

Open Water Peer Review Panel Monitoring Plan Recommendations Report

After discussion and review of ConocoPhillips' (COP) marine mammal monitoring plan for its proposed Exploration Drilling Activities in the Devils Paw Prospect, Chukchi Sea, Alaska, panel members have answered the questions below set forth by the National Marine Fisheries Service's Office of Protected Resources (OPR) and provide the following recommendations. Answers to, and recommendations based on, the specific questions were developed using the general monitoring requirements outlined in the Marine Mammal Protection Act (MMPA) implementing regulations and further guidance provided by OPR, which were included in the Instruction document and have been copied into this document below the questions.

Summary of Activity:

ConocoPhillips Company (COP) intends to drill one or two exploration wells within existing lease holdings in the Chukchi Sea during the open water season of 2014 to test whether oil deposits are present in a commercially viable quantity and quality. The drilling will be conducted with a jack-up rig and a variety of vessels (including tugs and barges, ice management and oil spill response vessels) and aircraft (fixed wing and helicopter) to support the drill rig operations. Activities that are part of the drilling operation include: (1) drill rig mobilization and positioning, (2) ice management, (3) drill rig resupply, (4) personnel transfer, (5) refueling, (6) oil spill response capability, and (7) drill rig demobilization. In addition, two or three vertical seismic profile (VSP) data acquisition runs per drilled well will be conducted from the rig.

The Marine Mammal Monitoring and Mitigation Plan (4MP) proposed by COP (Attachment B of IHA) consists of 2 monitoring activities: (1) rig- and vessel-based marine mammal monitoring and (2) acoustic monitoring utilizing an array of bottom-founded recording units. The main purpose of the 4MP is to mitigate the potential impacts that project activities might have on marine mammals and the availability of subsistence resources, and to monitor the effectiveness of these measures. Drilling activities-related monitoring consists of placing Protected Species Observers (PSOs) on the drill rig and on the ice management vessel. These observers will record all marine mammals sighted during daylight hours. Drilling activities-related monitoring also includes the use of acoustic recorders to characterize drilling sounds and sounds produced by adjacent vessel activities and marine mammals.

Questions

I. Will the applicant's stated objectives effectively further the understanding of the impacts of their activities on marine mammals and otherwise accomplish the goals stated below? If not, how should the objectives be modified to better accomplish the goals below?

The objectives of the rig- and vessel-based marine mammal monitoring (Section 2 of Attachment B) and acoustic monitoring (Section 3 of Attachment B) are treated separately below.

The objectives for the rig- and vessel-based marine mammal monitoring (Section 2.1) are to:

- 1) Implement mitigation measures in the field, where necessary, as required by the various permits COP receives.
- 2) Collect data on the occurrence, distribution, and activities of marine mammals in the areas where the drilling program is conducted.
- 3) Collect information to compare the distances, distributions, behavior and movements of marine mammals relative to the drill rig at times with and without drilling activity.
- 4) Collect information to estimate the number of marine mammals potentially harassed by the proposed project activities, which must be reported to NMFS and USFWS in accordance with the issued IHA and LOA.
- 5) Communicate with coastal communities including Inupiat hunters.

Objective 1: The “implementation” of mitigation measures will not necessarily further the understanding of impacts, as mitigation measures are intended to reduce impacts (e.g., minimum altitude of aircraft, speed or navigation guidelines for vessels). However, as part of the proposed mitigation measures, PSOs will be monitoring the exclusion zone (for VSP operations) from the drill rig, and will be monitoring the potential disturbance zones from both the drill rig and ice-management vessel. Information gathered during this monitoring may provide some information useful to assessing potential impacts of their operations.

Objectives 2-4: The overall objectives should be to provide reliable, statistically robust estimates of the number of marine mammals in the project area and information on their distribution and movement patterns, with sufficient power to determine if, and if so how, all aspects of the project’s operations affect marine mammal density, distribution, and movements.

The panel believes that the collection of all of the drilling and support activities may potentially have an effect on marine mammals. The proposed rig- and vessel-based monitoring plan will provide some useful information on the occurrence, distribution, and activities of marine mammals in the areas where the drilling program is conducted while COP is in the operation area. However, that information will not meet the standards of rigorous scientific surveys and should not be viewed as providing scientifically rigorous baseline information on the marine mammals in the area or the impacts upon them.

Objective 2 would be more useful if it were restated to read, “Collect data on the density, distribution, and activities of marine mammals in the areas where the drilling program is conducted at times before, during, and after COP enters the operation area.” Furthermore, because marine mammals in the Arctic undergo seasonal migrations, ideally this information on marine mammal ecology would be collected during years with and without drilling operations to enable investigation into the effects of the operations within specific phases of the migration.

In reference to Objective 3, the applicants may be able to compare marine mammal distances, densities, distributions, behavior and movement relative to the drill rig during times with and without drilling activity from data collected in the vicinity of the rig. However, this will not provide an effective way to assess the potential impact of the project’s operations. Other activity (e.g., vessels, helicopters) will always be present as the current protocol is described. Therefore, as the objective is currently stated, the comparison that would actually be made is between periods of drilling plus vessel, aircraft, and/or other activity, with periods of just vessel, aircraft,

and other activity. Because the drilling sounds are expected to be lower level sounds in comparison to some of the vessel activities, this comparison is expected to be of limited utility because it would attempt to determine impacts of the drilling activity against the background of potentially greater disturbances. It would therefore be more useful to restate Objective 3 to read “Collect information to compare the densities, distributions, behavior and movements of marine mammals relative to the locations and activity states of the drill rig and support vessels and aircraft.”

Objective 4 should be revised to explicitly state what is included in “proposed project activities”; the panel believes this objective should refer to the ensemble of activities, including the drill rig and associated support vessel and aircraft in order to try to understand the impacts of COP’s presence on marine mammals.

Objective 5: In order to be more applicable to the monitoring plan goals being reviewed, the panel recommends that objective 5 is revised to read, “Communicate with coastal communities, including Inupiat hunters, to help determine whether (and how) activities associated with the drilling operations have an effect on availability of marine mammals for subsistence hunting.”

The objectives for the acoustics monitoring component (Section 3) are to:

- (1) quantify the absolute sound levels produced by drilling and to monitor their variations with time, distance and direction from the drill rig;
- (2) measure the sound levels produced by vessels operating in support of drilling operations;
- (3) measure sounds from VSP data acquisition runs; and
- (4) detect vocalization (*sic*) of marine mammals.

Objectives 1-3: Each of these objectives, if achieved, will provide data useful towards assessing potential impacts of the proposed activities on marine mammals. The panel stresses the importance of characterizing the entire acoustic footprint of the project (i.e., a combination of these three objectives), including a spatially explicit understanding of the sound field in various activity states.

Objective 4: This objective is important but incomplete. The panel suggests amending this to include localization and quantification of marine mammal acoustic detections aimed towards providing insights on how project operations may potentially affect marine mammal density, distribution, and movements.

II. Can the applicant achieve the stated objectives based on the methods described in the plan?

Rig- and Vessel-based Monitoring (PSOs)

Objective 1: Since mitigation measures to reduce Level A take are likely to be required only during the limited VSP operations, which have modeled exclusion zones of less than 1km, the applicant should be able to achieve the stated objective.

Objectives 2-4: As with other proposed PSO monitoring plans, the panel generally feels that these objectives are over-ambitious to achieve in a scientifically rigorous manner, and that the applicants will be unlikely to fully accomplish these objectives. With only the rig- and vessel-based PSOs, they will be able to collect limited data on the occurrence of animals in the immediate vicinity, of the rig and vessel, but not the broader areas and not during times completely void of activity that would be necessary to provide scientifically rigorous baseline data on the density, distribution, and behavior of marine mammals.

The panel also discussed the difficulties of using PSO data to estimate the number of animals potentially harassed by the activity. Beyond the restrictions on visual observation data during darkness or poor weather, PSO data is inherently limited in that it is collected from the vessels or platforms involved in the activity itself. Keeping in mind that the NMFS Level B Harassment radii occur at modeled ranges of 4.9km for VSP alone, 7.9km for drilling operations and support vessels activity, and 0.24km for drilling operations alone, many potentially harassed animals are unlikely to be sighted by the PSOs, at least for the first two activities. At best, the PSO data will provide a basis for estimating the minimum number of marine mammals harassed, but the closeness of that minimum estimate to the actual number will remain uncertain. Without an adequate control, it is not possible to use PSO data to directly determine the number of animals harassed. A relative assessment might be extrapolated from differences in sighting rates between the various activity states with different acoustic footprints (as described in Objective 3), although based on the limited sighting range of the PSOs and likely small numbers of animals sighted, the utility of this estimate is likely to be limited.

It is also important to note that animals may be responding at lower levels than suggested by the NMFS 160dB or 120dB Level B Harassment thresholds for impulsive and continuous sounds, respectively sound (e.g. Blackwell *et al.*, in press; Schick and Urban, 2000). If this is the case, it suggests harassment might occur at greater distances than projected here, and obtaining an accurate estimate of the number of animals harassed will be even less likely. The panel therefore stresses the importance of understanding the footprint of all activities (e.g., vessels and aircraft) as well as the drill rig, and for monitoring to occur beyond the zone encompassing 120 dB.

Objective 5: The panel feels that with the Com-Station protocols outlined in the monitoring plan, the applicants should be able to achieve this objective.

Acoustic Objectives

Objective 1: The applicants will be able to quantify the absolute sound levels produced by drilling and monitor their variations with time and distance from the rig, at the locations where recording instruments are placed. Their ability to quantify variation over distance and direction from the drill rig will be entirely dependent on the number of sensors placed and their spatial configuration around the drill rig and vessels. If the sensors are placed in a single line extending outward from the drill rig for the whole season, they will not be able to assess variability in the sound field at different bearings from the rig.

Objective 2: The measurement of sound levels produced by vessels operating in support of drilling operations is achievable, and characterizing the acoustic signatures of individual vessels will be valuable data for providing a more complete understanding of cumulative sound fields from multiple individual sources. The panel emphasizes the importance of monitoring variations in vessel noise over time and activity states (e.g., dynamic positioning, during transit, at anchor) rather than just from a single pass over a sensor.

Objective 3: The measurement of sounds from VSP data acquisition runs is achievable based on the methods described in the monitoring plan.

Objective 4: The detection of vocalizations of marine mammals is achievable based on the methods described in the monitoring plan. Note that in Section I, the panel recommended changing the objective from simply detecting, to localizing marine mammals. The current methods as described will not be sufficient to localize the vocalizing marine mammals.

III. Are there technical modifications to the proposed monitoring techniques and methodologies proposed by the applicant that should be considered to better accomplish their stated objectives?

The panel recommends augmenting the acoustic monitoring capabilities proposed by the applicant. In particular, including an ability to localize marine mammal vocalizations was recommended as a means to enhance the ability to assess the potential zone of influence around the activities, rather than simply counting acoustic detections from a series of recorders at relatively short ranges from the activities. In addition, the panel recommended the addition of real-time acoustic monitoring capabilities from the drill rig as a valuable addition to the monitoring plan. Real-time acoustic monitoring will provide PSOs a greater awareness of changes in acoustic activity (e.g., drilling, dynamic positioning, vessel transits, aircraft overflights), and will help cue the PSOs to the presence of vocal animals, thus increasing the likelihood of detecting marine mammals.

The panel recommends that the applicants consider better ways to utilize the large number of vessels that will be present in a standby mode at anchor (e.g., deployment of additional acoustic instruments, measurements while at anchor with a dipping hydrophone). The panel emphasizes that obtaining a greater characterization of the cumulative acoustic footprint of all the associated activities should be an essential component of any monitoring program, and anything that can be done towards this goal would be valuable.

In the same light, the applicants should give careful consideration to the number and configuration of acoustic recorders deployed to ensure they will be able to adequately characterize the sound field produced during various activity states. In conjunction with this, the locations and activities of the vessels (dynamic positioning, at anchor, transit), aircraft, and drill rig, should be logged to ensure the recorded sound data can be linked to the associated activities.

IV. Are there techniques not proposed by the applicant (i.e., additional monitoring techniques or methodologies) that should be considered for inclusion in the applicant's monitoring program to better accomplish their stated objectives?

The panel is mindful of the fact that the activities proposed here generally have a smaller spatial and acoustic footprint than many other proposed activities in the Arctic. However, considering that these exploratory activities may lead to production in this location for 20 years or more, it is important to obtain a rigorous scientific baseline for understanding marine mammal density, distribution, behavior, and potential for harassment in the immediate vicinity, as well as the far-field surrounding the proposed activities. With this in mind, a number of recommendations were suggested by members of the panel that would help in obtaining this more scientifically rigorous baseline information, and in assessing potential effects over both the near and far-field areas surrounding the proposed activity.

- A Directional Autonomous Seafloor Acoustic Recorders (DASAR) array could be placed at greater distance from the drill rig to record and localize marine mammals, allowing for a characterization and comparison of animal behavior at greater distances from the drill rig.
- The panel suggests that the applicant consider additional monitoring techniques (e.g., passive acoustic monitoring, vessel- or aerial-based surveys) to assess the actual area of influence around the drill rig. This monitoring should extend beyond the 120dB zone as animals have been demonstrated to respond to lower received levels of sound (e.g. Blackwell *et al.*, in press; Schick and Urban, 2000).
- The applicants voiced their interest in using gliders for sampling and monitoring, and the panel strongly encourages this, with the inclusion of passive acoustic monitoring capabilities.
- As the proposed activity is not scheduled to occur until 2014, the applicants are encouraged to consider incorporating the use of Unmanned Aerial Surveys for marine mammals in a broader region around the drill rig.
- Continue to support the Chukchi Sea Environmental Studies Program.

V. What is the best way for an applicant to present their data and results (formatting, metrics, graphics, etc.) in the required reports that are to be submitted to NMFS (i.e., 90-day report and comprehensive report)?

The panel feels it is important that the required reports are useful summaries and interpretations of the results of the various elements of the monitoring plan as opposed to merely regurgitations of all of the raw results. They should thus represent an initial level of summary or interpretation of the efficacy, measurements, and observations rather than raw data or fully processed analysis. A clear summary timeline and spatial (map) representation or summary of operations and

important observations should be given. A complete characterization of the acoustic footprint resulting from various activity states should be provided. Any and all mitigation measures (e.g., operational shutdowns if they occur) should be summarized. Additionally, an assessment of the efficacy of monitoring methods should be provided.

References

Blackwell, S.B., Nations, C.S., McDonald, T.L., Greene, C.R., Thode, A.M., Guerra, M., and Macrander, M.A. in press. Effects of airgun sounds on bowhead whale calling rates in the Alaskan Beaufort Sea. *Mar. Mamm. Sci.* 24pp.

Schick, R. S., and Urban, D.L. 2000. Spatial components of bowhead whale (*Balaena mysticetus*) distribution in the Alaskan Beaufort Sea. *Can. J. Fish. Aquat. Sci.* 57:2193-2200.

Monitoring Plan Requirements

The MMPA implementing regulations generally indicate that each Incidental Harassment Authorization (IHA) applicant's monitoring program should be designed to accomplish one or more of the following: document the effects of the activity (including acoustic) on marine mammals; document or estimate the actual level of take as a result of the activity (in this case, seismic surveys or exploratory drilling programs); increase the knowledge of the affected species; or increase knowledge of the anticipated impacts on marine mammal populations. As additional specific guidance beyond that provided in the MMPA regulations, NMFS further recommends that monitoring measures prescribed in MMPA authorizations should be designed to *accomplish or contribute to one or more of the following top-level goals*:

(a) An increase in our understanding of the likely occurrence of marine mammal species in the vicinity of the action, i.e., presence, abundance, distribution, and/or density of species.

(b) An increase in our understanding of the nature, scope, or context of the likely exposure of marine mammal species to any of the potential stressor(s) associated with the action (e.g., sound, explosive detonation, or expended materials), through better understanding of one or more of the following: 1) the action itself and its environment (e.g., sound source characterization, propagation, and ambient noise levels); 2) the affected species (e.g., life history or dive patterns); 3) the likely co-occurrence of marine mammal species with the action (in whole or part) associated with specific adverse effects, and/or; 4) the likely biological or behavioral context of exposure to the stressor for the marine mammal (e.g., age class of exposed animals or known pupping, calving or feeding areas).

(c) An increase in our understanding of how individual marine mammals respond (behaviorally or physiologically) to the specific stressors associated with the action (in specific contexts, where possible, e.g., at what distance or received level).

(d) An increase in our understanding of how anticipated individual responses, to individual stressors or anticipated combinations of stressors, may impact either: 1) the long-term fitness and survival of an individual; or 2) the population, species, or stock (e.g., through effects on annual rates of recruitment or survival).

(e) An increase in our understanding of the effectiveness of mitigation and monitoring measures.

(f) A better understanding and record of the manner in which the authorized entity complies with the incidental take authorization and incidental take statement.

(g) An increase in the probability of detecting marine mammals (through improved technology or methodology), both specifically within the exclusion zone (thus allowing for more effective implementation of the mitigation) and in general, to better achieve the above goals.