program, employing dedicated (or semi-dedicated, e.g. a helicopter returning from an unrelated crew change, reconnaissance or supply mission) boats, aircraft, or both, is required."

In the report of WGWAP 1 the Panel endorsed and elaborated upon the plan for "carcass surveys" as proposed in the IISG report. It also welcomed Sakhalin Energy's commitment to having a "more comprehensive strategy" in place for the 2007 construction season and beyond. As noted in its earlier report, the Panel recognises that while surveys for beached carcasses are likely to be most effective when flown at altitudes <450m, low-level flying introduces more sound into the nearshore marine environment and thus increases the potential for disturbance to whales on the near-shore feeding ground. Although not mentioned earlier, it is also important to consider the potential for shoreline overflights to disturb nesting birds (e.g. Steller sea eagles, especially near Chayvo) and hauled-out pinnipeds (e.g. Steller sea lions). Therefore, the surveillance strategy needs to balance a number of concerns. The objective is to optimise the likelihood of detecting stranded whale carcasses whilst minimising the potential disturbance to whales and other wildlife in the nearshore environment.

After consulting with external experts (Bruce Mate, James G. Mead, David Weller) and reviewing relevant literature, the Panel **recommends** that surveys for stranded gray whale carcasses be conducted according to the following specifications:

- Flight (ground) speed: 80-100 knots (148-185 km/hr).
- Flight altitude: 1500 ft (450m). Although this is above the optimal height, it should preclude serious disturbance to near-shore living whales as well as nesting birds and hauled-out pinnipeds. The smallest gray whales expected during summer and autumn in this region would be 6-7m long and they should be at least moderately detectable from 450m.
- Flight path: Where the terrain permits, a flight path along the land-side (ca. ¼ mi [0.4km] from the beach) is preferred. However, it is essential that the beach be kept in sight and therefore in areas such as the Piltun feeding ground, where dunes, hills and cliffs might obscure a high-and-dry carcass, it may be necessary to fly directly along, or just offshore from, the waterline. In this circumstance, it will be especially important to avoid sharp turns and rapid changes in power that cause more sound to enter the water.
- Flight coverage and regularity: This should follow the guidance given in the reports of the IISG and WGWAP 1 (e.g. expand coverage to include areas north of Piltun Lagoon, entire east coast to be covered at least twice per season, Piltun feeding area to be covered biweekly from July-October) [WGWAP 2/004].

The Panel emphasises that this work is not intended to obtain quantitative estimates of gray whale mortality in the region; in particular, a lack of carcasses cannot be interpreted as a lack of effect of oil and gas operations.

Ideally, and as described in the IISG and WGWAP 1 reports, a full necropsy (post-mortem examination) should be undertaken by experienced people on all sufficiently fresh gray whale carcasses. In practice, however, logistics often will make that very difficult to achieve. For this reason, the Panel **recommends** that Sakhalin Energy develops, in consultation with appropriate experts, a list of data and samples to be collected, and an associated protocol for such collection. The protocol will need to incorporate, *inter alia*, consideration for the state of the carcass and the level of experience of available personnel [WGWAP 2/005].

6 MARINE MAMMAL OBSERVER (MMO) PROGRAMME

6.1 General

The presence of marine mammal observers (MMOs) on selected vessels forms a major part of Sakhalin Energy's Marine Mammal Protection Plan (MMPP). The Panel received the MMO observer's manual (WGWAP 2/INF 3) and close-out report (WGWAP 2/INF 4) for 2006; a summary of the information was given in a slide presentation by Vladimir Efremov. A number of instances had been documented in which the travel direction, speed or another aspect of a vessel's activity was changed in response to advice from an onboard MMO. These actions should have reduced the risks of collisions with gray whales in the vicinity at the time.

The Panel had not requested Sakhalin Energy's updated MMPP, although it was noted that the 2006 MMPP was available on the company's website and some Panel members had downloaded it. Sakhalin Energy stated that only relatively minor changes were anticipated in the updated version for 2007. For example, there will no longer be "construction corridors" along the pipeline as the pipeline construction work is largely finished.

The Panel **recommends** that as a matter of routine, IUCN and Sakhalin Energy ensure that the Panel is provided with relevant updated MMPP documents for review well in advance of each field season [WGWAP 2/006].

6.2 MMO deployment decisions in 2007

The Panel had requested (WGWAP 1/027) that Sakhalin Energy submit for review its protocol for allocating MMOs to the various vessels in the fleet. It was disappointing that this document was not provided prior to the meeting.

However, during the meeting, Sakhalin Energy provided a table of planned deployments of MMOs for the 2007 construction season in the Piltun area as well as a brief description of the rationale used for deployment decisions (WGWAP 2/INF 24). The Panel was informed that such decisions are made on a case-to-case basis, taking account of the vessel's movement status (stationary, semi-stationary or moving through the area), whether it is part of a "spread" (i.e. multiple vessels working in close proximity to one another) and availability of onboard accommodation.

The Panel had time for only a brief review of the information at the meeting. In general, the decisions appeared sensible. However, in view of the fact that whales are migrating to/from the main feeding area (Piltun) in the beginning/end of the feeding season as well as moving around during the peak season, the Panel **recommends** that MMOs are also placed on the crew change vessel operating between Nogliki and LUN-A at all times [WGWAP 2/007].

Crew change vessels will continue to be an important component of the overall vessel activity associated with Sakhalin-II operations in 2007 and therefore these remain a concern because of the collision risk that they represent. Sakhalin Energy assured the Panel that the same policies would apply in 2007 as in 2006 with regard to using vessels for crew changes and for MMO placement on such vessels. Vessels will be used only when conditions are unfavourable for helicopter flight – the preferred mode for accomplishing crew changes. The information provided to the Panel at the meeting (WGWAP 2/INF 24) implies that the crew change vessels servicing all three offshore platforms (LUN-A, PA-A and PA-B) operate during the night. Given Sakhalin Energy's commitment to a precautionary approach, the Panel **recommends** that no crew change vessel trips be conducted during the night (any instances where this policy is not followed should be documented with an explanation of the circumstances in the 2007 close-out report) [WGWAP 2/008].

6.3 Evaluation of MMO programme effectiveness

As noted above, the MMO programme is a major part of Sakhalin Energy's MMPP. The Panel recognises that for a critically endangered population such as this one, even if a collision with only one gray whale were to be avoided, this would mean that the programme has some value. However, it is important that a regular review of the programme is undertaken to assess its level of coverage and to identify if and how improvements can be made.

An important aspect of any such review is an assessment of its overall effective coverage, stratified by area and/or month if necessary. The overall effective coverage is a combination of the following factors:

- proportion of vessels/traverses with MMOs on board;
- of those vessels with MMOs on board, the proportion of (1) time steaming and (2) nautical miles steamed during periods of daylight and reasonable visibility;
- of that time/distance, the proportion in which the MMOs are operating effectively, given that the number of observers placed on each vessel (one or two) is insufficient to maintain effective watch continuously - this factor may be hard to quantify and thus need to be estimated roughly, based on the lengths of duty periods;
- an estimate of the mean detection probability (g(0)) while MMOs are on effective watch. This is a function of the number of MMOs, visibility and sea state.

Since the overall effective coverage is a product of several factors, it could be quite low, even when each factor individually is greater than, say, 0.5. However, even if the overall coverage of the MMOs might be not as high as one expects, the Panel recognises the MMO programme as one component of a suite of mitigation measures that can and should be taken to reduce the risk of whale-vessel collision. In this context it is important that any review of programme effectiveness also documents (1) the absolute number of cases where a vessel is diverted, slowed or stopped in response to MMO advice and (2) the circumstances surrounding each of those cases.

In conclusion, the Panel **recommends** that the MMO dataset, in conjunction with the company's other records of vessel operations, be analysed by Sakhalin Energy, with a view to evaluating each of the above factors that contributes to overall effective coverage [WGWAP 2/009]. These analyses do not necessarily need to yield a specific figure for the overall effective coverage, but they should provide enough information on each of the factors to enable the Panel to make a reasonable assessment of the likely range of overall effectiveness. They also may identify ways for MMO programme improvement and/or suggest better ways to undertake future evaluations.

7 SAKHALIN ENERGY WORK/CONSTRUCTION PROGRAMME

In its first report, the Panel outlined in some detail the kind of information it needs, well in advance, concerning Sakhalin Energy's construction, operations, and research and monitoring schedules over both the middle and long terms, including an indication of the times at which important decisions are taken. This is an essential component of the stated aim of the WGWAP process to enable proactive as well as reactive advice to be given. In response to that recommendation, Sakhalin Energy provided a document called "General Timeline (Work Schedule) for 2007-2011" which the Panel described in its subsequent Vladivostok recommendation (WGWAP/Vlad-01) as representing a start but still falling short of meeting the need for advance information. Associated with that recommendation, five sub-items were identified for which details or clarification were required in good time for consideration at the St. Petersburg meeting:

- actual timing and duration of noise-producing activities, including specific work planned, numbers and types of vessels expected to be involved, and predicted noise footprint of each activity;
- the company's plans for continuing to study and monitor whale behaviour beyond 2007;
- the company's plans for further seismic profiling on or near the habitat of western gray whales;
- whether the company intends to support satellite tagging of western gray whales;
- the importance of having observers and equipment on-site and functioning at least two weeks prior to the start of construction activities in 2007.

No full (i.e. covering all five sub-items) written response to the Vladivostok recommendation was available before or at the meeting, although some written information specifically related to a proposed 2008 seismic survey, was received and this is discussed under item 13.2. The verbal presentation of the work plan given in St. Petersburg was brief and limited to a description of planned construction activities in 2007. Given the nature of the information included in the presentation, it is very difficult to understand why even at this level of detail, and allowing for the practical difficulties one company participant encountered in travelling to the meeting, no written information had been provided well in advance. The Panel is extremely disappointed with this situation. Considerable time was spent both in Prangins and Vladivostok explaining what information was needed and why it was important. Indeed, it is difficult to see how the Panel can be proactive and fulfil its mandate if Sakhalin Energy does not provide such basic information in a timely manner. While the Panel was pleased to learn at the meeting that Sakhalin Energy considers the present situation unacceptable, this acknowledgement **must** be translated into action as soon as possible [WGWAP 2/010].

On a related matter, the Panel noted (based on what it had been told by Sakhalin Energy) that the various cost-sharing/co-funding arrangements between Sakhalin Energy and Exxon-Neftegas have had, and appear bound to continue having, a major negative effect on the Panel's access to data and thus its ability to provide the best possible scientific advice. As discussed elsewhere in the report under a number of items, that problem has been particularly evident at this meeting, where a number of key documents either were not delivered at all, were delivered too late for the Panel to give them proper review and deliberation, or were even withdrawn. The Panel recognises the sensitivity of the data rights issue. It acknowledges the need, for example, to respect such matters as rights to first publication – there is no intention to subvert data owners' rights. The Panel's view, which it hopes is shared by all, is that given the critical status of western gray whales, it is essential that the best possible use is made of the data (collected at considerable expense) to develop the most effective scientific advice and mitigation measures to ensure that anthropogenic activities do not impair the population's survival and recovery. Addressing this issue is critical and the Panel hopes that the initiatives suggested in other parts of this report are successful and that all interested parties will work towards this common goal in a co-operative manner.

With respect to monitoring, Sakhalin Energy explained that it makes a distinction between long-term monitoring intended to continue for the lifetime of the project and monitoring linked to exceptional activities such as the construction work during the last several years and the anticipated seismic survey in 2008. The company considers behaviour studies to fall under the latter category whereas it apparently intends to carry out benthic sampling, distribution studies (from shore and vessel), photo-identification and passive acoustics monitoring on an annual, long-term basis. As discussed further under item 8, the Panel disagrees with the company's view and stresses the need for long-term behaviour monitoring without which data on 'exceptional activities associated with the Sakhalin-II project' will be difficult if not impossible to interpret.

8 BEHAVIOUR MONITORING AND MULTIVARIATE ANALYSIS (MVA) OF EFFECTS OF PA-B CONSTRUCTION NOISE ON GRAY WHALE BEHAVIOUR AND DISTRIBUTION

In 2005 and 2006 Sakhalin Energy research and monitoring efforts and WGWAP's (or preceding panels') deliberations focused heavily on the vulnerability of gray whales to noise from platform construction and pipeline installation. This concern applies once again in 2007. The primary concern has been that the increase in noise could cause whales to abandon prime foraging habitat or could otherwise affect their behaviour. The latter could affect foraging success and, perhaps, compromise the condition of individuals and hence the population's reproduction, survival, and growth rates.

In 2005 and 2006, data were collected pertaining to gray whale behaviour and noise levels in the Piltun feeding area. In addition, in 2006 whale behaviour studies were conducted in an area near Chayvo, at the site of the offshore pipeline landfall, and an acoustic buoy was deployed approximately 2 km north of the landfall (A11) to record noise levels (but without real-time transmission). In 2006, installation of the east-west segment of the offshore pipeline was of particular concern because of potential effects on whales migrating to the Piltun feeding area. A shore-based research team monitored whales to detect potential effects. In both years, data collection was initiated after construction operations had already begun due, at least in part, to the company's desire to initiate and complete construction as early as possible and thereby minimise the potential effects of noise on arriving gray whales (a mitigation option promoted by the IISG). In addition, weather conditions and poor visibility precluded data collection during substantial portions of both construction seasons. Nonetheless, considerable behaviour and noise data were collected for assessment of potential noise effects in both 2005 and 2006.

Collection of behaviour data and subsequent analysis of the combined noise and behaviour datasets were led by Glenn Gailey. He and his colleagues used multivariate regression analysis to evaluate the 2005 data and reported preliminary results to the WGWAP at its November 2006 meeting. The results suggested that (1) whales tended to move farther offshore with increasing noise, (2) small watercraft (used for research) approaching within 0.5 km were the primary cause of whale exposure to peak transient noise levels, and (3) approach by such vessels was more likely than construction-related noise to elicit an overt behavioural response. The Panel reviewed the analysis, considered it to be excellent in many respects, and recommended several analytical adjustments. Some of those recommendations were used to modify the analysis and others were simply acknowledged as factors to be considered in future work (WGWAP 2/INF.7).

Observations in 2006 were summarized in WGWAP 2/INF.6, which suggested that compared to 2004 and 2005, whales tended to spend more time travelling than feeding. Compared to feeding whales, travelling whales move at greater speed in more linear directions with fewer dives and longer intervals between respirations. The largest number of whales was observed at the northernmost station, and in general more whales were observed at the northern stations than at the southern stations. The whales also exhibited some temporal variability in distribution. Near the dredging activities, relatively few whales were observed in late June and July, but then the number of whales in that area increased in August and September despite the fact that the nearshore dredging vessel was within 0.5 km of the shoreline during both periods. WGWAP 2/INF. 6 suggested that these differences could reflect changes in prey densities and distribution, but that suggestion was based on limited information and did not take into account construction-generated noise or other environmental factors. The Panel considered the information to be inconclusive pending more detailed evaluation.

The 2006 behaviour, distribution and noise data will also be evaluated using multivariate analysis (MVA). At the Vladivostok briefing (WGWAP/Vlad-05), the Panel had requested an outline of analysis methods. Although a document was not provided in advance, a presentation by Gailey at the St. Petersburg meeting indicated that the analytical approach would be similar to that used for the 2005 data, modified to incorporate at least some previous Panel recommendations. During the discussion, the Panel suggested additional considerations that might be incorporated into the multivariate analysis or, if that is not possible, analyses that should be conducted separately. These include analyses of (1) mother-calf pairs separately from other individuals, (2) potential deflection of animals approaching the offshore pipeline landfall during pipeline installation, and (3) disturbance effects stratified on the basis of distance from noise sources. Further discussion of the characteristics of construction noise led to the identification of several noise parameters that should be considered for incorporation into the analysis as additional predictor variables (e.g. composition of spectrum, ratio of peak to average level). Also, the number of weeks from start of construction in that season (2006) could be used as an impact variable, representing auditory fatigue or annoyance from prolonged exposure to construction noise.

Based on a discussion of the 2005 results and 2006 plans, the Panel concluded that the field efforts to collect behaviour and noise data and the multivariate analysis provided an important opportunity not only to evaluate potential noise effects, but also to better understand the natural history of gray whales in this area and their interactions with the environment. The results to date do not provide strong evidence of impact by industrial activity. However, those results remain somewhat ambiguous due to the confounding of potentially important variables such as proximity to construction, natural patterns of gray whale distribution and the possible effects of other sound sources including research vessels.

To address the ambiguity, additional analyses are required to try to further delineate the possible range of potential effects on whales of the human activities off Sakhalin, based on the collected data. Such analyses will require specifying alternative models and/or scenarios, as well as analyses to determine the power of the existing data to distinguish between alternative impact models. Plausible models that are not rejected by the data warrant further investigation. Such exercises may be quite demanding analytically, and the Panel believes that bringing in additional expertise is warranted to explore the data along the lines suggested in Annex 4, such that analyses of this kind can be performed and reviewed at an expert workshop.

Finally, the Panel was informed by Sakhalin Energy that it does not plan to continue monitoring gray whale behaviour after the 2007 construction season unless required to do so by specific circumstances (e.g., during seismic surveys). The Panel disagrees with this approach because behaviour data may provide important insights on the long-term, cumulative impacts of Sakhalin II – Phase 2, as well as those of nearby oil and gas operations by other companies. Moreover, continuity in data series often proves essential for interpreting observations in a single season or year. For these reasons, the Panel **recommends** continued, annual monitoring of gray whale behaviour off Sakhalin [WGWAP 2/011].

9 PHOTO-IDENTIFICATION

9.1 Results from the 2006 field season

The Panel welcomed the report of the Institute of Marine Biology (IBM) 2006 photo-identification season presented by Olga Tyurneva (WGWAP 2/INF 9). Work was undertaken in both the Piltun (26 days) and Offshore (8 days) feeding areas as well as in the Chayvo area (4 days). After completion of the 2006 field season, the catalogue contains 146 animals, 7 of which have a temporary identification (i.e. no reliable right side photograph was obtained). A total of 114 identified animals and six ‘temporary’ ones were seen and photographed in 2006. The number of within-season resightings of an individual ranged up to 12 with an average of about 3. Between 2002 and 2006, 63 animals have used multiple feeding areas (Piltun/Offshore/Chayvo/Kamchatka) either within or between seasons. The primary feeding area remains the Piltun area: 105 animals have been seen there, 67 of which have been seen only there.

The Panel also welcomed the report of 16 whales observed off southeastern Kamchatka in two years (2004, 2006). Those animals are included in a southeastern Kamchatka catalogue. Comparison with the IBM catalogue indicates that 6 of the 16 animals are known from the Sakhalin region and several of them have moved between the two areas either within or between seasons. Although gray whales have been recorded off southern Kamchatka since the 1970s (Yablokov and Bogoslovskaya 1984; Blokhin et al. 1985), no mother-calf pairs have been seen there. In discussion, Weller mentioned earlier efforts of the Russia-U.S. research program to compare photographs of gray whales from outside Sakhalin, including Kamchatka, to photographs from the Piltun area in the Russia-U.S. catalogue (Weller et al., 2002; 2003). He offered to supply the IBM team with copies of the relevant papers.

As in previous years, the IBM team classified animals with respect to body condition. According to its criteria, about 16% of animals were classified as having ‘poor body condition’ in 2006 (as compared to about 8.5% in 2005, 11.5% in 2004 and 18.5% in 2003). Some animals seen early in a season and classified as being in poor condition have been resighted later in the same season and reclassified. Similarly, animals classified as having poor body condition in one season have been seen in good condition in a subsequent season. The IBM and Russia-US teams have not attempted to standardize body condition classification schemes. The IBM team includes lactating females in the skinny proportion, whereas the Russia-US team excludes them.

9.2 Task Force update

A Task Force was established at WGWAP 1 to compare catalogues from the two primary research teams (Russia-US and IBM) to obtain an agreed list of known individuals, to suggest future collaborative arrangements to ensure regular updating of the comparison, and to develop consistent procedures for identification of new whales and re-sightings (see Annex 4 of WGWAP 1 Report). The agreed programme of work of the Task Force included:

(i) the exchange of catalogues (through the 2005 season);

(ii) cross-matching of the catalogues by each team;

(iii) a review of the results of the cross-matching by an independent expert who would also recommend further work;

(iv) a practical workshop to resolve outstanding issues and discuss further collaboration;

(v) a final report back to WGWAP.

To date, items (i) - (iii) have been completed, and the meeting reviewed interim progress. Each team and the independent expert (Victoria Rowntree, University of Utah) have compared the catalogues. The degree of agreement is extremely high, with only a handful of individual cases left to resolve. At the time of the meeting, the Panel was advised by Sakhalin Energy that authorisation had not yet been secured from one of the IBM sponsors to release the results of the cross-matching, and therefore it is not possible to report on the results in more detail here. However, the Panel agrees that the results to date are extremely encouraging.

The independent expert made a number of specific recommendations for further work. Given the detailed nature of those recommendations, the Panel decided that they could best be addressed by the Task Force at the proposed photo-identification workshop.

Although the Russia-US catalogue contains more entries than the IBM catalogue, this does not imply that the former is more complete with respect to the current living population. The Russia-US catalogue is based on data from 1995-2005, whereas the IBM catalogue covers the period 2002-2005. The former will therefore contain more animals that are no longer alive.

Members of the Task Force met separately during the St. Petersburg meeting and recommended that the originally specified workshop should go ahead, subject to approval by all of the data owners. Given that the matching exercise had left only a small number of doubtful cases still to resolve, the emphasis would primarily be on a review of the construction of annual sighting histories for each catalogued whale (and associated issues relevant to this), discussion of possible collaborative targeted analyses of a combined dataset, and consideration of the specific recommendations by the independent expert. The Task Force agreed on a draft agenda for the proposed workshop (Annex 5).

Attendance at the workshop should include those involved in the maintenance of each catalogue, along with the independent expert and the other Task Force members. The proposed date is early November 2007, perhaps in conjunction with WGWAP 3. The advantages of holding the workshop in Seattle were noted (it would allow access to the non-digitised photographic archives of the Russia-US team) but it was agreed that a final choice of venue would be based on other relevant work of the WGWAP including the venue of WGWAP 3.

In an overall discussion of photo-identification studies in 2007 and beyond, the Panel noted (1) the excellent agreement during the cross-catalogue comparison and (2) the work of Gailey *et al*., demonstrating short-term responses of whales to close approaches by boats. These observations indicate that the current photo-identification efforts are largely duplicative and should be reviewed with the aim of minimizing disturbance without compromising data collection. Meeting participants agreed to include this issue on the agenda of the Task Force workshop.

The Panel also notes that the high level of agreement between the Russia-US and IBM photo-identification catalogues reveals the critical importance of the nearshore Piltun feeding ground because all whales identified in the IBM catalogue—which is based on spatially broad effort—have also been identified by the Russia-US group, which limits its effort to the Piltun feeding area.

Finally, the high level of agreement between the catalogues suggests that the photo-identification efforts are effectively characterizing the population, and that the majority of individuals in the population in this region are being identified.

10 EFFORT-CORRECTED DENSITY DISTRIBUTION AND NOISE FOOTPRINT

In the report from its first meeting (WGWAP 1), the Panel requested that it be provided with "a full analysis using effort-corrected data on distribution, for each year that such data are available, overlaid onto the appropriate acoustic 'footprint' information" to allow a comparison (WGWAP 1/006). The Panel asked again for these data and associated analysis following the Vladivostok briefing (see WGWAP/Vlad-02). The Vladivostok recommendation reiterated and attempted to clarify the Panel's earlier request, asking not only for the data to be effort-corrected but also that the data from all years and all sightings platforms (shore, vessel and aerial) be included. Such a comparison of acoustic data with data on density distribution might provide an indication of adverse whale response to noise.

WGWAP 2/INF 11 did include density distribution data for all years and the data from all sightings platforms were integrated. The data were presented as whale densities at three spatial scales: (1) the entire area; (2) three blocks (north, central and south); and (3) 15 blocks. Unfortunately, the maps showing the locations and configurations of these blocks were not included in the document transmitted to the Panel prior to the St. Petersburg meeting (although Sakhalin Energy believed they had been), making the data difficult to interpret. A full version of the document was provided to the Panel during the second day of WGWAP 2. The effort-corrected data indicate an increase in whale density in the southern part of the study area, consistent with the Gailey *et al.* report (WGWAP 2/INF 6), but the significantly higher numbers of whales reported by Gailey *et al.* for their northernmost station are not reflected in WGWAP 2/INF 11. Although results from the Gailey *et al*. behaviour study and those from the vehicle-based sampling might vary somewhat because of differences in method, the apparent inconsistency should be resolved as it raises questions regarding the reliability of the existing density distribution data.

Noise footprint maps were included in the full version of WGWAP 2/INF 11. However, they were not plots of the actual acoustic data as requested in the Vladivostok recommendation, but instead were modeled noise levels updated with the actual schedule of activities executed during the 2006 season. There was some confusion within Sakhalin Energy about the exact format of presentation the Panel desired and some earnest concern about the best way to display the noise and density distribution data together (e.g., ideal temporal scale). However, that uncertainty was not conveyed to the Panel and this led to some frustration about the inability to compare whale density distribution with noise footprints. There was **general agreement** that a more efficient means of conveying Panel requests and Sakhalin Energy's questions about those requests needs to be implemented [WGWAP 2/012].

Judith Muir presented the methodological details on how the density distribution data were processed and corrected for effort and platform type, thus providing whale density values for each week of the season at the various spatial scales, as the Panel had requested. She also presented the results of a calibration study undertaken by the ship-based survey teams and a team from the Centre for Research into Ecological and Environmental Modelling (CREEM) (St. Andrews, UK) that was designed to investigate how sighting probability is affected by distance from shore. The Panel **requests** that it be provided with the detailed methods and results of the calibration experiment.

An approximately 4-week gap in the density distribution data was discussed briefly, and this gap was discovered to have been primarily the result of onshore fog that besieged the observation areas from early to late August 2006.

Muir reported that the density distribution data can be calculated down to the scale of 1 km^2, and that different spatial resolutions can be plotted. Positive bias in density estimates occurs when the area over which the density is calculated is less than 0.5 km^2, and the error in density estimates increases substantially as the area decreases. A small subset of the Panel met separately with Muir and several Sakhalin Energy scientists to consider this issue and, more generally, how best to compare whale density distributions with noise footprints. They also considered: (1) the most appropriate temporal and spatial scale for analysis; (2) how best to 'remove' noisy activities that were not a result of Sakhalin Energy construction, e.g., a vessel passing a particular acoustic receiver; and (3) the best way to present the data to facilitate comparisons. Many of these same issues will be considered by the Task Force on Seismic Surveys (Annex 6). It was agreed that Muir and her colleagues would undertake further analyses in an effort to find an informative, standardised method to integrate and visually portray noise and distribution data. To begin investigating the pros and cons of different ways to compare whale densities and noise footprints, the Panel **recommends** that, for the period of 14-28 July 2006, the densities of whales and noise levels for a small area (blocks 7-9 from WGWAP 2/INF 11) be calculated and plotted together. Whale density should be calculated for grid cells of 10 km^2 (5 km parallel to shore x 2 km perpendicular) with a 1-day average and reported in whales/km^2. The noise should be calculated with hourly averages (with local vessel traffic removed), and the two datasets overlain on plots of standard line type with time/date on the x-axis and two y-axes, one for whale density and one for noise amplitude [WGWAP 2/013].

11 ACOUSTIC FOOTPRINT AND 2006 NOISE MONITORING

In considering the noise resulting from Sakhalin Energy's construction activities in 2006, there is little doubt that the efforts of Sakhalin Energy and the Panel (specifically its earlier incarnations – ISRP and IISG) have reduced the noise footprint. That said, the data provided for WGWAP 2 indicate that the exposure criteria agreed to by the company were probably violated on some occasions. Confirmation of this issue, however, must be delayed until the next meeting due to the late delivery of the comprehensive data sources. With the importance given to the noise issue for this loudest of seasons (2006), it is disappointing that critical documents were not delivered to the Panel until the St. Petersburg meeting had already convened. Indeed, the noise analyses requested in the WGWAP 1 report and the Vladivostok recommendations (see WGWAP 2/INF 1) were only provided upon direct request by a Panel member. The relevant document (WGWAP 2/INF 14a, also known as the 'JASCO report') should be considered at the next Panel meeting as it could not be evaluated for WGWAP 2. The document that was made available prior to the St. Petersburg meeting (WGWAP 2/INF 14) is the report from POI on all of their acoustic work from the summer of 2006, only a fraction of which was relevant to monitoring the noise of concern with respect to western gray whales.

WGWAP 2/INF 14 did provide some data on the levels of noise recorded at the edge of the Piltun near-shore feeding area. Additionally, the data from all acoustic recorders deployed by POI in 2006 were provided to the Panel after the St. Petersburg meeting had convened. In the short time available, the Panel was able to ascertain that noise levels well within the feeding area (i.e., at the 10 m bathymetric contour almost directly offshore of the Piltun lighthouse) hovered between 115-120 dB for as many as 14 days in a row. Based on this superficial review, it appears that the exposure criteria described in Sakhalin Energy's 2006 MMPP were exceeded. Specifically, the levels measured at the 10 m bathymetric contour indicate that >10% of the feeding area was ensonified at >120 dB for > 7 days. Racca agreed to investigate more thoroughly the sound levels and the proportions of the feeding area that were ensonified, and to provide an accounting so that this matter can be considered at the next WGWAP meeting, by which time the Panel will have had time to review the JASCO report (WGWAP 2/INF 14a). The period between 14-28 July mentioned under Item 10 (above) is of particular interest and concern due to the lack of data from the "Piltun" recording station. Apparently no data were recorded at all (i.e., either radio-linked or archived) for ~ 9-15 July, and there are no archived data for 16-30 July. Noise exposure in this near-shore area off the Piltun lighthouse is of particular concern because of the consistent presence there of mother-calf pairs. Racca indicated that JASCO was planning a complete analysis of its own 2006 acoustic data (which would not necessarily, however, include all of the POI data). The panel agreed that this was an important exercise as it could, for example, help to explain any observed effects on whale behaviour or distribution that might be revealed by multivariate (and other) analyses.

A set of transmission loss (TL) experiments was conducted by POI in and around the Piltun feeding area during the 2006 season. TL experiments are conducted to test the loss of acoustic energy through a particular environment, and the loss depends on the frequency of the sound, bathymetry, depth and other physical factors. Briefly, the experiments consist of placing an acoustic source in the water or on the beach, signals are broadcast at known source levels, and a receiver some distance away receives the transmitted signal. From these experiments one can measure precisely how much energy is lost at a given frequency, and these data can then be used to estimate or model the TL of another signal or set of signals. The Panel was informed that these experiments have been part of Sakhalin Energy's acoustic monitoring program.

The Panel is concerned about these experiments for several reasons. Firstly, the Panel was not informed that they were part of the company's work plan, and this compromised the Panel's ability to assess the potential effects of noise on the whales and/or to advise on monitoring and mitigation measures. Secondly, although these signals do not typically have high source levels, the figures included in INF. 14 indicate that some of the experiments were conducted in and around the feeding area. So, regardless of the relatively low source levels, the signals certainly would have been audible to whales nearby. Finally, based on the characteristics of the signals (e.g. frequency band, frequency modulation) and the response of other baleen whales to similar signals (Nowacek *et al.* 2004), these signals, even at low received levels, could elicit significant behavioural responses from individual whales. The Panel **requests** that, in the future, information regarding the conduct of such experiments be included in the detailed work plan submitted for the Panel's consideration and evaluation prior to the field season (see recommendation under Item 7) [WGWAP 2/014]. Moreover, the Panel **recommends** that such work be conducted only in good-weather periods (and in daytime) to ensure that MMOs and the shore-based teams are able to monitor efficiently for the presence and behaviour of gray whales [WGWAP 2/015]. Finally, the Panel eventually would like to see practical application of the results from the TL experiments, e.g. in estimations of seismic airgun pulse levels in the feeding area.

12 EXPOSURE CRITERIA AND PROPOSED 2008 SEISMIC SURVEY

12.1 Exposure Criteria for Continuous Noise

Noise Exposure Criteria

The Panel presented its criteria for acceptable levels of exposure of whales to continuous noise; the criteria had been developed by Panel members Nowacek and Vedenev in consultation with external experts Sue Moore and Ann Bowles (WGWAP 2/INF 15).

In discussion, Racca agreed that the dosage-based structure, i.e. criteria based on both time and level, was the generally accepted method. However, he indicated that this agreement did not imply that Sakhalin Energy accepted the Panel's criteria or that the company considered those criteria suitable for triggering action under practical conditions (e.g. given telemetry limitations at low noise levels). Racca disagreed with the Panel's proposal to use the 5 dB exchange (i.e. Q = 5), citing the type of noise associated with Sakhalin Energy activities, e.g., intermittency, and suggested instead the use of Q = 3. He correctly stated that Q=5 is more permissive at higher noise levels. However, the Panel is less concerned about these levels because they are predicted to occur only infrequently in the present context (except in the case of seismic exploration, see section 12.2). Both Q = 5 and Q = 3 have pros and cons as well as literature supporting their use. Optimal protection for the whales would actually come from varying the Q value according to noise levels (dB), with the curve of permitted levels and time being nonlinear. At low noise levels (e.g. 125-130 dB) a higher Q value is more conservative, while at higher levels (e.g. 140-150 dB) a lower Q limits the time of exposure. Such high levels of continuous noise are not typically generated by the types of construction activities undertaken by Sakhalin Energy. Which Q to use may be debatable, but the use of nonlinear criteria is not practical for implementation in the field with real-time monitoring. For the current situation, namely providing protection to western gray whales on the Sakhalin Shelf in relation to Sakhalin Energy's construction activities, the Panel recommends a relatively high Q value due to the expected range of continuous noise levels produced by those activities. Therefore, the Panel **recommends** that Sakhalin Energy adopts the criteria as presented in WGWAP 2/INF 15 [WGWAP 2/016].

12.2 4-D Seismic Surveys Proposed for 2008

Sakhalin Energy informed the Panel of seismic survey work planned for the Astokh portion of the Piltun- Astokhskoye field (where both the Molikpaq and PA-B platforms are located) in 2008, including the rationale and some operational details, as well as preliminary noise modelling and mitigation measures (WGWAP 2/INF 17). The company deems the survey necessary to characterize oil and gas deposits and how these have changed since extraction began in 1999. Survey results provide a basis for more efficient drilling, which lowers the risk of certain environmental effects by reducing the number of wells drilled. The risks associated with drilling include noise, collision risk due to the movement and positioning of vessels associated with the drilling, and the possibility that drilling muds (which are normally reinjected) could be released accidentally to the water column. Also, the more drilling there is, the greater the risk of a blow-out.

The primary concern with respect to the proposed seismic survey is ensonification of the gray whale feeding area by sound energy from the airgun pulses. Sakhalin Energy indicated that additional seismic surveys will be necessary about every three years for the lifetime of the field. As production from the PA-B platform will not commence until late 2008 or early 2009, the company does not anticipate a repeat seismic survey of that area until 2011 or 2012.

Sakhalin Energy is requesting the Panel's views regarding the survey to assist in preparation of the environmental impact assessment (EIA). A draft of the EIA will be completed between May 2007 and the end of August 2007, it will undergo technical review, and the EIA is expected to be final by October 2007. A Panel task force will be created to provide timely input into the process (Annex 6), and the discussion of monitoring and mitigation measures will be deferred to the task force.

The possibility of conducting on-ice seismic surveys when the whales are absent was discussed. Sakhalin Energy and its consultants considered such surveys unlikely for safety reasons and because they would not give results comparable to previous surveys. During the discussion, a suggestion was made to explore the possibility of conducting both an on-ice survey (if safe and feasible) and an open-water survey in 2008 to calibrate the two and provide a new reference for future surveys and eliminate the need for further open-water surveys. The Panel **recommends** that the feasibility of this comparative approach be evaluated (see Annex 6) [WGWAP 2/017].

A question was raised as to whether the occurrence of an earthquake might alter the hydrocarbon reservoir enough to necessitate another seismic survey. Sakhalin Energy considers the likelihood that an earthquake would affect flow behaviour in the reservoir to be extremely small. Therefore the company considers it very unlikely (but not impossible) that earthquake damage would lead to a proposal to acquire new seismic data.

With regard to risks to whales from the proposed 2008 survey, Sakhalin Energy has already explored several means of estimating and, where possible, minimising the impact on whales. Those measures include:

(1) minimising the area to be surveyed (the Panel notes, however, the importance of avoiding a scenario in which the area is not adequately covered and additional seismic work becomes necessary);

(2) aligning transects perpendicular to the shore so that most of the energy is directed away from the feeding area;

(3) timing the survey to minimise the potential impact on the whales – timing is constrained by the fact that ice-free, calm conditions are needed for an open-water survey.

Sakhalin Energy requested a recommendation from the Panel on the timing of the survey. The Panel in turn requested additional information on specifications and requirements for the open-water survey. Because whales remain in the area later than operations are typically safe (i.e., mid October), June may be the best time for the survey, assuming conditions are safe and mitigation/monitoring operations are fully implemented prior to the initiation of the survey. The Panel suggested several additional issues and mitigation measures Sakhalin Energy should consider in planning this survey, some of which were discussed while others were tabled for further consideration by the task force.

JASCO has conducted preliminary modelling of the noise levels that would be introduced into the feeding area. Based on this work, Sakhalin Energy estimated that about 6% of the feeding area would be ensonified at levels >163 dB re 1 μPa rms for 3-6 days, although more refined modelling presented by JASCO/LGL indicated that this 6% of the feeding area would be exposed only to 160 dB. Although the company is seeking to keep levels below 160 dB, the Panel cautioned that this somewhat arbitrary limit may not be a reliable indicator of when significant effects would be expected to occur. The whales may react differently or unpredictably depending on their activity. The reactions of feeding bowhead whales to impulsive noise indicate that they begin to interrupt feeding and swim away at received levels of 142 dB, and show total avoidance at 152-178 dB (Ljungblad et al. 1988). For these reasons, the Panel suggested reducing the allowable exposure to a more conservative level. The task force will consider the appropriate thresholds in its deliberations.

Several manuscripts *in-press* at the journal *Environmental Monitoring and Assessment* as well as two IWC Scientific Committee documents (Weller *et al*. 2006a, 2006b) and a final Sakhalin Energy/Exxon-Neftegas report of 1997 research results (Würsig *et al*., 1999) describe western gray whale responses to seismic surveys off Piltun in 1997 and 2001. Sakhalin Energy mentioned that the relevant manuscripts submitted to *Environmental Monitoring and Assessment* had been formally accepted for publication. The company agreed to check on the expected publication date and, if necessary, to investigate the availability of pre-publication proofs of those papers. Sakhalin Energy also indicated its willingness to provide additional relevant data that may not be publicly available.

Sakhalin Energy was not aware of other seismic surveys planned for 2008. However, the press has reported that Rosneft may conduct a seismic survey in 2008 in Lebedinskoe, in the northern part of the Piltun feeding ground and inshore of the Odoptu Licence Area. Although originally planned for 2007, this survey apparently has been delayed due to administrative processes. Any and all agencies (e.g., Sakhalin State Government) that might have information on seismic surveys planned for 2008 on the Sakhalin shelf should be approached by both Sakhalin Energy and IUCN to ensure that management decisions to protect western gray whales are fully informed [WGWAP 2/018].

13 SATELLITE TAGGING

Weller presented a progress report on a review (co-funded by the U.S. Marine Mammal Commission [MMC] and IUCN) of the benefits and risks (physiological and behavioural) associated with tagging large whales, with specific reference to western gray whales (WGWAP 2/INF 19). Two reports will be prepared to meet the respective needs of WGWAP (specific to western gray whales) and MMC (specific to large whales in general). These reports will include draft recommendations for consideration, adoption, revision, or rejection by the WGWAP and MMC. To date, progress has been made on numerous fronts including (1) review of materials from the 2005 Marine Mammal Commission workshop on large whale tagging, (2) review of recommendations from the MMC to the U.S. National Marine Fisheries Service on an assortment of scientific permit applications to attach tags to large whales, (3) review of two reports on the effects of tagging and assessment of attachment wounds incurred by North Atlantic right whales, (4) relevant literature (published, gray, and unpublished) that is presently being collected and synthesized, and (5) collaboration and communication with the MMC and WGWAP. A final report should be available by September 2007.

WGWAP 2/INF 20 presented results from a satellite tagging study on eastern gray whales off Chukotka. Thirteen tags were deployed of which four failed completely and nine provided locations for an average of 39 days (range = 12-81 days). This study, funded by Sakhalin Energy and Exxon-Neftegas Limited, was designed in part as a feasibility study to examine the potential effectiveness of tagging western gray whales on their Sakhalin feeding grounds. Unfortunately, no effort was made to evaluate the behavioural or physiological effects of tagging on individual whales.

The authors of WGWAP 2/INF 20 suggest that attachment problems were due to whale contact with the bottom during feeding, as would be true for whales tagged off Sakhalin. To address this problem, they recommend that smaller tags be designed and further tested on eastern gray whales on their feeding grounds. They also recommend development of a new or modified tag delivery system to allow longer-range deployment (the average approach time for tag deployment in this study was 45 min). Finally, they conclude that more than 20 tags would need to be deployed to obtain useful results on western gray whales.

The Panel agrees with the authors of WGWAP 2/INF.2 that their system is not adequate. Any new tag and delivery system should be evaluated first on eastern gray whales in a feeding area. The question of how many animals should be tagged will be a function of the efficacy of tagging efforts and the specific questions to be addressed. It is therefore premature to determine the most appropriate sample size for a tagging experiment. The Panel reiterates its conclusion at the previous meeting that, in principle, telemetry work on western gray whales is desirable and should be carried out once the various stated conditions have been met.

When asked if it planned to support further tagging studies of eastern or western gray whales, Sakhalin Energy indicated that it had no such plans.

14 OIL SPILL PREVENTION AND RESPONSE

14.1 Follow-up to Hokkaido Seabird Oiling Event(s)

The Panel was given verbal reports regarding an oil spill near Hokkaido. Naoko Funahashi reported that more than 5,000 oiled, dead birds were found in late 2005 and the first half of 2006 along Hokkaido's northern shoreline. Additional oiled birds were found in the same area in the winter of 2006/07. The Japanese Coast Guard reported that the oil from the birds had been identified as heavy fuel oil. A Coast Guard aerial survey failed to detect the source of the oil, e.g. oil slicks on the water surface or along the shoreline of northern Hokkaido. Japanese laboratories (Hokkaido Institute of Environmental Sciences and National Institute for Environmental Sciences) and a laboratory in California (California Department of Fish and Game, Office of Spill Prevention and Response Petroleum Chemistry Laboratory) independently identified the oil as 'bunker C', which is synonymous with heavy fuel oil used by most cargo ships. A Japanese researcher (Capt. Shin Ohnuki, Japan Association of Marine Safety and Vice-president of Japan Environmental Disaster Information Center) suggested that the oil could have come from a sunken vessel in the Okhotsk Sea (N. Funahashi, pers. comm.).

Julian Roberts reported on IUCN's efforts to collect additional information on the spill from the government of Japan (WGWAP 2/INF.21). Sakhalin Watch noted that the European Space Agency has archival satellite photographs that could be obtained to look for possible oil spills during the time of the Hokkaido event. WWF-Russia offered to translate its report on oil spills in this region from Russian to English and make it available to the Panel. The Panel notes that the source of the oil would be difficult to determine because the area where the birds were exposed could have been well away from where they were found.

There is no evidence that this spill has affected western gray whales or their migratory corridors. Nonetheless, the Panel has been particularly interested in pursuing this event because resulting information could shed light on the source of the spill and help point to a means for prevention and investigation of similar events in the future. The Panel also has been interested because the actions taken subsequent to the discovery of the oiled birds in this instance may be indicative of response capabilities with regard to future spills of undetermined origin and significance in the region. Intergovernmental cooperation between Russia and Japan will be an important aspect of effective response to such spills. In the present instance, given the passage of time and the limitations of the available evidence, it is unlikely that much can be gained from further pursuit of the subject. Nevertheless, the Panel **recommends** that IUCN:

(1) determine whether oil on dead birds in 2005 and the winter of 2006/07 can be fingerprinted to establish if it came from the same source;

(2) consider whether archived satellite photographs are likely to provide additional evidence of the source and movement of spilled oil; and

(3) consider preparing a summary report on the spill, after consultation with authorities at the UNESCO World Heritage Site on the Shiretoko Peninsula [WGWAP 2/019].

14.2 Terms of Reference for an Oil Spill Task Force

The status of Sakhalin Energy's oil spill prevention, preparedness, and response planning was initially reviewed in the 2005 report of the Independent Scientific Review Panel. Progress since then has not been evaluated by the Panel, but an evaluation is now necessary because first oil is expected from the PA-B platform and through the offshore pipeline system in 2008.

To review the current state of Sakhalin Energy's oil spill prevention and response planning and capabilities, the WGWAP will form a task force with the following terms of reference.

(1) The task force will consist of several panelists (VanBlaricom, Dicks, Tsidulko, Ragen), designated Sakhalin Energy representatives, selected experts contracted by international Lenders, and an independent consultant under contract to IUCN.

(2) The independent consultant to IUCN will complete a review entitled "Oil spill planning and response evaluation criteria" that will be used to guide the task force's evaluation. Preparation of this document is underway.

(3) Sakhalin Energy will provide the documents needed for the review to IUCN by 1 June 2007. The documents will be distributed to the Task Force. The required documentation (listed in part in WGWAP 2/INF 22; additional documents may be identified and requested by Task Force members) consists of the following:

- Corporate Oil Spill Response Plan,
- Lunskoye Oil Spill Response Plan,
- Piltun – Astokh Oil Spill Response Plan,
- Prigorodnoye Offshore Oil Spill Response Plan,
- A report on Sakhalin II oil characteristics,
- An analysis of the fates of spilled oil, including weathering, emulsification, and dispersibility (SINTEF report),
- A report or reports providing environmental sensitivity maps (e.g., Piltun feeding area and lagoon) pertaining to western gray whales and associated biota or habitats (notably benthic communities), and
- A report describing ice conditions and ice movement.

Task Force members will review the documents independently and then meet for additional review and discussion in October 2007 in Washington, D.C. The Task Force will complete and distribute a report to WGWAP prior to its November 2007 meeting (WGWAP 3).

In St. Petersburg, there was considerable discussion regarding the possibility that the task force would discover shortcomings in the company's strategy subsequent to formal approval of the plans by regional and national Russian authorities. If large adjustments are required, the company may need to change and resubmit its modified plans for additional review and approval, potentially causing delay in preparations for first oil. Alternatively, changes to the overall plan may not be required if any recommended adjustments can be accomplished simply through changes in implementation and/or operational strategy. While the Panel recognizes such complications, it views its role as limited to an objective review of the plans and the company's prevention and response capabilities as they may affect western gray whales and related biodiversity.

15 WHALE MONITORING BY NON-SAKHALIN ENERGY GROUPS

Three independent groups provided information on planned activities in 2007 related to whale and noise monitoring, as follows:

1. Spiridonov gave a presentation on behalf of the World Wildlife Fund – Russia (WWF) (WGWAP 2/INF 23). Most of the presentation focused on a proposal for establishment of a nature reserve ("Sakhalinsky-morsky") incorporating the Piltun feeding area and Piltun Lagoon. Establishment and function of the proposed reserve will be influenced by an interaction of proposed reserve boundaries, relevant Russian laws, and existing leases and use licenses for areas within the proposed reserve. Successful establishment of a reserve likely would have important implications for shipping, construction, hunting activities on the water, and wildlife observation activities within its boundaries. The process for evaluating and implementing the proposed reserve includes flexibility in specifying target species and protocols for protection. Submission of a formal proposal for reserve establishment to the Russian Ministry of Natural Resources is anticipated in 2007.

Spiridonov also described likely efforts by WWF personnel to monitor western gray whales in the 2007 field season. A locally based group of individuals will be organized and deployed to the shoreline area north of the Piltun Lagoon entrance channel to observe whale distribution and behaviour. WWF studies also will include continued evaluation of satellite photographs for evidence and behaviour of oil spills.

2. Tsidulko summarized briefly the plans of International Fund for Animal Welfare (IFAW) to monitor western gray whales and industrial noise during the 2007 field season. Behaviour observations will commence in late May based at the Piltun lighthouse (south of the Piltun Lagoon entrance), providing a spatial complement to similar observational work planned by WWF north of the Lagoon entrance. Scans will be conducted by IFAW staff according to the same protocols as those used by the Russia-US Research Team in previous field seasons. IFAW also is planning to carry out acoustic monitoring in the vicinity of the PA-B offshore drilling platform, and IFAW will again provide a research grant in support of photo-identification studies by the Russia-US Research Team.

3. Weller confirmed that the Russia-US Research Team had conducted photo-identification studies and shore counts in 2006, as it has done since 1995, and he described plans for continued photo-identification work by the team in the 2007 field season. Detailed results from 2006 will be presented to the forthcoming IWC Scientific Committee meeting in Alaska in May 2007.

In response to questions from the Panel, Sakhalin Energy staff indicated that Vladimir Vertyankin, of SevVostRybvod, has been photographing western gray whales near Cape Lopatka on the southern end of the Kamchatka Peninsula for a number of years. Yablokov noted the importance of having similar work carried out on the Magadan coast where some western gray whales may be present in summer.

The present WWF proposal for a nature reserve is not sufficiently developed for further scientific or technical comment by the Panel. However, the Panel **encourages** the continued development of any proposal that may contribute to improved conservation of the western gray whale population. The Panel supports efforts that include protection of Piltun Lagoon from industrial development and other types of anthropogenic disturbance [WGWAP 2/021]. In previous reports the Panel and its predecessors (ISRP, IISG) have stated strong support for protection of both Piltun Lagoon and the nearby gray whale feeding area. In that regard, the Panel continues to have concern over any plans for a pipeline to be constructed across the northern part of the lagoon with potential for damaging/degrading the lagoon and surrounding land.

The Panel welcomes planned, well-designed studies of western gray whales and also welcomes the opportunity to comment on both the research plans and the results. The results from the Russia-US research team have, for example, proved of tremendous benefit to the Panel's work. However, to be able to comment meaningfully, the Panel **requires** written documentation well in advance of meetings to ensure adequate time for review [WGWAP 2/022]. It also **emphasises** the need for all research groups to minimise disturbance of whales while conducting fieldwork, and to provide information about field activities that may be relevant to the interpretation of acoustic data collected in the study area [WGWAP 2/023]. The Panel's concerns regarding coordination of research protocols for groups involved in photo-identification studies are presented under item 9 of this report.

16 LONG-TERM ARCHIVING OF SCIENTIFIC DATA

In response to a brief discussion during the meeting, the Panel **encourages** Sakhalin Energy and all other groups involved in work on western gray whales to develop and pursue plans for centralized, long-term archiving of data and samples (without prejudice to the rights of data owners) [WGWAP 2/024]. This should be standard practice to ensure that the greatest possible scientific/conservation benefit can be gained from field observations and collections made at considerable effort and expense. The Panel noted that there are many examples demonstrating that the value of such material tends to increase over time, but only when it is accompanied by clear descriptions of methodology, scope etc. to facilitate interpretation by the end users.

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SUMMARY OF RECOMMENDATIONS FROM THE 2ND MEETING OF THE WGWAP 2007

Reference	Cross-Reference	WGWAP Recommendation & Requests	Responsible Party	Target Completion Date	SEIC Response
ITEM 4: BENTHIC MONITORING					
WGWAP 2/001	WGWAP 2/3 Section 4	The Panel **recommends** that Sakhalin Energy's scientists take into account the Panel's recommendations from the WGWAP 1 (November 2006) in the planning and execution of 2007 benthic fieldwork (see WGWAP 2/INF 1). The Panel **attaches particularly high priority** to the recommended incorporation of benthic ecosystem data into a GIS-type database in order to facilitate two types of investigation: (1) a more thorough understanding and appreciation of spatial and temporal patterns in the benthos, and (2) evaluation of quantitative relationships among benthic data and data from other aspects of the study of western gray whales in the area. For example, benthic ecosystem data should be included among the variables incorporated in analyses of noise effects (see Annex 4).			
WGWAP 2/002	WGWAP 2/3 Section 4	Recognizing the practical difficulties that occurred last year, the Panel **recommends** that timing of sampling of benthos be standardized within month among years, to the maximum extent practicable.			
WGWAP 2/003	WGWAP 2/3 Section 4	The Panel **recommend**s that Sakhalin Energy's scientists attempt field collections of fecal matter from foraging whales, to the extent practical and with minimal disturbance of foraging whales, to search for hard-part remains of sand lance and to assess the frequency and significance of sand lance in the whales' diet.			

Reference	Cross-Reference	WGWAP Recommendation & Requests	Responsible Party	Target Completion Date	SEIC Response
ITEM 5: BEACH SURVEYS					
WGWAP 2/004	WGWAP 2/3 Section 5	The Panel **recommends** that surveys for stranded gray whale carcasses be conducted according to the following specifications: • Flight (ground) speed: 80-100 knots (148-185 km/hr). • Flight altitude: 1500 ft (450m). Although this is above the optimal height, it should preclude serious disturbance to near-shore living whales as well as nesting birds and hauled-out pinnipeds. The smallest gray whales expected during summer and autumn in this region would be 6-7m long and they should be at least moderately detectable from 450m. • Flight path: Where the terrain permits, a flight path along the land-side (ca. ¼ mi [0.4km] from the beach) is preferred. However, it is essential that the beach be kept in sight and therefore in areas such as the Piltun feeding ground, where dunes, hills and cliffs might obscure a high-and-dry carcass, it may be necessary to fly directly along, or just offshore from, the waterline. In this circumstance, it will be especially important to avoid sharp turns and rapid changes in power that cause more sound to enter the water. • Flight coverage and regularity: This should follow the guidance given in the reports of the IISG and WGWAP-I (e.g. expand coverage to include areas north of Piltun Lagoon, entire east coast to be covered at least twice per season, Piltun feeding area to be covered biweekly from July-October).			
WGWAP 2/005	WGWAP 2/3 Section 5	The Panel **recommends** that Sakhalin Energy develops, in consultation with appropriate experts, a list of data and samples to be collected from gray whale carcasses, and an			

Reference	Cross-Reference	WGWAP Recommendation & Requests	Responsible Party	Target Completion Date	SEIC Response
		associated protocol for such collection. The protocol will need to incorporate, *inter alia*, consideration for the state of the carcass and the level of experience of available personnel.			
ITEM 6: MARINE MAMMAL OBSERVER (MMO) PROGRAMME)					
WGWAP 2/006	WGWAP 2/3 Section 6.1	The Panel **recommends** that as a matter of routine, IUCN and Sakhalin Energy ensure that the Panel is provided with relevant updated MMPP documents for review well in advance of each field season.			
WGWAP 2/007	WGWAP 2/3 Section 6.2	The Panel **recommends** that MMOs are also placed on the crew change vessel operating between Nogliki and LUN-A at all times.			
WGWAP 2/008	WGWAP 2/3 Section 6.2	The Panel **recommends** that no crew change vessel trips are conducted during the night (any instances where this policy is not followed should be documented with an explanation of the circumstances in the 2007 close-out report).			
WGWAP 2/009	WGWAP 2/3 Section 6.3	The Panel **recommends** that the MMO dataset, in conjunction with the company's other records of vessel operations, be analysed by Sakhalin Energy, with a view to evaluating each of the factors (specified in the report text) that contributes to overall effective coverage.			
ITEM 7: SAKHALIN ENERGY WORK/CONSTRUCTION PROGRAMME					
WGWAP 2/010	WGWAP 2/3 Section 7	While the Panel was pleased to learn at the meeting that Sakhalin Energy considers the present situation (with regard to provision of advance information on decisions and plans) unacceptable, this acknowledgement **must** be translated into action as soon as possible.			
ITEM 8: BEHAVIOUR MONITORING AND MULTIVARIATE ANALYSIS (MVA)					

Reference	Cross-Reference	WGWAP Recommendation & Requests	Responsible Party	Target Completion Date	SEIC Response
WGWAP 2/011	WGWAP 2/3 Section 8	Unless whale behaviour is monitored over the long term, it will be impossible to characterize and assess cumulative effects on the whale population, including those arising from the activities of other oil and gas companies operating in the region. Continuity in data series often proves essential for interpreting observations in a single season or year. For these reasons, the Panel **recommends** continued, annual monitoring of gray whale behaviour off Sakhalin.			
ITEM 10: EFFORT-CORRECTED DENSITY DISTRIBUTION AND NOISE FOOTPRINT					
WGWAP 2/012	WGWAP 2/3 Section 10	There was **general agreement** that a more efficient means of conveying Panel requests and Sakhalin Energy's questions about those requests needs to be implemented.			
WGWAP 2/013	WGWAP 2/3 Section 10	The Panel **recommends** that, for the period of 14-28 July 2006, the densities of whales and noise levels for a small area (blocks 7-9 from WGWAP 2/INF 11) be calculated and plotted together. Whale density should be calculated for grid cells of 10 km^2 (5 km parallel to shore x 2 km perpendicular) with a 1-day average and reported in whales/km^2. The noise should be calculated with hourly averages, and the two datasets overlain on plots of standard line type with time/date on the x-axis and two y-axes, one for whale density and one for noise amplitude.			
ITEM 11: ACOUSTIC FOOTPRINT AND 2006 NOISE MONITORING					
WGWAP 2/014	WGWAP 2/3 Section 11	The Panel **requests** that, in the future, information regarding the conduct of transmission loss (TL) experiments be included in the detailed work plan (see recommendation under Item 7).			
WGWAP 2/015	WGWAP 2/3 Section 11	The Panel **recommends** that transmission loss experiments be conducted only in good-weather periods (and in daytime) to ensure that MMOs and the shore-based behaviour teams are able to monitor efficiently for the			

Reference	Cross-Reference	WGWAP Recommendation & Requests	Responsible Party	Target Completion Date	SEIC Response
		presence of gray whales.			
ITEM 12: EXPOSURE CRITERIA AND PROPOSED 2008 SEISMIC SURVEY					
WGWAP 2/016	WGWAP 2/3 Section 12.1	The Panel **recommends** that Sakhalin Energy adopts the criteria as presented in WGWAP 2/INF 15.			
WGWAP 2/017	WGWAP 2/3 Section 12.2	The possibility of conducting on-ice seismic surveys when the whales are absent was discussed. The Panel **recommends** that the feasibility of this comparative approach be evaluated (see Annex 6).			
WGWAP 2/018	WGWAP 2/3 Section 12.2	Any and all agencies (e.g., Sakhalin State Government) that might have information on seismic surveys planned for 2008 on the Sakhalin shelf **should be approached** by both Sakhalin Energy and IUCN to ensure that management decisions to protect western gray whales are fully informed.			
ITEM 14: OIL SPILL PREVENTION AND RESPONSE					
WGWAP 2/019	WGWAP 2/3 Section 14.1	The Panel **recommends** that IUCN: • determine whether oil on dead birds in 2005 and the winter of 2006/07 can be fingerprinted to establish if it came from the same source; • consider whether archived satellite photographs are likely to provide additional evidence of the source and movement of spilled oil; and • consider preparing a summary report on the Hokkaido spill, after consultation with authorities at the UNESCO World Heritage Site on the Shiretoko Peninsula.			

Reference	Cross-Reference	WGWAP Recommendation & Requests	Responsible Party	Target Completion Date	SEIC Response
WGWAP 2/020	WGWAP 2/3 Section 14.2	The Panel **adopts** and **recommends implementation** of the Terms of Reference for a Task Force as prescribed under Item 14.2 of the main body of this report.			
ITEM 15: WHALE MONITORING BY NON-SAKHALIN ENERGY GROUPS					
WGWAP 2/021	WGWAP 2/3 Section 15	The Panel **encourages** the continued development of any proposal that may contribute to improved conservation of the western gray whale population. The Panel supports efforts that include protection of Piltun Lagoon from industrial development and other types of anthropogenic disturbance.			
WGWAP 2/022	WGWAP 2/3 Section 15	In cases of planned studies of western gray whales by non-Sakhalin Energy groups that wish to have comments from the Panel, the Panel **requires** written documentation well in advance of meetings to ensure adequate time for review.			
WGWAP 2/023	WGWAP 2/3 Section 15	The Panel **emphasises** the need for all research groups to minimise disturbance of whales while conducting fieldwork, and to provide information about field activities that may be relevant to the interpretation of acoustic data collected in the study area.			
ITEM 16: LONG-TERM ARCHIVING OF SCIENTIFIC DATA					
WGWAP 2/024	WGWAP 2/3 Section 16	The Panel **encourages** Sakhalin Energy and all other groups involved in work on western gray whales to develop and pursue plans for centralized, long-term archiving of data and samples.			

ANNEX 1 - LIST OF PARTICIPANTS

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ANNEX 2 - FINAL AGENDA

Adopted 15 April 2007

15 April

(1)	**09:00 – 09:15**	**Opening** – Introductions and logistics – Adoption of agenda – Discussion of report drafting procedures	
(2)	**09:15 – 09:30**	**Update on status of Sakhalin 2 project and SEIC**	SEIC presentation
(3)	**09:30 - 10:15**	**Review recommendations from previous meeting and Vladivostok briefing**	WGWAP 2/INF.1
	10:15 – 10:30	**Break**	
(4)	**10:30-11:15**	**Benthic monitoring** – MNR report – Plans for synthesis and analyses integrating benthic results with demographic results (e.g. yearly calf production)	SEIC presentation Panel discussion WGWAP 2/INF.2
(5)	**11:15 – 11:45**	**Beach surveys**	Panel discussion
(6)	**11:45 – 12:30**	**MMO programme** – MMO close out report – MMO manual – Discussion of traffic rules under MMPP for 2007 season (e.g. crew change vessels)	SEIC presentation Panel discussion WGWAP 2/INF.3 WGWAP 2/INF.4
	12:30	**Adjourn for the day**	

16 April

(7)	**08:30 – 09:00**	**Work/construction programme**	SEIC presentation WGWAP 2/INF.5
(8)	**09:00-10:30**	**Behaviour monitoring** – MNR report - Overview of 2006 monitoring	SEIC presentation Panel discussion WGWAP 2/INF.6
	10:30 – 10:45	**Break**	
(9)	**10:45 – 12:00**	**Multivariate analysis (MVA)**	SEIC presentation

		– Close out report for 2005 MVA – SEIC methodology for preparing the 2006 MVA – to be presented by SEIC and discussed by panel	Panel discussion WGWAP 2/INF.7 WGWAP 2/INF.8
	12:00-13:00	**Lunch**	
(10)	**13:00-15:00**	**Photo-identification** – Overview of 2006 programme – Task Force update – Russia-USA Team and SEIC	SEIC presentation Panel discussion WGWAP 2/INF.9 WGWAP 2/INF.10
	15:00	**Adjourn for the day**	

17 April

(11)	**08:30 - 10:00**	**Distribution**	SEIC presentation WGWAP 2/INF.11
	10:00-10:15	**Break**	
(12)	**10:15-12:15**	**Acoustic modeling for 2007 and noise management rules into the future** – Exposure criteria for continuous noise – Acoustic modeling for 2007 – SEIC 4-D seismic project proposal – Exposure criteria for pulse noise – future noise management rules	Panel presentation & discussion SEIC presentations WGWAP 2/INF.15 WGWAP 2/INF.16 WGWAP 2/INF.17 WGWAP 2/INF.18
	12:15-13:15	**Lunch**	
(12)	**13:15 – 15:15**	**Acoustic footprint analysis & 2006 acoustics monitoring** – Lunskoye noise monitoring – 2006 noise data – Daily construction activities by vessels – MNR acoustic monitoring report (2006 monitoring)	SEIC presentation WGWAP 2/INF.12 WGWAP 2/INF.13 WGWAP 2/INF.14
	15:15	**Adjourn for the day**	

18 April

	08:30 – 09:30	**Unfinished business from previous days**	Panel discussion
(14)	**09:30 - 10:15**	**Satellite tagging** – Progress report from Dave Weller – Consideration of reports from Bruce Mate – Consideration of report on Chukotka tagging studies	WGWAP 2/INF.19 WGWAP 2/INF.20 Panel discussion
	10:15 - 10:30	**Break**	

	10:30 -11:15	**Satellite tagging contd.**	
(15)	**11:15 – 12:15**	**Oil spill prevention and response** – Update from IUCN on Hokkaido spill – Update on oil spill Task Force and Panel member	Panel discussion WGWAP 2/INF.21 WGWAP 2/INF.22
	12:15-13:15	**Lunch**	
(16)	**13:15-13:45**	**Whale monitoring by independent groups**	WGWAP 2/INF.23
(17)	**13:45-15:15**	**Panel self-assessment**	IUCN discussion
	15:15	**ENDS**	

ANNEX 3 - LIST OF DOCUMENTS DISTRIBUTED IN CONNECTION WITH THE SECOND MEETING OF THE WGWAP

Unless otherwise stated – all documents in English

Document Ref.	Document Title	Status
WGWAP 2/1	Provisional agenda	Public
WGWAP 2/1 -R	Provisional agenda (RUSSIAN)	Public
WGWAP 2/2	List of documents distributed in connection with the first meeting of the WGWAP	Public
WGWAP 2/INF.1	Progress report and status of previous recommendations	Public
WGWAP 2/INF.2	Benthos and Food Supply Studies in Feeding Grounds of the Okhotsk-Korean Gray Whale Population in 2006	Confidential
WGWAP 2/INF.2-R	Benthos and Food Supply Studies in Feeding Grounds of the Okhotsk-Korean Gray Whale Population in 2006 (RUSSIAN)	Confidential
WGWAP 2/INF.3	Marine mammal observers manual 2006	Public
WGWAP 2/INF.3-R	Marine mammal observers manual 2006 (RUSSIAN)	Public
WGWAP 2/INF.4	Marine mammal observation programme 2006 close-out report	Public
WGWAP 2/INF.5	Revised construction schedule for 2007 and beyond	Pending / Confidential
WGWAP 2/INF.6	Western gray whale behavior, movement, and occurrence patterns off Sakhalin Island, 2006	Confidential
WGWAP 2/INF.6-R	Western gray whale behavior, movement, and occurrence patterns off Sakhalin Island, 2006 (RUSSIAN)	Confidential
WGWAP 2/INF.7	Influence of Underwater Sound and Nearshore Vessel Activity on Western Gray Whale Behaviour During the Installation of a Concrete Gravity Base Structure off Sakhalin Island, Summer 2005	Confidential
WGWAP 2/INF.8	Methodology for preparing Multivariate analysis of 2006 data	Pending / Confidential
WGWAP 2/INF.9	Photographic Identification of the Korean-Okhotsk Gray Whale (Eschrichtius Robustus) Offshore Northeastern Sakhalin Island and Southeastern Kamchatka, Russia 2006	Confidential
WGWAP 2/INF.9-R	Photographic Identification of the Korean-Okhotsk Gray Whale (Eschrichtius Robustus) Offshore Northeastern Sakhalin Island and Southeastern Kamchatka, Russia 2006 (RUSSIAN)	Confidential
WGWAP 2/INF.11	Western Gray Whale Weekly Average Estimated Densities (2001-2006) and Modelled Acoustic Footprints During the 2005 - 2006 SEIC Construction Season	Confidential
WGWAP 2/INF.12	Acoustic monitoring of Lunskoye 2006: Lun-A topsides installation summary report	Draft - confidential / Final - public
WGWAP 2/INF.13	Daily construction activities by vessels	Confidential
WGWAP 2/INF.14	Acoustic & Hydrographic Studies on the North East Sakhalin Shelf 15 June to 5 October, 2006	Confidential
WGWAP 2/INF.14-R	Acoustic & Hydrographic Studies on the North East Sakhalin Shelf 15 June to 5 October, 2006 (RUSSIAN)	Confidential
WGWAP 2/INF.14A	Acoustic Monitoring of Piltun 2006 Offshore Construction	Confidential
WGWAP 2/INF.15	Exposure criteria for continuous noise	Public
WGWAP 2/INF.16	Underwater acoustic modeling for 2007	Confidential
WGWAP 2/INF.17	SEIC 4-D seismic project proposal	Confidential
WGWAP 2/INF.18	Summary document outlining the history of recommendations on noise criteria and the exchanges between SEIC and Panel since WGWAP 1	Public

WGWAP 2/INF.19	Overview - Global experience of satellite tagging experience with large whale species	Public
WGWAP 2/INF.20	Important Foraging Grounds for Gray Wales (Eschrichtius Robustus) Along the Chukotka Peninsula, Russia	Confidential
WGWAP 2/INF.21	Update on oil spill issues discussed at WGWAP 1 meeting.	Public
WGWAP 2/INF.22	Summary table - status of all oil spill documents	Confidential
WGWAP 2/INF.23	WWF update report on the Piltun MPA planning process	Public
WGWAP 2/INF.24	MMO Deployment for 2007 – Briefing Note Provided by SEIC at WGWAP 2 Meeting	Public

ANNEX 4 – "CONCEPT DOCUMENT": POTENTIAL MECHANISM FOR OBTAINING THE BEST POSSIBLE SCIENTIFIC ADVICE ON COMPLEX ISSUES WHILST RESPECTING DATA OWNERSHIP

SCIENTIFIC ISSUES

A number of very complex scientific issues surround the question of the potential effects of oil and gas related activities on western gray whales and the development of appropriate mitigation measures. Considerable amounts of money have been and continue to be spent on field and analytical efforts by a number of companies and other groups. Of particular importance and difficulty is the issue of developing an appropriate framework to analyse and integrate the diverse datasets relating to behavioural observations and operational factors. For example, very good progress has been made by Gailey and colleagues in their multivariate analysis approach and this should be continued. However, much of the work on integrating the available data and attempting to reach conclusions is at the cutting edge of our analytical ability. There is no simple agreed method and thus it is vital to explore a number of options. Further work is needed to include additional variables (especially the benthic data; see Item 4 of main report text) and potentially information from other datasets (e.g. photo-identification). This requires collaboration of a number of experts (or groups of experts) if it is to develop robust conclusions of immediate, practical relevance for minimising the impacts of oil and gas related activities (and indeed other activities if possible) on gray whales in the Sakhalin region. Such collaborative work will also have significance for the analysis of similar complex datasets around the world.

DATA AVAILABILITY ISSUES

Given the considerable amount of money and effort already invested in the collection of data to address these potential impacts, it is understandable that all groups with relevant data are sensitive concerning the need to respect normal rights associated with data owners, including rights to first publication. Whilst recognising that making all potentially useful data freely available would jeopardise those rights, it is worth trying to develop a process that will, at the same time, enable the best and most expeditious use of the data *and* protect the rights of data owners. Similar issues with respect to data availability have been faced by other organisations seeking to develop the best possible scientific analyses and advice whilst protecting the rights of data owners. That experience could be used to develop an appropriate process in this case. One such process, described below, could be further developed and modified by an appropriate steering group.

A POSSIBLE PROCESS

The general idea is that the work would progress through a series of (at least two) iterative expert scientific workshops with intersessional activity. For practical reasons the workshops should involve only scientific experts (i.e. no observers would be present). The aim would, however, be to develop a publicly available agreed final scientific report that would provide a 'state of the art' summary of the methods used and results of the scientific analyses undertaken, including conclusions and, if appropriate, recommendations for further work (data collection, analyses etc).

The details of the development of the workshops should be left to a steering group with appropriate expertise nominated by the appropriate data owners and perhaps other mutually agreed relevant bodies. It may be valuable to consider the use of a facilitation organisation such as IUCN. However, the primary work should be undertaken by the Steering Group. This document, deliberately, does not try to second-guess the results of any Steering Group discussion but rather indicates what that group needs to finalise. The tasks of the Steering Group would include:

1 Development of full scientific terms of reference and a possible timescale

2 Determination of a list of relevant data available including information on:

   2.1 nature of datasets (fields, units etc.)

   2.2 short description of data, including collection methods, references if appropriate

   2.3 time periods of data collection

   2.4 format of data (e.g. electronic, relational database, nature of validation etc.)

   2.5 ownership of data (including whether publicly available)

3 Determination of a list of relevant documents (both published and 'grey')

4 Determination of draft agenda

5 Selection of appropriate attendees

6 Suggestion of papers to be prepared in advance

7 Finalisation of data availability agreement (to be signed by all participants in the process and preventing the release of data to third parties), taking into account:

   7.1 use of data in advance of first workshop and intersessionally

   7.2 use of data at workshops themselves

   7.3 availability/confidentiality of reports and workshop papers

   7.4 level of detail of the data to be included in reports and working papers.

Possible models for such data availability agreements and the workshop process include those developed by the International Whaling Commission for the provision of management advice.

ANNEX 5 - DRAFT ANNOTATED AGENDA FOR THE PROPOSED PHOTO-IDENTIFICATION WORKSHOP

Comments in italics are explanatory notes that are not part of the agenda itself.

1. Introductory items

2. Cross-matching exercise

2.1 Presentation of report of independent expert and cross-matching results

Dr Victoria Rowntree has reviewed the cross matching exercises and is preparing a report, which will respect the rights of the data owners and be circulated to participants well in advance of the Workshop.

2.2 Resolution of doubtful cases, and, if appropriate, matching of temporary whales

Based on the results received from each team to date, there remains only a very small number of doubtful cases which the workshop will need to examine. The Teams will be encouraged to bring all available photos of these whales.

3. Presentation of each team’s work, including:

> 3.1 Field methods (e.g. locating and approaching whales; obtaining photographs, including multiple aspects [left/right/flukes]; auxiliary field data collected)
>
> 3.2 ‘Laboratory’ procedures (criteria/procedures for: (a) designating new whales; (b) identifying re-sights; (c) linking different aspects; (d) designating temporary whales; (e) dealing with undetermined/pending cases (if any); (f) photo quality rating or other procedure for acceptance/rejection of photos
>
> *A general understanding of the field and laboratory procedures followed to date is important to interpret the data and to ensure that any analyses to be conducted are based on assumptions that are consistent with the way the data were collected.*
>
> 3.3 Procedures for regular updating of catalogues and cross-matching (incl. matching 3rd party photos)
>
> 3.4 Conclusions and recommendations
>
> *This item is a placeholder in case the participants develop any agreed conclusions and recommendations. Recommendations contained in the independent expert’s report can also be considered under this item.*

4. Presentation and comparison of sighting histories compiled by each team

Analyses of the data to address demographic and related issues typically require not merely the catalogue but the records of annual sighting history of each whale. Under this item, it would be helpful to view tabulations of these data in order to aid understanding of their scope and limitations with respect to particular analytical techniques. This opportunity can also be used to resolve any discrepancies in the histories that are found.

5. Scientific questions that can be addressed by analyses of WGW photo-id data

> 5.1 Examples of analyses conducted to date (e.g. WGWAP population assessment)

5.2 Other potential questions, and analyses that could be performed

The obvious scientific questions of conservation relevance relate to demographics (survival rates, birth intervals, age at first reproduction, population trend), but there may be further relevant questions that could be addressed using photo-id data.

5.3 Issues related to undertaking analyses involving both datasets

5.3.1 Scientific benefits

A more complete coverage of the population, and more complete sighting histories, are obvious benefits of a combined analysis, but there may be others.

5.3.2 Practical issues (incl. safeguards for data owners and facilitation of use permission)

5.4 Recommendations

6. Consideration of ways to reduce photo-id-related disturbance to whales, while maintaining sufficient data collection for population assessment and other important scientific questions

The excellent agreement found during the cross-catalogue comparison and the work demonstrating short-term responses of whales to close approaches by boats, suggests that the current (largely duplicative) level of photo-identification research effort needs to be reviewed in terms of minimising disturbance without compromising data collection and the ability to answer relevant scientific questions.

7. Adoption of report to be submitted to WGWAP

ANNEX 6 - TASK FORCE ON SEISMIC SURVEYS – DRAFT TERMS OF REFERENCE

To review and analyse (as a contribution to the EIA) the noise that would be associated with the proposed 2008 Astokh seismic operations in the light of its possible effects on gray whales, and make recommendations on mitigation and monitoring.

Suggested members:

Donovan; Nowacek; Vedenev; Racca; Muir; van Haaster; others to be decided.

Methods

A key input to the review will be the provision of simulation results addressing the uncertainty in model predictions of both acoustic contours and whale distributions. This work, specified by the task force (see below), will be undertaken by JASCO and LGL and provided in advance of a 4-day workshop to be held in time for the work to be incorporated in the EIA (due date around mid-September). Practical considerations mean that the workshop cannot be held before mid-June.

The process will involve:

(1) determination of appropriate 'trial structure' – complete asap and certainly by end April (Task Force)

(2) determination of format for presentation of results – complete asap and certainly by end April (Task Force)

(3) development of workshop agenda – complete asap and certainly by end April (Task Force)

(4) agreement on venue (Den Haag?) and dates – asap and certainly by end of April (Julian to organise)

(5) agreement on additional experts required - asap and certainly by end of April (Task Force - Julian to organise)

(6) completion of simulation results and circulation of results to task force – beginning June (JASCO; LGL)

(7) compilation of relevant information on potential 'safe' dB levels [and initial proposal] – beginning June (Doug to organise)

(8) compilation of relevant information on 'best practice' mitigation measures [and initial proposal] – beginning June (Doug to organise)

(9) document discussing feasibility of also conducting an ice-based acquisition – (external expert [to be determined] and SEIC)

(10) holding of 4-day workshop (with capability for running extra trials) – mid→end June [NB scope for Workshop to identify additional work if needed but hoped not necessary]

(11) Finalise report and circulate to Panel for comment – beginning July (Task Force)

(12) Finalise EIA - SEIC

Specification of trial structure:

Need to decide on appropriate runs to examine uncertainty in:

(a) Acoustic contours (for plausible range - e.g.140-160dB in 3dB steps) derived from the noise model or models (see Appendix 1)

Key parameter values (and combinations of these)/scenarios

E.g. water temperature profile; Roberto for more details for other parameters

Vessel tracks and towing depths

Appropriate temporal scale (assume 2-3 week window at beginning of season)

Acoustic array beam pattern: i) 900 (broadside); ii) 300; iii) 600

(b) Whale distribution information (see Appendix 2)

Investigate effect of choice of temporal/geographical scale (e.g. average over period and ‘highest’ values for density)

Differing approaches to ‘missing’ data (e.g. interpolation, adjacent period) – emphasis on conservatism (i.e. precaution)

ANNEX 6 - Appendix 1 (still being developed by task force)

Suggested ‘trials’ for acoustic contour modelling (all to produce contours for 140-160dB in 3dB steps). The design principles are as follows: (1) develop a ‘base case’ of ‘default’ values Racca has already chosen; (2) based on what is known about the variables within a suitable window of expected dates in the area, choose plausible ranges for each parameter, recognising the need to take a realistic yet precautionary approach – in doing so change one variable at a time to help with interpretation; (3) develop a number of appropriate ‘combination’ trials

Trial	Track design	Towing depth	Sound speed profile	Etc.
1				
2				
3				
…..				

Racca to provide some suggestions:

Water column: sound speed profile (in depth) v(z)

Sediment: profile in depth (z) of:

Density

Compressional speed

Compressional attenuation

Shear speed

Shear attenuation

Source: depth below surface

ANNEX 6 - Appendix 2 (still being developed by task force)

Sensitivity tests for the density data (need to finalise with Muir) – end result will be a series of density matrices for various time periods

Aggregated at the following geographical scales: e.g. 1 km^2; 3km^2; 5km^2; 10km^2?

Aggregated at the following temporal scales during the predicted 2-3 week window:

Methods of data gap ‘correction’:

Methods of combining data from different sources:

For each ‘cell’ provide average (over all years) and highest value in any one year of the period

Draft agenda for the seismic task force workshop

1. Introductory items
2. Overview of sensitivity trial results with regard to noise modelling
3. Overview of sensitivity trial results with regard to density information
4. Review of acceptable exposure criteria
    4.1. Current literature
    4.2. Recommendations
5. Implications of proposed 2008 activity given results of sensitivity analyses
    5.1. Review of mitigation measures in the light of Items 3 and 4
    5.2. Recommendations for 2008 seismic survey: practice and mitigation
6. Consideration of ice-based acquisition in 2008 as basis for future years
7. Adoption of report for submission to WGWAP

ANNEX 7 - PREVIOUS WGWAP RECOMMENDATIONS THAT REMAIN OPEN (UNRESOLVED) AND ARE NOT ENTIRELY SUPERSEDED BY NEW RECOMMENDATIONS IN THE PRESENT REPORT

WGWAP Recommendations & Requests	Reference	Status as of WGWAP II
The Panel **requests** that Sakhalin Energy prepare a schedule of its work for at least the next five years – this should include the construction and operations schedule, the research and monitoring plans and the times when decisions will be taken. As well as confirmed activities, it should indicate all anticipated or likely events, such as seismic testing. In addition, the Panel **requests** that Sakhalin Energy establish a standard practice of keeping the Panel informed of its plans, through IUCN, without the Panel's having to request such information repeatedly.	WGWAP 1/001 (and WGWAP/Vlad-01)	Re-addressed in section 7 of WGWAP II report.
In view of the endangered status of the western gray whale population, the observed offshore displacement, change in diving pattern, and other potential effects on the whales in 2005 warrant additional scrutiny and follow-up analyses.	WGWAP 1/004	Re-addressed in section 8 of WGWAP II report.
The Panel **recommends** that: In the final report of the multivariate analysis of 2005 data, and in any other outlet citing its findings (e.g. on Sakhalin Energy's website), the study's limits, as outlined in the WGWAP II report, e.g. in relation to the lack of baseline (pre-disturbance) behavioural data and the failure to collect behavioural data during the two loudest phases of the construction activity, be clearly acknowledged. It should not be claimed that the extent of the whales' response to noise, such as movement offshore, has been quantified.	WGWAP 1/005	Still applies.
The Panel **recommends** that it be provided with a full analysis using effort-corrected data on density distribution for each year that such data are available, overlaid onto the appropriate acoustic 'footprint' information. The results should be integrated to produce an appropriate multi-year comparison of distribution, particularly for years with and without significant anthropogenic noise	WGWAP 1/006	Still applies. Re-addressed in section 10 of WGWAP II report.

WGWAP Recommendations & Requests	Reference	Status as of WGWAP II
The Panel **recommends** that noise exposure criteria developed in the IISG report and intended for application in the 2006 construction season be followed during the 2007 season and thereafter unless, during the interim, sound exposures below the recommended thresholds are found to result in unexpected adverse effects.	WGWAP 1/007	As discussed in section 12.1 of WGWAP II report, the Panel has produced its final recommended criteria for exposure to continuous noise.
The Panel **emphasises its concern** about one major drawback of having multiple research and monitoring teams in the field, which is that it can add to the disturbance from vessel noise or vessel presence on and near the feeding grounds. Therefore, any encouragement of independent initiatives must carry a caveat – that due consideration be given to this concern and that every effort is made to avoid or minimise additional disturbance to the whales.	WGWAP 1/008	Still applies.
In terms of DNA and other biological sampling, the Panel refers Sakhalin Energy to the IISG report where detailed advice was provided. Here, it **recommends** that a tissue sample (preferably skin or bone) be collected as soon as possible if any carcass of a baleen whale is found and there is any possibility that it could be a gray whale.	WGWAP 1/012	Still applies. Also re-addressed in section 5 of WGWAP II report.
The Panel agreed that in principle, telemetry work on western gray whales **should be carried out** but only once certain conditions have been met.	WGWAP 1/014	Still applies but re-addressed in section 13 of WGWAP II report.
The Panel recognizes the spatial separation of Piltun Lagoon from Sakhalin II activities, but nevertheless continues to **recommend** studies of the linkage of Lagoon biota and detrital output with WGW feeding areas.	WGWAP 1/016	Still applies.
Concerning the issue of reducing collision risks associated with crew change vessels, the Panel notes some positive changes in the Sakhalin Energy approach. However, it believes that further work in this area is important and should be pursued. Therefore, it is **recommended** that:	WGWAP 1/023	Still applies. Also re-addressed (but not in detail) in section 6.2 of WGWAP II report.
(a) *Both* crew change vessels have 2 MMOs onboard on a *permanent* basis, as recommended by the IISG, instead of 'whenever possible', as reported by Sakhalin Energy at the WGWAP-I meeting;		
(b) Further measures be taken to avoid deviations of crew change vessels from the prescribed route;		
(c) Serious consideration continue to be given by Sakhalin Energy to the issue of collision risk associated with number and frequency of crew change vessel trips; a solution to this problem must be found.		

WGWAP Recommendations & Requests	Reference	Status as of WGWAP II
It was agreed that there was a need for access to an authoritative, up-to-date and more detailed map showing the spatial boundaries (including latitudes/longitudes) of the existing (and proposed) oil and gas lease areas on the Sakhalin Shelf. The Panel **recommends** that IUCN consult with industry (Sakhalin Energy as well as other companies), Russian governmental agencies, NGOs and other sources, as appropriate, to obtain better information on oil and gas activities in the Sakhalin region. Such information needs to be provided to the Panel on a routine basis.	WGWAP 1/030	Good progress but still applies.
The Panel further noted that it would be useful to obtain access to expertise in spatial data management and modelling (e.g. GIS, 3-dimensional modelling) for assistance in analysing existing and future data and for helping to ensure that such data are archived for future use. The Panel **recommends** that IUCN investigate and pursue this matter with Sakhalin Energy and relevant panel members on an ongoing basis and that a report on progress be provided at the next WGWAP meeting (i.e. WGWAP II).	WGWAP 1/031	Some progress but still applies.
Follow-up on WGWAP 1/007 regarding 2006 acoustic data The Panel **recommends** that for every recorder available, Sakhalin Energy provides the following:	WGWAP/Vlad-03	Some of the requested data were provided in St. Petersburg but not in time for consideration at the meeting.
(1) Spectrograms and amplitude levels for all recordings from all recorders, both real-time data from T-AUARs and sonobuoys <u>and</u> the post-season analysis of the recorders. These plots should take the form of those from a previous MNR report, for example, figure 1.8 from the following document prepared for the second Vancouver meeting (i.e., IISG) – 'WGWAP_13E_MNR_Report_Acoustics_Volume_1_2005.pdf'. This is a traditional presentation of acoustic data, and some completed analyses were shared at the Vladivostok briefing. Frequency analysis should be in 1 Hz steps, and time steps should be ≤1 min. We would make two recommendations regarding changes in the display of these data: i) the frequency axis should be linear, not logarithmic, and need only cover the range from 1-1000 Hz; and ii) the plots for the levels should be expanded so that the axis for the levels is larger and more readable.		

WGWAP Recommendations & Requests	Reference	Status as of WGWAP II
(2) 90th, 50th and 10th percentile amplitude levels calculated for 1/3 octave bands up to 5 kHz every half-hour based on ≤ 30 sec time window analysis, i.e., for every recorder, again both the real-time recordings and the post-season analysis, we should see plots of at least the 90th, 50th, and 10th percentile levels for 1/3 octave bands, with the levels calculated every half-hour based on ≤ 30 sec windows. So, the levels are taken for every 30 sec time window, averaged over one half-hour, then the 10th, 50th, and 90th percentile levels for 1/3 octave bands are calculated.		
(3) correlations between different hydrophones, e.g., how do the recordings of a particular event compare between a hydrophone at the edge of the feeding area and one inside the area?		
Follow-up on WGWAP 1/007 regarding 2006 Daily Construction Activities, by Vessel The Panel **recommends** that information on day-by-day construction activities and locations for each vessel be provided as a document for the St. Petersburg WGWAP meeting (per the SEIC response to WGWAP 1/007). There should be at least three sources of such information – satellite-linked tracking data for each vessel, vessel logbooks, and MMO data (recorded at half-hourly intervals).	WGWAP/Vlad-04	Some of these data were provided in St. Petersburg but not in time for consideration at the meeting.

ANNEX 8 – MAP OF SAKHALIN SHELF REGION