



# MARINE MAMMAL COMMISSION

25 July 2013

Mr. Christopher Yates  
Assistant Regional Administrator  
Protected Resources Division, Southwest Region  
National Marine Fisheries Service  
501 W. Ocean Blvd, Suite 4200  
Long Beach, CA 90802

Dear Mr. Yates:

The Marine Mammal Commission (MMC), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the National Marine Fisheries Service's (NMFS's) proposal of 8 May 2013 (78 Fed. Reg. 26751) to authorize the incidental taking of marine mammals from the California/Oregon/Washington stocks of fin, humpback, and sperm whales in the California thresher shark/swordfish drift gillnet ( $\geq 14$  inch mesh) fishery and the Washington/Oregon/California sablefish pot fishery (hereafter, the drift gillnet and sablefish pot fisheries, respectively).

## RECOMMENDATIONS

The Marine Mammal Commission recommends<sup>1</sup> that the National Marine Fisheries Service—

- before issuing permits, (1) describe and publish a notice of the process it plans to use to develop a take reduction plan for the sablefish pot fishery, (2) take affirmative steps to develop such a plan, (3) provide a statistical justification, taking into account available resources, for the statement that the current observer coverage in the drift gillnet fishery is “adequate to produce reliable estimates of mortality and serious injury of listed species” (78 Fed. Reg. 26756), or describe plans for attaining the recommended 30-percent coverage level, and (4) describe what alternative approach or approaches, such as gear marking, are necessary to obtain reliable estimates of serious injury and mortality rates in the sablefish pot fishery;
- use analytical approaches in this and future negligible impact determinations that are consistent with those used in its stock assessments and negligible impact determinations conducted in other regions, and ensure that those approaches make use of the best available science and data to minimize the negative bias in total serious injury and mortality rate estimates;
- authorize the taking of the specified humpback whale stock incidental to the drift gillnet and sablefish pot fisheries, once it has addressed the recommendations in the “Take Reduction Plans and Observer Programs” section of this letter;
- authorize the taking of the specified fin whale stock incidental to the drift gillnet and sablefish pot fisheries, once it has addressed the recommendations in the “Take Reduction Plans and Observer Programs” section of this letter;

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<sup>1</sup> Full recommendations are provided in the body of the letter. The core of each recommendation is repeated here to provide a readily accessible summary of the MMC's recommendations.

- authorize the taking of the specified sperm whale stock incidental to the sablefish pot fishery, once it has addressed the relevant recommendations in the “Take Reduction Plan and Observer Programs” section of this letter;
- before authorizing the taking of the specified sperm whale stock incidental to the drift gillnet fishery, assure that it has accounted for negative biases in serious injury and mortality estimates in some manner and followed its own criteria and guidance in making a negligible impact determination for this stock;
- incorporate the potential effect of negative bias in serious injury and mortality rate estimates in its negligible impact determinations and stock assessments, and make every effort to increase the reliability of those estimates by minimizing bias and increasing precision in those estimates; and
- in consultation with the MMC, review its negligible impact determination criteria and their application, and take the necessary steps to establish improved criteria that are clear, logical, internally consistent, and cover all probable scenarios.

## **RATIONALE**

Subject to specified criteria, section 101(a)(5)(E) of the Marine Mammal Protection Act (MMPA) directs NMFS to issue permits that authorize the taking of marine mammals from species or stocks listed as threatened or endangered under the Endangered Species Act (ESA) incidental to commercial fishing operations. Those criteria require NMFS to determine that (1) the authorized incidental serious injury and mortality will have a negligible impact on the affected marine mammal stocks; (2) an ESA recovery plan has been, or is being developed, for the affected stocks; (3) monitoring programs for the fisheries proposed to be included in the permit have been implemented; (4) take reduction plans have been, or are being, developed for the affected stocks; and (5) fishing vessels in the fisheries proposed to be permitted are registered. In this letter, we address the following issues:

- compliance with criteria 3 and 4 (“Take Reduction Plans and Observer Programs”),
- the analytical approach used in the negligible impact determination process (“Negligible Impact Determination – Analytical Process”),
- the negligible impact determinations for each stock (“Negligible Impact Determination – Humpback Whales / Fin Whales / Sperm Whales”),
- the issue of cryptic mortality in the estimation of serious injury and mortality (“Cryptic Mortality”), and
- the negligible impact criteria themselves (“Negligible Impact Determination Criteria”).

## **Take-Reduction Plans and Monitoring Programs**

NMFS, in its *Federal Register* notice, affirmed that (1) a recovery plan is in place for each of the three species; (2) a take reduction plan (TRP) developed by the Pacific Offshore Cetacean Take Reduction Team (POCTRT) was finalized in October 1997 for the drift gillnet fishery, and a TRP for the sablefish pot fishery is being developed; (3) the drift gillnet fishery has been observed regularly at levels (12-23 percent) that NMFS states are “adequate to produce reliable estimates of



mortality and serious injury” (emphasis added) since the early 1990s, and the sablefish pot fishery has been observed regularly since 2003, with between 1 and 6 percent annual coverage; and (4) the participants in both fisheries are registered in accordance with section 118(c). The MMC generally concurs with NMFS on the findings regarding recovery and take reduction plans as well as monitoring, but raises three concerns.

First, although NMFS reports that it has begun to develop a TRP for the sablefish pot fishery (M. DeAngelis, NMFS, pers. comm.), the details of that process have yet to be published and no TRT team has been formed. Alternatively, if NMFS intends to rely on the POCTRT to develop that plan, NMFS has not indicated its intent to augment its membership to provide the expertise needed to develop a TRP for this very different type of fishery. The MMC commends NMFS for the research underway to address the overlap between the sablefish pot fishery and humpback whales, as part of an effort to develop fishery entanglement risk models. As demonstrated by the success of the POCTRT and take reduction plan for the drift gillnet fishery, a science-based dialogue with stakeholders can lead to the development of effective management measures. Nevertheless, the MMC notes that the effort to develop fishery entanglement risk models, while part of a useful scientific foundation, does not constitute the development of a TRP.

Second, although these fisheries have observers, it is not clear that coverage is sufficient to meet the MMPA’s mandate under section 118(d)(1)(A) that such programs be adequate to “obtain statistically reliable estimates of incidental mortality and serious injury.” The most recent U.S. National Bycatch Report (Karp et al. 2011) states that “an observer program designed to provide data for estimating protected species bycatch may require a high coverage level because fishery interactions with these species occur infrequently.” Observer coverage in the drift gillnet fishery from 1998 to 2005 varied between 20 and 23 percent, its apparent target coverage, but subsequently declined to a low of 12 percent in 2010. NMFS concluded that this range of observer coverage is “adequate to produce reliable estimates of mortality and serious injury of listed species” (78 Fed. Reg. 26756; emphasis added). However, the Karp et al. 2011 report recommended that coverage levels for the California drift gillnet fishery “should be increased to 30% ... to better document bycatch of rare and sensitive species.” Following the bycatch of two sperm whales by the drift gillnet fishery in 2010, coverage was raised back to the 20 percent target, but not to the recommended 30 percent level.

Third, the sablefish pot fishery has been subject to much lower observer coverage. For the “open access fixed gear hook-and-line and pot gears” sector of the fishery, NMFS reports that coverage has varied between zero and 3.5 percent since 2002 (average 2.1 percent). For the limited-entry sector of the fishery, coverage rates are much higher. In any event, large whale entanglements are rarely detected by the owner of the gear because the gear is carried off by the whales. Indeed, it seems likely that identification of large whale serious injury and mortality in the sablefish pot fishery will need to rely on the identification of gear removed from disentangled or stranded whales. Therefore, regardless of the coverage level, placing observers on pot fishery vessels is not considered to be an effective way to estimate serious injury and mortality rates for large whales. The fishery needs to be monitored in a different manner to provide reliable estimates of serious injury and mortality rates for large whales. NMFS needs to identify how it intends to employ an alternative approach or alternative approaches, such as gear identification marking, to achieve reliable estimates of serious injury and mortality rates for large whales for this fishery. Consideration should be given



to the applicability of the modified gear-marking system proposed for northeast pot fisheries to the west coast pot fisheries (78 Fed. Reg. 42653).

Because of these concerns, the MMC recommends that NMFS, before issuing permits, (1) describe and publish a notice of the process it plans to use to develop a take reduction plan for the sablefish pot fishery, (2) take affirmative steps to develop such a plan, (3) provide a statistical justification, taking into account available resources, for the statement that the current observer coverage in the drift gillnet fishery is “adequate to produce reliable estimates of mortality and serious injury of listed species” (78 Fed. Reg. 26756), or describe plans for attaining the recommended 30-percent coverage level, and (4) describe what alternative approach or approaches, such as gear marking, are necessary to obtain reliable estimates of serious injury and mortality rates in the sablefish pot fishery.

### **Negligible Impact Determination – Analytical Process**

The MMC largely agrees with NMFS’s conclusions regarding negligible impacts, but has concerns about the methods used to estimate serious injury and mortality rates and to reach the finding of negligible impact on the sperm whale stock. A finding that the incidental take of affected species or stocks has a negligible impact is governed by five criteria, published by NMFS in 1999 (64 Fed. Reg. 28800), that relate a stock’s serious injury and mortality rate to the estimate of its potential biological removal (PBR) level, and consider its population trajectory. Criterion 1 allows a finding of negligible impact if the stock’s total human-related serious injury and mortality rate is less than 10 percent of its PBR level. Criterion 2 allows a finding of negligible impact if the total human-related serious injury and mortality rate exceeds the stock’s PBR level, but the total fisheries-related serious injury and mortality rate is less than 10 percent of that level. Criterion 3 allows a finding of negligible impact if the total fishery-related serious injury and mortality rate is less than the stock’s PBR level but greater than 10 percent of that level, and the size of the population (stock) is stable or increasing. Criterion 4, which is complex and somewhat opaque, applies to situations in which a stock is declining, and Criterion 5 does not allow a permit to be issued if the total fishery-related serious injury and mortality rate is greater than the stock’s PBR level.

Based on the analysis of available data as described in its draft negligible impact determination document (NMFS 2013), NMFS concluded that all three stocks meet Criterion 3. Accordingly, the agency indicated that “mortality and serious injury incidental to the CA thresher shark/swordfish drift gillnet fishery and the WA/OR/CA sablefish pot fishery will have a negligible impact on the CA/OR/WA stock of sperm whales, the CA/OR/WA stock of humpback whales, and the CA/OR/WA stock of fin whales,” and proposed to issue incidental take permits to these fisheries for a period of up to three years (78 Fed. Reg. 26751).

NMFS compared serious injury and mortality rates to the PBR levels for these stocks for two time periods, 1998-2011 and 2007-2011. The former interval corresponds to the period since implementation of the TRP for the drift gillnet fishery (62 Fed. Reg. 51805), and the latter to the standard most-recent-five-year-period used in stock assessments. The PBR estimates published in the most recent stock assessments for these stocks of fin, humpback, and sperm whales were 16, 11.3, and 1.5 whales, respectively.



Estimates of serious injury and mortality rates involving large whales rely principally on interactions documented by fishery observers, injuries reported by mariners and large-whale disentanglement teams, and examination of dead stranded whales. Fisheries-observer data may be used to estimate total fishery-related serious injury and mortality rates by multiplying the observed number of serious injuries and mortalities by the ratio of total fishing effort to the observed effort (the ratio method).<sup>2</sup> Such estimates are typically negatively biased, because not all animals that are injured or die on observed fishing trips are detected by the observer, and because fishermen may alter their fishing behavior and methods in the presence of an observer (Benoît and Allard 2009). Nevertheless, the extrapolations from observed serious injury and mortality numbers yield the best available estimates.

NMFS based its negligible impact determination on serious injury and mortality rates that are known to be negatively biased. In similar analyses, NMFS has been unable to address those biases because they could not be easily estimated or corrected. However, in its negligible impact determination NMFS did not extrapolate from the observed number of serious injuries and mortalities, but instead used only the actual numbers from the observed portions of the fisheries—implicitly assuming, without apparent justification, that no mortalities or serious injuries occurred in the unobserved (majority) portion of these fisheries. In one situation, however, a partial adjustment was available. Because the drift gillnet fishery is covered by an observer program, application of the ratio method could have provided an estimate of the number of serious injuries and mortalities in the unobserved portions of this fishery. The most recent sperm whale stock assessment referred to one observed serious injury and one mortality attributable to the drift gillnet fishery and three mortalities attributed to unknown fisheries over the most recent 5-year period (2006-2010). Applying the ratio method to these observations, as was done in the stock assessment, resulted in an estimated total fishery-related serious injury and mortality rate of 3.8, more than double the PBR level of 1.5. However, in its negligible impact determination, NMFS did not apply the ratio method, but instead assumed that the five observed fishery-related serious injuries and mortalities were the only ones for the fishery, which corresponded to an annual serious injury and mortality rate of 1.0. Because that rate was less than the stock's PBR level, NMFS concluded that a negligible impact finding was warranted. However, NMFS did not explain why it chose:

1. not to follow its own rules in making the negligible impact determination under Criterion 3, which is based on a comparison of “total fisheries-related serious injuries and mortalities” (emphasis added), not just observed serious injuries and mortalities, and PBR;
2. to, in effect, use a different method for the estimation of the total fishery-related serious injury and mortality rate than it uses in its stock assessment reports; and
3. to use a more biased estimate of the serious injury and mortality rate than the best estimate available.

An explanation of why NMFS made these choices is particularly important in the sperm whale case because the decision made the difference between being able and not being able to reach a determination of negligible impact. The same approach was used to estimate the serious injury and mortality rates for fin whales and humpback whales, although applying the ratio method in these

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<sup>2</sup> In some cases, an effort proxy, such as landings, is used.



cases would not have changed the negligible impact determinations. Finally, we note that in negligible impact determinations made recently in other regions, NMFS applied the same ratio-method approach it used in the corresponding stock assessments to estimate the total serious injury and mortality rate (75 Fed. Reg. 81972, 75 Fed. Reg. 29984).

Accordingly, the MMC recommends that NMFS use analytical approaches in this and future negligible impact determinations that are consistent with those used in its stock assessments and negligible impact determinations conducted in other regions, and ensure that those approaches make use of the best available science and data to minimize the negative bias in total serious injury and mortality rate estimates.

### **Negligible Impact Determination – Humpback Whales**

For humpback whales, the total human-related serious injury and mortality rates, as a percentage of the stock's PBR level, were 38 and 64 percent for the 14-year and 5-year periods, respectively. Total fishery-related serious injury and mortality rates, as a percentage of the stock's PBR level, were 32 and 53 percent. Thus, this stock did not meet the requirements of Criteria 1, 2, 4 or 5, but it did meet the first requirement of Criterion 3 (total fishery-related serious injury and mortality rate between the stock's PBR level and 10 percent of that level). Also, based on estimates of abundance from surveys and mark-recapture studies, NMFS concluded that the stock has been growing at a rate of roughly 6 to 7 percent per year since the late 1970s. Therefore, NMFS determined that the stock meets the remaining requirement of Criterion 3 (stable or increasing stock). The MMC agrees with this determination and recommends that NMFS authorize the taking of the specified humpback whale stock incidental to the drift gillnet and sablefish pot fisheries, once it has addressed the recommendations in the "Take Reduction Plans and Observer Programs" section of this letter.

### **Negligible Impact Determination – Fin Whales**

For fin whales, total human-related serious injury and mortality rates, as a percentage of the stock's PBR level, were 9 and 14 percent, and total fishery-related serious injury and mortality rates were 1.8 and 3.8 percent. Although none of the negligible impact criteria precisely fit this pattern of human- and fishery-related serious injury and mortality rates, NMFS concluded that Criterion 3 was the most applicable (S. Bettridge and M. DeAngelis, NMFS, pers. comm.). Criterion 3 allows a finding of negligible impact when total fishery-related serious injury and mortality rates exceed 10 percent of the stock's PBR level (the threshold for achieving the zero mortality rate goal), but not so large that they exceed the level of PBR, as long as the stock is increasing. In this case, fishery-related serious injury and mortality rates were less than 10 percent of the stock's PBR level, not only meeting, but surpassing the first part of Criterion 3. In its draft negligible impact determination document (NMFS 2013), NMFS cited (1) survey evidence that this stock of fin whales increased from 1979/1980 through the mid-1990s (Barlow 1994, 1997), although the trend was not statistically significant, and (2) a statistical analysis that showed the stock is growing at a rate of approximately 3 percent per year (Moore and Barlow 2011). Therefore, although not strictly applicable (because total fishery-related serious injury and mortality rates were less than 10 percent of the PBR level), NMFS



concluded that the fin whale stock met the requirements of Criterion 3 and that a finding of negligible impact is appropriate. The MMC finds merit in this analysis, and recommends that NMFS authorize the taking of the specified fin whale stock incidental to the drift gillnet and sablefish pot fisheries, once it has addressed the recommendations in the “Take Reduction Plans and Observer Programs” section of this letter.

### **Negligible Impact Determination – Sperm Whales**

For sperm whales, total human-related serious injury and mortality rates, as a percentage of the stock’s PBR level, were 53 and 93 percent, and total fishery-related serious injury and mortality rates, as a percentage of the stock’s PBR level, were 33 and 67 percent, for the 14-year and 5-year periods, respectively. Because Criterion 1 (total human-related serious injury and mortality rates less than 10 percent of the stock’s PBR level) was not met, and Criterion 2 (total human-related serious injury and mortality rates greater than the stock’s PBR level) did not apply, NMFS relied on Criterion 3 to reach its determination of negligible impact.

Sperm whales have not been recorded as bycatch in the sablefish pot fishery. Even though observer coverage in that fishery is extremely low and fishermen are unlikely to detect sperm whales that are killed or seriously injured in the fishery, the MMC believes that the likelihood of sperm whale interactions with this fishery is low or non-existent given the characteristics of the fishery and the relatively low susceptibility of sperm whales to entanglement in pot gear. Therefore, the MMC recommends that NMFS authorize the taking of the specified sperm whale stock incidental to the sablefish pot fishery, once it has addressed the relevant recommendations in the “Take Reduction Plan and Observer Programs” section of this letter. However, the MMC believes that NMFS’s analyses and reasoning need to be strengthened to comport fully with the requirements of Criterion 3 before an authorization for the drift gillnet fishery can be issued.

Criterion 3 ostensibly applies to the taking of this stock incidental to the drift gillnet fishery because NMFS stated that the fishery-related serious injury and mortality rate was less than the stock’s PBR level but greater than 10 percent of that level. However, as discussed below, there is good reason to believe that total fishery-related serious injury and mortality rates actually were greater than PBR. Even if this requirement of Criterion 3 was met, though, the criterion also requires that “the size of the population (stock) is stable or increasing” (emphasis added). NMFS apparently concluded that the stock is, at worst, stable, but did not provide a rigorous analysis to support that conclusion. The “Negligible Impact Determinations” section of the *Federal Register* notice states that the stock “is growing at a rate of 2%/year which is one half of the default maximum growth rate for cetaceans (4%).” The two-percent rate is not an empirical estimate of the stock’s growth rate, but, rather, a default assumption made in the stock assessments of a large number of stocks for the purpose of calculating PBR in the absence of an empirical estimate. In the section titled “Current Population Trend” in the most recent stock assessment report on this stock, there is a statement that “[t]o date, there has not been a statistical analysis to detect trends in abundance.” The stock assessment report does provide some information on, and interpretation of, population estimates from surveys. Comparable surveys of the California, Oregon and Washington coasts in 1993 and 1996 (pooled), 2001, 2005, and 2008, estimated sperm whale stock size to be 1407 (CV=0.39), 2593 (CV=0.30), 3140 (CV=0.40), and 300 (CV=0.51). Taken at face value, the



point estimates from the first three surveys would suggest an increasing trend and that from the last survey would suggest an abrupt decrease. NMFS stated in the 2012 stock assessment report (Carretta et al. 2013) and in its draft negligible impact determination document (NMFS 2013), that the low estimate in 2008 “may be due to interannual variability of sperm whale distribution,” and that there was “no reason to believe that the population has declined.” While the MMC is inclined to agree with these interpretations of the survey data and does not believe that the apparent patterns in the survey estimates should be taken at face value, Criterion 3 requires more than certainty than NMFS or the MMC is willing to ascribe to these interpretations. Criterion 3 requires that “the population is stable or increasing” (emphasis added; 64 Fed. Reg. 28801). However, an assumed growth rate, or an assumption of no trend because of a lack of sufficient data to demonstrate a trend, is not a rigorous or adequate basis upon which to conclude that the population is stable. NMFS suggests, and the MMC agrees, that this apparent decline is, perhaps entirely, a reflection of “interannual variability.” However, NMFS does not provide a compelling rationale, which the MMC believes is needed, for its conclusions or for its implicit rejection of the possibility that an actual population decline of much smaller magnitude could have occurred and contributed to the difference survey estimates.

The MMC recognizes that the population likely occupies an area much larger than the area surveyed, and, therefore, that such differences in abundance estimates could be due more to, perhaps entirely to, distribution variations than to changes in population size. However, the magnitude of the earlier variability—the three population estimates covered a range of just over a factor of two (1407 to 3140) over a period of 9 to 12 years—does not support an expectation of a pattern of variability that would include an order of magnitude change (3140 to 300) over a period of three years. This line of reasoning suggests the possibility that, although the change observed between 2005 and 2008 may represent only “interannual variability,” the stock may be showing a new pattern or exhibiting new dynamic behavior, a potential source of uncertainty that needs to be taken into account.

Given the incompletely understood migratory movements of sperm whales on the West Coast, possible shifts in prey distributions, highly patchy distribution of sperm whales, and variation and difficulty in estimating group size, it is possible that a decline in estimated abundance from 3140 to 300 in three years is, as suggested by NMFS, due entirely to “interannual variability.” In the absence of other data, however, it cannot be determined if this purported interannual variability is masking a trend in the population. In other words, even if much of the difference in estimates is due to such variability, some portion of the 90 percent decline in the population estimate between 2005 and 2008 might be attributable to an actual population decline. Because there are no data on which to base that determination, it is difficult to conclude that the population is not declining. NMFS might, from a frequentist perspective, argue that, in the absence of statistically significant evidence of a trend, acceptance of the null hypothesis of no trend is the appropriate conclusion. However, the MMC notes that, given the limited data available, the power to detect a small trend is very low.

The full text of Criterion 3 includes two cautionary statements (64 Fed. Reg. 28801). NMFS noted that, even if the serious-injury-and-mortality and population-trend conditions are met, incidental take authorizations should be “subject to individual review and certainty of data.” NMFS also recognized that, “as serious injuries and mortalities approach the PBR level, uncertainties in



elements such as population size, reproductive rates, and fisheries related mortalities become more important.” In the case of sperm whales, NMFS has not demonstrated a “certainty of data.” The lack of a trend analysis, the extreme variation in survey population estimates, and the abrupt, order-of-magnitude drop in estimated population size are indicative of what should be characterized as a scenario without “certainty of data.” In addition, because the serious injury and mortality rates are approaching (or even exceeding) the PBR level, especially in recent years, NMFS should have assessed the effect of uncertainty in population size, reproductive rates, and fishery-related serious injuries and mortalities on the magnitude of the serious injury and mortality estimates relative to the PBR level. Arguably, there is substantial uncertainty in all three of these variables – an order of magnitude variation in stock-size point estimates, large CV’s for those estimates, an unknown reproductive rate, and questionable estimates of serious injury and mortality. Given the negative bias in serious injury and mortality estimates, it is likely that, over the 14-year period used in the negligible impact analysis, undetected serious injuries and/or mortalities would have occurred in the drift gillnet fishery. Just one additional serious injury or mortality in the fishery during the latest 5-year period would have been sufficient to increase the total human-related and fishery-related serious injury and mortality rates to 106 and 80 percent of the stock’s PBR level, respectively. Applying Criterion 2, this would have precluded a determination of negligible impact.

The MMC recommends that NMFS, before authorizing the taking of the specified sperm whale stock incidental to the drift gillnet fishery, assure that it has accounted for negative biases in serious injury and mortality estimates in some manner and followed its own criteria and guidance in making a negligible impact determination for this stock. Specifically, to sustain a negligible impact determination, NMFS should demonstrate, given the available survey data and the degree of uncertainty in the data on population size and trends, reproductive rate and serious injury and mortality estimates, that it has a sound statistical basis for concluding that the stock is stable or increasing, in other words, that it is not declining.

### *Cryptic Mortality*

NMFS regularly publishes serious injury and mortality estimates for each stock in its stock assessment reports. Serious injury and mortality numbers are reported most reliably by trained observers on fishing vessels, but also are self-reported by vessel captains, reported by researchers and mariners who encounter injured or dead marine mammals at sea, and by individuals and authorities who discover injured or dead marine mammals in ports or stranded on shorelines. Because not all serious injuries and mortalities are detected or reported, estimates published by NMFS are viewed as minimum estimates of total serious injury and mortality rates occurring over a given time interval. 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 a fishery. Experts agree that the number of seriously injured or dead animals that strand or are discovered at sea, for which a human-related cause can be determined, is only a fraction of the total number that are seriously injured or killed. In its negligible impact determination for the proposed action, NMFS stated that mortality estimates are “considered a minimum because not all entangled animals die and not all dead animals are found, reported, or



cause of death determined.”<sup>3</sup> A very small number of studies have attempted to estimate the portion of individuals dying that are subsequently detected (Kraus et al. 2005, Williams et al. 2011, Punt and Wade 2012). Although a variety of factors would have to be considered before the results of these studies could be applied to other stocks and regions, it is important to note that the estimated carcass detection rates were all considerably less than fifty percent.

The negative bias in estimated serious injury and mortality rates is reflected in stock assessment report tables that label estimates of total mortality rates as “minimum total annual mortality” or “minimum total annual takes” (emphasis added). Narrative portions of those same reports typically contain statements such as the following:

- “Stranding data probably underestimate the extent of fishery-related mortality and serious injury because all of the marine mammals that die or are seriously injured may not wash ashore, nor will all of those that do wash ashore necessarily show signs of entanglement or other fishery-interaction.”<sup>4</sup>
- “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.”<sup>5</sup>
- “This estimate [of serious injury and mortality] is considered a minimum because not all entangled animals strand and not all stranded animals are found, reported, or cause of death determined.”<sup>6</sup>

The MMC recommends that NMFS incorporate the potential effect of negative bias in serious injury and mortality rate estimates in its negligible impact determinations and stock assessments, and make every effort to increase the reliability of those estimates by minimizing bias and increasing precision in those estimates. That effort should give full consideration to the potential value of increasing observer coverage, and of adapting existing methods or developing new methods to estimate all forms of undetected and unreported (cryptic) human-related mortality.

### **Negligible Impact Determination Criteria**

The MMC notes that the criteria established for determining negligible impact under section 101(a)(5)(E) of the Marine Mammal Protection Act are not well defined by statute. Furthermore, as illustrated by the fin whale case, the criteria developed by NMFS in 1999 constitute an incomplete set of scenarios, such that none may apply to a given stock, leaving NMFS without clear guidance. Other aspects of those criteria are unclear or problematic. Criterion 3 refers to “total fisheries-based serious injuries and mortalities”, but Criterion 2 refers simply to “fisheries-related serious injury and mortality.” It is not clear whether the word “total” was unintentionally omitted in Criterion 2, or perhaps it is referring to particular fisheries (e.g., to the fisheries subject to permitting). The full text of Criterion 4 is: “If the population abundance of a stock is declining, the threshold level of 0.1 PBR

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<sup>3</sup> National Marine Fisheries Service 2013, page 37.

<sup>4</sup> Waring et al. 2013, p. 37.

<sup>5</sup> Waring et al. 2013, p. 10.

<sup>6</sup> Allen and Angliss 2013, p. 180.



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will continue to be used. If a population is declining despite limitations on human-related serious injuries and mortalities below the PBR level, a more conservative criterion is warranted.” It is not clear what is meant by “the threshold level of 0.1 PBR will continue to be used”, or what path NMFS should take in the situation where a “more conservative criterion is warranted.” The MMC recommends that NMFS, in consultation with the MMC, review its negligible impact determination criteria and their application, and take the necessary steps to establish improved criteria that are clear, logical, internally consistent, and cover all probable scenarios. In addition, NMFS should examine its other authorities that play a part in making determinations under section 101(a)(5)(E) (e.g., recovery plans under the ESA and take reduction plans under section 118 of the MMPA) to identify possible modifications to fishing gear and practices that would reduce the likelihood of serious injury or mortality to the lowest degree practicable and further efforts to satisfy the zero mortality rate goal of the MMPA.

Thank you for the opportunity to comment on these authorizations for incidental take in the west coast fisheries. Please contact me if you have any questions about our recommendations and rationale.

Sincerely,



Rebecca J. Lent, Ph.D.  
Executive Director



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