Cascadia Research Collective
a non-profit research organization

Phone: (360) 943-7325
FAX: (360) 943-7026
Homepage: www.cascadiaresearch.org

September 17, 2007

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, HI 96752

Dear Sir or Madam,

I am writing in regards to the Draft Environmental Impact Statement/Overseas Environmental Impact Statement (HRC DEIS/OEIS) for the Hawai‘i Range Complex (Fed Reg 72(149):43251-43252). In terms of my background relevant to this issue, I have been studying cetaceans since 1986, have a Ph.D. in Biology (1994), served as a member of the IUCN Cetacean Specialist Group (1992-1998), the Committee of Scientific Advisors for the Society for Marine Mammalogy (1995-2001), and the Marine Mammal Advisory Committee of the Western Pacific Fishery Management Council (2005-present), and have been undertaking research on cetacean populations around the main Hawaiian Islands since 1999. My research in Hawaiian waters has involved examining stock structure, estimating population sizes, and studying diving behavior, ecology and social organization of more than 10 species of odontocetes, as well as studies of the diving behavior of humpback whales. I have published a number of papers and reports pertinent to understanding potential impacts of anthropogenic activities on these populations (see www.cascadiaresearch.org/robin/hawaii.htm). In addition, I have reviewed relevant sections of the HRC DEIS/OEIS, the Navy's Programmatic Environmental Assessment/Overseas Environmental Assessment and Finding of No Significant Impact for the USWEX exercises, the After-Action Report from RIMPAC 2006, and most publications and reports available on cetacean populations in Hawaiian waters, among other documents. I have a number of concerns regarding the analyses and measures outlined in the HRC DEIS/OEIS in regards to potential impacts on marine mammal populations, outlined below.

1. Do the lack of documented strandings associated with prior naval exercises in Hawai‘i mean no impacts have occurred?

The HRC DEIS/OEIS bases conclusions on the potential for impacts from future naval exercises in Hawai‘i in part on the relative lack of observed impacts from prior naval exercises. Faerber and Baird (2007a, 2007b) address the question of whether the lack of beaked whale strandings in Hawai‘i in relation to military exercises mean no impacts have occurred. A number of recent cetacean strandings have been linked to naval exercises, particularly involving mid-frequency sonar. Two species most affected are Cuvier’s and Blainville’s beaked whales. In 22 years there have been six such strandings in the Canary Islands, yet none have occurred in the Hawaiian Islands, despite the existence of regular naval exercises in the islands and resident populations of both species of beaked whales (McSweeney et al. 2007). The HRC DEIS/OEIS and other assessments of potential impacts of ongoing naval exercises in Hawai‘i have used the lack of mass strandings to imply that there have been no past impacts. Faerber and Baird (2007a,

2007b) hypothesize that the likelihood of a dead or moribund beaked whale stranding, and the probability of a stranded animal being detected, differ between the Canary and Hawaiian Islands. They examined near-shore bathymetry, shoreline slope, human population densities, fringing reef presence, ocean currents, sea surface temperature, and the presence of large scavenging sharks. The Canary Islands have a greater proportion of beaked whale "habitat" (depths >650 m) closer to shore (10.6% versus 6.3% within 3-km of shore), with a steeper slope (avg. slope Canaries -134m/km, Hawai'i -95 m/km). Hawai'i is dominated by steeper (>50°) shoreline cliffs (6% of shorelines vs. <1% for Canaries), human population density is 28% of that in the Canaries, and population per kilometer of shoreline is 53% of that in the Canaries. Fringing reefs are common around the main Hawaiian Islands, while such reefs do not form in the Canaries. Suitable habitat closer to shore, more accessible coastlines, lack of fringing reefs, lower water temperature with slower currents, and increased human population densities all suggest moribund or dead beaked whales are more likely to strand and be detected in the Canary Islands than in the Hawaiian Islands. Faerber and Baird (2007b) thus conclude that a lack of mass strandings in the Hawaiian Islands cannot be used to indicate a lack of impact.

In addition, a lack of sightings of dead floating whales or dolphins in monitoring efforts does not indicate that animals have not been killed. Most species of whales and dolphins (with the exception of sperm whales and right whales) usually sink upon death. If animals die in shallow water, decomposition processes may eventually result in the carcass re-floating (where it has a chance of being detected). In deep waters, however, increased hydrostatic pressure and differences in gas solubility may prevent carcasses from re-floating (Allison et al. 1991). Given that beaked whales and other potentially at risk species typically inhabit deep waters in Hawai'i, if an individual is killed the carcass may not re-float where it could be detected.

2. Is the Hanalei Bay melon-headed whale embayment associated with RIMPAC 2006 related to the Rota sighting?

The HRC DEIS/OEIS notes that (page 4-28) "A simultaneous "stranding" of 500 to 700 melon headed whales and Risso's dolphins occurred at Sasanhaya Bay, Rota, in the Northern Marianas Islands on the same morning as the Hanalei stranding", and suggest that this is in some way related to the embayment of melon-headed whales at Hanalei Bay associated with the RIMPAC 2006 exercise. It is factually incorrect to consider the sighting reported by Jefferson et al. (2006) as a "stranding", as the whales were first seen in a water depth of 77 m and moved into deeper water as the sighting progressed. Additionally, as noted by Ligon et al. (2007), inferring habitat preferences from other populations may be misleading, given population-level variability in habitat use. To assess melon-headed whale habitat preferences specific to the main Hawaiian Islands, Ligon et al. (2007) examined 2,515 hours of search effort between 2000-2006 for sighting depths and distance-from-shore. They recorded 23 melon-headed whale encounters with depths from 148-4,779m (median = 1,610m); distance-from-shore values ranged from 3.0-41.2km, (median = 9.8km). While over 55% of effort (1,402 hours) was in waters <1,000m, only 21.7% of melon-headed whale sightings occurred in this range. At a finer resolution, 811 hours (32.2 %) were spent searching waters <200m with only one melon-headed whale encounter (4.3%). For distance-from-shore values, 43.5% of sightings occurred between 5-10km from shore; only 17.4% occurred in waters <5km; and none less than 3km. Consequently, when normalized against per-unit-effort, sighting rates were 4.5 times higher in depths >1000m and 3.1 times higher for sightings >20km from shore, indicating that melon-headed whales show a preference for deeper, offshore waters. Therefore, Ligon et al. (2007) conclude that the

occurrence of melon-headed whales in the shallow waters of Hanalei Bay should be considered abnormal behavior within the main Hawaiian Islands.

3. Mitigation measures outlined are ineffective at detecting long-diving and cryptic species

The HRC DEIS/OEIS assumes that the measures it proposes will mitigate impacts on marine mammals. The mitigation measures outlined (Sec. 4.1.2.4.12) primarily involve a combination of visual and passive acoustic detection methods for the presence of marine mammals around vessels operating mid-frequency active sonar. However, a number of species of odontocetes found in Hawaiian waters dive for extended periods. For example, Blainville's and Cuvier's beaked whales have been documented diving for periods of up to 83 and 94 minutes, respectively (Baird et al. 2006, Baird unpublished), and regularly dive for periods of 50-60 minutes. Short-finned pilot whales may dive for periods of up to 27 minutes in Hawai‘i (Baird unpublished), and dwarf and pygmy sperm whales dive for extended periods (>10 minutes). According to the best available estimates, fewer than 2% of beaked whales would likely be detected by visual observations as outlined in the HRC DEIS/OEIS, even when directly on the ship's trackline (Barlow and Gisiner 2006). The detection rate would approach zero for beaked whales occurring one km away (Barlow and Gisiner 2006). The HRC DEIS/OEIS suggest that monitoring by passive sonar would allow detection of cetaceans, however the probability of locating all or most toothed whales through passive acoustic monitoring is extremely low. There is currently no information available on the sounds produced by some species of Hawaiian odontocetes (e.g., dwarf sperm whales) so it would be impossible to train passive sonar operators to detect these sounds. No information is available on the proportion of time individuals of most species spend producing sounds, of the sound pressure levels of vocalizations (and thus the potential distance at which they might be detected), or on the depths at which sounds are produced (some species, such as beaked whales, may only vocalize at depth). Information presented in the RIMPAC 2006 After Action Report documents the ineffectiveness of the Navy's passive acoustic monitoring. In this report is it noted that there were 29 instances where marine mammals were detected, 28 visually (at least 20 from ships) and only one acoustically. The fact that there was only a single acoustic detection and at least 20 ship-based visual detections indicates that passive acoustics are unlikely to be an effective means of monitoring marine mammal presence (and thus mitigating impacts) around naval vessels in Hawai‘i. Given that passive acoustics are the primary method the Navy intends to use to detect marine mammals at night (and thus mitigate impacts), impacts at night will be impossible to avoid.

4. Estimated exposures for non-ESA species for the no-action alternative (4.1.2.5.3) misrepresent the likelihood of detecting species.

Species accounts in this section continually assume that "whales that migrate into the Hawaii OPAREA would be detected by visual observers". This statement is not supported by available scientific evidence for most species of small/mid-sized cetaceans, particularly given that the HRC DEIS/OEIS assumes that observers on Navy vessels will have similar abilities to detect cetaceans as experienced observers on NMFS surveys. For minke whales, Rankin et al. (2007) found that visual surveys alone had underestimated the minke whale population around the Hawaiian Islands, because "minke whales are notoriously difficult to detect using visual methods due to their small size, short surfacing intervals, and lack of visual blow". Given this, the statement that "it is very likely that lookouts would detect a group of minke whales at the surface" (HRC DEIS/OEIS, page 4-113) in monitoring efforts misrepresents the likelihood that

minke whales will be detected with visual monitoring efforts. The same is true for most other species of small/mid-sized cetaceans in Hawaiian waters.

5. The HRC DEIS/OEIS does not fully take into account evidence of population structure when assessing risks to populations.

Understanding and predicting the impacts of anthropogenic activities on protected species such as marine mammals requires knowledge of population structure. If populations are fragmented into a number of smaller demographically isolated units, and some of these units are more exposed to anthropogenic activities, the impacts of anthropogenic activities on populations may be greater than otherwise predicted. In Hawaiian waters, population structure has been examined for only four species of odontocetes: false killer whales, short-finned pilot whales, bottlenose dolphins, and spinner dolphins. Genetic evidence from all four of these species indicates the presence of demographically-isolated island-associated populations (Andrews et al. 2006; Chivers et al. 2003, 2007; Martien et al. 2005). Given the high levels of site fidelity that have been documented for melon-headed whales, pygmy killer whales, Blainville's beaked whales, Cuvier's beaked whales, and rough-toothed dolphins (Huggins et al. 2005; McSweeney et al. 2005, 2007; Webster et al. 2005), it is likely that if sufficient genetic samples were available from these populations there would be similar evidence of demographically isolated island-associated populations. As such, instead of potentially impacting a small proportion of a number of widely-ranging populations of odontocetes, naval exercises around the main Hawaiian Islands have the potential to impact a large proportion of individuals in a number of relatively small island-associated populations. High levels of site fidelity documented from photo-identification suggest that if individuals were killed due to anthropogenic activities re-colonization from other populations would not occur quickly.

6. Data collected as part of the marine mammal exercise monitoring plan should be used to assess the effectiveness of the monitoring effort.

The HRC DEIS/OEIS notes that U.S. Navy lookout watchstander reports (page 6-22) will be the primary data to be evaluated to examine the effectiveness of the monitoring. In particular, the "quality of the data" (line 17, page 6-25) will be examined to assess whether species were identified and animals that were exposed were detected, but no information is presented on how this will be done. Information presented in the RIMPAC After Action Report was insufficient to assess the efficacy of the visual monitoring, because no information was presented on the number of hours of visual monitoring that was undertaken by each vessel. To assess the efficacy of such visual monitoring, information on effort (number of vessels, number of observers, number of hours observed, and sea conditions during observations), and the number of sightings of each species must be recorded and reported. This would allow independent assessment of the efficacy of the monitoring, by comparing sighting rates (by species) to independent survey data from the Hawaiian Islands, to estimate what proportion of marine mammals in the operating area the observers are detecting.

Sincerely,

Robin W. Baird, Ph.D.
Research Biologist

References

Allison, P.A., C.R. Smith, H. Kukert, J.W. Deming, and B.A. Bennett. 1991. Deep-water taphonomy of vertebrate carcasses: a whale skeleton in the bathyal Santa Catalina Basin. Paleobiology 17:78-89.

Andrews, K.R., L. Karczmarski, W.W.L. Au, S.H. Rickards, C.A. Vanderlip and R.J. Toonen. 2006. Patterns of genetic diversity of the Hawaiian spinner dolphin (*Stenella longirostris*). Atoll Research Bulletin 543:65-73.

Baird, R.W., D.L. Webster, D.J. McSweeney, A.D. Ligon, G.S. Schorr, and J. Barlow. 2006. Diving behaviour of Cuvier's (*Ziphius cavirostris*) and Blainville's (*Mesoplodon densirostris*) beaked whales in Hawai‘i. Canadian Journal of Zoology 84:1120-1128.

Barlow, J., and R. Gisiner. 2006. Mitigating, monitoring and assessing the effects of anthropogenic sound on beaked whales. Journal of Cetacean Research and Management 7:239-249.

Chivers, S.J., R.G. LeDuc and R.W. Baird. 2003. Hawaiian island populations of false killer whales and short-finned pilot whales revealed by genetic analyses**.** In Abstracts of the 15th Biennial Conference on the Biology of Marine Mammals, Greensboro, NC, December 2003.

Chivers, S.J., R.W. Baird, D.J. McSweeney, D.L. Webster, N.M. Hedrick, and J.C. Salinas. 2007. Genetic variation and evidence for population structure in eastern North Pacific false killer whales (*Pseudorca crassidens*)**.** Canadian Journal of Zoology 85:783-794.

Faerber, M.M., and R.W. Baird. 2007a. Beaked whale strandings in relation to military exercises: a comparison between the Canary and Hawaiian Islands. Presentation at the 21st Annual Conference of the European Cetacean Society, San Sebastian, Spain, April 22-27, 2007. Presentation available at www.cascadiaresearch.org/robin/hawaii.htm

Faerber, M.M., and R.W. Baird. 2007b. Does a lack of beaked whale strandings in relation to military exercises mean no impacts have occurred? A comparison of stranding and detection probabilities in the Canary and Hawaiian Islands. Abstract submitted to the 18th Biennial Conference on the Biology of Marine Mammals, Cape Town, South Africa, November-December 2007. (accepted for an oral presentation)

Huggins, J., R.W. Baird, D.L. Webster, D.J. McSweeney, G.S. Schorr and A.D. Ligon. 2005. Inter-island movements and re-sightings of melon-headed whales within the Hawaiian archipelago. Presentation at the 16th Biennial Conference on the Biology of Marine Mammals, San Diego, CA, December 2005.

Jefferson, T.A., D. Fertl, M. Michael, and T.D. Fagin. 2006. An unusual encounter with a mixed school of melon-headed whales (*Peponocephala electra*) and rough-toothed dolphins (*Steo bredanensis*) at Rota, Northern Mariana Islands. Micronesica 38:239-244.

Ligon, A.D., R.W. Baird, D.L. Webster, D.J. McSweeney, G.S. Schorr. 2007. Habitat preferences of melon-headed whales (*Peponocephala electra*) around the main Hawaiian

Islands: implications for interpretation of the 2004 Hanalei Bay stranding event. Abstract submitted to the 18th Biennial Conference on the Biology of Marine Mammals, Cape Town, South Africa, November-December 2007. (accepted for a poster presentation)

Martien, K.K., R.W. Baird and K.M. Robertson. 2005. Population structure of bottlenose dolphins (*Tursiops sp.*) around the main Hawaiian Islands. Presentation at the 16th Biennial Conference on the Biology of Marine Mammals, San Diego, CA, December 2005.

McSweeney, D.J., R.W. Baird, D.L. Webster, G.S. Schorr and S.D. Mahaffy. 2005. Requirements for conservation action? Small population size, high site-fidelity, strong associations, and uncertainty: pygmy killer whales off the island of Hawai‘i. Presentation at the 16th Biennial Conference on the Biology of Marine Mammals, San Diego, CA, December 2005.

McSweeney, D.J., R.W. Baird and S.D. Mahaffy. 2007. Site fidelity, associations and movements of Cuvier's (*Ziphius cavirostris*) and Blainville's (*Mesoplodon densirostris*) beaked whales off the island of Hawai‘i. Marine Mammal Science 23:666-687.

Rankin, S., T.F. Norris, M.A. Smultea, C. Oedekoven, A.M. Zoidis, E. Silva, and J. Rivers. 2007. A visual sighting and acoustic detections of minke whales, *Balaenoptera acutorostrata* (Cetacea: Balaenopteridae), in nearshore Hawaiian waters. Pacific Science 61:395-398.

Webster, D.L., R.W. Baird, D.J. McSweeney, A.D. Ligon and G.S. Schorr. 2005. High site-fidelity of a deep-water dolphin: rough-toothed dolphins in the Hawaiian archipelago. Presentation at the 16th Biennial Conference on the Biology of Marine Mammals, San Diego, CA, December 2005