



MARINE MAMMAL COMMISSION

6 June 2023

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. 26939
(Northeast Fisheries Science Center)

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 Northeast Fisheries Science Center (NEFSC) proposes to conduct research on pinnipeds in the Atlantic Ocean during a five-year period—permit 21719 authorized similar activities.

NEFSC proposes to conduct research on harbor, gray, harp and hooded seals from North Carolina to Canada. The purpose of the research is to investigate (1) abundance and trends, (2) distribution and movement patterns, (3) health and disease, and (4) foraging ecology. Researchers would harass, observe, photograph/videotape, capture, handle, restrain, measure/weigh, sedate, mark¹, sample², conduct ultrasound on, and/or attach instruments to³ numerous individual seals of either sex and various age classes per year (see the take table for specifics). NEFSC requested up to five mortalities⁴ each of harbor and gray seals per year and one mortality each of harp and hooded seals per year. Researchers would implement various measures to minimize impacts on pinnipeds and also would be required to abide by the National Marine Fisheries Service's (NMFS) standard permit conditions. NEFSC's Institutional Animal Care and Use Committee has reviewed and approved most⁵ of the proposed protocols. Updated protocols will be submitted for approval after NMFS has issued this permit.

¹ Using flipper tags, livestock markers, or non-toxic, water-soluble paint.

² Including blood, skin, blubber, teeth, swabs, vibrissae, hair, nails, and/or feces.

³ Including non-acoustic tags (i.e., very high frequency, SPOT, and SPLASH tags) and acoustic tags (i.e., Vemco V13 transmitters (V13 tags) and RETAGs).

⁴ Either unintentional or intentional mortality (i.e., euthanasia for humaneness purposes).

⁵ For example, sedation and blubber biopsy sampling of harp and hooded seals was not included.

Acoustic tags

V13 tags—In its [22 May 2018 letter](#)⁶, the Commission opposed NEFSC's request to use V13 tags in its previous permit application. The Commission argued that V13 tags (1) would not provide the intended data on population and foraging ecology, (2) would be perceived as loud by the tagged seals, which could alter those seals' normal behavior, and (3) would have a protracted impact on the tagged seals given the long tag retention and transmission⁷ time. The Commission further noted that the lower cost of V13 tags relative to satellite tags has no bearing on whether their use should be authorized under a research permit. Although the Commission recommended that NMFS prohibit NEFSC and any other applicant⁸ from deploying V13 tags on pinnipeds, the agency authorized NEFSC to conduct a pilot program investigating whether V13 tags affected the dive behavior or survival of gray and harbor seals. Those determinations have yet to be made.

In the current permit application, NEFSC proposed to deploy V13 tags and satellite tags on 15 non-pup gray seals and 15 non-pup harbor seals during the five-year period, with 15 additional animals of each species receiving only a satellite tag. To detect a significant effect on dive behavior with greater than a 50-percent probability and a maximum Type I error rate of 0.05, NEFSC indicated that it would need to tag roughly 30 animals in each group (with and without V13 tags) and roughly 60 animals in each group would need to be tagged to detect a significant difference in the number of animal transmission days (a proxy for survival) with greater than a 50-percent probability. Based on the few gray seals and the even fewer harbor seals that have been double-tagged in previous years, it is unclear whether tagging 15 additional seals in each cohort would provide enough statistical power to determine whether V13 tags affect dive behavior and survival. Further, none of the tags proposed for use (i.e., V13, SPLASH, SPOT) provide information on survival. The number of transmission days could be cut short due to factors unrelated to survival such as the tags falling off or getting ripped out of a flipper, tag failure, or tag transmission limitations.

For the few animals NEFSC tagged with V13 and/or SPLASH tags, animals without acoustic tags (n=3) made more dives per day on average and had slightly deeper and longer dives than those with acoustic tags (n=2). Those findings are similar to recent observations of decreased appetite in four captive harbor seals and three captive harp seals that were exposed to V13 tags in their pool (Jakobek et al. 2023). The captive seals also exhibited agitation and a reluctance to enter the water, causing the researchers to terminate their study on day two, when preset animal welfare endpoints had been reached. The V13 tag was not physically attached to any of the captive seals, as would be the case for NEFSC. Jakobek et al. (2023) additionally indicated that the captive seals were geriatric. Numerous captive-maintained, older-aged marine mammals have been documented to have high-frequency hearing loss, including pinnipeds (NMFS 2018). However, the seals in the Jakobek et al. (2023) study were still affected by a 69-kHz transmitter that operated, not only at a frequency that is 15 dB less than the seals' frequencies of best sensitivity⁹, but at a frequency prone

⁶ The rationale provided in the Commission's letter will not be repeated herein but is still valid and should be considered accordingly.

⁷ V13 tags are estimated to transmit for 915 days.

⁸ No other permittee is authorized to attach V13 tags to pinnipeds.

⁹ The underwater hearing range for phocids is 50 Hz to 86 kHz (NMFS 2018).

to cause presbycusis. For all of these reasons, the Commission again recommends that NMFS prohibit NEFSC and any other applicant from deploying V13 tags on pinnipeds.

RETAG—In addition to V13 tags, NEFSC proposed to attach a RETAG to three gray seals¹⁰ during the five-year period. The RETAG is an acoustic transmitting tag that communicates with an autonomous underwater vehicle (AUV) that follows the seal and collects video data¹¹ for up to 12 hours. NEFSC would use RETAGs to investigate foraging and predator-avoidance behavior and interactions with anthropogenic threats including fisheries and offshore energy development. The RETAG operates at a lower frequency¹² and has a higher source level¹³ than V13 tags. Thus, it has an even greater potential to impact the seals.

Based on the worst-case scenario (170 dB re 1 μ Pa at 1 m, 22.5 kHz, 0.2 sec ping every 10 sec for 12 hours, and 15logR), the Level A harassment zone for PTS would be 0.5 m¹⁴. NEFSC confirmed that the 28-cm RETAG would be positioned so that the acoustic portion of the tag is pointed aft and that the tag could be positioned 0.4 m away from the seal's ear and still be able to communicate with the AUV. It is unclear if that is still the case if the zone is 0.5 m and whether repositioning the tag more posteriorly on the back would inhibit swimming and diving. Even if PTS can be avoided, any seal instrumented with a RETAG operating at the worst-case scenario parameters could incur a temporary threshold shift (TTS) after less than 30 minutes. If the intent is to document foraging and predator-avoidance behavior with the RETAG AUV, it is unclear how NEFSC could do that accurately if at the same time the animals are experiencing TTS—or if being followed by an AUV in general. The Commission is unaware of any other permit that authorizes the use of an acoustic source that could cause TTS as an ancillary means to obtain data. Permits that authorize the use of acoustic tags as playback devices attached to pinnipeds transmit at levels below what could cause TTS. Since the RETAG is programmable, TTS can and should be avoided.

NMFS indicated that it could possibly lower the source level to 160 dB re 1 μ Pa at 1 m. However, that source level could induce TTS after two hours and thus is still insufficient. If the limiting factor is the ability to communicate with the AUV, a source level of 150 dB re 1 μ Pa at 1 m would minimize the possibility of TTS¹⁵ and allow for the RETAG to communicate with the AUV. At 5 m, the received level at the AUV would be approximately 140 dB re 1 μ Pa at 1 m, with the received level at the maximum separation distance of 30 m being approximately 128 dB re 1 μ Pa at 1 m. Since the separation distance is based on having sufficient light and low-turbidity conditions to obtain adequate video data, it is likely that the AUV would need to follow the animal at much closer

¹⁰ Based on the Commission's informal comments regarding potential permanent threshold shift (PTS), NEFSC indicated that it would not attach the RETAG to harbor seals as originally proposed.

¹¹ As well as proximity to the seafloor, depth, water currents, turbidity, biological productivity data, dissolved oxygen, temperature, and salinity.

¹² Based on the Commission's informal comments, NEFSC indicated that the bandwidth specified in the application was incorrect and should be 22.5–27 kHz, with a center frequency of 25 kHz.

¹³ NEFSC originally proposed to operate the RETAG at 185 dB re 1 μ Pa at 1 m but then lowered it to 170 dB re 1 μ Pa at 1 m. The source level and interval between pings are programmable, but less video data are collected at longer intervals.

¹⁴ When the lowest frequency was originally assumed to be 25 kHz, the zone was 0.4 m.

¹⁵ The worst-case scenario would result in a 0.5 m zone for TTS, which is the same size as the PTS zone using the current 170-dB re 1 μ Pa at 1 m source level.

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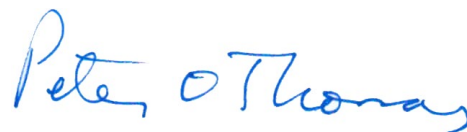
than 30 m. To minimize the potential to cause TTS, the Commission recommends that NMFS require NEFSC to either lower the source level of the RETAG to 140 dB re 1 μ Pa at 1 m or limit the total amount of time that the RETAG can transmit based on the source level to be used and the cumulative weighted TTS threshold. Since NMFS is in the process of revising its PTS and TTS thresholds, the Commission further recommends that, if the PTS and TTS thresholds are lowered or result in larger zones than currently estimated, NMFS adjust the RETAG source level, total transmission time, transmission interval, and/or separation distance as needed to minimize the potential for TTS.

Additionally, the co-investigator (CI) who would instrument the seals with RETAGs did not specify any experience conducting passive acoustic monitoring or active acoustic (or playback) studies. NEFSC did indicate that it could add the RETAG manufacturer's representative as a CI. However, that person's expertise lies with the AUV portion of the RETAG, not the acoustic components. Since RETAGs have only been deployed on sharks and sea turtles, the acoustic parameters relative to marine mammal hearing have yet to be assessed and implemented in the field—the novelty of which was acknowledged by NEFSC. Consistent with previous permit applications and issued permits, the Commission recommends that NMFS condition any issued permit to require that any CI instrumenting seals with RETAGs receive training in active acoustics before conducting such activity in the field.

Regarding acoustics in general, it is apparent that NMFS's acoustic expert is not being consulted on revised applications or responses to the Commission's acoustic comments. To maximize efficiencies and ensure accuracy of applications involving acoustic studies, the Commission recommends that NMFS ensure that its acoustic expert has reviewed (1) the final version of any application involving acoustic studies, including any revised application, before providing it to the Commission for comment or publishing it in the *Federal Register* notice for public comment and (2) any applicant's response(s) to the Commission's questions and comments involving acoustics.

Please contact me if you have any questions concerning the Commission's recommendations.

Sincerely,



Peter O. Thomas, Ph.D.,
Executive Director

cc: Amy Scholik-Schlomer, Office of Protected Resources

References

- Jakobek, B.T., S. Lair, X. Bordeleau, M. Desmarchelier, and J. Farley. 2023. Behavioral impacts of 69 kHz acoustic transmitter on aquarium-housed harbor seals (*Phoca vitulina*) and harp seals (*Pagophilus groenlandicus*). International Association for Aquatic Animal Medicine, Salt Lake City, Utah.
- NMFS. 2018. 2018 Revision to: Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing: Underwater acoustic thresholds for onset of permanent and temporary threshold shifts. Office of Protected Resources, Silver Spring, Maryland. 178 pages.