MARINE MAMMAL COMMISSION

30 March 2012

Mr. P. Michael Payne, Acting Chief
Marine Mammal and Sea Turtle Conservation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring MD 20910

Mr. Mike Weimer, Chief
Resource and Mapping Support
U.S. Fish and Wildlife Service
4401 N. Fairfax Drive
Arlington, VA 22203

Re: Guidelines for Assessing Marine Mammal Stocks (GAMMS)

Dear Mr. Payne and Mr. Weimer:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the draft revisions to the Guidelines for Assessing Marine Mammal Stocks prepared by the National Marine Fisheries Service and announced in the *Federal Register* on 24 January 2012 (77 Fed. Reg. 3450). Section 117 of the Marine Mammal Protection Act establishes the requirements for stock assessments, which are intended to provide a scientific basis for protecting and conserving marine mammals and the ecosystems upon which they depend. The Commission appreciates the Service's efforts to revise the guidelines and thereby improve that basis. To further that end, the Commission provides the following recommendations and rationale regarding the proposed revisions described in Appendix IV of the workshop report (Moore and Merrick 2011).

RECOMMENDATIONS

The Marine Mammal Commission recommends that the National Marine Fisheries Service and, where appropriate, the Fish and Wildlife Service —

- implement the approach recommended in the workshop report to estimate N_{min} when the most recent surveys are out of date;
- convene a national workshop to systematically review the status of stock identification efforts and to identify and prioritize the information needed to improve stock identification;
- adopt the recommendations of the workshop report to (1) include, when appropriate, a statement in each assessment explaining that bycatch data are not sufficient to estimate the bycatch rate with acceptable precision and (2) treat each such stock as strategic unless and until the data are sufficient to demonstrate that it is not;

- require stock assessment authors to set PBR to zero in those cases that are not in accord with the commonly assumed PBR framework and that involve stocks with no tolerance for additional human-related removals;
- include in their stock assessments comparisons of PBR for feeding aggregations and estimate or apportion mortality and serious injury levels for each aggregation;
- apply the total unassigned mortality and serious injury to each affected stock in both data-rich and data-poor cases involving taking of mixed stocks that cannot be or are not identified in the field;
- discourage the use of informed interpolation, require strong justification where it is used, and require that it be accompanied by reasonable measures of uncertainty associated with the interpolation;
- require a summary of all human-caused mortality and serious injury in each stock assessment report;
- consider any marine mammal stock that has declined by 40 percent or more to be strategic;
- treat declining stocks with a greater than 50 percent probability of continuing to decline by at least 5 percent per year as strategic with the aim of reducing and eventually reversing the stock's rate of decline before designation as depleted is required;
- include all relevant sources or measures of uncertainty in stock assessment documents;
- require sections in stock assessment reports that identify and characterize non-lethal factors that may affect population status;
- continue to encourage more exchange between Regional Scientific Review Groups to ensure consistency where needed and to promote useful and informative exchange among them; and
- consider requiring in their stock assessment report a brief summary paragraph or table on the historical trend of the stock in question.

RATIONALE

The revisions to the guidelines were developed at a workshop sponsored by the National Marine Fisheries Service and Fish and Wildlife Service in February 2011. The workshop objectives were to—

> (1) consider methods for assessing stock status (i.e., how to apply the potential biological removal (PBR) framework) when abundance data are outdated, nonexistent, or only partially available;
> (2) develop policies for identifying stocks and applying PBR to small stocks, transboundary stocks, and situations where stocks mix; and
> (3) develop consistent national approaches to a variety of other issues, including reporting mortality and serious injury information in assessments. To meet those objectives, the workshop focused on the following nine specific topics.

Outdated abundance estimates (Topic 1)

Under existing guidelines (National Marine Fisheries Service 2005) abundance estimates that are more than eight years old are considered to be outdated and are not used to calculate PBR. In such cases PBR is considered "undetermined." However, this has created problems because the term "undetermined" has no statutory meaning in this context and may be wrongly interpreted to mean the allowable mortality is unlimited. Workshop participants discussed two methods to project numerical estimates of minimum abundance estimates (N_{min}) that would appropriately incorporate increasing uncertainty in projected abundance estimates with time and eliminate the use of the term "undetermined" to characterize PBR.

Workshop participants recommended a precautionary approach for generating N_{min} in the absence of up-to-date abundance estimates. The approach is flexible in that it takes into account existing data, can vary depending on whether the existing data indicate that the population is increasing or decreasing, and appropriately reflects increasing uncertainty in N_{min} estimates with increasing time since the last survey estimate. It also becomes more precautionary after eight years to ensure that the N_{min} estimate would not overestimate abundance in cases when stocks are declining at the most rapid rates documented to date. The Marine Mammal Commission considers the described approach to be duly precautionary and recommends that the National Marine Fisheries Service and the Fish and Wildlife Service implement the approach recommended in the workshop report to estimate N_{min} when the most recent surveys are out of date. By virtue of its precautionary nature, the proposed approach should provide an incentive for the Services and those whose activities are affected by the N_{min} estimates to advocate for more resources to maintain timely survey schedules. Because the approach allows some flexibility in the calculation of N_{min}, it also will be important for the Services' scientists to describe clearly how they have estimated N_{min} for each stock.

Improving stock identification (Topic 2)

The Marine Mammal Protection Act established "stocks" or "population stocks" as the appropriate conservation/management unit for marine mammals. In the 2005 revisions to the guidelines (National Marine Fisheries Service 2005), the National Marine Fisheries Service effectively redefined a stock as "a management unit that identifies a demographically isolated biological population." Under this definition, a group of marine mammals would be considered demographically isolated if "the population dynamics of the affected group is more a consequence of births and deaths within the group (internal dynamics) rather than immigration or emigration (external dynamics)." Since the passage of the Marine Mammal Protection Act, and particularly in the last two decades, advances in the field of genetics have provided new insights into the stock structure of marine mammals, indicating that such structure is often complex.

Accurate identification of stocks is vital to successful management of marine mammals. Inappropriate pooling of stocks may result in overestimates of minimum abundance and hence PBR, or may discourage surveys to estimate abundance because of the expense and logistics involved with large or widely distributed groups of marine mammals presumed to constitute a single stock. To date, the tendency has been to treat marine mammals distributed over large geographic regions as a single stock. In contrast, the original guidelines (Barlow et al. 1995) recognized that (1) the more

risk-averse strategy is to define stocks based on small groupings and only combine them when there was compelling evidence to do so and (2) such a risk-averse approach was more likely "…to restore and maintain stocks within their optimum sustainable population," in accordance with the Marine Mammal Protection Act.

The workshop report calls for more effort to improve stock delineations in the near future. The report also suggests that the guidelines be revised to include in each assessment a statement regarding the likelihood that the stock contains multiple demographically independent populations. Because stocks are the basic unit of conservation under the Act, the Marine Mammal Commission concurs with the workshop report on these points. The Commission also recommends that, in the near future, the National Marine Fisheries Service and the Fish and Wildlife Service convene a national workshop to systematically review the status of stock identification efforts and to identify and prioritize the information needed to improve stock identification.

Assessment of very small stocks (Topic 3a)

The Commission concurs with the workshop report that the estimation of bycatch for small populations can be particularly difficult, but also may be particularly important. The problem is that, although bycatch may occur relatively infrequently and observer coverage may not be adequate to estimate its frequency of occurrence, the population may be at elevated risk from bycatch because it is small. The workshop report reviews tradeoffs between increasing the number of years used to estimate the bycatch rate to increase precision in the mortality and serious injury rate, versus using fewer years to emphasize the most recent data but reducing precision by doing so. In the Commission's view, the workshop participants and report rightly emphasize use of the most recent five years of data when possible, but also using enough data to reduce imprecision in the estimate. Workshop participants and the report also emphasize that assessments should include a statement explaining when bycatch estimates are insufficiently precise and that the Services should interpret uncertainty in favor of such stocks by treating them as strategic unless the appropriate Service can confirm with data that such is not the case. The Marine Mammal Commission recommends that the National Marine Fisheries Service and the Fish and Wildlife Service adopt the recommendations of the workshop report to (1) include, when appropriate, a statement in each assessment explaining that bycatch data are not sufficient to estimate the bycatch rate with acceptable precision and (2) treat each such stock as strategic unless and until the data are sufficient to demonstrate that it is not. Here, too, this precautionary approach should increase the incentive to collect better information on the actual bycatch rate.

Assessment of small endangered stocks (Topic 3b)

The Marine Mammal Protection Act defines PBR to mean "the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population." The workshop participants considered how to estimate PBR for small, endangered populations or populations that are below their optimum sustainable population level but also declining or not recovering for reasons apparently not related to human activities. In both situations such populations appear to have no tolerance for additional human related take. That is, the dynamics of these stocks are not

consistent with the basic theory underlying the PBR approach. The problem here is that the PBR approach does not account for such situations.

The equation used to calculate PBR cannot produce a zero value unless the estimated net productivity rate of the population in question becomes zero or negative. Indeed, that may be the case naturally if depensatory processes come into play at some minimum population size; e.g., rates of reproduction decrease at or below this population size so that productivity is not sufficient to replaces losses from mortality. This may be the case for some populations that go extinct. In addition, in modern times when human activities have affected virtually all natural ecosystems, it may be difficult to confirm that the factors precluding a population's recovery to the optimum sustainable population level are completely unrelated to human activities. It is clear, however, that the populations in question appear to have zero tolerance for additional human-related removals.

The workshop report indicates that the participants favored giving authors of stock assessment reports some flexibility by not requiring that they report PBR in certain cases if they can justify doing so. The Commission does not disagree with that approach, but also believes that the authors should be able to report a PBR of zero if the circumstances warrant such a value. That approach seems the clearest way to convey that the population has no tolerance for human-related removals. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service and the Fish and Wildlife Service require stock assessment authors to set PBR to zero in those cases that are not in accord with the commonly assumed PBR framework and that involve stocks with no tolerance for additional human-related removals.

Apportioning PBR, allocating mortality for mixed socks, and estimating PBR for Transboundary stocks (Topic 4)

This topic covers several issues about which the Commission has long been concerned. The workshop report first addresses the issue of whether to apply the PBR model to feeding aggregations. This issue is complicated by the fact that some feeding aggregations have been recognized as management units. The debate as to whether to recognize them as biological stocks has not been fully resolved. Recognizing them as such may not be consistent with the Marine Mammal Protection Act if they appear to be part of a larger reproductive population. However, protecting them is important if the primary objective of the Act is to be achieved—that is, if the health and stability of the marine ecosystem is to be maintained—and marine mammals are to remain functional elements of the ecosystem of which they are a part. The workshop participants recommended calculating PBR values for feeding aggregations and reporting those numbers with information on human-related takes for each feeding aggregation. Despite questions regarding the management significance of such calculations, the Commission believes that the information will be informative, help identify localized problems, and focus management attention on those areas before the problems become larger. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service and Fish and Wildlife Service include in their stock assessments comparisons of PBR for feeding aggregations and estimate or apportion mortality and serious injury levels for each aggregation.

The second issue under this topic deals with apportioning mortality and serious injuries when incidental take involves several stocks with overlapping distributions and the information is not sufficient to attribute each death or serious injury to a specific stock. Here, the Services considered two situations, one referred to as data-rich and the other as data-poor. In data-rich cases, the report suggests that the best approach is to "partition mortality and serious injuries based on the relative abundance of the stocks within the region of concern." The report then indicates that, in data-poor situations, when relative abundances of different stocks in an area are unknown, the total unassigned mortality and serious injuries should be assigned to each stock within the affected area. The Commission concurs with the report for data-poor situations, but also believes that the same remedy should be applied to the data-rich cases. Here, the main issue is whether any of the stocks involved can tolerate the removals occurring from fishery interactions and other human-related activities. The tolerances of the affected stocks will vary not only as a function of their abundances, but also of their natural history traits and behavior. For example, irrespective of their relative abundances, two overlapping stocks may differ in their feeding environment (e.g., shallow or coastal versus deep or pelagic), which may in turn make them more or less likely to interact with fisheries. In such cases, the take from the most vulnerable stocks may be underestimated when takes are apportioned according to abundance. In short, apportioning take according to relative abundance is equivalent to assuming that individuals of all affected stocks are equally likely to interact with the human activity (e.g., the fishery). That assumption may easily be wrong unless the natural history, behavior, and distribution of the stocks are identical. Such an assumption also is not precautionary and may pose heightened risks to small stocks, in particular. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service and the Fish and Wildlife Service apply the total unassigned mortality and serious injury to each affected stock in both data-rich and data-poor cases involving taking of mixed stocks that cannot be or are not identified in the field. Doing so is the only way to be precautionary and also provides the appropriate incentive to develop better information about the affected stocks.

The third issue covered under this topic was the idea of extrapolating abundance estimates from a surveyed area to another area not surveyed to estimate a range-wide PBR. The workshop report recommends against doing so. Marine mammals are rarely (if ever) distributed evenly throughout their ranges and their distributions vary by a number of factors (e.g., season, sex, feeding strategy). The challenge in ecology is to explain the distribution and abundance of species. Doing so has proven to be an extraordinary challenge. The workshop report suggested that "informed interpolation" might be used, "as appropriate and supported by existing data," but such interpolation should be strongly justified because it may easily result in overestimation of abundance. Such interpolation obviously adds a considerable degree of uncertainty to abundance estimates and any resulting total estimates should be accompanied by reasonable measures of that uncertainty. In essence, such interpolation may easily increase risks to the affected stocks and, the Commission believes, would be justified only in rare cases. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service and Fish and Wildlife Service discourage the use of informed interpolation, require strong justification where it is used, and require that it be accompanied by reasonable measures of uncertainty associated with the interpolation.

Clarifying reporting of mortality and serious injury (Topic 5)

A number of human-related risk factors cause marine mammal mortality and serious injury, the extent of which is poorly known. Section 117 of the Marine Mammal Protection Act states that each draft stock assessment shall "…(3) estimate 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." The workshop report called for an added section in assessment reports entitled "Summary of the most important potential Human-caused Mortality (HCM) and Serious Injury threats that are unquantified." The Marine Mammal Commission considers such an addition to be essential if the reports are to satisfy the requirements of the Act. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service and Fish and Wildlife Service require a summary of all human-caused mortality and serious injury in each stock assessment report. Efforts to meet that requirement will almost certainly vary, perhaps markedly. With that in mind, the Commission encourages the Services to re-examine those report sections after one or two years to identify the most effective reporting strategies that could then be used to develop a consistent and informative reporting approach.

Guidelines for determining when stock declines are evident enough to label a stock "strategic" (Topic 6)

Under this topic, the workshop participants attempted to address two issues. The first was simply to indicate that any population that had declined by 50 percent would qualify for designation as depleted and, as such, also should be considered strategic. The workshop report clearly stipulates that this guideline is not intended to replace the existing working definition of the optimum sustainable population level, but rather to simplify and clarify the process for identifying strategic stocks. The Commission supports the general thrust of this recommendation, but also believes that the Services should be more precautionary by suggesting that a 40 percent decline is sufficient to consider a stock as strategic. A 40-percent threshold would be consistent with that established by the National Marine Fisheries Service as the threshold for designating a stock as depleted (45 Fed. Reg. 72178). Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service consider any marine mammal stock that has declined by 40 percent or more to be strategic.

The second issue was how to manage stocks that are declining at a high rate and expected to continue such a decline. The workshop report recommends that a stock be designated as strategic if it is declining and has a greater than 50 percent probability of continuing its decline of at least 5 percent per year. The Marine Mammal Commission recommends that the National Marine Fisheries Service treat such stocks as strategic with the aim of reducing and eventually reversing the stock's rate of decline before designation as depleted is required. The Commission considers this an appropriate, pro-active management approach.

Assessing stocks without abundance estimates or PBR (Topic 7)

The Services combined do not have abundance estimates, the most basic information needed for management, for about 30 percent of the identified stocks in U.S. waters (Allen and Angliss 2011; Carretta et al. 2011, Waring et al. 2011). Workshop participants discussed several alternatives to the PBR framework for assessing population status in the absence of such information. They concluded that detailed discussion and recommendations for addressing this problem was outside the scope of this particular workshop, but also acknowledged the need for additional discussions. This is a longstanding issue and the Commission has been engaged in discussions regarding improving stock assessments and the basis for setting priorities, both relevant to this topic. The Commission will continue to engage the Services on this topic, as the current lack of information is a fundamental impediment to informed, science-based management.

Characterizing uncertainty in key stock assessment report elements (Topic 8)

The Commission concurs with the workshop participants regarding the need to characterize the uncertainty regarding key stock assessment report elements. The report identified a number of elements that may be uncertain, such as stock status, abundance estimate, human-caused mortality and serious injury, other known sources of mortality, stock structure, and the question of whether the existing data would be sufficient to detect a precipitous decline if one were occurring. As a general rule, the Marine Mammal Commission recommends that the National Marine Fisheries Service and the Fish and Wildlife Service include all relevant sources or measures of uncertainty in stock assessment documents. Such indicators of uncertainty are essential for readers to form reliable conclusions regarding the status of the affected stocks and the factors affecting them.

Expanding the stock assessment reports to include non-serious injuries and disturbance (Topic 9)

The Commission supports revisions to the guidelines that encourage the authors to describe, as possible, "other non-lethal factors" affecting the status of the stock under consideration. First, scientists can rarely draw a clear and unambiguous line between lethal and non-lethal factors affecting stocks, as evident in recent efforts by the National Marine Fisheries Service to distinguish serious from non-serious injury. Second, such factors may have indirect effects on the probability of mortality and/or reproduction, both of which determine population status. Third, apparently non-lethal factors may have important effects on the habitat of marine mammals thereby lowering the environment's capacity to support the population. Fourth, even non-lethal factors may have significant cumulative effects on a population. Given the uncertainty about the population effects of such factors, the Marine Mammal Commission recommends that the National Marine Fisheries Service and the Fish and Wildlife Service require sections in stock assessment reports that identify and characterize non-lethal factors that may affect population status.

General recommendations

In the past, scientists in different regions have used different assessment and reporting methods, leading to systematic inconsistency among stock assessment reports. To a degree,

inconsistencies can be expected because the status of the stocks vary considerably. Inconsistency becomes a problem primarily when it involves the standards for information and/or the level of effort or diligence in meeting those standards. The original guidelines and various updates to them have helped avoid or correct inconsistencies and the Services are to be commended for providing such clear directions. Nonetheless, more could be done to ensure that all the assessment reports are meeting basic requirements. The regional Scientific Review Groups play an important role in promoting better stock assessments, including identifying areas where more consistency is needed on a national scale. To that end, the Marine Mammal Commission recommends that the National Marine Fisheries Service and Fish and Wildlife Service continue to encourage more exchange between these Regional Scientific Review Groups to ensure consistency where needed and to promote useful and informative exchange among them.

Recent discussions regarding means to improve stock assessment efforts have considered how to report historical information in them. One option is to carry the historical information in each new report and a second option is to simply refer to past reports to get that information. The Commission considers the historical information critical to conveying and understanding the status of a particular stock. The tendency to focus only on the most recent years may have at least two undesirable consequences. The first is that readers may essentially shift their baseline, only evaluating how a stock is doing relative to its recent history. The Commission does not agree that such a truncated perspective is appropriate. The second is that the historical record may include important information regarding stock dynamics that has important bearing on the stock's status but that may be missed if the stock assessment focuses only on the most recent period. To ensure such information is taken into account by and available to the reader and to minimize the amount of effort required of the stock assessment authors, the Marine Mammal Commission recommends that the National Marine Fisheries Service and the Fish and Wildlife Service consider requiring in their stock assessment report a brief summary paragraph or table on the historical trend of the stock in question.

Finally, it is worth noting that the stock assessment reports prepared by the Services' scientists can be very useful and informative documents. Similarly, it is noteworthy that the guidelines prepared for these documents have been insightful and helpful. In the Commission's view, this most recent effort to improve the guidelines for stock assessments (and therefore the assessments themselves) was very productive and successful in addressing issues that the Commission has long considered important. The Commission commends those scientists who led the effort or participated in it.

Please contact me if you wish to discuss the Commission's recommendations and rationale.

Sincerely,

Timothy J. Ragen

Timothy J. Ragen, Ph.D.
Executive Director

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