MARINE MAMMAL COMMISSION

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Office of Protected Resources
National Marine Fisheries Service
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Dear Ms. LeBoeuf:

The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the draft National Marine Fisheries Service (NMFS) 2014 stock assessment reports (SARs) for marine mammals occurring in U.S. waters. These reports provide valuable information needed to understand and address important marine mammal conservation issues. The Commission appreciates NMFS's efforts to improve these reports, as well as the opportunity to review them, provide comments, and recommend further improvements.

Unfortunately, the available stock assessment information often is not sufficient to meet the requirements of the Marine Mammal Protection Act (MMPA). Limits in overall NMFS funding, as well as lack of prioritization of marine mammal stock assessments, have impeded the agency's ability to carry out its mandate under the MMPA. The Commission is aware of and appreciates NMFS's efforts to remedy these problems, and the Commission understands the difficulty of increasing funding to critical protected resource conservation needs in the current appropriations climate.

NMFS has recently launched a new initiative - the Protected Resources Science Investment and Planning Process (PRSIPP). Its intent is to increase funding and infrastructure for meeting protected species science needs through improved coordination and leveraging of existing resources, both within and external to NMFS. Although NMFS has only recently begun implementing the PRSIPP, the process is already assisting NMFS staff in evaluating the need for conducting multispecies, multidisciplinary surveys in all marine ecosystems for which NMFS has marine mammal jurisdiction, on a rotating six-year cycle (each region being surveyed at least once, some twice, during a single cycle). The Commission applauds these efforts and encourages NMFS to continue with the PRSIPP process.

GENERAL COMMENTS

Estimation of Cryptic Mortality

Section 117 of the Marine Mammal Protection Act requires that NMFS and the Fish and Wildlife Service describe in each stock assessment "the annual human-caused mortality and serious injury of the stock by source and, for a strategic stock, other factors that may be causing a decline or impeding recovery of the stock, including effects on marine mammal habitat and prey." Accordingly, NMFS regularly publishes mortality and serious injury estimates for each stock in its stock assessment reports. Mortality and serious injury numbers are reported most reliably by trained observers on fishing vessels, but mortalities and injuries also are self-reported by vessel captains, reported by researchers and mariners who encounter dead or injured marine mammals at sea, and by individuals and authorities who discover dead or injured marine mammals in ports or stranded on shorelines.

Reliably assessing the number of marine mammal mortalities and serious injuries is difficult even when the cause involves direct or operational interactions between marine mammals and fisheries. Marine mammals drowned in nets or on hooks may fall out or off before the gear is fully retrieved, or may not be observed even if an observer is on the cruise. Further, Karp et al. (2011) reported that 58 percent of 274 commercial fisheries managed by NMFS do not have observer coverage, and even a larger proportion of state-managed fisheries are unobserved. While self-reporting does occur, it is generally assumed to be rare. Van der Hoop et al. (2012) summarized 1,762 large whale deaths in the United States and Canada and attributed 28 percent to entanglement, ship strike, or other human causes; 14 percent to non-human causes; and 57 percent to undetermined causes. The various means of detecting marine mammals killed or seriously injured by human activities may be complementary to a degree (e.g., dead animals not detected by a fishery observer may be observed by a member of a stranding network). Still, the study by van der Hoop et al. (2012) indicates that the existing information is not sufficient to conclude the agencies are detecting all, or even most, marine mammals killed or seriously injured by human activities.

Because not all mortalities and serious injuries are detected, reported, or linked to a specific cause, NMFS rightly views the mortality and serious injury estimates it publishes as minimum estimates of total mortality and serious injury rates occurring over a given time interval. The negative bias of these estimates is acknowledged in stock assessment reports by referring to "minimum total annual mortality" or "minimum total annual takes" (emphasis added) in the tables. Narrative portions of those same reports often contain statements such as the following:

- "Annual rates calculated from detected mortalities should not be considered an unbiased representation of human-caused mortality, but they represent a definitive lower bound. Detections are haphazard and not the result of a designed sampling scheme. As such they represent a minimum estimate of human-caused mortality which is almost certainly biased low."[1]
- "…this figure is clearly an underestimate because personal-use subsistence fishers are not required to report marine mammal takes, and the commercial fishery has not been observed."[2]

[1] Waring et al. 2013, p. 11.
[2] Allen and Angliss 2014, p. 101.

- "Stranding records are a gross underestimate of mortality and serious injury and mortality because many animals and carcasses are never recovered."[3]

Marine mammals caught by or entangled in fishing gear or struck by vessels may not be included in published estimates because they are not discovered at sea or after stranding, are discovered but not reported, or are reported but the cause of injury or death cannot be determined or is not attributed to a fishery or a ship strike. There is broad agreement among experts within and outside NMFS that the number of dead or seriously injured animals that strand or are discovered at sea, for which a human-related cause can be determined, is only a fraction of the total. Indeed, of the marine mammals that die from whatever cause only a small proportion of the carcasses are detected or recovered.

In the last 25 years a dozen studies have estimated the portion of individuals dying that are subsequently detected – the carcass recovery rate (Heyning and Dahlheim 1990, Knowlton and Kraus 2001, Kraus et al. 2005, Moore and Read 2008, Robbins et al. 2009, Williams et al. 2011, Peltier et al. 2012, Punt and Wade 2012, Barbieri et al. 2013, Prado et al. 2013, Carretta et al. 2014, Wells et al. 2015). Those studies have varied in methodology, species and regions, and the estimated carcass recovery rates have, not surprisingly, varied considerably. However, it is readily apparent that carcass recovery rates appear to be very low, ranging from a high of 33% to a low of zero (average across 25 populations = 8.0%). The inverse of the carcass recovery rate is the cryptic mortality rate (i.e., the proportion of mortality that is not detected), which for these studies varied from 67% to 100% (average = 92%). The highest recovery rates occur for coastal and estuarine stocks, while recoveries of carcasses from pelagic stocks are generally rare. For example, offshore common bottlenose dolphins are 50 times less likely to strand than individuals from the coastal population (Perrin et al. 2011). These estimates are likely subject to considerable uncertainty, but the point being made here is that there have been no estimates of recovery rates for cetaceans greater than 33%. At this point, there is nothing to indicate that true recovery rates are substantially higher.

For the few populations with an estimated carcass recovery rate, that rate could be used in any given year to back calculate (estimate) the number of animals that died in the populations. For example, applying a carcass recovery rate of 20% to a recovery of 17 carcasses in one year would imply a mortality of 85 animals (17 x 1/0.20). This suggests that known or recorded mortality rates could be expanded or corrected to provide an estimate of the total mortality rate, where the correction is the reciprocal of the recovery rate expressed as a proportion. The correction factor could be applied to recoveries of carcasses killed by a particular human interaction (e.g., ship strike) to estimate the unknown total number of animals killed by ship strike. This approach, of course, relies on an implicit assumption that the probability of recovery does not significantly vary as a function of the cause of death, which would have to validated.

For example, Heyning and Dahlheim (1990) estimated the recovery rate of Pacific gray whales to be 5.0% (correction factor of 20.0) and later Punt and Wade's 2012 population analysis of the eastern population of gray whales suggested that the recovery rate was between 3.9% and 13.0% (correction factor between 7.69 and 25.6). The Punt and Wade data included strandings that occurred during the gray whale die-off of 1999 and 2000. Those whales were emaciated, and the lower body fat levels could have increased the probability of animals sinking before they were detected, which would have led to a lower recovery rate than would be expected in 'normal' years.

[3] Carretta et al. 2014, p. 5.

The 2014 draft Pacific SAR stated that rate of known mortalities and serious injuries of eastern North Pacific gray whales per year due to fishery interactions and ship strikes was 6.45. Applying the range of correction factors from the two studies cited above would suggest that the total mortality and serious injury rate due to fisheries and ship strikes was on the order of between 50 and 165 animals per year, rather than between six and seven. Most recently NMFS's Southwest Fisheries Science Center (SWFSC) estimated that the recovery rate of carcasses from the California Coastal stock of common bottlenose dolphins is 24.0% (Carretta et al. 2014), which corresponds to a correction factor of 4.2. In the most recent assessment for that stock, the rate of known mortality and serious injury was 0.2 animals per year (NMFS 2014), which would translate to an estimated total rate of 0.84 per year. In both cases (gray whales and coastal bottlenose dolphins) the reported rates were below the zero mortality rate goal (ZMRG = 10% of PBR, the potential biological removal level), but the corrected rates are likely above ZMRG, although still below PBR.

Certainly considerable analysis and research will be necessary before total mortality and serious injury rates can be rigorously estimated, but the research to date suggests that the observed rates are significantly negatively biased. Therefore, the Commission recommends that NMFS expand its efforts to understand and estimate the recovery rates of carcasses for marine mammal stocks, where the requisite data are available, and to report those estimated rates and their associated uncertainties in future stock assessment reports.

Stock Assessment Guidelines and Advancements

The GAMMS III recommendations were published in December 2011, and public comments were solicited in March 2012 (Moore and Merrick 2011). However, for three years NMFS stock assessment scientists have not been able to put those recommendations into practice because the corresponding stock-assessment guidelines have not been issued. While some of the GAMMS III recommendations may be problematic, most are not and are needed to improve the quality of NMFS's stock assessments. The Commission recommends that NMFS immediately publish new stock-assessment guidelines from the GAMMS III recommendations that are not controversial or problematic.

In recent years, NMFS's SWFSC has developed several new analytical methods that represent potential improvements to the stock assessment toolbox. The new methods include new correction factors for g(0) based on sea state (Barlow 2015), population estimates derived from trend analyses (Moore and Barlow 2011, Moore and Barlow 2013), mortality and serious injury rates averaged over more than the standard five years (Carretta and Moore 2014), model-based estimates of mortality and serious injury rates (Carretta 2015, Moore 2015), the estimation of a carcass recovery rate for California Coastal common bottlenose dolphins (Carretta et al. 2014), and the estimation of R_{MAX} from life history parameters (J. Moore, pers. comm.).

These new methods are in various stages of development, some have been published in peer-reviewed journals, one is in the gray literature, some have been presented to the Pacific Scientific Review Group (SRG) and some are still in preparation. The Commission believes that most, if not all, of these methods have the potential to substantially improve certain stock assessments. However, the Commission does not believe that they have been fully vetted for application to the management decision-making process. Further, the Commission notes that there does not appear to be a plan or set of criteria that would determine to which Pacific stock

assessments these methods will be applied in the future. Finally, there does not appear to be a mechanism whereby these methods could be reviewed and adopted by the other regions. The Commission recommends that NMFS develop guidelines for the development of new stock assessment methods that include review by appropriate experts not only on their scientific merit, but also on their application to the management decision-making process. Further, the Commission recommends that NMFS develop a mechanism for the timely (i.e., faster than the GAMMS process), joint review and adoption of new methods by all six of the science centers.

ATLANTIC AND GULF OF MEXICO

Serious Injury Information

In several of the large whale stock assessment reports the table on human-caused mortality and serious injury (Table 2) includes an "Unknown" category in the column marked "Fate." The Commission finds this confusing as it is not clear if it is the injury (severity or type) that is unknown or the fate of the animal. If the column refers exclusively to the fate of the animal what does the category "serious injury" represent? It appears that this column might be combining information on whether the fate of the animal is known or unknown, with the injury determination. To clarify the information presented in the stock assessment reports the Commission recommends that NMFS replace the term "Fate" as a column header in Table 2 with the term "Injury Determination" and limit the categories used under that heading to the following three: "Mortality" (when the individual is known to have died), "Serious injury" or "Prorated serious injury" as appropriate based on the large whale injury determination categories.

North Atlantic Right Whale

The Commission suggests that three serious injuries to North Atlantic right whales should be added to Table 2 in the stock assessment report:

1. Right whale # 1151(Mayvine) was found immobilized with a life-threatening entanglement on 4 September 2009 on Jeffreys Ledge. Although she was successfully disentangled the day she was discovered and appeared to be in good condition when released, it is our understanding that when she was next resighted in 2011 she was no longer in good condition and exhibited a further marked decline when she was last resighted in 2012. Serious injury criterion L5b considers superficial injuries as non-serious unless, based on subsequent resightings, "…there is indication that the whale's health has significantly declined as a result of the entanglement." To our knowledge there is nothing to indicate that this whale's decline was caused by something other than the entanglement, and therefore the observations subsequent to the disentanglement justify considering this a case of serious injury.

2. Right whale #4160, a 7-month old calf of #2160, was seen with fresh entanglement wounds but no attached gear and without its mother on 19 July 2011 in Provincetown Harbor. The mother was also subsequently found badly entangled without her calf. At the time the calf was found her condition was considered a serious injury and was so

listed in last year's stock assessment report. However, the calf was subsequently resighted as a juvenile in 2014 apparently in good condition. Based on that information, the Table indicates the injury status is now considered non-serious. In our view, this is inappropriate. The fact that the whale survived does not mean its condition was not a serious injury at the time and we do not believe it is appropriate to change that earlier assessment. The purpose of the serious injury determinations is to provide a measure of management's effectiveness and no action was taken to enhance this animal's potential survival. Separating a calf from its mother as a result of entanglement at 7 months of age is clearly a life-threatening situation for the calf. The fact that this animal has been able to survive thus far is not justification for altering its earlier assessment. Although we realize that Criterion L8 provides for changing a serious injury based on separation from its mother if the animal is subsequently found alive, we do not believe this is an appropriate decision. Therefore, the Commission recommends that when NMFS reviews and revises the policy on serious injury that it considers changing criterion L8 by deleting the provision for altering initial assessments about risks of separating mothers and calves pending better information on the length of calf dependence, and in the interim refrain from making alterations based on subsequent sightings.

3. Right Whale #3308 was found with extensive entanglement wounds but no attached gear on 20 July 2012 in the Gulf of Maine. Since that sighting, the Commission understands that this animal's condition has deteriorated with signs of thinning, wounds remaining open, a heavy load of cyamids and no clear signs of improving condition. As noted above, Criterion L5b calls for changing non-serious injuries to serious injuries if subsequent resightings indicate a declining condition.

The Commission recommends that NMFS reassess the serious injury determinations for right whales #1151, #4160, and #3308 and add these animals to the list of serious injuries in Table 2. As a general matter, where there may be some questions about the classification of an injury, steps should be taken to get as broad a view of the injury decisions as possible.

ALASKA

Subsistence/Alaska Native Harvest

As in previous years, many of the draft 2014 stock assessment reports state "…data on community subsistence harvests are no longer routinely being collected, and no new statewide annual harvest estimates exist." For ice seals the most recent statewide estimates come from 2000. Although NMFS has suggested that the level of subsistence harvest may not be a primary concern to the status of ice seal populations in the future, it certainly is a contributing factor to population dynamics and something that should be monitored both for the health of the seal populations as well as the hunters.

The Commission is not the only entity that has drawn attention to this shortcoming in the SARs on more than one occasion. Indeed even in its response to comments in previous years NMFS has acknowledged "…that information on subsistence harvest is necessary for ice-associated seals." See for example NMFS's responses to comments on the draft 2012 stock assessment reports (78 FR

19446, April 1, 2013, Comments 56, 63, and 74). Those responses describe how in December 2010 and March 2011, NMFS partnered with the Indigenous People's Council on Marine Mammals to convene two workshops of marine mammal hunters and representatives from Alaska Native Organizations to begin to develop a statewide program for monitoring subsistence hunting and harvests. The Commission recommends that NMFS reference any workshop reports or recommendations that came from those meetings in the stock assessment reports, and provide an update on the status of the development of a statewide program for monitoring subsistence hunting and harvests. Further the Commission recommends that the language in the SARs be adjusted to reflect these efforts and address the concerns about this shortcoming. For example, is the following statement from the ribbon seal SAR still accurate: "at this time, there are no efforts to quantify the total statewide level of harvest of ribbon seals by all Alaska communities"? The Commission is very interested in this topic and would be happy to meet with NMFS to discuss progress, next steps and any impediments to more recent harvest numbers being made available in the SARs.

North Pacific Right Whale

The stock assessment report states that "it is impossible to assess the threat of ship strikes to the North Pacific stock of right whales at this time." The Commission disagrees. A model developed by Van der Hoop and colleagues was used to estimate absolute probabilities of vessel strikes on North Atlantic right whales in the Roseway Basin south of Nova Scotia (van der Hoop et al. 2012). This model could be applied to North Pacific right whales facing ship-strike risk where they cross the great circle route just south of their foraging grounds in the southeastern Bering Sea, particularly where the route passes through the very narrow Unimak Pass. Little is known about the use of this area by right whales, but it is almost certain, given what is known about the migratory behaviour of the other right whale species, that they move through the area during migration. By making assumptions about when, where and how often they pass through the area, the model could be used to place bounds on the absolute probabilities of ship-strike. The Commission recommends that NMFS estimate the range of ship-strike probabilities and assess the results in the context of this stock's PBR level and a population-viability analysis.

PACIFIC

Hawaiian Monk Seal

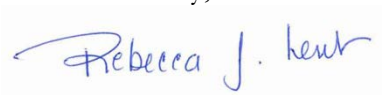
In the first paragraph of the section on Fisheries Information, Hawaiian monk seals are said to prey on two deep-water fish species that are targeted by the bottom handline fishery. The report states that this relationship "… highlight[s] the need to better understand potential ecological interactions with the Main Hawaiian Islands (MHI) bottomfish handline fishery." The Commission concurs and recommends that NMFS conduct further research on this relationship and explicitly incorporate the requirements of the MHI monk seal population into future stock assessments of the two deep-water species in question.

Eastern North Pacific Southern Resident Stock of Killer Whales

Regarding the section entitled "Current and Maximum Net Productivity Rates", given that there are so few stocks for which an empirical estimate of R_{MAX} (maximum net productivity rate) is available, it is encouraging that sufficient data are available to estimate R_{MAX} for this stock. However, the estimate is based on research that has been reported only in a conference presentation. The Commission recommends that NMFS use the default R_{MAX} for cetaceans (4%) for this stock until such time that the research from which the specific R_{MAX} estimate for this stock was derived has been peer reviewed and published.

The Commission appreciates the opportunity to provide comments on the draft 2014 marine mammal stock assessment reports. Please contact me if you have any questions regarding the Commission's rationale and/or recommendations.

Sincerely,



Rebecca J. Lent, Ph.D.
Executive Director

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