

**Open Water Peer Review Panel
Monitoring Plan Recommendations Report
for Fairweather's Proposed Anchor Retrieval Program, Chukchi and
Beaufort Seas, Alaska**

March 2016

The Open Water Peer Review Panel (Panel) reviewed Fairweather LLC's Incidental Harassment Authorization (IHA) and marine mammal monitoring and mitigation plan (4MP) for its proposed 2016 Anchor Retrieval Program, Chukchi and Beaufort seas. Panel members answered the questions below set forth by the National Marine Fisheries Service's (NMFS) Office of Protected Resources (OPR) and provide the following recommendations and additional guidance. 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

Fairweather plans to retrieve large seafloor anchors and associated gear (i.e., chain, wire rope, clump weights, connecting gear, and float ropes that weigh up 20,000 lbs) that were deployed as part of the Shell's exploratory drilling operation in 2012 and 2015. Anchors will be retrieved at five locations: (1) Good Hope Bay in Kotzebue Sound, (2) Burger A in the Chukchi Sea, (3) Burger V in the Chukchi Sea, (4) Kakapo in the Chukchi Sea, and (5) Sivuilik in the Beaufort Sea. Anchors and the associated gear are configured slightly differently at each location depending on their specific purposes. They will be retrieved using three specialized Anchor Handling Towing Supply Vessels and an oil spill response vessel. Operations are planned for the open-water season (early July through October) in 2016.

Fairweather intends to first retrieve anchors in Kotzebue Sound in early July. From there, they will move to the Chukchi Sea sites and work there until it becomes possible to access the Beaufort Sea site as the ice retreats. Once the Beaufort Sea is navigable, two vessels will transit to the Sivuilik site to retrieve those anchors. Fairweather's intent is to have all vessels exit the Beaufort Sea by 25 August 2016 to avoid possible conflicts with bowhead whale hunters. One or two vessels may need to transit to Dutch Harbor during the season to offload anchors and other equipment because of limited deck and storage space.

Interferometric sonar, multi-beam sonar, side scan sonar, and/or a ROV will be used to visualize the anchors and associated gear. The float rope or anchor chain will be secured and pulled on deck. Once connected to the vessel, the anchor winch and ship thrusters (using dynamic positioning) will be used to unseat and retrieve the anchors. Sound levels for anchor handling were measured by Shell in 2012 when the anchors were deployed. Received sound levels were measured at 143 dB at 860m.

Fairweather's 4MP outlines how vessel-based monitoring will be their primary method for meeting the plans objectives.

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 Fairweather's 4MP (page 4) are:

- Establish real-time mitigation procedures, if necessary, as required by the IHA and LOA (Letter of Authorization being sought from the U.S. Fish and Wildlife Service [USFWS] for walrus and polar bears).
- Collect information needed to estimate the number of exposures of marine mammals to sound levels that may result in harassment, which must be reported to NMFS and USFWS.
- Collect data on occurrence and activities of marine mammals in the area and timing of the anchor retrieval activities.
- Provide an opportunity to collect information on behavioral response of marine mammals to vessels.
- Provide a communication channel to coastal communities and whalers.

The specific objectives of the vessel-based monitoring program (page 11) are very similar to the overall objectives of the 4MP but provide more specifics in some instances.

- The basis for real-time mitigation, if necessary, as required by the various permits,
- Information needed to estimate the number of "takes" of marine mammals by harassment, which must be reported to NMFS and USFWS,
- Data on the occurrence, distribution, and activities of marine mammals in the areas where the program was conducted,
- Information to compare the distances, distributions, behaviors, and movements of marine mammals relative to the anchor handling activities, and
- A communication channel to coastal subsistence communities, including Iñupiat subsistence hunters.

The Panel believes that the objectives are appropriate but may not be fully addressed by the proposed 4MP, as discussed in more detail in the following section.

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

Fairweather proposes to use vessel-based Protected Species Observers (PSOs) to monitor for marine mammals during vessel operations during all daylight hours. The PSOs will observe

marine mammals and implement real-time mitigation measures, as necessary and possible. However, once an anchor is being retrieved, the process cannot stop until the anchor is on board a vessel because of safety considerations. Therefore, modifying operations or implementing mitigation measures will not be possible for the periods of time when anchors are connected to the vessels.

Further, Fairweather acknowledges that PSOs will not be able to monitor the entire 120 dB “safety zone” or Level B disturbance zone during anchor handling because that zone extends out 12 km from the vessel. Vessel-based PSOs cannot see that far from their observation position on the vessel thus cannot monitor the number, species, reaction or other information about marine mammals in the entire 120 dB zone. Instead, Fairweather proposes that PSOs will focus on the 160 dB zone, which is calculated to extend out 1 km or less. The PSOs will conduct behavioral observations of marine mammals to improve the understanding of how marine mammals respond to the activities and sounds associated with anchor retrieval.

The Panel noted that asking PSOs to conduct focal follows of marine mammals could interfere with their ability to collect density estimates of marine mammals at each specific site. Fairweather plans to have one PSO scan the area while the other is conducting focal follows. If this occurs, the total number of PSOs scanning to estimate density of marine mammals for specified time periods should be noted and accounted for during analysis of sighting data. The Panel also recommends dedicating one PSO to focal follows only when new noise sources will start or when ongoing noise sources will stop. The Panel believes focal follows will only be useful to identify changes in behavior related to the onset or ending of a noise source. This will require a very close communication with machinery operators.

The inability of vessel-based PSOs to monitor the entire zone where marine mammals might be exposed to sounds from the operations results in Fairweather not being able to fully address their objectives, other than the first and last objective. PSOs will be able to observe some marine mammals that might be exposed to anthropogenic sounds or observe impacts caused by anchor handling sounds but they will likely miss some marine mammals within the Level B zone and will not be able to see “over the horizon.” Therefore, their estimates of exposure will be negatively biased unless somehow corrected. This is not only a problem with Fairweather’s proposed monitoring program but a general problem with vessel-based PSOs, as the Panel has pointed out many times in reviews of IHA applications over the past years.

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?

Panel members were concerned that a single density estimate, from an area and habitat other than the actual specific anchor retrieval sites, was used to calculate the number of marine mammals that might be exposed to anthropogenic sounds for all five sites. Subsequent to the Peer Review Panel meetings, Fairweather revised their take estimates using monthly, depth-stratified density estimates recommended by the NMFS Alaska Fisheries Science Center and Alaska Regional Office.

The Panel further recognizes the need to have and use better density estimates for each species of marine mammal, including the coefficient of variation for those estimates, across the Beaufort and Chukchi seas and more specifically for each of the anchor retrieval sites. These estimates are needed to provide better information to the public and decision makers, including NMFS, about possible impacts to individual and populations of marine mammals. Better estimates of density and variation in the density of marine mammals will also be helpful for estimating numbers of marine mammal exposed and possibly impacted to anthropogenic sounds. If NMFS is planning to continue to authorize the taking of marine mammals incidental to oil and gas activities in the Beaufort and Chukchi seas, Panel members recommend that NMFS, in partnership with other entities as appropriate, financially support broad-scale surveys of marine mammals in estuarine and marine waters of the Chukchi and Beaufort seas during the open-water season in order to derive relatively accurate and precise marine mammal density estimates at the appropriate spatial and temporal scales to derive take estimates prior to an activity taking place. Such surveys should be designed to distinguish and enumerate separately the various species, and may require a combination of aerial, vessel, land-based, and/or acoustic monitoring methods.

The Panel recommends that Fairweather clear a larger zone for side scan sonar than is suggested in their 4MP. The zone identified in Table 2 specifies that the 180 dB zone is 100 m. The Panel recommends that using a larger zone of up to 1 km (based on the area in which received levels are estimated to be 160 dB or greater) is feasible and would provide added precaution that sonar does not impact marine mammals that might be more sensitive to the higher frequencies of sonar (such as belugas). Because of the directionality of the beams of side scan sonar, the Panel recommends to concentrate the PSO effort to the sides of the vessel, rather than to the front quadrant.

The Panel was concerned about the use of spherical spreading ($20 \log R$) for estimating the propagation loss of sonar signals. The Panel recommends that the zones be recalculated using practical spreading ($15 \log R$). For side scan sonar, the sound energy is directed downward in narrow beams, therefore spherical spreading is not expected to occur to larger distances than the depth of the area. By applying the practical spreading, the potentially impactful sound thresholds will substantially larger than predicted with $20 \log R$.

The Panel recommends that Fairweather measures spectral density of signals associated with the sonar equipment. There is a need to better understand and potentially mitigate energy below the 160 kHz level (upper end of odontocete hearing) for instruments with carrier frequencies at or above 200 kHz.

The Panel also recommends that Fairweather clears a larger zone than the 160 dB zone before hooking up to, unseating, or pulling the anchors. The 160 dB zone is approximately 221m but clearing a larger zone out to at least 500m will be more protective of marine mammals and should have little impact on operations to retrieve the anchors.

Fairweather is expecting to use Communication Centers in villages to help reduce potential conflict with subsistence hunters or marine mammals by communicating hunter sightings of marine mammals. The Panel agrees this is a positive method for reducing potential impacts, but

the Panel is also concerned that the Communication Centers might not be in operation because Shell is apparently not funding them in 2016. The Panel encourages NMFS to promote communications with coastal villages during all proposed activities that may result in incidental harassment of marine mammals in the Chukchi and Beaufort seas in 2016.

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 Panel agrees that Fairweather's 4MP can be improved by including passive acoustic monitoring (PAM). PAM could be used to better understand variations in the acoustic footprint of removing anchors and site specific aspects of acoustic propagation. If implemented appropriately, PAM could also provide additional needed information about the propagation of sounds and sound characterization associated with the use of sonar.

As mentioned above, using only vessel-based PSOs provides a biased estimate of the number of marine mammals potentially exposed and impacted by anchor handling activities. PAM potentially provides data and acoustic observations about impacts on calling behavior of marine mammals and potentially on the distribution of vocalizing animals. If the PAM program is designed correctly it also provides continuous (24/7) data on marine mammal presence before, during, and after the disturbance period, which cannot be accomplished with PSO efforts on the operation vessels.

The Panel encourages Fairweather to employ PAM in the vicinity of the proposed anchor handling activities. Previous acoustic data exist for most of the sites, including information on calling marine mammals, and could be compared with acoustic monitoring data collected during anchor retrieval.

PAM would also provide better data on the presence, calling behavior and possible impacts to marine mammals for all the locations where anchors are deployed. Additional PAM would be especially helpful for Kotzebue Sound where there is no information on the potential effects of acoustic disturbance to the seasonality of marine mammal presence, and habitat use. Comparison of data from PAM during anchor retrieval in 2016 in the Chukchi and Beaufort seas with past data would also provide insights into potential impacts.

Fairweather should also coordinate closely with the communities nearest to each of the locations where it plans to retrieve anchors. They should plan the timing of their activities to avoid the peak of marine mammals' presence and subsistence hunting. Avoiding belugas and beluga hunting in Kotzebue Sound and at the Kakapo site, which is relatively close to Point Lay, will be especially important. In many situations (e.g., Kotzebue Sound), the communities have very good sources of information about the timing, presence and relative density of marine mammals in their area. Fairweather could include traditional knowledge among other sources of information to help guide the scheduling of its activities to be as least impactful as possible. In the past, Point Lay has recommended that offshore activities not commence until the beluga hunt

is completed (usually by mid-July??). Point Lay has been concerned that activity offshore may cause beluga behavior to change, making it more difficult for the community to get resources essential for meeting nutritional and cultural needs.

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 does not have any additional recommendations regarding this issue beyond what has been suggested in previous years.

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.