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VIA EMAIL and REGULATIONS.GOV

Jolie Harrison
Chief, Permits and Conservation Division
Office of Protected Resources
National Marine Fisheries Service
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RE: **Taking and Marine Mammals Incidental to the U.S. Navy Training and Testing Activities in the Northwest Training and Testing Study (NWTT) Area, 85 Fed. Reg. 33,914 (June 2, 2020)**

Dear Ms. Harrison,

I submit these comments on the June 2, 2020 proposal by the National Marine Fisheries Service (the Service) to issue regulations and subsequent Letters of Authorization to the Navy to take marine mammals incidental to training and testing activities conducted in the Northwest Training and Testing (NWTT) Study Area (Proposed Rule).[1] I recognize the important role the Navy plays in our nation's national defense and the Navy's long-standing commitment to steward the unique natural resources of this region. However, based on my office's review of the Proposed Rule, the Service has failed to meet its obligations under the Marine Mammal Protection Act (MMPA) and did not meet its burden to establish that the Navy's actions will have a negligible impact on marine mammals in and around Washington. The Service must fully analyze the impacts to marine mammals from the Navy's proposed actions and require mitigation to ensure the least practicable adverse impact to marine mammals in Washington, especially Southern Resident orcas.

[1]Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to the U.S. Navy Training and Testing Activities in the Northwest Training and Testing (NWTT) Study Area, 85 Fed. Reg. 33,914 (June 2, 2020), Docket ID No. NOAA-NMFS-2020-0055.

The Service proposes to allow the Navy to impose significant harm to marine life along the West coast, including all of Washington's coastline, and particularly to the already-threatened Southern Resident orcas. Although the Service's proposed authorization covers the Navy's ongoing activities, the Service also proposes to authorize several new activities, including undersea warfare testing and sonar testing.[2] Governor Jay Inslee's Southern Resident Orca Task Force identified ongoing Naval exercises in the air and water around Washington as a threat to Southern Resident orcas,[3] and the Service does not fully take into account the impact of new and expanded activities on this vulnerable population. The Service's preliminary determination of negligible impact[4] on Southern Resident orcas and other marine mammals does not fully account for all of the harmful impacts of the Navy's activities.

Additionally, the Service has failed to impose adequate mitigation requirements on the Navy's activities to ensure the long-term health of Washington's marine wildlife. The Service's proposal to authorize the Navy's activities after failing to sufficiently analyze the impact of the Navy's proposed activities and failing to impose necessary mitigation measures violates the Service's obligations under the MMPA and is further arbitrary and capricious in violation of the Administrative Procedure Act.

I. DETAILED COMMENTS

The Service has obligations under the MMPA to analyze the actions of the Navy's proposed testing and training activities and to assess whether or not the actions meet the legal thresholds set forth in the statute. The Service has an additional obligation to satisfy the mandates of the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA). The Service has failed to fulfill its legal obligations under each of these statutes.

A. The Service Did Not Meet Its Statutory Obligations Under the MMPA

The MMPA seeks to protect marine mammals from extinction or depletion as a result of human activity,[5] and broadly prohibits "take" of marine mammals, including harassing, hunting, capturing, or killing any marine mammal.[6] As an exception to this broad prohibition on take, the Service may authorize taking of marine mammals associated with military readiness activities if certain conditions are met.[7] For military readiness activities, the MMPA defines harassment to include Level A harassment which is "any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild" and Level B harassment, which is

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[2] 85 Fed. Reg. at 33,915.
[3] Southern Resident Orca Task Force, Report and Recommendations, 84 (Nov. 16, 2018) https://www.governor.wa.gov/sites/default/files/OrcaTaskForce_FinalReportandRecommendations_11.07.19.pdf.
[4] 85 Fed. Reg. at 34,038.
[5] 16 U.S.C. § 1361.
[6] *Id.* §§ 1361(2), 1362, 1371.
[7] *Id.* § 1371(5)(A).

"any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including but not limited to migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered."[8] The MMPA directs the Secretary of the Service to authorize the requested take only if the Secretary finds that the takings will have a "negligible impact" on species or stock and prescribes in regulations mitigation measures to limit harm to marine mammals to the "least practicable adverse impact."[9]

The Service's June 2, 2020 Proposed Rule proposes to authorize takes of marine mammals from the Navy's use of sonar and other transducers and in-water detonations and from ship strikes that may occur during training or testing activities over a seven-year period starting November 2020.[10] The testing and training area would cover air and water space from northern California to Alaska.[11] The Service proposes to authorize over 2,800 Level A harassment exposures and over 1.7 million Level B harassment exposures to marine mammals in these waters over the seven-year authorization period, [12] including up to three vessel strikes to large whales that are likely to result in mortality or serious injury. [13]

As explained below, this high level of takes does not meet the "negligible impact" standard in the MMPA and the Service does not provide mitigation measures to ensure the least practicable adverse impact. The Service does not sufficiently consider the already imperiled status of Southern Resident orcas and gray whales in determining a negligible impact. The Service similarly overlooks the impact of repeated exposures to animals in the NWTT Study Area. The Service also fails to sufficiently consider the potential impact of emerging naval technologies, naval overflights and climate change. Furthermore, the Service has failed to propose sufficient mitigation to ensure the least practicable adverse impact from the Navy's proposed testing and training activities in the NWTT Study Area. The mitigation zones proposed by the Service are inconsistent with existing Washington State law to protect Southern Resident orcas and insufficient to ensure a negligible impact to other marine mammals. The Service does not require the use of additional practicable mitigation measures including the use of publicly available whale sighting data to reduce the chance of negative interactions between the Navy and marine mammals.

1. The Service's negligible impact analysis is deficient

The Service did not meet the legal standard in the MMPA to find that the Navy's proposed actions "will have a negligible impact on" the species and stocks of marine mammals living in

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[8] 16 U.S.C. § 1362(18)(B).
[9] 16 U.S.C. § 1371(a)(5)(A); *Natural Res. Def. Council, Inc. v. Pritzker*, 828 F.3d 1125, 1129–30 (9th Cir. 2016).
[10] 85 Fed. Reg. at 33,915.
[11] 85 Fed. Reg. at 33,914.
[12] *See, e.g.* Tables 32-33, 85 Fed. Reg. at 33982-84.
[13] 85 Fed. Reg. at 33,986.

the NWTT Study Area.[14] The Service defines "[n]egligible impact" as an impact "that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."[15] The Service must make the negligible impact based on the "best available science."[16] However, the Service does not adequately engage with identified impacts to vulnerable species, including Southern Resident orcas and gray whales, assess potential impacts of emerging naval technologies, analyze impacts of Naval aircraft, or address the role of climate change in exacerbating anticipated impacts of Naval activities. For these reasons, the Service cannot justify its finding of negligible impact based on the record in the Proposed Rule.

a. Impacts to Southern Resident orcas are not negligible

The Service's lack of justification is particularly stark for Southern Resident orcas. An icon of the Pacific Northwest, Southern Resident orcas have captured the hearts of Washington's residents, citizens, and visitors and hold significant cultural value for Washington's tribes. With the apparent loss of three whales last summer, Southern Resident orcas appear to have a population of just 73 whales—the lowest population size in more than 40 years.[17] Given this declining population, the loss of even one more whale could greatly undermine recovery efforts for decades.[18] However, just as I noted in my comment letter on the Navy's application to the Service,[19] the Service does not consider the most up-to-date information on the Southern Resident orca population. While the Service purports to rely on the "best available science" in developing stock numbers, the Service actually assesses impacts based on a potentially outdated population size of 75, and does not note the data indicating the population may sit at just 73 whales.[20] As a result, the Service fails to ensure its reliance on the best and most-up-to-date scientific information, which could result in the Service's underestimating the harm of the Navy's activities on this vulnerable population. With such a small and shrinking population, the impact of each take is amplified within the population.

The Service ultimately finds that the Navy's actions will result in a total of 51 annual "takes" of Southern Resident orcas in the form of Level B harassment, [21] a significant increase from the two

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[14] 16 U.S.C. §§ 1371(a)(5)(A)(i), (D)(i)(I).
[15] 50 C.F.R. § 216.103.
[16] 50 C.F.R. § 216.102(a).
[17] Center for Whale Research (Dec. 31, 2019) https://www.whaleresearch.com/orca-population.
[18] Letter from Director Kelly Susewind to Naval Facilities Engineering Command Northwest, at 2 (May 31, 2019) (hereinafter WDFW DSEIS Letter) (attached as Ex. 1). *See also* Carretta, J.V., U.S. Pacific Marine Mammal Stock Assessments: 2018, Killer Whale, Eastern North Pacific Southern Resident Stock (2019).
[19] Letter from Office of the Washington State Attorney General to National Marine Fisheries Service, (Sept. 5, 2019) (hereinafter Ferguson Letter) (attached as Ex. 2).
[20] 85 Fed. Reg. at 33,929–30.
[21] 85 Fed. Reg. at 34031.

annual takes identified in the Navy's application[22]. Given the imperiled nature of this population, this number of takes threatens a significant impact on the populationfrom the Navy's training and testing activities. Furthermore, these take numbers do not account for the fact that Southern Resident orcas generally travel in pods and thus likely underestimate the potential adverse impact to this precarious population.

Nor does the Service adequately assess the cumulative impact of repeated exposures to the same whales over time. The Navy's testing and training activities have already been authorized twice before, and are likely to continue into the future. As noted by the Washington Department of Fish and Wildlife (WDFW) in their comment letter on the Proposed Rule, due to the longevity of Southern Resident orcas "and the estimated percentage of take for the population [being] so high (68%), the effects of take will be compounded over time and may have cumulative effects, such as behavioral abandonment of key foraging areas and adverse, long term effects on hearing and echolocation."[23] Instances of temporary hearing loss, such as the Temporary Threshold Shifts (TTS) contemplated in the Service's authorization, can be cumulative and lead to long-term hearing loss.[24] This could have a significant impact on Southern Resident orcas, which rely on hearing for communication, feeding, and ship avoidance.[25] In addition, Level B Harassment can disrupt "migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered,"[26] all behaviors critical to survival of the Southern Resident orcas. Given the many stresses already faced by this endangered population, repeated harassment on this scale could be significant and even lead to mortality. The Service has thus failed to show that these impacts are negligible under the MMPA.

The Proposed Rule also does not incorporate the latest, most seasonally specific distribution and hotspot information for Southern Resident orcas. In particular, the Service does not specifically propose to use recent monitoring evidence from the National Oceanic and Atmospheric Administration's (NOAA) hydrophone network in its analysis.[27] While the Navy did propose to work with the Service to determine the likelihood of gray whale and Southern Resident orca presence, the Service does not require itself or the Navy to rely on NOAA's hydrophone network.[28] This omission is of particular concern because NOAA's monitoring shows

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[22] U.S. Navy, Commander U.S. Pacific Fleet, Request for Regulations and Letters of Authorization for the Incidental Takings of Marine Mammals Resulting from U.S. Navy Training and Testing Activities in the Northwest Training and Testing Study Area (Rev. June 21, 2019) (hereinafter Navy Request).
[23] Letter from Director Kelly Susewind et al to Chief Jolie Harrison, at 2 (July 16, 2020) (hereinafter WDFW Letter) (attached as Ex. 3).
[24] *Id*.
[25] *Id*.
[26] 16 U.S.C. § 1362(18).
[27] WDFW DSEIS Letter, *supra* n.18, at 2.
[28] U.S. Navy's Northwest Training and Testing Draft Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement, (March 2019) at K-12.

considerable temporal and spatial overlap between high-use testing areas for active sonar and explosives and high-use areas by Southern Resident orcas off Washington's north coast.[29]

Additionally, as WDFW noted in comments on the Navy's Draft Supplemental EIS, the Navy's use of mid-frequency sonar can impact wildlife within 2,000 square miles and mine explosives can cause death or injury.[30] Although these activities may affect a wide range of marine mammals, the potential impact of these activities on endangered Southern Resident orcas is of particular concern, given their dangerously low population size.

b. The Service failed to properly assess impacts to other species

For other marine mammal species in the NWTT Study Area, the Service similarly failed to show that impacts will be negligible based on the best available science.

Gray whales are currently undergoing an unexplained die-off leading to 352 strandings between January 2019 and July 2020, including 44 strandings along the coast of Washington alone.[31] NOAA is investigating the die-off as an Unusual Mortality Event.[32] While it is not clear what specifically is driving this event, many animals show signs of "poor to thin body condition."[33] In the Proposed Rule, the Service relies on the increasing population of the stock to assert that the Navy's proposed takes will not be exacerbated by the Unusual Mortality Event to the point of affecting annual rates of recruitment or survival.[34] However, as the exact cause of the Unusual Mortality Event is not known, the Service also cannot know if the current Unusual Mortality Event is indicative of a longer–term trend in the population, potentially linked to the impacts of climate change. The Service's reliance on an increasing stock may be misplaced, particularly in light of the fact that the Service will authorize the Navy's activities for a seven-year period during which the health of the gray whale population could decline.

For several species, including harbor seals, Dall's porpoise, and harbor porpoise, the Service proposes to allow the Navy's near constant harassment every year for a seven–year period. For example, the Service proposes to authorize the Navy to take 30 times the abundance of the Hood

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[29] *Id*.
[30] WDFW DSEIS Letter, *supra* n.18, at 2; *see also* Letter from the Washington Office of the Attorney General to Jacqueline Queen, (June 12, 2019) (hereinafter AG Letter) (included as Ex. A attached to Ex. 2).
[31] 2019-2020 Gray Whale Unusual Mortality Event along the West Coast and Alaska. https://www.fisheries.noaa.gov/national/marine-life-distress/2019-2020-gray-whale-unusual-mortality-event-along-west-coast-and .
[32] 85 Fed. Reg. at 33933.
[33] *Id. See also* NMFS, "Frequent questions: 2019 gray whale Unusual Mortality Event along the west coast," https://www.fisheries.noaa.gov/national/marine-life-distress/frequent-question-2019-gray-whale-unusual-mortality-event-along-west (last visited July 12, 2020).
[34] 85 Fed. Reg. at 34025, ("… this population of gray whales is not endangered or threatened under the ESA and the stock is increasing.")

Canal population of harbor seals every year, 3,084 percent of population abundance,[35] and similarly authorizes high levels of takes for Southern Puget Sound harbor seals (168 percent of population abundance[36]). Although the Service states that this high level of take could lead to interruptions in foraging that could lead to reproductive loss for female harbor seals,[37] the Service does not analyze how this harassment and loss of reproduction could affect the population as a whole, beyond baldly asserting that these impacts "would not be expected to adversely affect the stock through effects on annual rates of recruitment or survival."[38]

The Service also seeks to minimize the impact of these repeated harassments by relying on the possibility of habituation. The Service notes, "some animals may habituate or learn to tolerate the new baseline or fluctuations in noise level" when discussing impacts to pinnipeds. [39] However, the Service's analysis on this issue is inadequate. Some research on sound impacts to pinnipeds observed changes in behavior in response to noise and human disturbance and damage to pinniped hearing from noise.[40] The Service does not cite or engage with these studies and has thus ignored an important aspect of the problem and failed to ensure that it relies on the best available science in reviewing the Navy's application.

The rates of take for populations of Dall's porpoises (131 percent of population abundance[41]) and the populations of harbor porpoises on the Northern OR/WA Coast (244 percent of population abundance) and in Washington Inland Waters (265 percent of population abundance[42]) are also exceptionally high. As noted by the service, these porpoises are particularly vulnerable to the impacts of anthropogenic sound.[43] The Service recognizes that this level of take could also lead to reproductive loss, but again asserts, without thorough analysis, that it "would not be expected to adversely impact annual rates of recruitment or survival."[44] However, the service goes on to authorize these very high levels of take. Such "cursory" statements are not enough under the MMPA.[45] Rather the Service has a legal obligation to assess these impacts using the best available science.[46]

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[35] 85 Fed. Reg. at 34,036, Table 57.
[36] 85 Fed. Reg. at 34,036, Table 57.
[37] 85 Fed. Reg. at 34,037.
[38] 85 Fed. Reg. at 34,038.
[39] 85 Fed. Reg. at 34,037.
[40] *See* Alejandro Acevedo-Gutierrez and Sara Cendehas-Zarelli, *Nocturnal haulout patterns of harbor seals (Phoce vitulina) related to airborne noise levels in Bellingham, Washington, USA*, Aquatic Mammals 37(2),167-174 (2011); D. Katsak, & C Reichmuth Katsak, *Noise impacts on pinniped hearing. Final Technical Report to the Office of Naval Research*. Grant No. N00014-04-1-0284 (2006).
[41] 85 Fed. Reg. at 34,033, Table 56.
[42] 85 Fed. Reg. at 34,033, Table 56.
[43] 85 Fed. Reg. at 34,034.
[44] 85 Fed. Reg. at 34,034.
[45] *Conservation Council for Hawaii v. Nat'l Marine Fisheries Serv.*, 97 F. Supp.3d 1210, (D. Hawaii 2015) (finding that a "cursory" analysis under the MMPA was arbitrary and capricious).
[46] 50 C.F.R. § 216.102(a).

c. The Service must carefully evaluate emerging technologies

My previous comments highlighted the need for the Service to review the Navy's plans to rapidly increase its use of emerging technologies, including the use of unmanned underwater systems in Puget Sound and off the Washington coastline and the use of sonar, high-energy lasers, payload systems, kinetic energy weapons, and biodegradable polymers.[47] However, the Proposed Rule does not include a detailed analysis of potential impacts from these activities. The Service should thoroughly analyze the impacts of these emerging technologies on marine mammals and prescribe any necessary mitigation measures, including seasonal restrictions and monitoring of short- and long-term impacts and careful testing and monitoring of the impacts of new technologies, to ensure that the Navy's activities have the least practicable adverse impact on marine mammals.

d. The Service failed to evaluate potential harms from Navy overflights

The Service mentions potential impacts from overflight of Navy aircraft in the NWTT Study Area only to dismiss it as a potential source of harassment to marine mammals.[48] The Service relies exclusively on the analysis of potential impacts from overflights of the Navy's EA-18 Growler aircrafts in the 2019 NWTT draft Supplemental Environmental Impact Statement/ Overseas Environmental Impact Statement (DSEIS).[49] However, the Navy's analysis in the DSEIS is insufficient to justify this conclusion.[50]

While the scientific literature regarding impacts of aircraft on marine mammals is less extensive than that for vessel impacts, the Service still has an obligation to assess the potential impacts from these Growler flights, which the Navy recently authorized to increase by 33 percent.[51] Multiple studies demonstrate behavior impacts to cetaceans from aircraft.[52] The Service should review these studies to ensure that it does not overlook scientific evidence in reviewing the Navy's application and to ensure that Navy aircraft overflights not have more than a negligible impact on marine mammals in the NWTT Study Area, including when analyzed in the context of the cumulative impacts associated with all of the Navy's training and testing activities.

This analysis is especially relevant for the endangered population of Southern Resident orcas. The Governor's Orca Task Force noted the importance of addressing sound impacts to Southern

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[47] *See* Ferguson Letter, *supra* n. 19.
[48] 85 Fed. Reg. at 33,918.
[49] *Id.*
[50] *See, e.g.*, AG Letter, *supra* n. 30.
[51] *See* Record of Decision for the Final Environmental Impact Statement (EIS) for EA-18G "Growler" Airfield Operations at Naval Air Station Whidbey Island Complex, Island County, Washington, (March 12, 2019).
[52] *See, e.g.* Luksenburg, J.A., and Parsons, E.C.M., The effects of aircraft on cetaceans: implications for aerial whalewatching, *Proceedings of the 61st Meeting of the International Whaling Commission* (2009). (reviewing multiple studies that address aircraft noise effects on cetaceans) (attached as Ex. 4).

Resident orcas from the Navy's overflights.[53] The Service's dismissal of the possibility of impacts from Growler overflights fails to recognize this potential impact. As discussed above, this population is already under threat and any additional stress could lead to significant impacts.

e. The Service fails to consider the impact of climate change on the authorization

I noted in my comments on the Navy's application for authorization that the Service must also account for current and future impacts of climate change on marine mammals and their habitat in the action area in assessing the harm from the Navy's proposed activities and in determining how to best mitigate that harm.[54] However, the Service has no substantive discussion of climate change in the Proposed Rule. This lack of acknowledgement of the role of climate change and lack of engagement with the potential impacts of climate change on marine mammals present in the NWTT Study Area could lead to the Service missing important significant impacts to these populations that will be exasperated by the Navy's activities and the authorized levels of take. Climate change could lead to significant changes in prey availability, water temperature, and weather patterns going into the future that could stress already vulnerable populations, such as the Southern Resident orcas. The impacts of the Navy's proposed testing and training activities could be magnified over time as the impacts of climate change exacerbate existing stresses on the marine mammal populations in the NWTT Study Area.

2. The Service must require mitigation measures to ensure the least practicable adverse impact

The MMPA requires the Service to prescribe "methods" and "means of effecting the least practicable adverse impact" on marine mammals.[55] The Service must meet this obligation even if it finds that the authorized actions will have a negligible impact on marine mammal populations.[56] The Service must consider "personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity" in assessing potential mitigation measures.[57]The mitigation measures "must be both effective in reducing impact, but also not so restrictive of military activity as to unduly interfere with the government's legitimate needs for military readiness activities."[58] Additionally, the Service "cannot just parrot what the Navy says" with respect to analysis of the practicability of mitigation measures.[59]

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[53] Final Report and Recommendations, Southern Resident Orca Task Force, Nov. 2019, at 11.
[54] Ferguson Letter, *supra* n. 19.
[55] 16 U.S.C. §§ 1371(a)(5)(A)(ii), (D)(vi).
[56] *NRDC v. Pritzker*, 828 F.3d 1125, 1134 (9th Cir. 2016)(Compliance with the "negligible impact" requirement does not mean there was compliance with the "least practicable adverse impact" standard during rulemaking.)
[57] 16 U.S.C. § 1371(a)(5)(A)(ii).
[58] *NRDC v. Pritzker*, 828 F.3d at 1134-35.
[59] *Conservation Council*, 97 F.Supp.3d at 1230.

However, in the Proposed Rule, the Service has done little more than parrot the Navy's position on mitigation for actions in the NWTT Study Area, asserting an independent review of the Navy's assertions of impracticability but providing no substantiation of that review.[60] Even if the Service did conduct such a review, the Service failed to consider and implement additional mitigation measures that are both practicable and effective to reduce the adverse impacts to marine mammals in the NWTT Study Area.

WDFW and I provided comments on the Navy's DSEIS and the Navy's request for authorization that outlined specific mitigation measures the Navy could incorporate into its training and testing activities.[61] More specifically, we suggested that the Service consider seasonal closures based on Southern Resident orca presence, require additional mitigation in the Southern Resident orca offshore habitat area, use of real-time whale reporting, and additional mitigation measures regarding impulsive sound and sonar exposure.[62] However, the Service did not assess or incorporate these practicable and effective mitigation measures.

a. The Service must increase Mitigation Zones to at least 1,000 yards

The Service proposes to authorize procedural mitigation for active sonar, explosive sonobuoys, and various explosives activities that include mitigation zones.[63] The Navy proposes to implement mitigation, often the cessation of an activity, when a marine mammal is observed within a mitigation zone.[64] These mitigation zones can drop to a distance as small as 100 yards.[65]

This is an insufficient mitigation measure. Sonar can impact marine mammals within a 2,000 square mile area, much farther than the 100 yards proposed for some of the Navy's proposed activities.[66] Consistent with Washington State law which imposes restrictions on vessel speeds within 1,000 yards of on orca [67], these mitigation zones should be at least 1,000 yards or one-half nautical mile, for the protection of the marine mammals, and especially for Southern Resident orcas. As discussed above, Southern Resident orcas rely heavily on hearing for important functions necessary to their survival. The use of sonar and explosive sonobuoys can disrupt these functions and lead to harm. Additionally, the Service's prior authorizations, when added to the instant proposed authorization, and potential future authorizations, amount to a lifetime of sonar exposure. In light of the potential for negative impacts to a lifetime of exposure to sonar, the Navy must expand the mitigation zones. When Southern Resident orcas are spotted within this 1,000-yard zone, the Navy should be required to postpone or cancel any exercises.

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[60] 85 Fed. Reg. at 33990–91.
[61] *See* Ferguson Letter *supra* n. 19; WDFW DSEIS Letter, *supra* n. 18.
[62] *Id*.
[63] 85 Fed. Reg. at 33,992–34,000.
[64] 85 Fed. Reg. at 33,991.
[65] *See, e.g.* Fed. Reg. at 33,992.
[66] WDFW DSEIS Letter, *supra* n. 18.
[67] RCW 77.15.740(1)(e).

b. The Service should require use of available whale location data

Additionally, the mitigation zones required to mitigate the impact of the Navy's testing and training activities are based purely on animal sightings by vessel board lookouts.[68] Should any animals be underwater they could be easily missed. However, as WDFW and I urged previously, there are additional measures the Navy can take to operate on the best available data and reduce adverse impacts to the marine mammals in the NWTT Study Area.

Most notably, the Navy could use information from real-time whale alert systems. This includes NOAA's hydrophone network and data from the Whale Report Alert System used by the Washington State Ferries. Passive acoustic monitoring in the waters in and around Washington can provide real time data to the Navy. However, the Service does not evaluate the possibility of using this data from either an effectiveness or practicability standpoint.

This data is readily available and serves as a useful resource for the Navy to plan out its testing and training activities to reduce impacts to marine mammals. In fact, it could even increase the effectiveness of the Navy's testing and training activities if it helps to reduce the number of delayed or canceled actions due to animal presence. I recommend that the Service amend its proposed authorization to require the Navy to utilize readily available whale location data as a form of mitigation.

c. The Service should include temporal restrictions based on Southern Resident orca activity

The Service should consider temporal restrictions on the Navy's activities to reflect the best available location data of marine mammals. Specifically, the Service should consider limitations on the Navy's activities in the Marine Species Coastal Mitigation Area, which covers winter habitat areas for Southern Resident orcas.[69] The Service should limit naval activities, which have the capacity to harm Southern Resident orcas, especially mid–frequency sonar, over the winter months in order to limit harm to this endangered species.

B. The Service must meet its obligations under NEPA and the ESA

The Service has an obligation under the National Environmental Policy Act (NEPA) to take a "hard look" at the Navy's proposed testing and training activities before making a decision on the Navy's request.[70] This includes a review of the environmental impacts anticipated, potential alternatives and mitigation measures.[71]

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[68] 85 Fed. Reg. at 33,991.
[69] *See* 80 Fed. Reg. 9,682 (Feb. 24, 2015).
[70] 85 Fed. Reg. at 34,038; 40 C.F.R. §§ 1500.1(b), 1502.1; *Balt. Gas & Elec. v. NRDC*, 462 U.S. 87, 97 (1983)
[71] *Id*.

Here, the Service proposes to adopt the Navy's NWTT SEIS/OEIS in order to fulfill its own obligations under NEPA.[72] However, the Service cannot adopt another agency's EIS where it does not "meet the standards for an adequate statement" under NEPA regulations.[73] As detailed in Washington's comments on the DSEIS, the DSEIS is deficient and does not meet this standard.[74] Unless these deficiencies are remedied in the Final SEIS, the Service cannot rely on the deficient SEIS to satisfy its own obligations under NEPA.[75] The Service also risks adopting an EIS that does not address its specific needs here.[76] Before issuing its Final Rule, the Service must ensure compliance with NEPA.

Additionally, the Service must also ensure that the Navy's activities will not jeopardize endangered species in the NWTT Study Area, including the Southern Resident orca population, as required by the Endangered Species Act.[77] The Service and the Navy must fully comply with their obligations under the ESA.

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[72] 85 Fed. Reg. at 34,038.
[73] 40 C.F.R. § 1506.3(a).
[74] Comments of Attorney General on the Navy's DSEIS/OEIS (included as Ex. A attached to Ex. 2); Comments of Governor Jay Inslee on the Navy's DSEIS/OEIS (included as Ex. B attached to Ex. 2); Comments of WDFW on the Navy's DWEIS/OEIS (included as Ex. C attached to Ex. 2).
[75] *See Sierra Club v. U.S. Army Corps of Eng'rs*, 701 F.2d 1011, 1030 (2d Cir. 1983) (holding that permitting agency cannot rely on action agency's inadequate EIS).
[76] *See Conservation Council*, 97 F. Supp. 3d at 1236 (holding that the Service had violated the MMPA by simply adopting, without modification, a Navy EIS that reflected a different "purpose and need").
[77] 16 U.S.C. § 1536(a)(2).

II. CONCLUSION

For the above reasons, I strongly urge the Service to revise its proposed authorization and mitigation measures to better protect Washington's marine mammals, including endangered Southern Resident orcas, in accordance with the MMPA. The Service bases its authorization on inadequate data and does not require sufficient mitigation measures. As a result, the Service's findings of negligible impact and least practicable adverse impact and proposed approval violate the MMPA and are further arbitrary and capricious under the Administrative Procedure Act.

Thank you for your consideration of my comments on this important matter.

Sincerely,

ROBERT W. FERGUSON
Attorney General of Washington

Exhibit 1

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May 31, 2019

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Building 385, Admin, Room 216
Oak Harbor, WA 98278-5000

SUBJECT: 2019 Draft Navy Northwest Training and Testing Supplemental Environmental Impact Statement

The Washington Department of Fish and Wildlife (WDFW) has reviewed the Draft Northwest Training and Testing Supplemental Environmental Impact Statement (Draft EIS). WDFW works extensively to conserve and protect the fish and wildlife species that share the water and land outlined as important for the Navy's continued training and testing. We appreciate the thorough analysis the Navy has drafted to determine impacts of their proposed activities on species and their habitats. WDFW would like to outline some concerns about impacts to fish and wildlife from new and increased Navy activities and provide suggestions to improve and clarify these analyses (See Table in Appendix A).

To evaluate the impacts to fish and wildlife species from existing, new, and increased training and testing activities more accurately, we request the Navy clarify the times of year in which proposed activities will occur. This is especially important when assessing impacts to fish and wildlife, which have seasonal movements and behaviors that will greatly determine whether Navy activities significantly affect each species in the proposed areas (e.g. Tufted puffin, rockfish, Southern Resident killer whale).

WDFW is especially concerned about potential impacts to the endangered and struggling Southern Resident killer whale (SRKW) population from proposed Navy activities. The Draft EIS inaccurately states that Governor Inslee's Orca Task Force did not identify Navy actions as a source for any of the identified threats to SRKW. Recommendation #25 from the Task Force report outlines the need to "address the acoustic and physical impacts to Southern Resident orcas from Naval exercises in waters and air of Washington state." WDFW appreciates the Navy's recent engagement in the Task Force process and welcomes continued coordination and engagement to identify and implement measures to minimize impacts to SRKW. We believe the timing, methodology and intensity of the actions in the draft EIS present an opportunity to begin to tackle this challenge, while still meeting the objectives of the Navy.

Our major concerns for new and increased impacts to SRKW lie around the use of mid-frequency sonar, which can impact wildlife within 2,000 square miles, and mine explosives, which could cause immediate injury or death. Since SRKW travel in larger pods, it is unlikely that Navy activities would affect only one or two individual animals. However, in this declining and endangered population, even the loss of one single SRKW could greatly undermine recovery efforts for decades. We request that the Navy: 1) use the latest, most seasonally specific distribution and hotspot information for SRKWs in their analysis of proposed activities, 2) clarify the timing of their proposed activities to better understand potential impacts to SRKW, and 3) accomplish Navy objectives while minimizing impacts to SRKW by shifting these most concerning activities in time and space. In particular, we encourage the Navy to integrate recent acoustic monitoring evidence from NOAA's hydrophone network (Emmons et al. 2019) into their planning efforts. This information shows considerable temporal and spatial overlap between high-use testing areas for active sonar and explosives and high-use areas by SRKWs off the north coast of Washington—which current and proposed activities do not appear to recognize. One key takeaway from the report is that SRKWs show disproportionately high use of the Cape Flattery Offshore area in spring compared to other areas of the coast. To minimize potential adverse effects on SRKWs, sonar and explosives testing and training should be moved to another location or another season, or both. In addition, we request that the Navy re-examine the finding that neither alternatives would not result in (or significantly risk) the incidental taking of killer whales.

Underwater acoustic testing and electronic warfare may have significant impacts to fish behavior and migration (e.g. salmon and forage fish) or result in auditory injury to the threatened marbled murrelet. Similarly, surface and underwater explosions could directly impact short-tailed albatross, marbled murrelets, or tufted puffins, all of which forage in offshore areas greater than 30-50 nautical miles from shore, especially seasonally. These potential impacts also include the ingestion of post-explosive fragments and debris at the surface, and disturbance caused by high underwater sound pressure levels (barotrauma). WDFW encourages a more thorough analysis using recent data on distributions (See Appendix A for suggestions) and reconsideration of increases of these activities where they are most likely to coincide in space and time with these sensitive fish and birds.

Finally, the use of high-energy lasers, kinetic energy weapons, and biodegradable polymer outlined in the EIS are new and their effects are unknown. It is critical that the Navy pair these new technologies, which are potential energy and entanglement stressors or sources of mortality, with rigorous testing and monitoring to avoid impacts to fish and wildlife.

We hope that you find these comments helpful in your EIS process and welcome any questions regarding our comments. WDFW looks forward to continuing to cooperate with the Navy to ensure protections for Washington's fish and wildlife.

Respectfully,

Kelly Susewind
Director

APPENDIX A

Detailed Washington Department of Fish and Wildlife Comments:
2019 Navy Northwest Training and Testing Supplemental EIS

#	Throughout EIS or Chapter	Section	Page#	Comment
1	Appendix A	A.1.2.1	A-10	Underwater explosions may impact foraging Tufted Puffins, which often forage at the continental shelf break >50 km offshore; see Menza et al. (2016). Tufted Puffin foraging activity during the breeding season overlaps the area where explosive training activity could occur. The report by Menza et al. (https://repository.library.noaa.gov/view/noaa/9329) provides similar maps for several bird and mammal species. This information should be used when evaluating potential impacts of activities on species of conservation concern. The USFWS is currently evaluating whether or not to list the Puffin under the ESA.
2	Appendix A	A.1.5	A-25	Underwater explosions may impact foraging Tufted Puffins, which often forage >50 km offshore
3	Appendix A	A.1.5.2	A-27	Underwater explosions may impact foraging Tufted Puffins, which often forage >50 km offshore
4	Appendix A	A.1.5.3	A-29	Underwater explosions may impact foraging Tufted Puffins, which often forage >50 km offshore
5	Appendix A	A.2.1.6	A-54	Underwater explosions may impact foraging Tufted Puffins, which often forage >50 km offshore
6	Appendix A	A.2.2.1	A-58	Underwater explosions may impact foraging Tufted Puffins, which often forage >50 km offshore
7		3.4.1.16.1	3.4-46	"Navy actions were not the sources for any of the identified threats" in the SRKW Task Force report." This statement is incorrect. Recommendation #25 from the Task Force outlining the need to "address the acoustic and physical impacts to Southern Resident orcas from Naval exercises in waters and air of Washington state." Early in the Task Force process several members and the Vessels working group indicated the need for direct engagement with the Navy, which was reinforced in hundreds of public comments on the draft report. "Recommendation 25: Coordinate with the Navy in 2019 to discuss reduction of noise and disturbance affecting Southern Resident orcas from military exercises and Navy aircraft. Implementation details: The governor should meet with the U.S. Navy's Commanding Officer for the region that includes Washington state to address the acoustic and physical impacts to Southern Resident orcas from Naval exercises in waters and air of Washington state. The governor should request the Navy participate on the Vessels working group in Year Two and identify actions to reduce the Navy's impacts to Southern Resident orcas."
8	Throughout the EIS			Throughout the EIS, the number of Southern Resident killer whales needs to be updated. There are currently 74 adult individuals and one young of the year (not usually counted until 1 year of age).

#	Throughout EIS or Chapter	Section	Page#	Comment
9	Omitted from EIS		3.4.103	*Wieland, M., A. Jones, and S. C. P. Renn. 2010. Changing durations of southern resident killer whale 23 (Orcinus orca) discrete calls between two periods spanning 28 years. Mar. Mam. Sci. 26(1):195–201.* "The increase of mean durations of discrete calls demonstrated here indicates that the Southern Residents are making a behavioral adjustment as a result of vessel noise. Because they are adjusting their vocal behavior, we must consider the very real possibility that engine noise is hindering their ability to communicate, and may well impact their efficiency at using acoustics to forage and navigate, as well." This should be incorporated into 3.4.2.1.1.4 on masking (which talks about other species but not killer whales) – as well as the odontocete discussion on page 3.4-120.
10	Omitted from EIS			*Emmons, C.K., M.B. Hanson, and M.O. Lammers. 2019. Monitoring the occurrence of Southern resident killer whales, other marine mammals, and anthropogenic sound in the Pacific Northwest. Prepared for: U.S. Navy, U.S. Pacific Fleet, Pearl Harbor, HI. Prepared by: National Oceanic and Atmospheric Administration, Northwest Fisheries Science Center under MIPR N00070-17-MP-4C419. 25 February 2019. 23p.* There were 148 mid-frequency active sonar events detected between 2011 and 2017, with peak overlapping with occurrence of the three killer whale communities (southern residents, northern residents, and transients). Reasons for concern: • Separation of an orca calf from its group during exposure to mid-frequency sonar playback was observed (Miller et al 2011) (page 125 marine mammal chapter). • Newer high-duty or continuous active sonars have more potential to mask vocalizations, particularly for delphinids and other mid-frequency cetaceans. (pg. 116 marine mammal chapter/pg. 3.4-102). Consequences may include avoidance of the area and interruptions to foraging or other essential behaviors. Longer-term consequences could include potential decrease in recruitment if masking interferes with reproductive activities or mother-calf communication. • Mass strandings of cetaceans have been linked to mid-frequency active sonar activity. (3.4.2.1.1.6)
11		Table 3.4-30		An estimation of two to three behavioral impacts to SRKW per year from sonar and other transducers was cited, however SRKW spend most of their time travelling in larger pods close together. This estimate does not seem realistic. The estimate could be zero if the Navy activity occurs in a time of year in which SRKWs are infrequently found in the area, but much larger if SRKWs are present due to their close proximity to one another. Suggest that the Navy should more closely analyze the time of year for their activities and overlay

#	Throughout EIS or Chapter	Section	Page#	Comment
				with the most up to date seasonal and hotspot SRKW distribution information from NOAA (instead of extrapolating across the year and geography).
12		3.4-26 3.4-46		In multiple locations in the EIS, there is discussion about SRKWs shifting their range to forage less in the Salish Sea because of a shift in availability of Chinook salmon. "As a result, foraging during the spring in Salish Sea by Southern Resident killer whales has declined in recent years as they shift their range and forage for Chinook salmon or other prey species elsewhere in response to reduced prey availability in that historically used inland waters foraging area (Shields et al., 2018b)." "The use of the Inland Waters portion of the NWTT Study Area by Southern Resident killer whales has declined in recent years as they shift their range and forage for Chinook salmon or other prey species elsewhere and outside the currently designated critical habitat in response to prey availability (Shields et al., 2018b)." While the SRKWs may have been forced to forage further and differently more recently to meet their nutritional needs, decreasing noise and disturbance to increase access to the prey that is available in the Salish may result in their return to that area. In addition, WDFW and our partners are working to increase prey availability for SRKWs in the Salish sea. Therefore, the recent information on foraging distribution should not be seen as a reason to discontinue the avoidance of impacts to SRKWs in the Salish sea.
13	Appendix A	A.1.1.3	A-5	Short-tailed Albatross (STAL) could be directly impacted by ingestion of post-explosive target fragments and debris, chaff, neutralizer and mine fragments, and other expended materials visible at the surface. Any surface or underwater explosions could directly impact foraging STAL by death or injury.
14	Appendix A	A.1.1.4	A-7	Short-tailed Albatross (STAL) could be directly impacted by ingestion of post-explosive target fragments and debris, chaff, neutralizer and mine fragments, and other expended materials visible at the surface. Any surface or underwater explosions could directly impact foraging STAL by death or injury.
15	Appendix A	A.1.3.1	A-19	Short-tailed Albatross (STAL) could be directly impacted by ingestion of post-explosive target fragments and debris, chaff, neutralizer and mine fragments, and other expended materials visible at the surface. Any surface or underwater explosions could directly impact foraging STAL by death or injury.
16	Appendix A	A.1.5.1	A-25	Short-tailed Albatross (STAL) could be directly impacted by ingestion of post-explosive target fragments and debris, chaff, neutralizer and mine fragments, and other expended materials visible at the surface. Any surface or underwater explosions could directly impact foraging STAL by death or injury.

#	Throughout EIS or Chapter	Section	Page#	Comment
17	Appendix A	A.1.5.3	A-29	Short-tailed Albatross (STAL) could be directly impacted by ingestion of post-explosive target fragments and debris, chaff, neutralizer and mine fragments, and other expended materials visible at the surface. Any surface or underwater explosions could directly impact foraging STAL by death or injury.
18	Appendix A	A.2.1.6	A-54	Short-tailed Albatross (STAL) could be directly impacted by ingestion of post-explosive target fragments and debris, chaff, neutralizer and mine fragments, and other expended materials visible at the surface. Any surface or underwater explosions could directly impact foraging STAL by death or injury.
19	Appendix A	A.2.1.7	A-56	Short-tailed Albatross (STAL) could be directly impacted by ingestion of post-explosive target fragments and debris, chaff, neutralizer and mine fragments, and other expended materials visible at the surface. Any surface or underwater explosions could directly impact foraging STAL by death or injury.
20	Appendix A	A.2.2.1	A-58	Short-tailed Albatross (STAL) could be directly impacted by ingestion of post-explosive target fragments and debris, chaff, neutralizer and mine fragments, and other expended materials visible at the surface. Any surface or underwater explosions could directly impact foraging STAL by death or injury.
21	Appendix A	A.1.1.3, A.1.1.4, A.1.2.1, A.1.2.3, A.1.2.4, A.1.2.5, A.1.4.1, A.1.4.2, A.1.5.1, A.1.5.2, A.1.5.3, A.1.6.7, A.1.6.8, A.1.6.9, A.2.1.2, A.2.1.3, A.2.1.4, A.2.1.5, A.2.1.6, A.2.1.7, A.2.2.1	Corresp. Appendix pp.	Marbled Murrelets (MAMU) in offshore areas <35 nautical miles from shore (Adams et al. 2014) and in all of Puget Sound operations areas are very likely susceptible to impacts from disturbances caused by high underwater sound pressure levels (barotrauma) from in-water and above-water explosions (especially in the Explosive Ordinance Disposal areas) depending on the locality and distance of the detonation. Underwater explosions will likely result in mortality of some MAMU prey resources and possible disruption of foraging by breeding adults, which could create additional indirect impacts by increased probability of mortality to nestlings by missed feedings (USFWS 2009 and ref. therein). In addition, increased vessel traffic (USFWS 2009) and disturbance by extended helicopter rotor wash over foraging areas could have direct impacts on MAMU foraging activity. Auditory injury impacts to MAMU are expected to occur at Low and Mid Frequency active sonars at decibel levels ≥220 dB SEL re: 1 uPa^2 –sec (thresholds: USFWS 2016: Table 18), and high probability of impact to MAMU at close range at active sonar frequencies MF1, MF8, ASW4 in the Puget Sound areas (USFWS 2016:Table 20).

#	Throughout EIS or Chapter	Section	Page#	Comment
22		3.9		Rockfishes in Puget Sound generally mate in the fall. Courtship is complex and requires potential mates to first locate one another. Though detailed information about how this occurs is lacking, it is clear that rockfishes utilize sound to communicate with one another both prior to and during courtship. Any Navy activity that increases submarine sound proximate to deep, rocky habitats has the potential to disrupt reproductive activity of ESA-listed rockfishes. At a minimum, monitoring should occur to evaluate changes in sound intensity and temporal frequency in areas of documented Yelloweye and Bocaccio occurrence.
23	Throughout EIS			The impact of noise and sonar on SRKWs should not be underestimated. Behavior change occurs at much lower received levels in killer whales than other marine mammals and responses to mid-frequency sonar have been observed over 25 miles from the source. Mid-frequency sonar also has the potential to have impacts on wildlife within a 2,000 sq. mi. radius. WDFW encourages the Navy to decrease potential impacts on SRKW by limiting activities to the seasons in which SRKW are the least likely to be present and by ensuring an adequate spatial buffer for SRKWs leaving the Strait of Juan De Fuca and heading south along the coastline to allow sound to attenuate before it reaches the whales.
24	Throughout EIS			The current estimates of marine mammal densities may be underestimated, therefore leading to an underestimation of potential impacts to these species. WDFW requests that the Navy better analyze their potential impacts on marine mammals and SRKW in particular with the most recent available data on distributions and hotspots (not currently in the EIS). In addition, these estimates along with information on timing of Navy activities should be seasonally specific (at least at some level) instead extrapolating across the year.
25	Omitted from EIS			In addition to the use of viewing platforms and other measures to detect wildlife before conducting activities, WDFW encourages the Navy to explore using the new whale report alert system for more information on marine mammal movements. This new network includes hydrophones and sightings information network.
26			ES-28	The Executive Summary the document identifies mitigation areas around live hard bottom, artificial reefs, and shipwrecks where anchoring and use of explosives will not occur. WDFW would like the addition of Marine Preserves, Marine Protected Areas, and other Conservation Areas added to this list.
27		Table K-2		Marine Species Mitigation Areas- The table discusses max number of hours training will occur. Time of year training conducted will greatly influence impact to marine mammals and birds, especially SRKW.
28	Omitted from EIS			Plastics are mentioned as a potential contaminant associated with ordinance detonation and other activities. The EIS focuses on the harmful chemicals in plastics, but these is also a detrimental effect of filling up gut space

#	Throughout EIS or Chapter	Section	Page#	Comment
				with plastic particles. Organisms feel full, but do not gain any nutrients, so their body condition degrades over time. This also results in more risky foraging and other behavioral alterations as organisms seek to satisfy their nutritional needs. A gut full of plastic also occupies space that would otherwise be filled by developing gonads, decreasing reproductive potential. Release of plastics should be avoided at all cost in all environments.

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Exhibit 2

Bob Ferguson
ATTORNEY GENERAL OF WASHINGTON
Administration Division
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September 5, 2019

By U.S. Mail, Email, and Electronically

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RE: **Taking Marine Mammals Incidental to U.S. Navy Training and Testing Activities in the Northwest Training and Testing Study Area, 84 Fed. Reg. 38,225 (Aug. 6, 2019)**

Dear Ms. Harrison:

I submit these comments on the U.S. Navy's request for authorization to take marine mammals incidental to training and testing activities conducted in the Northwest Training and Testing Study Area for a period of seven years, from November 2020 through November 2027.[1] Although the Navy's proposed activities continue certain training and testing activities,[2] the Navy also plans to expand its activities and introduce new activities in Puget Sound and off the Washington Coast. I have significant concerns about the potential impacts of the Navy's activities on Washington's marine mammals, including Southern Resident orcas.

Through these comments, I seek to ensure that the Navy and the National Marine Fisheries Service (the Service) continue to contribute to the protection of Southern Resident orcas and other marine mammals to ensure the long-lasting ecological health of Washington's marine ecosystems and wildlife. Specifically, in reviewing the Navy's application, the Service must carefully consider impacts on Southern Resident orcas, ensure the Navy's activities have a

[1] U.S. Navy, Commander U.S. Pacific Fleet, Request for Regulations and Letters of Authorization for the Incidental Takings of Marine Mammals Resulting from U.S. Navy Training and Testing Activities in the Northwest Training and Testing Study Area (Rev. June 21, 2019) (hereinafter Navy Request).

[2] Navy Request, *supra* n.1, at 7.

negligible impact on marine mammals in and around Washington waters, and impose mitigation measures necessary to ensure the Navy's activities have the least practicable adverse impact.

I. DETAILED COMMENTS

The Marine Mammal Protection Act (MMPA) seeks to protect marine mammals from extinction or depletion as a result of human activity,[3] and broadly prohibits "take" of marine mammals, including harassing, hunting, capturing, or killing any marine mammal.[4] In the case of military readiness activities, the MMPA defines harassment to include Level A harassment which is "any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild" and Level B harassment, which is "any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behaviors, including but not limited to migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered."[5]

On May 11, 2019, the Navy applied for authorizations that, if granted, will allow the Navy to take a certain amount of marine mammals incidental to the Navy's Northwest Training and Testing activities for a period of seven years, starting in late 2020.[6] The Navy seeks authorization for these takes from its use of sonar and other transducers and in-water detonations and from ship strikes that may occur during training or testing activities.[7] In total, the Navy anticipates that these activities will result in no marine mammal mortalities but will cause 2,879 Level A harassment exposures and 1,789,617 Level B harassment exposures.[8]

The MMPA directs the Secretary to authorize the requested take if the Secretary finds that the takings will have a "negligible impact" on species or stock and prescribes in regulations mitigation measures to limit harm to marine mammals to the "least practicable adverse impact."[9] As discussed below, I am concerned that the Navy's application does not adequately demonstrate that the Navy's training and testing activities between 2020 and 2027 will have a negligible

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[3] 16 U.S.C. § 1361.

[4] *Id.* §§ 1361(2), 1362, 1371.

[5] 16 U.S.C. § 1362(18).

[6] Taking Marine Mammals Incidental to U.S. Navy Training and Testing Activities in the Northwest Training and Testing Study Area, 84 Fed. Reg. 38,225, 38,225 (Aug. 6, 2019).

[7] Navy Request, *supra* n.1, at 4.

[8] *Id.* at 98.

[9] 16 U.S.C. § 1371(a)(5)(A); *Natural Res. Def. Council, Inc. v. Pritzker*, 828 F.3d 1125, 1129–30 (9th Cir. 2016).

impact on marine mammals in and around Washington waters or that those activities will limit harm to these marine mammals to the least practicable adverse impact.[10]

A. The Service Must Carefully Review Impacts to Southern Resident Orcas

The Service must carefully review the Navy's application to ensure that the Navy's training and testing activities will have the least practicable adverse impact on Southern Resident orcas.

An icon of the Pacific Northwest, Southern Resident orcas have captured the hearts of Washington's residents, citizens, and visitors and hold significant cultural value for Washington's tribes. With the apparent loss of three whales this summer, Southern Resident orcas have a population of just 73 whales—the lowest population size in more than 40 years.[11] Given this declining population, the loss of even one more whale could greatly undermine recovery efforts for decades.[12]

In response to the species' declining population, Washington just this year passed a suite of laws to minimize harmful impacts to Southern Resident orcas by, among other things, limiting certain vessel noise and traffic near orcas, increasing safety requirements for transporting oil through Rosario Strait, and decreasing toxic pollution.[13] Washington enacted these laws based on recommendations made by Governor Inslee's Southern Resident Orca Task Force,[14] which identified a number of threats to Southern Resident orcas, including threats from "acoustic and

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[10] Because the Navy bases its application on its preferred alternative in its Draft Supplemental Environmental Impact Statement (EIS), I attach to this letter comments submitted by my office (Exhibit A), Washington Governor Jay Inslee (Exhibit B), and the Washington Department of Fish and Wildlife (Exhibit C) on the Navy's Northwest Training and Testing Draft Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement, 84 Fed. Reg. 11,972 (Mar. 29, 2019); 84 Fed. Reg. 16,250 (Apr. 18, 2019).

[11] Lynda V. Mapes, *Both orca babies are alive, and all 3 southern resident pods have been spotted in Canadian Waters*, Seattle Times (Aug. 14, 2019), https://www.seattletimes.com/seattle-news/environment/both-orca-babies-alive-all-three-southern-resident-pods-seen-in-canadian-waters/.

[12] Letter from Director Kelly Susewind to Naval Facilities Engineering Command Northwest re: 2019 Draft Navy Northwest Training and Testing Supplemental Environmental Impact Statement, at 2 (May 31, 2019) (hereinafter WDFW Letter) (Attached as Ex. C).

[13] *See* Washington Governor's Office, Inslee signs bill package to protect, aid, grow orca and salmon population in Salish Sea, https://medium.com/wagovernor/inslee-signs-bill-package-to-protect-aid-grow-orca-and-salmon-population-in-salish-sea-721b2d4758c9.

[14] Washington Governor Inslee, Southern Resident Orca Whale Recovery, https://www.governor.wa.gov/issues/issues/energy-environment/southern-resident-orca-recovery (task force recommendations formed the basis for the governor's proposed plan to the legislature in December 2019).

physical impacts to Southern Resident orcas from [n]aval exercises in the waters and air of Washington state."[15]

As the Washington Department of Fish and Wildlife (WDFW) noted in comments on the Navy's Draft Supplemental EIS, the Navy's use of mid-frequency sonar can impact wildlife within 2,000 square miles and mine explosives can cause death or injury.[16] Although these activities may impact a wide range of marine mammals, the potential impact of these activities on endangered Southern Resident orcas is of particular concern, given their dangerously low population size.

Despite these potential sound and physical impacts and the level of training conducted by the Navy in and around existing Southern Resident orca critical habitat and anticipated critical habitat along the west coast,[17] the Navy's application estimates that Southern Resident orcas will be exposed to only two level B harassments annually and just fifteen level B harassments over seven years.[18] These low exposure numbers do not account for the fact that Southern Resident orcas generally travel in pods and thus likely underestimate the potential adverse impact to this precarious population. Nor do these exposure numbers account for potential harassment from vessel noise, which WDFW identified as a potential threat to Southern Resident orcas,[19] or adequately consider the impact of repeated exposures to the same whales.

In addition, the Navy's application does not appear to be based on the most up-to-date information on the status of the Southern Resident orca population. The Navy's application erroneously states that Southern Resident orca stock abundance is 77 whales,[20] but as WDFW noted in its comment on the Draft SEIS, the population rested at that time at just 74 adults and one young of year.[21] Since those comments were submitted, the Center for Whale Research recently placed the population at just 73 whales.[22] The Navy's application also does not

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[15] Southern Resident Orca Task Force, Report and Recommendations, at 60 (Nov. 16, 2018); *see also* WDFW Letter, *supra* n.12, at 1.

[16] WDFW Letter, *supra* n.12, at 2; *see also* Letter from the Washington State Attorney General's Office to Jacqueline Queen re Comments on the U.S. Navy's Northwest Training and Testing Draft Supplemental EIS/Overseas EIS (June 12, 2019) (hereinafter AG Letter).

[17] Stipulated Settlement Agreement and [Proposed Order], *Ctr. for Biological Diversity v. Nat'l Marine Fisheries Serv.*, No. 2:18-cv-01201-RSM, at 2–3 (W.D. Wash. Apr. 12, 2019).

[18] Navy Request, *supra* n.1, at 99.

[19] WDFW Letter, *supra* n.12, at 4.

[20] Navy Request, *supra* n.1, at 42, 70.

[21] WDFW Letter, *supra* n.12, at 3.

[22] Lynda V. Mapes, *Both orca babies are alive, and all 3 southern resident pods have been spotted in Canadian Waters*, Seattle Times (Aug. 14, 2019), https://www.seattletimes.com/seattle-news/environment/both-orca-babies-alive-all-three-southern-resident-pods-seen-in-canadian-waters/.

incorporate the latest, most seasonally specific distribution and hotspot information for Southern resident orcas. In particular, the Navy has not integrated recent monitoring evidence from the National Oceanic and Atmospheric Administration's (NOAA) hydrophone network into its analysis.[23] This omission is of particular concern because NOAA's monitoring shows considerable temporal and spatial overlap between high-use testing areas for active sonar and explosives and high-use areas by Southern Resident orcas off Washington's north coast.[24]

The Service should also carefully consider impacts to Southern Resident orcas in the inland portion of the Navy's training area. The Navy's application states that Southern Resident orca use of this area has declined in recent years as orcas shift their range to forage for prey elsewhere.[25] However, this analysis ignores the considerable efforts by the State and its partners to decrease disturbances and increase prey availability in the Salish Sea.[26] The Service should consider these efforts and the potential for Southern Resident orcas to return to its historic foraging area in analyzing the Navy's efforts to avoid impacts to orcas.

Given the multiple stressors confronting Southern Resident orcas, even the Navy's predicted harassment levels, which as noted above are likely an underestimate, could have a significant impact on the health of the orca population. To protect this imperiled population, the Service should carefully consider whether the Navy's anticipated impacts will be "negligible" under the MMPA and impose necessary mitigation measures to ensure the least practicable adverse impact from the Navy's activities. Any mitigation measures must minimize impacts by shifting use of mid-frequency sonar and mine explosives away from areas used by Southern Resident orcas and timing those activities to avoid potentially catastrophic impacts on this imperiled population. The Service must also ensure that the Navy's activities will not jeopardize the Southern Resident orca population as required by the Endangered Species Act.[27]

B. The Service Must Ensure the Navy's Activities Will Have Negligible Impacts on Marine Mammals and Must Require Mitigation Measures to Ensure the Least Practicable Adverse Impact

In addition to impacts on Southern Resident orcas, the Navy's activities will impact a wide variety of marine mammals in and around Washington waters. Among other things, the Navy's proposal seeks authorization to expose 55,493 northern right whale dolphins, 36,788 Pacific white-sided dolphins, 15,972 Risso's dolphins, 92,793 Dall's porpoises, and 79,934 harbor

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[23] WDFW Letter, *supra* n.12, at 2.

[24] *Id*.

[25] Navy Request, *supra* n.1, at 67.

[26] WDFW Letter, *supra* n.12, at 5.

[27] 16 U.S.C. § 1536(a)(2).

porpoises to Level B Harassment over a 7-year period, which means that these species will likely experience disturbance of their natural behaviors like migration, breeding, and feeding.[28] During that same time period, the Navy seeks authorization to expose 48 Dall's porpoises, 291 harbor porpoises, and 46 harbor seals to Level A harassment or the likelihood of direct injury from the Navy's training and testing activities.[29]

Before authorizing the Navy's request, the Service must thoroughly evaluate the Navy's application to ensure that the Navy's proposed activities comply with the MMPA. In addition to ensuring that the harm to species will be "negligible," the MMPA requires the Service to prescribe mitigation measures to ensure that the harm from the Navy's activities have the least practicable adverse impact before authorizing those activities.[30]

To properly establish these mitigation measures, the Service must carefully consider the impacts to marine mammals. In doing so, the Service must ensure that the Navy's application contains accurate information about species impacts from the Navy's activities. In particular, I am concerned about the adequacy of the Navy's analysis of the impacts of mid-frequency sonar, noise, underwater explosives, and other disturbances to marine mammals; the accuracy of the Navy's quantitative analysis and estimates of marine mammal densities in the action area; and the thoroughness of the Navy's analysis of longer-term costs to species and stock beyond immediately observed reactions. The Service should ensure that it assesses the most recent available data on species distributions and hot spots and require the Navy to provide seasonally-specific information about the timing of its activities to better aid the Service in analyzing the impacts from the Navy's activities.[31]

The Service should also carefully review the Navy's plans to rapidly increase its use of emerging technologies, including the use of unmanned underwater systems in Puget Sound and off the Washington coastline and the use of sonar, high-energy lasers, payload systems, kinetic energy weapons, and biodegradable polymers. The Service should thoroughly analyze the impacts of these emerging technologies on marine mammals and prescribe any necessary mitigation measures, including seasonal restrictions and monitoring of short- and long-term impacts and careful testing and monitoring of the impacts of new technologies, to ensure that the Navy's activities have the least practicable adverse impact on marine mammals.

The Service should also impose mitigation measures that require the Navy to limit the amount of impulsive sound, decrease sonar exposure at-sea and pier side, and incorporate seasonal and/or

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[28] Navy Request, *supra* n.1 at 99–100.

[29] *Id.* at 99–101; 16 U.S.C. § 1362(18).

[30] 16 U.S.C. § 1371(a)(5)(A); *Natural Res. Def. Council, Inc. v. Pritzker*, 828 F.3d 1125, 1129–30, 1133 (9th Cir. 2016).

[31] WDFW Letter, *supra* n.12, at 7.

geographical restrictions. These seasonal and geographical restrictions should establish clear requirements and adequate spatial buffers to avoid biologically sensitive areas and critical habitat and areas essential for long-term species health.[32]

Finally, the Service must account for current and future impacts of climate change on marine mammals and their habitat in the action area in assessing the harm from the Navy's proposed activities and in determining how to best mitigate that harm.

II. CONCLUSION

For the above reasons, I strongly urge the Service to carefully consider the Navy's application for take authorizations under the MMPA to ensure that any such authorizations have a negligible impact to species or stock and that the harm from the Navy's activities has the least practicable adverse impact. The Service must also ensure that any authorizations fully comply with the Endangered Species Act with respect to federally listed species.

I appreciate your careful and thorough consideration of this important matter.

Sincerely,

BOB FERGUSON
Washington State Attorney General

RWF/jlg

[32] *See* WDFW Letter, *supra* n.12, at 7.

EXHIBIT

A

Bob Ferguson
ATTORNEY GENERAL OF WASHINGTON
Counsel for Environmental Protection
800 Fifth Avenue STE 2000 • Seattle WA 98104 • (206) 464-7744

June 12, 2019

By U.S. Mail, Email, and Electronically

Jacqueline Queen
Naval Facilities Engineering Command Northwest
Attention: NWTT Supplemental EIS/OEIS Project Manager
3730 N. Charles Porter Ave.
Building 385, Admin, Room 216
Oak Harbor, WA 98278-5000
ProjectManager@nwtteis.com

RE: **Comments on the U.S. Navy's Northwest Training and Testing Draft Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement, 84 Fed. Reg. 11,972 (Mar. 29, 2019); 84 Fed. Reg. 16,250 (Apr. 18, 2019).**

Dear Ms. Queen,

On behalf of the Attorney General of the State of Washington, we submit these comments on the U.S. Navy's Northwest Training and Testing Draft Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement (DSEIS).[1] The Attorney General agrees with and incorporates the comments submitted by the Governor's Office and the Washington Department of Fish and Wildlife (WDFW).[2] In addition to those comments, the Attorney General provides the following comments on the Navy's DSEIS.

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[1] Environmental Impact Statement, Notice of Availability, 84 Fed. Reg. 11,972 (Mar. 29, 2019); Notice of Extension of Public Comment Period for the Draft Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement for Northwest Training and Testing, 84 Fed. Reg. 16,250 (Apr. 18, 2019).

[2] Letter from Jay Inslee to Naval Facilities Engineering Command Northwest re: Comments regarding Northwest Training and Testing Activities Draft Supplemental Environmental Impact Statement/Oversees Environmental Impact Statement (June 12, 2019) [hereinafter Governor Letter]; Letter from Director Kelly Susewind to Naval Facilities Engineering Command Northwest re: 2019 Draft Navy Northwest Training and Testing Supplemental Environmental Impact Statement (May 31, 2019) [hereinafter WDFW Letter].

The Attorney General recognizes the important role of the Navy in protecting national security, ensuring military readiness, and keeping our troops safe abroad. However, the Attorney General submits these comments to express concern about the far-reaching environmental impacts of the Navy's Northwest Training and Testing activities, which will utilize explosives, impulsive sound, and sonar in marine environments; employ emerging technologies such as high-energy lasers and unmanned underwater systems; contribute to vessel noise in Puget Sound; contribute to aircraft noise in Puget Sound, on the Olympic Peninsula, and off the Washington Coast; and potentially harm marine mammals, fish, and other wildlife, including tufted puffins, marbled murrelets, ESA-listed rockfish and salmon, harbor porpoises, and Southern Resident killer whales.

The Navy has developed this DSEIS to assess the environmental impacts of continuing and expanding its training, research, development, testing, and evaluation activities in the Northwest Training and Testing Study Area beyond 2020 and into the reasonably foreseeable future.[3] The Navy's training and testing activities will occur in Puget Sound and the Strait of Juan de Fuca, across the Olympic Peninsula, and along the Washington Coast.[4] As a result, the Navy's training and testing activities will impact Washingtonians, waterways, and wildlife in these areas.

The National Environmental Policy Act (NEPA) mandates that the Navy assess—"to the fullest extent possible"—the environmental impacts of its Northwest Training and Testing activities.[5] The Navy must also fully apprise the public of the environmental impacts associated with this proposed major federal action.[6] As detailed below, to ensure compliance with NEPA, the Navy should revise its environmental analysis to: (A) consider an alternative that is designed to reduce impacts to marine mammals and other wildlife while also meeting the Navy's training, testing, and military readiness needs; (B) conduct a more thorough evaluation of environmental impacts; and (C) expand the Navy's mitigation measures to ensure better protection of marine mammals, fish, and other wildlife.

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[3] DSEIS 2-1.

[4] DSEIS ES-3; 2-2–2-4.

[5] 42 U.S.C. § 4332.

[6] 40 C.F.R. § 1500.1; *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1185 (9th Cir. 2008) (The purpose of NEPA is twofold: "ensure[ ] that the agency ... will have available, and will carefully consider, detailed information concerning significant environmental impacts[, and] guarantee [ ] that the relevant information will be made available to the larger [public] audience.") (citations omitted).

I. DETAILED COMMENTS

A. The Navy Should Consider an Alternative that Would Minimize Environmental Impacts

The alternatives section "is the heart of the environmental impact statement."[7] Agencies must rigorously explore and objectively evaluate all reasonable program alternatives, including no action, and must discuss the reasons for eliminating any alternatives which were rejected for detailed study.[8] An EIS is evaluated based on its "reasonably identified and defined objectives," and alternatives should be excluded from consideration "*only* if it would be reasonable for the agency to conclude that the alternative does not bring about the ends of the federal action."[9] The alternatives analysis should "present the environmental impacts of the proposal and the alternatives in comparative form" to "sharply defin[e] the issues and provid[e] a clear basis for choice among options by the decisionmaker and the public."[10]

Here, the Navy has considered three alternatives in detail: (1) the no-action alternative, under which the Navy would not conduct proposed training and testing activities in the Northwest Training and Testing Study Area; (2) Alternative 1, the Navy's preferred alternative, which reflects a representative year of training and testing for the reasonably foreseeable future; and (3) Alternative 2, which reflects the maximum number of training activities that could occur within a given year and assumes that this maximum level of activity will occur annually for the reasonably foreseeable future.[11]

To ensure that it considers an adequate range of alternatives, the Navy should develop and consider in detail an alternative designed to reduce impacts to marine mammals, fish, and other wildlife while also meeting the Navy's training, testing, and military readiness needs.[12] At a minimum, this alternative should limit the amount of impulsive sound to reduce impacts on marine mammals and Endangered Species Act listed species, decrease sonar exposure at-sea and pier side, and incorporate seasonal and/or geographical restrictions to reduce impacts on wildlife,

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[7] 40 C.F.R. § 1502.14.

[8] 40 C.F.R. § 1502.14(a) and (d). *See also Border Power Plant Working Grp. v. Dep't of Energy*, 260 F. Supp. 2d 997, 1030 (S.D. Cal. 2003) ("[A]n agency must look at every reasonable alternative, with the range dictated by the nature and scope of the proposed action") (quoting *Idaho Conservation League v. Mumma*, 956 F.2d 1508, 1520 (9th Cir. 1992)).

[9] *Anglers Conservation Network v. Pritzker*, 139 F. Supp. 3d 102, 118–19 (D.D.C. 2015) (emphasis in original, internal quotations excluded).

[10] *Id.*

[11] DSEIS 2-23–2-27.

[12] *See Nat'l Res. Def. Council v. U.S. Forest Serv.*, 421 F.3d 797, 813 (9th Cir. 2005) ("The existence of a viable but unexamined alternative renders an environmental impact statement inadequate") (quoting *Citizens for a Better Henderson v. Hodel*, 768 F.2d 1051, 1057 (9th Cir. 1985)).

including tufted puffin, marbled murrelets, ESA-listed rockfish and salmon, harbor porpoises, and Southern Resident killer whales.[13]

Considering such an alternative would be consistent with the purpose and need statement in the DSEIS, which identifies both the Navy's purpose for the proposed action to meet the Navy's statutory purpose "to maintain, train, and equip combat-ready naval forces capable of winning wars, deterring aggression, and maintaining freedom of the seas," and the National Marine Fisheries Service's (NMFS) purpose of evaluating the Navy's proposed action and ensuring compliance with the statutory mandates of the Marine Mammal Protection Act (MMPA), including NMFS's obligations to prescribe methods for effecting the "least practicable adverse impact" on marine mammals, fish, and their habitat.[14]

The Navy's current range of alternatives fails to analyze an alternative that would minimize impacts to marine mammals, fish, and other wildlife. Instead, the two action alternatives are the same or very similar with respect to many training and testing activities. For example, both Alternative 1 and 2 include the same number of air combat maneuvers,[15] maritime patrol aircraft tracking exercises,[16] aircraft electronic warfare training exercises,[17] anti-submarine warfare testing activities,[18] torpedo testing,[19] unmanned aerial system testing,[20] acoustic component testing in inland waters,[21] radar and other system testing,[22] semi-stationary equipment testing in inland waters,[23] simulant testing,[24] track testing,[25] intelligence, surveillance, reconnaissance electronic warfare triton testing, [26] and high-energy laser testing.[27] In addition, the two action alternatives contemplate the same maximum level of training and testing activities for surface-to-

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[13] *See generally* Governor Letter; WDFW Letter.

[14] 16 U.S.C. § 1371(a)(5)(A)(iii); *see Conservation Council for Hawaii v. Nat'l Marine Fisheries Serv.*, 97 F. Supp. 3d 1210, 1237–38 (D. Haw. 2015) (concluding that NEPA analysis failed to sufficiently consider an alternative that would restrict Navy training and testing activities to reduce harm to marine mammals).

[15] DSEIS 2-28.

[16] DSEIS 2-29.

[17] *Id.*

[18] DSEIS 2-33

[19] *Id.* (reflecting the same levels for torpedo (explosive) testing and for torpedo (non-explosive) testing for Alternatives 1 and 2).

[20] DSEIS 2-34.

[21] DSEIS 2-36.

[22] DSEIS 2-37.

[23] *Id.*

[24] *Id.*

[25] DSEIS 2-38.

[26] *Id.*

[27] DSEIS 3-31.

air missile exercises,[28] submarine torpedo exercises[29] submarine tracking exercises,[30] precision anchoring,[31] and unmanned underwater vehicle testing in the offshore area.[32] The two action alternatives also apply the same mitigation measures, which the Navy contends is the "maximum level of mitigation that is practicable for the Navy to implement when balanced against impacts to safety, sustainability, and the ability to continue meeting its mission requirements."[33] Given the similarity between these two action alternatives, they do not provide sufficient information for the Navy and NFMS to engage in informed decisionmaking.[34] Accordingly, the Navy should develop and consider an alternative that contemplates a level of training and testing that will reduce impacts to marine mammals and other wildlife consistent with the purpose and need of the proposed action.[35]

B. The Navy Should Conduct a More Thorough Analysis of Environmental Impacts

"NEPA requires that a federal agency consider every significant aspect of the environmental impact of a proposed action and inform the public that it has indeed considered environmental concerns in its decisionmaking process."[36] Under NEPA, agencies must take a "hard look" at the environmental impacts of the proposed action by considering all foreseeable direct, indirect, and cumulative impacts.[37]

To satisfy its NEPA obligations, the Navy should revise its analysis of environmental impacts to better reflect the impacts of its training and testing operations. In particular, the Navy should more thoroughly analyze the environmental impacts of its use of emerging technologies, including the use of unmanned underwater systems in Puget Sound and off the Washington coastline and the use of sonar, high-energy lasers, payload systems, kinetic energy weapons, and biodegradable polymers. Moreover, the Navy should clarify any time-of-year restrictions on its

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[28] DSEIS 2-28.

[29] *Id.*

[30] DSEIS 2-29.

[31] DSEIS 2-31.

[32] DSEIS 2-35.

[33] DSEIS 2-26; *see also* DSEIS 2-27.

[34] *See Conservation Council for Hawaii*, 97 F. Supp. 3d at 1237 ("An EIS must '[r]igorously explore and objectively evaluate all reasonable alternatives'") (quoting 40 C.F.R. § 1502.14(a)); *see also* 40 C.F.R. § 1502.1.

[35] *See City of Sausalito v. O'Neill*, 386 F.3d 1186, 1206 (9th Cir. 2004) ("The EIS should 'provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment.'") (quoting 40 C.F.R. § 1502.1).

[36] *Pit River Tribe v. U.S. Forest Serv.*, 469 F.3d 768, 781 (9th Cir. 2006) (quoting *Earth Island Inst. v. U.S. Forest Serv.*, 442 F.3d 1147, 1153–54 (9th Cir. 2006)).

[37] 40 C.F.R. §§ 1508.25; 1508.7, 1508.8; *League of Wilderness Defs.-Blue Mountains Biodiversity Project v. U.S. Forest Serv.*, 689 F.3d 1060, 1075 (9th Cir. 2012).

training and testing activities to provide a better understanding of the potential impacts to marine mammals, fish, and other wildlife. In addition, the Navy should engage in a more robust analysis of the impacts of mid-frequency sonar and mine explosives to marine mammals, fish, and other wildlife. As WDFW observed, mid-frequency sonar can impact wildlife within 2,000 square miles and mine explosives can cause death or injury.[38] Although these activities may impact a wide range of wildlife, the impact of these activities on endangered Southern Resident killer whales is of particular concern, given their dangerously low population size and the significant efforts of the State, Tribes, and Washingtonians to ensure orca survival.

The Navy's revised analysis also should respond to the concerns expressed by WDFW in Appendix A to its comments, including concerns about impacts of underwater explosions on tufted puffins; impacts of noise, sonar, and other disturbances from Navy activities on Southern Resident killer whales; impacts to short-tailed albatross from ingestion of post-explosive target fragments, debris, and other materials; impacts to marbled murrelets from underwater sound pressure levels and in-water and above-water explosions, and increased vessel traffic; disruptions to ESA-listed rockfish reproductive activities; and the accuracy of estimates of marine mammal densities in the action area.[39]

Finally, the Navy should engage in a more robust analysis of the noise impacts from its increased aircraft operations in Puget Sound and across the Olympic Peninsula. Both action alternatives consider significant increase in aircraft training activity.[40] These aircraft activities affect communities, rural areas, and pristine landscapes across the Northwest, including in and around Olympic National Park, off the Washington Coast, and in Puget Sound.[41]

C. The Navy Should Include Additional Mitigation Measures in Its Analysis

NEPA also requires that the DSEIS "contain a detailed discussion of possible mitigation measures."[42] Although NEPA does not require that harms from a proposed action actually be mitigated, an EIS must discuss mitigation measures with "sufficient detail to ensure that environmental consequences have been fairly evaluated."[43]

The Navy should revise its discussion of mitigation measure to fairly evaluate the environmental consequences of its proposed training and testing activities. Specifically, the Navy's mitigation

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[38] WDFW Letter, at 2.

[39] *Id.* at 3–8.

[40] *See* DSEIS 3.12-30–3.12-34.

[41] *See* DSEIS 2-18; Appx. J-17; J-21.

[42] *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 351 (1989).

[43] *S. Fork Band Council Of W. Shoshone Of Nevada v. U.S. Dep't of Interior*, 588 F.3d 718, 727 (9th Cir. 2009) (quoting *Robertson*, 490 U.S. at 352).

measures should be modified to establish seasonal limits on Navy activities in certain areas to reduce risks to marine mammals, fish, and wildlife; encompass marine preserves, marine protected areas, and other conservation areas as mitigation areas; include efforts to increase forage fish populations for marine mammals; avoid the release of plastics into the environment; and carefully test and monitor the implementation of new technologies that may have unanticipated impacts on marine mammals, fish, and other wildlife.[44]

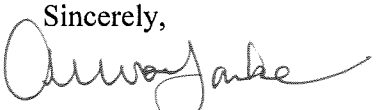
Consideration of these mitigation measures will help the Navy to comply with its NEPA obligations as well as its obligations under the MMPA and the ESA.[45]

II. CONCLUSION

For the above reasons, the Attorney General strongly urges the Navy to address the concerns stated in these comments and in the comments submitted by the Governor's office and the Washington Department of Fish and Wildlife. In addition, the Attorney General strongly urges the Navy to comply with all applicable federal and state laws in reviewing and conducting its training and testing activities in the Northwest region.

We appreciate your consideration of this important matter.

Sincerely,



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[44] Governor Letter, at 2; WDFW Letter, at 2, 7–8.

[45] *See generally* 16 U.S.C. §§ 1362; 1371 (MMPA); 16 U.S.C. §§ 1536, 1538 (ESA); *see also Conservation Council for Hawaii*, 97 F.Supp.3d at 1229–31 (concluding that NMFS failed to meet the "stringent standard" of the MMPA's "least practicable adverse impact" requirement in assessing mitigation measures for Navy activities); DSEIS 5-2.

EXHIBIT

B

JAY INSLEE
Governor

STATE OF WASHINGTON
Office of the Governor

June 7, 2019

Captain Chad M. Brooks
Naval Facilities Engineering Command Northwest
ATTN: NWTT Supplemental EIS/OEIS Project Manager
3730 N. Charles Porter Ave.
Building 385, Admin, Room 216
Oak Harbor, WA 98278-5000

RE: Comments on Northwest Training and Testing Activities Draft Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement

Dear Captain Brooks:

The United States Navy has a proud history and has trained in Washington for more than 75 years. That training – along with commercial, scientific, and recreational activities in our waterways – has had a cumulative effect on our unique and fragile ecosystem. The State recognizes and appreciates the Navy's long-standing commitment as a steward of our natural resources. However, that commitment needs to drive a more robust mitigation strategy that includes a wide array of investments to preserve this unique landscape and protect animals such as the Southern Resident Killer Whales.

It is in this spirit that I write this letter to ask the Navy to take the following concerns into consideration as the Navy develops a training program:

1. Limit the amount of impulsive sound.
The physiological effect of impulsive sound to marine life can cause injury, such as ruptured swim bladders and hemorrhaging of other gas-filled organs. I recommend that you seasonally limit training that involves underwater explosions. Doing so reduces any adverse effects during the critical timeframe when fish migration takes place. Part of the current plan includes using lookouts on surface vessels and aircraft, as well as an expanded mitigation zone, but only has post-event monitoring of the detonation site when practical. This portion of the mitigation plan should be mandatory to ensure no marine mammals or Endangered Species Act-listed species were injured or killed.

2. Decrease sonar exposure at-sea and pier side.
Marine mammals can temporarily or permanently lose their hearing when they get exposed to sonar. This exposure also increases their behavioral reactions, physiological stress, and masks the sounds they need to hear for communication or hunting. I urge you to reduce exposure time, reduce power settings on sonar, or develop shielding to reduce sonar range during maintenance and testing.

While at-sea sonar affects marine species differently, exposure can result in the inability to communicate within the pod or group, reduce their ability to avoid predators or locate prey, and push marine animals to leave the area for less desirable locations.

The mitigation strategy proposed in the SEIS does not sufficiently address this issue. Please consider including the following in the mitigation plan:

1.) Establish seasonal limitations on sonar use in certain locations to reduce risk of marine mammals leaving their preferred habitat. This is most apparent with the Southern Resident Killer Whales hunting Chinook salmon off the coast in the spring.
2.) Increase the forage fish population for marine mammals. I encourage the United States Navy and the Department of Defense to work with the State's Southern Resident Killer Whale Task Force to improve prey forage stock.

3. Better understand the effects of testing and training unmanned systems.
I am concerned about the rapid increase of unmanned underwater systems and their use in the Puget Sound and the offshore coastline. The proposed activities in the SEIS includes a broad array of activates, including possible use of sonar, lasers, and payload systems. As the Navy tests emerging technology and trains on new systems, it is critical that we understand the implications of this testing and training on our undersea environment. A more thorough analysis of the proposed activities is requested.

Washington has made significant investments to restore the ecosystem of the Puget Sound and coastal waterways. Protecting our marine mammals, which include the region's majestic Southern Resident Killer Whales, is part of the investment. Together, we can ensure the survival of Southern Resident Killer Whales, salmon, shorelines, and an ecosystem that makes Puget Sound one of the state's greatest treasures.

Very truly yours,

Jay Inslee
Governor

EXHIBIT

C

State of Washington
DEPARTMENT OF FISH AND WILDLIFE
Mailing Address: P.O. Box 43200, Olympia, WA 98504-3200 • (360) 902-2200 • TDD (360) 902-2207
Main Office Location: Natural Resources Building, 1111 Washington Street SE, Olympia, WA

May 31, 2019

Naval Facilities Engineering Command Northwest
Attention: NWTT Supplemental EIS/OEIS Project Manager
3730 N. Charles Porter Avenue
Building 385, Admin, Room 216
Oak Harbor, WA 98278-5000

SUBJECT: 2019 Draft Navy Northwest Training and Testing Supplemental Environmental Impact Statement

The Washington Department of Fish and Wildlife (WDFW) has reviewed the Draft Northwest Training and Testing Supplemental Environmental Impact Statement (Draft EIS). WDFW works extensively to conserve and protect the fish and wildlife species that share the water and land outlined as important for the Navy's continued training and testing. We appreciate the thorough analysis the Navy has drafted to determine impacts of their proposed activities on species and their habitats. WDFW would like to outline some concerns about impacts to fish and wildlife from new and increased Navy activities and provide suggestions to improve and clarify these analyses (See Table in Appendix A).

To evaluate the impacts to fish and wildlife species from existing, new, and increased training and testing activities more accurately, we request the Navy clarify the times of year in which proposed activities will occur. This is especially important when assessing impacts to fish and wildlife, which have seasonal movements and behaviors that will greatly determine whether Navy activities significantly affect each species in the proposed areas (e.g. Tufted puffin, rockfish, Southern Resident killer whale).

WDFW is especially concerned about potential impacts to the endangered and struggling Southern Resident killer whale (SRKW) population from proposed Navy activities. The Draft EIS inaccurately states that Governor Inslee's Orca Task Force did not identify Navy actions as a source for any of the identified threats to SRKW. Recommendation #25 from the Task Force report outlines the need to "address the acoustic and physical impacts to Southern Resident orcas from Naval exercises in waters and air of Washington state." WDFW appreciates the Navy's recent engagement in the Task Force process and welcomes continued coordination and engagement to identify and implement measures to minimize impacts to SRKW. We believe the timing, methodology and intensity of the actions in the draft EIS present an opportunity to begin to tackle this challenge, while still meeting the objectives of the Navy.

Our major concerns for new and increased impacts to SRKW lie around the use of mid-frequency sonar, which can impact wildlife within 2,000 square miles, and mine explosives, which could cause immediate injury or death. Since SRKW travel in larger pods, it is unlikely that Navy activities would affect only one or two individual animals. However, in this declining and endangered population, even the loss of one single SRKW could greatly undermine recovery efforts for decades. We request that the Navy: 1) use the latest, most seasonally specific distribution and hotspot information for SRKWs in their analysis of proposed activities, 2) clarify the timing of their proposed activities to better understand potential impacts to SRKW, and 3) accomplish Navy objectives while minimizing impacts to SRKW by shifting these most concerning activities in time and space. In particular, we encourage the Navy to integrate recent acoustic monitoring evidence from NOAA's hydrophone network (Emmons et al. 2019) into their planning efforts. This information shows considerable temporal and spatial overlap between high-use testing areas for active sonar and explosives and high-use areas by SRKWs off the north coast of Washington—which current and proposed activities do not appear to recognize. One key takeaway from the report is that SRKWs show disproportionately high use of the Cape Flattery Offshore area in spring compared to other areas of the coast. To minimize potential adverse effects on SRKWs, sonar and explosives testing and training should be moved to another location or another season, or both. In addition, we request that the Navy re-examine the finding that neither alternatives would not result in (or significantly risk) the incidental taking of killer whales.

Underwater acoustic testing and electronic warfare may have significant impacts to fish behavior and migration (e.g. salmon and forage fish) or result in auditory injury to the threatened marbled murrelet. Similarly, surface and underwater explosions could directly impact short-tailed albatross, marbled murrelets, or tufted puffins, all of which forage in offshore areas greater than 30-50 nautical miles from shore, especially seasonally. These potential impacts also include the ingestion of post-explosive fragments and debris at the surface, and disturbance caused by high underwater sound pressure levels (barotrauma). WDFW encourages a more thorough analysis using recent data on distributions (See Appendix A for suggestions) and reconsideration of increases of these activities where they are most likely to coincide in space and time with these sensitive fish and birds.

Finally, the use of high-energy lasers, kinetic energy weapons, and biodegradable polymer outlined in the EIS are new and their effects are unknown. It is critical that the Navy pair these new technologies, which are potential energy and entanglement stressors or sources of mortality, with rigorous testing and monitoring to avoid impacts to fish and wildlife.

We hope that you find these comments helpful in your EIS process and welcome any questions regarding our comments. WDFW looks forward to continuing to cooperate with the Navy to ensure protections for Washington's fish and wildlife.

Respectfully,

Kelly Susewind
Director

APPENDIX A

Detailed Washington Department of Fish and Wildlife Comments:
2019 Navy Northwest Training and Testing Supplemental EIS

#	Throughout EIS or Chapter	Section	Page#	Comment
1	Appendix A	A.1.2.1	A-10	Underwater explosions may impact foraging Tufted Puffins, which often forage at the continental shelf break >50 km offshore; see Menza et al. (2016). Tufted Puffin foraging activity during the breeding season overlaps the area where explosive training activity could occur. The report by Menza et al. (https://repository.library.noaa.gov/view/noaa/9329) provides similar maps for several bird and mammal species. This information should be used when evaluating potential impacts of activities on species of conservation concern. The USFWS is currently evaluating whether or not to list the Puffin under the ESA.
2	Appendix A	A.1.5	A-25	Underwater explosions may impact foraging Tufted Puffins, which often forage >50 km offshore
3	Appendix A	A.1.5.2	A-27	Underwater explosions may impact foraging Tufted Puffins, which often forage >50 km offshore
4	Appendix A	A.1.5.3	A-29	Underwater explosions may impact foraging Tufted Puffins, which often forage >50 km offshore
5	Appendix A	A.2.1.6	A-54	Underwater explosions may impact foraging Tufted Puffins, which often forage >50 km offshore
6	Appendix A	A.2.2.1	A-58	Underwater explosions may impact foraging Tufted Puffins, which often forage >50 km offshore
7		3.4.1.16.1	3.4-46	"Navy actions were not the sources for any of the identified threats" in the SRKW Task Force report." This statement is incorrect. Recommendation #25 from the Task Force outlining the need to "address the acoustic and physical impacts to Southern Resident orcas from Naval exercises in waters and air of Washington state." Early in the Task Force process several members and the Vessels working group indicated the need for direct engagement with the Navy, which was reinforced in hundreds of public comments on the draft report. "Recommendation 25: Coordinate with the Navy in 2019 to discuss reduction of noise and disturbance affecting Southern Resident orcas from military exercises and Navy aircraft. Implementation details: The governor should meet with the U.S. Navy's Commanding Officer for the region that includes Washington state to address the acoustic and physical impacts to Southern Resident orcas from Naval exercises in waters and air of Washington state. The governor should request the Navy participate on the Vessels working group in Year Two and identify actions to reduce the Navy's impacts to Southern Resident orcas."
8	Throughout the EIS			Throughout the EIS, the number of Southern Resident killer whales needs to be updated. There are currently 74 adult individuals and one young of the year (not usually counted until 1 year of age).

#	Throughout EIS or Chapter	Section	Page#	Comment
9	Omitted from EIS		3.4.103	*Wieland, M., A. Jones, and S. C. P. Renn. 2010. Changing durations of southern resident killer whale 23 (Orcinus orca) discrete calls between two periods spanning 28 years. Mar. Mam. Sci. 26(1):195–201.* "The increase of mean durations of discrete calls demonstrated here indicates that the Southern Residents are making a behavioral adjustment as a result of vessel noise. Because they are adjusting their vocal behavior, we must consider the very real possibility that engine noise is hindering their ability to communicate, and may well impact their efficiency at using acoustics to forage and navigate, as well." This should be incorporated into 3.4.2.1.1.4 on masking (which talks about other species but not killer whales) – as well as the odontocete discussion on page 3.4-120.
10	Omitted from EIS			*Emmons, C.K., M.B. Hanson, and M.O. Lammers. 2019. Monitoring the occurrence of Southern resident killer whales, other marine mammals, and anthropogenic sound in the Pacific Northwest. Prepared for: U.S. Navy, U.S. Pacific Fleet, Pearl Harbor, HI. Prepared by: National Oceanic and Atmospheric Administration, Northwest Fisheries Science Center under MIPR N00070-17-MP-4C419. 25 February 2019. 23p.* There were 148 mid-frequency active sonar events detected between 2011 and 2017, with peak overlapping with occurrence of the three killer whale communities (southern residents, northern residents, and transients). Reasons for concern: • Separation of an orca calf from its group during exposure to mid-frequency sonar playback was observed (Miller et al 2011) (page 125 marine mammal chapter). • Newer high-duty or continuous active sonars have more potential to mask vocalizations, particularly for delphinids and other mid-frequency cetaceans. (pg. 116 marine mammal chapter/pg. 3.4-102). Consequences may include avoidance of the area and interruptions to foraging or other essential behaviors. Longer-term consequences could include potential decrease in recruitment if masking interferes with reproductive activities or mother-calf communication. • Mass strandings of cetaceans have been linked to mid-frequency active sonar activity. (3.4.2.1.1.6)
11		Table 3.4-30		An estimation of two to three behavioral impacts to SRKW per year from sonar and other transducers was cited, however SRKW spend most of their time travelling in larger pods close together. This estimate does not seem realistic. The estimate could be zero if the Navy activity occurs in a time of year in which SRKWs are infrequently found in the area, but much larger if SRKWs are present due to their close proximity to one another. Suggest that the Navy should more closely analyze the time of year for their activities and overlay

#	Throughout EIS or Chapter	Section	Page#	Comment
				with the most up to date seasonal and hotspot SRKW distribution information from NOAA (instead of extrapolating across the year and geography).
12		3.4-26 3.4-46		In multiple locations in the EIS, there is discussion about SRKWs shifting their range to forage less in the Salish Sea because of a shift in availability of Chinook salmon. "As a result, foraging during the spring in Salish Sea by Southern Resident killer whales has declined in recent years as they shift their range and forage for Chinook salmon or other prey species elsewhere in response to reduced prey availability in that historically used inland waters foraging area (Shields et al., 2018b)." "The use of the Inland Waters portion of the NWTT Study Area by Southern Resident killer whales has declined in recent years as they shift their range and forage for Chinook salmon or other prey species elsewhere and outside the currently designated critical habitat in response to prey availability (Shields et al., 2018b)." While the SRKWs may have been forced to forage further and differently more recently to meet their nutritional needs, decreasing noise and disturbance to increase access to the prey that is available in the Salish may result in their return to that area. In addition, WDFW and our partners are working to increase prey availability for SRKWs in the Salish sea. Therefore, the recent information on foraging distribution should not be seen as a reason to discontinue the avoidance of impacts to SRKWs in the Salish sea.
13	Appendix A	A.1.1.3	A-5	Short-tailed Albatross (STAL) could be directly impacted by ingestion of post-explosive target fragments and debris, chaff, neutralizer and mine fragments, and other expended materials visible at the surface. Any surface or underwater explosions could directly impact foraging STAL by death or injury.
14	Appendix A	A.1.1.4	A-7	Short-tailed Albatross (STAL) could be directly impacted by ingestion of post-explosive target fragments and debris, chaff, neutralizer and mine fragments, and other expended materials visible at the surface. Any surface or underwater explosions could directly impact foraging STAL by death or injury.
15	Appendix A	A.1.3.1	A-19	Short-tailed Albatross (STAL) could be directly impacted by ingestion of post-explosive target fragments and debris, chaff, neutralizer and mine fragments, and other expended materials visible at the surface. Any surface or underwater explosions could directly impact foraging STAL by death or injury.
16	Appendix A	A.1.5.1	A-25	Short-tailed Albatross (STAL) could be directly impacted by ingestion of post-explosive target fragments and debris, chaff, neutralizer and mine fragments, and other expended materials visible at the surface. Any surface or underwater explosions could directly impact foraging STAL by death or injury.

#	Throughout EIS or Chapter	Section	Page#	Comment
17	Appendix A	A.1.5.3	A-29	Short-tailed Albatross (STAL) could be directly impacted by ingestion of post-explosive target fragments and debris, chaff, neutralizer and mine fragments, and other expended materials visible at the surface. Any surface or underwater explosions could directly impact foraging STAL by death or injury.
18	Appendix A	A.2.1.6	A-54	Short-tailed Albatross (STAL) could be directly impacted by ingestion of post-explosive target fragments and debris, chaff, neutralizer and mine fragments, and other expended materials visible at the surface. Any surface or underwater explosions could directly impact foraging STAL by death or injury.
19	Appendix A	A.2.1.7	A-56	Short-tailed Albatross (STAL) could be directly impacted by ingestion of post-explosive target fragments and debris, chaff, neutralizer and mine fragments, and other expended materials visible at the surface. Any surface or underwater explosions could directly impact foraging STAL by death or injury.
20	Appendix A	A.2.2.1	A-58	Short-tailed Albatross (STAL) could be directly impacted by ingestion of post-explosive target fragments and debris, chaff, neutralizer and mine fragments, and other expended materials visible at the surface. Any surface or underwater explosions could directly impact foraging STAL by death or injury.
21	Appendix A	A.1.1.3, A.1.1.4, A.1.2.1, A.1.2.3, A.1.2.4, A.1.2.5, A.1.4.1, A.1.4.2, A.1.5.1, A.1.5.2, A.1.5.3, A.1.6.7, A.1.6.8, A.1.6.9, A.2.1.2, A.2.1.3, A.2.1.4, A.2.1.5, A.2.1.6, A.2.1.7, A.2.2.1	Corresp. Appendix pp.	Marbled Murrelets (MAMU) in offshore areas <35 nautical miles from shore (Adams et al. 2014) and in all of Puget Sound operations areas are very likely susceptible to impacts from disturbances caused by high underwater sound pressure levels (barotrauma) from in-water and above-water explosions (especially in the Explosive Ordinance Disposal areas) depending on the locality and distance of the detonation. Underwater explosions will likely result in mortality of some MAMU prey resources and possible disruption of foraging by breeding adults, which could create additional indirect impacts by increased probability of mortality to nestlings by missed feedings (USFWS 2009 and ref. therein). In addition, increased vessel traffic (USFWS 2009) and disturbance by extended helicopter rotor wash over foraging areas could have direct impacts on MAMU foraging activity. Auditory injury impacts to MAMU are expected to occur at Low and Mid Frequency active sonars at decibel levels ≥220 dB SEL re: 1 uPa^2 –sec (thresholds: USFWS 2016: Table 18), and high probability of impact to MAMU at close range at active sonar frequencies MF1, MF8, ASW4 in the Puget Sound areas (USFWS 2016:Table 20).

#	Throughout EIS or Chapter	Section	Page#	Comment
22		3.9		Rockfishes in Puget Sound generally mate in the fall. Courtship is complex and requires potential mates to first locate one another. Though detailed information about how this occurs is lacking, it is clear that rockfishes utilize sound to communicate with one another both prior to and during courtship. Any Navy activity that increases submarine sound proximate to deep, rocky habitats has the potential to disrupt reproductive activity of ESA-listed rockfishes. At a minimum, monitoring should occur to evaluate changes in sound intensity and temporal frequency in areas of documented Yelloweye and Bocaccio occurrence.
23	Throughout EIS			The impact of noise and sonar on SRKWs should not be underestimated. Behavior change occurs at much lower received levels in killer whales than other marine mammals and responses to mid-frequency sonar have been observed over 25 miles from the source. Mid-frequency sonar also has the potential to have impacts on wildlife within a 2,000 sq. mi. radius. WDFW encourages the Navy to decrease potential impacts on SRKW by limiting activities to the seasons in which SRKW are the least likely to be present and by ensuring an adequate spatial buffer for SRKWs leaving the Strait of Juan De Fuca and heading south along the coastline to allow sound to attenuate before it reaches the whales.
24	Throughout EIS			The current estimates of marine mammal densities may be underestimated, therefore leading to an underestimation of potential impacts to these species. WDFW requests that the Navy better analyze their potential impacts on marine mammals and SRKW in particular with the most recent available data on distributions and hotspots (not currently in the EIS). In addition, these estimates along with information on timing of Navy activities should be seasonally specific (at least at some level) instead extrapolating across the year.
25	Omitted from EIS			In addition to the use of viewing platforms and other measures to detect wildlife before conducting activities, WDFW encourages the Navy to explore using the new whale report alert system for more information on marine mammal movements. This new network includes hydrophones and sightings information network.
26			ES-28	The Executive Summary the document identifies mitigation areas around live hard bottom, artificial reefs, and shipwrecks where anchoring and use of explosives will not occur. WDFW would like the addition of Marine Preserves, Marine Protected Areas, and other Conservation Areas added to this list.
27		Table K-2		Marine Species Mitigation Areas- The table discusses max number of hours training will occur. Time of year training conducted will greatly influence impact to marine mammals and birds, especially SRKW.
28	Omitted from EIS			Plastics are mentioned as a potential contaminant associated with ordinance detonation and other activities. The EIS focuses on the harmful chemicals in plastics, but these is also a detrimental effect of filling up gut space

#	Throughout EIS or Chapter	Section	Page#	Comment
				with plastic particles. Organisms feel full, but do not gain any nutrients, so their body condition degrades over time. This also results in more risky foraging and other behavioral alterations as organisms seek to satisfy their nutritional needs. A gut full of plastic also occupies space that would otherwise be filled by developing gonads, decreasing reproductive potential. Release of plastics should be avoided at all cost in all environments.

REFERENCES CITED IN COMMENTS

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Emmons, C.K., M.B. Hanson, and M.O. Lammers. 2019. Monitoring the occurrence of Southern resident killer whales, other marine mammals, and anthropogenic sound in the Pacific Northwest. Prepared for: U.S. Navy, U.S. Pacific Fleet, Pearl Harbor, HI. Prepared by: National Oceanic and Atmospheric Administration, Northwest Fisheries Science Center under MIPR N00070-17-MP-4C419. 25 February 2019. 23p.

USFWS (United States Fish and Wildlife Service) 2009. Marbled Murrelet *(Brachyramphus marmoratus)* 5-Year Review. June 12, 2009. U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office, Lacey, WA.

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Exhibit 3

STATE OF WASHINGTON

July 16, 2020

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

Comments submitted electronically

Re: Taking Marine Mammals Incidental to the U.S. Navy Training and Testing Activities in the Northwest Training and Testing Study Area, NOAA-NMFS-2020-0055

Dear Jolie Harrison:

On behalf of the state of Washington, we write today regarding the proposed rule for *Taking Marine Mammals Incidental to the U.S. Navy Training and Testing Activities in the Northwest Training and Testing Study Area.* As you know, our state has made significant investments to restore the ecosystems of the Puget Sound and our coastal waterways. We appreciate that the National Marine Fisheries Service (NMFS) and the U. S. Navy have a history of partnering with the Washington Department of Fish and Wildlife, the Puget Sound Partnership, the Department of Natural Resources, and many other state agencies on a number of important issues. We also appreciate that NMFS and Navy staff actively participated in Governor Inslee's Southern Resident Killer Whale (SRKW) Task Force proceedings during its second year.

However, we have serious concerns with NMFS's proposed rule for the incidental take of Southern Resident Killer Whales by the Navy and urge that no such rule be finalized until significant revisions are made.

The amended Navy application and NOAA's proposed rule now predict and would allow for a vastly increased level of incidental take—formerly 2 takes, now 51 takes—every year. **The approval of such a high level of incidental take without requiring any additional mitigation measures represents gross neglect of the agency's management responsibilities under the Endangered Species Act and the Marine Mammal Protection Act to avoid or mitigate impacts to this highly endangered and iconic species**.

In our review of the application and many supporting documents, we have deduced that because 49 of 51 estimated takes are in "testing" rather than "training," and because the vast

majority of testing activities are deployments of sonobuoys off the coast, that it would be the active (e.g., DICASS) and Multistatic Active Coherent sonobuoys (AN/SSQS-125) that would lead to the most incidental takes. This seems logical, as those types of sonobuoys emit sonar that is omni-directional on the horizontal plane, expanding the range of impact and potential overlap with nearby cetaceans. Based on the potential magnitude of takes of SRKWs, the difficulty of distinguishing SRKWs from other orca ecotypes (such as Transients and Offshores), and the currently far-too-lax standards for canceling an exercise in the presence of cetaceans (usually only when within 200 yards), **we urge NMFS to require the Navy to update its mitigation measures so the Navy must postpone or cancel any exercises when spotters detect any killer whales within 1,000 yards (i.e., 0.5 nautical miles) of the exercise**.

Despite the apparent attempt to be representative and comprehensive, Tables 19-31 fail to include the potential effects of ASW2 mid-frequency sonar on marine mammals. This type of sonobuoy is expected to be used during antisubmarine exercises. According to the document, such systems only operate above 200dB (and appear to be omnidirectional), making them much louder, more potentially damaging, and with a much greater range than the MF1 and MF5 systems that are currently profiled. Combined, there are 590 planned deployments of ASW2 expected annually during the proposed training and testing activities. Although it appears that such tests will only occur 12 or more nautical miles offshore, the distribution of Southern Resident orcas and many other cetaceans still have considerable potential overlap with that zone. We therefore believe that **NMFS must require the Navy to provide a table showing the ranges to temporary and permanent threshold shifts for the ASW2 sonar bin and clarifying the predicted effects on marine mammals before approving the use of such sonar/activities.**

In addition, we are concerned that this is the third consecutive authorization period during which the Navy may be approved for such testing and training exercises and that these or similar activities are likely to continue for decades. Because SRKWs are so long-lived, and the estimated percentage of take for the population is so high (68%), the effects of take will be compounded over time and may have cumulative effects, such as behavioral abandonment of key foraging areas and adverse, long-term effects on hearing and echolocation. Over the next seven years, the estimated incidental take for SRKW Temporary Threshold Shifts (TTS) is at least 14. This total would add to the cumulative levels of take experienced by SRKWs over the past decade of similar training activities. Leading scientific authorities have cautioned that in situations like this, managers should apply "distinct and different marine mammal exposure criteria that consider potential long-term hearing loss produced by cumulative exposure over years, decades, or lifetimes." [1] NMFS has also asserted as recently as 2018[2] that repeated TTS

[1] Southall, B. L., J. J. Finneran, C. Reichmuth, P. E. Nachtigall, D. R. Ketten, A. E. Bowles, W. T. Ellison, D. P. Nowacek, and P. L. Tyack. 2019. Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects. Aquatic Mammals 45(2):125-232.

[2] 83 FR 28824.

exposures can lead to long-term hearing loss[3,4], which can affect the survival and fitness of cetaceans that are heavily reliant on hearing for communication, feeding and avoidance of ship strikes. Furthermore, NMFS[2] has suggested that longer-term considerations that weigh the impact of noise exposure over a lifetime of exposure (e.g., 29 CFR Part 1926 over 40 years) are needed for marine mammals. To mitigate such long-term effects, we again **urge that the Navy be required to cease active sonar exercises if any orcas are sighted within 1,000 yards, rather than the proposed 200- or 100-yard shut-down mitigation zones.** This minimum distance aligns with Washington State law which requires most vessels slow down to 7 knots when within 0.5 nautical miles of Southern Resident orcas in order to mitigate noise impacts and disturbance.

Finally, as mitigation for active sonar training and testing activities in Puget Sound, **NMFS should require the Navy to consult regional real-time whale alert systems rather than relying solely on human observers on Navy vessels and communications with NMFS**. There are additional, often superior sources of such near real-time information at the state and local level, including the Whale Report Alert System used by Washington State Ferries and many other maritime professionals.

Without bold and immediate actions, the SRKWs may become functionally extinct before the end of the century. We urge NMFS to recognize that the repeated exposure of more than half of the SRKW population annually to incidental take does not equate to "negligible harm" in any year—let alone over the course of decades. The population of Southern Resident orcas has suffered additional declines even since the population count used in the Navy's Environmental Impact Statement calculations, resulting in the take estimates to now represent at least 70% of the current population.

We strongly urge NMFS to revise its proposed rule by changing the determination of negligible impact and then working with the Navy to incorporate improved monitoring and mitigation measures, in order to significantly reduce the number of Southern Resident orcas authorized for incidental take.

Thank you for your consideration of these concerns. Washington looks forward to our continued partnership with NMFS and the Navy on these and many other critical issues.

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[3] Kastak, D., J. Mulsow, A. Ghoul, and C. Reichmuth. 2008. Noise-induced permanent threshold shift in a harbor seal. Journal of the Acoustical Society of America 123:2986.

[4] Reichmuth, C. 2009. Effects of Noise and Tonal Stimuli on Hearing in Pinnipeds. Report on Grant N000140610295.

Sincerely,

Kelly Susewind, Director
Washington Department of Fish and Wildlife

Laura Blackmore, Director
Puget Sound Partnership

Kaleen Cottingham, Director
Recreation and Conservation Office

Hilary Franz, Commissioner of Public Lands
Washington Department of Natural Resources

Erik Neatherlin, Executive Coordinator
Governor's Salmon Recovery Office

Exhibit 4

The effects of aircraft on cetaceans: implications for aerial whalewatching

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Abstract
The effects of anthropogenic noise on marine mammals are a rich subject for study and have attracted considerable attention in the past two decades. Aircraft noise may not only affect the biology of cetaceans but may also skew aerial survey data. Since 1995 few studies have been published, but these have documented behavioral responses of cetaceans to aircraft in much greater detail.. This paper reviews and discusses progress in the study of aircraft noise effects on marine mammals since the landmark review of Richardson et al. (1995). In each of the studies reviewed here, cetaceans responded to aircraft to some extent, in most cases by diving. Several major gaps in knowledge on the effects of noise on marine mammals also apply to aircraft noise, e.g. quantification of received sound level, the role of vision, knowledge of baseline behavior, the effect on vocalizations. The possible implications for whalewatching by aircraft are discussed.

INTRODUCTION

Cetaceans are highly dependent on sound for communication, navigation and detection of potential predators and prey (Würsig & Richardson 2002). Anthropogenic noise may therefore affect various aspects of cetacean biology. The impact of anthropogenic noise on cetaceans is a rich subject for study and has attracted considerable attention during the past decade and a half (e.g., Richardson et al. 1995, Perry 1998, Hildebrand 2005, Nowacek et al. 2007, Johnson et al. 2007). Most studies of the effects of anthropogenic noise on cetaceans have focused on underwater noise, caused by sources such as motorized boats, sonar, and seismic airguns. The effects of aerial sources of noise pollution have received far less attention.

Aircraft, including helicopters and fixed-wing airplanes, are used in various human activities, including transportation, military training exercises, the off-shore oil and gas industry, recreational flights, cetacean research and whale-watching tours (Patenaude et al. 2002, Richter et al. 2006, Smultea et al. 2008). Aircraft produce noise at frequencies that are well within the frequency range of cetacean calls and also produce visual signals such as the aircraft itself and its shadow (Richardson et al. 1995, Richardson & Würsig 1997). A major difference between aircraft noise and noise caused by other anthropogenic sources is that the sound is generated in the air, transmitted through the water surface and then propagates underwater to the receiver. As a result, analysis of the effects of aircraft noise on marine mammals is complicated (Richardson et al. 1995, Nowacek et al. 2007). A detailed review of the air-to-water transmission of aircraft noise was provided by Richardson et al. (1995). Aircraft noise also differs from boat noise in that it is typically present for shorter periods, and moves at a greater speed due to the higher travel speed of aircraft. The sound pressure levels produced by even small-sized aircraft may be extremely high (exceeding 120 dB re 20 μPa at 1m) and thus could have profound effects on cetacean populations near e.g. airports and along busy flight trajectories.

The last comprehensive review of the effects of aircraft noise on marine mammals was Richardson et al. (1995). This review was based largely on anecdotal evidence scattered in a large number of papers, mostly involving population surveys using aircraft. Evidence available at the time indicated that the responses of cetaceans to aircraft were highly variable among individuals and species, ranging from no apparent reaction to active avoidance (Richardson et al. 1995). Some responses (e.g. changes in respiration frequency) were subtle and became apparent only after statistical analysis (Richardson et al. 1995). Nonetheless, several factors affecting the responsiveness of cetaceans to aircraft noise were identified. A stronger response was observed in small groups or single individuals than in large groups (e.g. Herman et al. 1980, Payne et al. 1983, Richardson et al. 1985a, Richardson et al. 1985b, Fairfield 1990), in mothers with calves (e.g. Ljungblad et al. 1983, Clarke et al. 1989), in shallow waters (e.g. Richardson et al. 1985a, Richardson et al. 1985b) and in situations where the initial observed behavior was resting (Richardson & Malme 1993). A stronger response was also seen when the aircraft flew at low altitudes (e.g. Walker 1949, Bel'kovich 1960, Kleinenberg et al. 1964, Best 1981, Seargeant & Hoek 1988). However, it remains unclear to what extent these factors, identified in studies of a limited number of species, apply generally to cetaceans.

The purpose of this paper is to review and discuss progress in the study of the effects of aircraft noise on cetaceans since the landmark review of Richardson et al. (1995) and to identify critical aspects that require detailed additional study. This paper was prepared in response to a request for information on the possible impacts of aerial whalewatching (for a definition see Parsons et al. 2006a) on cetaceans at the 60th Meeting of the International Whaling Commission (International Whaling Commission 2009).

RECENT STUDIES (1995-2008)

Würsig et al. (1998) assessed the responses of cetaceans to aerial surveys in the north-central and western Gulf of Mexico using a DeHavilland Twin Otter fixed-wing airplane. Species of cetaceans were grouped in 6 categories according to their morphology and behavior. Observations were made aboard the plane. The altitude of the plane was 229 m at a speed of 204 km/hr over waters from 100–1000 m deep. A minimum of 305 m straight line distance from the cetaceans was maintained. Upon sighting of a pod, the plane approached the animals after an assessment of their behavior. Pods were usually circled for a period of time (approximately 10–50 min) and in some cases fly-bys were carried out at less than 229 m altitude.

'Cryptic' species, such as beaked whales (*Ziphiidae*), pygmy sperm whale (*Feresa attenuata*) and dwarf sperm whale (*Kogia simus*), showed a stronger response to the airplane than other species. Forty percent (12/30) of the observed *Kogia* spp. and 89% (8/9) of the observed ziiphids changed their behavior in response to the airplane. Of the smaller delphinids, pantropical spotted (*Stenella attenuata*) (43%, 18/42), Clymene (*S. clymene*) (71%, 5/7), striped (*S. coeruleoalba*) (75%, 6/8) and spinner dolphins (*S. longirostris*) (100%, 4/4) changed their behavior in response to aircraft. Sperm whales (*Physeter macrocephalus*) reacted in 28% of the observations (7/25). The other cetacean species (e.g. the larger delphinids: short-finned pilot whale (*Globicephala macrorhynchus*), Risso's dolphin (*Grampus griseus*), false killer whale (*Pseudorca crassidens*), Atlantic spotted dolphin (*S. frontalis*), and bottlenose dolphin (*Tursiops truncatus*)) responded in less than 29% of the sightings. The authors noted that the species responding to the NOAA survey ships also responded to the aircraft.

The authors noted the observed behavior prior to disturbance by aircraft. Their results suggest that when the initial behaviors are 'milling' (43%) and 'resting,' (39%), the animals are most sensitive to disturbance by aircraft. Some species, especially the smaller delphinids, were sensitive to disturbance while traveling (31%). They changed their behavior 100% of the time. However, the sample sizes for the initial behavioral categories and observed behavioral reactions were small, ranging from 1 to 14 observations.

The type of reaction to the aircraft differed among species. Most of the *Kogia* spp. (100%) and ziiphids (87%) responded to the aircraft by diving. In the small delphinid species, diving occurred in 50% of the cases. Bottlenose dolphins most commonly responded by diving (48%), while 14% responded by moving away. Most of the sperm whales (86%) also responded to the aircraft by diving. Würsig et al. (1998) demonstrates that different species vary in their sensitivity to aircraft disturbance, and that the initial behavior of the animal affects the response to aircraft noise.

Patenaude et al. (2002) assessed the short-term behavioral responses of migrating bowhead whales (*Balaena mysticetus*) and beluga whales (*Delphinapterus leucas*) to aircraft in the western Beaufort Sea. Two types of aircraft, a Bell 212 helicopter and a Twin Otter fixed-wing airplane, were compared. The reactions of bowhead and beluga whales were observed via brief sightings made by biologists aboard the aircraft and on the ice (only when the aircraft was at 0 m altitude). Most observations were made of whales in open-water corridors. Reactions to the aircraft were noted at 3 altitude levels. The altitude of the helicopter ranged from 150-460 m (over-flight), 30-300 m (within 2 min. after landing/take-off), and 0 m (stationary on the ice with engine running); the altitude of the fixed wing airplane ranged from 150-460 m, ~145 m, and circling at 460 m.

With the Bell 212 helicopter present, 14% of bowhead whales (singletons or groups) (n=63 observations) responded. These responses consisted of abrupt dives, breaching, tail slapping, and brief surfacing. The most common responses were abrupt dives and breaching. Most responses occurred when the helicopter was at altitudes of ≤ 150 m and at lateral distance ≤ 250 m. The sample sizes for the higher altitude (n=8) and when the helicopter was stationary on the ice (n=8) were small. Only one whale (a sub-adult) out of 8 observations reacted to a helicopter stationary on the ice. This animal made an unusually brief surfacing at a lateral distance of 230 m from the helicopter. A mother-calf bowhead whale pair was observed during four passes by a helicopter over 2.8 hours. Of those four passes, three passes were at 50-150 m lateral range and low altitudes of 15-30 m and one pass was at 500 m lateral distance. The mother dove during the two times she was at the surface, while the calf dove once during the four times it was at the surface. Although this study confirms that brief single straight-line helicopter over-flights can affect the behavior of some bowhead whales, the behavioral effects may not be biologically significant (Patenaude et al. 2002). In 38% of the beluga whale observations (n=40 observations) a response to the helicopter was noted, which included immediate dives, changes in heading, changes in behavioral state, and apparent displacement. Forty-seven percent of the responses were observed when the helicopter was stationary on the ice and 33% of the responses were observed when the helicopter was at low altitudes (≤ 150 m). Most observed responses by beluga occurred when the helicopter was at a lateral distance ≤ 250 m. The biological significance of these reactions is uncertain. It is also uncertain if the small-scale reactions were caused by the noise of the helicopter, visual cues, or both (Patenaude et al. 2002).

For the Twin Otter airplane, in 2.2% of the 507 observations of bowhead whales a response was noted, with the majority of reactions occurring when the plane was at altitudes ≤ 182 m and at a lateral distance ≤ 250 m. The most common reaction was an unusually short surfacing, but abrupt dives and turning or heading away from the plane were also observed. Two of the 11 groups reacting to the plane were mother-calf pairs. No conspicuous startle reaction to a circling plane at 460 m altitude was observed, but when the responses were analyzed statistically, subtle effects on blow intervals, number of blows per surfacing and duration of dives were found (Patenaude et al. 2002). However, the changes in blow intervals were very small and were felt to be unlikely to seriously diminish the fitness of the bowhead whales (Patenaude et al. 2002). A small proportion (3.2%; n = 24/760) of the beluga whales responded to the fixed-winged plane with immediate dives with a tail thrash (n=10), unusual turns or changes in heading (n=6), twisting to look upwards (n=5), changes in behavioral state (n=2) or some other unrecorded reaction (n=1). Most of the responses of beluga whales occurred when the plane was at altitudes ≤ 182 m and at a lateral distance ≤ 250 m. Direct

over-flights generated the most conspicuous reactions, such as vigorous swimming, abrupt dives or tail thrashing.

Both bowhead and beluga whales responded more frequently to the helicopter than to the fixed-wing plane. These reactions may correspond to higher levels, greater complexity, and variability of sounds from a passing helicopter as compared to a fixed-wing plane. Beluga whales showed more detectable responses to the helicopter than bowhead whales (38% vs. 14% of observations).

The characteristics of the aircraft sounds underwater, at 3 m and 18 m depth when the aircraft flew directly overhead, were measured. The helicopter sounds were generally stronger that the plane. The authors concluded that the dominant low-frequency components of aircraft sound are audible to bowhead whales, but may be inaudible to beluga whales. Beluga whales might barely detect the mid-frequency sound components from either aircraft flying at 300 m altitude overhead. However, these sounds should be readily audible during an over-flight at 150 m altitude. For beluga whales mid-frequency sound components, visual cues, or both may elicit a reaction.

The study by Patenaude et al. (2002) was reviewed by Nowacek et al. (2007). Nowacek et al. (2007) argued that although Patenaude et al. (2002) did report the received level of sound at 3 m depth and 18 m depth, these measurements were taken directly under the aircraft and the authors did not model the received level of sound away from this track. Nowacek et al. (2007) also noted that Patenaude et al. (2002) did not elaborate on the choice of the range categories; that is, ≤ 250 m versus > 250 m lateral distance.

Richter et al. (2003, 2006) studied the reactions of male sperm whales off Kaikoura, New Zealand, to airplanes and whale-watching boats using a 6.6 m boat (1998-2001) and land-based observations (in years 2000-2001) between November 1998 and February 2001. Kaikoura is one of the few places worldwide where aerial whale watching is carried out on a regular basis. In this region both resident and transient male sperm whales are present. In New Zealand there are two companies that use fixed-wing planes (Cessna 172, Piper Cherokee, Pilatus Britten Norman Islander) or helicopter (Bell Model 206 JetRanger) for 'on demand' whale-watching trips. The whale-watching flights last between 30 and 50 minutes. It is unclear how often these whale-watching flights go out.

Behaviors quantified in this study included blow duration (ventilation), time until first click production after a fluking up (vocalization patterns), and surface time (spatial behavior at the surface). A total of 145 observations with an aircraft present were recorded, 116 observations from the research boat and 29 observations from the shore. A total of 996 observations with no aircraft or other boats present were recorded, of which 244 observations were made from shore. Richter et al. (2003, 2006) made visual observations of sperm whale reactions when the aircraft made a circular flying pattern at a distance within at least 150 m.

Overall, they found that transient sperm whales responded more strongly to aircraft than residents. In both resident and transient sperm whales there was little change in the blow duration (ventilation) when exposed to aerial whale watching (0 and 0.8 sec. shorter duration with aircraft present). Surface times were also similar for resident whales, with a slightly longer surface duration when exposed to aircraft. For the transient whales a substantially shorter surface duration time of 2.7 minutes was recorded. This could indicate that resident whales show signs of habituation to aircraft (Richter et al. 2006). The time to first click after 'fluke-up' dive showed a stronger reaction to aircraft. Resident sperm whales tended to delay their first click after a 'fluke-up' dive by less than 5 s, whereas transient sperm whales tended to delay their first click after fluke-up by almost 20 s when an aircraft was present. Both transient and resident male sperm whales showed no reaction by altering the frequency of the heading changes. This could be the result of less noise entering the water and thus less disturbance or, alternatively, the inability of whales to pinpoint the position of the aircraft (Richter et al. 2006).

The study showed a very high degree of variation in responses among individuals. The effects of whale-watching activities could be more severe on specific animals. Especially, transient whales are less tolerant of aerial whale-watching activities and may not cope as well with aircraft exposure. Resident whales may cope better with these activities due to

habituation, but the downside could be that they are less likely to avoid ships, increasing the chance of ship strikes (Richter et al. 2006).

This study did not report the altitude of the whale-watching aircraft over the sperm whales or the received sound levels under the aircraft. Information on these factors is important for the interpretation of the observed responses by cetaceans. Also, no distinction was made between the fixed-wing airplane and the helicopter. It is known that helicopters elicit more responses from cetaceans than fixed-wing planes (Richardson et al. 1995).

Smultea et al. (2008) also observed reactions of sperm whales from an airplane within 45 km from the shore of the main Hawaiian Islands. For the surveys, small fixed-winged planes (Cessna 172, Skymaster 1994 and 1995, and a Partenavia) were used over water less than 2000 m deep. Visual observations of sperm whale reactions were made to initial straight-line fly-bys with an average altitude of 233–269 m, a speed of 185 km/h and a lateral distance ranging from 103 to 3,427 m.

Three of the 24 sperm whales observed reacted to the plane. All reactions consisted of a sudden dive. These reactions occurred when the plane was at a lateral distance of < 360m. Of the 24 observations of sperm whales, 8 groups were observed at lateral distances of < 360 m (38% reacted to the plane) and the remaining 16 groups were observed at lateral distances of > 360 m. Interestingly, no reaction was observed during the two closest initial passes, 103 m and 208 m lateral distance respectively. The authors interpreted these abrupt dive behaviors as a mild fright response to the plane. The authors noted that although perceived sound levels from the plane were not calculated, the expected frequency range and dominant tones produced by the plane overlap with the known low-end frequency range of sperm whale vocalizations.

Smultea et al. (2008) had the opportunity to observe a unique behavioral reaction, perhaps indicative of stress, by a group of 11 sperm whales (including an adult male and a calf) to a fixed-wing plane (Skymaster) circling for nine minutes. When, after an initial pass at 103 m lateral distance and 235 m altitude, the plane circled (0–500 m lateral distance, 245–335 m altitude) the sperm whales. The whales ceased their forward movement and positioned themselves closer to each other, first in a parallel flank-to-flank formation and later in a semi-circle “fan” formation. This behavior may have represented agitation, distress and/or a defense reaction to the plane and was similar to behavior seen in another study in the Bahamas when a Cessna 172 passed and circled 6 sperm whales. The group was directly under the plane where there is transmission of sound from the air into the water (see discussion on Snell’s law sound cone -a 26° arc under an aircraft where sound transmission is greatest- in Richardson et al. 1995). One sperm whale was observed on its side with its mouth agape. The authors considered this to be a distress response elicited by the plane and speculated that the animal was swimming on its side possibly to look up at the plane.

No explanation was given for the choice of the lateral distance categories, and no details were presented on the specific lateral distance for each observation. Although the results indicate that airplanes at close range have an increasingly disruptive effect on cetaceans, it remains difficult to interpret the precise influence of an aircraft’s lateral distance without more detailed study.

DISCUSSION

Our review of the literature indicates that there is a trend towards a more systematic approach to the study of the effects of aircraft on cetaceans since 1995. Whereas most studies reviewed by Richardson et al. (1995) documented opportunistically observed behavioral changes, subsequent studies have examined behavioral responses of cetaceans to aircraft in a more detailed and hypothesis-driven manner.

In each of the studies reviewed here, cetaceans responded to aircraft in some manner to varying degrees, in many cases by diving. However, behavioral changes were sometimes subtle and became apparent only after statistical analysis (Patenaude et al. 2002). Furthermore, the lack of a pronounced behavioral reaction to an aircraft did not necessarily

mean that there were no other effects (Richardson & Würsig 1997). For example, there was a 6.5% increase (resident sperm whales) and a 28% decrease (transient sperm whales) in surface time and a 26% increase (resident and transient sperm whales) in the time to first click after a 'fluke-up' dive after a fly-by from an aircraft (Richter et al. 2006).

Various factors have been identified that affect the response of cetaceans to aircraft noise. The sensitivity of whales and dolphins to aircraft noise may depend on the animals' behavioral state at the time of exposure (e.g. resting, socializing, foraging or travelling). Resting individuals appear to be most sensitive to disturbance (Würsig et al. 1998). Also, the altitude and lateral distance of the aircraft to the animals have been identified as important factors affecting the response. Thus, aircraft flying at low altitude, at close lateral distances and above shallow water elicit stronger responses than aircraft flying higher, at greater lateral distances and over deep water (Patenaude et al. 2002, Smultea et al. 2008). The sensitivity to disturbance by aircraft may also differ among species (Würsig et al. 1998). In the Alaskan Beaufort Sea, beluga whales responded more often to all noise than bowhead whales (Patenaude et al. 2002).

Although some research progress has been made, the number of studies on the impacts of aircraft on cetaceans since 1995 is meager compared to the number of studies published between 1980 and 1995 (Richardson et al. 1995), and the great number of studies on the impacts of other sources of potential disturbance, such as whalewatching or Acoustic Deterrent Devices (aka 'pingers') (Parsons et al. 2006a, Nowacek et al. 2007). In addition, recent studies on aircraft and cetaceans are limited to sperm whales, bowhead whales and beluga whales. This bias in species representation is not specific to studies involving aircraft, but seems to be an overall gap in information on how cetaceans respond to anthropogenic noise (Nowacek et al. 2007).

Previous authors have indicated several major gaps in knowledge on the effects of noise on marine mammals (e.g. Richardson et al. 1995, Richardson & Würsig 1997, Nowacek et al. 2007). Their conclusions also apply to aircraft noise. First, both the observed behavioral change and the received sound level from the aircraft should be quantified (Richardson et al. 1995, Nowacek et al. 2007). Data on received sound levels are needed to assess whether there is a relationship between noise exposure levels and the type and degree of response of the animals (Richardson et al. 1995, Nowacek et al. 2007). Only one recent study included an analysis of received levels of sound from the aircraft at 3 m and 18 m depth (Patenaude et al. 2002).

Second, the role of vision in the observed responses of cetaceans to aircraft remains unclear (Richardson et al. 1995, Richardson & Würsig 1997). Although in most cases noise is probably the dominant stimulus, there is anecdotal evidence indicating that visual cues affect cetacean behavior. Bottlenose dolphins have been observed to react when an aircraft's shadow passed over them (Mullin et al. 1991). Some species (e.g. beluga whales and Dall's porpoise, *Phocoenoides dalli*) have been observed looking up at the aircraft (Withrow et al. 1985, Richardson et al. 1995, Richardson & Würsig 1997). As noted earlier, a sperm whale was also observed apparently looking up (Smultea et al. 2008). Thus, the aircraft and/or its shadow may represent a disturbing factor in addition to noise. This issue has not been discussed by any of the studies reviewed here and should be considered in future studies.

Third, as noted above, an animal's initial behavioral state is known to have an effect on its responsiveness to aircraft (Richardson et al. 1995). Unfortunately, most studies did not document initial behavioral states. Thus, future assessments of the effects of aircraft should document initial behavioral states.

Finally, the possibility that aircraft noise affects cetacean vocalizations has rarely been investigated. Only one recent study documented a delay in the production of the first click after 'fluke-up' dives in sperm whales (Richter et al. 2006). During the last decade, several studies have demonstrated that some whales and dolphins are able to change their acoustic signals in response to anthropogenic noise. These studies have further demonstrated that whales and dolphins may modify their calls in various ways, e.g. by changing the source level (Holt et al. 2009), frequency (Lesage et al. 1999), duration (Miller et al. 2000; Foote et al. 2004), number

of frequency modulations (Morisaka et al. 2005) and call rate (Van Parijs & Corckeron 2001b; Buckstaff 2004). Repeated and prolonged exposure to aircraft may affect the vocalizations of (particularly resident) cetacean populations. Such exposure might be most common near coastal airports, such as Anchorage International Airport and Elmendorf Air Force Base in Alaska (Blackwell et al. 2002), but also in areas with intensive whale-watching flights, and in areas with daily flights for oil and gas drilling and production.

All studies in this review, except that of Richter et al. (2006), were conducted from aircraft. A well known problem of such studies is that the observer is on board the source of potential disturbance (Richardson & Würsig 1997, Patenaude et al. 2002, Smultea et al. 2008). This has important implications. First, such studies typically do not include a control group (i.e. a group of whales not exposed to the aircraft). Second, because the observer is moving, the opportunity to observe the behavior before, during and after the disturbance is very limited (Richardson & Würsig 1997, Smultea et al. 2008). Third, there is an inverse relationship between the distance to the animal and the duration of the observation time, two factors that may lead to an underestimation of the number of responses (Richardson & Würsig 1995, Patenaude et al. 2002, Smultea et al. 2008).

Aircraft noise may not only affect the biology of cetaceans but also cause a bias in aerial survey data, including the numbers of individuals and their distribution (Smultea et al. 2008, Richardson & Malme 1993). The sightability of cetaceans might change as a response to aircraft, which could lead to an underestimation of the population density (Würsig et al. 1998). The use of aerial surveys seems particularly problematic for assessments of the behavioral responses of cetaceans to other anthropogenic noise sources, such as seismic airguns. In these studies, the aircraft noise may exacerbate the effects of the other noise sources. If the effects of the aircraft are not understood this could create biases in the behavioral data, since it is unknown if the response is triggered by the aircraft, the other source of noise, or both. Therefore, great care should be taken with the interpretation of the results of such studies.

The study of the effects of aircraft on cetaceans has applications for the whale-watching industry. Whale watching is a significant and growing industry worldwide (Parsons et al. 2006, Hoyt 2007). As a result, the number of companies that offer aerial whale-watching trips is likely to increase. Whale watching via aircraft has the potential to have long-term (negative) effects on cetaceans for several reasons. First, for practical and economic reasons aerial whale watching often occurs not far from shore in relatively shallow waters. Shallow water and close proximity to shore are known to increase the sensitivity of whales to disturbances (Richardson et al. 1985a, Richardson et al. 1985b). Second, to give a better view of the whales and dolphins, whale-watching aircraft often fly at low altitudes, another factor known to increase the impact of aircraft noise on cetaceans. This is especially the case when an aircraft is at low altitude above shallow water (Richardson et al. 1985a, Richardson et al. 1985b). Third, aerial whale watching often involves repeated circling above a group or an individual animal. Circling for a longer period could increase the sensitivity of the particular animal, group or population to disturbance (Smultea et al. 2008). Finally, aerial whale watching increases the chance that the same resident individuals will be viewed multiple times (Richter et al. 2006). If these individuals and populations are unable to habituate to the presence of the aircraft, this could affect the reproductive success and survival of the population. Cetaceans often use coastal waters for breeding and resting (Karczmarski et al. 2005), behaviors that are more sensitive to disturbance than other behaviors such as travelling (Würsig et al. 1998). It is therefore important that the effects of aircraft on cetaceans are fully understood so that guidelines may be developed to mitigate these effects.

CONCLUSIONS

The response of cetaceans to noise is known to be influenced by several factors, although much remains to be learned. There is still a complete lack of information on noise impacts at the population level, including impacts on reproductive success, survival, communication and

migratory patterns. Future studies may benefit from considering the biological and methodological factors reviewed in this paper. The effect of aircraft noise on marine mammals is an important but neglected field in marine mammal acoustics research and thus offers an area for further study.

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