20 February 2019

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

Dear Ms. Harrison:

The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the application submitted by the U.S. Air Force (the Air Force) seeking issuance of regulations under section 101(a)(5)(A) of the Marine Mammal Protection Act. The Air Force proposed to take marine mammals by harassment incidental to conducting rocket and missile launch activities, rocket recovery activities[1], and overflight operations[2] at Vandenberg Air Force Base (VAFB) in California. The Commission also has reviewed NMFS's 24 January 2019 notice (84 Fed. Reg. 321)[3] announcing receipt of the application and proposing to issue regulations, subject to certain conditions.

The Air Force proposes to conduct up to 110 rocket launches, 12 Falcon 9 rocket recoveries[4], 15 missile launches, and various UAS overflights each year at VAFB. The main source of disturbance is from launch and landing noise and sonic booms emitted during launch and/or recovery activities. NMFS preliminarily has determined that, at most, the proposed activities would result in the temporary modification of the behavior of six pinniped species. It also anticipates that any impact on the affected species and stocks would be negligible. NMFS does not anticipate any take of marine mammals by death or serious injury and believes that the potential for disturbance will be at the least practicable level because of the proposed mitigation measures. The proposed mitigation, monitoring, and reporting measures include—

- avoiding, whenever practicable, launch and recovery activities during the harbor seal pupping season of March through June, unless constrained by human safety or national security;

[1] Associated with boost backs and landings of Space Explorations Technology Corporation's (SpaceX) Falcon 9 rockets.
[2] Of unmanned aerial systems (UASs). The National Marine Fisheries Service (NMFS) clarified that marine mammal taking would be subsequent to UAS operations, consistent with the Air Force's application, rather than operations of both manned and unmanned aircraft, as stated in the *Federal Register* notice. NMFS will amend the preamble and final rule to clarify this point.
[3] The Commission informally noted multiple typos, inconsistencies, minor errors, missing stipulations, and vague or misleading statements in the preamble and proposed rule. NMFS indicated all issues would be corrected in the preamble and final rule.
[4] The Commission informally noted that recovery activities are missing in various sections and tables of the preamble and proposed rule. NMFS indicated it would include those activities accordingly in the preamble, relevant tables, and final rule.

- conducting in-situ acoustic measurements[5] and using qualified observers to monitor pinniped activity at VAFB (1) from 1 January to 31 July during launch and recovery activities[6] of all space launch vehicles and (2) year-round during launches of new types of space launch vehicles and missiles that have not been monitored three times previously, launches of existing space launch vehicles that are expected to be louder than previous launches of the same vehicle types, and recovery of Falcon 9 rockets with a predicted sonic boom of greater than 1.0 pound per square foot (psf)[7];
- conducting in-situ acoustic measurements[5] and using qualified observers to monitor haul-out sites closest to the predicted sonic boom impact area on the Northern Channel Islands (NCI), if it is determined by modeling that a sonic boom of greater than (1) 2 psf is predicted to impact one of the Islands between 1 March and 31 July, (2) 3.0 psf 1 August and 30 September, and (3) 4.0 psf between 1 October and 28 February[7];
- using qualified observers to monitor (1) all pinniped activity for at least 72 hours before and 48 hours after any planned launch or recovery activities and (2) harbor seal and elephant seal activity within 2 weeks of activities during the pupping season[8];
- supplementing observations at VAFB and on NCI with time-lapse photography or videotaping of pinniped responses and night-vision capabilities, when feasible;
- abiding by various minimum altitude requirements for manned aircraft and UASs[9];
- reporting injured and dead marine mammals to the Office of Protected Resources and the West Coast Regional Stranding Coordinator using NMFS's phased approach and suspending activities, if appropriate; and
- submitting an annual report.

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[5] The Commission noted that Tables 14 and 15 in the preamble did not specify that concurrent visual observations and acoustic measurements would be taken. The Commission also pointed out that § 217.65(a)(8) of the proposed rule incorrectly stated that acoustic monitoring would be conducted during launches and recoveries of those launch vehicles that have not had sound pressure level (SPL) measurements documented previously rather than during the conditions stipulated in Tables 14 and 15. NMFS clarified that the Air Force confirmed that concurrent visual observations and acoustic measurements would be taken consistent with the other stipulations in Tables 14 and 15. These clarifications should be included in the preamble and final rule.

[6] The Commission informally noted that Table 14 of the preamble did not specify monitoring during launches *and* recovery activities of all space launch vehicles from 1 January to 31 July. NMFS indicated it would revise Table 14 in the preamble to the final rule.

[7] Based on previous monitoring reports, visual observations obtained hours or the day prior to a launch were reported rather than observations immediately before the launch. NMFS indicated that the Air Force has agreed to ensure that PSOs report the number of pinnipeds hauled out immediately before the launch or recovery. In addition, acoustic measurements during previous launches were taken at sites closer to the launch site but not actually at the haul-out sites where observations were being made. To better understand the sound levels to which pinnipeds are responding, acoustic measurements must be taken at the haul-out site that is being monitored visually. Thus, the Commission informally noted that NMFS should specify that both visual observations *and* acoustic measurements would be conducted at the closest significant haul-out site to the modeled sonic boom impact area or launch/landing platform. NMFS indicated that it would include these revisions in the preamble to the final rule, both of which should be included in the LOA as well.

[8] The Commission informally noted that NMFS incorrectly stipulated the timeframe during which post-activity monitoring would occur as 1 March through 31 July rather than 1 January through 31 July in § 217.65(a)(6) of the proposed rule. NMFS confirmed it would include the correct timeframe in the final rule.

[9] The Commission informally noted that the UAS minimum altitude requirements were included in the preamble but not in the proposed rule. NMFS indicated it would include the minimum altitude requirements for UASs in the final rule.

Background

The Commission has commented previously[10] that the totality of a rocket activity (both the launch and boost-back and landing of the same rocket) should be covered under a single authorization, which should be the Air Force's regulations, rather than issuing a separate authorization for recovery activities. The Air Force has agreed to include recovery activities under its regulations. The Commission also recently recommended[11] that NMFS estimate the numbers of harbor seal, California sea lion, and Steller sea lion takes based on 100 percent of the animals potentially being taken by Level B harassment at VAFB rather than NMFS's presumed 75- and 50-percent response rates. NMFS incorporated that recommendation into the Air Force's proposed rule for both launch and recovery activities. In addition, the Commission recommended that NMFS increase the number of Level B harassment takes of Guadalupe fur seals. For the proposed rule, NMFS amended the method and assumptions used to estimate numbers of takes of Guadalupe fur seals, which resulted in more reasonable take estimates.

The Commission had previously commented both formally[11] and informally[12] on the appropriateness of the various mitigation, monitoring, and reporting measures. The Commission had recommended that NMFS require the Air Force to conduct paired visual[13] and acoustic monitoring at both VAFB and NCI[14], supplement visual monitoring with night-vision[15] video recording capabilities at both VAFB and NCI, and measure and report both sound levels (in SELs, SPL_{peak}, and root-mean-square SPLs) and sonic booms (in psf) for all acoustic monitoring at both VAFB and NCI[16].

The Commission appreciates that NMFS worked with the Air Force to incorporate all related Commission comments and recommendations into the proposed rule. With regard to night-vision capabilities, the Air Force has indicated that PSOs are not allowed near the pinniped haul-out sites during launches and recoveries due to safety concerns, thus use of the equipment would be precluded. The Commission agrees but notes that time-lapse cameras and video-recording devices are outfitted with night-vision capabilities and is not aware of any practicability concerns involving their use. Further, the cost of such devices should not be prohibitive. Therefore, the Commission recommends that NMFS require the Air Force to use time-lapse cameras and video-recording devices that have night-vision capabilities to document responses of pinnipeds to nighttime launches and recoveries.

[10] See its most recent 15 October 2018 letter regarding the advance notice of proposed rulemaking for the Air Force's proposed activities.
[11] In its 17 December 2018 letter regarding SpaceX's activities.
[12] During the comment period regarding the advanced notice of proposed rulemaking for the Air Force's activities.
[13] For safety reasons, video capabilities can be used in lieu of PSOs.
[14] Based on the various proposed sonic boom overpressures and time of year.
[15] Due to many launches and recoveries occurring at night and for which visual observations have been precluded.
[16] NMFS indicated that the Air Force agreed to report sound levels and sonic booms based on the various metrics in the monitoring reports. These requirements should be specified in the preamble and the LOA.

Take estimates

The Commission informally noted multiple typos and errors in NMFS's estimation of the numbers of pinniped takes. The proposed numbers of takes of harbor seals at VAFB in 2019, 2020, 2021, 2022, and 2024 were inserted incorrectly in Tables 11 and 13 of the preamble. For California sea lions, the proposed number of takes at NCI in 2024 was off due to a rounding and significant figure error. In addition, an incorrect multiplier[17] was used to estimate the proposed numbers of takes of elephant seals at San Miguel Island (SMI)[18]. NMFS indicated it would include the revised take estimates in the preamble and final rule, which would result in an increase in the numbers of takes for harbor seals at and California sea lions and a decrease in the numbers of takes for elephant seals.

In its informal comments, the Commission also inquired why takes of pinnipeds at Point Conception were not included in the proposed rule, as they were for previous Air Force and SpaceX activities. The Air Force confirmed that there are no launch trajectories over Point Conception and launch noise would not be expected to impact pinnipeds hauled out there[19]. However, takes of pinnipeds subsequent to recovery activities cannot be discounted based on possible landing trajectories. NMFS indicated that it planned to include takes of pinnipeds associated with recovery activities in the final rule based on (1) the numbers of harbor seals and elephant seals observed at Point Conception as specified in SpaceX's 2018 IHA application[20], (2) a conservative estimate of 25 California sea lions[21], (3) an assumed take rate of 100 percent for harbor seals and California sea lions and 15 percent for elephant seals, and (4) one recovery per month during 12 months of the year. Finally, NMFS only included takes of pinnipeds at NCI during launch activities. Pinnipeds could be taken during recovery activities as well and may not be the same animals as those harassed during the launch[22]. NMFS indicated that it planned to use the same abundance estimates and take rates[23] for recoveries as for launches and would assume one recovery could occur per month[24]. The Commission agrees with the aforementioned revisions and recommends that NMFS issue the final rule, contingent on inclusion of *all* revisions noted herein in the preamble and final rule as well as in the various LOA conditions.

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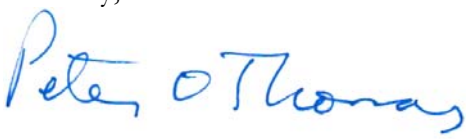
[17] Based on the average annual rate of increase in the population from Lowry et al. (2014).
[18] Takes at NCI were based on abundance estimates at SMI, Santa Rosa Island, and/or Richardson Rock.
[19] Based on the distance from the launch site.
[20] 516 harbor seals and 11 elephant seals.
[21] The Commission informed NMFS that, although there was no abundance estimate for California sea lions at Point Conception in SpaceX's application, the Air Force's LOA application indicated that sea lions occur at Point Conception. NMFS contacted researchers at Southwest Fisheries Science Center (SWFSC), who confirmed that sea lion abundance estimates were not available and that they had never observed California sea lions at Point Conception. NMFS plans to assume 25 sea lions could be taken during each recovery activity at Point Conception as a conservative estimate based on the anecdotal information in the Air Force's application.
[22] Based on different trajectories of the launch and recovery.
[23] Based on the estimated number of animals exposed to a sonic boom above 1 psf and the estimated number of animals that could potentially be taken (i.e., the take rate) from a sonic boom.
[24] Which was adjusted based on the assumption that 33 percent of the recovery activities for large rockets would result in a sonic boom on NCI, consistent with the assumptions for launches. NMFS further indicated that Falcon 9 rockets are considered medium rockets, so that assumption is considered conservative. NMFS also assumed that 50 percent of the sonic booms associated with recovery activities would result in a sonic boom footprint different from that of the launch (resulting in take of entirely new animals).

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

Sincerely,



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

Reference

Lowry, M.S., R. Condit, B. Hatfield, S.G. Allen, R. Berger, P.A. Morris, B.J. Le Boeuf, and J. Reiter. 2014. Abundance, distribution, and population growth of the northern elephant seal (*Mirounga angustirostris*) in the United States from 1991 to 2010. Aquatic Mammals 40(1):20–31.