CENTER FOR BIOLOGICAL DIVERSITY ◆ EARTHJUSTICE
FRIENDS OF THE EARTH ◆ FRIENDS OF THE SAN JUANS
INTERTRIBAL SINKYONE WILDERNESS COUNCIL
NATURAL RESOURCES DEFENSE COUNCIL
ORCA NETWORK ◆ SEATTLE AQUARIUM

Via Electronic Mail

July 17, 2020

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

Re: *Proposed Rule for Northwest Training and Testing Study Area Activities*

Dear Ms. Harrison:

On behalf of the Natural Resources Defense Council ("NRDC"), Center for Biological Diversity, Earthjustice, InterTribal Sinkyone Wilderness Council, Seattle Aquarium, Friends of the Earth, Friends of the San Juans, and Orca Network, as well as our millions of members and activists, we are writing to submit comments on the Proposed Rule for the Navy's Northwest Training and Testing ("NWTT") Study Area. 85 Fed. Reg. 33,914 (June 2, 2020).

As you know, our organizations are deeply concerned about the impacts of Navy activities on the region's wildlife populations, including on whales and other marine mammals. The science has become clear that many marine mammal species are more vulnerable to underwater noise than NMFS and the Navy accounted for in their prior analyses. Given this new information, as well as some increases in systems testing, NMFS now estimates that the Navy's activities in the Pacific Northwest would cause more than 1.7 million instances of marine mammal "take" over seven years, from November 2020 to November 2027, including over 2,800 instances of Level A harassment resulting in permanent hearing loss from exposure to sonar and explosives. *See* 85 Fed. Reg. at 33,982-84. In sum, this represents a roughly 250% increase in the total number of takes estimated to occur during the current 2015-20 authorization cycle—a disturbing picture of harm.[1]

[1] This increase accounts for the difference in the periods covered by the two processes, five years in the prior rulemaking and seven in the present one.

Our overriding concern, unchanged since we submitted our comments on the Navy's application, is with the impact of the Navy's proposed activities on certain highly vulnerable marine mammal populations. First among these is the Southern Resident orca, a population of enormous cultural importance for Tribes and First Nations and for the region as a whole, which, as the agencies (and, indeed, the world) know, is critically endangered and declining. Loss of prey has left the whales unable to reproduce, and some are starving; they are unable to withstand additional human stressors, including disruptions of essential behavior such as foraging. Meanwhile, a second iconic population, the California gray whale, has been experiencing a major die-off caused apparently by a contraction of its prey base and has stranded in alarming numbers since early last year along the west coast and Alaska. Disrupting the behavior of a whale struggling from inanition can have severe consequences. Additionally, a number of populations would be taken each year at rates that significantly exceed their abundance, with the Hood Canal population of harbor seals experiencing annual levels of take that are more than 30 times their population size—leading to serious questions about the sustainability of the Navy's activity.

As it has with its take authorizations for other ranges, NMFS has once again chosen to follow the larger agency in virtually every aspect of its analysis. It has employed the same unsupported methods used by the Navy to reduce its estimates of harm; it discounts the effects of frequent military overflights just as the Navy does, and contrary to best available science; and it accepts the Navy's assumption that visual monitoring is so effective as to eliminate any risk of mortality from explosives. By the same token, it has adopted the Navy's proposed mitigation virtually without change and without any evidence of the independent review that the law requires. *See Conservation Council for Hawai'i v. NMFS*, 97 F.Supp.3d 1210, 1230 (D. Haw. 2015). Many of these concerns are shared by the U.S. Marine Mammal Commission, which notes throughout its own comments the agency's recent intractability about improving its analysis and mitigation in accordance with the governing statute, the Marine Mammal Protection Act ("MMPA").[2]

Our organizations urge NMFS to take the conservative approach that Congress intended. To this end, we request that you issue a new Proposed Rule for public comment that incorporates the recommendations below.

I. LEGAL FRAMEWORK

The MMPA was adopted more than forty years ago to ameliorate the consequences of human impacts on marine mammals. Its goal is to protect and promote the growth of marine mammal populations "to the greatest extent feasible commensurate with sound policies of resource management" and to "maintain the health and stability of the marine ecosystem." 16 U.S.C. § 1361(6). A careful approach to management was necessary given the vulnerable status of many of these populations (a substantial percentage of which remain endangered or depleted) as well as the difficulty of measuring the impacts of human activities on marine mammals in the wild. 16 U.S.C. § 1361(l), (3). "[I]t seems elementary common sense," the House Committee on Merchant Marine and Fisheries observed in sending the bill to the floor, "that legislation should

[2] Comments of Peter O. Thomas, Executive Director, Marine Mammal Commission, to Naval Facilities Engineering Command, Northwest (June 12, 2020).

be adopted to require that we act conservatively—that no steps should be taken regarding these animals that might prove to be adverse or even irreversible in their effects until more is known. As far as could be done, we have endeavored to build such a conservative bias into the [MMPA]." Report of the House Committee on Merchant Marines and Fisheries, reprinted in 1972 U.S. Code Cong. & Admin. News 4148.

At the heart of the MMPA is its so-called "take" provision, which establishes a moratorium on the harassing, hunting, or killing of marine mammals, and generally prohibits any person or vessel subject to the jurisdiction of the United States from taking a marine mammal on the high seas or in waters or on land under the jurisdiction of the United States. 16 U.S.C. §§ 1362(13), 1371(a). Under the law, NMFS may grant exceptions to the take prohibition, provided it determines, using the best available scientific evidence, that such take would have only a negligible impact on marine mammal populations or stocks. NMFS must prescribe "methods" and "means of effecting the least practicable impact" on protected species as well as "requirements pertaining to the monitoring and reporting of such taking." 16 U.S.C. §§ 1371(a)(5)(A)(ii), (D)(vi).

II. POPULATIONS OF HEIGHTENED CONSERVATION CONCERN

The NWTT Study Area coincides with important habitat for multiple cetacean species of conservation concern. Here, we highlight two species whose present status necessitates a particularly careful application of the standards embedded in the MMPA.

A. Southern resident orcas

The Southern Resident orca (*Orcinus orca*) population of the Pacific Northwest is one of the most critically imperiled, iconic populations of marine mammals on the planet. NMFS' tentative finding that Navy activities will have only a negligible impact on the population is arbitrary and capricious, and its failure to prescribe mitigation sufficient to satisfy the strict standards for incidental take violates the MMPA.

The Southern Resident population has fallen to its lowest point in more than 40 years, with only 73 remaining (and probably only 72 since another is presumed dead),[3] and is continuing to decline. Scientists report that only 26 breeding adults remain in the Southern Resident killer whale population; however, only 14 adult females have successfully given birth in the last decade.[4] A recent genetic analysis found that only two adult males fathered 52 percent of the calves born since 1990.[5] A population viability study indicated that Southern Residents have an

[3] Center for Whale Research (Dec. 31, 2019) at https://www.whaleresearch.com/orca-population.

[4] Ford, M.J, et al., Inbreeding in an endangered killer whale population, *Animal Conservation*, 23: 423-432 (2018); Ward et al. Summary of science investigating killer whale demography and Chinook relationships, 2007-2019. NWFSC presentation to PFMC, (May 2019); https://www.fisheries.noaa.gov/event/ad-hoc-southern-resident-killer-whale-workgroup

[5] Ford, M.J., Parsons, K.M., Ward, E.J., Hempelmann, J.A., Emmons, C.K., Hanson, M.B., Balcomb, K.C., and Park, L.K., Inbreeding in an endangered killer whale population, *Animal Conservation* 10.1111/ acv.12413 (2018).

annual decline of 0.91%, meaning the population would reach an expected size of 75 by 2036—[6] yet the Southern Residents have already surpassed that dangerous milestone, and their numbers continue to plummet. According to NMFS' stock assessment report, the loss of even a single whale in seven years can substantially reduce the probability of survival and recovery for this endangered population.[7] And given its poor conservation status, the population's vulnerability to stochastic events is high and would be catastrophic.[8]

The Southern Residents use the Salish Sea year-round, and in most years the whales are generally present in the central Salish Sea from May through September or October. The whales are drawn to the region because these fish-eating predators feed almost exclusively on salmonids,[9] and the Strait of Juan de Fuca, Haro Strait, and Georgia Strait are relatively narrow channels that concentrate salmon returning from the Pacific Ocean to spawn in U.S. and Canadian rivers.[10] Given the manifest importance of this area, both the United States and Canada have designated the waters of the Salish Sea as "critical habitat" for the population pursuant to the endangered species laws of both countries.[11] The Southern Residents also make extensive use of the waters along the outer coast of Washington, Oregon, and Northern California, particularly during the winter and spring months, when they range as far south as Monterey Bay in search of Chinook salmon. Consistent with this, NMFS' proposed offshore critical habitat extends from

---

[6] Vélez-Espino, L.A. et al., Comparative demography and viability of northeastern Pacific resident killer whale populations at risk, *Can. Tech. Rep. Fish. Aquat*. Sci. 3084 (2014).

[7] Carretta, J.V., U.S. Pacific Marine Mammal Stock Assessments: 2018, Killer Whale, Eastern North Pacific Southern Resident Stock (2019)

[8] As one example of a stochastic event, the 2008 Recovery Plan noted the Southern Resident's particular vulnerability to disease outbreaks due to a confluence of factors. Alarmingly, in 2016, a necropsy determined that L95, a 20-year old male Southern Resident, had succumbed to *mucormycosis*, an aggressive fungal disease that has increasingly been seen in the region's harbor porpoises and harbor seals. Raverty, S., *Final Report AHC Case: 16-1760* (2016) (prepared for the Ministry of Agriculture Animal Health Centre, British Columbia and available at https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/southern-resident-killer-whale-recovery-planning-and). Huggins et al. (2020), in documenting the *mucormycosis* outbreak, warned that existing population-level stressors, including insufficient prey and underwater noise pollution, could predispose the Southern Residents to fatal *mucormycetes* infections. Huggins, J.L., Garner, M.M., Raverty, S.A., Lambourn, D.M., Norman, S.A., Rhodes, L.D., Gaydos, J.K., Olson, J.K., Haulena, M., and Hanson, M.B., The emergence of *mucormycosis* in free-ranging marine mammals of the Pacific Northwest, *Front. Mar. Sci.,* 7: 555 (2020). NMFS must take full account of the threats facing the Southern Residents (and other marine mammals) in making its negligible impact determinations.

[9] Ford, M.J., Hempelmann, J., Hansen, M.B., Ayres, K.L., Baird, R.W., Emmons, C.K., Lundin, J.I., Schorr, G.S., Wasser, S.K., and Park, L.K., Estimation of killer whale (*Orcinus orca*) population's diet using sequencing analysis of DNA from feces, *PLoS ONE* 11(1): e0144956 (2016).

[10] Hanson, M.B., Baird, R.W., Ford, J.K.B., Hempelmann-Halos, J., Van Doornik, D.M., Candy, J.R., Emmons, C.K., Schorr, G.S., Gisborne, B., Ayres, K.L., Wasser, S.K., Balcomb, K.C., Balcomb-Bartok, K., Sneva, J.G., and Ford, M.J., Species and Stock Identification of Prey Consumed by Endangered Southern Resident Killer Whales in Their Summer Range, *Endangered Species Research* 11: 69-82 (2010).

[11] Designation of critical habitat for Southern Resident killer whale, 71 Fed. Reg. 69,054 (Nov. 29, 2006); Fisheries and Oceans Canada, Identification of habitats of special importance to resident killer whales (*Orcinus orca*) off the west coast of Canada (2017) (DFO Canadian Science Advisory Secretariat).

the U.S. international border with Canada south to Point Sur, California, between the 6.1-meter (m) depth contour to the 200-m depth contour.[12]

The Navy's application and DSEIS contemplates activities within the range of the Southern Resident population, including the Salish Sea. These include bombing and missile exercises in the Navy's offshore operations area, including in Area W-237; sonar exercises in offshore area generally; and various activities in the Salish Sea, although Navy units would be required to obtain approval from a designated Command authority before using mid-frequency active sonar during training or pierside maintenance or testing. DSEIS at 2-28 to 2-38, K-12. Notably, according to the Navy's analysis, the Washington Inland Waters population of harbor porpoises and of the Hood Canal population of harbor seals will be subjected to some of the highest estimated take (DSEIS to E-2 to E-37), strongly suggesting that some activities with the potential to harm the orcas are concentrated in the Salish Sea and the interior waters of Puget Sound. The proposed activities overlap with areas of proposed critical habitat that NMFS itself recognizes as a "high-use foraging area" for the Southern Residents.[13] Studies show that tagged Southern Residents spend more than 50 percent of their time off the Washington Coast.[14]

Lack of adequate prey is directly exacerbated by physical and acoustic disturbance from vessels, which has long been recognized by both the United States and Canada as one of three principal threats to the survival and recovery of the Southern Resident population.[15] Killer whales rely on sound for orientation and navigation, for communication vital to group cohesion, and for hunting of salmon.[16] The underwater noise produced by vessels and the vessels' physical presence mask the acoustic cues that the whales depend on and disrupt these vital behaviors. Notably, researchers have reported that, on exposure to vessel noise, the whales increase their swimming speeds, engage in evasive swimming patterns, increase their time spent traveling, alter their dive lengths, and significantly reduce their foraging time.[17] Reduction in foraging efficiency translates to lower intake of food energy, which in turn compromises fitness and survival, lowers birthrates, and increases mortality. An independent population viability analysis found that if it were possible to eliminate acoustic disturbance while maintaining current levels of Chinook abundance, annual population growth would increase to 1.7 percent.[18]

---

[12] NMFS, Proposed Rulemaking to Revise Critical Habitat for the Southern Resident Killer Whale Distinct Population Segment, 84 Fed. Reg. 49214 (Sept. 19, 2019).

[13] NMFS Proposed Revision of the Critical Habitat Designation for Southern Resident Killer Whales: Draft Biological Report (2019) at https://www.fisheries.noaa.gov/action/critical-habitat-southern-resident-killer-whale.

[14] Id.

[15] *E.g.*, NMFS, Recovery plan for Southern Resident killer whales (*Orcinus orca*) (2008); Fisheries and Oceans Canada, Recovery strategy, *supra*; Fisheries and Oceans Canada, Action plan for the Northern and Southern Resident killer whales (*Orcinus orca*) in Canada (2017) (Species at Risk Act Action Plan Series).

[16] Ford, J.K.B., Ellis, G.M., and Balcomb, K.C., *Killer Whales: The Natural History and Genealogy of* Orcinus orca *in British Columbia and Washington, 2nd ed.* (2000).

[17] Williams, R., Lusseau, D., and Hammond, P.S., Estimating relative energetic costs of human disturbance to killer whales (Orcinus orca), *Biological Conservation* 133: 301-11 (2006); Lusseau, D., Bain, D.E., Williams, R., and Smith, J.C., Vessel traffic disrupts the foraging behavior of Southern Resident killer whales *Orcinus orca*, *Endangered Species Research* 6: 211-21 (2009).

[18] Lacy, R.C., Williams, R., Ashe, E., Balcomb, K.C., Brent, L.J.N., Clark, C.W., Croft, D.P., Giles, D.A.,

In May 2003, the U.S. Navy vessel USS *Shoup* was conducting a mid-frequency sonar exercise while passing through Haro Strait, between Washington's San Juan Islands and Canada's Vancouver Island. According to one contemporaneous account, "[d]ozens of porpoises and killer whales seemed to stampede all at once . . . in response to a loud electronic noise echoing through" the Strait.[19] Several field biologists present at the scene reported observing a pod of endangered orcas bunching near shore and engaging in very abnormal behavior consistent with avoidance, a minke whale "porpoising" away from the sonar ship, and Dall's porpoises fleeing the vessel in large numbers.[20] Eleven harbor porpoises—an abnormally high number given the average stranding rate of six per year—were found beached in the area of the exercise.[21]

The training and testing activities set forth in the present rulemaking threaten the Southern Residents with potential injury and mortality from explosives use; with foraging disruption, acute and chronic stress, and displacement from exposure to naval active sonar; and toxic contamination from unexploded ordinance and other materials.[22] Given the overlap between the Navy's activities and the orcas' habitat, and given the potential for harm, the Washington State Southern Resident Orca Task Force specifically included the Navy in its recommendations, advising that the governor meet with the region's commanding officer "to address the acoustic and physical impacts to Southern Resident orcas from Naval exercises in waters and air of Washington state" and request the Navy's participation in the second year of the Task Force, to "identify actions to reduce the Navy's impacts to Southern Resident orcas."[23] Similarly, NMFS, in its Recovery Plan, prioritized using "agency coordination and established MMPA mechanisms to minimize any potential impacts from human activities involving acoustic sources, including Navy tactical sonar." And it acknowledged the sensitivity that killer whales have to the ensonification of their habitat:

> Killer whales rely on their highly developed acoustic sensory system for navigating, locating prey, and communicating with other individuals. Increased levels of anthropogenic sound have the potential to mask echolocation and other signals used by the species, as well as to temporarily or permanently damage hearing sensitivity.[24]

MacDuffee, M., and Paquet, P.C., Evaluating anthropogenic threats to endangered killer whales to inform effective recovery plans, *Scientific Reports* 7: art. 14119 (2017).

[19] Christopher Dunagan, "Navy sonar incident alarms experts," *Bremerton Sun*, May 8, 2003.

[20] NMFS, Assessment of acoustic exposures on marine mammals in conjunction with *USS Shoup* active sonar transmissions in the Eastern Strait of Juan de Fuca and Haro Strait, Washington—5 May 2003 at 6, 9 (2005).

[21] NMFS, Preliminary report: Multidisciplinary investigation of harbor porpoises (*Phocoena phocoena*) stranded in Washington State from 2 May – 2 June 2003 coinciding with the mid-range sonar exercises of the *USS Shoup*, at 53-55 (2004) (conclusions unchanged in final report). Unfortunately, according to the report, freezer artifacts and other problems incidental to the preservation of tissue samples made the cause of death in most specimens difficult to determine; but the role of acoustic trauma could not be ruled out. *Id.*

[22] NMFS, Recovery Plan for Southern Resident Killer Whales (*Orcinus orca*) (2008).

[23] Southern Resident Orca Task Force, Report and Recommendations, at 60 (2018) (Rec. 25, in final report of task force convened by the Washington State Governor).

[24] NMFS, Recovery plan for Southern Resident killer whales (*Orcinus orca*) (2008).

NMFS' conclusory statement that the Navy's activities are "unlikely to result in impacts on individual reproduction or survival" or cause greater than negligible impacts on the Southern Resident population (85 Fed. Reg. at 34,032) is arbitrary and capricious. That conclusion is based in part on the premise that the Navy would cause as many as 51 Southern Resident takes each year, a number that, like the Navy's original calculation of two annual takes, makes little sense given that the whales travel together in pods, making it far more likely that every member of the pod would be affected. Nor does it make sense that take estimates for Washington Inland Waters harbor porpoises and Hood Canal harbor seals would number in the hundreds of thousands, while Southern Residents account for a handful. The number of mid-frequency active sonar events that have occurred within the whales' range is not trivial.[25]
But even assuming *arguendo* that NMFS' estimates were accurate, the agency has provided little rationale for why the abandonment or significant alteration in vital activities that these take numbers represent would have a negligible impact on Southern Residents, given the low vital rates that currently prevail in this endangered, declining population.

The proposed mitigation measures do not sufficiently protect Southern Resident killer whales from the proposed activities. Although some form of command approval is required before mid-frequency sonar is used in the Salish Sea, this requirement does little to ensure that such activities do not occur. As noted above, the high estimates of harbor seal takes in Hood Canal suggest an abundance of activity in the inland waters that the Southern Residents have used with increasing frequency in winter. And the mitigation area for Southern Resident killer whales fails to include the whales' offshore habitat, where most of the agency's estimated takes are expected to occur. Indeed, when K and L pod are offshore, as they were in 2019, it is possible that a single sonar exercise would take most of the population. Finally, NMFS has grossly overstated the effectiveness of the Navy's mitigation in preventing mortalities. Although the Navy intends to conduct missile training and other explosives activities with an impact zone that is extremely difficult to monitor, the agency, following the Navy, assumes that its monitoring measures will completely preclude mortalities for all species. These apparent defects in the agency's analysis are extremely concerning given the status of the Southern Residents.

Consistent with these concerns, and in addition to the points made further below, we make the following recommendations:

(a) NMFS should address the methodological problems described above and in our comments below, which underestimate and discount potential take of Southern Resident orcas, and reconsider its negligible impact determination for the population.

(b) NMFS should engage in a rigorous analysis of measures for the Navy's Puget Sound and Strait of Juan de Fuca Mitigation Area, with the aim of eliminating potential impacts on Southern Residents. The agency should consider (1) completely prohibiting activity during periods of higher residency or occurrence of the population, viz, roughly May through October for the

[25] Emmons, C.K., Hanson, M.B., and Lammers, M.O., Monitoring the occurrence of Southern Resident killer whales, other marine mammals, and anthropogenic sound in the Pacific Northwest (2019) (report for Pacific Fleet, prepared by NMFS Northwest Fisheries Science Center).

Salish Sea and roughly October through mid-February for the inland waters of Puget Sound;[26] (2) requiring noise isolation, particularly for activities such as pierside testing and maintenance that are concentrated in particular locations; (3) setting a transparent, rigorous protocol for ensuring that Southern Residents will not be exposed to noise that can cause behavioral disruption, before an activity proceeds, including by using the region's existing real-time hydrophone networks and by establishing additional hydrophone sites in key areas as needed;[27] and (4) considering measures to mitigate the impacts of its Growler overflights on Southern Residents and other marine species.

(c) NMFS should expand activity restrictions within the Navy's proposed Marine Species Coastal Mitigation Area, which includes essential foraging and wintering areas for the Southern Residents. *See* 80 Fed. Reg. 9,682 (Feb. 24, 2015). NMFS should prohibit or at least significantly limit the use of mid-frequency active sonar from all sources, including dipping sonar, within this Mitigation Area, at least out to 47 miles from shore between December and June; and, similarly, should further limit other activities, such as mine countermeasures and gunnery activities, that have the potential to result in species take. Waters of greatest concern within the Mitigation Area extend between Cape Flattery, Washington, and Tillamook Head, Oregon, including the waters offshore of the Columbia River mouth, as these waters experience highest relative habitat use for Southern Residents as indicated by presently available satellite telemetry data.[28]

(d) NMFS should undertake other mitigation described below that is relevant to the protection of the Southern Residents.

B. California gray whales

The California gray whale is presently experiencing a major die-off. On May 31, 2019, NMFS deemed the die-off an "Unusual Mortality Event" pursuant to the Marine Mammal Protection Act (16 U.S.C. § 1421c), triggering an investigation. As of June 5, 2020, the total number of strandings across the whales' range was 340 animals.[29] Many of the necropsied whales were considered emaciated, and in 2019 more than 50% of the animals observed in their calving lagoons, in Baja California, showed signs of "skinniness,"[30] such as a post-cranial depression and protruding scapula.

---

[26] Olson, J.K., Wood, J., Osborne, R.W., Barrett-Lennard, L., and Larson, S., Sightings of Southern Resident killer whales in the Salish Sea 1976-2014: The importance of a long-term opportunistic dataset, *Endangered Species Research* 37: 105-18 (2018).

[27] The mere assurance (*see* DSEIS at K-12) that Navy biologists will work with NMFS to determine the likelihood of species occurrence—a statement that does not imply use of any real-time detection systems—is not sufficient.

[28] Center for Biological Diversity, Petition to revise the critical habitat designation for the Southern Resident killer whale (Orcinus orca) under the Endangered Species Act (submitted to NMFS on Jan. 16, 2014); *see also* NMFS, "Southern Resident killer whale satellite tagging," available at http://www.nwfsc.noaa.gov/research/divisions/cb/ecosystem/marinemammal/satellite_tagging/blog.cfm (accessed June 10, 2019).

[29] 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.

[30] NMFS, "Frequent questions: 2019 gray whale Unusual Mortality Event along the west coast," available at https://www.fisheries.noaa.gov/national/marine-life-distress/frequent-question-2019-gray-whale-unusual-mortality-

While the cause remains unknown, the skinniness and emaciation of the whales strongly suggests a decline in prey availability. A previous die-off in 1998-2000 of gray whales was associated with strong El Niño and La Niña events and a regime shift in the benthic prey base of the Bering Sea.[31] For the scientific community, the present-day concern is that warming seas—caused by climate change—are reducing primary productivity in the whales' northern foraging range and that vanishing sea ice is constricting populations of ice-associated amphipods.[32] If so, the die-off may be a "harbinger of things to come," in the words of one NOAA ecologist,[33] a diminished, more tenuous future for the species rather than a one-or-two-year anomaly.

It is well established that animals already exposed to one stressor may be less capable of responding successfully to another; and that stressors can combine to produce adverse synergistic effects.[34] Here, disruption in gray whale behavior can act adversely with the inanition caused by lack of food, increasing the risk of stranding and lowering the risk of survival in compromised animals. Further, starving gray whales may travel into unexpected areas in search of food—a likely contributing cause of some of the ship-strikes observed in recently stranded animals.[35] NMFS estimates that the Navy's activities will cause as many as 43 takes of gray whales each year, including fifteen cases of temporary hearing loss caused by underwater explosives (85 Fed. Reg. at 34,021), indicating the potential for adverse interactions with nutritionally-stressed animals.

Consistent with these concerns, and in addition to the points made further below, we make the following recommendations:

(a) In considering the effects of acoustic exposure on gray whales, NMFS must carefully consider the biological context of behavioral disruption in that species and evaluate the potential for severe consequences—including the clear potential mortality, which, in violation of the MMPA, is not authorized in the Proposed Rule.

---

event-along-west (accessed June 5, 2020).

[31] Le Boeuf, B.J., Pérez-Cortés H., Urbán, J., Mate, B.R., and Ollervides, F., High gray whale mortality and low recruitment in 1999: Potential causes and implications, Journal of Cetacean Research and Management 2(2): 85-99 (2000); Moore, S.E., Urbán, J., Perryman, W.L., Gulland, F., Perez-Cortes, H., Wade, P.R., Rojas-Bracho, L., and Rowles, T., Are gray whales hitting "K" hard? *Marine Mammal Science* 17: 954-58 (2001); Moore, S.E., Grebmeier, J.M., and Davies, J.R., Gray whale distribution relative to forage habitat in the northern Bering Sea: Current conditions and retrospective summary, *Canadian Journal of Zoology* 81: 734-42 (2003).

[32] L.V. Mapes, "Researchers seek answers to gray whale deaths after 57 are stranded this year," *Seattle Times*, May 17, 2019; *see also* Swartz, S., The sentinels of the sea: Gray whales respond to climate change (undated presentation).

[33] Mapes, "Researchers seek answers," *supra*.

[34] Wright, A.J., Soto, N.A., Baldwin, A.L., Bateson, M., Beale, C.M., Clark, C., Deak, T., Edwards, E.F., Fernández, A., Godinho, A. and Hatch, L.T., Anthropogenic noise as a stressor in animals: a multidisciplinary perspective. *International Journal of Comparative Psychology* 20(2): 250-73 (2007).

[35] *See, e.g.*, The Marine Mammal Center, The Marine Mammal Center confirms ship strike as cause of death for gray whale at San Francisco's Ocean Beach (May 7, 2019) (press release containing necropsy results for recently stranded gray whales).

(b) NMFS should expand the geographic protections proposed by the Navy to reduce activities in habitat used seasonally by gray whales, as described in our comments below. Such habitat includes the Marine Species Coastal Mitigation Area, the Olympic Coast National Marine Sanctuary Mitigation Area, Stonewall and Hecata Bank Humpback Whale Mitigation Area, the Northern Puget Sound Gray Whale Mitigation Area. Most of these areas represent important habitat for other baleen whales as well.

(c) Consistent with its responsibilities under the MMPA's provisions on unusual mortality events (e.g., 16 U.S.C. § 1421c), as well as with its requirements, under the National Environmental Policy Act ("NEPA"), to obtain information essential to its analysis of reasonable alternatives (40 C.F.R. § 1502.22), NMFS should urgently fund research to assess the extent of prey availability loss for California gray whales and to determine the cause of that loss of prey.

C. Hood Canal harbor seals and other species and populations with high exposure

As with past analyses, NMFS tabulates takes of marine mammal species but has not adequately assessed the aggregate impacts. On the contrary, it assumes, typically without any explanation, that the accumulated annual mortalities, injuries, energetic costs, temporary losses of hearing, chronic stress, and other impacts would not affect vital rates in individuals or populations, even though the Navy's activities would affect the same populations over time. This assumption seems predicated, for many species, on the unsupported notion that transient activity will not accumulate into population-level harm. The Proposed Rule makes this assertion even for populations such as Hood Canal harbor seals and Washington Inland harbor porpoises, for which it estimates auditory injury, temporary hearing loss, and behavioral disruption at high numbers relative to the size of individual populations. *See Motor Veh. Mfrs. Ass'n v. State Farm Ins.*, 463 U.S. 29, 43 (1983) (holding an agency arbitrary and capricious where, inter alia, it "offered an explanation for its decision that runs counter to the evidence before [it]").

NMFS' treatment of the Hood Canal population of harbor seals is illustrative. Here the agency, relying on the Navy's 2013-15 aerial surveys for its take estimate, concludes that the population as a whole would be taken an astonishing 30.84 times its abundance each year, for seven years. 85 Fed. Reg. at 34,037. (If the older estimate reported in the agency's most recent stock assessment report were used, that percentage would double.[36]) NMFS observes that such high numbers of takes make it likely that females will suffer reproductive loss, yet it argues—without any quantitative support—that any such effects would be negligible on the population level because only a small number of individual females would be affected. 85 Fed. Reg. at 34,037. Nowhere does NMFS consider the potential for sensitization, permanent habitat displacement, or other effects of repeated exposure that could exacerbate the already high numbers of takes.

---

[36] NMFS, Harbor Seal (*Phoca vitulina richardii*) Washington Inland Waters Stocks: Hood Canal, Southern Puget Sound, Washington Northern Inland Waters, *in* J.V. Caretta et al., *U.S. Pacific Marine Mammal Stock Assessments, 2013* (2014) (NOAA Tech. Memo. NMFS-SWFSC-532). That report found that information was not available to obtain minimum population estimates or population trends or to generate Potential Biological Removal levels in accordance with the statute.

The MMPA requires more than hand-waving. *See passim Conservation Council*, 97 F.Supp. 3d at 1220-29. For years, other parties have conducted quantitative analysis of population consequences of disturbance, both in cases where substantial information is available for modeling and in cases where it is not—as is evident even in a three-year-old report from the National Academy of Sciences.[37] NMFS can no longer engage in its usual business of estimating take down to the single animal (or, more precisely, recapitulating the Navy's estimates of take) and then discounting the results without any quantitative or remotely meaningful analysis. Its attempt to do so here for populations with high levels of take is unreasonable on its own terms and insupportable under the MMPA's standard of "best available science."

III. NEGLIGIBLE IMPACT ANALYSIS

Under the MMPA's general permit provision, NMFS can authorize exceptions to the take moratorium only upon making an affirmative finding that an activity will have no more than a "negligible impact" on a species or stock. 16 U.S.C. §§ 1371(a)(5)(A)(i), (D)(i)(I). "Negligible impact" has been defined by the agency as one "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" (50 C.F.R. § 216.103); or, as the agency translates, one that is "not likely to reduce annual rates of adult survival or recruitment." 71 Fed. Reg. 21,003 (Apr. 24, 2006). Here, NMFS proposes to authorize take of multiple island-associated populations, most of unknown population size and many presumably with small or limited ranges. To justify that authorization notwithstanding the lack of robust mitigation measures, the agency makes a number of assumptions that are not supported by the best available science.

A. Analysis of Injury and Mortality

The Navy acknowledges the potential for marine mammals to experience non-auditory injury and mortality as a result of its activities. Nonetheless, the assumptions it has made in modeling

---

[37] National Academies of Sciences, Engineering, and Medicine, *Approaches to Understanding the Cumulative Effects of Stressors on Marine Mammals* (2017). *See also, e.g.*, New, L.F., Moretti, D.J., Hooker, S.K., Costa, D.P., and Simmons, S.E., Using energetic models to investigate the survival and reproduction of beaked whales (family *Ziphiidae*), *PLoS ONE* 8: e68725 (2013); King, S.L., Schick, R.S., Donovan, C., Booth, C.G., Burgman, M., Thomas, L., and Harwood, J., An interim framework for assessing the population consequences of disturbance, *Methods in Ecology and Evolution* doi: 10.1111/2041-210X.12411 (2015); Farmer, N.A., K. Baker, D.G. Zeddies, S.L. Denes, D.P. Noren, L.P. Garrison, A. Machernis, E.M. Fougeres, and M. Zykov, Population consequences of disturbance by offshore oil and gas activity for endangered sperm whales (*Physeter marcocephalus*), *Biological Conservation* 227: 189-204 (2018);.Pirotta, E., Booth, C.G., Costa, D.P., Fleishman, E., Kraus, S.D., Lusseau, D., Moretti, D., New, L.F., Schick, R.S., Schwarz, L.K., Simmons, S.E., Thomas, L., Tyack, P.L., Weise, M.J., Wells, R.S., and Harwood, J., Understanding the population consequences of disturbance, *Ecology and Evolution* doi:10.1002/ece3.4458 (2018); Hin, V., Harwood, J. and de Roos, A.M., Bio-energetic modeling of medium-sized cetaceans shows high sensitivity to disturbance in seasons of low resource supply, *Ecological Applications*, *29*(5), p.e01903 (2019); Pirotta, E., Mangel, M., Costa, D.P., Goldbogen, J., Harwood, J., Hin, V., Irvine, L.M., Mate, B.R., McHuron, E.A., Palacios, D.M. and Schwarz, L.K., Anthropogenic disturbance in a changing environment: modelling lifetime reproductive success to predict the consequences of multiple stressors on a migratory population. *Oikos*, *128*(9), pp.1340-1357 (2019).

these types of harm result in take estimates that both underestimate effects and are inconsistent with the MMPA.

1. Use of means in estimations of blast traumas

NMFS, following the criteria set forth in a 2017 Navy technical report,[38] has elected to base its estimates of mortality and non-auditory injury (such as lung damage) from explosives on a 50% averaging of risk rather than on the onset of risk. 85 Fed. Reg. at 33965 (incorporating Navy analysis); *see also* DSEIS at 3.4-294 (Table 3.4-72). Both the 50% average and onset criteria account for variability in water depth and body mass; the difference between them appears to stem from natural variability in the data produced by the 45-year-old study on which the Navy's criteria is founded, a study that exposed a range of terrestrial species to underwater explosives.[39] Remarkably, the Navy—and presumably NMFS—uses the 50% average for its impact analysis while using onset for purposes of assessing the effectiveness of the Navy's mitigation zones. 85 Fed. Reg. at 33,980-81, 33965; *see also* DSEIS at 3.4-293 to 3.4-294.

This approach is not consistent with the probability standards set forth in the Marine Mammal Protection Act ("MMPA"). The MMPA incorporates a standard of "significant potential" into its definition of "injury" for military readiness activities; this standard plainly differs from the higher "likelihood" standard that applies to behavioral disruption. *Compare* 16 U.S.C. §§ 1362(18)(B)(i) *and* (B)(ii). And while the probability standard for mortality is not specifically defined in the Act, Congress expressly amended the MMPA in 1994 to incorporate a "potential" standard in the wake of the Ninth Circuit decision in *U.S. v. Hiyashi*, 22 F.3d 859 (9th Cir. 1993). If NMFS is to satisfy the plain language of the Marine Mammal Protection Act, and provide a more conservative estimate of harm, it cannot base its mortality and injury estimates on the mean.

2. Disregard of non-auditory injury and death of beaked whales

In March 2000, sixteen whales from at least three species stranded over 150 miles of shoreline along the northern channels of the Bahamas. The beachings occurred within 24 hours of Navy ships using mid-frequency sonar in those same channels.[40] Post-mortem examinations found, in all whales examined, hemorrhaging in and around the ears and other tissues related to sound conduction or production, such as the larynx and auditory fats, some of which was debilitative and potentially severe.[41] It is now universally accepted, including by NMFS and the Navy, that these mortalities were caused by the Navy's use of high-intensity, mid-frequency sonar. The Bahamas event is merely one of numerous mortality events coincident with military activities

---

[38] SSC Pacific, Technical report: Criteria and thresholds for U.S. Navy acoustic and explosive effects analysis (Phase III) (June 2017).

[39] *Id.* at 90-96.

[40] Departments of Commerce and the Navy, Joint interim report: Bahamas marine mammal stranding event of 15-16 March 2000, *supra.*

[41] *Id.*

and active sonar that have now been documented, including but not limited to[42] the Canary Islands (1985, 1988, 1989, 1991, 2002, 2004),[43] Greece (1996, 1997, 2011),[44] Hawaii (2004),[45] Madeira (2000),[46] Spain (2006),[47] Virgin Islands (1999),[48] Washington State (2003),[49] and the Mariana Islands (2006-present).[50] While most of these events have involved beaked whales, other marine mammals such as minke whales, melon-headed whales, and harbor porpoises have also stranded and died coincident with sonar use. Additionally, Simonis et al. (2020) implicate

---

[42] The following is not a complete list, as other relevant events have been reported in Bonaire, Japan, Taiwan, and other locations. See, *e.g.*, Brownell, R.L., Jr., Yamada, T., Mead, J.G., and van Helden, A.L., Mass strandings of Cuvier's beaked whales in Japan: U.S. naval acoustic link? (2004) (IWC SC/56E37); Wang, J.Y., and Yang, S.-C., Unusual cetacean stranding events of Taiwan in 2004 and 2005, *Journal of Cetacean Research and Management* 8: 283-92 (2006); van Bree, P.J.H., and Kristensen, I., On the intriguing stranding of four Cuvier's beaked whales, *Ziphius cavirostris*, G. Cuvier, 1823, on the lesser Antillean island of Bonaire, *Bijdragen tot de Dierkunde* 44: 235-238 (1974).

[43] Simmonds, M., and Lopez-Jurado, L.F., Whales and the military, *Nature* 337: art. 448 (1991); Martín, V., Servidio, A., and Garcia, S., Mass strandings of beaked whales in the Canary Islands, *in* P.G.H. Evans and L.A. Miller, *Proceedings of the Workshop on Active Sonar and Cetaceans* (2004); Fernández, A., *et al.*, Gas and fat embolic syndrome" involving mass stranding of beaked whales (family *Ziphiidae*) exposed to anthropogenic sonar signals, *supra*

[44] Frantzis, A., Does acoustic testing strand whales? *Nature* 392: art. 29 (1998); SACLANT Undersea Research Center, "Summary Record," SACLANTCEN Bioacoustics Panel, SACLANTCEN M-133, La Spezia, Italy (15-17 June 1998); Frantzis, A., The first mass stranding that was associated with the use of active sonar (Kyparissiakos Gulf, Greece, 1996), *in* Evans, P.G.H., and Miller, L.A., *Proceedings of the Workshop on Active Sonar and Cetaceans* (2004); Frantzis, A., Growing numbers – Update on the mass stranding of Ziphius in the Ionian Sea, Greece (Dec. 7, 2011) (posting of Greek biologist to the MARMAM academic listserv, with previous updates embedded).

[45] Southall, B.L., Braun, R., Gulland, F.M.D., Heard, R.D., Baird, R.W., Wilkin, S.M., and Rowles, T.K., Hawaiian melon-headed whale *(Peponacephala electra)* mass stranding event of July 3-4, 2004 (2006) (NOAA Tech. Memo. NMFS-OPR-31); *see also* Brownell, R.L., Jr., Ralls, K., Baumann-Pickering, S., and Poole, M.M., Behavior of melon-headed whales, *Pepnoncephalia electra*, near oceanic islands, *Marine Mammal Science* 25: 639-58 (2009).

[46] Ketten, D.R., Beaked whale necropsy findings (2002) (report submitted to NMFS); Freitas, L., The stranding of three Cuvier's beaked whales *Ziphius Cavirostris* in Madeira Archipelago—May 2000, *in* Evans, P.G.H., and Miller, L.A., *Proceedings of the Workshop on Active Sonar and Cetaceans* (2004).

[47] International Whaling Commission, Report of the Scientific Committee, Annex K. (2006) (IWC/58/Rep1).

[48] Personal communication of Dr. David Nellis, U.S. Virgin Island Department of Fish and Game, to Eric Hawk, NMFS (Oct. 1999); personal communication from Ken Hollingshead, NMFS, to John Mayer, Marine Acoustics Inc. (March 19, 2002); Letter from William T. Hogarth, Regional Administrator, NMFS Southeast Regional Office, to RADM J. Kevin Moran, Navy Region Southeast (undated); personal communication from Ken Hollingshead, NMFS, to John Mayer, Marine Acoustics Inc. (March 19, 2002).

[49] NMFS, Assessment of acoustic exposures on marine mammals (21 January 2005); NMFS, Preliminary report: Multidisciplinary investigation of harbor porpoises (*Phocoena phocoena*) stranded in Washington State from 2 May – 2 June 2003 coinciding with the mid-range sonar exercises of the *USS Shoup* (2004) (conclusions unchanged in final report).

[50] Simonis, A.E., R.L. Brownell, Jr., B.J. Thayre, J.S. Trickey, E.M. Oleson, R. Huntington, and S. Baumann-Pickering, Co-occurrence of beaked whale strandings and naval sonar in the Mariana Islands, Western Pacific, *Proceedings of the Royal Society B* 287: 20200070 (2020); *see also* Simonis, A., B. Thayre, E. Oleson, and S. Baumann-Pickering, Mid-frequency active sonar and beaked whale acoustic activity in the Northern Mariana Islands. *The Journal of the Acoustical Society of America*, 140(4): 3413-3413 (2016).

sonar in beaked whale mortalities outside the context of atypical mass strandings, which have been the focus of most of the scientific effort and investigation.[51]

As it has done for every Navy offshore range in its third round of MMPA authorizations, NMFS finds, notwithstanding this long record, that the Navy's use of active sonar would not result in a single instance of serious injury or mortality in any cetacean species. In doing so, the agency is at pains to dismiss the scientific literature. It spends almost five columns of the Federal Register notice characterizing the leading scientific explanation for sonar-related injuries in beaked whales—maladaptive behavioral response—as a mere "hypothesis" about which more information is needed. 85 Fed. Reg. at 33937-38. In this, it elides the obvious fact that this "hypothesis" is supported by numerous papers along multiple lines of evidence, including forensic investigations, laboratory study of organ tissue, and theoretical work on dive physiology, and plainly constitutes best available science.[52] And it concludes by opining that, even if the "hypothesis" were true, pathologies would occur only upon exposure "at very close range over a prolonged period of time," which, it says, would not happen here. It provides no evidence for this conclusion, which should not come as a surprise since it is contradicted by the agency's own investigations into at least two prior mass stranding events. *See* 85 Fed. Reg. at 33938.

There is no question that sonar causes mortalities of beaked whales and other species, and that the severe injuries observed in beaked whales across multiple sonar-related mortality events occur independent of the animals' stranding.[53] NMFS' refusal to incorporate such impacts into its rulemaking violates the MMPA, which requires that decisions be based on best available science and which, consistent with the 1994 Amendments to the Act, implicitly sets a probability standard of *potentiality* for takes resulting in serious injury and mortality.

3. *Basic errors in auditory injury thresholds*

---

[51] *Id.*

[52] *See, e.g.*, Jepson, P.D., Arbelo, M., Deaville, R., Patterson, I.A.P., Castro, P., Baker, J.R., Degollada, E., Ross, H.M., Herráez, P., Pocknell, A.M., Rodríguez, F., Howie, F.E., Espinosa, A., Reid, R.J., Jaber, J.R., Martín, V., Cunningham, A.A., Fernández, A., Gas-bubble lesions in stranded cetaceans, *Nature* 425: 575-76 (2003); Fernández, A., *et al.*, "Gas and fat embolic syndrome" involving a mass stranding of beaked whales (family *Ziphiidae*) exposed to anthropogenic sonar signals," *supra*; Hooker, S.K., Baird, R.W., and Fahlman, A., Could beaked whales get the bends? Effect of diving behavior and physiology on modeled gas exchange for three species: *Ziphius cavirostris*, *Mesoplodon densirostris*, and *Hyperoodon ampullatus*, *Respiratory Physiology and Neurobiology* 167(3): 235-46 (2009); Hooker, S.K., et al, Deadly diving? Physiological and behavioural management of decompression stress in diving mammals, *supra*; Jepson, P.D., Deaville, R., Patterson, I.A.P., Pocknell, A.M., Ross, H.M., Baker, J.R., Howie, F.E., Reid, R.J., Colloff, A., and Cunningham, A.A., Acute and chronic gas bubble lesions in cetaceans stranded in the United Kingdom, *Veterinary Pathology* 42: 291-305 (2005); Parsons, E.C.M., Dolman, S.J., Wright, A.J., Rose, N.A., and Burns, W.C.G., Navy sonar and cetaceans: Just how much does the gun need to smoke before we act? *Marine Pollution Bulletin* 56: 1248 (2008).

[53] *See, e.g.*, Bernaldo de Quiros, Fernandez, A., Baird, R.W., Brownell, Jr., R.L., Aguilar de Soto, N., Allen, D., Arbelo, M., Arregui, M., Costidis, A., Fahlman, A., Frantzis, A., Gulland, F.M.D., Iniguez, M., Johnson, M., Komnenou, A., Koopman, H., Pabst, D.A., Roe, W.D., Sierra, E., Tejedor, M., and Schorr, G., Advances in research on the impacts of anti-submarine sonar on beaked whales, *Proceedings of the Royal Society B* 286: 20182533 (2019).

The criteria that the Navy's SPAWAR command has produced to estimate temporary and permanent threshold shift in marine mammals,[54] and that NMFS applies here, are erroneous and non-conservative. Wright (2015)[55] has identified several statistical and numerical faults in the Navy's approach, such as pseudo-replication, use of means rather than onset (as with the treatment of blast trauma, discussed above), and inconsistent treatment of data, that tend to bias the proposed criteria towards an underestimation of effects. Similar and additional issues were raised by a dozen scientists during the public comment period on the draft criteria held by NMFS.[56] At the root of the problem are the agencies' broad extrapolation from a small number of individual animals, mostly bottlenose dolphins, without taking account of what Racca et al. (2015b)[57] have succinctly characterized as a "non- linear accumulation of uncertainty." The auditory impact criteria should be revised.[58]

Further, in estimating the number of instances of injury and mortality, NMFS (as in all things following the Navy) makes two *post hoc* adjustments, significantly reducing the totals based on presumed animal avoidance and mitigation effectiveness. These two adjustments are arbitrary and non-conservative.

Adjustment for avoidance.— By itself, NMFS' avoidance adjustment (discussed at 85 Fed. Reg. at 33,981) effectively reduces the number of estimated auditory injuries by 95%, on the assumption that marine mammals initially exposed to three or four sonar transmissions at levels below those expected to cause permanent injury would avoid injurious exposures.[59] While it is certainly true that some marine mammals will flee the sound, there are no data to inform how

---

[54] Finneran, J.J., Auditory weighting functions and TTS/ PTS exposure functions for cetaceans and marine carnivores (2015) (SPAWAR No. TR 3026).

[55] Wright, A.J., Sound science: Maintaining numerical and statistical standards in the pursuit of noise exposure criteria for marine mammals, *Frontiers in Marine Science* 2: art. 99 (2015).

[56] Letter from Racca, R., Hannay, D., Yurk, H., McPherson, C., Austin, M., MacGillivray, A., Martin, B., Zeddies, D., Warner, G., Delarue, J., and Denes S., JASCO, to N. LeBoeuf, NMFS (Sept. 14, 2015) (Comment Letter on National Marine Fisheries Service's 31 July 2015 notice (80 Fed. Reg. 45642)); Letter from Racca, R., Yurk, H., Zeddies, D., Hannay, D., Austin, M., MacGillivray, A., Warner, G., Martin, B. and McPherson, C., JASCO, and Tyack, P., University of St. Andrews, to A.R. Scholik-Schlomer, NMFS (Sept. 11, 2015) ("Request for an extension of the public comment period on the proposed acoustic guidelines for assessing the effects of anthropogenic sound on marine mammals").

[57] Letter from Racca, R., et al. (Sept. 14, 2015), *supra*.

[58] Additionally, the criteria should be revised to incorporate, as appropriate, new data that were not available at the time they were developed. These new data include Branstetter, B.K., St. Leger, J., Acton, D., Stewart, J., Houser, D., Finneran, J.J., and Jenkins, K., Killer whale (Orcinus orca) behavioral audiograms, *Journal of the Acoustical Society of America* 141: 2387-98 (2017); Kastelein, R.A., Helder-Hoek, L., and Van de Voorde, S., Effects of exposure to sonar playback sounds (3.5-4.1 kHz) on harbor porpoise (Phocoena phocoena) hearing, *Journal of the Acoustical Society of America* 142(2): 1965-75 (2017). For further discussion of these and other issues, see comment letters on NMFS' draft auditory impact criteria submitted to NMFS by NRDC et al.

[59] Blackstock, S.A., Fayton, J.O., Hulton, P.H., Moll, T.E., Jenkins, K., Kotecki, S., Henderson, E., Bowman, V., Rider, S., and Martin, C., Quantifying acoustic impacts on marine mammals and sea turtles: Methods and analytical approach for Phase III testing and training (2018) (NUWC-NPT Tech. Rep.). As noted, NMFS, in following the Navy, incorporates the methodology set forth in this report.

many would do so, let alone that 95% would move as expeditiously as the agency presumes. Marine mammals may remain in important habitat, and the most vulnerable individuals may linger in an area, notwithstanding the risk of harm; marine mammals cannot necessarily predict where an exercise will travel; and Navy vessels engaged in certain activities may move more rapidly than a marine mammal that is attempting to evacuate.

Avoidance adjustments were first used in 2012, for an environmental impact report prepared under the California Environmental Quality Act; in that case, the authors, to compensate for their non-conservative assumptions about avoidance, presumed that *every instance* of permanent threshold shift would result in biological removal of the individual.[60] As the Marine Mammal Commission has repeatedly advised, NMFS should not adjust for avoidance here.

Adjustment for mitigation.— NMFS' adjustment of mortality numbers for "mitigation effectiveness," which incorporates the methodology set forth in a 2018 Navy technical report, is also arbitrary. 85 Fed. Reg. at 33,980-81; *see also* DSEIS at 3.4-297 to 3.4-298. That report begins with the species-specific g(0) factors applied in professional marine mammal abundance surveys, then multiplies them by a simple factor to reflect the relative effectiveness of Navy lookouts in routine operating conditions.[61] In fact, the Navy's sighting effectiveness is likely to be much poorer than assumed.

In the first place, the sighting conditions that may obtain during Navy activities are substantially inferior to those used to generate g(0) factors in abundance surveys. As the authoritative NOAA paper on the subject observed, abundance survey detection rates decline significantly as sea states rise above Beaufort 1.[62] Yet most Navy activities would be authorized to occur in all sea conditions and hours of day, and Beaufort sea states in areas proximate to Navy activities within the Northwest Study Area averaged Beaufort 5 across the previous three years—*a point at which detection power is a small fraction of g(0) for most species*.[63] (*See* Table 1 below for averages at representative NOAA buoy stations.)

Second, the impact radius of many of the Navy's explosives extends far beyond the limited sighting distances used in vessel abundance surveys. The g(0) factor is predicated on sightings occurring directly on the trackline of the vessel, with detection rates dropping substantially as distance from the trackline increases.[64] Yet the distances expected to cause permanent hearing loss in "high-frequency cetaceans" (i.e., porpoises) are expected to run thousands of kilometers in all directions from both explosive sonobuoys and explosive torpedoes, and in both cases the mobile source can be kilometers away from Navy watchstanders when it detonates.

---

[60] Wood, J., Southall, B.L., and Tollit, D.J., PG&E Offshore 3-D Seismic Survey Project EIR: Marine Mammal Technical Report, Appendix H (2012) (CSLC EIR No. 758).

[61] Blackstock, S.A., et al., Quantifying acoustic impacts on marine mammals and sea turtles, *supra*.

[62] Barlow, J., Inferring trackline detection probabilities, g(0), for cetaceans from apparent densities in different survey conditions, *Marine Mammal Science* 31: 923-43 (2015).

[63] *Id.*

[64] *See* Barlow, J., Balance, L.T., and Forney, K.A., Effective strip widths for ship-based line-transect surveys of ceteaceans (2011) (NOAA Tech. Memo NMFS-SWFSC-484).

Finally, Navy watchstanders are significantly less effective than professional biologists in detecting marine mammals. Indeed, we know from the Navy's own studies that watchstanders charged with implementing marine mammal exclusion zones appear to fare much poorer in detecting animals than do trained protected species observers, who are generally not allowed aboard ship.[65] And it is worth noting, as has the Marine Mammal Commission, that courts, experts, and NMFS itself on previous occasions have questioned the effectiveness of the Navy's lookout regime.[66]

NMFS' *post hoc* adjustment for operational mitigation effectiveness is not a trivial or an abstract issue. It has the apparent effect of eliminating risk of mortality from explosives known to be of a power to kill marine mammals. Some experts have raised concerns that one Southern Resident orca mortality (L112) was caused by naval explosives or ordnance.[67] NMFS should have made the Navy's approach transparent and explained the rationale for its acceptance of that approach. Its failure to do so has prevented the public from effectively commenting on its approach to this issue, in contravention of the APA, on a matter of obvious significance to the agency's core negligible impact findings. 5 U.S.C. § 553(b), (c); 5 U.S.C. § 706(2)(D).

Buoy	Location	Wave Height (m)				B.S.S. (Mean [Range])
		Mean	S.D.	Min.	Max.	
Station 46100 – OOI Westport Offshore	46.851 N, 124.972 W	2.31	1.20	0.47	11.29	5 [2-10]
Station 46089 (LLNR 689) – TILLAMOOK OR – 85 NM WNW of Tillamook, OR	45.925 N, 125.771 W	2.40	1.23	0.43	9.74	5 [2-9]

[65] Watwood, S., Rider, S., Richlen, M., and Jefferson, T., *Cruise report: Marine species monitoring & lookout effectiveness study*, Submarine Commanders Course, February 2015, Hawaii Range Complex (2016) (prepared under Navy contract); *see also* comments of Rebecca Lent, Marine Mammal Commission, to Naval Facilities Engineering Command, Pacific (Nov. 13, 2017) (citing various combined cruise reports and lookout effectiveness studies from 2010 through 2014).

[66] Comments of Dr. Peter O. Thomas, Executive Director, Marine Mammal Commission, to Jolie Harrison, NMFS (June 17, 2015) (comments on NMFS's proposed rule authorizing Northwest Training and Testing Activities).

[67] *See* Sarah Petrescu, "Baby killer whale investigation flawed," *Vancouver Sun*, Mar. 10, 2014 (citing Southern Resident experts Ken Balcomb and Scott Veirs).

Station 46098 – OOI Waldport Offshore	44.381 N, 124.956 W	2.46	1.26	0.42	10.33	5 [2-10]
Station 46213 – Cape Mendocino, CA (94)	40.295 N, 124.732 W	2.56	1.09	0.60	9.43	5 [2-9]

Table 1. Mean, standard deviation (S.D.), minimum (min.), and maximum (max.) wave height (m), and mean and range on Beaufort Sea State (B.S.S.) values for data collected at four buoys positioned within the Northwest Study Area from 2016 through 2018. Data source: NOAA National Buoy Data Center (NBDC) (2019).[68]

B. Behavioral Response Thresholds

In its Proposed Rule, NMFS, following the Navy, has abandoned the narrowly conceived behavioral risk function that it employed in previous authorizations. In lieu of a simple dose-response curve, the Navy applies a biphasic function that assumes an unmediated dose-response relationship at higher received levels and a context-influenced response at lower received levels. And instead of limiting its data sources to three studies, at least one of which— the response of captive bottlenose dolphins to tones generated in a temporary threshold shift experiment—was inapposite and should not have been used, the Navy has incorporated data from a broader set of behavioral response studies, including the SOCAL BRS and the 3S project funded jointly by the U.S., French, and Norwegian navies.

We agree that a biphasic approach is better suited to the data and incorporates contextual factors far better than the approach NMFS took in previous analyses; and we concur with its expansion of data sources along with its removal of the threshold shift experiment as a basis for analysis, as we have recommended. The resulting functions, however, depend on a number of inappropriate assumptions that tend to significantly underestimate effects.

1. Data sources

For example, two of the proposed behavioral response functions rely substantially on captive animal studies, even though it is generally accepted that captive animals, especially (but not limited to) those that have previously been trained, are likely to be less responsive to intrusive sound.[69] More specifically, every data point that informs the pinniped function, and nearly two-

[68] NOAA, "National Buoy Data Center," available at: https://www.ndbc.noaa.gov (accessed June 10, 2019).
[69] *E.g.*, Parsons, E.C.M., Dolman, S.J., Wright, A.J., Rose, N.A. and Burns, W.C.G., Navy sonar and cetaceans: Just how much does the gun need to smoke before we act? *Marine Pollution Bulletin 56*(7): 1248-57 (2008).

thirds of the data points informing the odontocete function (30/49), are derived from a captive study.[70] In the case of the odontocete function, the reliance on captive studies exacerbates that function's heavy dependence on the bottlenose dolphin, a species that is generally considered relatively insensitive, to represent a diverse set of taxa with divergent sensitivity and reactiveness to mid- frequency anthropogenic noise. If, for example, the number of wild killer whale data points (n=8) and captive bottlenose dolphin data points (n=30)—a discrepancy that owes itself to the greater accessibility of captive animals—were exchanged, such that killer whales represented the larger and bottlenose dolphins the lesser amount of data, the resulting response function would differ substantially. That result is entirely arbitrary. *See Ocean Mammal Institute v. Gates*, 546 F.Supp.2d 960, 974-75 (D. Haw. 2008) (finding invalid a NMFS/Navy threshold that was based arbitrarily on a captive animal study while downgrading other data).

Additionally, the risk functions do not incorporate (nor does NMFS, following the Navy, apparently consider) a number of relevant studies on wild marine mammals, such as a passive acoustic study on blue whale vocalizations and a tagging study on behavioral responses to dipping sonar, even though received levels from these studies are either available or can be estimated.[71] Some were included in the only published quantitative synthesis of behavioral response data, Gomez et al. (2016);[72] others, like the dipping sonar study, appeared after that synthesis was published, and after the Navy produced its behavioral take functions two years ago. Exclusion of those studies fails to meet regulatory requirements that base evaluation of impacts on research methods generally accepted in the scientific community. *See* 40 C.F.R. § 1502.22(b)(4).

It is not clear from the Proposed Rule, the DSEIS, or the Navy's associated technical report on acoustic "criteria and thresholds" exactly how each of the studies considered relevant were applied in the analysis, or how the functions were fitted to the data, but the available evidence on behavioral response raises concerns that—notwithstanding the agencies' claims to the contrary—the functions are not conservative for some species. For this reason and others, we urge NMFS to make additional technical information available, including expert elicitation and peer review (if any), so that the public can fully comment pursuant to the APA.

2. *Incorporating effects of dipping sonar*

---

[70] SSC Pacific, Technical report: Criteria and thresholds, *supra*.

[71] *E.g.*, Melcon, M.L., Cummins, A.J., Kerosky, S.M., Roche, L.K., and Wiggins, S.M., Blue whales respond to anthropogenic noise *PLoS ONE* 7(2): e32681 (2012); Falcone, E.A., Associating patterns in movement and diving behavior with sonar use during military training exercises: A case study using satellite tag data from Cuvier's beaked whales at the Southern California Anti-submarine Warfare Range (2017) (presentation given at Society for Marine Mammalogy Biennial Conference, Halifax, N.S., Oct. 23, 2017); Falcone, E., Schorr, G.S., Watwood, S.L., DeRuiter, S.L., Zerbini, A.N., Andrews, R.D., Morrissey, R.P., and Moretti, D.J., Diving behavior of Cuvier's beaked whales exposed to two types of military sonar, *Royal Society Open Science* 4: 170629 (2017).

[72] Gomez, C., Lawson, J.W., Wright, A.J., Buren, A.D., Tollit, D., and Lesage, V., A systematic review on the behavioural responses of wild marine mammals to noise: The disparity between science and policy, *Canadian Journal of Zoology* 94: 801-19 (2016).

Dipping sonar, like hull-mounted sonar, appears on the basis of preliminary data to be a significant predictor of deep-dive rates in beaked whales on the Navy's SOAR range, with the dive rate falling significantly (*e.g.*, to 35% of that individual's control rate) during sonar exposure, and likewise appears associated with habitat abandonment. Importantly, these effects were observed at substantially greater distances (*e.g.*, 30 or more km) from dipping sonar than would otherwise be expected given the systems' source levels and the beaked whale response thresholds developed from research on hull-mounted sonar.[73] Researchers have hypothesized that the inherently unpredictable nature of this system—the inability of whales to track its progress in the water—make it a disproportionately powerful stressor.[74] Yet all the data sources used to produce the agencies' behavioral response functions concern hull-mounted sonar, an R/V-deployed sonar playback, or an in-pool source.

NMFS generic behavioral response function for beaked whales thus does not incorporate their heightened response to these sources, although such a response would be presumed to shift the function "leftward." Nor do the response functions for other species account for this difference, although unpredictability is known to exacerbate stress response in a diversity of mammalian species[75] and should conservatively be presumed, in this case, to lead to a heightened response in marine mammal species other than beaked whales.

3. Use of distance-based "cut-offs"

As has been the case of other recent Navy authorizations, NMFS applies "cut-offs" in estimating the number of behavioral takes of marine mammals. This approach, adopted from the Navy, significantly affects its estimates. The Proposed Rule postulates that the cutoffs would zero-out take estimates at a point where, using the Navy's response functions, 25% of all odontocetes other than beaked whales and harbor porpoises, 13% of all mysticetes, and 18% of all pinnipeds and mustelids (i.e., sea otters) would be considered to have a potentially significant behavioral response when exposed to "MF1" hull-mounted mid-frequency sonar. 85 Fed. Reg. at 33,969; *see also* DSEIS at 3.4-150 (Table 3.4-13).

Applying this *post hoc* adjustment makes no sense theoretically, as the Marine Mammal Commission has repeatedly observed in its comment letters, since distance is already incorporated in the new behavioral response functions as a contextual factor.[76] More than this, the agencies' chosen cut-offs are plainly inconsistent with the available data, including but not limited to blue whale feeding response, blue whale vocalization response, controlled exposure studies on beaked whales, and opportunistic data from at least one mass stranding, of melon-headed whales, associated with sonar use.[77] Indeed, a recent controlled exposure study of

---

[73] Falcone, E.A., et al., Diving behaviour of Cuvier's beaked whales, s*upra.*

[74] *Id*.

[75] Wright, A.J., et al., Anthropogenic noise as a stressor in animals, *supra*.

[76] Comments of Peter O. Thomas, Executive Director, Marine Mammal Commission, to Naval Facilities Engineering Command, Northwest, at 4-5 (Apr. 15, 2019); comments of Peter O. Thomas (June 12, 2020), *supra*.

[77] Southall, B.L., Braun, R., Gulland, F.M.D., Heard, A.D., Baird, R.W., Wilkin, S.M., and Rowles, T.K., Hawaiian melon-headed whale (*Peponacephala electra*) mass stranding event of July 3-4, 2004 (2006) (NOAA

Northern bottlenose whales designed to investigate this very issue concluded that received level, and not distance, drove responses to sonar in this beaked whale species even at distances somewhat beyond the cutoffs used by NMFS and the Navy here.[78] The agencies appear to respond to this criticism by doubling their cutoffs where higher-intensity sonar or multi-platform sonar activities are concerned, but these adjustments do not cure the inconsistencies with the data we have cited above.

As the Marine Mammal Commission has stated, NMFS' use of cut-off distances "*contradicts* the data underlying the Bayesian [behavioral risk functions], *negates* the intent of the functions themselves, and *underestimates* the numbers of takes."[79] We urge the agency to abandon this arbitrary but consequential approach.

4. Behavioral thresholds for explosives

For purposes of take estimation, NMFS, again following the Navy, assumes that marine mammals do not respond behaviorally to single explosive detonations, beyond a brief alerting response that would not constitute a significant alteration in behavior. This assumption appears to derive from final rules issued under the Marine Mammal Protection Act for ship-shock trials in the late 1990s and 2000s, and is entirely without empirical support.

The Navy's preferred alternative provides for detonations with net explosive weights up to 650 lbs. There is no reason for NMFS to assume, as the Marine Mammal Commission observes, that a marine mammal "would exhibit a significant behavioral response to two 5-lb. charges detonated within a few minutes of each other but would not exhibit a similar response for a single detonation of 50 lbs., let alone detonations of more than 500 lbs."[80] In response to comments made concerning other ranges, the Navy justified its position by claiming it had not observed significant behavioral responses to single detonations in the course of its observations since the 1990s. Yet the Navy's monitoring effort around underwater explosives is typically limited and is focused, where it occurs, on preventing injuries and mortalities within the blast radius, not on detecting marine mammal behavioral responses.

Tech. Memo. NMFS-OPR-31); Melcon, M.L., et al. (2012). Blue whales respond to anthropogenic noise, *supra*; Goldbogen, J.A., Southall, B.L., DeRuiter, S.L., Calambokidis, J., Friedlaender, A.S., Hazen, E.L., Falcone, E.A., Schorr, G.S., Douglas, A., Moretti, D.J., Kyburg, C., McKenna, M.F., and Tyack, P.L., Blue whales respond to simulated mid-frequency military sonar, *Proceedings of the Royal Society B* 280: 20130657 (2013); Wensveen, P.J., Isojunno, S., Hansen, R.R., von Benda-Beckmann, A.M., Kleivane, L., van IJsselmuide, S., Lam, F.-P.A., Kvadsheim, P.H., DeRuiter, S.L., Curé, C., Narazaki, T., Tyack, P.L., and Miller, P.J.O., Northern bottlenose whales in a pristine environment respond strongly to close and distant navy sonar signals, *Proceedings of the Royal Society B* 286: 20182592 (2019).

[78] Wensveen et al., Northern bottlenose whales in a pristine environment respond strongly, *supra*.

[79] Comments of Peter O. Thomas (June 12, 2020), *supra*, at 5 (emphasis in original).

[80] *Id.* at 7.

The literature on responses to explosions does not distinguish between single and multiple detonations.[81] It is arbitrary for NMFS, in estimating takes and assessing impacts, to assume that only multiple rounds of in-water detonations can cause behavioral takes.

C. Selection of Modeled Locations

The delineation of Biologically Important Areas by NMFS, the updates made by the Navy to its predictive habitat models,[82] and evidence of additional important habitat areas within the NWTT Study Area, provide the opportunity for the agencies to improve upon their current approach to the development of alternatives by improving resolution of their analysis of operations.

Recognizing that important habitat areas imply the non-random distribution and density of marine mammals in space and time, both the spatial location and the timing of training and testing events in relation to those areas is a significant determining factor in the assessment of acoustic impacts. Levels of acoustic impact are likely to be under- or over-estimated depending on whether the location of the modeled event is further from the important habitat area, or closer to it, than the actual event. Thus, there is a need for the Navy to compile and provide more information regarding the number, nature, and timing of testing and training events that take place within, or in close proximity to, important habitat areas, and to refine its scale of analysis of operations to match the scale of the habitat areas that are considered to be important. And there is a need for NMFS to demand it.

While the DSEIS, in assessing environmental impacts on marine mammals, breaks down estimated impacts by population, little detail is provided about assumptions concerning modeled locations and times of year. *See, e.g.*, DSEIS at 2-28 TO 2-38 (*e.g.*, defining numerous activities as simply occurring "[o]ffshore"). And the Proposed Rule notice adds nothing further, making it impossible for the public to assess the reasonableness of NMFS take estimates and negligible impact analysis in capturing the distribution of the activities proposed in the document. Additionally, the lack of definition in activity locations means that the agency cannot ensure takes are kept below authorized levels—and that sufficient measures are taken to protect particularly vulnerable marine mammal populations, such as the critically endangered Southern Resident orca and the struggling California gray whale.

We recommend that NMFS require the Navy to produce further information on modeled locations and, if activities are not limited through the authorization process to specific geographic areas, to determine a worst-case take estimate for each species or population.

D. Impacts of Overflights

---

[81] *See* Gomez, C., et al., A systematic review, *supra*.

[82] *E.g.*, the incorporation of the densities models derived by Roberts, J.J., Best, B.D., Mannocci, L., Fujioka, E., Halpin, P.N., Palka, D.L., Garrison, L.P., Mullin, K.D., Cole, T.V.N., Khan, C.B., McLellan, W.M., Pabst, D.A., and Lockhart, G.G., Habitat-based cetacean density models for the U.S. Atlantic and Gulf of Mexico, *Scientific Reports* 6: 22615 (2016); and Mannocci, L., Roberts, J.J., Miller, D.L., and Halpin, P.N., Extrapolating cetacean densities to quantitatively assess human impacts on populations in the high seas, *Conservation Biology* 31: 601-14 (2017).

NMFS, in its Proposed Rule notice, completely fails to analyze (and mitigate) the impact of overflights on marine mammals, including critically endangered Southern Resident orcas.

The agency states that the Navy's training and testing activities in air warfare, including overflights, do not involve any "stressors that could result in harassment, serious injury, or mortality of marine mammals," and so declines to consider the impact of overflights at all in the proposed rule. 85 Fed. Reg. at 33,918. In this, it ignores a substantial body of research demonstrating that overflights are likely to have significant adverse impacts on marine mammals. NMFS then avers that the Navy analyzed these impacts in the NWTT DSEIS—but that document does not contain the analysis that the proposed rule lacks. On the contrary, while that document claims to "evaluate the potential environmental impacts of training and testing activities within the NWTT Study Area involving different types of platforms and weapons systems, including EA-18G Growler aircraft" (DSEIS at 1-10), the purported evaluation is deficient in several vital respects.

As a threshold matter, it is unclear where in the DSEIS this purported analysis of the environmental effects of Growler training in the offshore area appears. For example, while the Navy points to its cumulative effects discussion for this analysis, that chapter is limited to the observation that "[t]hese proposed operations, when considered with the Proposed Action, could add to the cumulative impacts on air quality, birds, noise, socioeconomic resources, cultural resources, and American Indian and Alaska Native Traditional resources." DSEIS at 4-4 (Table 4.3-1). Nor does Appendix J, which summarizes the modeled noise impacts to human health, recreational, and aesthetic values, discuss the impacts of Growler operations within the training range.

Second, as the Navy admits, its analysis of the impacts from Growler overflights has been parceled out into multiple actions and multiple EISs. DSEIS at 1-10. The Navy attempts to justify these segmented analyses based on its belief that each of the Growler expansion and training activities—as well as the training purportedly considered in the SDEIS itself—are disconnected from one another but "cumulatively" addressed in each of these documents. DSEIS at 1-10, 4-1, 4-4. Neither the Growler EIS, nor the electronic warfare EA, nor the NWTT EIS adequately and completely analyzes the impacts of Growler overflights and training on marine and terrestrial wildlife.

NMFS cannot rely on the Navy's inadequate and piecemeal analysis to bypass the impact analysis and mitigation required by the MMPA. The limited discussion in the Navy's NEPA documents, including the DSEIS and the NAS Whidbey Island Complex Growler FEIS, are cursory at best and overlook significant evidence of the adverse effects of aircraft noise on marine mammals. For example, in Appendix A1 to the NAS Whidbey Island Complex Growler FEIS, the Navy's analysis of the impact of aircraft noise on wildlife relies primarily on studies that are decades old, without discussing or even acknowledging the significant body of more recent, relevant research discussed below. DSEIS A1-64 ("Since 1980, it appears that research on responses of aquatic mammals to aircraft noise and sonic booms has been limited."). *See also* DSEIS A1-59 (stating that there is not significant research on the

effects of aircraft noise on predator-prey interactions and effects on populations, among other issues).

It is clear that the presence of Growlers and other aircraft throughout this region can disrupt wildlife, including marine mammals. Multiple studies and literature reviews that NMFS and the Navy fail to discuss have documented effects of aircraft on the behavior of cetaceans. Luksenburg et al. (2009)[83] reviewed the literature on the impacts of aircraft noise on marine mammals from 1995 through 2009. Numerous studies found that noise from aircraft caused significant behavioral modifications for cetaceans, including diving and avoidance behavior, particularly for low-flying aircraft directly over the animals.[84] Studies of the effects of aircraft noise on other species similarly found that noise from aircraft can reduce the ability of predators to hunt using acoustical cues.[85] It is well established that repeated exposure to disturbance can affect vital rates in individuals and lead to population-level impacts.[86]

It is also clear from the literature that noise from aircraft transfers to the water column at biologically meaningful volumes.[87] Indeed, as the Navy notes in the DSEIS—but does not bring

---

[83] 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).

[84] Smultea, M.A., and Lomac-MacNair, K., Assessing 'observer effects' from a research aircraft on behavior of three *Delphinidae* species (*Grampus griseus*, *Delphinus delphis*, and *Orcinus orca*), *Wildlife Biology in Practice* (2016); Smultea, M.A., Mobley, J.R. Jr., Fertl, D., and Fulling, G.L., An unusual reaction and other observations of sperm whales near fixed-wing aircraft, *Gulf and Caribbean Research* 20: 75-80 (2008); Nowacek, D.P., Thorne, L.H., Johnston, D.W., and Tyack, P.L., Responses of cetaceans to anthropogenic noise, *Mammal Review* 37: 81-115 (2007); Richter, C., Dawson, S., and Slooten, E., Impacts of commercial whale watching on male sperm whales at Kaikoura, New Zealand, *Marine Mammal Science* 22: 46-63 (2006); Richter, C.F., Dawson, S.M., and Slooten, E., Sperm whale watching off Kaikoura, New Zealand: Effects of current activities on surfacing and vocalisation patterns, *Science for Conservation Report No. 219*, Department of Conservation, Wellington, New Zealand (2003); Patenaude, N.J., Richardson, W.J., Smultea, M.A., Koski, W.R., Miller, G.W., Würsig, B. and Greene, C.R., Jr., Aircraft sound and disturbance to bowhead and beluga whales during spring migration in the Alaskan Beaufort Sea, *Marine Mammal Science* 18: 309-335 (2002); Blackwell, S.B. and Greene, C.R., Jr., Acoustic measurements in Cook Inlet, Alaska, during august 2001, *Report from Greeneridge Sciences, Inc. For National Marine Fisheries Service Anchorage, Alaska* (2002); Würsig, B., Lynn, S.K., Jefferson, T.A. and Mullin, K.D., Behaviour of cetaceans in the northern Gulf of Mexico relative to survey ships and aircraft, *Aquatic Mammals* 24: 41-50 (1998); Richardson, W.J. and Würsig, B., Influences of man-made noise and other human actions on cetacean behavior, *Marine and Freshwater Behaviour and Physiology* 29:183-209 (1997).

[85] Barber, J.R., Fristrup, K.M., Brown, C.L., Hardy, A.R., Angeloni, L.M., and Crooks, K.R., Conserving the wild life therein: Protecting park fauna from anthropogenic noise, *Park Science* 26: 36-31 (2009).

[86] *See, e.g.*, Shannon, G., McKenna, M.F., Angeloni, L.M., Crooks, K.R., Fristrup, K.M., Brown, E., Warner, K.A., Nelson, M.D., White, C., Briggs, J., McFarland, S., and Wittemyer, G., A synthesis of two decades of research documenting the effects of noise on wildlife, *Biological Reviews* 91: 982-1005 (2016); Barber, J.R., Crooks, K.R., and Fristrup, K.M., The cost of chronic noise exposure for terrestrial organisms, *Trends in Ecology & Evolution* 25: 180-189 (2010). .

[87] 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) (noting that "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"); Erbe, C., Williams, R., Parsons, M., Parsons, S.K., Hendrawan, I.G., and Dewantama, I.M.I., Underwater noise from airplanes: An overlooked source of ocean noise, *Marine Pollution Bulletin* 137: 656- 61 (2018) (noting that noise levels under the flight path of an airport "sometimes exceeded the 120 dB re 1 μPa

forward for analysis—modeling specific to Growlers demonstrates that sound levels from overflights can range from 152 dB re 1 µPa at 2 meters below the water surface for a subsonic flight at 1,000 ft., to 128 dB re 1 µPa at 2 meters below the water surface for subsonic flight at 10,000 ft. DSEIS at 3-19 (Table 3.0-4). These levels plainly exceed, for example, the 120 dB re 1 µPa threshold that coincided in one study with the onset of behavioral responses, in orcas, to vessel noise.[88] And sonic booms from Growlers can also produce noise at levels far above those causing behavioral changes.[89] Even in the absence of studies specific to the impacts of noise from aircraft on specific marine mammal populations, NMFS must analyze the impacts of aircraft noise based on this known noise transfer and the known adverse effects of noise on these taxa.

These impacts are particularly troubling for Southern Resident orcas. Vessel noise has been shown to reduce the foraging efficiency of resident orcas, induce short-term avoidance and other behavioral changes (such as changes in respiration, changes in swimming speed or path, and increases in surface-active behaviors such as breaches and tail slaps), result in range displacement, interfere with communication (including vocalizations used in reproduction), interfere with navigation (including coordination of group movement), cause physiological stress detectable in hormone levels, and, at certain levels, cause hearing damage.[90] While these studies are specific to vessel noise, as discussed above, noise from aircraft transfers to the water column at levels that have been shown elicit a similar response.

Repeated behavioral changes in response to noise significantly affect Southern Resident orca energetics. Research shows that the net impact of vessel disturbance over the course of a day has a significant impact on whales' activity budget, given that whales spend less time feeding in the presence of boats. On the other side of the ledger, whales may be spending additional energy on transit or other noise-induced behaviors.[91] This impact is key in an environment where the Southern Residents face prey limitations. Particularly for this critically imperiled population, NMFS cannot dismiss behavioral changes caused by noise from aircraft as insignificant.

(broadband, root-mean-square) found to coincide with the onset of behavioural responses in a killer whale dose-response study to ship noise").

[88] Williams, R., Erbe, C., Ashe, E., and Beerman, A., Severity of killer whale behavioral responses to ship noise: A dose–response study, *Marine Pollution Bulletin* 79(1-2): 254-260 (2014).

[89] Naval Sea Systems Command, Northwest Training and Testing Activities Final Environmental Impact Statement/ Overseas Environmental Impact Statement,.at 3.0-39 (Table 3.0-14) (2015) (predicting in-water received peak pressure levels from sonic booms at various depths almost all above 130 dB, even at 50-100m deep).

[90] Williams R., Erbe C., Ashe E., Beerman A., Smith J., Severity of Killer Whale Behavioral Responses to Ship Noise: a Dose-Response Study, 79 Mar. Pollut. Bull. 254 (2014); Lusseau, D., Bain, D. E., Williams, R., Smith, J. C., Vessel Traffic Disrupts the Foraging Behavior of Southern Resident Killer Whales *Orcinus orca*, 6 Endang. Species Res. 211 (2009); Williams, R., Lusseau, D., Hammond, P., Estimating Relative Energetic Costs of Human Disturbance to Killer Whales (*Orcinus orca*), 133 Biol. Conserv. 301 (2006).

[91] Williams R., Erbe C., Ashe E., Beerman A., Smith J., Severity of Killer Whale Behavioral Responses to Ship Noise: a Dose-Response Study, 79 Mar. Pollut. Bull. 254 (2014); Williams, R., Lusseau, D., Hammond, P., Estimating Relative Energetic Costs of Human Disturbance to Killer Whales (*Orcinus orca*), 133 Biol. Conserv. 301 (2006).

Finally, the Navy and NMFS are too quick to conclude that the temporary nature of noise from aircraft means it will not significantly impact marine mammals. While a single overflight might not lead to lasting impacts to a population, Growlers will be using the Olympic MOAs and Warning Areas 237A and B, and transiting to and from these areas to Whidbey Island NAS tens to hundreds of thousands of times during the period evaluated in the Proposed Rule.[92] This offshore area and those in the Salish Sea represent a significant part of Southern Resident orca habitat—much of it designated as critical habitat under the Endangered Species Act—but NMFS fails to analyze or mitigate for these impacts. Nor does the Navy discuss effects to this habitat or to cetaceans or other marine mammals anywhere in the DSEIS, or in any of the other NEPA analyses prepared for this overflight activity. Moreover, NMFS and the Navy must consider the cumulative effect of the noise from aircraft along with the vessel and sonar noise from other NWTT activities, as well as the noise from other vessels and aircraft in the Salish Sea and coastal areas. It is worth noting that Southern Residents are regularly exposed to significant levels of noise in the critical habitat, including levels above 120 dB, at which Williams et al. have documented behavioral responses in resident orcas[93] and which NMFS has historically characterized as take.

For the above reasons, NMFS must thoroughly analyze and mitigate for the noise impacts from overflights in the NWTT Study Area. The agency cannot rely on the Navy's inadequate analysis, scattered across multiple NEPA documents, to avoid considering impacts to marine mammals, including, but not limited to, the critically endangered Southern Residents.

IV. MITIGATION AND MONITORING REQUIREMENTS

In authorizing "take" under the general authorization provision of the MMPA, NMFS has the burden of meeting the Act's mitigation standard. Specifically, and as noted above, the agency must prescribe "methods" and "means of effecting the least practicable adverse impact" on marine mammals and set additional "requirements pertaining to the monitoring and reporting of such taking." 16 U.S.C. §§ 1371(a)(5)(A)(ii), (D)(vi). While NMFS is required to consult with the Department of Defense before making a determination under this provision, and to consider "personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity" (id.), the "least practicable adverse impact" standard is, in any case, a rigorous one. *NRDC v. Pritzker*, 828 F.3d at 1133; see also, *e.g.*, *Conservation Council*, 97 F.Supp.3d at 1231.

A. NMFS' interpretation of the MMPA's mitigation standard

The Ninth Circuit's opinion in *Pritzker* rejected the agency's formulation of the "least practicable adverse impact" standard in a number of important ways. Perhaps most significantly,

---

[92] Department of the Navy, 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, at 8 (Mar. 12, 2019).

[93] Williams R., Erbe C., Ashe E., Beerman A., Smith J., Severity of Killer Whale Behavioral Responses to Ship Noise: a Dose-Response Study, 79 Mar. Pollut. Bull. 254 (2014)

it held that NMFS—in a *post hoc* attempt to excuse its own failure—had wrongly imported the "population-level focus" of the MMPA's "negligible impact" requirement into the Act's mitigation provision; and it held that the agency, when faced with scientific uncertainty, had erred on the side of underprotection, whereas the law requires measures "aimed at protecting marine mammals *to the greatest extent practicable* in light of military readiness needs." *NRDC v. Pritzker*, 828 F.3d at 1134 (emphasis added). Unfortunately, in addressing the *Pritzker* opinion in its Proposed Rule, NMFS introduces at least one element that is plainly inconsistent with the opinion and the underlying statute.

The *Pritzker* Court made clear that NMFS, in arguing—as justification for failing to prescribe additional mitigation measures—that "the agency 'cannot mitigate adverse population-level impacts to any degree less than zero,'" had improperly imported a "population-level focus" into the MMPA's mitigation standard. 828 F.3d at 1134. Yet here NMFS, while clarifying that population-level impacts are mitigated "through the application of mitigation measures that limit impacts to individual animals," has again set population-level impact as the basis for mitigation. 85 Fed. Reg. at 33,989. Because NMFS' mitigation analysis is opaque, it is not clear what practical effect this position may have on its rulemaking.

The Proposed Rule is also unclear in its application of the "habitat" emphasis in the MMPA's mitigation standard. As NMFS recognizes (*id.*), the Act requires mitigation achieving the least practicable adverse impact on both marine mammals *and their habitat*, "paying particular attention to rookeries, mating grounds, and areas of similar significance." 16 U.S.C. § 1371(a)(5)(A)(i)(II). Consistent with this, the *Pritzker* Court held that protecting marine mammal habitat from Navy sonar is "of paramount importance" under the law, and that, in defining habitat for mitigation, the agency is compelled to err on the side of overprotection rather than underprotection where data on marine mammal distribution are limited. *NRDC v. Pritzker*, 828 F.3d at 1138, 1141. On that basis, the Court ruled that NMFS had failed to adequately identify Offshore Biologically Important Areas—not only in data-poor regions, but in other regions, such as the Northwest Hawaiian Islands, where the agency "faced the familiar choice of how to handle uncertainty, and chose underprotection without adequately explaining the decision, or how the least practicable adverse impact standard for mitigation was met." *Id.* at 1141 n.14; *see also id.* at 1136-41. While, again, the agency's discussion in the Proposed Rule is opaque, its apparent failure even to attempt to identify other viable time-area measures beyond what the Navy has proposed (*see* 85 Fed. Reg. at 34,000-03), let alone to consider them in the context of the MMPA's protective purpose, suggests that the agency has not addressed this aspect of the *Pritzker* decision.

Once it has set forth the correct mitigation standard, the agency must apply it. The MMPA, as noted above, sets forth a "stringent standard" for mitigation that requires the agency to minimize impacts to the lowest practicable level. *NRDC v. Pritzker*, 828 F.3d at 1135 (citation omitted). The agency must conduct its own analysis and clearly articulate it; it "cannot just parrot what the Navy says." *Conservation Council*, 97 F.Supp.3d at 1230. Yet NMFS, in past authorizations of Navy activities, has done little more than parrot the Navy's position on mitigation, accepting, without any meaningful evaluation of its own, the Navy's assertions of impracticability. *Id.* The baselessness of this approach can be seen from the outcome of *Conservation Council*, where the

parties were able to reach a settlement agreement establishing time-area management measures (*inter alia*) on the Navy's SOCAL and Hawaii Range Complexes notwithstanding NMFS' finding, following the Navy, that all such management measures would substantially affect military readiness and were not practicable. Unfortunately, there is no indication in the Proposed Rule that NMFS has, as yet, done anything different here. *See* 85 Fed. Reg. at 34,000-03.

B. Time-area management

Time and place restrictions designed to protect important habitat are one of the most effective available means to reduce the potential impacts of noise and disturbance on marine mammals, including mid-frequency sonar and noise resulting from other naval activities.[94] We therefore note NMFS' proposal, following the Navy, to establish six areas for mitigation.

For these areas to effectively protect marine mammals, however, they must be properly sited, and the management measures for each must achieve the "least practicable adverse impact," as the law requires. Below, we evaluate each of the six proposed areas and highlight gaps, where they exist, in their geographic coverage and mitigation requirements. We subsequently highlight additional areas of geographic importance for marine mammals for which Mitigation Areas should be considered. It is incumbent upon NMFS to ensure that time-area management of the Navy's activities is as comprehensive and effective as practicable.

A summary of our recommendations for habitat-based mitigation appears at Table 1.

Table 1. A bulleted summary of recommendations pertaining to the Mitigation Areas proposed by the agencies. Our recommendations for additional Mitigation Areas are discussed separately at subsection IV.B.2, below.

Habitat-Based Mitigation Recommendations	
Mitigation Area	**Specific Recommendations for the Area**

[94] *See, e.g.*, Agardy, T., Aguilar, N., Cañadas, A., Engel, M., Frantzis, A., Hatch, L., Hoyt, E., Kaschner, K., LaBrecque, E., Martin, V., Notarbartolo di Sciara, G., Pavan, G., Servidio, A., Smith, B., Wang, J., Weilgart, L., Wintle, B., and Wright, A., A global scientific workshop on spatio-temporal management of noise, Report of workshop held in Puerto Calero, Lanzarote (June 4-6, 2007); Dolman, S., Aguilar Soto, N., Notarbartolo di Sciara, G., and Evans, P., Technical report on effective mitigation for active sonar and beaked whales, Working group convened by European Cetacean Society (2009); OSPAR Commission, Assessment of the environmental impact of ocean noise, OSPAR Biodiversity Series, London, UK (2009); Memorandum from Dr. Jane Lubchenco, NOAA Administrator, to Ms. Nancy Sutley, CEQ Chair (January 19, 2010); Convention on Biological Diversity, Scientific synthesis on the impacts of underwater noise on marine and coastal biodiversity and habitats, U.N. Doc. UNEP/CBD/SBSTTA/16/INF/12 (2012).

Marine Species Coastal Mitigation Area (year-round)	• Prohibit, or significantly limit, mid-frequency active sonar from all sources, including dipping sonar, at least between December and June. • Prohibit mid-frequency active sonar in the area extending between Cape Flattery, Washington, and Tillamook Head, Oregon, including the waters offshore of the Columbia River mouth.
Olympic Coast National Marine Sanctuary Mitigation Area (year-round)	• Prohibit or restrict air-deployed mid-frequency active sonar (i.e., dipping sonar). • Prohibit or restrict all other sources of mid-frequency active sonar, including unit-level training, and maintenance and system checks while vessels are in transit. • Restriction on all forms of mid-frequency active sonar within the vicinity of the Quinault Canyon.
Stonewall and Heceta Bank Humpback Whale Mitigation Area (May-November)	• Prohibit air-deployed mid-frequency active sonar (i.e. dipping sonar). • Prohibit all other sources of mid-frequency active sonar, including unit-level training, and maintenance and system checks while vessels are in transit. • Limit vessel speeds.
Point St. George Humpback Whale Mitigation Area (July-November)	• Prohibit air-deployed mid-frequency active sonar (i.e. dipping sonar). • Prohibit all other sources of mid-frequency active sonar, including unit-level training, and maintenance and system checks while vessels are in transit. • Limit vessel speeds.
Puget Sound and Strait of Juan de Fuca Mitigation Area (year-round)	• Completely prohibit activity during periods of higher residency or occurrence of Southern Residents, *viz*, roughly May through October for the Salish Sea and roughly October through mid-February for the inland waters of Puget Sound. • Requiring noise isolation, particularly for activities, such as pierside testing and maintenance, that are concentrated in particular locations. • Set a transparent, rigorous protocol to ensure Southern Residents will not be exposed to noise that can cause behavioral disruption, before an activity proceeds, including by using the region's existing real-time hydrophone networks and by establishing additional hydrophone sites in key areas as needed.

	• Consider measures to mitigate the impacts of its Growler overflights on Southern Residents and other marine species. • Limit vessel speeds.
Northern Puget Sound Gray Whale Mitigation Area (March-May)	• Prohibit training and testing activities from March through May. • Limit vessel speeds.
Additional submarine canyon areas for mitigation: Grays Canyon, Guide Canyon, Willapa Canyon, Astoria Canyon, and Eel Canyon (year-round)	• Prohibit mid-frequency active sonar during training and testing activities within the vicinity of the canyons. • Observe mitigation measures specified for the Marine Species Coastal Mitigation Area, as appropriate.

1. *Evaluation of proposed Mitigation Areas*

(a) Marine Species Coastal Mitigation Area (year-round)

The Marine Species Coastal Mitigation Area is intended to avoid or reduce potential impacts from explosives, non-explosive practice munitions, and active sonar on fish and bird species listed under the Endangered Species Act ("ESA"), as well as on marine mammals that inhabit, feed in, or migrate through this area, including killer whales, humpback whales, and gray whales. DSEIS at K-14. NMFS, following the Navy, proposes three tiers of mitigation measures, to be applied within 50 nm, 20 nm, and 12 nm from shore, respectively. Within 50 nm from shore, the Navy would not conduct explosive training and testing activities (with the exception of explosive Mine Countermeasures and Neutralization Testing Activities) and non-explosive missile training activities. Within 20 nm from shore, the Navy would not conduct non-explosive large-caliber gunnery training activities and non-explosive bombing training activities. Within 12 nm from shore, the Navy would not conduct non-explosive small- and medium-caliber gunnery training activities, non-explosive torpedo training activities, and Anti-Submarine Warfare Tracking Exercise—Helicopter, Maritime Patrol Aircraft, Ship, or Submarine training activities. In all cases, should national security present a requirement, the Navy would seek "designated Command authority" prior to commencement of the activity, provide NMFS with advance notification, and include information about the event in its annual activity reports to NMFS. 85 Fed. Reg. at 34,000-01 (Table 50).

The proposed Marine Species Coastal Mitigation Area would provide protection for a large portion of the NWTT Study Area, including the proposed revised critical habitat area for the highly endangered Southern Resident orca to reflect essential foraging and wintering areas. *See* 80 Fed. Reg. at 9,682 (Feb. 24, 2015). That protection, however, though improved on the current NMFS authorization, would not be comprehensive, particularly for the Southern Resident orca

population. Best available scientific information indicates that this endangered population uses waters of the Pacific Ocean beyond the U.S. international border with Canada to Point Sur, California, extending from the six to the 200-meter isobath. *Id.* The proposed rule to designate critical habitat for the Central America, Mexico, and Western North Pacific distinct population segments of humpback whales further reinforces the importance of the waters within the proposed Marine Species Coastal Mitigation Area for multiple endangered species and populations. 84 Fed. Reg. 54,354 (Oct. 9, 2019).

NMFS should therefore expand activity restrictions within the Navy's proposed Marine Species Coastal Mitigation Area to the greatest extent practicable. NMFS should prohibit or at least significantly limit the use of mid-frequency active sonar from all sources, including dipping sonar, within this Mitigation Area, at least out to the 200-meter isobath; and, similarly, should further limit other activities, such as mine countermeasures and gunnery activities, that have the potential to result in species take. Notably, waters of greatest concern within the Mitigation Area extend between Cape Flattery, Washington, and Tillamook Head, Oregon, including the waters offshore of the Columbia River mouth, as these waters experience highest relative habitat use for Southern Residents as indicated by presently available satellite telemetry data.[95] These additional mitigation measures will also benefit other at-risk species, including the Central America and Mexico distinct population segments of humpback whale. *Id.*

(b) Olympic Coast National Marine Sanctuary Mitigation Area (year-round)

The Olympic Coast National Marine Sanctuary Mitigation Area is intended to avoid or reduce potential impacts from mid-frequency active sonar, explosives during Mine Countermeasure and Neutralization testing activities, and non-explosive practice munitions on marine mammals that inhabit the National Marine Sanctuary, including killer whales, humpback whales, and gray whales. DSEIS at K-15. Specifically, NMFS would not authorize more than 32 hours of MF1 mid-frequency active sonar training or 33 hours of MF1 mid-frequency active sonar testing annually, except for within the portion of the mitigation area that overlaps with the Navy's Quinault Range Site; explosive Mine Countermeasure and Neutralization Testing activities; or non-explosive bombing exercises. The same derogation procedures for reasons of national security would apply. 85 Fed. Reg. at 34,000-01 (Table 50). Since the Olympic Coast National Marine Sanctuary Mitigation Area is located entirely within the Marine Species Coastal Mitigation Area, both sets of mitigation would apply. DSEIS at K-15.

In addition to the proposed restrictions, NMFS should consider prohibiting or restricting air-deployed mid-frequency active sonar (i.e., dipping sonar) within the Olympic Coast National Marine Sanctuary Mitigation Area, as well as other activities involving sources of mid-frequency active sonar, including unit-level training and maintenance and system checks while vessels are in transit.

---

[95] Center for Biological Diversity, Petition to revise the critical habitat designation for the Southern Resident killer whale (*Orcinus orca*) under the Endangered Species Act (submitted to NMFS on Jan. 16, 2014); *see also* NMFS, "Southern Resident killer whale satellite tagging," available at http://www.nwfsc.noaa.gov/research/divisions/cb/ecosystem/marinemammal/satellite_tagging/blog.cfm (accessed June 10, 2019).

In particular, the deployment of all forms of mid-frequency active sonar should be restricted within the vicinity of the Quinault Canyon. Both visual and passive acoustic surveys have demonstrated the importance of the canyon for a diversity of marine mammal species. Remarkably, the extremely rare and endangered North Pacific right whale has been acoustically detected within the canyon,[96] as have humpback whales, sperm whales, offshore, transient, and resident killer whales, Pacific white-sided dolphins, and Risso's dolphins,[97] and a variety of beaked whale species.[98] Dall's porpoise, Cuvier's beaked whale, northern right whale dolphin, and northern fur and elephant seals have also been sighted in the vicinity of the Quinault Canyon,[99] and Southern Resident orca have been satellite-tracked in this area.[100]

We recognize that the Quinault Canyon lies within the Quinault Range Site and that the practicability of implementing comprehensive mitigation may be limited; but those considerations do not relieve NMFS of its responsibility to ensure the least practicable adverse impact consistent with the MMPA, by fully probing opportunities for mitigation. For those activities that the agency concludes, after rigorous analysis, cannot be reduced or relocated, the Navy (1) should undertake year-round monitoring of the Canyon to ascertain the seasonality of species presence and habitat use and adaptively plan to reduce operations during periods of greater biological importance; and (2) should employ enhanced monitoring techniques, including the use of passive acoustics, to avoid protected species.

(c) Stonewall and Heceta Bank Humpback Whale Mitigation Area (May-November)

The Stonewall and Heceta Bank Humpback Whale Mitigation Area is intended to avoid or reduce potential impacts on humpback whales in a seasonally important feeding area. This area has now been proposed as critical habitat (Unit 13) due, in part, to large, persistent aggregations of krill that have been observed inshore of Heceta Bank, off Cape Blanco, in association with submarine canyons. 84 Fed. Reg. 54,354. The Stonewall and Heceta Bank Humpback Whale Mitigation Area is also intended to avoid or reduce potential impacts on other marine mammals that may inhabit or migrate through this area, including killer whales and gray whales. Specifically, NMFS will not authorize MF1 mid-frequency active sonar or explosives during

---

[96] Širovič, A., Johnson, S.C., Roche, L.K., Varga, L.M., Wiggins, S.M., and Hildebrand, J.A., North Pacific right whales (Eubalaena japonica) recorded in the northeastern Pacific Ocean in 2013, Marine Mammal Science 31: 800-807 (2015).

[97] Oleson, E., Calambokidis, J., Falcone, E., Schorr, G., and Hildebrand, J.A., Acoustic and visual monitoring for cetaceans along the outer Washington coast (2009) (Naval Postgraduate School rep. no. OC-19-001).

[98] Baumann-Pickering, S., Roch, M.A., Brownell, Jr., R.L., Simonis, A.E., McDonald, M.A., Solsona-Berga, A., Oleson, E.M., Wiggins, S.M., and Hildebrand, J.A., Spatio-temporal patterns of beaked whale echolocation signals in the North Pacific, PLoS ONE 9: e86072 (2014) (reporting occurrence of Baird's, Blainville's, and Stenjeger's beaked whales).

[99] Oleson, E., et al., Acoustic and visual monitoring, *supra*; Oleson, E. & Hildebrand, J., Marine mammal demographics off the outer Washington coast and near Hawaii, NPS-OC-12-001CR, pp. 56, 2012.

[100] NOAA, 2015 Southern Resident killer whale satellite tagging, Northwest Fisheries Science Center, NOAA Fisheries, 2015. Available at: https://www.nwfsc.noaa.gov/research/divisions/cb/ecosystem/marinemammal/satellite_tagging/blog2015.cfm

training and testing from May to November. The same derogation procedures for reasons of national security would apply. 85 Fed. Reg. at 34,000-01 (Table 50). The Stonewall and Heceta Bank Humpback Whale Mitigation Area is located within the Marine Species Coastal Mitigation Area and, as such, will also be subject to the mitigation measures proposed within 20 nm and 50 nm of shore. DSEIS at K-11, K-13.

NMFS should expand the proposed mitigation measures to more comprehensively protect humpback whales at Stonewall and Heceta Bank between May and November. Air-deployed mid-frequency active sonar (*i.e.*, dipping sonar) should be prohibited, as well as other activities involving sources of mid-frequency active sonar, including unit-level training and maintenance and system checks while vessels are in transit. The expanded mitigation measures would benefit a variety of species, including noise-sensitive harbor porpoise, that are likely to be found in relatively higher densities within the Mitigation Area. The agency should also include mitigation measures that limit vessel speeds to reduce the likelihood of vessel strike.

(d) Point St. George Humpback Whale Mitigation Area (July-November)

The Point St. George Humpback Whale Mitigation Area is designed to avoid or reduce potential impacts on humpback whales in a seasonally important feeding area. DSEIS at K-15. This area has now been proposed as critical habitat (Unit 14) due, in part, to multiple, recurring, high density aggregations (hotspots) of krill that occur off of Cape Mendocino and elsewhere, in association with submarine canyons. 84 Fed. Reg. 54,354. Specifically, the Navy would not use MF1 mid-frequency active sonar or explosives during training and testing from July 1 to November 30. The same derogation procedures for reasons of national security would apply. 85 Fed. Reg. at 34,000-01 (Table 50). The Point St. George Humpback Whale Mitigation Area is located within the Marine Species Coastal Mitigation Area and, as such, would be subject to the mitigation measures proposed within 20 nm and 50 nm of shore. DSEIS at K-11, K-13.

As with the Stonewall and Heceta Bank Humpback Whale Mitigation Area, NMFS should expand the proposed mitigation measures to more comprehensively protect humpback whales at Point St. George Humpback Whale Mitigation Area, here between July and November. The agency should prohibit air-deployed mid-frequency active sonar (i.e., dipping sonar), as well as other activities involving sources of mid-frequency active sonar, including unit-level training and maintenance and system checks while vessels are in transit. NMFS should also include mitigation measures that limit vessel speeds to reduce the likelihood of vessel strike.

(e) Puget Sound and Strait of Juan de Fuca Mitigation Area (year-round)

The Puget Sound and Strait of Juan de Fuca Mitigation Area encompasses, per the Navy's DSEIS (at K-16), "the full extent of the NWTT Inland Waters portion of the Study Area." Mitigation within the Puget Sound and Strait of Juan de Fuca Mitigation Area is intended to avoid or reduce potential impacts on marine mammals that inhabit, feed in, or migrate through this area. *Id.* Specifically, NMFS would require Navy units to obtain approval from the designated Command authority prior to (1) the use of hull-mounted mid-frequency active sonar during training, and (2) conducting ship and submarine active sonar pierside maintenance or testing. In addition, for Civilian Port Defense—Homeland Security Anti-Terrorism/ Force

Protection Exercises, Navy event planners would coordinate with Navy biologists during the event planning process. Navy biologists are required to work with NMFS to determine the likelihood of gray whale and Southern Resident orca presence in the planned training location, and then notify event planners as they plan specific details of the event (e.g., timing, location, duration). The Navy would alert participating ship and aircraft crews to the possible presence of marine mammals in the training location. 85 Fed. Reg. at 34,000-01 (Table 50).

As noted elsewhere in these comments, the Salish Sea, including the inland waters of Puget Sound, constitutes critical habitat for the Southern Resident orca and is a focus of extensive conservation effort, on both sides of the border, to sustain and recover the population. The high numbers of takes estimated, in the Proposed Rule, for both the Washington Inland Waters harbor porpoise and the Hood Canal harbor seal indicates that considerable activity would take place in the whales' critical habitat. This appears true notwithstanding the requirement that units obtain approval from the "designated Command authority" before undertaking certain activities in the area, which differs notably from the derogation procedures proposed for other Navy Mitigation Areas in not incorporating a "national security" standard. *See id.* And, as discussed above, the effects of the Navy's Growler overflights are simply dismissed by the agency and unmitigated. It should be observed that any impacts on the Southern Resident population, particularly in the Salish Sea and inland waters, would be intolerable both to the whales and to the public.

We therefore urge NMFS to engage with the Navy in a more rigorous analysis of alternatives and mitigation options in this area, with the aim of eliminating potential impacts on Southern Residents. NMFS should (1) completely prohibit activity during periods of higher residency or occurrence of the population, viz, roughly May through October for the Salish Sea and roughly October through mid-February for the inland waters of Puget Sound;[101] (2) require noise isolation, particularly for activities such as pierside testing and maintenance that are concentrated in particular locations; (3) set a transparent, rigorous protocol for ensuring that Southern Residents will not be exposed to noise that can cause behavioral disruption, before an activity proceeds, including by using the region's existing real-time hydrophone networks and by establishing additional hydrophone sites in key areas as needed; and (4) consider measures to mitigate the impacts of its Growler overflights on Southern Residents and other marine species. The mere assurance (*see* DSEIS at K-12) that Navy biologists will work with NMFS to determine the likelihood of species occurrence—a statement that does not imply use of any real-time detection systems—is plainly not sufficient.

In addition, there is evidence that the Strait of Juan de Fuca represents important habitat for humpback whales. NMFS has proposed the expansion of humpback whale critical habitat beyond the Northern Washington humpback whale feeding area to include the Strait. 84 Fed. Reg. 54,354. The proposed rule notes that "hundreds of whales appear to be using the strait. *Id.* (citing Calambokidis, pers comm, May 2018).[102] Therefore, NMFS should consider the likelihood of humpback whale presence in the planned training location, in addition to gray

[101] Olson, J.K., Wood, J., Osborne, R.W., Barrett-Lennard, L., and Larson, S., Sightings of Southern Resident killer whales in the Salish Sea 1976-2014: The importance of a long-term opportunistic dataset, *Endangered Species Research* 37: 105-18 (2018).

[102] *Id*.

whales and Southern Residents, in prescribing mitigation. NMFS should also include mitigation measures that limit vessel speeds in the area to reduce the likelihood of vessel strike.

(f) Northern Puget Sound Gray Whale Mitigation Area (March-May)

The Northern Puget Sound Gray Whale Mitigation Area is intended to avoid or reduce potential impacts from active sonar on gray whales within seasonally important feeding habitat, and to also afford protection to other marine mammal species within the area. DSEIS at K-16. Specifically, NMFS will not authorize Civilian Port Defense—Homeland Security Anti-Terrorism/Force Protection Exercises from March to May. The same derogation procedures for reasons of national security would apply. 85 Fed. Reg. at 34,000-01 (Table 50).

As noted above, gray whales are undergoing a major die-off of uncertain duration, with large percentages showing signs of "skinniness" and some stranded whales exhibiting emaciation; in animals suffering from such stress, the addition of another stressor could have severe consequences. NMFS should require the Navy to expand its proposed mitigation measures to more comprehensively protect gray whales at Northern Puget Sound Gray Whale Mitigation Area between March and May. The Navy should not conduct any testing or training activities within the Mitigation Area from March through May. In addition, NMFS should require mitigation measures that limit vessel speeds to reduce the likelihood of vessel strike.

2. Additional areas for mitigation

In addition to the canyons included within the six proposed Mitigation Areas (e.g., Quinault Canyon, Juan de Fuca Canyon), five notable submarine canyons are present within the NWTT Study Area: Grays Canyon, Guide Canyon, Willapa Canyon, Astoria Canyon, and Eel Canyon. The biological importance of these areas for marine mammals is expected to be comparable to the Quinault Canyon, and available survey data support this assumption.

The presence of submarine canyons along the West Coast support persistent high-density aggregations ("hotspots") of krill, a primary prey of humpback whales and other baleen whales.[103] In fact, 76 percent of krill hotspots along the West Coast occur within and adjacent to submarine canyons and, collectively, the canyons that support krill hotspots can be considered a habitat network that supports baleen whales during their migration.[104] As submarine canyons are a static habitat feature that may also serve as thermal refugia, the value of canyons as important habitats are only likely to increase further in the era of climate change.[105]

Located approximately 60 km west of Grays Harbor, Washington, Grays Canyon represents seasonal feeding habitat for high densities of humpback whales.[106] In addition, sightings of Dall's porpoise, fin whale, and the first sighting of a blue whale in the region in several decades

[103] Santora, J.A., Zeno, R., Dorman, J.G., and Sydeman, W.J., Submarine canyons represent an essential habitat network for krill hotspots in a Large Marine Ecosystem, *Scientific Reports* 8: 7579 (2018).

[104] *Id*.

[105] *Id*.

[106] Calambokidis, J., et al., Biologically Important Areas for selected cetaceans, *supra*.

have been made in the vicinity of the Grays Canyon.[107] Guide and Willapa Canyon, located to the west of Willapa Bay, Washington, have been shown to represent biologically important foraging habitat for female northern fur seals.[108]

Astoria Canyon, Oregon, is located directly west of the Columbia River mouth, coincident with the Columbia River plume. Astoria Canyon has a rich prey field that supports an important groundfish fishery[109] and falls within the recently recorded expansion in the range of jumbo squid in the California Current,[110] a primary prey species for endangered sperm whales. This highly productive environment provides biologically important feeding habitat for marine mammals, including humpback whales,[111] and has led to the site being designated as an Important Bird Area.[112] In addition, there is evidence from satellite telemetry that Southern Resident orcas use the topography of the Astoria Canyon during navigation along the Oregon/Washington coastline.[113] Humpback whale, Risso's dolphin, and harbor porpoise have been sighted within the Eel River Canyon, in northern California.[114]

The five canyon systems fall within the 50 nm and, in some cases, the 20 nm boundaries of the Marine Species Coastal Mitigation Area and are thus afforded protection from most explosive and several non-explosive training and testing activities, as discussed above. We recommend that, additionally, the Navy conduct no training or testing activities with mid-frequency sonar within the vicinity of the canyons at any time of year to provide protection for deep-diving and/or noise-sensitive species, including endangered sperm whales and harbor porpoise.

3. Extension of restrictions to dipping sonar

The best available science, including the Navy's multi-year research in the Southern California Range Complex, indicates an urgent need to extend mitigation to dipping sonar, which is deployed via cable from manned and unmanned aircraft. Dipping sonar, like hull-mounted sonar,

---

[107] Oleson, E., and Hildebrand, J., Marine mammal demographics off the outer Washington coast and near Hawaii (2012) (Naval Postgraduate School rep. no. OC-12-001CR).

[108] Pelland, N.A., Sterling, J.T., Lea, M.-A., Bond, N.A., Ream, R.R., Lee, C.M., and Eriksen, C.C., Fortuitous encounters between seagliders and adult female northern fur seals (*Callorhinus ursinus*) off the Washington (USA) coast: Upper ocean variability and links to top predator behavior, PLoS ONE 9: e101268 (2014).

[109] Genin, A., Bio-physical coupling in the formation of zooplankton and fish aggregations over abrupt topographies, *Journal of Marine Systems* 50(1-2): 3-20 (2004) (citing Pereyra, W.T., Pearcy, W.G., Carvey, F.E., *Sebastodes flavidus*, a shelf rockfish feeding on mesopelagic fauna, with consideration of the ecological implications, *Journal of the Fisheries Research Board of Canada* 26: 2211-15 (1969)).

[110] Field, J.C., Baltz, K., Phillips, A.J., and Walker, W.A., Range expansion and trophic interactions of the jumbo squid, *Dosidicus gigas*, in the California Current, *CalCOFI Report* 48: 131-45 (2007).

[111] Brueggeman, J.J., ed., Oregon and Washington marine mammal and seabird surveys (1992) (report for Minerals Management Service, Pacific OCS Region OCS Study MMNS 91-0093).

[112] Suryan, R.M., Phillips, E.M., So, K., Zamon, J.E., Lowe, R.W., and Stephensen, S.W., Marine bird distribution along the Oregon Coast, (2012) (Northwest National Marine Renewable Energy Center, Report No. 2).

[113] NMFS, "Southern Resident killer whale satellite tagging," supra.

[114] Halpin, P.N., Read, A.J., Fujioka, E., Best, B.D., Donnelly, B., Hazen, L.J., Kot, C., Urian, K., LaBrecque, E., Dimatteo, A., Cleary, J., Good, C., Crowder, L.B., and Hyrenbach, K.D., OBIS-SEAMAP: The world data center for marine mammal, sea bird, and sea turtle distributions, *Oceanography* 22: 104-15 (2009).

has been shown to be a significant predictor of deep-dive rates in beaked whales. Evidence indicates that beaked whales dive deeper and stay at depth during exposure to mid-frequency active sonar (possibly to escape from the sound, as the lowest sound pressure levels occur at depth), behavior that also extends the inter-deep-dive-interval ("IDDI," a proxy for foraging disruption).[115] IDDIs were found to significantly lengthen upon exposure to mid-frequency sonar, with the longest, lasting 541 and 641 minutes, recorded during helicopter-deployer sonar use at distances of ~17 and ~11 km, respectively.[116] These effects have been documented at substantially greater distances (~30 km) than would otherwise be expected given the systems' source levels and the response thresholds developed from research on hull-mounted sonar. Deep-dive duration increases as distance to the helicopter decreases.[117]

Helicopters deploy mid-frequency active sonar from a hover in bouts generally lasting under 20 minutes, moving rapidly between sequential deployments in an unpredictable pattern. That unpredictability may well explain the comparatively strong response of whales to these exposures, even though their duration of use and source level (217 dB) are generally well below those of hull-mounted mid-frequency active sonar (235 dB).[118] This finding is consistent with the wider stress literature, for which predictability is a significant factor in determining stress-response from acoustic and other stimuli (Wright et al. 2007).[119] It should thus be presumed conservatively to apply to marine mammal species other than beaked whales. Notably, dipping sonar is deployed at depth, which may be another reason why it is relatively more impactful.[120]

NMFS has proposed authorizing take from as many as 41-50 annual testing events—amounting to 298 events across the 7-year authorization (as well as one training event across the 7-year period). 85 Fed. Reg. at 33,926-27 (Tables 5 and 6). NMFS must consider restricting or limiting use of dipping sonar during the present MMPA process.

4. Stand-off distances

NMFS does not incorporate stand-off distances of any size within its management requirements for the proposed Mitigation Areas, providing only that activities not take place "within" the defined areas. Thus, activities that are otherwise restricted or limited within a Mitigation Area could occur directly along the boundary and ensonify the area at levels capable of causing injury or increasing the risk or severity of behavioral disruption. Stand-off distances are a reasonable

---

[115] Falcone, E.A., et al., Diving behavior of Cuvier's beaked whales, supra.

[116] Falcone, E., et al., Diving behavior of Cuvier's beaked whales, supra; Schorr G., Falcone, E., Watwood, S., DeRuiter, S., Zerbini, A., Andrews, R., Morrissey, R., McCarthy, E., and Moretti, D., Factors associated with unusually strong responses to mid-frequency active sonar in Cuvier's beaked whales (2017) (presentation at Society of Marine Mammalogy Biennial Conference, Halifax, Canada, Oct. 23, 2017).

[117] Falcone, E., Schorr, G., Watwood, S., DeRuiter, S., Zerbini, A., Andrews, R., Morrissey, R., and Moretti, D., Go long! Behavioral changes in satellite-tagged Cuvier's beaked whales exposed to two types of military mid-frequency active sonar (2017) (presentation at Society of Marine Mammalogy Biennial Conference, Halifax, Canada, Oct. 23, 2017).

[118] Falcone, E.A., et al., Diving behavior of Cuvier's beaked whales, *supra*.

[119] Wright, A.J., et al., Anthropogenic noise as a stressor in animals, *supra*.

[120] Falcone, E., et al., Go long! Behavioral changes in satellite-tagged Cuvier's beaked whales, *supra*.

mitigation measure that is routinely required by NMFS in authorizing take under the Marine Mammal Protection Act. *See* 40 C.F.R. §§ 1502.14(f), 1503.3(d).

NMFS must consider establishing stand-off distances around its Mitigation Areas to the greatest extent practicable, allowing for variability in size given the location of the Mitigation Area, the type of operation at issue, and the species of concern.

5. National security exception

As with the consent order entered by the court in *Conservation Council*, the present Proposed Rule would allow the Navy to derogate from the measures associated with its mitigation areas, where necessary for national security, if certain conditions are met. Specifically, authorization must be granted, the Navy must provide NMFS with advance notice of the derogation and with further information after the completion of events, and the Navy must provide information on those activities in its annual reports. Unlike the consent order, however, the Proposed Rule does not clearly restrict derogation authority to highest-level officers. *See* 85 Fed. Reg. at 34,046-47 (Proposed Rule) (emphasis added); *see also* 85 Fed. Reg. at 34,000-01 (Table 50).

Under the consent order, authority could be invoked only by certain named officers representing the highest command authority, namely the Commander or Acting Commander of the Pacific Fleet, for training activities, and the Commander or Acting Commander of the various research branches for testing activities, and then only when the Navy "deems it necessary for national defense." Stipulated Settlement Agreement and Order, *Conservation Council*, *supra* (Sept. 14, 2015). Similarly, at least some of the geographic areas adopted by the Navy in prior NEPA processes, such as the Humpback Whale Cautionary Area established in previous Hawaii-Southern California Training and Testing EISs, allowed for derogation only upon approval of the Pacific Fleet Commander. This requirement made it more likely that derogation decisions would be taken with the greatest seriousness and consideration. By contrast, the Proposed Rule is unclear in its designation, generally allowing units to obtain permission from "the appropriate *designated* Command authority." 85 Fed. Reg. at 34,046-47 (Proposed Rule) (emphasis added); *see also* 85 Fed. Reg. at 34,000-01 (Table 50). NMFS should clarify that authorization may be given only by the highest-level Command authorities, consistent with the consent order in *Conservation Council*.

C. Additional mitigation research and requirements

NMFS should consider the following additional measures, whether as mitigation measures to prescribe or as research.

1. Mitigation to improve detection effectiveness during explosives events

At night and during periods of low-visibility, the Navy's ability to detect marine mammals within its safety zone declines significantly.[121] Additionally, some endangered species engage in

[121] *E.g.*, Barlow, J., Gerrodette, T. and Forcada, J., Factors affecting perpendicular sighting distances on shipboard line-transect surveys for cetaceans, *Journal of Cetacean Research and Management* 3: 201-12 (2001); Barlow, J.,

rest or shallow diving during the night, increasing their vulnerability to ship collision and to injury from explosives and ordnance.[122] Many individual Navy exercises, tests, and maintenance activities last eight hours or fewer,[123] making avoidance of nighttime activity practicable, in most cases.

While NMFS states that "[n]early all explosive events would occur during daylight hours to improve the sightability of marine mammals and thereby improve mitigation effectiveness" (85 Fed. Reg. at 34,012), the agency does not restrict any of these events to daylight hours in its proposed regulation, nor, correspondingly, does it require the Navy to report when, for exigent national security reasons, it must derogate from such a restriction. The agency should do so.

Furthermore, NMFS provides no assurance that explosives activities, even if they occur during daylight hours, will take place in sea states mild enough to make visual observation possible. Obviously, any mitigation measure dependent on visual observation will be ineffectual in the MITT Study Area without further means of compensating for the high sea states and low-visibility conditions that typically prevail (as discussed above, at II.A.3). We therefore urge NMFS to consider additional measures to address this fundamental problem, either by enhancing the observation platforms to include aerial and/or passive acoustic monitoring (such as glider use),[124] as has been done here with sinking exercises, or by restricting events to particular Beaufort sea states (depending on likely species presence and practicability).

2. Sonar signal modifications

NOAA's Ocean Noise Strategy puts an emphasis on source modification, along with habitat management, as an important means of reducing acoustic impacts on marine life.[125] In the case of naval activities, behavioral response studies on harbor porpoises and gray seals have yielded preliminary insights into how various characteristics of the sonar signal may affect the likelihood and severity of impact, and it suggests ways in which the sonar signal might be modified at the source to reduce both.

---

and Gisiner, R., Mitigation and monitoring of beaked whales during acoustic events, *Journal of Cetacean Research and Management* 7: 239-49 (2006).

[122] Goldbogen, J.A., *et al*., Mechanics, hydrodynamics and energetic of blue whale lunge feeding: efficiency dependence on krill density, *supra*; *see also*, *e.g*., Calambokidis, J., Schorr, G.S., Steiger, G.H., Francis, J., Bakhtiari, M., Marshal, G., Oleson, E.M., Gendron, D. and Robertson, K., Insights into the underwater diving, feeding, and calling behavior of blue whales from a suction-cup attached video-imaging tag (CRITTERCAM), *Marine Technology Society Journal* 41: 19-29 (2007).

[123] U.S. Department of the Navy, Draft Environmental Impact Statement/ Overseas Environmental Impact Statement for Hawaii-Southern California Training and Testing, at App. A (2017).

[124] *See*, *e.g.*, Baumgartner, M.F., Bonnell, J., Corkeron, P.J., Van Parijs, S.M., Hotchkin, C., Hodges, B.A., Bort Thornton, J., Mensi, B.L. and Bruner, S.M., Slocum gliders provide accurate near real-time estimates of baleen whale presence from human-reviewed passive acoustic detection information, *Frontiers in Marine Science* 7: 100 (2020).

[125] Gedamke, J., Harrison, J., Hatch, L., Angliss, R., Barlow, J., Berchok, C., Caldow, C., Castellote, M., Cholewiak, D., De Angelis, M.L., Dziak, R., Garland, E., Guan, S., Hastings, S., Holt, M., Laws, B., Mellinger, D., Moore, S., Moore, T.J., Oleson, E., Pearson-Meyer, J., Piniak, W., Redfern, J., Rowles, T., Scholik-Schlomer, A., Smith, A., Soldevilla, M., Stadler, J., Van Parijs, S., and Wahle, C., Ocean Noise Strategy Roadmap (2016).

For example, research to date suggests that behavioral response to up-sweep and down-sweep signals vary, depending on the presence or absence of harmonics (i.e., side-bands). For 1 to 2 kHz sweeps with harmonics, harbor porpoises were observed to swim further away from the sound source in response to the up-sweeps than to the down-sweeps; in the absence of harmonics, however, sweep type (up-sweep and down-sweep) caused no significant difference in the response. For simulated naval sonar sounds with fundamental frequencies in the 1 to 2 kHz range containing harmonics, using down-sweeps appears to affect harbor porpoise less than up-sweeps.[126] A related study showed that for 1-2 kHz sweeps without harmonics, a 50% startle response rate occurred at maximum received levels (mRLs) of 133 dB re 1 μPa; for 1-2 kHz sweeps with strong harmonics at 99 dB re 1 μPa; and for 6-7 kHz sweeps without harmonics at 101 dB re 1 μPa.[127] A follow-up study quantifying the behavioral effects of 25-kHz FM signals with high frequency side bands showed that harbor porpoise respiration rate, a probable indicator of stress-response, increased by ~39% compared to signals without side bands at an average received sound pressure level of 148 dB re 1 μPa.[128]

Based on these studies, mitigating active sonar impacts might be achieved by employing down-sweeps with harmonics or by reducing the level of side bands (or harmonics).[129] To our knowledge, the Navy is not presently investigating signal modification as a potential mitigation measure, nor, unfortunately, has NMFS required it—despite repeated urgings from NRDC, the California Coastal Commission, and others. Given the tangible management implications of this research and the potentially broad benefits to multiple species through modification at the signal source, we recommend again that more research of this nature be carried out in order to understand the extent to which these results can be generalized across species. In parallel, the feasibility of implementing signal modifications (such as those recommended above) into Navy operations should be explored.

Other signal characteristics may also be of interest. For example, short rise times (i.e., rise times less than or equal to 15 ms) are correlated across mammalian species with startle response, raising concerns about sensitization. In a 2011 study, researchers demonstrated that sounds with short rise times elicited an acoustic startle response in captive grey seals, followed by "rapid and pronounced" sensitization, taking hold after about 3 playbacks, whereas sounds with longer rise

---

[126] Kastelein, R.A., Schop, J., Gransier, R., Steen, N., and Jennings, N., Effect of series of 1 to 2 kHz and 6 to 7 kHz up-sweeps and down-sweeps on the behavior of a harbor porpoise (*Phocoena phocoena*), *Aquatic Mammals* 40: 232-42 (2014).

[127] Kastelein, R.A., Steen, N., Gransier, R., and de Jong, C.A.F., Threshold received sound pressure levels of single 1-2 kHz and 6-7 kHz up-sweeps and down-sweeps causing startle responses in a harbor porpoise (*Phocoena phocoena*), *Journal of the Acoustical Society of America* 131: 2325-33 (2012).

[128] Kastelein, R.A., van den Belt, I., Gransier, R., and Johansson, T., Behavioral response of a harbor porpoise (*Phocoena phocoena*) to 25.5- to 24.5-kHz sonar down-sweeps with and without side bands, *Aquatic Mammals* 41: 400-11 (2015).

[129] Kastelein et al., Effect of series of 1 to 2 kHz and 6 to 7 kHz up-sweeps and down-sweeps on the behavior of a harbor porpoise (*Phocoena phocoena*), *supra*; Kastelein et al., Behavioral response of a harbor porpoise (*Phocoena phocoena*) to 25.5- to 24.5-kHz sonar down-sweeps with and without side bands, *supra*.

times failed to induce a startle response and did not sensitize the animals.[130] The startled seals then displayed sustained spatial avoidance, rapid flight responses, and "clear signs of fear conditioning," and, once sensitized, even avoided food that was proximate to the sound source. According to the authors, sounds with short rise times thus have "the potential to cause severe effects on long-term behavior, individual fitness and longevity of individuals in wild animal populations."[131] In a follow-on study, high-frequency echosounders with short rise times were found to produce a strong behavioral response in the same species, leading the researchers to conclude that these systems could produce startle responses, and therefore potentially sensitization, as well.[132]

Here, too, we recommend further research and exploration of the feasibility of signal modification.[133]

While the Navy rejects modifying sonar sound sources as a mitigation measure (DEIS at 5-80), a decision that was summarily upheld by NMFS during its most recent Proposed Rule for Navy activities off Southern California and Hawaii, it never explains why making the modifications implied by the marine mammal behavioral studies discussed above would be impracticable. Indeed, some of these modifications, such as converting up-sweeps to down-sweeps, would not alter the system's spectral output in any way. We believe source modification requires greater validation across species and in more behavioral contexts before any decisions are made to alter signals—but given the preliminary data, and given the potential of this measure to reduce the instances and severity of behavioral harassment—we urge NMFS to require the Navy to expedite that research.

Finally, we note that the Navy's ongoing research off Southern California presents a strong opportunity for advancing mitigation research in this area. Its multi-year Southern California behavioral response studies provide baseline data and a vehicle for testing the effects of sonar modifications in the field. Research on modified signals can be incorporated into those ongoing behavioral response studies as a variant on exposure experiments on tagged animals, for which there already exists data on blue whales, fin whales, Cuvier's beaked whales, and other species. Again, we strongly recommend that NMFS require and set a timeline for this research within the context of the present rulemaking.

3. *Thermal detection systems*

---

[130] Götz, T., and Janik, V.M., Repeated elicitation of the acoustic startle reflex leads to sensitisation in subsequent avoidance behaviour and induces fear conditioning, *BMC Neuroscience* 12:30, doi:10.1186/1471-2202-12-30 (2011).

[131] *Id*.

[132] Hastie, G.D., Donovan, C., Götz, T., and Janik, V.M., Behavioral responses by grey seals (*Halichoerus grypus*) to high frequency sonar, *Marine Pollution Bulletin* 79: 205-210 (2014).

[133] Other factors associated with acoustic effects on humans, such as rise-time in the time-frequency domain of complex signals, kurtosis in frequency and amplitude variability, and non-linear harmonic interactions within complex signals, may also be relevant but have not been studied in the marine mammal context.

Because mitigation measures based on visual observation, such as safety zone maintenance, results in highly limited risk reduction for most species and under most conditions (e.g., Leaper *et al.* 2015;[134] see Impacts section for further discussion), we view alternative detection measures as a significant area for development. Thermal detection offers a supplement to visual detection measures and has been demonstrated to outperform observers in number of detected whale blows and ship-whale encounters due to its ability to continuously monitor a 360° field of view during both daylight and nighttime hours.[135] In addition, aerial-mounted infrared cameras have proven able to detect thermal 'trails' up to 300 m behind humpback whales, formed by the thermal mixing of the stratified water that persists for up to 2 minutes.[136] The emerging development of automated whale blow detection systems for infrared video[137] also indicate that this technology can feasibly be used for real-time whale detection and mitigation.

The Navy correctly acknowledges the limitations inherent in thermal detection systems, including its lesser utility in warmer temperatures and foggy conditions (DSEIS at 5-69), when whale blow is less distinguishable from the ambient air; but such systems are effective in colder conditions as a supplement to visual monitoring.[138] NMFS should consider requiring the Navy to employ thermal detection in optimal conditions, or, alternatively, require the establishment of a pilot program for thermal detection, with annual review under the adaptive management system. According to the DSEIS, the Navy "plans to continue researching thermal detection technology to determine their effectiveness and compatibility with Navy applications." DSEIS at 5-70. A pilot program would be consistent with that interest, while allowing for trial use as a monitoring measure. Further, we note that BC Ferries and some offshore wind developers—as well as the U.S. Air Force—are presently undertaking similar pilot programs with thermal detection systems; there plainly is no reason why the Navy cannot do the same.

4. *Mitigation and reporting of Navy ship speeds*

---

[134] Leaper, R., Calderan, R.S., and Cooke, J. A simulation framework to evaluate the efficiency of using visual observers to reduce the risk of injury from loud sound sources, *Aquatic Mammals* 41: 375-87 (2015).

[135] Burkhardt, E. Kindermann, L., Zitterbart, D., and Boebel, O., Detection and tracking of whales using a shipborne, 360° thermal-imaging system, *in* Popper, A.N., and Hawkins, A. (eds.), *The Effects of Noise on Aquatic Life* (2012); Peckham, J., O'Young, S.D., and Jacobs, J.T., Comparison of medium and long wave infrared imaging for ocean based sensing, *Journal of Ocean Technology* 10: 113-128 (2015); Zitterbart D.P., Kindermann, L., Burkhardt, E., and Boebel, O., Automatic round-the-clock detection of whales for mitigation from underwater noise impacts, *PLoS ONE* 8: art. e71217 (2013).

[136] Churnside, J., Ostrovsky, L., and Veenstra, T., Thermal footprints of whales, *Oceanography* 22: 206-09 (2009).

[137] Santhaseelan, V., and Asari, V.K., Automated whale blow detection in infrared video, *in* Zhou, J. (ed.), *Computer Vision and Pattern Recognition in Environmental Informatics*, at 58-78 (2015); Zitterbart et al., Automatic round-the-clock detection of whales, *supra*.

[138] Smith, H.R., Zitterbart, D.P., Norris, T.F., Flau, M., Ferguson, E.L., Jones, C.G., Boebel, O. and Moulton, V.D., A field comparison of marine mammal detections via visual, acoustic, and infrared (IR) imaging methods offshore Atlantic Canada, *Marine Pollution Bulletin* 154: 111026 (2020); Zitterbart, D.P., Smith, H.R., Flau, M., Richter, S., Burkhardt, E., Beland, J., Bennett, L., Cammareri, A., Davis, A., Holst, M. and Lanfredi, C., Scaling the laws of thermal imaging–based whale detection, *Journal of Atmospheric and Oceanic Technology* 37(5):.807-24 (2020).

Ships have become the most pervasive source of anthropogenic noise in the oceans. In open ocean, traffic is responsible for a steady rise in ambient noise at low frequencies,[139] and the Salish Sea is one of the most trafficked areas along the west coast of North America.[140]

Vessel noise impacts marine mammals in a variety of ways, including inducing changes in both physical and acoustic behavior, masking communication and echolocation sounds, and increasing stress levels.[141] In Southern Resident orcas, it is known to interfere with foraging and other behavior.[142] Recovery plans for the Southern Residents prepared by both the U.S. and Canadian governments identify underwater noise from vessels and other sources as a key threat to the survival of the population.[143] Accordingly, significant efforts are in place to reduce vessel noise in the region. For example, the Port of Vancouver is investing significant funds into research and ship incentive programs that mitigate underwater noise from vessels.[144] Likewise, the Port of Seattle, NOAA, Washington State Ferries and others are currently working together to identify ways to reduce underwater noise, in response to Governor Inslee's Southern Resident Orca Task Force recommendation.[145]

NMFS can and must require the Navy to reduce the impacts to Southern Resident orcas and other marine mammals through measures that reduce underwater noise from Navy vessels. For the vast majority of ships, reducing speed is an effective measure for reducing a ship's acoustic footprint. Results from three years of voluntary vessel slowdowns in the Salish Sea confirm that reduced speeds substantially lower noise exposure at behaviorally important frequencies for resident killer whales.[146] Furthermore, the speed at which Navy vessels operate during testing and

---

[139] Andrew, R.K., Howe, B.M., and Mercer, J.A., Long-time trends in ship traffic noise for four sites off the North American West Coast, *J. Acoust. Soc. Am.* 129(2): 642-651, (2010).

[140] O'Neill, C., Wladichuk, J., Li, Z., Allen, A.S., Yurk, H., and Hannay, D., Cumulative Noise Modelling in the Salish Sea, Document 01369, Version 1.0. Technical report by JASCO Applied Sciences for Noise Exposure to the Marine Environment from Ships (NEMES), University of Victoria, (2017).

[141] *See, e.g.*, Erbe, C., Marley, S.A., Schoeman, R.P., Smith, J.N., Trigg, L.E., and Embling, C.B., The effects of ship noise on marine mammals – A review, *Front. Mar. Sci.* 6.:606, doi:10.3389/fmars.2019.00606 (2019).

[142] Williams, R., Lusseau, D., and Hammong, P.S., Estimating relative energetic costs of human disturbance to killer whales (*Orcinus orca), Biol. Conserv.* 133: 301-311 (2006); Holt, M.M., Noren, D.P., Veirs, V., Emmons, C.K., and Veirs, S., Speaking up: Killer whales (*Orcinus orca)* increase their call amplitude in response to vessel noise, *J. Acoust. Soc. Am.* 125: EL27-EL32 (2009); Lusseau, D., Bain, D.E., Wiliams, R., and Smith, J.C., Vessel traffic disrupts the foraging behavior of southern resident killer whales *Orcinus orca*, *Endanger. Species Res.* 6: 211-221 (2009).

[143] National Marine Fisheries Service, Recovery Plan for Southern Resident Killer Whales (*Orcinus orca)* (2018); Recovery Strategy for the Northern and Southern Resident Killer Whales (*Orcinus orca)* in Canada [Proposed] (2018).

[144] Port of Vancouver. *Enhancing Cetacean Habitat and Observation (ECHO) Program* (accessed June 22, 2020) (available at https://www.portvancouver.com/environment/water-land-wildlife/echo-program/).

[145] Port of Seattle, October 7, 2019. *Port gathers diverse maritime interests to protect endangered orcas by reducing ship noise*, Oct. 7, 2019 (accessed June 22, 2020) (available at https://www.portseattle.org/news/port-gathers-diverse-maritime-interests-protect-endangered-orcas-reducing-ship-noise).

[146] Joy, R., Tollit, D., Wood, J., MacGillivray, A., Li, Z., Trounce, K., and Robinson, O., Potential benefits of vessel slowdowns on endangered Southern Resident Killer Whales. *Front. Mar. Sci.* 6: 344. doi: 10.3389/fmars.2019.00344 (2019).

training exercises, and during general transit between exercises, has direct implications for the probability of mortality from a ship strike.[147] A vessel speed of 15 knots is estimated to result in an 80% probability of mortality if a ship strike were to occur, and this probability approaches 100% at a speed of 20 knots or higher.[148] Slowing ships below 10 knots can reduce collision rates by 90% and decrease the probability of serious injuries or death.[149]

While the Navy has indicated a need to operate at higher speeds under certain circumstances, such as when an aircraft carrier must maintain a minimum wind speed relative to ground in order to launch and receive aircraft (DEIS at 5-64), there are other conditions when maintaining a 10-knot vessel speed is surely practicable. The Proposed Rule does not contain any indication that a practicability analysis was conducted, nor does it prescribe any speed reduction measure. This failure appears based on an unsupported finding that vessel noise generated by Navy vessels has *de minimis* or no impacts on Southern Residents and other marine mammals. 85 Fed. Reg. at 33919.

NMFS should require the Navy to engage in lowest practicable speed reductions in biologically important habitats to reduce noise, including in designated critical habitat for endangered Southern Resident orcas and other biologically important habitat for vulnerable species. (See section above on "Time-area management".) Additionally, given that the speed of Navy ships during all aspects of their operations potentially impacts marine mammals, we recommend that the agency require the Navy to collect and report data on ship speed as part of the rulemaking process. This will allow for objective evaluation by NMFS of ship-strike risk, of harassment resulting from vessel activity, and of the potential benefit of additional speed-focused mitigation measures. Finally, NMFS should require the Navy to take steps to quiet smaller support vessels used in the NWTT Study Area, by seeking and incorporating best commercial off-the-shelf technology for vessel retrofits and new builds.

According to a scientists' statement on underwater noise pollution in the Salish Sea, "the acoustic environment of the Salish Sea is already highly degraded relative to pre-industrial conditions" and thus requires "reducing the already excessive levels of underwater noise pollution in the Salish Sea *from all sources.*"[150] The Navy's contribution to underwater noise

---

[147] Conn, P.B., and Silber, G.K., Vessel speed restrictions reduce risk of collision-related mortality for North Atlantic right whales, *Ecosphere* 4: art. 43 (2013); Laist, D.W., Knowlton, A.R., and Pendleton, D., Effectiveness of mandatory vessel speed limits for protecting North Atlantic right whales, *Endangered Species Research* 23: 133-47 (2014).

[148] Conn, P.B., and Silber, G.K., Vessel speed restrictions reduce risk of collision-related mortality for North Atlantic right whales, *supra*.

[149] *Id.*; Wiley D.N., Thompson, M., Pace, R.M., and Levenson, J., Modeling speed restrictions to mitigate lethal collisions between ships and whales in the Stellwagen Bank National Marine Sanctuary, USA, *Biological Conservation* 144: 2377–81 (2011); Laist, D.W. et al., Effectiveness of mandatory vessel speed limits for protecting North Atlantic right whales, *supra*.

[150] B.C. Cetacean Sightings Network, *Marine Scientists Urge Federal Government to Reduce Underwater Noise in the Salish Sea*, April 12, 2017 (accessed June 22, 2020) (available at https://wildwhales.org/2017/04/12/marine-scientists-urge-federal-government-to-reduce-underwater-noise-in-the-salish-sea-read-their-letter-here/ (emphasis added).

must be mitigated to the fullest extent possible in sensitive marine habitats, including in established and proposed critical habitat for Southern Resident orcas and humpback whales.

5. Compensatory mitigation

To the extent that additional operational mitigation is impracticable, NMFS should consider a compensatory mitigation scheme to help improve the conservation status or habitat of affected populations. Compensatory mitigation is a concept that is routinely employed in implementation of the Endangered Species Act, Clean Water Act, and other environmental laws, and is consistent with the Marine Mammal Protection Act, which is broad in its characterization of mitigation. 16 U.S.C. § 1371(a)(5)(A)(II)(aa) (requiring NMFS to prescribe not only "permissible methods of taking pursuant to [a specified activity]," but also "other means of effecting the least practicable adverse impact" on affected marine mammal species and populations and on their habitat). NMFS should consider requiring compensatory mitigation for the adverse impacts of the permitted activity on marine mammals and their habitat that cannot be prevented or mitigated.

D. Long-term monitoring

As part of its species monitoring program in the Pacific, the Navy has supported baseline research into the occurrence, distribution, and population structure of marine mammal species and stocks through tagging and passive acoustic monitoring studies and other approaches.[151] The resulting data provide baseline information upon which the extent of exposure to disturbance from training and testing activities, individual and, ultimately, population-level impacts, and the effectiveness of mitigation measures, can be evaluated. In addition, studies involving aerial surveys, passive acoustic monitoring, and tagging have produced important information on spatial and temporal habitat use that can be used to directly inform seasonal or year-round Mitigation Areas for training and testing activities.

In addition to requiring long-term monitoring studies,[152] we recommend that NMFS prioritize Navy research projects that aim to quantify the impact of training and testing activities at the individual, and ultimately, population-level. First, detailed, individual-level behavioral-response studies, such as focal follows and tagging using DTAGs, carried out before, during, and after Navy operations, can provide important insights for these species and stocks. Second, recent studies using DTAGs have also been used to characterize social communications between individuals of a species or stock, including between mothers and calves;[153] we recommend

---

[151] Department of the Navy, 2016 U.S. Navy annual marine species monitoring report for the Pacific: A multi-range monitoring report for Hawaii-Southern California Training and Testing (HSTT), Mariana Islands Training and Testing (MITT), Northwest Training and Testing (NWTT), and the Gulf of Alaska Temporary Maritime Activities Area (GOA TMAA) (2017).

[152] Long-term data collection using comparable methods is needed to capture trends in marine mammal abundance or shifts in distribution or seasonality; such information is essential to understand population-level effects of Naval or other human activities, as well as the response of species and stocks to the impacts of climate change.

[153] Videsen et al., High suckling rates and acoustic crypsis of humpback whale neonates, *supra*.

studies be prioritized that further characterize the suite of vocalizations related to social interactions.

Third, the use of unmanned aerial vehicles is also proving useful for surveying marine species,[154] and can provide a less invasive approach to undertaking focal follows. Imagery from unmanned aerial vehicles can also be used to assess body condition and, in some cases, health of individuals.[155] We recommend that NMFS require the Navy to use these technologies for assessing marine mammal behavior before, during, and after Navy operations (e.g. swim speed and direction, group cohesion). In addition, studies into how these technologies can be used to assess body condition should be supported as this can provide an important indication of energy budget and health, which can inform the assessment of population-level impacts.

V. COMPLIANCE WITH TRIBAL TRUST RESPONSIBILITIES

In all of their dealings with federally recognized Indian Tribes, federal agencies are obligated to conform their policies and regulations to the fiduciary duties owed the Tribes from the long course of dealings with them. For nearly two hundred years, the U.S. Supreme Court has affirmed the trust relationship between the United States and sovereign Indian Tribes. *Cherokee Nation v. Georgia,* 30 U.S. 1 (1831); *Seminole Nation v. United States,* 316 U.S. 286, 296 (1942) (noting the "distinctive obligation of trust incumbent" on the United States in its dealings with Indian Tribes); *United States v. Mitchell,* 463 U.S. 206 (1983) (noting the "undisputed existence of a general trust relationship between the United States and Indian tribes."). Trust duties apply to all federal agencies, not just the Department of the Interior. *Parravano v. Babbitt,* 70 F. 3d 539, 546 (9th Cir. 1995) (the trust responsibility "attaches to the federal government as a whole.").

In the regulatory context, the federal trust responsibility means that NMFS has a heightened duty to apply the Marine Mammal Protection Act with special care to ensure that the cultures and ecosystems of Indian Tribes are not harmed. NMFS does not act merely as an administrator of the Act when it is apparent that the proposed regulatory action will impact sovereign Indian Tribes. Rather, when faced with several alternatives for mitigation, for example, NMFS "must choose the alternative that is in the best interests of the Indian tribe." *Jicarilla Apache Tribe v. Supron Energy Corp.,* 728 F. 2d 1555, 1567 (10th Cir. 1984) (Judge Seymour concurring in part and dissenting in part), *on reh'g en banc,* 782 F. 2d 855 (10th Cir. 1986) (adopting dissenting opinion), *as modified,* 793 F. 2d 1171 (10th Cir. 1986). The trust responsibility serves several purposes in this context. First, it requires NMFS to be especially cognizant of Tribes' needs as they pertain to their cultural ways of life and engage in meaningful government-to-government

---

[154] Hodgson, A., Peel, D., and Kelly, N., Unmanned aerial vehicles for surveying marine fauna: assessing detection probability, *Ecological Applications* 27: 1253-67 (2017).

[155] Christiansen, F., Dujon, A.M., Sprogis, K.R., Arnould, J.P.Y., and Bejder, L., Noninvasive unmanned aerial vehicle provides estimates of energetic cost of reproduction in humpback whales, *Ecosphere* 7(10): art. e01468 (2016); Christiansen, F., Sironi, M., Moore, M.J., Di Martino, M., Ricciardi, M., Warick, H.A., Irschick, D.J., Gutierrez, R. and Uhart, M.M., Estimating body mass of free-living whales using aerial photogrammetry and 3D volumetrics. *Methods in Ecology and Evolution* 10(12): 2034-44 (2019).

consultation concerning the proposed rule. Second, it requires NMFS to ensure that its application of the MMPA incidental take provisions avoids harm to Tribes' cultural ways of life, including subsistence, that are dependent upon culturally important species, places and ecosystems and protects the species necessary for the Tribes' wellbeing and survival. *See North Slope Borough v. Andrus*, 486 F. Supp. 332, 344 (D. D.C. 1980), *aff'd,* 642 F. 2d 589 (D.C. Cir. 1980).

As described above, NMFS's obligation to Indian Tribes applies to all Tribes affected by the Navy's NWTT activities, including the ten federally recognized member Tribes of the InterTribal Sinkyone Wilderness Council, whose territories are situated within and offshore from Northern California and who maintain important cultural connections with their traditional coastal ecosystems and migrating marine mammals. The Sinkyone Council's member Tribes are: Cahto Tribe of Laytonville Rancheria; Coyote Valley Band of Pomo Indians; Hopland Band of Pomo Indians; Pinoleville Pomo Nation; Potter Valley Tribe; Redwood Valley Band of Pomo Indians; Robinson Rancheria of Pomo Indians; Round Valley Indian Tribes; Scotts Valley Band of Pomo Indians; and Sherwood Valley Rancheria of Pomo Indians. The ten Tribes are in formal government-to-government consultation with the Navy regarding Tribal opposition to the Navy's training and testing activities, and the NWTT's impacts to marine mammals and the Tribes' cultural ways of life.

VI. COMPLIANCE WITH THE NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act is "our basic national charter for protection of the environment." 40 C.F.R. § 1500.1(a); *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1215-16 (9th Cir. 1998). Among its provisions, it requires federal agencies to include an environmental impact statement "in every recommendation or report on . . . major Federal actions significantly affecting the quality of the human environment." 42 U.S.C. § 4332(2)(C). The fundamental purpose of an EIS is to compel decision-makers to take a "hard look" at a particular action, both at the environmental impacts it will have and at the alternatives and mitigation measures available to reduce those impacts, before a decision to proceed is made. 40 C.F.R. §§ 1500.1(b), 1502.1; *Balt. Gas & Elec. v. NRDC*, 462 U.S. 87, 97 (1983).

In evaluating the seven-year incidental take regulations, NMFS indicates its intent to rely on the Navy's SEIS to satisfy its own NEPA compliance for authorizing marine mammal take within the NWTT Study Area. *See* 85 Fed. Reg. at 34,038-34,039 (noting that NMFS was a cooperating agency and "worked extensively" with the Navy to prepare the EIS). NEPA allows an agency to adopt another agency's EIS, however, only where the document "meets the standards for an adequate statement" under NEPA regulations. 40 C.F.R. § 1506.3(a). Here, NMFS cannot rely on the Navy's deficient EIS to satisfy the former's NEPA obligations when issuing regulations or permits under the MMPA. *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). NMFS must prepare a separate EIS, or, at minimum, a supplemental EIS, before proceeding with the proposed action.

As many of our organizations detailed in comments on the Navy's DSEIS, which we included in our comments on the Navy's application, that document is deficient on its face. As they pertain to NMFS' consideration of impacts on marine mammals, those deficiencies include, but are not limited to:

- Failing to take a hard look at the effects of the action to endangered Southern Resident orcas and other sensitive species,
- Failing to take a hard look at the effects of the proposed training and testing activities, including modeling, thresholds, and assumptions about harm that underestimate the extent and severity of marine mammal take (both behavioral impacts and injury),
- Failing to take a hard look at the effects of the entire action,
- Failing to evaluate a full range of reasonable alternatives,
- Failing to evaluate a full range of reasonable mitigation measures,
- Failing to accurately estimate the amount of take and impact of all the activity covered by the SEIS, and
- Failing to consider the cumulative impacts of noise and other stressors in conjunction with other reasonably foreseeable activities.

In addition to these and other basic inadequacies, NMFS cannot rely on that document for its MMPA decisions because the SEIS does not adequately address NMFS' own actions and responsibilities under the MMPA. As explained above, the MMPA requires NMFS to protect and manage marine mammals, allowing incidental take of marine mammals only in limited circumstances when such take satisfies the Act's statutory requirements, including the "negligible impact" and "least practicable adverse impact" standards. 16 U.S.C. § 1371(a)(5)(A)(i). In other words, NMFS is charged under the MMPA with prioritizing the protection of species. The Navy, on the other hand, seeks primarily to maximize its opportunities for training and testing activities. Thus, the Navy's SEIS is framed around a fundamentally different purpose and need—one that is incongruent with NMFS' obligations under the MMPA. *See Conservation Council for Hawaii*, 97 F. Supp. 3d at 1236 (holding that NMFS had violated the MMPA by simply adopting, without modification, a Navy EIS that reflected a different "purpose and need").

Our organizations are aware that on July 16, one day before the conclusion of the instant comment period, CEQ issued new regulations governing the preparation of environmental assessments and environmental impact statements under NEPA. *See* 85 Fed. Reg. 43304 (modifying 40 C.F.R. § 1500 *et seq.*). For the reasons some of our organizations stated in separately submitted comments to CEQ, we believe these new regulations contain numerous provisions that are contrary to law and destructive of federal environmental decision-making.[156] Agencies that have begun the NEPA process for a particular agency action prior to September 14, 2020, as is the case with NWTT, have discretion under the new regulations to decide whether to apply them. 85 Fed. Reg. 43304, 43372-73 (new regulations at § 1506.13). Given the legal

[156] *See, e.g.*, letter from 327 organizations and tribal nations to Mary Neumayr, Chairman, CEQ (Mar. 10, 2020); letter from Sharon Buccino, Lands Director, NRDC, to Mary Neumayr, Chairman, CEQ (Mar. 10, 2020).

infirmities of the new CEQ rulemaking, we strongly recommend that the agency elect not to apply them here; and NMFS should make that choice clear in its EIS.

In sum, NMFS has failed to take a "hard look" at the environmental impacts of the proposed Navy's training and testing exercises, and has not considered a reasonable range of alternatives and mitigation measures. *See* 42 U.S.C. § 4332(2)(C); 40 C.F.R. §§ 1500.1(a), (b), 1502.1; *see also Balt. Gas & Elec. v. NRDC*, 462 U.S. at 97. The final rule should not issue until after NMFS completes a proper NEPA analysis.

VII. NMFS MUST COMPLY WITH THE ENDANGERED SPECIES ACT

NMFS cannot finalize the proposed incidental take regulations or issue any letters of authorization until it completes consultation and imposes limits to mitigate the hazards of Navy's training and testing on threatened and endangered species and their habitats. Section 7(a)(2) of the Endangered Species Act requires federal agencies to "insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or result in the destruction or adverse modification of [the critical] habitat of such species." 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(a). To comply with this mandate, NMFS itself must consult with the delegated agency of the Secretary of Commerce or Interior because its MMPA authorizations "may affect" listed species, and the consultation must be based on the "best scientific and commercial data available." 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(a).

At the completion of consultation, the expert agency issues a biological opinion that determines whether the action is likely to jeopardize the continued existence of the species. If so, the opinion must specify reasonable and prudent alternatives that would avoid the likelihood of jeopardy and allow the action to proceed. 16 U.S.C. § 1536(b)(3)(A). A biological opinion concluding that the agency action is not likely to jeopardize the continued existence of a listed species, but will result in incidental take, must include an incidental take statement. 16 U.S.C. § 1536(b)(4). Any incidental take statement must specify the impact of any expected takes of individual members of the species, provide reasonable and prudent measures necessary to minimize the impact of those takes, and set forth terms and conditions that must be followed to ensure against jeopardy. *Id.*; 50 C.F.R. § 402.14(i).

In this situation, the consultation must evaluate the programmatic impact of seven years of Navy training and testing as authorized by NMFS in final regulations. In addition to completing programmatic consultation, NMFS must also consult on a site-specific basis prior to issuing or modifying letters of authorization. NMFS, however, cannot avoid programmatic consultation by deferring to partial, LOA-specific consultations. *Pac. Coast Fed'n of Fishermen's Ass'ns v. NMFS*, 482 F.Supp.2d 1248, 1267 (W.D. Wash. 2007).

NMFS' consultation must also evaluate the impacts of the proposed action beyond ESA-listed marine mammals and their habitat, to include the other threatened and endangered species that will be affected by the Navy activities authorized here. But see 85 Fed. Reg. at 34,038 (noting NMFS and the Navy's duties to consult, but only as to seven ESA-listed marine mammal

species). For example, the Northwest Training Range includes designated critical habitat for endangered Pacific leatherback sea turtles (*see* 50 C.F.R. § 226.207), one of NMFS' "Species in the Spotlight" in need of immediate effective actions to prevent extinction.[157] These waters are also home to more than two dozen listed populations of Pacific salmon and Steelhead. NMFS has a duty to ensure against jeopardy for each of these, and any other, imperiled species in this area.

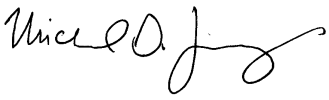
In complying with the ESA, NMFS must consider the appreciable impact of the proposed activities on listed species and their habitats. *Nat'l Wildlife Fed'n v. NMFS*, 524 F.3d 917, 930 (9th Cir. 2008). If other activities or conditions also harm an endangered species or its habitat, the effects of NMFS's authorization of the Navy's activities must be added to that baseline and analyzed together to determine whether the proposed activity jeopardizes the species or adversely modifies critical habitat. Here, threatened and endangered species along the coast are exposed to a variety of threats from ship strikes, oil and gas activities,[158] noise from vessels, entanglement or bycatch in fishing gear, wastewater discharge, oil spills, as well as other cumulative impacts from fishing, shipping, military activities, and climate change. The aggregate impact of these activities must be considered in the consultation.

Finally, in conducting this analysis, NMFS cannot rely on the flawed approach adopted in its proposed incidental take regulations; and the expert agency must require additional mitigation to promote the conservation and recovery of listed species and to protect critical habitat.

****

Thank you for considering our comments. As always, we welcome the opportunity to meet with you, your staff, and other relevant offices at any time to discuss these matters. For further discussion, please contact Michael Jasny (mjasny@nrdc.org) at NRDC.

Very truly yours,



Michael Jasny
Director, Marine Mammal Protection
NRDC

Miyoko Sakashita
Oceans Director
Center for Biological Diversity

---

[157] *See* NMFS, "Leatherback turtle: In the spotlight," *available at* https://www.fisheries.noaa.gov/species/leatherback-turtle#spotlight (accessed June 15, 2020).

[158] Although the plan has not recently advanced, the Trump administration has proposed a vast expansion of offshore oil and gas leasing in its proposed 2019-2024 nationwide leasing program. *See* Bureau of Ocean Energy Management, Notice of Availability of the 2019-2024 Draft Proposed Outer Continental Shelf Oil and Gas Leasing Program and Notice of Intent to Prepare a Programmatic Environmental Impact Statement, 83 Fed. Reg. 829 (Jan. 8, 2018). This includes leasing areas along the entire West coast. This potential for offshore oil and gas activities must be taken into consideration during this consultation.

Steve Mashuda
Managing Attorney, Oceans
Earthjustice

Priscilla Hunter
Chairwoman
InterTribal Sinkyone Wilderness Council
(a consortium of 10 Federally-recognized
Northern California Indian Tribes)

Marcie Keever
Marine Protection Program Director
Friends of the Earth

Lovel Pratt
Marine Protection Program Director
Friends of the San Juans

Howard Garrett
President
Orca Network

Dr. Erin Meyer
Director of Conservation Programs
and Partnerships
Seattle Aquarium