

**Open Water Peer Review Panel  
Monitoring Plan Recommendations Report  
for Hilcorp's Proposed Liberty Development and Production Project  
in the Beaufort Sea, Alaska**

**June 2018**

After discussion and review of Hilcorp Alaska, LLC's (Hilcorp) marine mammal monitoring plan for its proposed Liberty Development and Production Island (LDPI) Project, panel members have answered the questions below set forth by the National Marine Fisheries Service's (NMFS) 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 Activities**

Hilcorp is proposing to develop the Liberty Oil field, located in Foggy Island Bay in the Beaufort Sea. Project activities would include the construction of a gravel island in 5.8 m of water approximately 8 km offshore, the installation of a sub-sea pipeline, the construction of ice roads during the winter, drilling, and production. There would also be vessel, vehicle, and aircraft activities associated with the project. The proposed activities included in the proposal reviewed by the panel would span five years (with a proposed start date of December 2019) and would occur year-round.

More information regarding the project and the proposed marine mammal incidental take regulations can be found on the NMFS website at:

<https://www.fisheries.noaa.gov/action/incidental-take-authorization-hilcorp-alaska-construction-and-operation-liberty-drilling-and->

**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?**

Hilcorp's stated objectives apply to mitigation and monitoring using both visual and acoustic methods, and are as follows:

- Avoid or minimize injury or death to marine mammals;
- Minimize the likelihood that impacts will occur to the species, stocks, and subsistence use of marine mammals occurring in the Action Area of Foggy Island Bay and areas immediately outside of the bay;

- Eliminate the potential for Level A injury takes and eliminate or reduce the potential for Level B harassment takes through the use of Project timing and shutdown zones;
- Avoid overlap of noise-producing activities with traditional subsistence hunting locations and events;
- Quantify the number of marine mammals exposed to or taken by harassment (Level B).

The panel noted that the stated objectives address the MMPA's requirements to 1) minimize impacts on marine mammals and the availability of marine mammals for subsistence taking and 2) further understanding of the impacts of Hilcorp's activities on marine mammals. The panel did not recommend any modifications.

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

Overall, the panel believed that the stated objectives could be achieved using the proposed mitigation and monitoring methods, which include:

- using two land-based protected species observers (PSOs) to monitor the Level A harassment zones<sup>1</sup> for 30 minutes before, during, and for 30 minutes after pile- and pipe-driving activities during the Year 2 open-water season;
- using a third island-based PSO to deploy an unmanned aircraft system (UAS)<sup>2</sup> to monitor the Level B zone for 30 minutes before, during, and for 30 minutes after pile- and pipe-driving and slope shaping activities during the Year 2 open-water season;
- using a land-based based PSO to monitor the Level B zone during Year 3 and 4 open-water seasons;
- using standard soft-start and delay (i.e., zone clearance) procedures during pile- and pipe-driving activities;
- ceasing pile- and pipe-driving activities if a bowhead whale enters the Level A harassment zone;
- ceasing pile- and pipe-driving activities if a beluga whale or pinniped remains within the Level A harassment zone for 20 minutes;
- conducting on-ice activities at least 150 m from any observed ringed seal lair;
- using passive acoustic monitoring during Year 2-5 open-water seasons;
- implementing vessel and aerial operation and speed reduction procedures, as appropriate, to avoid interactions with whales;
- avoiding transit within designated North Pacific right whale critical habitat and not approaching within 5.5 km of Steller sea lion rookeries or major haulouts.

In addition, the existing Plan of Cooperation and Conflict Avoidance Agreement will be renewed and implemented annually to ensure that project activities are coordinated with the North Slope Borough and Alaska Native whaling captains.

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<sup>1</sup> 1.94 km for low-frequency cetaceans (bowhead and gray whales), 0.1 km for mid-frequency cetaceans (beluga whales), and 0.5 km for pinnipeds (bearded, ringed, and spotted seals).

<sup>2</sup> If UAS deployment is not possible, the third PSO would monitor for marine mammals from a vessel located at the edge of the Level A zone.

The panel was concerned that PSOs would not be able to quantify the number of marine mammals exposed to or taken by Level A and B harassment. Of particular concern was the ability to implement the required mitigation measures for bowhead whales during pile- and pipe-driving activities because of limitations in being able to monitor the full extent of the Level A zone due to the large size of the zone (1.94 km). Although the PSOs will be deployed on an elevated land-based platform, detection of bowhead whales (and other marine mammals) would be limited at night and in low visibility conditions.

Hilcorp has proposed to use UAS to supplement visual monitoring by land-based observers; however, the panel noted that the UAS viewing area is not suitable for monitoring the presence of marine mammals in the harassment zone for the purpose of implementing mitigation measures. Detections would be limited due to the narrow strip width of imagery from the UAS. At present, the panel believes that UAS technology by itself would not be effective for mitigation purposes.

That said, the panel acknowledged that the potential for Level A takes of bowhead whales is extremely low based on the timing and location of the proposed activities and the proposed immediate shutdown requirements. Based on previous observations of bowhead whale behavior in the Beaufort Sea around oil and gas facilities (e.g., at Northstar), bowhead whales are unlikely to approach the project area during construction activities.

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

The panel noted that the use of UAS technology could provide information on the location of marine mammals in the project area and how long they remain in the area. This would allow Hilcorp to incorporate marine mammal observations into modeling of exposures. However, there are very limited studies involving the use of UAS technology for marine mammal mitigation and monitoring purposes. Given uncertainties regarding its effectiveness as a mitigation and monitoring tool, the panel recommended:

- Hilcorp should consult with biologists at the NMFS Marine Mammal Laboratory and other scientists and users familiar with the use and limitations of UAS technology for studying marine mammals at sea<sup>3</sup> regarding appropriate protocols and procedures for the proposed project.

Hilcorp plans to conduct passive acoustic monitoring using autonomous sound recorders deployed on the sea floor at the start of the open-water season in Years 2 to 5. A total of four recorders would be deployed – two at close range northwest of the facility (at 0.5 and 2 km) and two at a greater distance to the north and northeast of the facility (both at 15 km). Hilcorp would not deploy the recorders until the start of the open-water season and would not retrieve them until the end of the open-water season. This approach raised a few concerns:

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<sup>3</sup> See, for example, UAS users identified at <https://swfsc.noaa.gov/UASsymposium/>.

- There would be no monitoring of sounds produced by construction activities during the ice-covered season. As noted in Liberty’s IHA application, the measurements used to estimate sound levels under ice for this project were taken at Northstar Island over ten years ago, were limited, and were taken in deeper water.
- There would be no monitoring of marine mammal presence in the vicinity of the island during the ice-covered season. Previous acoustic monitoring studies have detected bearded and ringed seal vocalizations north of Utqiagvik (Barrow) throughout the winter months, during periods of 80-100% ice cover (MacIntyre et al. 2013, Jones et al. 2014). Although models indicate sound propagation is reduced under ice as compared to open water, Level B takes of seals during pile-driving activities are expected to occur. However, Hilcorp has not proposed to conduct any monitoring of Level B takes during construction activities that would take place in ice-covered months.
- The number of recorders proposed to be used may be inadequate, particularly if one of the recorders fails. Because the recorders would not be retrieved until the end of the open-water season, loss of acoustic data due to a failure would not be detected in a timely manner.
- Acoustic recorder data will be used to verify impact thresholds using weighted SELs for PTS onset. The panel noted that the sampling rate of the acoustic recorders will not be high enough to fully capture mid-frequency cetacean hearing range for weighted threshold calculations. Specifically, frequencies between 128 and 160 kHz will not be characterized but the activities (construction and pile driving) will generate low frequency dominated sounds and thus, the panel acknowledges that the recorders will be able to characterize thresholds adequately.

The panel discussed two options for recording sound production under ice during pipe-driving: deployment of recorders prior to the start of winter and deployment through drilled ice at the time of pile-driving (and other sound-producing activities). The deployment of recorders prior to the start of winter may be less risky (in terms of ice movements crushing or pulling the recorder from its mooring) if those recorders are deployed farther from shore, in deeper water, but close enough to adequately characterize sounds of the activities above ambient levels (received levels at least 6 dB above ambient). It may also require deployment of a different, lower profile recorder than the Autonomous Multichannel Acoustic Recorder (AMAR) design proposed for use. Drilling through ice and deploying a recorder at the time of construction activities may be more feasible for monitoring sound levels in shallower locations. The panel recommended:

- Deployment of acoustic recorders during ice-covered periods to obtain data on both presence of marine mammals and sound levels generated during pile driving activities;
- The deployment of additional recorders, or mid-season checks of recorder performance and downloading of data, to provide redundancy and avoid the risk of losing all of the season’s data if the recorders are lost or malfunction;

The panel also encouraged Hilcorp to consider deployment of additional acoustic recorders approximately 15 km northwest of the project area to facilitate a broader, multi-year approach to analyzing the effect of sound exposure on marine mammals by various LDPI and non-LDPI sources (such as vessel traffic, the Northstar production facility, seismic surveys (i.e., TGS), etc.). As noted by Ellison et al. (2016), “estimates of the instantaneous sound level to which individuals are exposed over time from multiple sources suggests that the presence of multiple

sound sources might not substantially increase the maximum SPL [sound pressure level] to which most individuals in a given population are exposed, but may affect the duration of exposures above a given level. However, inferences might differ at higher modeled levels of industrial activity, such as a greater number of concurrent seismic surveys. Additionally, the cumulative effects of exposure to multiple sound sources may be more relevant at the population level on a chronic basis than at the individual level on an acute basis, particularly if the exposure includes increases in other anthropogenic activities, such as commercial shipping and other types of vessel traffic.”

Finally, the panel noted that the resolution provided by the laser range finders could be improved (better than 600 m). The panel recommended:

- Investigating the latest laser range finder technology and using finders that would improve the resolution and range of detections of marine mammals beyond 600 m.

#### **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 the objectives?**

The panelists questioned whether the proposed measures to avoid seal lairs were adequate. Few details were provided as to how lairs would be detected, except to note that a subsistence advisor would be used. Detection techniques commonly involve the use of dogs to detect lairs, or having PSOs or local hunters scout the area in advance of road construction or vehicle traffic. However, it is not clear the extent to which those methods may actually attract predators (like polar bears) to the lairs. Also, there was some concern that the proposed 150 m avoidance distance may be inadequate for preventing disturbance of seals in lairs.

The panel recommended:

- Increasing the distance for avoidance of seal lairs from 150 m to 300 m;
- Consultation with local hunters regarding the best techniques for detecting seal lairs, particularly in lieu of changing climate conditions which may result in lairs being more exposed;
- Collaboration with NMFS on a review of past incidents of seal disturbance and the development of more appropriate mitigation measures for avoiding disturbance of seal lairs, including minimum distances for avoiding lairs; and
- Expanded data collection on lair detections and associated mitigation, including:
  - Detection method (dogs, hunters, thermal imaging, etc.);
  - Training and previous experience of dogs and/or hunters in detection of lairs;
  - Distance at which lair was first detected;
  - Activities being conducted when lair was detected;
  - Distance between activities and lair;
  - Response by seals (if any);
  - Observations of other wildlife in area (i.e., polar bears);
  - Mitigation measure(s) implemented and outcome.

## 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 recommended that Hilcorp provide the following information in its final report(s):

- Histograms of the perpendicular distance at which marine mammals were sighted by the PSOs.
- An estimate of the effective strip width of the island-based PSOs and the UAS imagery.
- Information on sound levels measured during different activities;
- Sightings and locations of marine mammals associated with acoustic recordings<sup>4</sup>;
- Acoustic detections of marine mammals;
- A summary of the number of calls and emails that Hilcorp sent and received from the communities regarding their annual operations. If possible, this information should be provided by village.
- An assessment of which outreach and communication methods were effective at relaying information to, receiving information from, and addressing the concerns of the local communities.
- A summary of the amount of time during which operations were conducted when PSOs could not effectively monitor (e.g., during darkness and periods of inclement weather), and a similar summary of the amount of time during which operations were conducted when PSOs could effectively monitor. Include details about how it was determined that the PSO monitoring was effective.

The panel also recommended that a Hilcorp representative with technical knowledge of the project report back, in person, on the results of mitigation and monitoring efforts to the villages, village whaling captains, and the Alaska Eskimo Whaling Commission.

## References

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- Jones, J.M., B.J. Thayre, E.H. Roth, M. Mahoney, I. Sia, K. Mercurief, C. Jackson, C. Zeller, M. Clare, A. Bacon, S. Weaver, Z. Gentes, R.J. Small, I. Stirling, S.M. Wiggins, and J.A. Hildebrand. 2014. Ringed, bearded, and ribbon seal vocalizations north of Barrow, Alaska: Seasonal presence and relationship with sea ice. *Arctic* 67(2): 203-222.
- MacIntyre, K.Q., K.M. Stafford, C.L. Berchok, and P.L. Boveng. 2013. Year-round acoustic detection of bearded seals (*Erignathus barbatus*) in the Beaufort Sea relative to changing environmental conditions, 2008–2010. *Polar Biology* doi:10.1007/s00300-013-1337-1.

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<sup>4</sup> This information would also facilitate a broader, multi-year analysis of aggregated exposure from known, measured sources of underwater sound, as per Ellison et al. (2016).

## 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.