



MARINE MAMMAL COMMISSION

14 November 2012

Nicole R. Le Boeuf, Chief
Marine Mammal and Sea Turtle Conservation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3226

Dear Ms. Le Boeuf:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the draft 2012 stock assessment reports for marine mammals occurring in U.S. waters. These reports provide valuable information needed to understand and resolve important marine mammal conservation issues. The Commission appreciates the Service's work on the reports, as well as the opportunity to review them, provide comments, and recommend improvements.

Unfortunately, the available stock assessment information often is not sufficient to meet the requirements of the Marine Mammal Protection Act. Many stock assessments lack even the most basic information such as up-to-date minimum abundance estimates, which are necessary to calculate the stocks' potential biological removal (PBR) levels. Estimates of serious injury and mortality rates are lacking for even more stocks. In the absence of such information, managers cannot confidently determine the status of these stocks, the significance of human effects on them, and the effectiveness of management measures intended to protect them. In the end, the lack of information means that managers are likely to err by over- or under-protecting marine mammal species, either of which can be unnecessarily costly.

RECOMMENDATIONS

To improve stock assessment efforts generally, the Marine Mammal Commission recommends that the National Marine Fisheries Service—

- convene a workshop or series of workshops to explore novel ideas for detecting entanglements and ship strikes, improving information on their frequency and trends, reducing the bias in estimates of large whale mortality and serious injury caused by these interactions, and considering possible options for addressing these risk factors;
- in conjunction with the Fish and Wildlife Service, more completely assess human effects on marine mammals by (1) developing a framework for describing the full effects, both direct and indirect, of all human activities that may cause serious injury or mortality of marine mammals and then (2) incorporating that framework into stock assessment reports so that decision-makers are informed not only about the known information on a stock, but also about the degree of uncertainty regarding the other risk factors that may be affecting the stock's status and what would be required to reduce that uncertainty;

- consider the feasibility and advisability of providing explicit technical guidance on trend analysis and, for each stock assessment with no trend analysis, require an explicit explanation for why such an analysis could not be completed; and
- establish an internal review process to standardize the updating of the SARs within and across regions, and consider using a copy editor to check for completeness, errors, and consistency.

To improve stock assessment efforts in the Atlantic and Gulf of Mexico, the Marine Mammal Commission recommends that the National Marine Fisheries Service—

- expand Table 2 in the North Atlantic right whale report to include right whale #3903 as a serious injury and the unidentified dead right whale seen on 18 May 2006 as an entanglement-related mortality, and recalculate the five-year average of entanglement-related mortality and serious injury;
- expand the section of the report on right whale fishery-related mortality and serious injury to include the total number of entanglements between 2006 and 2012;
- expand the report for the Gulf of Maine harbor porpoise either to include a trend analysis and explanation, or to describe the reasons that the analysis and explanation cannot be provided. If the latter, then the Service also should explain how it plans to rectify the problem(s);
- contact Canadian officials to (1) determine the feasibility of an analysis of port catch levels to estimate the number of harbor porpoises caught in the Canadian Bay of Fundy sink gillnet fishery since 2002 and (2) pursue the development of a reliable means for estimating harbor porpoise bycatch in the Canadian Bay of Fundy; and
- conduct the required surveys of the western North Atlantic harbor and gray seal stocks, incorporate the results into the stock assessment reports, and use that information in its management of those stocks and the risk factors affecting them.

To improve stock assessment efforts in the Alaska region, the Marine Mammal Commission recommends that the National Marine Fisheries Service—

- meet with the Commission to discuss the impending changes in the Arctic and consider the development of (a) a long-term assessment strategy to characterize population abundance, stock status, and ecological and human interactions as climate disruption continues and (b) a long-term management strategy that anticipates the risks to ice seals and develops pro-active measures to avoid or minimize those risks;
- continue its efforts to (1) collaborate with the Alaska Native community to monitor the abundance and distribution of ice seals and (2) use seals taken in the subsistence harvest to obtain data on demography, ecology, life history, behavior, health status, and other pertinent topics; among other things, subsistence harvests provide opportunities to collect valuable data on ice seal populations in many parts of their ranges while minimizing the logistical requirements and costs;
- revise its stock assessments for the north Kodiak, south Kodiak, and Cook Inlet harbor seal stocks by (1) reducing the recovery factor to be consistent with the Service's 2005 guidelines,

- (2) recalculating their PBR values, (3) updating the stock assessment reports accordingly, including changing the status of the north Kodiak stock, and (4) working with Native communities to ensure that harvest numbers, when combined with other human-related serious injuries and deaths, do not exceed the PBR for the north Kodiak stock;
- conduct the research needed to (1) analyze and describe the risks to North Pacific right whales associated with increasing shipping traffic in the Bering Sea and North Pacific, paying particular attention to Unimak Pass, and of entanglement in fishing gear and (2) use that information to design management measures that will minimize the risk of ship strikes and entanglement, and that it ensure its activities do not significantly increase the risk faced by the whales;
 - make every effort to expedite the analysis of all passive acoustic, satellite telemetry, and other data available for North Pacific right whales, update the stock assessment report accordingly, and use those data to develop protective measures for this population; and
 - revise the stock assessment report for the North Pacific right whale stock to indicate that based on knowledge of migratory patterns of similar species, Hawaii and Mexico could be low latitude habitats used more regularly by North Pacific right whales than currently recognized.

To improve stock assessment efforts in the Pacific, the Marine Mammal Commission recommends that the National Marine Fisheries Service—

- first verify that compliance with the measures of the 1997 take reduction plan for sperm whales remains at a high level and monitor any changes in fishery effort that might systematically affect entanglement risk, and then reconvene the take reduction team only if either of those efforts reveal deficiencies;
- continue to plan and request funding for the necessary surveys to estimate abundance of Pacific Coast harbor seals but also consider alternative assessment approaches to update stock assessment reports for harbor seals along the Pacific coast; and
- review all available information on stock structure for Pacific Island stocks of melon-headed whales, pantropical spotted dolphins, and rough-toothed dolphins and update the stock assessment reports accordingly.

RATIONALE

GENERAL COMMENTS

Large whale mortality and serious injury from entanglement and ship strikes

Entanglement in fishing gear and ship strikes are important causes of mortality and serious injury for some whale species. Entanglement was determined to be the cause of death for 36 percent (31 of 87) of North Atlantic right whales necropsied between 1970s and 2009 (van der Hoop et al. 2012). In addition, photographs of whales with scars indicate that the rate of entanglement is increasing: 57 percent of individuals photographed through 1989 showed evidence of entanglement (Krauss 1990), 62 percent through 1996 (Hamilton et al. 1998), 73 percent through 2002 (Knowlton et al. 2005), and 83 percent through 2009 (Knowlton et al. 2012). This trend suggests that actions taken in recent decades to reduce the frequency and severity of entanglements have not been

sufficient, if they have been effective at all (Kraus et al. 2005, Knowlton et al. 2012). The records also indicate that observer programs are ineffective at detecting entanglement. Despite the evidence from photographs, observers have not reported a single entanglement since 1993.

This problem is not restricted to North Atlantic right whales. Robbins (2009) analyzed humpback whale photographs taken in the Gulf of Maine and found that 65 percent of 207 individual whales seen for the first time in the period from 2003 to 2006 (inclusive) bore entanglement scars. Only nine (6 percent) of those 207 whales were seen entangled. Robbins (2009) estimated annual entanglement-related mortality to be 19 to 29 whales per year, compared to an average of only three dead whales detected annually.

Similarly, the number of whale deaths from ship strikes is difficult to determine reliably. Of the 87 necropsies just described, ship strikes accounted for 38 (44 percent). However, few of these events were reported when they happened (Laist et al. 2001). Whales killed by ship strikes generally are not detected until they either strand and are examined fully at necropsy or a ship arrives in port with a carcass on its bow.

The 2012 draft stock assessments generally provide thorough descriptions of the available evidence indicating serious injury and death from entanglement and ship strikes. The problem is that the available evidence almost certainly is not sufficient to describe the full extent of such injury and death. This shortcoming is well illustrated by a statement in the 2012 assessment of the central North Pacific humpback whale stock:

... these estimates of serious injury/mortality levels should be considered a minimum. No observers have been assigned to several fisheries that are known to interact with this stock, making the estimated mortality rate unreliable. Further, due to limited Canadian observer program data, mortality incidental to Canadian commercial fisheries ... is uncertain. Though interactions are thought to be minimal, data regarding the level of humpback whale mortality related to commercial fisheries in northern British Columbia are not available, again indicating that the estimated mortality incidental to commercial fisheries is underestimated for this stock.

Clearly, the existing monitoring strategy is not sufficient to characterize the true serious injury and mortality rates from entanglements and ship strikes. That is understandable to a degree because these are difficult rates to assess. At the same time, the current situation should not be considered acceptable. Improving detection of these events will require new thinking and likely will require new fishing and shipping technology. Both are imperative because those rates already are considered significant for some listed species, and at least ship strikes are likely to increase over time with growth in international trade—commercial vessels account for about 95 percent of that trade (by weight). Service scientists have recognized the need to address these risk factors. Wade et al. (2011) called for a plan “to reduce or mitigate current and future threats to these whales from ship strikes ... and entanglement in fishing gear.” With that in mind, the Marine Mammal Commission recommends that the National Marine Fisheries Service convene a series of workshops to explore novel ideas for detecting entanglements and ship strikes, improving information on their frequency and trends, reducing the bias in estimates of large whale mortality and serious injury caused by these interactions, and considering possible options for addressing these risk factors.

Addressing all sources of human-caused mortality and injury

Section 117 of the Marine Mammal Protection Act requires that the National Marine Fisheries Service and 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.” The Service has acknowledged this directive in its correspondence with the Commission in previous years.

Assessing all human-caused mortality and serious injury is not feasible, however, under current conditions and with available resources and technology. Certainly the vast majority of natural deaths are not detected. Williams et al. (2011) used population estimates and adult survival rates for 14 cetacean species to estimate the number of individuals dying each year in the Gulf of Mexico. A comparison of those estimates to the known number of deaths based on strandings suggested that, for all species combined, just 2 percent of all marine mammal deaths are detected (range=0 to 6 percent). In regions with little land (e.g., the Hawaiian Islands), or very low population human density (e.g., Alaska) the detection rates are likely even lower.

Human-caused marine mammal deaths also may not be detected, reported, and attributed correctly to the cause. The last of these possibilities is particularly true when the cause of death is indirect, such as through fisheries competition or habitat degradation. Reliably assessing the number of marine mammal deaths and serious injuries is difficult even when the cause involves direct or operational interactions between marine mammals and fisheries. Marine mammals killed in nets may fall out of them before the nets are fully retrieved, and observers do not monitor the retrieval of most nets. Karp et al. (2011) reported that 58 percent of 274 commercial fisheries managed by the Service do not have observer coverage. 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 Services are detecting all, or even most, marine mammals killed or seriously injured by human activities.

The question, then, is how to improve estimates of human-caused marine mammal mortality and serious injury. The obvious solutions (e.g., comprehensive observer coverage, complete necropsies on all stranded carcasses) are expensive and/or logistically or technologically difficult, if not infeasible. However, those limitations are or have been true for many marine mammal conservation challenges and should not preclude efforts to seek at least incremental improvements in these assessment efforts. The first challenge for stock assessment scientists is to lay out reasonable hypotheses about which human activities may seriously injure or kill marine mammals, identify the species that may be affected, describe the information or the types of studies that would be needed to assess accurately the extent of serious injury or death, estimate the nature and types of resources (e.g., funding, infrastructure) that would be needed to conduct such studies, and describe to the best of their abilities the costs and consequences of either conducting the studies or failing to do so. All of that information provides a better basis for decision-makers within the Service to (1)

determine where or how they can most effectively use their existing resources and (2) estimate their future resource needs. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service, in conjunction with the Fish and Wildlife Service, more completely assess human effects by (1) developing a framework for describing the full effects, both direct and indirect, of all human activities that may cause serious injury or mortality of marine mammals and then (2) incorporating that framework into stock assessment reports so that decision-makers are informed not only about the known information on a stock, but also about the degree of uncertainty regarding the other risk factors that may be affecting the stock's status and what would be required to reduce that uncertainty.

Insufficient trend data

Section 117 of the Marine Mammal Protection Act requires that each stock assessment describes the current population trend, "including a description of the information upon which these are based." The Service did not estimate the current population trend in many 2012 reports, generally concluding that the available data were insufficient for that purpose. That conclusion may be warranted in many, if not all, cases because of insufficient data on population size over time, irreconcilable differences in assessment methods, or insufficient resources to conduct the needed analyses. Often, the reason(s) for not reporting trend data is(are) not described in the reports. In addition, the Service's regions may be using different criteria for concluding that a trend analysis can or cannot be conducted. That inconsistency may be due, at least in part, to the lack of guidance on trend analysis in the stock assessment guidelines (National Marine Fisheries Service 2005).

All that considered, the trend of each stock is one of the most important measures of its status. Even when stock assessment scientists cannot describe the reasons for or mechanisms of decline, it is vital to know whether a stock is increasing, stable, or declining, and if not stable, what the best estimate of the rate of change is. Given that the Service has substantial expertise on this matter, the Marine Mammal Commission recommends that the National Marine Fisheries Service consider the feasibility and advisability of providing explicit technical guidance on trend analysis and, for each stock assessment with no trend analysis, require an explicit explanation for why such an analysis could not be completed.

Updating stock assessments

Each year the Service updates the information in dozens of stock assessments. However, the updating process is not consistent across stock assessments and regions, and it is not difficult to find omissions, errors, and inconsistencies in the stock assessments or cases where information is almost outdated before analyses are completed. For example, the draft stock assessment report for harbor seals in Alaska cites three different date ranges when reporting estimates of annual mortality from subsistence harvest; two in the text (one in reference to a table) and a third in the table legend itself. The report for the North Atlantic right whale provides an example where important new information on the distribution of the species is omitted (e.g., Firestone et al. 2008, Jiang et al. 2007, Keller et al. 2006, Mellinger et al. 2007, Mellinger et al. 2011), undermining the reliability and credibility of the report.

The Commission will provide a separate list of similar errors and omissions to the Service in the form of staff comments. However, to avoid the perpetuation of errors moving forward the Marine Mammal Commission recommends that the National Marine Fisheries Service establish an internal review process to standardize the updating of the SARs within and across regions, and consider using a copy editor to check for completeness, errors, and consistency.

ATLANTIC AND GULF OF MEXICO

North Atlantic right whale

The draft 2012 stock assessment report for the North Atlantic right whale should include information on all sources of confirmed or suspected serious injury and mortality of North Atlantic right whales. Table 2 of the report does not include two cases that appear to constitute serious injury and death attributable to entanglement interactions. Those cases include an entanglement-scarred calf (#3903 in the right whale photo-identification catalogue) seen on 9 August 2009 in the Bay of Fundy with serious entanglement-related injuries, and a dead unidentified right whale seen floating off Montauk, Long Island, on 18 May 2006. Although the latter animal was not recovered, photographs of it reveal cuts on the jaw and peduncle likely caused by entanglement in fishing gear. Also, that whale's death was attributed to an entanglement injury in a recent review of lethal baleen whale entanglements (Cassoff et al. 2011). The Marine Mammal Commission recommends that the National Marine Fisheries Service expand Table 2 in the North Atlantic right whale report to include right whale #3903 as a serious injury and the unidentified dead right whale seen on 18 May 2006 as an entanglement-related mortality, and recalculate the five-year average of entanglement-related mortality and serious injury.

Similarly, the Atlantic Large Whale Disentanglement Network's database includes at least 23 reported right whale entanglements observed between 2006 and 2010 that are not reported in the section on right whale fishery-related mortality and serious injury. The Commission also understands that at least three other animals have been seen with entanglement scars. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service also expand the section of the report on right whale fishery-related mortality and serious injury to include the total number of entanglements between 2006 and 2012.

Gulf of Maine harbor porpoise

The stock assessment report for the Gulf of Maine/Bay of Fundy harbor porpoise stock does not include a trend analysis. The 2011 population estimate in the stock assessment, 61,959 (CV=0.32) is considerably lower than the last complete population estimate of 89,054 (CV=0.47) in 2006. Taken at face value, this is a 30 percent drop in just five years. The draft report did not discuss the difference or provide any explanation to help the reader judge whether it reflects a real decline or was related to changes in survey methods, coverage, or analysis. Given the high levels of bycatch from this stock and the concern that bycatch may be causing it to decline, the Service should provide an explanation that puts this large drop in perspective. To that end, the Marine Mammal Commission recommends that the National Marine Fisheries Service expand the report for the Gulf of Maine harbor porpoise either to include a trend analysis and explanation, or to describe the

reasons that the analysis and explanation cannot be provided. If the latter, then the Service also should explain how it plans to rectify the problem(s).

The same stock assessment report includes a description of the Canadian Bay of Fundy sink gillnet fishery. The assessment notes that the estimate of takes in this fishery during 2011 was based on a Canadian official's expert opinion, and that it might be possible to estimate bycatch rates from 2002 to 2010 based on an analysis of port catch levels. Given the lack of any recent by-catch estimates for this fishery, the Marine Mammal Commission recommends that the National Marine Fisheries Service contact Canadian officials to (1) determine the feasibility of an analysis of port catch levels to estimate the number of harbor porpoise caught in the Canadian Bay of Fundy sink gillnet fishery since 2002 and (2) pursue the development of a reliable means for estimating harbor porpoise bycatch in the Canadian Bay of Fundy.

Gray and harbor seals

The 2012 draft stock assessment reports do not include up-to-date estimates of gray and harbor seal abundance in the northwest Atlantic, apparently because the Service has not conducted recent aerial surveys. Researchers that have visited breeding sites such as Muskeget and Monomoy Islands indicate that seal populations have changed at those sites in recent years. Updating the reports with new information on abundance, distribution, and the relationship between U.S and Canadian populations of these species is necessary for a number of reasons, such as evaluating the potential effects of renewable energy development, quantifying the impact of gillnet and trawl fishery bycatch, and identifying the causes and significance of unusual mortality events (e.g., harbor seals in the Gulf of Maine experienced unusual mortality events in 2003, 2004, and 2006, and a new event began last month). The Commission commends the Service for its efforts to obtain a minimum raw count of non-pup gray seals from archived photos and understands that efforts are underway to obtain a survey correction factor and update abundance estimates. However, concurrent tagging programs and aerial surveys are required to do this reliably and have not been possible to date. Therefore, the Marine Mammal Commission repeats its recommendation from 2010 and 2011 that the National Marine Fisheries Service conduct the required surveys of the western North Atlantic harbor and gray seal stocks, incorporate the results into the stock assessment reports, and use that information in its management of those stocks and the risk factors affecting them.

ALASKA

Ice seals

The loss of Arctic sea ice arising from climate disruption poses considerable risks to ringed and bearded seals and, to a lesser extent, ribbon and spotted seals. The loss of sea ice likely is affecting now, and will continue to affect, their prey, predators, and reproductive habitat. Increased shipping, oil and gas development, military activities, commercial fishing, and coastal development—all facilitated by the warming temperatures and the loss of sea ice—will pose additional new risks to these species.

The Commission commented on this issue in its letter to the Service regarding the 2011 stock assessment reports. The Service responded that “NMFS understands that the viability of Arctic marine mammals in the context of a rapidly changing environment is a concern. NMFS will assess Arctic marine mammal abundance, trends, stock identification, foraging ecology, and vital rates, and how these features change in response to environmental and anthropogenic perturbations, as resources become available.”

The Commission recognizes that the Service is well aware of the risks posed by climate disruption to ice seals. However, the challenge associated with conserving these species should not be dismissed or discounted because of a lack of resources. At the least, the Service could be approaching this problem at two levels. First, its leaders should be making a strong case for the needed resources. The effects of climate disruption on these species likely will be profound—they may be extirpated throughout large portions of their respective ranges or perhaps even driven extinct. Second, at the regional level, the Service should be considering what tools it must develop and implement to prevent such extirpations or extinctions. Certainly research to assess their abundances, trends, distributions, movements, and various measures of individual animal health will help guide the conservation effort, but the Service—and the Commission as well—should be considering what other measures, in addition to research, should be initiated in the near future. For example, the agencies should consider the possibility of establishing marine protected areas and determining where such areas should be located. The agencies also should be considering what steps might be taken now to avoid or minimize the risks from secondary risk factors such as shipping, fishing, energy development, military activities, tourism, and coastal development.

Accordingly, the Marine Mammal Commission invites the National Marine Fisheries Service to meet with the Commission to discuss the impending changes in the Arctic and consider the development of (a) a long-term assessment strategy to characterize population abundance, stock status, and ecological and human interactions as climate disruption continues and (b) a long-term management strategy that anticipates the risks to ice seals and develops pro-active measures to avoid or minimize those risks.

As the Commission has long argued and the Service is demonstrating by example, working with Alaska Natives greatly benefits both research and conservation efforts and more such cooperation will be essential as the Arctic climate continues to change. To maximize research and management capacity in the Arctic, the Marine Mammal Commission recommends that the National Marine Fisheries Service continue its efforts to (1) collaborate with the Alaska Native community to monitor the abundance and distribution of ice seals and (2) use seals taken in the subsistence harvest to obtain data on demography, ecology, life history, behavior, health status, and other pertinent topics. Among other things, subsistence harvests provide opportunities to collect valuable data on ice seal populations in many parts of their ranges while minimizing the logistical requirements and costs.

Harbor seals

The Service’s 2005 guidelines for preparing stock assessment reports state that recovery factors of 1.0 should be used for stocks of unknown status only if N_{\min} , R_{\max} , and the estimated

numbers of serious injuries and deaths are unbiased and the stock structure is unequivocal (National Marine Fisheries Service 2005). The draft reports for three harbor seal stocks (north Kodiak, south Kodiak, and Cook Inlet) have unknown population trends and unknown status, and the information available for them does not meet the guidelines for using a recovery factor of 1.0. If a recovery factor of 0.5 is used, as indicated by the guidelines, their PBR values would be reduced to 128, 320, and 657, respectively. Importantly, the subsistence harvest from the north Kodiak stock, which is 131, would exceed this stock's PBR value of 128 without taking into account serious injury and deaths from other human activities. To address this concern, the Marine Mammal Commission recommends that the National Marine Fisheries Service revise its stock assessments for the north Kodiak, south Kodiak, and Cook Inlet harbor seal stocks by (1) reducing the recovery factor to be consistent with the Service's 2005 guidelines, (2) recalculating their PBR values, (3) updating the stock assessment reports accordingly, including changing the status of the north Kodiak stock, and (4) working with Native communities to ensure that harvest numbers, when combined with other human-related serious injuries and deaths, do not exceed the PBR for the north Kodiak stock.

North Pacific right whales

In the last two centuries the eastern population of the North Pacific right whale was severely reduced by whaling and is now perilously close to extinction (Brownell et al. 2001, Clapham et al. 2004, Wade et al. 2006, Wade et al. 2010). Totalling perhaps no more than 30-some individuals, it should not be expected to sustain any human-caused mortality. The available information on this population is not sufficient to quantify reliably the risk it faces from stochastic events, but there are good reasons to believe that it is at risk from human activities in the Bering Sea, western Gulf of Alaska, and at least portions of the North Pacific.

Experience with the North Atlantic right whale suggests that right whales are particularly susceptible to ship strikes that cause serious injury and death. This small population occupies the southeast Bering Sea during the summer and fall and, based on the seasonal movements of other right whale species and populations, it almost certainly winters south of the Bering Sea in warmer, calmer waters. To leave and return to the Bering Sea, the whales must use the Aleutian Island passes and, given their occurrence near Kodiak Island, they likely move through Unimak Pass. Unimak Pass is just 18.5 km wide at its narrowest point and is on the great circle route between the west coast of North America and Asia. From October 2006 through September 2007 nearly 4,500 commercial vessels transited the pass moving between North America and Asia (Transportation Research Board 2008). In addition, another 1,700 local vessels, mostly fishing boats, used the pass during that same period. These totals equate to an average of nearly 17 vessels per day. With the relatively steady increase in global commercial shipping, combined with the loss of Arctic sea ice and increased human activities in the Arctic, vessel traffic through Unimak Pass can be expected to increase substantially in the foreseeable future.

North Atlantic right whales also are highly susceptible to entanglement in gillnet and trap gear. As noted earlier in this letter, Knowlton et al. (2012) found that 83 percent of all known North Atlantic right whales photographed through 2009 bore scars indicative of entanglement in fishing gear. From 1970 to 2009, 31 western North Atlantic right whales from a population of roughly 350 to 400 are known to have died from entanglement in fishing gear (van der Hoop et al. 2012). Because most deaths at sea are not detected, the actual number killed is almost certainly higher.

These data suggest the potential for similar, possibly fatal interactions of eastern North Pacific right whales with the several gillnet and pot fisheries that operate in the Bering Sea and Gulf of Alaska, particularly within the North Pacific right whale critical habitat areas located in those waters.

The serious injury or death of a single whale from a ship strike or entanglement would increase substantially this population's risk of extinction. To prevent such occurrences, the Marine Mammal Commission recommends that the National Marine Fisheries Service conduct the research needed to (1) analyze and describe the risks to North Pacific right whales associated with increasing shipping traffic in the Bering Sea and North Pacific, paying particular attention to Unimak Pass, and of entanglement in fishing gear and (2) use that information to design management measures that will minimize the risk of ship strikes and entanglement, and that it ensure its activities do not significantly increase the risk faced by the whales.

In addition, given the urgent need for information on this critically endangered population, the Commission encourages the Service to continue using a variety of tools, such as satellite telemetry and passive acoustic monitoring, to better inform management and conservation efforts. Those efforts should be conducted cautiously so that the risks from research are minimized as well.

The Commission also understands the Service has been collecting acoustic data that could provide insights into the behavior, movements, and distribution of whales in this population. The Commission further understands that the acoustic data collected since 2007 has yet to be analyzed. If that is still the case, then the Commission requests an explanation for the data having not been analyzed. Given our collective ignorance about this population, any data that might help us develop protective measures should be examined post-haste. As a general matter, the Marine Mammal Commission recommends that the National Marine Fisheries Service make every effort to expedite the analysis of all passive acoustic, satellite telemetry, and other data available for North Pacific right whales, update the stock assessment report accordingly, and use those data to develop protective measures for this population.

Finally, with regard to North Pacific right whales the Commission finds the statement in the draft stock assessment that "there is no reason to believe that either Hawaii or Mexico have ever been anything except extralimital habitat for the species" suggests a conclusion that is overly dispositive and unjustified. Although some may have stated this to be true, such migrations are entirely consistent with migratory patterns of every other right whale species and population whose movements have been documented. Given that this species' calving grounds have never been documented, we believe it is premature to suggest the possibility that the low latitude areas referenced in this sentence are not calving areas. The Marine Mammal Commission therefore recommends that the National Marine Fisheries Service revise the stock assessment report for the North Pacific right whale stock to indicate that based on knowledge of migratory patterns of similar species, Hawaii and Mexico could be low latitude habitats used more regularly by North Pacific right whales than currently recognized.

PACIFIC

Sperm whales

Following the 1997 implementation of a Pacific Offshore Cetacean Take Reduction Plan, which included skipper education workshops and required the use of pingers and minimum 6-fathom extenders, overall cetacean entanglement rates in the drift gillnet fishery off the Pacific West Coast dropped considerably (Barlow and Cameron 2003). Sperm whales have been entangled only 10 times in over 8,000 observed drift gillnet sets since 1990. Six entanglements occurred prior to the use of pingers in this fishery. Two entanglements (1996 and 1998) occurred in sets that did not use a full complement of pingers, and two animals were entangled in 2010 in a single net where a full complement of 40 pingers was used (Carretta and Enriquez 2012). However, because of the low estimated abundance of sperm whales (751) the two entanglements in 2010 result in estimated annual fisheries mortality of 3.8 individuals, which exceeds the PBR (1.5) of the California/Oregon/Washington sperm whale stock. Exceeding the PBR usually would lead the Commission to recommend that the Service reconvene the take reduction team. However, sperm whale entanglements in the California drift gillnet swordfish fishery are infrequent and the coefficient of variation for the mortality estimate is relatively high (0.95), which indicates the take estimate has considerable variability. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service first verify that compliance with the measures of the 1997 take reduction plan for sperm whales remains at a high level and monitor any changes in fishery effort that might systematically affect entanglement risk, and then reconvene the take reduction team only if either of those efforts reveal deficiencies.

Harbor seals

Abundance estimates for harbor seals along the Oregon and Washington coasts and in Washington inland waters currently are more than eight years old and are considered outdated based on standards that the Service has set and the Commission supports. Those harbor seals are taken in both gillnet and trawl fisheries, and new aerial surveys to estimate abundance are needed to evaluate the significance of such takes. The Commission understands that the Service has planned and requested funding for both harbor seal and harbor porpoise surveys in this region in recent years but the surveys were not funded. The Marine Mammal Commission commends the National Marine Fisheries Service for recognizing the need for these surveys and recommends that the Service continue to plan and request funding for the necessary aerial surveys to estimate abundance of Pacific Coast harbor seals, but also consider alternative assessment approaches (e.g., boat- or land-based surveys, use of index sites) to update stock assessment reports for harbor seals along the Pacific coast.

Pacific Islands cetaceans

The Commission acknowledges the efforts of the Service to survey and generate abundance estimates for many of the cetaceans in the Hawaiian Archipelago and Palmyra Atoll. Still, much more remains to be done to meet the objectives of the Marine Mammal Protection Act, particularly to assess cetacean stock structure around remote Pacific island groups such as American Samoa, Guam, the Northern Marianas, and Wake Island. Information on the stock structure of three

species—melon-headed whales, pantropical spotted dolphins, and rough-toothed dolphins—has been published recently or has been presented at recent meetings of the Pacific Scientific Review Group. All three species face threats from anthropogenic interactions, including fisheries interactions and shooting, and management efforts are more likely to be effective if stock structure is accurately described. Therefore the Marine Mammal Commission recommends that the National Marine Fisheries Service review all available information on stock structure for Pacific Islands stocks of melon-headed whales, pantropical spotted dolphins, and rough-toothed dolphins and update the stock assessment reports accordingly.

Please contact me if the Commission can support in any way the Service's efforts to improve these important stock assessments.

Sincerely,



Timothy J. Ragen, Ph.D.
Executive Director

cc: Shannon Bettridge

References

- Barlow, J. and G.A. Cameron. 2003. Field experiments show that acoustic pingers reduce marine mammal bycatch in the California drift gillnet fishery. *Marine Mammal Science* 19(2):265–283.
- Brownell, R.L., P.J. Clapham, T. Miyashita, T. Kasuya. 2001. Conservation status of North Pacific right whales. *Journal of Cetacean Research and Management* 2:269–286.
- Calambokidis, J., G.H. Steiger, J.M. Straley, T. Quinn, L.M. Herman, S. Cerchio, D.R. Salden, M. Yamaguchi, F. Sato, J.R. Urban, J. Jacobson, O. Von Ziegeler, K.C. Balcomb, C.M. Gabriele, M.E. Dahlheim, N. Higashi, S. Uchida, J.K.B. Ford, Y. Miyamura, P. Ladrón de Guevara, S.A. Mizroch, L. Schlender, and K. Rasmussen. 1997. Abundance and population structure of humpback whales in the North Pacific basin. Final Contract Report to Southwest Fisheries Science Center, La Jolla, California, 72 pages.
- Carretta, J.V., and L. Enriquez. 2012. Marine mammal and seabird bycatch in California gillnet fisheries in 2010. Administrative Report LJ-12-01, available from Southwest Fisheries Science Center, 3333 N. Torrey Pines Court, La Jolla, California 92037, 16 pages.
- Cassoff, R.M, K.M. Moore, W.A. McLellan, S.G. Barco, D.S. Rotstein, and M.J. Moore. 2011. Lethal entanglement of baleen whales. *Diseases of Aquatic Organisms* 96:175–185 doi: 10.3354/dao02385.
- Clapham, P.J., C. Good, S.E. Quinn, R.R. Reeves, J.E. Scarff, and R.L. Brownell, Jr. 2004. Distribution of North Pacific right whales (*Eubalaena japonica*) as shown by 19th and 20th century whaling catch and sighting records. *Journal of Cetacean Research and Management* 6(1):1–6.

- Firestone, J., S.B. Lyons, C. Wang, and J.J. Corbett. 2008. Statistical modeling of North Atlantic right whale migration along the mid-Atlantic region of the eastern seaboard of the United States. *Biological Conservation* 141:221–232.
- Hamilton P.K., M.K. Marx, and S.D. Kraus. 1998. Scarification analysis of North Atlantic right whales (*Eubalaena glacialis*) as a method of assessing human impacts. Report to National Marine Fisheries Service, Woods Hole, Massachusetts, 39 pages.
- Jiang, M., M.W. Brown, J.T. Turner, R.D. Kenney, C.A. Mayo, Z. Zhang, and M. Zhou. 2007. Springtime transport and retention of *Calanus finmarchicus* in Massachusetts and Cape Cod Bays, U.S.A., and implications for right whale foraging. *Marine Ecology Progress Series* 349:183–197.
- Karp, W.A., L.L. Desfosse, and S.G. Brooke. 2011. U.S. National Bycatch Report. NOAA Technical Memorandum NMFS-F/SPO-117E, 508 pages.
- Keller, C.A., L.I. Ward-Geiger, W.B. Brooks, C.K. Slay, C.R. Taylor, and B.J. Zoodsma. 2006. North Atlantic right whale distribution in relation to sea-surface temperature in the southeastern United States calving grounds. *Marine Mammal Science* 22(2):426–445.
- Knowlton, A.R., M.K. Marx, H.M. Pettis, P.K. Hamilton, and S.D. Kraus. 2005. Analysis of scarring on North Atlantic right whales (*Eubalaena glacialis*): monitoring rates of entanglement interaction 1980–2002. National Marine Fisheries Service, Contract #43EANF030107, Final Report.
- Knowlton, A.R., P.K. Hamilton, M.K. Marx, H.M. Pettis, and S.D. Kraus. 2012. Monitoring North Atlantic right whale *Eubalaena glacialis* entanglement rates: a 30-year retrospective. *Marine Ecology Progress Series* 466:293–302.
- Kraus, S.D. 1990. Rates and potential causes of mortality in North Atlantic right whales (*Eubalaena glacialis*). *Marine Mammal Science* 6(4):278–291.
- Kraus, S.D., M.W. Brown, H. Caswell, C.W. Clark, M. Fujiwara, P.K. Hamilton, R.D. Kenney, A.R. Knowlton, S. Landry, C.A. Mayo, W.A. McLellan, M.J. Moore, D.P. Nowacek, D.A. Pabst, A.J. Read, and R.M. Rolland. 2005. North Atlantic right whales in crisis. *Science* 309:561–562.
- Laist, D.W., A.R. Knowlton, J.G. Mead, A.S. Collet, and M. Podesta. 2001. Collisions between ships and whales. *Marine Mammal Science* 17(1):35–75.
- Mellinger, D.K., S.L. Nieukirk, H. Matsumoto, S.L. Heimlich, R.P. Dziak, J. Haxel, and M. Fowler. 2007. Seasonal occurrence of North Atlantic right whale (*Eubalaena glacialis*) vocalizations at two sites on the Scotian Shelf. *Marine Mammal Science* 23(4):856–867.
- Mellinger, D.K., S.L. Nieukirk, K. Klinch, H. Klinch, R.P. Dziak, P.J. Clapham, and B. Brandsdóttir. 2011. Confirmation of right whales near a nineteenth-century whaling ground east of southern Greenland. *Biology Letters* 7:411–413.
- National Marine Fisheries Service. 2005. Revisions to Guidelines for Assessing Marine Mammal Stocks. 24 pages. Available at www.nmfs.noaa.gov/pr/pdfs/sars/gamms2005.pdf.
- Robbins, J. 2009. Scar-based inference into Gulf of Maine humpback whale entanglement: 2003–2006. Report submitted to the Northeast Fisheries Science Center, Woods Hole, Massachusetts, 34 pages.
- Transportation Research Board, Committee on the Risk of Vessel Accidents and Spills in the Aleutian Islands: A Study to Design a Comprehensive Assessment. 2008. Risk of vessel accidents and spills in the Aleutian Islands: designing a comprehensive risk assessment. National Academies of Science, Special Report 293.

- van der Hoop, J.M., M.J. Moore, S.G. Barco, T.V.N. Cole, P.-Y. Daoust, A.G. Henry, D.F. McAlpine, W.A. McLellan, T. Wimmer, and A.R. Solow. 2012. Assessment of management to mitigate anthropogenic effects on large whales. *Conservation Biology*, in press (published online: 1 October 2012).
- Wade, P.R., M.P. Heide-Jorgensen, K. Shelden, J. Barlow, J. Carretta, J. Durban, R. LeDuc, L. Munger, S. Rankin, A. Sauter, and C. Stinchcomb. 2006. Acoustic detection and satellite tracking leads to discovery of rare concentration of endangered North Pacific right whales. *Biology Letters* 2:417–419.
- Wade, P.R., A. Kennedy, R. LeDuc, J. Barlow, J. Carretta, K. Shelden, W. Perryman, R. Pitman, K. Robertson, B. Rone, J. Carlos Salinas, A. Zerbini, R.L. Brownell, Jr., and P. Clapham. 2011. The world's smallest whale population. *Biology Letters* 7:83–85.