



MARINE MAMMAL COMMISSION

20 April 2017

Ms. Jolie Harrison, Chief
Permits and Conservation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3225

Re: Permit Application No. 20465
(Marine Mammal Laboratory)

Dear Ms. Harrison:

The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the above-referenced permit application with regard to the goals, policies, and requirements of the Marine Mammal Protection Act (the MMPA). The Marine Mammal Laboratory (MML) is seeking to renew its permit to conduct research on cetaceans during a five-year period—permit 14245 authorized similar activities.

MML proposes to conduct research on numerous species of cetaceans in the North Pacific Ocean, Bering, Beaufort and Chukchi Seas, and Gulf of Maine. The purpose of the research is to investigate (1) abundance and distribution, (2) foraging ecology, (3) social and genetic structure, (4) movement patterns and habitat use, (5) disease and health, and (6) acoustic behavior and hearing. Researchers would harass, observe/track¹, photograph/videotape², capture³/restrain/handle/release, weigh/measure, record acoustically⁴ and conduct playbacks⁵ on, sample⁶, instrument⁷, and/or

¹ Including conducting focal follows.

² Including using manned aircraft, unmanned aerial systems, and underwater pole cameras and conducting photogrammetry.

³ Only juvenile and adult beluga whales from the Beaufort Sea, Bristol Bay, Eastern Bering Sea, and Eastern Chukchi Sea stocks would be captured. They would be captured using break-away hoop nets, tangle nets, or encirclement nets or by stranding them on mud flats.

⁴ Including conducting acoustic evoked potential (AEP) and masked hearing tests.

⁵ Using a sound source that emits various types of impulsive and non-impulsive signals (e.g., odontocete calls, vessel sounds, pile driving, and an airgun array). A sound source would be active from 10 seconds up to 10 hours, and an individual animal would be exposed to received levels no greater than 198 and 185 dB re 1 $\mu\text{Pa}^2\text{-sec}$ for impulsive and non-impulsive sounds, respectively, for mid-frequency (MF) cetaceans.

⁶ Including skin, blood, blubber, swabs, exhaled air, feces, urine, milk, and/or a tooth. Environmental DNA, sloughed skin, and feces from free-ranging cetaceans also could be collected opportunistically from the water. Multiple biopsy samples (not to exceed three samples/year) could be collected from individual Bristol Bay beluga whales, killer whales, humpback whales, and North Pacific right whales.

⁷ With either suction-cup, dart, implantable, and/or spider tags. One to three tags (but no more than two invasive tags) could be attached to any given animal, depending on the species (see the take tables for specifics). Prophylactic antibiotics may be used to coat some of the invasive tags.

conduct procedures⁸ on numerous cetaceans of both sexes and various age classes (see the take tables). Free-ranging delphinid and porpoise calves less than 1 year of age and neonate calves (e.g., the presence of skin folds and/or a non-rigid dorsal fin) of all other cetacean species would not be biopsy sampled—females with those calves however could be biopsy sampled. Only juvenile and adult cetaceans would be instrumented with invasive tags (i.e., dart, implantable, or spider tags). Cetacean calves less than 6 months of age would not be instrumented with suction-cup tags, but females with those calves could be instrumented. Various species of marine mammals could be harassed incidental to the proposed activities (see the take tables).

To minimize disturbance during the various activities, researchers would cease activities if an animal exhibits signs of harassment (e.g., rapid changes in direction or prolonged diving). Vessels would approach animals slowly and would not separate females from their calves. In addition, aircraft would not circle a cetacean or group of cetaceans for more than 15 minutes. During playback studies, (1) pre- and post-monitoring would be conducted, (2) groups with calves would be avoided when possible, (3) if calves are present in targeted groups of beluga whales because groups without calves are not observed in the study area, a playback trial would cease if a dependent calf is clearly separated from the accompanying female, and (4) a playback trial would cease if a target beluga whale or any non-target marine mammal exhibits repetitive strong adverse reactions to the playback activity or the vessel independently of the distance to the source (e.g., unusual or abnormal surface and subsurface behavior involving apparent disorientation and confusion or dramatic changes in group cohesion putting the individual at risk of stranding or being struck by a vessel).

Further, MML would not target dependent beluga whale calves or females with those calves during live-capture activities. Researchers would tend nets every 15 minutes or would remove those nets after 15 minutes. Captured beluga whales (and any non-target animal) would be attended to immediately and the net would be removed from the water. Handling would occur for no longer than 2 hours, with an attending veterinarian monitoring the animal throughout. If an animal exhibits signs of distress while handled, it would be moved to deeper water and supported until it swims away. If it is unable to swim away or the veterinarian determines that it likely would die, it would be offered to the Alaska Native community for subsistence use. If the Alaska Native hunters do not want the animal for subsistence use and are not willing to euthanize it with a rifle, then the veterinarian would administer drugs either to facilitate recovery or euthanize the animal. MML requests up to four beluga whale mortalities⁹ from each stock during the five-year period. However, if four or more beluga whales of any stock die during capture or due to tagging activities, research activities would be halted until methods can be reevaluated. MML's Institutional Animal Care and Use Committee has reviewed and approved the research protocols.

Beluga whale live-capture activities

Although the Commission believes MML's various measures to minimize impacts are prudent, it also believes that MML falls short of minimizing impacts in a few instances. Specifically,

⁸ Including conducting ultrasound, lavage, stomach temperature studies with ingestible 'pills', and measuring colonic temperature.

⁹ By either unintentional mortality or intentional mortality (i.e., euthanasia for humaneness purposes).

when MML captures a third trimester pregnant female¹⁰, it proposes to conduct numerous activities on those animals including AEP and masked hearing studies, ultrasound, both non-invasive (i.e., swabs, exhaled air¹¹, sloughed skin) and invasive sampling (i.e., blood, skin, and blubber), and tagging (i.e., suction-cup, dart, and/or spider tags). Although MML indicated that it would handle those females with limited grounding, maintain them in a neutral position to avoid pressure on the abdomen, and not raise the caudal peduncle to access the urogenital region, the Commission believes those measures are not sufficient to limit risk to the pregnancy.

MML indicated that the most stressful part of the handling is capturing the animals in nets and disentangling them. MML further stated that although some procedures (namely blubber biopsy sampling, tagging, and collecting breath via the metabolic chamber) may cause stress to the pregnant female, the results would provide data on a critical component of the population and metabolic requirements of pregnancy in wild belugas. The Commission doesn't refute that the actual capture and disentanglement is quite stressful, but it believes that the female's stress level would continue to be elevated throughout the approximate 2 hours of handling and could compromise the unborn calf. Thompson et al. (2014) found that cortisol levels in the blood¹² and blow were elevated in wild-caught beluga whales from Bristol Bay¹³. Specifically, wild-caught beluga whales showed an 8.8 to 2,000 percent increase in cortisol levels in blow from when the animal was entangled in the net (within 45 minutes of entanglement) to when the health assessment activities concluded (47–93 minutes after those activities were initiated). Thompson et al. (2014) also detected a significantly positive relationship between handling time and cortisol in both blood and blow. Therefore, the Commission believes that the overall handling time¹⁴ for third trimester females should be limited, consistent with other live-capture cetacean permits. The Commission recommends that NMFS require MML to handle adult females captured from April to mid-August for no longer than 20 minutes during which time researchers can either (1) determine whether a female is pregnant using ultrasound and if not pregnant, conduct all the various activities or (2) assume that the female is pregnant and conduct a reduced number of activities in that 20 minutes. In either instance, multiple activities can be conducted simultaneously (e.g., collecting blood, swabs, attaching a suction-cup or dart tag) to minimize handling time.

MML stated that it would obtain data on metabolic requirements of beluga whales by collecting breath samples using a metabolic chamber¹⁵. MML then clarified that the metabolic chamber would not be used to conduct a traditional metabolic study in which the entire breath is collected in a closed chamber but that an open system would be used to collect exhaled air to measure the volume based on the rate of flow through the system. Given that the flow of air includes both breath and ambient air, target concentrations (i.e., carbon dioxide) cannot be measured absent information on the ratio of breath to ambient air. Therefore, the Commission recommends that NMFS ask MML to describe how it plans to measure the target concentrations

¹⁰ MML would assume that any female longer than 302 cm and captured between April and mid-August is a third trimester pregnant female.

¹¹ Which could be collected using a metabolic chamber.

¹² Plasma.

¹³ Similar results were found when captive belugas and bottlenose dolphins were held out of the water (Thompson et al. 2014 and Houser pers. comm., respectively).

¹⁴ Including conducting invasive procedures on (i.e., instrumenting with spider tags).

¹⁵ Up to three 20-minute sessions during the 2-hour handling time.

using the metabolic chamber. If those concentrations cannot be measured, the number and length of metabolic sessions should be adjusted accordingly.

In addition, MML indicated that it would not be using a local anesthetic during blubber biopsies¹⁶ due to the risk of contaminating the sample with the anesthetic and due to its view that the injections of the local anesthetics and extra time required to allow perfusion would cause more distress than collecting the sample without local anesthesia. The Commission questions that reasoning. First, the Commission is unaware of instances in which an anesthetic has contaminated the sample, which can be resolved by analyzing anesthetic blanks. Second, local anesthetics can be administered first, and other activities conducted while the medicine perfuses the underlying tissue. Finally, researchers should provide local pain control when they have the opportunity, that is, during live-capture activities. Researchers that conduct live-capture activities on both cetaceans and pinnipeds generally use local anesthetics during blubber biopsy sampling—based on veterinary review, MML researchers were required to use local anesthetics as well under the most recent permit 14245. The Commission therefore recommends that NMFS require MML to use a local anesthetic during blubber biopsy sampling and in general require the use of a local anesthetic for both blubber and muscle biopsy sampling as a standard permit condition in all future permits that involve live-capture activities on both cetaceans and pinnipeds.

Remote biopsy sampling

NMFS's Alaska Regional Office (AKR) has developed guidelines for biopsy sampling of Cook Inlet beluga whales (CIBWs)¹⁷. Those guidelines stipulate various measures researchers should take when proposing to conduct a biopsy sampling project on CIBWs. Some measures are quite reasonable, while others are a bit restrictive, though well-intentioned. The Commission recommends that NMFS require MML to abide by measures 1-4 in the AKR's guidelines and to follow, to the extent possible, the remaining measures.

Playback studies

MML plans to conduct playback studies on both live-capture and free-ranging beluga whales. Researchers would emit various sounds from 10 seconds up to 10 hours and from up to two speakers. MML's revised application¹⁸ indicated that the maximum source level would be 197 dB re 1 μ Pa at 1 m plus an additional 3 dB to account for the second speaker. The signal duration would range from 0.5 seconds with an unspecified duty cycle for impulsive or intermittent sound up to 10 hours of continuous sound not to exceed the Level A thresholds for MF cetaceans of 198 and 185 dB re 1 μ Pa²-sec for impulsive and non-impulsive sounds, respectively. The Commission understands MML's desire for flexibility in the types of playback studies it can conduct. However, basic information on the estimated range to effects for Level A and B harassment¹⁹ is lacking in the application²⁰ and should have been provided to evaluate not only the effects on target animals but also on non-target animals and non-target species.

¹⁶ Using a sampling device up to 1 cm in diameter.

¹⁷ <https://alaskafisheries.noaa.gov/sites/default/files/guidancebiopsyworkshop0115.pdf>

¹⁸ Received on 11 April 2017.

¹⁹ Generally based on a worst-case scenario.

²⁰ The Commission requested this information during its initial review of the application a few months ago but the information was not included in the revised application.

Based on the Level A harassment thresholds and associated weighting functions for high- and low-frequency cetaceans and phocids and the source levels that could be emitted, those species could be affected at ranges approximately 15 to 34 times greater²¹ than the ranges for MF cetaceans when exposed to impulsive sources. Thus, the exclusion zone for MF cetaceans may not be sufficient for other species. And, although the maximum estimated range to effects for Level B harassment for impulsive sources is less than 500 m, the range for non-impulsive sources could be more than 215 km²². The Commission does note that, depending on where the playback studies occur, sound likely would be clipped by the fetch of the river or the presence of landmasses in general.

MML did indicate that the Level B harassment isopleths could reach considerable distances, well beyond the visual observer's capacity and then clarified in its revised application that it had included incidental harassment takes for harbor porpoises and harbor seals, accordingly. However, the numbers of takes for both species have not been increased in the revised application. Those numbers of takes remain unchanged from what had been proposed a few months ago in MML's original application when it indicated it would not harass non-target species. For these reasons, the Commission recommends that NMFS require MML to provide the estimated ranges of the various Level A and B harassment zones (accounting for presence of land in the various project areas) and ensure that the number of Level B harassment takes are sufficient for target beluga whales, non-target beluga whales, and non-target species (e.g., harbor seals, harbor porpoises, and any other species).

The Commission believes that the proposed activities are consistent with the purposes and policies of the MMPA. Kindly contact me if you have any questions concerning the Commission's recommendations.

Sincerely,



Rebecca J. Lent, Ph.D.
Executive Director

Reference

Thompson, L.A., T.R. Spoon, C.E.C. Goertz, R.C. Hobbs, and T.A. Romano. 2014. Blow collection as a non-invasive method for measuring cortisol in the beluga (*Delphinapterus leucas*). PLoS ONE 9(12): e114062. doi:10.1371/journal.pone.0114062

²¹ Assuming a source level of 200 dB re 1 μ Pa at 1 m, signal duration of 0.5 seconds, repetition rate of one ping/second, 20 10-second trials, sound propagation of 15 log R, and a weighting adjustment factor of 2 kHz, which is standard for impact pile driving in NMFS's user spreadsheet. Those ranges also could be 27 to 117 times greater than the range for MF cetaceans assuming the same parameters but a weighting adjustment factor of 1 kHz, which is standard for seismic surveys in NMFS's user spreadsheet. A 20-kHz weighting adjustment factor would yield yet different trends.

²² Both ranges were estimated based on a maximum source level of 200 dB re 1 μ Pa at 1 m and sound propagation of 15 log R, as delineated in the revised application.