

**FINAL**

**Marine Mammal Protection Act Section 101(a)(5)(E)  
Negligible Impact Determination  
CA/OR/WA Fin Whale  
CA/OR/WA Humpback Whale  
CA/OR/WA Sperm Whale**

National Marine Fisheries Service  
Protected Resources Division  
Southwest Regional Office  
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## 2.0 List of Abbreviations

CA	California
CFR	Code of Federal Regulations
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
DGN	Drift gillnet
Emergency Rule	Temporary Emergency Rule for the drift gillnet fishery
ESA	Endangered Species Act
EEZ	Exclusive Economic Zone
Fm	Fathom
FMP	Fishery Management Plan
$F_r$	Recovery Factor
GAMMS	Guidelines for Assessing Marine Mammal Stocks
IWC	International Whaling Commission
LOF	List of Fisheries
MMPA	Marine Mammal Protection Act
MNPL	Maximum Net Productivity Level
$N_{MIN}$	Minimum population estimate
NMFS	National Marine Fisheries Service
Nm	Nautical mile
OR	Oregon
PBR	Potential Biological Removal
Plan	Pacific Offshore Cetacean Take Reduction Plan
$R_{MAX}$	Maximum theoretical net productivity rate
SAR	Stock Assessment Report
SI/M	Serious injury and mortality
Team	Pacific Offshore Take Reduction Team
VMS	Vessel Monitoring System
WA	Washington

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## 5.0 Executive Summary

Section 101(a)(5)(E) of the Marine Mammal Protection Act (MMPA), 16 U.S.C. 1361 *et seq.*, states that NOAA's National Marine Fisheries Service (NMFS) shall for a period of up to three years allow the incidental taking of marine mammal species listed under the Endangered Species Act (ESA), 16 U.S.C. 1531 *et seq.*, by persons using vessels of the United States and those vessels which have valid fishing permits issued by the Secretary (50 CFR 216.103; 50 CFR 229.2) in accordance with section 204(b) of the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1824(b) (50 CFR 660), while engaging in commercial fishing operations, if NMFS makes certain determinations. NMFS must first determine, after notice and opportunity for public comment, that:

- (1) the incidental mortality and serious injury from commercial fisheries will have a negligible impact on the affected species or stock;
- (2) a recovery plan has been developed or is being developed for such species or stock under the ESA; and
- (3) where required under section 118 of the MMPA, a monitoring program has been established, vessels engaged in such fisheries are registered in accordance with section 118 of the MMPA, and a take reduction plan has been developed or is being developed for such species or stock.

This document presents the analyses for determining whether the incidental mortality and serious injury from the California thresher shark/swordfish drift gillnet fishery ( $\geq 14$  in mesh) will have a negligible impact on California/Oregon/Washington stocks fin whales, humpback whales, and sperm whales and whether the Washington (WA)/Oregon (OR)/ California (CA) sablefish pot fishery will have a negligible impact on CA/OR/WA humpback whale stock.

### *Fisheries Considered for Authorization*

The Marine Mammal Protection Act mandates that each commercial fishery be classified by the level of serious injury and mortality of marine mammals that occurs incidental to each fishery. The List of Fisheries (LOF) classifies U.S. commercial fisheries into one of three Categories according to the level of incidental mortality or serious injury of marine mammals. This classification is based on the rate, in numbers of animals per year, of incidental mortality and serious injury of marine mammals due to commercial fishing operations relative to a stock's Potential Biological Removal (PBR) level, defined (50 CFR 229.2) as the maximum number of animals, not including natural mortality, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population.

A fishery may qualify as one Category for one marine mammal stock and another for a different marine mammal stock. A fishery is categorized on the LOF at its highest classification (*e.g.*, fishery qualifying for Category III for one marine mammal stock and for Category II for another marine mammal stock will be listed under Category II). Category I fisheries have frequent incidental mortality and serious injury of marine mammals and Category II fisheries have occasional incidental mortality and serious injury of marine mammals (16 U.S.C. 1387(c)(1); 50

CFR 229.2). Category III fisheries have a remote likelihood of, or no known incidental mortality and serious injury of marine mammals. The CA thresher shark/swordfish drift gillnet fishery ( $\geq 14$  in mesh) and the WA/OR/CA sablefish pot fishery are the Category I and II fisheries currently considered for authorization. All other Category II fisheries that interact with the marine mammal stocks observed off the coasts of Washington, Oregon, and California are state-managed and are not considered for authorization under this permit. The total human-related serious injury and mortality calculated to make a negligible impact determination for this authorization included all human sources, such as commercial fisheries and ship strikes.

### *Criteria for Determining Negligible Impact*

In 1999 NMFS adopted criteria for making negligible impact determinations for MMPA 101(a)(5)(E) permits (64 FR 28800; May 27, 1999). In applying the 1999 criteria to determine whether mortality and serious injury incidental to commercial fisheries will have a negligible impact on a listed marine mammal stock, Criterion 1 (total human-related serious injury and mortality are less than 0.1 PBR) is the starting point for analysis. If this criterion is satisfied (*i.e.*, total human-related serious injuries and mortality are less than 0.1 PBR), the analysis would be concluded as a negligible impact. The remaining criteria describe alternatives under certain conditions, such as fishery mortality below the negligible threshold but other human-caused mortality above the threshold or fishery and other human-caused mortality between the negligible threshold and PBR for a stock that is increasing or stable. If Criterion 1 is not satisfied, NMFS may use one of the other criteria as appropriate.

We used two time frames for this analysis. The first time frame for the data used in this analysis is from 1998 (the first full year post- Pacific Offshore Cetacean Take Reduction Plan (Plan) implementation (October 30, 1997)), through December 31, 2011. This 14-year time frame was chosen initially because after the Plan<sup>1</sup> was implemented, regulations required skippers to use at least 36' extenders and pingers in the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh), which is considered to have reduced the incidental take of many marine mammal species, particularly cetaceans (Carretta and Barlow 2011). This time frame also provided a comprehensive look at all of the fisheries, including the WA/OR/CA sablefish pot fishery, given changes in oceanographic conditions, fishing practices, and reporting and stranding records. The 2001 time/area closure of the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh) off central and northern California/southern Oregon is also encompassed in this time frame. The second time frame for the data used in this analysis includes the most recent five-year period (January 1, 2007 through December 31, 2011). A five-year time frame provides enough data to adequately capture year-to-year variations in take levels, while reflecting current environmental and fishing conditions as they may change over time. Additionally, because the permit issued under MMPA section 101(a)(5)(E) is for a three-year period, the most up-to-date data available for complete years is used (*i.e.*, 2007-2011). By using two time frames for the analyses (1998-

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<sup>1</sup> The 2011 U.S. Pacific Marine Mammal Stock Assessment Reports (Carretta *et al.* 2012) and the MMPA LOF indicate that no fin whales have interacted with either the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) or the WA/OR/CA sablefish pot fishery in the last five years, the time period used to determine PBR. As such, a take reduction plan is not required for the CA/OR/WA stock of fin whales because mortality and serious injury of this stock incidental to commercial fishing operations is at insignificant levels approaching a zero mortality and serious injury rate.

2011 and 2007-2011), we took a precautionary approach by ensuring that a negligible impact determination could be made for both time frames considered.

Only the mortality and serious injury incidental to commercial fishing in the two fisheries interacting with these stocks is subject to the negligible impact determination; however, total human-caused mortality and serious injury should be below PBR. The serious injury and mortality is below PBR for the CA/OR/WA fin and humpback whale stocks, but the serious injury and mortality is currently above PBR for the CA/OR/WA sperm whale stock. At this time no fishery other than the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh) has documented takes of sperm whales. NMFS convened the Pacific Offshore Cetacean Take Reduction Team (Team) on July 31 and August 7, 2013 and charged the Team with developing recommendations to reduce sperm whale serious injury and mortality in the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh). NMFS considered the Team's recommendations and developed an emergency rule (RIN 0648-BD57) to modify the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh) to reduce the risk of incidental mortality and serious injury of sperm whales incidental to the fishery such that the negligible impact determination conditions of the MMPA section 101(a)(5)(E) could be met; thereby allowing NMFS to provide incidental take authorization under the ESA and MMPA for the 2013-2014 fishing season. The emergency rule includes several provisions to reduce the risk to sperm whales and monitor the fishery. Specifically, the emergency rule provides for immediate closure of the California thresher shark/swordfish DGN ( $\geq 14$  inches) fishery if one sperm whale is observed killed or seriously injured in DGN gear off California, and requires all DGN fishing vessels to carry a NMFS-trained observer from August 15, 2013 to January 31, 2014 in a 100% observer coverage area. The observer coverage area includes nearly all areas in the U.S. exclusive economic zone (EEZ) deeper than the 1,100 fathoms (fm) (2,012 meters (m)) depth contour. Owners/operators of vessels intending to fish with DGN gear will be required to install, activate, carry and operate a vessel monitoring system (VMS) prior to embarking on a DGN fishing trip after the effective date of this rule.

NMFS intends to reconvene the Team to consider long-term measures for reducing sperm whale mortality and serious injury in the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh) in subsequent fishing seasons. It is expected that any future changes to the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) that may occur as a result of modifying the Pacific Offshore Take Reduction Plan would not change the negligible impact analysis. The underlying data indicate that there is a very low likelihood that another fishery may take a sperm whale, but in the unlikely event that a mortality or serious injury occurs during the three-year time frame for this authorization, the negligible impact determination would be re-evaluated pursuant to section 101(a)(5)(E)(iii), (iv), and (v) of the MMPA (16 U.S.C. §1371(a)(5)(E)(iii), (iv), and (v)). The total potential mortality and serious injury per year is expected to be minimized and below the PBR for each of the three stocks considered in this analysis.

### *Negligible Impact Determinations*

In considering the appropriate criteria to use for determining whether federally-managed commercial fisheries off the U.S. west coast are having a negligible impact on the CA/OR/WA stocks of fin whales, humpback whales, and sperm whales, Criterion 1 was not satisfied because

the total human-related serious injury and mortality for these stocks are not less than 0.1 PBR for either time period considered. The 14-year (1998-2011) annual average serious injury and mortality to the CA/OR/WA stock of fin whales from all human-caused sources is 1.71, or 10.71% of the PBR and the 5-year (2007-2011) annual average annual average serious injury and mortality from all human-caused sources is 2.2 or 13.75% of the PBR. The 14-year (1998-2011) average annual serious injury and mortality to the CA/OR/WA stock of humpback whales from all human sources is 4.29 or 38.0% of the PBR and the 5-year (2007-2011) average annual human-caused mortality or serious injury is 7.2 or 63.7% of the PBR. The 14-year (1998-2011) average annual serious injury and mortality to the CA/OR/WA stock of sperm whales from all human sources is 2.1 or 138.1% of the PBR and the 5-year (2007-2011) average annual human-caused mortality or serious injury is 4.2 or 279.97% of the PBR. As a result, the other criteria were examined for the CA/OR/WA stocks of fin, humpback, and sperm whales.

Criterion 2 is satisfied if *total human-related* serious injuries and mortalities *are greater than* PBR and the *total fisheries-related* mortality *is less than* 0.1 of PBR. For the CA/OR/WA fin whale stock, Criterion 2 was partially satisfied because the human-related serious injury and mortality is not greater than PBR but the total fisheries-related mortality is less than 0.1 of PBR. The fishery-related mortality and serious injury of the CA/OR/WA fin whale stock is 3.8% (5-year) and 3.6% (14-year) of PBR (which is 16). Fin whales do not precisely fit the criteria as written for Criterion 3, either. Criterion 3 is satisfied if total *fishery-related* serious injury and mortality is *greater than* 0.1 PBR and *less than* PBR and the population is stable or increasing. The fisheries-related serious injury and mortality for this stock of fin whales is less than 0.1 of PBR and therefore less than PBR for both time periods considered. Fin whales do not precisely meet the criteria, as written, for Criterion 2 or 3, but a negligible impact determination can still be made for the fin whale stock because of individual review of data regarding the stock, including increased growth rate of the stock, limited increases in serious injury and mortality due to the relevant fisheries, and the level of human-caused mortality and serious injury is below the estimated PBR and falls within both Criteria 2 and 3.

Criterion 2 was not satisfied for the CA/OR/WA stocks of humpback whales or sperm whales, and, as a result, the other criteria were examined for those stocks. Criterion 3 was satisfied for the CA/OR/WA humpback whales and conditionally for sperm whale stocks as the total fishery-related serious injury and mortality is greater than 0.1 PBR and is anticipated to be less than PBR following implementation of the Emergency Rule (RIN 0648-BD57), and the population is stable (sperm whales) or increasing (humpback whales). The fishery-related mortality and serious injury from all commercial fisheries for the CA/OR/WA humpback whale stock is estimated at 31.6% of PBR (14-year average from 1998-2011) and 53.1% of PBR (5-year average from 2007-2011). Accordingly, Criterion 3 is satisfied in determining that mortality and serious injury of the CA/OR/WA humpback whale stock incidental to commercial fishing would have a negligible impact on the stock because of individual review of data regarding the stock, including increased growth rate of the stock, limited increases in serious injury and mortality due to the relevant fisheries, and the level of human-caused mortality and serious injury is below the estimated PBR.

For the CA/OR/WA sperm whale stock, the fishery-related mortality and serious injury from all commercial fisheries is estimated at 119.3% (14-year) and 253.3% (5-year) of PBR. A total of three sperm whales were observed by NMFS' federal observers as either seriously injured or

killed in the CA thresher shark/swordfish DGN fishery since 1998, and none have interacted with the WA/OR/CA sablefish pot fishery. Because those 3 sperm whales were observed by NMFS' federal observers, the numbers of animals that interacted with the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) are extrapolated by the percent observer coverage for that year. Thus, in 1998, the observer coverage was 20% and the one observed animal is extrapolated to a total of five animals. Similarly, in 2010, the two animals that interacted with the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) were observed at an observer coverage rate of 11.9%, resulting in an extrapolated value of 16 total animals. In an effort to minimize the risk of annual bycatch of sperm whales so that it is less than PBR (current PBR is 1.5), modifications have been made to the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) for the 2013/2014 fishing season. As part of the Emergency Rule (RIN 0648-BD57) there will be a fixed cap of one serious injury or mortality for sperm whales (the current PBR for sperm whales is 1.5 animals per year and one serious injury or mortality per year is below this stock's current PBR). If the cap is met and one sperm whale take occurs in the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh), the fishery would be immediately closed for the rest of its season (*i.e.*, until January 31, 2014). NMFS intends to reconvene the Team to consider long-term measures for reducing sperm whale mortality and serious injury in the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh) in subsequent fishing seasons and it is expected that the bycatch of sperm whales by the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh) will not exceed PBR and Criterion 3 will still be satisfied. The time frame for the negligible impact authorization presented here is for a period of up to three years. It is expected that any future changes to the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) that may occur during that time will not change the negligible impact analysis. However, if a take of a sperm whale (CA/OR/WA stock) occurs in any commercial fishery and it is a serious injury or mortality, that take is included in the total fishery-related serious injury or mortality considered under Criterion 3 of the negligible impact determination. The underlying data indicate that there is a very low likelihood that another fishery may take a sperm whale, but in the unlikely event that a mortality or serious injury occurs during the three-year time frame for this authorization, the negligible impact determination would be re-evaluated pursuant to section 101(a)(5)(E)(iii), (iv), and (v) of the MMPA (16 U.S.C. §1371(a)(5)(E)(iii), (iv), and (v)). The CA/OR/WA sperm whale stock is stable and bycatch is anticipated to remain at greater than 0.1 of PBR and less than PBR. Based on this information and the applicability of Criterion 3, NMFS determines that the mortality and serious injury incidental to commercial fisheries will have a negligible impact on the CA/OR/WA stock of sperm whales.

In conclusion, based on the criteria outlined in 1999 (64 FR 28800), the 2011 U.S. Pacific Marine Mammal Stock Assessment (Carretta *et al.* 2012), and the best scientific information and data available, NMFS has determined that for a period of up to three years, mortality and serious injury incidental to the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh) will have a negligible impact on the CA/OR/WA stock of fin whales, the CA/OR/WA stock of humpback whales, and the CA/OR/WA stock of sperm whales, and that the and the WA/OR/CA sablefish pot fishery will have a negligible impact on the CA/OR/WA stock of humpback whales. Therefore, these identified commercial fisheries within the range of the CA/OR/WA fin, humpback, and sperm whale stocks may be permitted subject to their individual review and the certainty of relevant data, and provided that the other provisions of section 101(a)(5)(E) are met.

## 6.0 Introduction

Section 101(a)(5)(E) of the Marine Mammal Protection Act (MMPA), 16 U.S.C. 1361 *et seq.*, states that NOAA's National Marine Fisheries Service (NMFS), as delegated by the Secretary of Commerce, shall for a period of up to three years allow the incidental taking of marine mammal species listed under the Endangered Species Act (ESA), 16 U.S.C. 1531 *et seq.*, by persons using vessels of the United States and those vessels which have valid fishing permits issued by the Secretary (50 CFR 216.103; 50 CFR 229.2) in accordance with section 204(b) of the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1824(b) (50 CFR 660), while engaging in commercial fishing operations, if NMFS makes certain determinations. NMFS must first determine, after notice and opportunity for public comment, that:

- (1) the incidental mortality and serious injury from commercial fisheries will have a negligible impact on the affected species or stock;
- (2) a recovery plan has been developed or is being developed for such species or stock under the ESA; and
- (3) where required under section 118 of the MMPA, a monitoring program has been established, vessels engaged in such fisheries are registered in accordance with section 118 of the MMPA, and a take reduction plan has been developed or is being developed for such species or stock.

The purpose of this document is to explain the analyses and rationale for determining whether mortality and serious injury incidental to commercial fisheries will have a negligible impact on the California/Oregon/Washington (CA/OR/WA) stock of fin whales (*Balaenoptera physalus*), the CA/OR/WA stock of sperm whales (*Physeter macrocephalus*), and the CA/OR/WA stock of humpback whales (*Megaptera novaeangliae*), which are listed as endangered under the ESA (*i.e.*, determination (1) above). Seven Category I or II (as defined in the MMPA and described in Section 4.0) federal- and State-managed commercial fisheries are within the range of the CA/OR/WA fin, sperm, and humpback whale populations and have been observed to interact with and, in some cases, cause serious injury or mortality to these whales. They are the:

- CA thresher shark/swordfish drift gillnet (DGN) fishery ( $\geq 14$  in mesh);
- CA halibut/white seabass and other species set gillnet ( $> 3.5$  in mesh);
- CA spot prawn pot fishery;
- CA Dungeness crab pot fishery;
- Oregon Dungeness crab pot fishery;
- WA/OR/CA sablefish pot fishery;
- WA coastal Dungeness crab pot/trap fishery<sup>2</sup>

Of the seven fisheries described above, only the two federally managed fisheries, the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) and the WA/OR/CA sablefish pot fishery will be considered for authorization of incidental take by fishers. The other five fisheries are

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<sup>2</sup> Fisheries as classified in the 2013 List of Fisheries (78 FR 53336; August 29, 2013).

managed by the State(s) and were not considered for authorization of incidental take by fishers under this permit. However, the total human-related serious injury and mortality calculated to make a negligible impact determination for this authorization did include all human sources, such as commercial fisheries (*i.e.*, including the five Category II fisheries listed above) and ship strikes. Determinations related to recovery plans and related to the requirements of MMPA section 118 above, will be made in a *Federal Register* notice to issue the necessary permit.

## **6.1 Process and Criteria for Issuing a MMPA section 101(a)(5)(E) Permit**

Among the requirements of MMPA section 101(a)(5)(E) to issue a permit to take ESA-listed marine mammals incidental to commercial fishing, NMFS must determine whether the taking of marine mammals would have a negligible impact on the affected stock or stocks of marine mammals. Such determinations are required only in MMPA section 101(a)(5) and are currently required in authorizing the take of small numbers of any stock of marine mammals incidental to activities other than commercial fishing (Sections 101 (a)(5)(A) and (D)) or in permitting the take of threatened or endangered marine mammals incidental to commercial fishing operations (Section 101(a)(5)(E)).

Within the MMPA's provisions, NMFS must determine if the taking (by harassment, injury, or mortality – or a combination of these) incidental to specified activities will have a negligible impact on the affected stocks of marine mammals. For permitting the take of threatened or endangered marine mammals incidental to fishing operations, NMFS must determine if mortality and serious injury incidental to commercial fisheries will have a negligible impact on the affected species or stock(s) of marine mammals.

NMFS has implemented these programs, including a qualitative definition of negligible impact at 50 CFR 216.103, and has relied upon qualitative and quantitative approaches to determine the levels of taking that would result in a negligible impact to affected stocks of marine mammals. The quantitative approach is easier for serious injury and mortality than for non-lethal takes because mortality and serious injury are considered removals from the population and can be evaluated by well-documented models of population dynamics.

NMFS' regulations implementing the MMPA amendments of 1981 included a regulatory definition for “negligible impact”:

*Negligible impact is an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival. (50 CFR 216.103<sup>3</sup>)*

This qualitative definition of negligible impact was the standard NMFS used to implement the Small Take Program from its beginning in 1981 through 1994, when additional amendments to the MMPA were enacted and a more quantitative approach was developed for assessing what level of removals from a population stock of marine mammals could be considered a negligible

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<sup>3</sup> 50 CFR 216.103 specifically applies to the Small Take Program. However, the definition of “negligible impact” in 50 CFR 229.2, which implements MMPA sections 101(a)(5)(E) and 118, provides, “*Negligible impact* has the same meaning as in §216.103 of this chapter.”

impact. The qualitative definition remains the only regulatory definition of negligible impact for implementing the MMPA.

In 1998, NMFS published a notice (63 FR 71894; December 30, 1998) advising the public that the agency was extending for a 6-month period the 3-year permit issued nationwide to fisheries in 1995 to authorize the taking of threatened or endangered marine mammals. This notice also informed the public that NMFS considered the 6-month extension of the permit as an opportunity to review existing criteria for the issuance of permits and to address issues that have arisen since the permits were first issued. NMFS solicited public comments to develop alternatives to 10% of PBR as a criterion for determining negligible impact; however, none were received.

Having received no comments upon which to develop alternatives for determining negligible impact, NMFS published a notice proposing to issue permits under MMPA section 101(a)(5)(E) in 1999 (64 FR 28800; May 27, 1999). The notice contained a statement that NMFS, through internal deliberation, had adopted the following criteria for making negligible impact determinations for such permits:

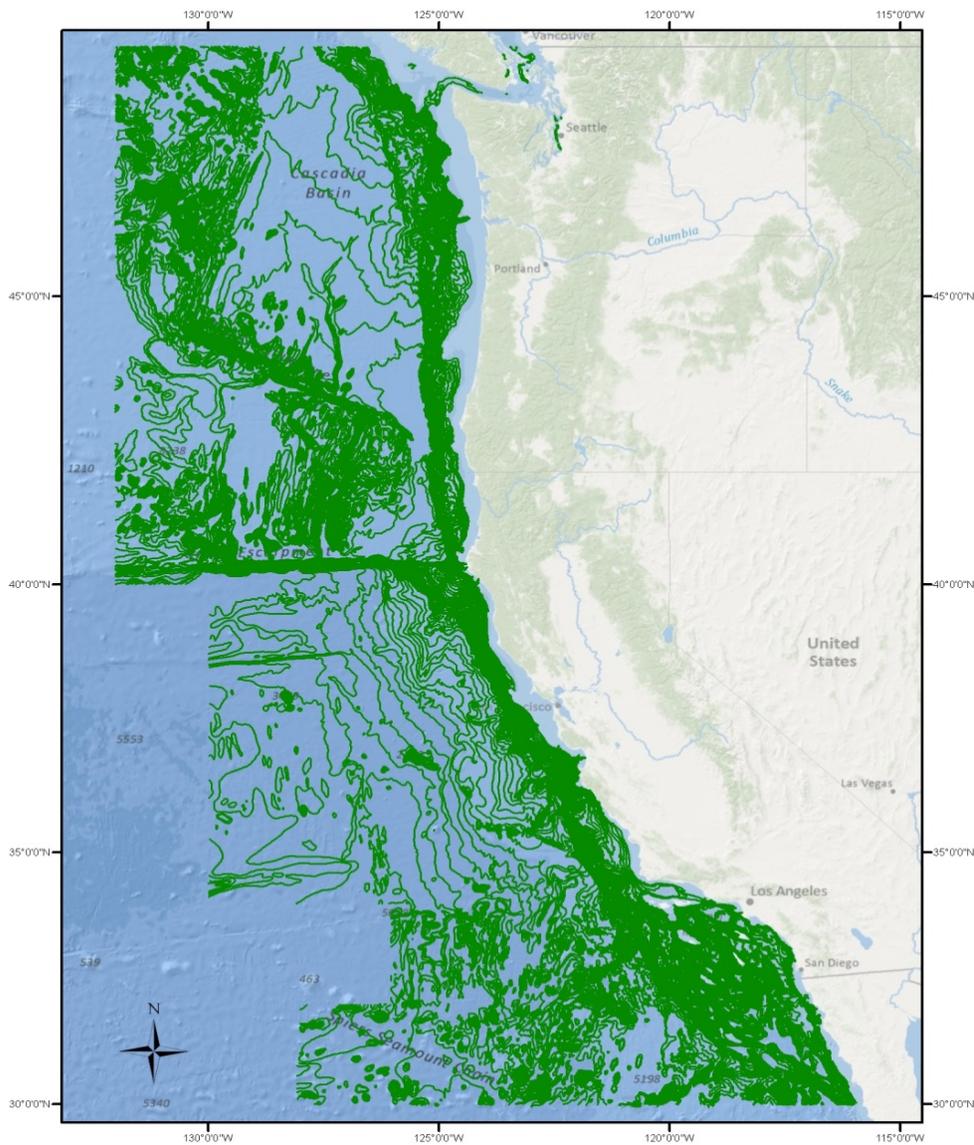
1. The threshold for initial determination will remain at 0.1 PBR. If total human-related serious injuries and mortalities are less than 0.1 PBR, all fisheries may be permitted.
2. If total human-related serious injuries and mortalities are greater than PBR, and fisheries-related mortality is less than 0.1 PBR, individual fisheries may be permitted if management measures are being taken to address non-fisheries-related serious injuries and mortalities. When fisheries-related serious injury and mortality is less than 10 percent of the total, the appropriate management action is to address components that account for the major portion of the total.
3. If total fisheries-related serious injuries and mortalities are greater than 0.1 PBR and less than PBR and the population is stable or increasing, fisheries may be permitted subject to individual review and certainty of data. Although the PBR level has been set up as a conservative standard that will allow recovery of a stock, there are reasons for individually reviewing fisheries if serious injuries and mortalities are above the threshold level. First, increases in permitted serious injuries and mortalities should be carefully considered. Second, 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.
4. If the population abundance of a stock is declining, the threshold level of 0.1 PBR 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.
5. If total fisheries-related serious injuries and mortalities are greater than PBR, permits may not be issued.

This set of criteria maintained 10% of PBR (from 1995) as the starting point in negligible impact determinations and explicitly noted ways in which determinations could deviate from the default. Criterion 3 notes that NMFS may give special consideration if the affected stock of marine mammals is stable or increasing and may permit take incidental to fishing even if incidental removals exceed 10% of PBR but are below PBR.

Relying upon the criteria outlined in 1999 (64 FR 28800), the 2011 U.S. Pacific Marine Mammal Stock Assessments (SAR) (Carretta *et al.* 2012) and the best scientific information and data available, NMFS has determined that for a period of up to three years, mortality and serious injury incidental to the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) 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 the WA/OR/CA sablefish pot fishery will have a negligible impact on the CA/OR/WA stock of humpback whales, based on the analysis that follows.

## **7.0 Action Area-California, Oregon, and Washington**

The action area is the U.S. Exclusive Economic Zones (EEZ) off the coast of California, Oregon, and Washington where fishing vessels are managed under a fishery management plan (FMP) (Figure 1; see Appendix 2 for more information and <http://www.pcouncil.org/groundfish/fishery-management-plan/> for the most current groundfish FMP and amendments)



**Figure 1. Action area off the coasts of California, Oregon, and Washington. Green lines delineate bathymetry within the U.S. Exclusive Economic Zone.**

## **8.0 Category I and II Fisheries in the Action Area**

Under the MMPA, fisheries are classified according to their incidental mortality and/or serious injury of marine mammals. Each fishery is evaluated on a per-stock basis, thus a fishery may qualify as one category for one marine mammal stock and another for a different marine mammal stock. A fishery is categorized on the MMPA LOF at its highest classification (*e.g.*, a fishery qualifying for Category III for one marine mammal stock and for Category II for another marine mammal stock will be listed under Category II). Category I fisheries have frequent

incidental mortality and serious injury of marine mammals and Category II fisheries have occasional incidental mortality and serious injury of marine mammals. Category III fisheries have a remote likelihood of, or no known incidental mortality and serious injury, of marine mammals. Additional details are provided in the preamble to the proposed rule implementing section 118 of the MMPA (60 FR 45086; August 30, 1995).

The fisheries included in Table 1 have been classified as either a Category I, II, or III fishery in the 2013 LOF (78 FR 53336; August 29, 2013), based on the level of serious injury and/or mortality of marine mammals that occurs incidental to each fishery. Of these fisheries, the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh), CA halibut/white sea bass and other species set gillnet fishery ( $> 3.5$  in mesh), CA spot prawn fishery, CA Dungeness crab pot fishery, OR Dungeness crab pot fishery, WA/OR/CA sablefish pot fishery, and WA coastal Dungeness crab pot/trap fishery have had documented interactions with ESA-listed marine mammal species off California, Oregon, and Washington and are described in Table 1. However, only the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) and WA/OR/CA sablefish pot fishery will be covered under this authorization because they are the only two federally-managed Category I or II fisheries that have been documented to interact with marine mammal species off California, Oregon, and Washington. The other five fisheries are state-managed fisheries.

A full description of these and all the fisheries listed in the LOF may be found in the published 2011 Pacific and Alaska SARs (Carretta *et al.* 2012; Allen and Angliss 2012), and online at <http://www.nmfs.noaa.gov/pr/interactions/lof/>.

The following provides a brief description of the two fisheries being analyzed: the CA thresher shark/swordfish DGN fishery ( $> 14$  inch mesh) and the WA/OR/CA sablefish pot fishery. This does not include those fisheries that are State-managed or with “None” recorded in Table 1 under “ESA-Listed Marine Mammals Incidentally Killed/Injured.” NMFS described each Category I and II fishery in detail in the final 2008 LOF (72 FR 66048; November 27, 2007) and these descriptions can also be found at <http://www.nmfs.noaa.gov/pr.interactions/lof/>

**Table 1. Category I and II Fisheries off California, Oregon, and Washington (sources: 2013 List of Fisheries 78 FR 53336; August 29, 2013, and a self-report from an owner/operator of a commercial fishing vessel). The two fisheries considered in this permit are in Bold.**

<b><u>Fishery Description</u></b>	<b><u>ESA-Listed Marine Mammals Incidentally Killed/Injured</u></b>
<b>Category I</b>	
<b>CA thresher shark/swordfish drift gillnet (&gt;14 inch mesh)</b>	<i>Fin whale - CA/OR/WA stock*</i> <b>Humpback whale - CA/OR/WA stock</b> <b>Sperm whale-CA/OR/WA stock</b>
<b>Category II</b>	
CA yellowtail, barracuda, white seabass and tuna drift gillnet fishery (mesh size $\geq 3.5$ inches and <14 inches)	None
CA halibut/white sea bass and other species set gillnet	Humpback whale-CA/OR/WA
CA spot prawn pot	Humpback whale - CA/OR/WA stock
CA Dungeness crab pot	Humpback whale - CA/OR/WA stock
OR Dungeness crab pot	Humpback whale - CA/OR/WA stock
<b>WA/OR/CA sablefish pot</b>	<b>Humpback whale - CA/OR/WA stock</b>
WA coastal Dungeness crab/pot	Humpback whale - CA/OR/WA stock
<b>Category III</b>	
CA anchovy, mackerel, sardine purse seine	None
CA squid purse seine	None

\*Fin whales are not listed under the current List of Fisheries (78 FR 53336; August 29, 2013). Fin whales are included in this table because they were historically taken in this fishery and even though the risk is extremely low, the possibility that a take may occur in this fishery still exists and thus a negligible impact analysis was conducted.

**Category I and II Federally managed fisheries**

**CA thresher shark/swordfish Drift Gillnet Fishery (>14 inch mesh)**

The Final 2013 LOF (78 FR 53336; August 29, 2013) elevated the category of the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) to a Category I fishery. The re-categorization from Category II to I was due to two sperm whales observed entangled in the CA thresher shark/swordfish DGN fishery. The December 5, 2010, NMFS Southwest Fisheries Observer Program records document that one animal was found dead and the other was released alive, but was seriously injured as gear remained attached to the animal. The self-report and observer data likely represent the CA/OR/WA stock of humpback whales and the CA/OR/WA stock of sperm whales. Therefore, these takes are included in the total estimate of human-induced serious injury or mortality under each of the appropriate negligible impact sections for humpback and sperm whales.

The CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) targets swordfish and thresher shark. This fishery is a limited entry fishery with seasonal closures and gear restrictions (see Appendix 2). The CA thresher shark/swordfish DGN fishery operates outside of state waters to about 150 miles offshore ranging from the U.S./Mexico border in the south to the Oregon border in the north, depending on sea temperature conditions (Figure 2). Regulations restrict the fishery to waters outside 200 nm from February 1 through April 30, outside 75 nm from May 1 through August 14, and is allowed to fish inside 75 nm from August 15 through January 31 (Figures 2 and 3). CA thresher shark/swordfish DGN vessels targeting swordfish tend to set on warm ocean water temperature breaks, which do not appear along the California coast until late summer; therefore, because of these restrictions, vessels are not active during February, March, and April, and very little fishing effort occurs during the months of May, June, and July.

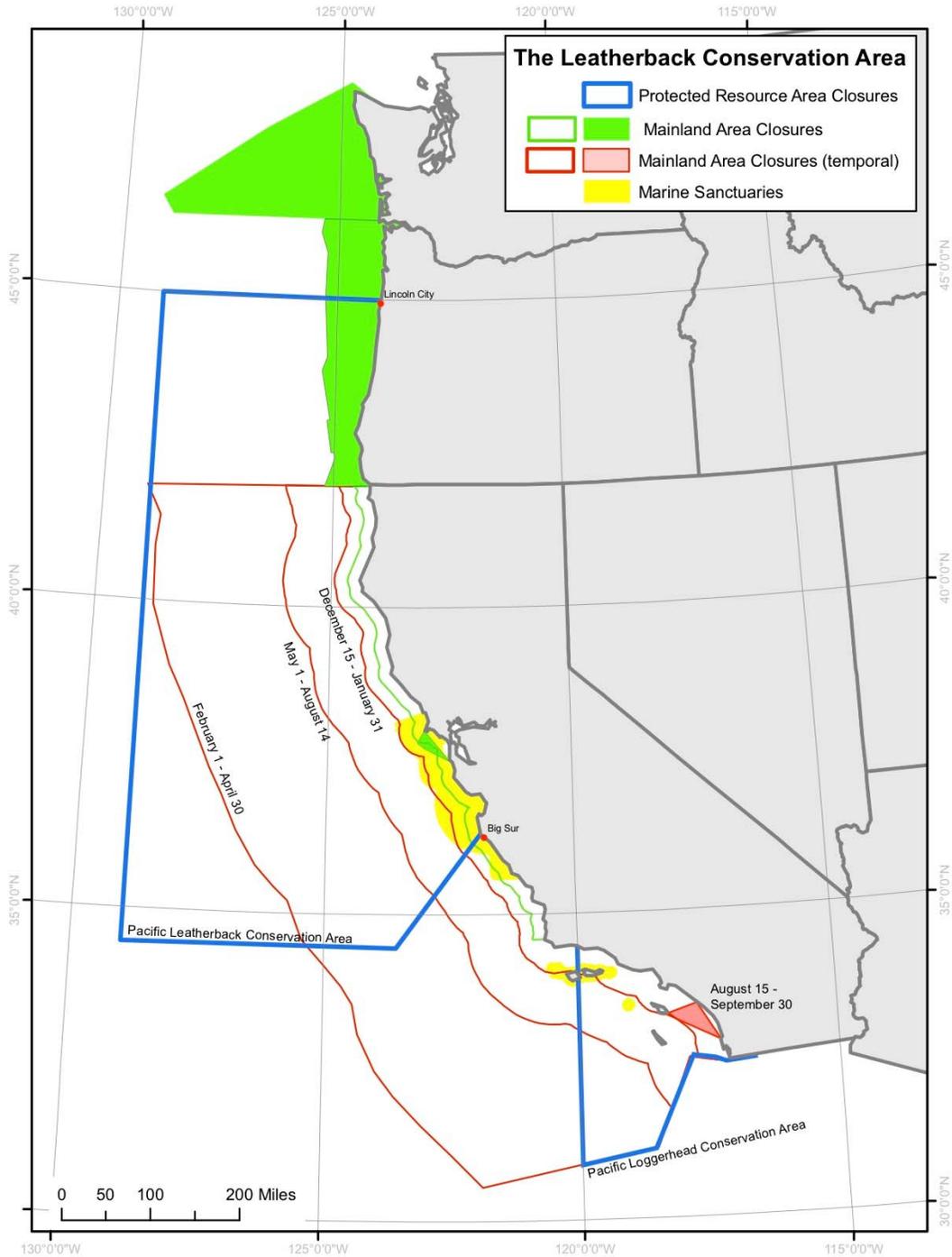
In 2001, a seasonal (15 August-15 November) area closure was implemented in the thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) north of Point Conception, to protect leatherback turtles that feed in the area and were observed entangled in previous fishing seasons (Figure 2). Additional seasonal/area closures in southern California have been established in the thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) to protect loggerhead turtles during a forecast or occurring El Niño event during the months of June, July and/or August. At this time no fishery other than the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh) has documented takes of sperm whales. NMFS convened the Pacific Offshore Cetacean Take Reduction Team (Team) on July 31 and August 7, 2013 and charged the Team with developing recommendations to reduce sperm whale serious injury and mortality in the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh). NMFS considered the Team's recommendations and developed an emergency rule (RIN 0648-BD57) to modify the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh) to reduce the risk of incidental mortality and serious injury of sperm whales incidental to the fishery for the 2013-2014 fishing season.

The Emergency Rule (RIN 0648-BD57) to address sperm whale bycatch risk:

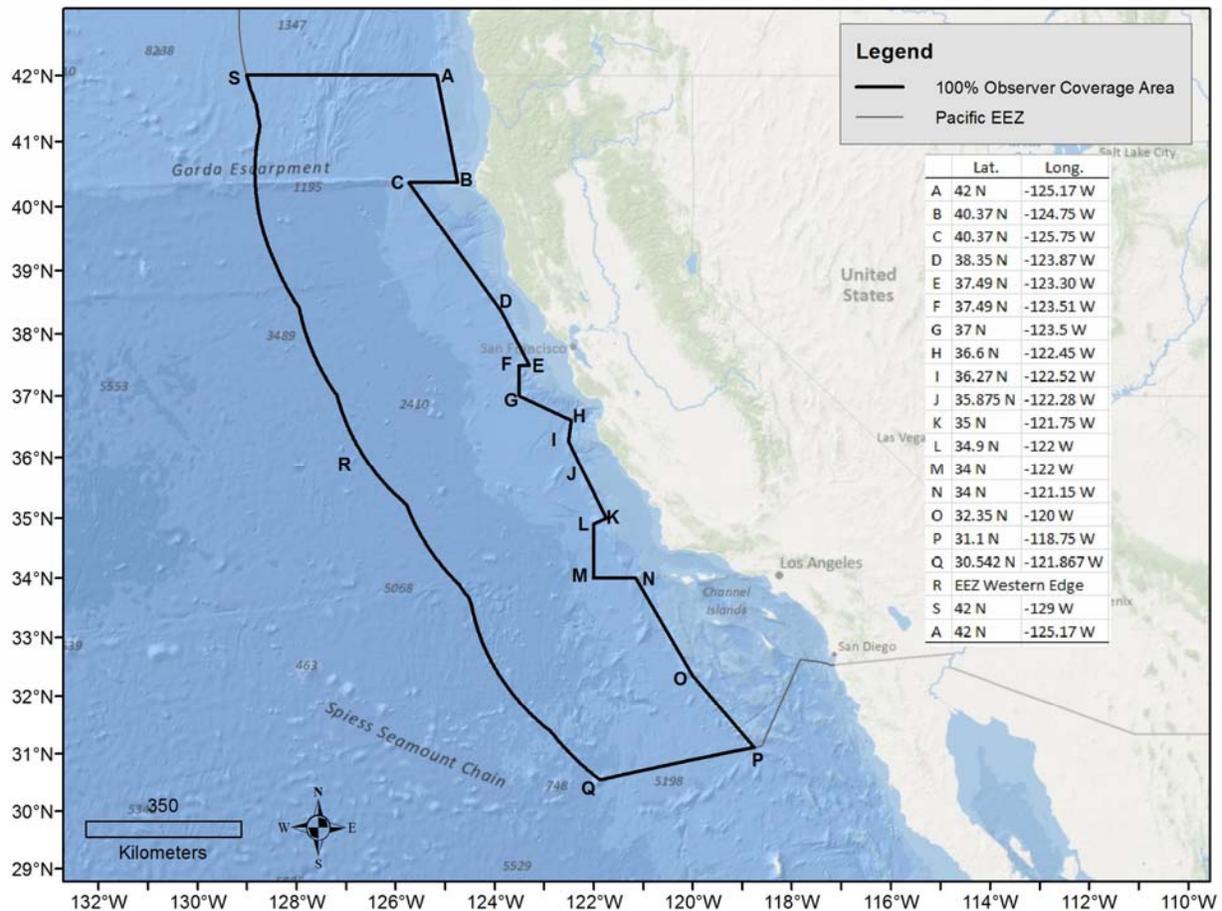
1. Implements immediate termination of the DGN fishery ( $\geq 14$  in mesh) if one sperm whale is observed killed or seriously injured CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh);
2. Establishes a requirement that owners and operators of vessels intending to fish in the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) will be required to install, activate, carry, and operate a vessel monitoring system; and
3. Establishes a year-round zone for DGN vessels generally in all areas deeper than the 1,100 fm (2,012 m) depth contour, with some exceptions in specific areas, unless the fishing vessel is carrying a NMFS-certified federal observer. The 100% observer coverage zone is specified by a line running through specific coordinates that are depicted below in Figure 4.



**Figure 2.** CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) area. The dotted area indicate the leatherback sea turtle conservation area, in effect from August 15-November 15, annually, and the hatched area delineates the loggerhead time/area closure during a forecast or occurring El Niño event.



**Figure 3. CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) area with areas designating the sea turtle conservation areas and time area closures. Regulations restrict the fishery to waters outside 200 nm from February 1 through April 30, outside 75 nm from May 1 through August 14, and inside 75 nm from August 15 through January 31.**



**Figure 4.** As described by the Emergency Rule measures for the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) area. Points A-S-A designate the 100% observer coverage zone.

The number of vessels active in this fishery from 1998-2010 are shown in Table 2. Information on the number of active permit holders is obtained from the *Status of the U.S. west coast fisheries for Highly Migratory Species through 2004; Stock Assessment and Fishery Evaluation* report, available from the Pacific Fishery Management Council website ([www.pcouncil.org](http://www.pcouncil.org)). Figure 5 is a map of observed sets from August 2001 to January 2010, pre-November 15 and post-November 15, to show the changes in effort due to time/area closures to protect leatherback turtles. Table 3 shows a summary of fishing effort and the number of observed sets for the thresher shark/swordfish DGN fishery, beginning with the year 2000, the year before the time/area closures were implemented.

**Table 2. Annual drift gillnet permits issued and number of active vessels, 1998–2010.**

	Active Vessels	Permits Issued
Year		
1998	98	148
1999	84	136
2000	78	127
2001	69	114
2002	50	106
2003	43	100
2004	40	96
2005	42	90
2006	45	88
2007	46	86
2008	46	85
2009	46	84
2010	27	73

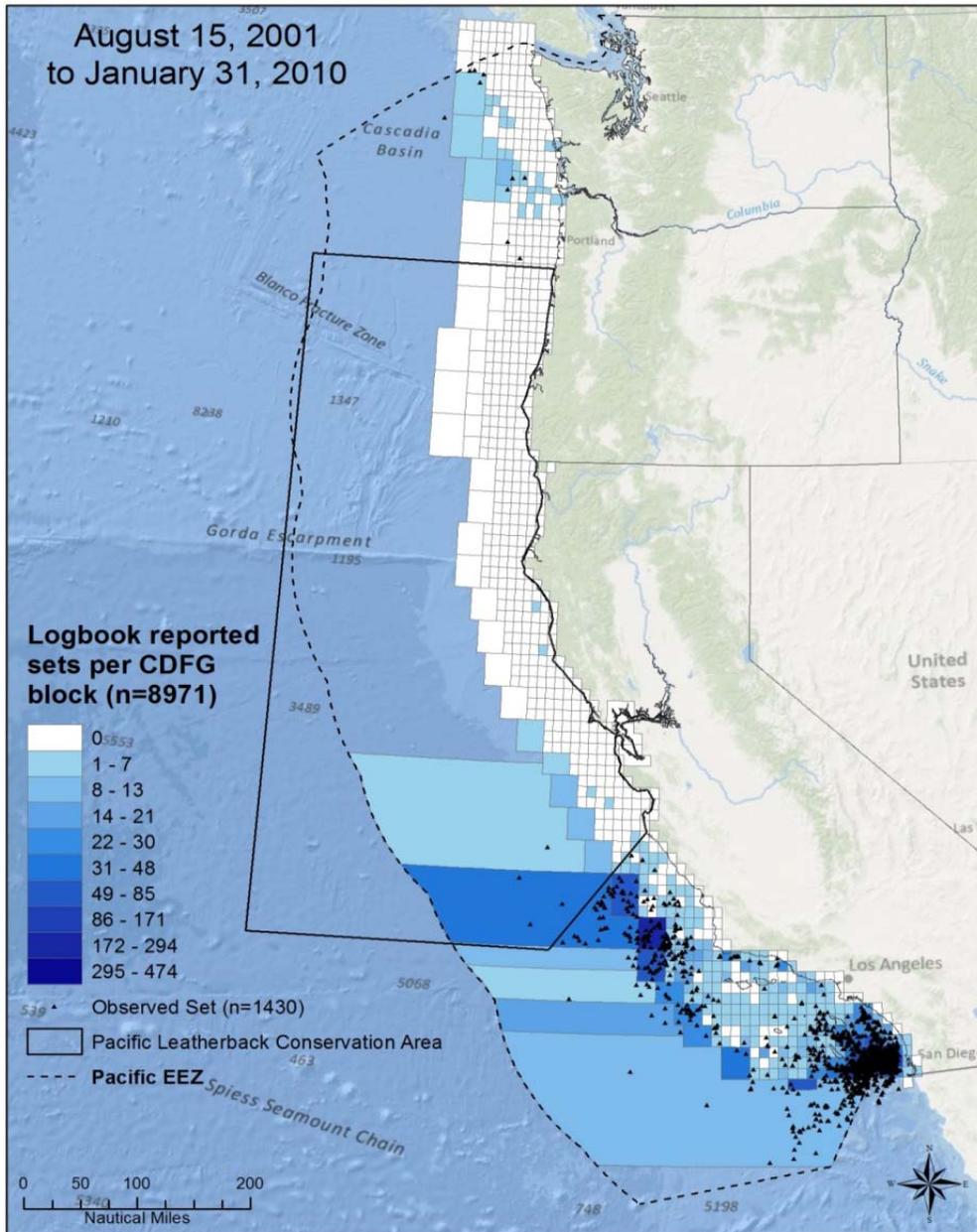
Source: California Department of Fish and Wildlife License and Revenue Branch (LRB), extracted July 14, 2011. Additional processing information:

1-some vessels only land thresher and/or swordfish from year to year so the highest number of active vessels for both components of the fishery were reported for this gear.

\*-actual number of permits issued by LRB not available but the California State Legislature set a cap of 150 in 1982.

**Table 3. Summary of CA thresher shark/swordfish DGN Observer Program from 2000-2012 (January to December; NMFS 2013).**

Fishing Season	Estimated Total Fishing Effort (Sets)	Total Number of Observed Sets	Percent Observer Coverage
2000	1936	444	22.9%
2001	1665	339	20.4%
2002	1630	360	22.1%
2003	1467	298	20.3%
2004	1084	223	20.6%
2005	1075	225	20.9%
2006	1433	266	18.6%
2007	1241	204	16.4%
2008	1103	149	13.5%
2009	761	101	13.3%
2010	492	59	12.0%
2011	435	85	19.5%
2012	445	83	18.7%



**Figure 5. CA thresher shark/swordfish DGN logbook-reported fishing effort and observed sets from August 15, 2001, to January 31, 2010. Although the fishing season runs a full year (August 15-August 14), no reported effort occurred during this time period outside of the August 15-January 31 timeframe. The solid line shows the leatherback sea turtle conservation area.**

### *Observer Information*

The NMFS’s Southwest Region has operated an at-sea federal observer program in the CA thresher shark/swordfish DGN fishery since July 1990 to the present, and the California Department of Fish and Wildlife had operated a DGN observer program from 1980–90. The objectives of the NMFS Observer Program are to record, among other things, information on non-target fish species and protected species interactions. Information regarding the thresher shark/swordfish DGN fishery interactions with listed marine mammal species, summarized in

Table 4 was drawn from Observer Program records for the calendar years 1990–2012 (NMFS 2013). Observer coverage (see Figure 3 for observed sets including temporal component and sea turtle closure) of the thresher shark/swordfish DGN fleet targets 20 percent of the annual sets made in the fishery, with close to 100 percent of net retrievals monitored on observed trips for, among other things, species identification and enumeration. The Emergency Rule has modified observer coverage in certain areas as shown in Figure 4 and included a requirement to install, activate, carry and operate VMS prior to embarking on a DGN fishing trip.

### **WA/OR/CA sablefish pot fishery**

The WA/OR/CA sablefish pot fishery targets sablefish using trapezoid, conical, or rectangular steel frame traps, wrapped with 3.5 inch nylon webbing (NMFS 2005). The fishery sets gear in waters past the 100 fathom curve off the west coast of the U.S (Figure 6). The fishery is managed under regulations implementing the West Coast Groundfish FMP developed by the Pacific Fishery Management Council. There are two separate trap fisheries for sablefish, limited entry and open access. The primary fishery, limited entry, is composed of a three tier system of cumulative landing quotas within a restricted season, from April 1 to October 31 (Pacific Coast Groundfish FMP (December 2011). Permits were assigned to a tier based on landing history when the system originally began in 1998 (L. Saez, pers. comm 2012). There are 32 Limited Entry Permits issued for the sablefish trap fishery on the west coast (NWFSC 2010), and the estimated number of current participants is 309. Fishing outside of the primary season or after fulfillment of tier quota is allowed subject to daily and weekly trip limits (NWFSC 2010). The limited entry permits are currently associated with vessels spread throughout the Pacific Northwest from Northern California through Washington (L. Saez, pers. comm 2012). Up to three permits may be filed for cumulative landings on one vessel; including both trap and longline gear endorsements (NWFSC 2010). Accounting for stacking of permits, there were twenty-four vessels using traps to target sablefish in the 2009 season; seven of those vessels used traps only and the other seventeen used a combination of traps and longline to catch their quota of sablefish (NWFSC 2010).

The open access fishery is available to fishermen year round. North of 36° N (California), the trip limit is 300 lb/day or 1 landing of 700 lb per week, not to exceed 2,100 lb over 2 months. South of 36° N, the limit goes up to 350 lb/day or one landing of 1,050 lb per week. NOAA's Northwest Fisheries Science Center estimates 123 fishermen, longline and trap combined, participated in the open access sector in 2009 based on a query of the fish ticket records in the Pacific Fisheries Information Network or PacFIN landings database (NWFSC 2010).

In California, a general trap permit is required for the open access sector for sablefish and gear is set outside 150 fathoms, with an average depth of 190 fathoms. South of Point Arguello, near Santa Barbara, the minimum depth for setting traps targeting sablefish is 200 fathoms. There is no depth requirement north of Point Arguello. Daily logbook reporting is required. Multiple traps are connected to a common ground line, 5/8<sup>th</sup> inch nylon floating line, at depths between 100 and 375 fathoms up to 600 fathoms with an average of 190 fathoms in California (NMFS 2010a). Traps are spaced on average 20 fathoms apart, with a range of 15 to 40 fathoms (NMFS 2005). Limited entry permit holders will commonly fish 20 to 30 traps per string, as opposed to

open access fishermen who fish several smaller strings of one to eight strings with three to four traps per string (NMFS 2010a), each with a float line and buoy stick.



**Figure 6. Map of the WA/OR/CA sablefish pot fishery.**

## **9.0 Marine Mammal Species Listed under the ESA in the Action Area**

According to the *U.S. Pacific Marine Mammal Stock Assessments: 2011* (Carretta *et al.* 2012) and *Alaska Marine Mammal Stock Assessments: 2011* (Allen and Angliss 2012), there are nine species of marine mammals listed under the ESA that occur within the area of operation of Category I and II fisheries off California, Oregon, and Washington. These species, including their status, are listed in Table 4.

**Table 4. ESA-Listed Marine Mammal Species off California, Oregon, and Washington.**

Species	Stock	Status
Blue whale ( <i>Balaenoptera musculus</i> )	Eastern North Pacific stock, (formerly the California/Oregon/Washington-Mexico stock)	Endangered
Fin whale ( <i>Balaenoptera physalus</i> )	California/Oregon/Washington stock	Endangered
Humpback whale ( <i>Megaptera novaeangliae</i> )	California/Oregon/Washington stock, (formerly the Eastern North Pacific stock and California/Oregon/Washington-Mexico stock)	Endangered
Killer whale ( <i>Orcinus orca</i> )	Eastern North Pacific Southern Resident stock	Endangered
North Pacific right whale ( <i>Eubalaena japonica</i> )	Eastern North Pacific stock	Endangered
Sei whale ( <i>Balaenoptera borealis</i> )	Eastern North Pacific stock	Endangered
Sperm whale ( <i>Physeter macrocephalus</i> )	California/Oregon/Washington stock	Endangered
Steller sea lion ( <i>Eumetopias jubatus</i> )	Eastern U.S. stock	Threatened
Guadalupe fur seal ( <i>Arctocephalus townsendii</i> )	Mexico	Threatened

NMFS issued a 101(a)(5)(E) permit on October 30, 2000 (65 FR 64670) for the currently named CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) to incidentally take, during the course of commercial fishing operations: sperm whales, humpback whales, fin whales, and Steller sea lions, based on documented takes in the fishery. For that assessment, the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) operated over a broader area than it currently operates, including fishing in the currently closed area north of Point Conception during August 15 through November 15. Blue whales, North Pacific right whales, and sei whales were not included in the October 2000 permit and will not be included further in this analysis because they have never been observed to interact with the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) or the WA/OR/CA sablefish pot fishery. Interactions with fishing gear have been observed in stranded Guadalupe fur seals; however, we are not able to identify the gear to a fishery at this time, and they will not be considered further in this document. Since NMFS began observing the CA thresher shark/swordfish DGN fishery in 1990, fishery interactions have not been observed for blue whales, North Pacific right whales, sei whales, and Guadalupe fur seals.

Given 21 years of observer data, logbook information, self-reports and stranding information (whale entanglement reports), NMFS does not anticipate takes of blue whales, North Pacific right whales, sei whales, or Guadalupe fur seals by any of the federally-managed Category I and II fisheries off California, Oregon, and Washington. Although Steller sea lions were included in the 2000 and 2003 negligible impact determinations, they have not been observed taken in the CA thresher shark/swordfish fishery since 1994. The Steller sea lion now occurs infrequently when compared to its historical distribution, south of the leatherback conservation area (Figures 2 and 3), the area where the majority of CA thresher shark/swordfish DGN fishing occurs. There have also been no recorded interactions with Steller sea lions and the WA/OR/CA sablefish pot fishery. In addition, take of the eastern Distinct Population Segment of Steller sea lions in other fisheries in the Northwest and Alaska are now covered by the Final MMPA Section 101(a)(5)(E) Permit-Negligible Impact Determination, dated December 13, 2010 (75 FR 81972; December 29, 2010). Therefore, Steller sea lions will not be considered further in this analysis.

In 2005, the Eastern North Pacific Southern Resident stock of killer whales was listed as endangered under the ESA (70 FR 69903; November 18, 2005). Most sightings of this stock of killer whales have occurred in the summer in the inland waters of Washington state and southern British Columbia. Pods belonging to this stock have also been sighted in coastal waters off southern Vancouver Island and Washington (Bigg *et al.* 1990; Ford *et al.* 2000). Of the three pods comprising this stock, one pod (J) is commonly sighted in inshore waters in winter, while the other two pods (K and L) apparently spend more time offshore (Ford *et al.* 2000). These latter two pods have been observed in recent years in Monterey Bay, California, near the Farallon Islands, and off Point Reyes. Thus, the entire range for the Southern Resident killer whale is as far south as Monterey, CA and based on a recent review by the Department of Fisheries and Oceans (Canada) of photographs taken in 2007, as far north as Chatham Strait, Southeast, AK. One killer whale from the non-ESA listed eastern North Pacific Transient Stock was observed taken in 1995 in the CA thresher shark/swordfish DGN (Carretta *et al.* 2006). Set gillnets and longlines may take killer whales, based on information gathered on similar fisheries in other areas (Carretta *et al.* 2006), but the total annual fishery mortality and serious injury for this killer whale stock is zero (Carretta *et al.* 2012). Thus, NMFS does not anticipate the incidental take (serious injury or mortality) of the Eastern North Pacific Southern Resident killer whale by the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) or the WA/OR/CA sablefish pot fishery and, therefore, this stock will not be considered further in this assessment.

## 10.0 Marine Mammals Considered in This Analysis

For this assessment, NMFS will consider the impact of mortality and serious injury of the CA/OR/WA stocks of fin whale, humpback whale, and sperm whale incidental to the following commercial fisheries: the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) and the WA/OR/CA sablefish pot fishery. Detailed information on each of these species can be found in the recovery plan for the fin whale, sperm whale, and humpback whale<sup>4</sup>; SARs<sup>5</sup>; and Take Reduction Plans<sup>6</sup>. Information from these sources that is relevant to this analysis and the best

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<sup>4</sup> <http://www.nmfs.noaa.gov/pr/recovery/plans.htm#mammals>

<sup>5</sup> <http://www.nmfs.noaa.gov/pr/sars/>

<sup>6</sup> <http://www.nmfs.noaa.gov/pr/interactions/trt/teams.htm#poc>; The 2011 U.S. Pacific Marine Mammal Stock Assessment Reports (Carretta *et al.* 2012) and the MMPA LOF indicate that no fin whales have interacted with

available science is summarized below for the CA/OR/WA stocks of fin whale, humpback whale, and sperm whale.

## 10.1 CA/OR/WA Fin Whales

The International Whaling Commission (IWC) first protected fin whales from commercial hunting in 1966. Fin whales were listed as Endangered under the ESA of 1973. They are also protected by the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) and by the MMPA.

### 10.1.1 Status of the Species – Fin Whales

Fin whales are widely distributed in the world's oceans; however, there is insufficient information to accurately determine population structure of the fin whale (Carretta *et al.* 2006) and no critical habitat has been designated. Below we provide a summary of fin whale population status, trends, and threats. For more detailed information on fin whales, refer to the Fin Whale Recovery Plan (NMFS 2010) and the SARs (Carretta *et al.* 2012).

Fin whales are found year-round off southern and central California, in the summer off Oregon, and in the summer. Observations show aggregations of fin whales year-round off southern and central California (Dohl *et al.* 1983; Barlow 1997; Forney *et al.* 1995), and in summer off Oregon (Green *et al.* 1992; McDonald 1995). Acoustic signals from fin whales are detected year-round off northern California, Oregon and Washington, with a concentration of vocal activity between September and February (Moore *et al.* 1998). Since fin whale abundance appears lower in winter/spring in California (Dohl *et al.* 1983; Forney *et al.* 1995) and in Oregon (Green *et al.* 1992), it is likely that the distribution of this stock extends seasonally outside these coastal waters.

The best estimate of fin whale abundance in California, Oregon, and Washington waters out to 300 nm is the geometric mean of line transect estimates from summer/autumn ship surveys conducted in 2005 (3,281, CV=0.25) and 2008 (2,825, CV = 0.26) (Forney 2007, Barlow 2010), or 3,044 (CV=0.18) whales. This is probably an underestimate because it almost certainly excludes some fin whales which could not be identified in the field and which were recorded as “unidentified rorqual” or “unidentified large whale”. There is some indication that fin whales have increased in abundance in California coastal waters between 1979/80 and 1991 (Barlow 1994) and between 1991 and 1996 (Barlow 1997), but these trends are not statistically significant. There is no evidence of a population trend from recent line-transect abundance surveys conducted in 1996, 2001, 2005, and 2008 in California, Oregon, and Washington waters out to 300 nm. Estimates from these four surveys have been 2,042 (CV= 0.13); 2,118 (CV= 0.18); 3,281 (CV=0.25); and 2,825 (CV=0.26) whales, respectively (Barlow and Forney 2007; Forney 2007; Barlow 2010). Recently, Moore and Barlow (2011) modeling predicted future abundance for fin whales in Oregon, Washington, and California and assuming no change in the

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either the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) or the WA/OR/CA sablefish pot fishery in the last five years, the time period used to determine PBR. As such, a take reduction plan is not required for the CA/OR/WA stock of fin whales because mortality and serious injury of this stock incidental to commercial fishing operations is at insignificant levels approaching a zero mortality and serious injury rate.

underlying population dynamics process, fin whale abundance in the study area beyond 2008 is expected to continue increasing at a rate of about 3% per year on average, although year-to-year abundance should rise and fall according to random process variation. Under the MMPA, the PBR is defined as the product of the minimum population estimate ( $N_{\text{MIN}}$ ) one half the maximum theoretical net productivity rate ( $R_{\text{MAX}}$ ), and a recovery factor ( $F_r$ ):  $\text{PBR} = N_{\text{MIN}} \times 0.5R_{\text{MAX}} \times F_r$ . The  $F_r$  for this stock is 0.3. According to the most recent SAR: for 2011 (Carretta *et al.* 2012), the PBR level for this stock is calculated as the minimum population size (2,624) times one half the default maximum net growth rate for cetaceans ( $\frac{1}{2}$  of 4%) times a recovery factor of 0.3 (for an endangered species with  $N_{\text{min}} > 1,500$  and  $\text{CV}_{N_{\text{min}}} < 0.50$ ), resulting in a PBR of 16 animals per year (Carretta *et al.* 2012).

### 10.1.2 Threats – Fin Whales

Here we provide a brief summary of the threats to fin whales as they are applicable to the negligible impact determination, but more detailed information can be found in the Fin whale Recovery Plan (available at <http://www.nmfs.noaa.gov/pr/pdfs/recovery/finwhale.pdf>) and the SARs (available at <http://www.nmfs.noaa.gov/pr/sars/>). Threats to fin whales include vessel disturbance, climate change, illegal whaling or resumed legal whaling, reduced prey abundance due to overfishing or other factors (including climate change), habitat degradation, disturbance from low-frequency noise, disease, impacts related to research, and natural causes.

Entanglement in fishing gear poses a threat to fin whales. In 2006, a fin whale was killed by a ship strike but stranded off of Washington with brown rope wrapped around its mouth that may have impeded feeding. In 2009 one fin whale was observed off of Long Beach in Los Angeles County, California, towing unidentified fishing gear. The gear was wrapped around the body between the blow hole and the dorsal fin. Also in 2009, off of San Diego, California, a fin whale was observed with approximately 300 feet of polypropylene line attached to a buoy and wrapped around the caudal peduncle. In both instances, the fate of the animal is unknown. According to the 2011 SAR, the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) is the only fishery that has been identified as taking (*i.e.*, killing or seriously injuring) a fin whale from the CA/OR/WA stock (Carretta *et al.* 2012). In 1999, a fin whale interacted with drift gillnet gear, but was released alive and died some time later, a male that was confirmed by genetic analysis. Because this fin whale was observed by a NMFS federal observer, the numbers of animals that interact with the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) are extrapolated by the percent observer coverage for that year. Thus, in 1999, the observer coverage was 20%, and the one observed animal is extrapolated to a total of five animals. After the 1997 implementation of the Pacific Offshore Cetacean Take Reduction Plan (Plan; 62 FR 51805; October 3, 1997), which included skipper education workshops and required the use of pingers and minimum 6-fathom net extenders, overall cetacean entanglement rates in the drift gillnet fishery have dropped considerably (Barlow and Cameron 2003). Of the 4 ESA-listed baleen whales observed or reported entangled off of California, Oregon, and Washington during the past five years (2007-2011), 3 were fin whales (Carretta *et al.* 2012 and the NMFS Southwest Regional Marine Mammal Stranding Database 2012; *See* Table 5). The CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) is the only fishery that is likely to take fin whales from this stock, and one fin whale death has been observed since 1990 when NMFS began observing the fishery. After the 1997 implementation of the 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 dropped considerably (Barlow and Cameron 2003). Mean annual takes for this fishery (Carretta *et al.* 2012) are based on 2004-2008 data (Carretta *et al.* 2005, Carretta and Enriquez 2006, 2007, 2009a, 2009b). This results in an average estimate of zero fin whales taken annually.

During the past 21 years (1990-2011), five fin whales have been recorded as having interacted with fishing gear (note that the cause of death for one of these animals was a ship strike) with a 14-year annual average of .57 animals per year (this time frame was chosen as it is post Plan) and a 5-year annual average of 0.6 animals per year; thus NMFS concludes a fin whale entanglement is a rare event in this region.

Fin whales are also injured or killed by ship strikes off west coast of the United States (Carretta *et al.* 2012). At least one, and probably more, fin whales were killed by collisions with ships off California in the early 1990s (Barlow *et al.* 1997). Seven fin whales were documented as killed due to ship strikes off of California; Oregon, and Washington between the period 1998-2005, the time period analyzed in the previous negligible impact determination (72 FR 60814; October 26, 2007). There were no reported ship strikes with a fin whale in 2007. One fin whale was struck in 2008 and brought into the port of Los Angeles on the bow of a ship. A total of four fin whales were reported as struck in 2009: two were struck off of San Clemente Island in Southern California, one came in on the bow of a vessel into Los Angeles Harbor, and one came in on a bow of a vessel into Tacoma, Washington. In 2010, a fin whale came in on the bow of a vessel in the port of Oakland, near San Francisco, CA. The whale was towed out to sea and within a few days another fin whale washed ashore near San Francisco with injuries believed to have been caused by a vessel collision. It is possible that this animal was the same animal as the one that came in on the vessel in Oakland; however, at the time of the issuance of this document, DNA evidence confirming the match was not available; thus both animals are counted as individual ship strikes. An adult female fin whale was also killed in 2011, and stranded in San Diego, CA, where it expelled a fetus, post-mortem. All human interactions recorded in the stranding databases involving fin whales were reviewed by James Carretta from the Southwest Fisheries Science Center (J.V. Carretta pers. comm. 2011 and 2012) using the Andersen *et al.* (2008) criteria. Only those that were determined to be either a serious injury or mortality were included in Table 5. Additional mortality from ship strikes probably goes unreported because the whales do not strand, or if they do, they do not always have obvious signs of trauma (Carretta *et al.* 2012). The average observed annual mortality due to ship strikes along the west coast of the U.S. is 1.0 fin whale per year, for the period 2004-2008 (Carretta *et al.* 2012).

### **10.1.3 Summary of Status – Fin Whales**

Fin whales in the entire North Pacific were estimated in 1984 to be less than 38% of historic carrying capacity (Mizroch *et al.* 1984). The initial abundance estimate has never been estimated separately for the "West Coast" stock of fin whales, but it is likely that it was depleted by whaling, particularly in the 20<sup>th</sup> century. Fin whales are listed as endangered under the ESA and consequently considered depleted and the CA/OR/WA stock is strategic under the MMPA. There is some indication that the population is growing. Commercial whaling for this species ended in the North Pacific in 1976 and in the North Atlantic in 1987. Fin whales are still hunted

in Greenland, subject to catch limits under the IWC's "aboriginal subsistence whaling" scheme. The threat to fin whales due to military activities, underwater noise, pollutants, marine debris, habitat degradation, etc., is not well known (NMFS 2010b).

## **10.2 CA/OR/WA Stock of Humpback Whales**

The IWC first protected humpback whales in the North Pacific in 1966. They are also protected under CITES. In the U.S. humpback whales were listed as "endangered" under the ESA of 1973 and are therefore classified as depleted and strategic under the MMPA.

### **10.2.1 Status of the Species - Humpback Whales**

Humpback whales are distributed worldwide in all ocean basins. They typically migrate between tropical/sub-tropical and temperate/polar latitudes, occupying tropical areas during winter months when they are breeding and calving, and polar areas during the spring, summer, and fall, when they are feeding.

Because fidelity appears to be greater in feeding areas than in breeding areas, the stock structure of humpback whales is defined based on feeding areas. A photo-identification study conducted in 2004-2006 estimated the abundance of humpback whales in the entire Pacific Basin to be approximately 18,000-20,000 (Calambokidis *et al.* 2008). Estimates of regional abundance in the California/Oregon stratum from that study (1,702) are less precise than estimates from dedicated west-coast studies. Barlow and Forney (2007) estimated 1,096 (CV=0.22) humpback whales in California, Oregon, and Washington waters based on summer/fall ship line-transect surveys in 2001. Forney (2007) estimated 1,769 (CV=0.16) humpback whales in the same region based on a 2005 summer/fall ship line-transect survey, which included additional fine-scale coastal strata not included in the 2001 survey. Barlow (2010) recently estimated 1,090 (CV=0.41) humpback whales from a 2008 summer/fall ship line-transect survey of the same region. The combined 2005 and 2008 line-transect estimate of abundance is the geometric mean of the two annual estimates, or 1,389 (CV=0.21). Calambokidis *et al.* (2009) estimated humpback whale abundance in these feeding areas from 1991 to 2008 using Petersen mark-recapture estimates based on photo-identification collections in adjacent pairs of years (Figure 2). The 2007/2008 mark-recapture population estimate for California and Oregon (2,043, CV=0.10) is higher than any previous mark-recapture estimates (Calambokidis *et al.* 2009). In general, mark-recapture estimates are negatively biased due to heterogeneity in sighting probabilities (Hammond 1986); however, this bias is likely to be minimal because the above mark-recapture estimate is based on data from nearly a third of the entire population (the 2007/2008 data contained 672 known individuals). The estimate of 2,043 humpback whales in 2007/2008 is also a negatively biased estimate of this stock because it excludes some whales in Washington. The best estimate of abundance for this stock is the mark-recapture estimate of 2,043 (CV=0.10) (Carretta *et al.* 2012), which is also the most precise estimate.

As for trends in the CA/OR/WA stock of humpback whales, ship surveys provide some indication that humpback whales increased in abundance in California coastal waters between 1979/80 and 1991 (Barlow 1994) and between 1991 and 2005 (Barlow and Forney 2007; Forney 2007), but this increase was not steady, and estimates showed a slight dip in 2001. Mark-

recapture population estimates have shown a long-term increase of approximately 7.5% per year (Calambokidis *et al.* 2009), although there have been short-term declines during this period, probably due to oceanographic variability. Population estimates for the entire North Pacific have also increased substantially from 1,200 in 1966 to approximately 18,000 to 20,000 whales in 2004 to 2006 (Calambokidis *et al.* 2008). Although these estimates are based on different methods and the earlier estimate is extremely uncertain, the growth rate implied by these estimates (6-7%) is consistent with the recently observed growth rate of the California/Oregon/Washington stock. Despite the apparently low proportion of calves, two independent lines of evidence indicate that this stock was growing in the 1980s and early 1990s (Barlow 1994; Calambokidis *et al.* 2003) with a best estimate of 8% growth per year (Calambokidis *et al.* 1999). The current net productivity rate is unknown.

Under the MMPA, the PBR is defined as the product of the minimum population estimate, one half the maximum theoretical net productivity rate, and a recovery factor (Fr):  $PBR = N_{MIN} \times 0.5R_{MAX} \times Fr$ . The Fr for this stock is 0.3. The PBR level for this stock is calculated as the minimum population size (1,878) times one half the estimated population growth rate for this stock of humpback whales ( $\frac{1}{2}$  of 8%) times a recovery factor of 0.3 (for an endangered species), resulting in a PBR of 22.5. Because this stock spends approximately half of its time outside the U.S. EEZ, the PBR in U.S. waters is 11.3 whales per year (Carretta *et al.* 2012).

### 10.2.2 Threats - Humpback Whales

Here we provide a brief summary of the threats to humpback whales as they are applicable to the negligible impact determination, but more detailed information can be found in the Humpback Whale Recovery Plan (available at [http://www.nmfs.noaa.gov/pr/pdfs/recovery/whale\\_humpback.pdf](http://www.nmfs.noaa.gov/pr/pdfs/recovery/whale_humpback.pdf)) and the SARs (available at <http://www.nmfs.noaa.gov/pr/sars/>). Threats to humpback whales include vessel disturbance, climate change, illegal whaling or resumed legal whaling, reduced prey abundance due to overfishing or other factors (including climate change), habitat degradation, disturbance from low-frequency noise, disease, impacts related to research, and natural causes.

Entanglement in fishing gear poses a threat to individual humpback whales throughout the Pacific. The estimated impact of fisheries on this humpback whale stock is likely underestimated, since the serious injury or mortality of large whales due to entanglement in gear may go unobserved because whales swim away with a portion of the net, line, buoys, or pots. According to the Southwest Region's Marine Mammal Stranding Network and Northwest Region's Stranding Databases (NMFS 2011), 46 humpback whales were entangled in fishing gear from 1998-2011. During the past five years (2007-2011), a total of 26 were humpback whales (Carretta *et al.* 2012 and the NMFS Southwest and Northwest Regional Marine Mammal Stranding Database 2012). This stock is driving the Category II classification of the following fisheries: the CA halibut/white seabass and other species set gillnet (>3.5 in mesh); CA spot prawn pot fishery; CA Dungeness crab pot fishery; Oregon Dungeness crab pot fishery; WA/OR/CA sablefish pot fishery; and the WA coastal Dungeness crab pot/trap fishery (Final List of Fisheries 2013; 78 FR 53336; August 29, 2013).

The deaths of two humpback whales (December 27, 1984) that stranded in the Southern California Bight have been attributed to entanglement in fishing gear (in Carretta *et al.* 2012, ref Heyning and Lewis 1990), and a humpback whale was observed off Ventura, California, in 1993, with a 20 foot section of netting wrapped around and trailing behind (Carretta *et al.* 2006). From 1999-2003, a humpback cow-calf pair was seen entangled in Big Sur, California (1999) and another single humpback was seen entangled in line and fishing buoys off Grover City, California (2000), but the fate of these animals is unknown. In 2003, there were five separate reports of humpback whales entangled in crab pot and/or polypropylene lines. In March 2003, an adult female with a calf was seen off Monterey with crab pot line wrapped around her flukes. An adult humpback was seen in May 2003 in the Santa Barbara Channel with 100 feet of yellow polypropylene line wrapped around its pectoral fins and caudal peduncle. Another adult female with a calf was seen in August 2003, west of the Farallon Islands with crab pot line with floats wrapped around its caudal peduncle and fluke lobe. In November 2003, there were two reports within four days near Crescent City and south of Humboldt Bay, California, of single humpback whales with crab pot line wrapped around their torso. These two reports may be the same whale, but the current disposition of these whales is unknown. In 2004, a humpback was observed swimming with a small amount of white rope, approximately 1/8 inch thick, wrapped around its caudal peduncle. The final status of this animal is unknown. In 2005, three humpback whales were entangled in trap/pot gear. One out of the three free-swimming animals was successfully disentangled. In 2006, seven humpback whales were reported entangled in gear. Six of the animals were free-swimming with gear attached to the body; one animal had numerous sablefish pots trailing. This single humpback whale interaction in 2006 elevated the classification of the WA/OR/CA sablefish pot fishery from a Category III to a Category II fishery. Another one of the six animals was also entangled in sablefish gear, but was successfully disentangled and all the gear was removed. This same year, in Charleston, Oregon, up to two animals stranded dead but are considered to be the same animal in the stranding database and counted as one humpback in this analysis. One animal had been sighted alive, but entangled, and then an animal stranded dead on the beach. In between the first sighting and the beached animal, the USCG attempted to disentangle an animal but was unsuccessful. A dead whale matching the description of the animal that had been unsuccessfully disentangled, stranded dead a little over a week after the disentanglement effort was attempted. According to the stranding database, these two animals could be the same animal and are counted as one here. In 2007, five humpback whales were reported entangled in gear. Four of the animals were free-swimming with gear attached and the other animal was alive and entangled in crab gear, but at the time of the sighting was being attacked and killed by killer whales. It is not clear how entanglement may have played a role in the death of this whale. In 2008, seven animals were reported entangled in gear. One of the seven was entangled in Dungeness crab pot gear, and although the fisherman's report indicated that he did not think the entanglement was life-threatening, the gear was left attached to the animal (reports indicated that the gear was on/near the chin area of the animal). In the absence of any other information, the final status of this animal is unknown and assumed to be a serious injury for this assessment. The remaining animals were free-swimming with crab pot, crab gear, unidentified pot/trap gear or gear from an unidentified fishery. Two of seven animals were reported with similar type gear attached. The database does link these two animals as possibly being the same individual; however, one of the animals was initially sighted in mid-May, positively identified with photo identification, and last seen at the beginning of June. The second animal was reported to be a young animal and was last observed in mid-July near Seiku,

Washington. Disentanglement efforts were attempted, but were unsuccessful. Since the original description that accompanied the mid-May animal did not state that it was a young animal and the description that accompanied the photo identification catalogue did not link these animals, they are considered two animals. In addition, when the Seiku animal was observed in mid-July, numerous sightings were reported, but positive identification was confounded due to the presence of several other animals in the area, including gray whales. In 2009, three humpback whales were reported entangled in gear, two stranded dead, and one was a fisherman's self-report from 2009 from the CA thresher shark/swordfish DGN fishery. In 2010, a total of eight humpback whales were reported entangled in gear. Two were found dead and six were trailing gear. Two of the animals observed entangled in gear from an unidentified fishery may be resights, decreasing the total to 6 animals. However, since the resights were not confirmed, a conservative total of six free-swimming whales were used. In 2011, three humpback whales were observed entangled in gear with final status unknown. Also in 2011, four humpback whales were observed alive, but entangled in gear that matches gear typically used by the Washington state recreational crab fishery<sup>7</sup>. No entanglements were reported from the observer program that monitors the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) (Carretta *et al.* 2012; Carretta and Enriquez 2006, 2007, 2009a, 2009b, 2012); however, a fisherman's self-report described the entanglement of a humpback whale in 2009. All human interactions recorded in the stranding database involving humpback whales were reviewed by James Carretta from the Southwest Fisheries Science Center (J.V. Carretta pers. comm. 2011 and 2012) using the Andersen *et al.* (2008) criteria. Only those that were determined to be either a serious injury or mortality were included in Table 5.

From October 29, 1997, the day before the effective date of the Plan, observers recorded the incidental entanglement of one humpback by the CA drift gillnet fishery, in 1994, off southern California. This animal was released alive and uninjured (NMFS 2000). After the 1997 implementation of the Plan, which included skipper education workshops and required the use of pingers and minimum 6-fathom extenders, overall cetacean entanglement rates in the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) dropped considerably (Barlow and Cameron 2003). Following the implementation of the Plan, three humpback whales have been observed entangled. One humpback was observed taken in 1999, off southern California; this animal was also released alive and uninjured. The net had a full complement of pingers (41) and 36 foot extenders (NMFS 2000). The other humpback was observed taken in November, 2004, off San Clemente Island, in Southern California waters. The animal was released alive and uninjured, however, the net was not in full compliance with the Plan (NMFS Observer Program 2006). Because the humpback whales were released alive without any trailing gear, it is not considered a serious injury or mortality (Angliss and DeMaster 1998). As noted previously in this section, a self-report was received from the owner of a fishing vessel in the CA thresher shark/swordfish DGN fishery, reporting an incidental entanglement with a humpback whale off of San Diego, California, in January 2009. The animal was released with trailing gear and, based on the description, is considered a serious injury. The interaction of this animal with the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) in 2009, elevated the classification of the fishery from a Category III to a Category II for the 2012 LOF.

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<sup>7</sup> [http://wdfw.wa.gov/fishing/shellfish/gear\\_rules.html](http://wdfw.wa.gov/fishing/shellfish/gear_rules.html)

In addition to the humpback entanglements, there were 21 unidentified whales observed entangled in pot/trap gear or unknown gillnet gear during 1998-2011. The 14-year annual average for all fishery-related serious injury or mortality is 3.57 animals per year and the 5-year annual average for all fishery-related serious injury or mortality is 6 animals per year. Some of these animals may represent re-sightings of entangled humpback whales described above. It is likely that most of the unidentified pot/trap fishery entanglements involved humpback whales. Other unobserved fisheries may also result in serious injuries or deaths of humpback whales (Carretta *et al.* 2012).

Ship strikes were implicated in the deaths of at least two humpback whales in 1993, one in 1995, and one in 2000 (J. Cordaro, NMFS unpublished data, *in* Carretta *et al.* 2006). In 2004, a humpback whale stranded dead in Washington with injuries consistent with those caused by a vessel collision. In 2005, a free-swimming humpback whale was reported to have been hit by a USCG vessel in San Francisco Bay. No blood was visible in the water, but the final status of this animal remains unknown. In 2007, a humpback whale cow/calf pair swam into the Sacramento River with injuries consistent with a vessel collision. The injuries appeared non-fatal as the animals eventually left the River and headed back into the Pacific Ocean. Also in 2007, a humpback whale stranded dead in Marin County, California, with a fractured skull, consistent with a vessel collision. In 2008, in Washington, two humpback whales stranded dead with injuries consistent with those caused by a vessel collision. In 2011, a humpback whale stranded dead with a large contusion near the dorsal fin, in Los Angeles County, CA with injuries consistent with those caused by a vessel collision. Additional mortality from ship strikes probably goes unreported because the whales do not strand or, if they do, they do not have obvious signs of trauma. Several humpback whales have been photographed in California with large gashes in their dorsal surface that appear to be from ship strikes (J. Calambokidis, pers. comm., *in* Carretta *et al.* 2012). The average number of humpback whale deaths by ship strikes off the west coast of the U.S. from 2004-2008 is at least 0.4 per year (Carretta *et al.* 2012), but this is considered a minimum since animals struck by ships may not be realized or reported.

### **10.2.3 Summary of Status - Humpback Whales**

Population estimates for humpback whales in the entire North Pacific have increased substantially, from 1,200 animals in 1966 to approximately 18,000 to 20,000 humpback whales in 2004 to 2006 (Calambokidis *et al.* 2008). Although these estimates are based on different methods and the earlier estimate is extremely uncertain, the growth rate implied by these estimates (6-7%) is consistent with the recently observed growth rate of the CA/OR/WA stock. Despite the apparently low proportion of calves, two independent lines of evidence indicate that this stock was growing in the 1980s and early 1990s (Barlow 1994; Calambokidis *et al.* 2003) with a best estimate of 8% growth per year (Calambokidis *et al.* 1999). The current net productivity rate is unknown. Humpback whales of the North Pacific were estimated to be reduced to 13% of carrying capacity by commercial whaling (Braham 1991). The initial abundance estimate has never been estimated separately for the CA/OR/WA stock, but shore-based whaling apparently depleted the humpback whale stock off California twice: once prior to 1925 (Clapham *et al.* 1997) and again between 1956 and 1965 (Rice 1974). Humpback whales are listed as endangered under the ESA, and consequently the CA/OR/WA stock is considered “depleted” and a “strategic stock” under the MMPA. The increasing levels of anthropogenic

noise in the world's oceans, have been suggested to be a habitat concern for whales, particularly baleen whales, that may communicate using low-frequency sound.

### **10.3 CA/OR/WA Stock of Sperm Whales**

Sperm whales have been protected from commercial harvest by the IWC since 1981, although the Japanese continued to harvest sperm whales in the North Pacific until 1988 (Reeves and Whitehead 1997). They are also protected by CITES. In the U.S., sperm whales were listed as endangered when the ESA was enacted in 1973. Because of this, they are considered depleted and the CA/OR/WA stock is strategic under the MMPA.

#### **10.3.1 Status of the Species - Sperm Whales**

Sperm whales are found year-round in California waters (Dohl *et al.* 1983; Barlow 1995; Forney *et al.* 1995). They reach peak abundance from April through mid-June and from the end of August through mid-November (Rice 1974). They have been seen in every season except winter (Dec-Feb.) in Washington and Oregon (Green *et al.* 1992). A recent survey designed specifically to investigate stock structure and abundance of sperm whales in the northeastern temperate Pacific revealed no apparent hiatus in distribution between the U.S. EEZ off California and areas farther west, out to Hawaii (Barlow and Taylor 2005).

Barlow and Taylor (2001) estimated 1,407 (CV=0.39) sperm whales in California, Oregon, and Washington waters during summer/fall based on pooled 1993 and 1996 ship line transect surveys within 300 nmi of the coast, while Barlow and Forney (2007) estimated 2,593 (CV= 0.30) sperm whales from a survey of the same area in 2001. A 2005 survey of this area resulted in an abundance estimate of 3,140 (CV=0.40) whales, which is corrected for diving animals not seen during surveys (Forney 2007). The most recent ship survey of the same area in 2008 resulted in an estimate of only 300 (CV = 0.51) sperm whales (Barlow 2010). The 2008 estimate is lower than all previous estimates within this region and may be due to interannual variability of sperm whale distribution in this region. The most recent estimate of abundance for this stock is the geometric mean of the 2005 and 2008 summer/autumn ship survey estimates, or 971 (CV = 0.31) sperm whales.

Large populations of sperm whales exist in waters that are within several thousand miles west and south of the California, Oregon, and Washington region; however, there is no evidence of sperm whale movements into this region from either the west or south and genetic data suggest that mixing to the west is extremely unlikely. There is limited evidence of sperm whale movement from California to northern areas off British Columbia, but there are no abundance estimates for this area. The most precise and recent estimate of sperm whale abundance for this stock is therefore 971 (CV = 0.31) animals from the ship surveys conducted in 2005 (Forney 2007) and 2008 (Barlow 2010). This estimate is corrected for diving animals not seen during surveys.

Under the MMPA, the PBR is defined as the product of the minimum population estimate, one half the maximum theoretical net productivity rate, and a recovery factor (Fr):  $PBR = N_{MIN} \times 0.5R_{MAX} \times Fr$ . The Fr for this stock is 0.1. Based on the minimum population size (751) times

one half the default maximum net growth rate for cetaceans ( $\frac{1}{2}$  of 4%) times a recovery factor of 0.1 (the default value for an endangered species), the calculated PBR for the CA/OR/WA sperm whale stock is 1.5 animals.

### 10.3.2 Threats - Sperm Whales

Here we provide a brief summary of the threats to sperm whales as they are applicable to the negligible impact determination, but more detailed information can be found in the Sperm Whale Recovery Plan (available at [http://www.nmfs.noaa.gov/pr/pdfs/recovery/final\\_sperm\\_whale\\_recovery\\_plan\\_21dec.pdf](http://www.nmfs.noaa.gov/pr/pdfs/recovery/final_sperm_whale_recovery_plan_21dec.pdf)) and the SARs (available at <http://www.nmfs.noaa.gov/pr/sars/>). Threats to sperm whales include vessel disturbance, climate change, illegal whaling or resumed legal whaling, reduced prey abundance due to overfishing or other factors (including climate change), habitat degradation, disturbance from noise, disease, pollution, impacts related to research, and natural causes.

Entanglement in fishing gear poses a threat to individual sperm whales and overall to the CA/OR/WA sperm whale stock. Prior to the implementation of the Plan on October 30, 1997, the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) was observed to incidentally take seven sperm whales; of these whales, three were dead (43%), three were released alive and uninjured (43%), and one was released injured and was not expected to survive (14%). More specifically in 1992 the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) was observed taking three sperm whales in one set off central California; two were alive and released uninjured, and one was dead. In 1993, two sperm whales were entangled in one set off southern California; one was alive and released uninjured, and one was dead. Also in 1993, one sperm whale was observed entangled and died in a drift gillnet off central California. In 1996, one sperm whale was observed entangled and released injured (trailing gear, and wounded from ramming the vessel) off central California.

After the 1997 implementation of the Plan, overall cetacean entanglement rates in the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) dropped considerably (Barlow and Cameron 2003), and only one sperm whale was observed incidentally taken in 1998. This animal died in a net off central California that did not have the full complement of pingers. However, because sperm whale entanglements are rare and because the net that took the sperm whale did not use the full mandated complement of pingers, it is difficult to evaluate whether pingers are having any effect on sperm whale entanglement. Pingers emit pulsed tones with source levels of 135 dB RMS; re:  $1 \mu\text{Pa}$  @ 1 m, fundamental operating frequencies of 10-12 kHz (with harmonics to 80 kHz), a pulse duration of 300 ms, and a pulse interval of 4 s, which is within the hearing range of sperm whales. The Team and Pacific Scientific Review Group both recommended no further strategies to reduce sperm whale entanglement, until the effectiveness of pingers is better understood. In late 2010, an observer recorded two sperm whales entangled in one net (with a full complement of pingers) in the CA thresher shark/swordfish DGN fishery. One animal was found dead and the other was released alive, but seriously injured with gear attached. The whales were likely taken from the CA/OR/WA stock of sperm whales. Because those three sperm whales were observed by NMFS' federal observers, the numbers of animals that interacted with the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) are extrapolated by the percent observer coverage for that year. Thus, in 1998, the observer coverage was 20%

and the one observed animal is extrapolated to a total of five animals for that year. Similarly, in 2010, the two animals that interacted with the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) were observed at an observer coverage rate of 11.9%, resulting in an extrapolated value of 16 total animals for that year (see Table 5).

With regard to other known fisheries interactions, one sperm whale was found dead in Marin County, California in 2004, with monofilament netting in its stomach (California Marine Mammal Stranding Network Database; U.S. Department of Commerce 2006). It is not known if this marine debris was the cause of death, however. Similar to 2004, in 2008, two sperm whales stranded dead: one was found in Crescent City, CA with a stomach full of a variety of different nets and the other in Point Reyes, CA with a variety of different netting, a plastic tarp, and rope marks on its pectoral flipper. Also, in 2008, an animal stranded dead in North Cove, Washington with apparent entanglement scars. Although it is not known if any of the animals' primary cause of death from 2008 was caused by interactions with gear, conservatively, they are included in this determination. Ship strikes were implicated in the deaths of at least four sperm whales in 2001, one in 2002, one in 2007, and one in 2009 (California Marine Mammal Stranding Network Database; U.S. Department of Commerce 2011). All human interactions recorded in the stranding database involving sperm whales were reviewed by the Southwest Fisheries Science Center (J.V. Carretta pers. comm. 2011 and 2012) using the Andersen *et al.* (2008) criteria. Only those that were determined to be either a serious injury or mortality were included in Table 5.

### **10.3.3 Summary of Status - Sperm Whales**

Large populations of sperm whales exist in waters that are within several thousand miles west and south of California, Oregon, and Washington. However, there is no evidence of sperm whale movements into these regions from either the west or south and genetic data suggest that mixing to the west is unlikely. There is limited evidence of sperm whale movement from California to northern areas off British Columbia, but there are no abundance estimates for this area. Current and historic estimates for the abundance of sperm whales in the North Pacific are considered unreliable (Allen and Angliss 2012). The abundance of sperm whales in the North Pacific was reported to be 1,260,000 prior to exploitation, which by the late 1970s was estimated to have been reduced to 930,000 whales (Rice 1989). These estimates include whales from the California/Oregon/Washington stock. The CA/OR/WA sperm whale stock is considered not to be declining (Carretta *et al.* 2012).

Sperm whales are listed as endangered under the ESA and consequently this stock is considered depleted and strategic under the MMPA.

## **11.0 Interaction with Category I and II Fisheries in California, Oregon, and Washington**

### *Process for Distinguishing Serious from Non-Serious Injuries*

The MMPA requires NMFS to estimate annual levels of human-caused mortality and serious injury to marine mammal stocks (section 117) and to categorize commercial fisheries based on their level of incidental mortality and serious injury of marine mammals (section 118). NMFS convened a workshop in 2007 to review performance under existing guidance, gather current

scientific information, and update guidance based on the best available information and based on results of the 2007 workshop recommendations for national guidance were developed (Andersen *et al.* 2008). These recommendations and results from new analysis of existing NMFS data were incorporated into a Policy Directive and accompanying Procedural Directive (NMFS 2012d), which currently serves as the basis for analyzing injury reports (e.g., observer, disentanglement, and stranding program reports) of marine mammals and incorporating the results into SARs and marine mammal conservation management regimes (e.g., LOF, Take Reduction Teams, Take Reduction Plans, ship speed regulations, and negligible impact determinations). For the purposes of this analysis the Andersen *et al.*, 2008 guidelines were used, because the NMFS Policy and Procedural Directives did not become effective until 2012, have not yet been applied to the data used in this analysis, and will not be applied until the 2013 SARs are finalized.

This section evaluates the available information to determine the likelihood of a fin, humpback, or sperm whale interacting with various commercial fisheries off California, Oregon, and Washington. Of all the Category I and II fisheries, as currently listed in the Final 2013 List of Fisheries (78 FR 53336; August 29, 2013), listed marine mammal species under NMFS' jurisdiction have been observed taken in the following two federally managed fisheries the CA thresher shark/swordfish DGN ( $\geq 14$  in mesh) and the WA/OR/CA sablefish pot fisheries. Information available for this analysis includes reports of interactions between the fishery and fin, humpback, and sperm whales, derived from observer programs, logbooks, and reports (e.g., reported entanglements, fisher self-reports, etc.). Additional serious injury and mortality have been documented through stranding reports. In cases where the specific fishery that caused the serious injury or mortality cannot be definitively identified, the serious injury or mortality has been attributed to "unknown fishery." Serious injury or mortality is not used to categorize unknown fisheries under the annual LOF but are included in this analysis to determine whether all commercial U.S. fisheries collectively have a negligible impact on the stocks. All human interactions recorded in the stranding database involving fin, humpback, or sperm whales were reviewed by James Carretta from the Southwest Fisheries Science Center (J.V. Carretta pers. comm. 2011 and 2012) using the Andersen *et al.* (2008) criteria. Only those that were determined to be either a serious injury or mortality were included in Table 5.

#### *Impacts of CA thresher shark/swordfish drift gillnet fishery*

In the CA thresher shark/swordfish DGN fishery, a wide variety of marine mammals are seriously injured or killed, which is most likely attributable to the non-selectivity of gear and location of fishing effort. The probability that a marine mammal will initially survive an entanglement in fishing gear depends largely on the nature of the interaction (e.g., location of entanglement on body, amount of gear, whether feeding or locomotion is impaired, etc.), species, size, age, and health of the marine mammal involved. For instance, larger animals such as fin whales, humpback whales and sperm whales may become entangled in gillnet but often survive the initial contact with the gear. Such entanglement may cause considerable damage to the gear, as the large whales may "punch" through and continue swimming. The degree of gear damage may be related to the type of net used, however, as fishermen do report that large blue and fin whales usually break through drift gillnets without entangling and that very little damage is done to the net (Barlow *et al.* 1997).

Marine mammals that die as a result of entanglement in drift gillnets usually drown. If entangled in a net with a typical soak time of 12-14 hours and suspended at least 36 feet from the surface, the animal is unable to survive without oxygen, especially if it is entangled at the beginning of the set, or in a deep section of the net. Marine mammals may also be affected as a result of being captured in a drift gillnet such as a sustained stress response, caused by repeated or prolonged entanglement in gear, may reduce fitness and make marine mammals more vulnerable to infection, disease, and predation (Angliss and DeMaster 1998).

In the CA thresher shark/swordfish DGN fishery, observers record detailed information on marine mammals entangled in the net. Animals that are released alive from the net with netting attached are classified as “injured.” Animals that completely release themselves or are completely released from the net by fishermen and can swim normally are recorded as “alive.” Based on the recent disentanglement efforts, the condition of the animal at the time of disentanglement likely predicts its future (*e.g.*, a skinny, weak animal is more likely to perish than an animal with less gear and swimming strongly). Seriousness of injuries was assessed under the MMPA serious injury guidelines (Angliss and DeMaster 1998; Andersen *et al.* 2008)). Because long-term stress studies have not been conducted on the impacts of capture by a fishery on marine mammals, NMFS is only able to make assumptions on the condition of marine mammals that have been released “unharmd” from a drift gillnet. Although marine mammals released “unharmd” do not have visible injuries, they may have been stressed from being caught or entangled in a net. This stress may cause an interruption in essential feeding behaviors or migration patterns; however, NMFS considers this effect, if experienced, is likely to be temporary and short-term, unless there are indications that the animal is or has been compromised. For these reasons, without long-term studies on a whale’s behavior following an entanglement, NMFS assumes that most of the marine mammals released and reported as “unharmd,” or “uninjured,” recover fully and survive following their capture in a drift gillnet, and that latent effects are limited to short-term physiological stress or short-term interruption of normal behavioral patterns.

Survival rate likely varies among marine mammal species incidentally taken by the CA thresher shark/swordfish DGN fishery. This is due in part to variations in size and diving and foraging behavior, as well as location in the net and time of entanglement. With few observed marine mammal entanglements in the CA thresher shark/swordfish DGN fishery, it is difficult to speculate as to the survival rate of the three listed species observed taken in the fishery. However, because baleen whales (humpback and fin) and sperm whales differ so greatly in the nature of their preferred prey and foraging behavior, as well as their physiology (*e.g.*, the sperm whale is capable of diving to much greater depths than the baleen whales in order to find their preferred prey of squid, depending largely on oxygen storage and metabolism, while the baleen whales rely less on diving, if possible, and tend to skim and gulp for euphausiids at the surface or below), survival rates following gillnet entanglement most likely vary greatly as well.

Since 1998, of the three species of whale analyzed, one fin whale (observed), one humpback (self-report), and three sperm whales (observed) were observed/reported as entangled in the CA thresher shark/swordfish drift gillnet gear. An additional 4 humpback whales were observed/reported in unknown net gear and 3 animals in gillnet gear (2 humpback whales and one sperm whale). From 1998-2011, one fin whale was killed and two other fin whales were

assumed seriously injured or killed in an unidentified fishery (Table 5). In addition, two humpback whales were observed seriously injured or killed, and 12 assumed seriously injured or killed in an unidentified fishery (Carretta *et al.* 2012 and the NMFS Southwest and Northwest Regional Marine Mammal Stranding Databases 2012)(Table 5).

### *Impacts of WA/OR/CA sablefish pot fishery*

In the WA/OR/CA sablefish pot fishery only one humpback whale was confirmed seriously injured or killed in this fishery. There is no observer coverage for this fishery, and, as mentioned previously, whales can swim off with pot gear trailing so interactions are likely much higher than those documented. From 1998-2011, one fin whale was killed and two other fin whales were assumed seriously injured or killed in an unidentified fishery (Table 5). In addition, two humpback whales were observed seriously injured or killed and 12 assumed seriously injured or killed in an unidentified fishery (Table 5). In addition, there were 21 unidentified whales observed entangled in pot/trap gear or unknown gillnet gear during 1998-2011 (NMFS Southwest and Northwest Regional Marine Mammal Stranding Databases 2012). Some of these animals may represent re-sightings of those described above. It is likely that most of the unidentified pot/trap fishery entanglements involved humpback whales.

## **12.0 Negligible Impact Analysis**

### **12.1 Incidental Takes in Commercial Fisheries**

The serious injury and mortality of fin, sperm, and humpback whales incidental to state and federal commercial fisheries are summarized by year in Table 5. In Table 5, the serious injury and mortality (SI/M) from fisheries is described as either 1) "Observed fishery SI/M (observer coverage rate)," which indicates those records that were observed by a NMFS federal observer and the corresponding observer coverage rate provided in the parentheses; 2)

"Extrapolated takes from observed SI/M" provides the extrapolated value from the observed serious injury or mortality multiplied by the observer coverage rate; 3) "Other reported fishery SI/M" represents any other fishery-related serious injury or mortality that was not observed or reported by a NMFS federal observer; and, 4) "Non-fishery human-caused SI/M (source)" indicative of any record of a non-fishery serious injury or mortality with the source of that serious injury or mortality included in parentheses. In Table 5, we also provide the minimum fishery SI/M and minimum total SI/M from all human-related sources which are additive, and both include the observed (by NMFS federal observer) extrapolated fishery-related serious injury and mortality and the other-fishery related (non-extrapolated) records of serious injury or mortality.

We used two time frames for this analysis. The first time frame for the data used in this analysis is from October 30, 1997 through December 31, 2011. This time frame was chosen initially because the Plan regulations (implemented August 13, 2001) required skippers to use at least 36' extenders and pingers in the CA thresher shark/swordfish DGN, which likely reduced the incidental take of many marine mammal species, particularly cetaceans such as the common dolphin (*Delphinus spp.*) and beaked whale (*Mesoplodon spp.*; Carretta and Barlow 2011). This time frame also provided a comprehensive look at all of the fisheries, given changes in

oceanographic conditions, fishing practices, and reporting and stranding records. The 2001 time/area closure of the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) off central and northern California/southern Oregon is also encompassed in this time frame.

The second time frame for the data used in this analysis includes the most recent five-year period (January 1, 2007 through December 31, 2011). The Guidelines for Assessing Marine Mammal Stocks (GAMMS) and the subsequent GAMMS II provide guidance that, when available, the most recent five-year time frame of commercial fishery incidental serious injury and mortality data is an appropriate measure of effects of fishing operations on marine mammal stocks. A five-year time frame provides enough data to adequately, though likely minimally, capture year to year variations in take levels, while better reflecting current environmental and fishing conditions as they may change over time. Additionally, because the permit issued under MMPA section 101(a)(5)(E) is for a three-year period, the most up-to-date data available for complete years are used (*i.e.*, 2007-2011).

Data sources for serious injury and mortality incidental to commercial fishing operations include observer data and stranded or entangled whales reported to NMFS through various sources. Seriousness of injuries was assessed using guidelines<sup>8</sup> developed for marine mammal stock assessments under the MMPA (Angliss and DeMaster 1998; Andersen *et al.* 2008). This estimate is considered a minimum because not all entangled animals die immediately and not all dead animals are found, reported, or cause of death determined.

A conservative approach is taken in these analyses for evaluating the negligible impact of fisheries and other sources, such as ship strikes, on these stocks, so in certain cases, the maximum number of serious injuries and mortality was used for the calculations. For example, if a ship strike occurred, but serious injury or mortality was not observed on scene or confirmed by necropsy of the stranded animal, and if further review of reports and other sources confirmed serious injury or mortality, it was assumed for purposes of this analysis that serious injury or mortality occurred. A summary of percentages representing ratios of serious injuries and mortality relative to PBR are provided in Tables 6 and 7.

### *Fishery Serious Injury and Mortality*

From 1998 to 2011, the total of all fin whale serious injury and mortality incidental to commercial fishing operations is 8, resulting in an annual average take of 0.57 animals. From 2007 through 2011, the total of all serious injury and mortality incidental to commercial fishing operations for the time period is 3 fin whales, resulting in an annual average take of 0.6 animals. The PBR calculated for this stock is 16 animals. Therefore, the total annual 14-year (1998-2011) average serious injury and mortality of fin whales in commercial fisheries is 3.6% and the 5-year (2007-2011) average is 3.8% of the PBR.

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<sup>8</sup> NMFS recently developed NMFS Policy Directive PD 02-238 Distinguishing Serious from Non-Serious Injury of Marine Mammals, Effective Date January 27, 2012. The data included in this document has not yet been analyzed using this new policy directive and only some is expected to be analyzed in the final 2012 SARs; thus, the previous version was used for analysis here.

From 1998 to 2011, the total of all humpback whale serious injury and mortality incidental to commercial fishing operations is 50, resulting in an annual average take of 3.57 animals. From 2007 through 2011, the total of all serious injury and mortality incidental to commercial fishing operations is 30 humpback whales, resulting in an annual average take of 6.0 animals. The PBR calculated for this stock is 11.3 animals. Therefore, the total annual 14-year (1998-2011) average serious injury and mortality of humpback whales in commercial fisheries is 31.6% and the 5-year (2007-2011) average is 53.1% of the PBR.

From 1998 to 2011, the total of all sperm whale serious injury and mortality incidental to commercial fishing operations is 25, resulting in an annual average take of 1.79 animals. From 2007 through 2011, the total of all serious injury and mortality due to commercial fishing operations is 19 sperm whales, resulting in an annual average take of 3.8 animals. The overall PBR calculated for this stock is 1.5 animals. Therefore, the total annual 14-year (1998-2011) average incidental take in commercial fisheries is 119.3% and the 5-year (2007-2011) average is 253.3% of the PBR.

## **12.2 Other Human-Caused Serious Injury and Mortality**

The same 14-year and 5-year time frames used above for commercial fisheries were also used to analyze other human-caused injury and mortality. The only records of human-caused injury and mortality other than those attributed to commercial fisheries were from ship strikes. Under the ship strike descriptions in Table 5, either (1) the ship strike was the confirmed cause of serious injury and/or mortality from direct observation from the ship or from the necropsy; or (2) the ship strike is assumed to be the cause of serious injury and/or mortality based on the report that accompanied the event (*e.g.*, ship captain observed blood in the water).

From 1998-2011, the total number of observed or assumed fin whale serious injury and mortality attributed to ship strikes is 16 resulting in an annual average of 1.14 fin whales. From 2007-2011, the total number of known or assumed serious injury and mortality attributed to ship strikes is 8, resulting in an annual average of 1.6 fin whales. Therefore, the total annual 14-year (1998-2011) average incidental take by ship strikes is 7.13% of PBR and the five-year (2007-2011) average is 10.71% of PBR. No other sources of direct human-caused serious injury or mortality are known to affect the CA/OR/WA stock of fin whales.

From 1998-2011, the total number of observed or assumed humpback whale serious injury and mortality attributed to ship strikes is 10 which results in an annual average of 0.71 humpback whales. From 2007-2011, the total number of observed or assumed serious injury and mortality attributed to ship strikes is 6, resulting in an annual average of 1.2 humpback whales. Therefore, the total annual 14-year (1998-2011) average incidental take by ship strikes is 6.28% of PBR and the five-year (2007-2011) average is 10.62% of PBR. No other sources of direct human-caused serious injury or mortality are known to affect the CA/OR/WA stock of humpback whales.

From 1998-2011, the total number of observed or assumed sperm whale serious injury and mortality attributed to ship strikes is 4.2, which results in an annual average of 0.29 sperm whales. From 2007-2011, the total number of observed or assumed serious injuries and mortality attributed to ship strikes is 2.1, resulting in an annual average of 0.42 sperm whales. Therefore,

the total annual 14-year (1998-2011) average incidental take by ship strikes is 19.05% of PBR and the five-year (2007-2011) average is 26.67% of PBR. No other sources of direct human-caused serious injury or mortality are known to affect the CA/OR/WA stock of sperm whales.

### **12.3 Total Human-Caused Mortality and Serious Injury**

The 14-year (1998-2011) average annual human-caused mortality or serious injury of fin whales, including ship strikes and incidental to all commercial fishing is 1.71 or 10.71% of the PBR for the CA/OR/ WA fin whale stock (Tables 5,6, and 7). The 5-year (2007-2011) average annual human-caused mortality or serious injury, including ship strikes and incidental to all commercial fishing is 2.2 or 13.75% of the PBR for the CA/OR/ WA fin whale stock (Tables 5, 6, and 7).

The 14-year (1998-2011) average annual human-caused mortality or serious injury of humpback whales, including ship strikes and incidental to all commercial fishing is 4.29 or 38.0% of the PBR for the CA/OR/WA humpback whale stock (Tables 5, 6 and 7). The 5-year (2007-2011) average annual human-caused mortality or serious injury, including ship strikes and incidental to all commercial fishing is 7.2 or 63.7% of the PBR for the CA/OR/WA humpback whale stock (Tables 5, 6, and 7).

The 14-year (1998-2011) average annual human-caused mortality or serious injury of sperm whales, including ship strikes and incidental to all commercial fishing for is 2.1 or 138.1% of the PBR for the CA/OR/WA sperm whale stock (Tables 5, 6, and 7). The 5-year (2007-2011) average annual human-caused mortality or serious injury, including ship strikes and incidental to all commercial fishing is 4.2 or 279.97% of the PBR for the CA/OR/WA sperm whale stock (Tables 5, 6, and 7).

**Table 5. Serious Injuries and Mortality Incidental to Commercial Fisheries and Ship Strikes for fin, humpback, and sperm whales (1998-2011) (J.V. Carretta pers comm., 2011 and 2012).**

**Fin Whale**

Year	Fishery	Observed fishery SI/M (observer coverage rate)	Extrapolated takes from observed SI/M	Other reported fishery SI/M	Non-fishery human caused SI/M (source)	Minimum fishery SI/M (includes extrapolated values)	Minimum total SI/M (includes extrapolated values)	PBR for that year
1998								
1999	CA/OR DGN	1 (20%)	5			5	5	
2000								2.1
2001					1 (ship strike)		1	2.1
2002					4 (ship strike)		4	
2003								
2004					1 (ship strike)		1	
2005					1 (ship strike)		1	
2006					1* (ship strike)		1	
2007								
2008					1 (ship strike)		1	14
2009	Unidentified			2	4 (ship strike)	2	6	
2010					2 (ship strike)		2	16
2011	Unidentified		1		1 (ship strike)	1	2	
<b>Total 1998-2011</b>								
					16	<b>8</b>	<b>24</b>	
<b>Average 1998-2011</b>								
					1.14	.57	1.71	
<b>Ratio of 14-year Average Annual to Most Recent PBR (16)</b>								
					7.13%	<b>3.6%</b>	<b>10.71%</b>	
<b>Total 2007-2011</b>								
					8	3	11	
<b>Average 2007-2011</b>								
					1.6	0.60	2.2	
<b>Ratio of 5-year Average to Most Recent PBR (16)</b>								
					10%	<b>3.8%</b>	<b>13.75%</b>	

\*2006-This animal interacted with fishing gear, but the ultimate cause of death was a ship strike.

## Humpback Whale

Year	Fishery	Observed fishery SI/M (observer coverage rate)	Extrapolated takes from observed SI/M	Other reported fishery SI/M	Non-fishery human caused SI/M (source)	Minimum fishery SI/M (includes extrapolated values)	Minimum total SI/M (includes extrapolated values)	PBR for that year
1998	Spot prawn			1		1	1	
1999	Unknown net			2		2	2	0.8
2000	Unidentified			1	1(ship strike)	2	3	1.7
	Unknown net			1				
2001	Pot gear			1		1	1	1.9
2002								1.6
2003	Crab pot			3		5	5	1.35
	Pot gear			1				
	Unknown			1				
2004	Unknown			1	1(ship strike)	1	2	1.6
2005	Trap pot			2	1(ship strike)	3	4	2.3
	Spot prawn			1				
2006	Unidentified			2	1(ship strike)	5	6	
	Sablefish trap			1 (id by license #)				
	Gillnet			1				
	Unidentified trap/pot			1				
2007	Gillnet			1	1(ship strike)	5	6	
	Trap gear			1				
	Crab gear			1				
	Unidentified			2				
2008	Dungeness crab gear			1*	3(ship strike)	7	10	2.5
	Unidentified net			1				
	Crab pot			2				
	Crab gear			1				
	Unidentified pot/trap			1				
	Unidentified			1				
2009	CA DGN			1(self-report)		3	3	2.5

Year	Fishery	Observed fishery SI/M (observer coverage rate)	Extrapolated takes from observed SI/M	Other reported fishery SI/M	Non-fishery human caused SI/M (source)	Minimum fishery SI/M (includes extrapolated values)	Minimum total SI/M (includes extrapolated values)	PBR for that year
	Unidentified			1				
	Unidentified net			1				
2010	Unidentified			4	1(ship strike)	8	9	11.3
	Crab pot			4				
2011	Unidentified			1	1(ship strike)	7	8	
	Crab pot			2				
	WA recreational crab			4				
<b>Total 1998-2011</b>								
Total 1998-2011					10	50	60	
Average 1998-2011					0.71	3.57	4.29	
<b>Ratio 14-year Average Annual to Most Recent PBR (PBR=11.3)</b>					6.28%	<b>31.6%</b>	<b>38.0%</b>	
<b>Total 2007-2011</b>								
Total 2007-2011					6	30	36	
Average 2007-2011					1.2	6	7.2	
<b>Ratio of 5-year Average to Most Recent PBR (PBR=11.3)</b>					10.62%	<b>53.1%</b>	<b>63.7%</b>	

\*Comment in report indicated that trailing gear did not appear life threatening, but after further review, considered a SI.

## Sperm Whale

Year	Fishery	Observed fishery SI/M (observer coverage rate)	Extrapolated takes from observed SI/M	Other reported fishery SI/M	Non-fishery human caused SI/M (source)	Minimum fishery SI/M (includes extrapolated values)	Minimum total SI/M (includes extrapolated values)	PBR for that year
1998	CA DGN	1 (20%)	5			5	5	
1999								2.0
2000					1(ship strike)		1	2.0
2001								2.1
2002					1(ship strike)		1	
2003								1.8
2004	Unknown net			1*		1	1	
2005								
2006								
2007					1(ship strike)		1	3.4
2008				3**		3	3	9.3
2009					1(ship strike)			
2010	CA DGN	2 (11.9%)	16			16	16	1.5
2011								
Total 1998-2011					4	25	29	
Average 1998-2011					.29	1.79	2.1	
<b>Ratio of 14-year Average to Most Recent PBR (PBR=1.5)</b>					19.05%	<b>119%</b>	<b>138.1%</b>	
Total 2007-2011					2	19	21	
Average 2007-2011					.4	3.8	4.2	
<b>Ratio of 5-year Average to Most Recent PBR (PBR=1.5)</b>					26.67%	<b>253.3%</b>	<b>279.97%</b>	

\* Net did not have a full complement of pingers

\*\* Monofilament netting found in stomach

**Table 6. Percentages representing the ratio of average annual human-caused mortality and serious injury relative to PBR.**

<b>FIN WHALE CURRENT PBR=16</b>	
FISHING: 5-year for Fin whale from 2007-2011 = 3.8%	5-year fishing and ship strikes Total=13.8 % of PBR
SHIP STRIKE: 5-year for Fin whale from 2007-2011 = 10%	
FISHING: 14-year for Fin whale from 1998-2011 = 3.6%	14-year fishing and ship strikes Total=10.7% of PBR
SHIP STRIKE: 14-year for Fin whale from 1998-2011 = 7.13%	
<b>HUMPBACK WHALE CURRENT PBR=11.3</b>	
FISHING: 5-year for Humpback whale from 2007-2011 = 53.1%	5-year fishing and ship strikes Total=63.7% of PBR
SHIP STRIKE: 5-year for Humpback whale from 2007-2011 =10.6%	
FISHING: 14-year for Humpback whale from 1998-2011 = 31.6%	14-year fishing and ship strikes Total=38.0% of PBR
SHIP STRIKE: 14-year for Humpback whale from 1998-2011 =6.3%	
<b>SPERM WHALE* CURRENT PBR=1.5</b>	
FISHING: 5-year for Sperm whale from 2007-2011 = 253.3%	5-year fishing and ship strikes Total= 279.97% of PBR
SHIP STRIKE: 5-year for Sperm whale from 2007-2011 = 26.67%	
FISHING: 14-year for Sperm whale from 1998-2011 = 119.3%	14-year fishing and ship strikes Total=138.1% of PBR
SHIP STRIKE: 14-year for Sperm whale from 1998-2011 = 19.05%	

\* The fishing totals for sperm whales include those animals that stranded with netting/fishing gear in their stomachs. It is not clear how the ingestion occurred (i.e., whether they were interacting with fishing or ingested ghost nets); however, the amount of gear in the stomach was determined to be the cause of death. In the previous NID, we included ingestion of gear under fisheries takes, so we continue this practice to be consistent until more is known.

**Table 7. Minimum all human-caused serious injury or mortality (HCM) and all fisheries-related serious injury or mortality used in the negligible impact analysis.**

<b>Fin Whales</b>	Current PBR	All HCM	All HCM annual average	All HCM as a % of PBR	All Fisheries SI/M	All Fisheries SI/M annual average	All Fisheries SI/M % of PBR
14-year	16	24	1.71	10.71%	8	0.57	3.6%
5-year	16	11	2.2	13.75%	3	0.6	3.8%
<b>Humpback Whales</b>	Current PBR	All HCM	All HCM annual average	All HCM as a % of PBR	All Fisheries SI/M	All Fisheries SI/M annual average	All Fisheries SI/M % of PBR
14-year	11.3	60	4.29	38.0%	50	3.57	31.6%
5-year	11.3	36	7.2	63.7%	30	6	53.1%
<b>Sperm Whales</b>	Current PBR	All HCM	All HCM annual average	All HCM as a % of PBR	All Fisheries SI/M	All Fisheries SI/M annual average	All Fisheries SI/M % of PBR
14-year	1.5	29	2.1	138.1%	25	1.79	119.3%
5-year	1.5	21	4.2	279.97%	19	3.8	253.3%

### 13.0 Application of Negligible Impact Determination Criteria

In applying the 1999 criteria (see Section 2.1.2 for a description of these criteria) to determine whether mortality and serious injury incidental to commercial fisheries will have a negligible impact on a listed marine mammal stock, Criterion 1 (total human-related serious injury and mortality are less than 0.1 PBR) is the starting point for analysis. If this criterion is satisfied, the analysis would be concluded. The remaining criteria describe alternatives under certain conditions, such as fishery mortality below the negligible threshold but other human-caused mortality above the threshold or fishery and other human-caused mortality between the negligible threshold and PBR for a stock that is increasing or stable. If Criterion 1 is not satisfied, NMFS may use one of the other criteria as appropriate. We include the 14-year annual average serious injury and mortality to provide historical context, but for all three stocks we conservatively use the 5-year annual average for the negligible impact determination analysis and the application of the appropriate criterion.

#### *Criterion 1*

In this analysis, Criterion 1 was not satisfied because the total human-related serious injury for the CA/OR/WA stocks of fin, humpback, and sperm whale, are **not** less than 0.1 PBR. The 14-year annual average serious injury and mortality to the CA/OR/WA stock of fin whales from all human-caused sources is 1.71 or 10.71% of the current PBR and the 5-year annual average annual average serious injury and mortality from all human-caused sources is 2.2 or 13.75% of the current PBR. The 14-year average annual serious injury and mortality to the CA/OR/WA stock of humpback whales from all human sources is 4.29 or 38.0% of the current PBR and the 5-year average annual human-caused mortality or serious injury is 7.2 or 63.7% of the current PBR. The 14-year average annual serious injury and mortality to the CA/OR/WA stock of sperm whales from all human sources is 2.1 or 138.1% of the current PBR and the 5-year average annual human-caused mortality or serious injury is 4.2 or 279.97% of the current PBR. As a result, the other criteria must be examined for the CA/OR/WA fin, humpback, and sperm whale stocks (see Tables 7 and 8).

#### *Criterion 2*

Criterion 2 is satisfied if total human-related serious injuries and mortalities are greater than PBR, and fisheries-related mortality is less than 0.1 PBR. Examining Criterion 2 with respect to the CA/OR/WA stock of fin whales, total human-related serious injury and mortality (14-year annual average of 1.71 and 5-year annual average of 2.2) is **not** greater than PBR (of 16) for both time periods considered. The 14-year annual average serious injury and mortality from fisheries-related sources is 0.57 or 3.6% of the PBR and the 5-year annual average fisheries-related mortality of serious injury is 0.6 or 3.8% of the PBR; therefore fisheries-related mortality **is** less than 0.1 PBR for both time periods considered. In the case of the CA/OR/WA stocks of fin whales Criterion 2 is partially satisfied because the human-related serious injury and mortality is not greater than PBR and the total fisheries-related mortality is less than 0.1 of PBR. Fin whales also do not exactly fit the criteria as written for Criterion 3, as the human-related serious injury

and mortality is not greater than PBR (Criterion 3 is satisfied if total fishery-related serious injury and mortality is *less than PBR*) and the total fisheries-related mortality is less than 0.1 of PBR (Criterion 3 is satisfied if total fishery-related serious injury and mortality is *greater than 0.1 PBR*). Therefore, fin whales do not precisely meet the criteria as written for Criterion 2 or 3, but a negligible impact determination can still be made for the fin whale stock because it falls within both Criteria 2 and 3. For the purposes of this analysis we will consider it under Criterion 2 and is discussed further in this section.

Examining Criterion 2 with respect to the CA/OR/WA stock of humpback whales, total human-related serious injury and mortality (14-year annual average of 4.29 and 5-year annual average of 7.2) is **not** greater than PBR (of 11.3) for both time periods considered. The 14-year annual average serious injury and mortality from fisheries-related sources is 3.57 or 31.6% of the PBR and the 5-year annual average fisheries-related mortality of serious injury is 6 or 53.1% of the PBR. Fisheries-related mortality is **not** less than 0.1 PBR for either time period considered. In the case of the CA/OR/WA stocks of humpback whales Criterion 2 is not satisfied (see Tables 7 and 8).

Examining Criterion 2 with respect to the CA/OR/WA stock of sperm whales, total human-related serious injury and mortality (14-year annual average of 2.0 and 5-year annual average of 4.0) is greater than PBR (of 1.5) for both time periods considered. The 14-year annual average serious injury and mortality from fisheries-related sources is 1.79 or 119.3% of the PBR and the 5-year annual average fisheries-related mortality of serious injury is 3.8 or 253.3% of the PBR. Fisheries-related mortality is **not** less than 0.1 PBR for either time period considered. In the case of the CA/OR/WA stocks of sperm whales Criterion 2 is not satisfied. As a result, the other criteria must be examined for the CA/OR/WA humpback and sperm whale stocks (see Tables 7 and 8).

### *Criterion 3*

In considering the appropriate criterion to use for determining whether commercial fisheries off the U.S. west coast are having a negligible impact on the CA/OR/WA stocks of humpback whales and sperm whales, Criterion 3 (total fishery-related serious injury and mortality is greater than 0.1 PBR and less than PBR, and the population is stable or increasing) was determined to be the appropriate criterion. For these stocks, the total fisheries-related serious injury and mortality is greater than 0.1 PBR and is or is expected to be less than PBR (see explanation below regarding the Emergency Temporary Regulations), and the populations of these stocks are considered to be stable or increasing. In August, 2013, NMFS implemented Emergency Temporary Regulations to Reduce Risk of Sperm Whale Takes by the West Coast Swordfish Drift Gillnet Fishery (RIN 0648-BD57). The modifications were made to the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) to reduce the bycatch of sperm whales in this fishery. It is expected that these measures will reduce the bycatch of sperm whales so that the total fisheries-related take will be less than PBR. Therefore, U.S. commercial fisheries within the range of the CA/OR/WA humpback, and sperm whale stocks may be permitted subject to their individual review and the certainty of relevant data, and provided that the other provisions

of section 101(a)(5)(E) are met. Criterion 3 is the appropriate criterion to analyze these two stocks (see Tables 7 and 8).

### *Explanation of Negligible Impact Analysis for Fin Whales*

The 14-year annual average serious injury and mortality to the CA/OR/WA stock of fin whales from all human-caused sources, including commercial fisheries (.57 animals) plus ship strikes (1.14 animals), is 1.71 animals, which is slightly more than 10% of this stock's PBR (16 animals/year). The 5-year annual average serious injury and mortality to the CA/OR/WA stock of fin whales from all human-caused sources, including all commercial fisheries (0.6 animals) plus ship strikes (1.6 animals), is 2.2 animals, which is greater than 10% of this stock's PBR (see Table 7). The 5-year average is conservatively used for the negligible impact determination analysis and the application of Criterion 2. While there is some indication that fin whales have increased in abundance in coastal waters off California in the late 1970s and mid-1990s, the trend is not statistically significant. However, surveys likely underestimate the abundance of fin whales by excluding animals that could not be identified. Since receiving protection from whaling, the stock is likely stable or increasing, as indicated most recently from abundance estimates from four surveys conducted off the U.S. west coast from 1996 through 2008. Recently, Moore and Barlow (2011) modeling predicted future abundance for fin whales in Oregon, Washington, and California and assuming no change in the underlying population dynamics process, fin whale abundance in the study area beyond 2008 is expected to continue increasing at a rate of about 3% per year on average, although year-to-year abundance should rise and fall according to random process variation.

Even with the current levels of human-caused mortality and serious injury, the fishery-related mortality and serious injury is 3.6% (14-year) and 3.8% (5-year) of the stock's PBR of 16, which is calculated using a recovery factor of 0.3 (would not delay recovery by more than 25%). The minimum population size is about 2,624 and is growing at a rate of about 3%/year (slightly less than the default maximum net growth rate for cetaceans of 4%). Criterion 2 is considered to be satisfied in determining that mortality and serious injuries of the CA/OR/WA fin whale stock incidental to commercial fishing would have a negligible impact on the stock because of individual review of data regarding the stock, including increased growth rate of the stock, limited increases in serious injury and mortality due to the relevant fisheries, and the level of human-caused mortality and serious injury is below the estimated PBR.

During the past 14 years, only one fin whale has been observed taken by the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) (1999; which is after the implementation of the Plan<sup>9</sup> and prior to the 2001 closure off California/Oregon). This fin whale was observed by a NMFS observer; and in the 14-year annual average estimate, that one animal was extrapolated by

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<sup>9</sup> The 2011 U.S. Pacific Marine Mammal Stock Assessment Reports (Carretta *et al.* 2012) and the MMPA LOF indicate that no fin whales have interacted with either the CA thresher shark/swordfish DGN fishery or the WA/OR/CA sablefish pot fishery in the last five years, the time period used to determine PBR. As such, a take reduction plan is not required for the CA/OR/WA stock of fin whales because mortality and serious injury of this stock incidental to commercial fishing operations is at insignificant levels approaching a zero mortality and serious injury rate.

the observer coverage rate for that year (20%). Therefore, the 14-year annual average includes the extrapolated value of 5 animals for that take in 1999 (see Table 5). However, the likelihood that a fin whale would be taken in the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) is very low. Based on the evaluation of stranding records, two fin whales were assumed to have either been killed or seriously injured in 2009 from an unidentified fishery, indicating that the likelihood that fin whale would be taken by any fishery, including the WA/OR/CA sablefish pot fishery, is also very low. Given this low likelihood and the application of Criterion 2 for this analysis (Table 8), NMFS determines that mortality and serious injury incidental to commercial fisheries will have a negligible impact on the CA/OR/WA stock of fin whales.

#### *Explanation of Negligible Impact Analysis for Humpback Whales*

The 14-year annual average serious injury and mortality to the CA/OR/WA stock of humpback whales from all human-caused sources, including commercial fisheries (3.57 animals) plus ship strikes (0.71 animals), is 4.29 animals, which is 38.0% of this stock's PBR (11.3 animals/year). The 5-year annual average serious injury and mortality to the CA/OR/WA stock of humpback whales from all human-caused sources, including commercial fisheries (6.0 animals) plus ship strikes (1.2 animals), is 7.2 animals, which is 63.7% of this stock's PBR. The total fisheries-related serious injury and mortality for both the 14- and 5-year annual average is more than 0.1 PBR but less than this stock's PBR. In addition, the population for this stock is considered to be increasing by 6-7% per year (Carretta *et al.* 2012). Based on the above, the conditions have been met for applying Criterion 3 (see Table 8) to the analysis of impacts to humpback whales.

Even with the current levels of human-caused mortality and serious injury, the fishery-related mortality and serious injury from all commercial fisheries is conservatively estimated at 53.1% (5-year average). However, a total of two humpback whales were observed, estimated or assumed to have either been killed or injured in the two fisheries considered in this authorization, the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) and WA/OR/CA sablefish pot fishery which is a small portion of the stock's PBR, which is calculated using a recovery factor of 0.3 (would not delay recovery by more than 25%). The minimum population size is about 1,878 and is growing at a rate of about 4%/year which is equal to the default maximum growth rate for cetaceans (4%). Accordingly, Criterion 3 is satisfied in determining that mortality and serious injuries of the CA/OR/WA humpback whale stock incidental to commercial fishing would have a negligible impact on the stock because of individual review of data regarding the stock, including increased growth rate of the stock, limited increases in serious injury and mortality due to the relevant fisheries, and the level of human-caused mortality and serious injury is below the estimated PBR.

Since the beginning of the NMFS observer program in 1990, no deaths of humpback whales have been attributed to the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) and after the implementation of the Plan, overall cetacean entanglement rates in the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) dropped considerably. However, in 2009 a humpback whale was reported seriously injured after interacting with the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) and in 2006 one humpback whale was considered seriously injured/killed after interacting with the WA/OR/CA sablefish pot fishery. Fisheries

that use pot and trap gear have a history of causing death and serious injury of this stock as noted in the recent listing of pot/trap fisheries as Category II fisheries in the most recent List of Fisheries 2013 (CA spot prawn pot fishery; CA Dungeness crab pot fishery; Oregon Dungeness crab pot fishery; WA/OR/CA sablefish pot fishery; WA coastal Dungeness crab pot/trap fishery). A total of two humpback whales were either estimated or assumed to have either been killed or injured in the two fisheries considered in this authorization, the CA thresher shark/swordfish DGN ( $\geq 14$  in mesh) fishery and WA/OR/CA sablefish pot fishery, indicating that the likelihood that a humpback whale would be taken by these fisheries is very low. Given this low likelihood and in analyzing impacts of commercial fisheries, with consideration of other human-caused impacts and an increasing trend in this stock, Criterion 3 has been met (Table 8); and, therefore, NMFS determines that mortality and serious injury incidental to commercial fisheries will have a negligible impact on the CA/OR/WA stock of humpback whales.

#### *Explanation of Negligible Impact Analysis for Sperm Whales*

The 14-year annual average serious injury and mortality to the CA/OR/WA stock of sperm whales from all human-caused sources, including commercial fisheries (1.79 animals) plus ship strikes (0.29 animals), is 2.1 animals, which is 138.1% of this stock's PBR (above the 0.1 PBR threshold and PBR). The 5-year annual average serious injury and mortality to the CA/OR/WA stock of sperm whales from all human-caused sources, including commercial fisheries (3.8 animals) plus ship strikes (0.4 animals), is 4.2 animals, which is 279.97% of this stock's PBR.

The 5-year fishery-related mortality and serious injury from all commercial fisheries is conservatively estimated at 253.3% of PBR. Since the implementation of the Plan, three sperm whales have been incidentally taken. One in 1998 was taken prior to the 2001 closure off central California/southern Oregon in the CA thresher shark/swordfish DGN fishery, but the net did not have a full complement of pingers; therefore, it is difficult to evaluate whether pingers have an effect on sperm whale entanglement. However, pingers have been shown to have a positive effect on other odontocetes (*i.e.*, lower entanglement rates) (Barlow and Cameron 2003). Two more sperm whales were taken in 2010 (one killed; one released seriously injured) in the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) in a compliant net with a full complement of pingers. Because those 3 sperm whales were observed by NMFS' federal observers, the numbers of animals that interacted with the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) are extrapolated by the percent observer coverage for that year. Thus, in 1998, the observer coverage was 20% and the one observed animal is extrapolated to a total of 5 animals over five years (see Tables 5, 6 and 7). Similarly, in 2010, the two animals that interacted with the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) were observed at an observer coverage rate of 11.9%, resulting in an extrapolated value of 16 total animals over five years (see Table 5). No sperm whales have interacted with the WA/OR/CA sablefish pot fishery. The stock's PBR is calculated using a recovery factor of 0.1 (with a long term-average mortality and serious injury equal to PBR, 90% of the stock's net annual production would be reserved for recovery). The minimum population size is about 751 and is growing at a rate of about 2%/year which is one half of the default maximum growth rate for cetaceans (4%).

Sperm whale abundance appears to have been variable off California between 1979/80 and 1991 (Barlow 1994) and between 1991 and 2008 (Barlow and Forney 2007). The most recent estimate from 2008 is the lowest to date, in sharp contrast to the highest abundance estimate obtained from 2001 and 2005 surveys. However, there is no reason to believe that the population has declined; the most recent survey likely reflects interannual variability with the study area. Sperm whale distribution and relative abundance may be correlated to the abundance of their main prey items. Jaquet and Gendron's (2002) research suggests that sperm whales changed their distribution in response to a decline in jumbo squid. The distribution and relative abundance of sperm whales in relation to key environmental features may also influence the distribution of their prey and thus, sperm whale relative abundance. Although the population in the eastern North Pacific is expected to have grown since large-scale pelagic whaling ceased in 1980, the possible effects of unreported catches are unknown (Yablokov 1994; Clapham and Ivashchenko 2009). The overall population of sperm whales has increased worldwide since it was listed under the ESA in 1973. Sperm whales are found year-round in California waters, but they reach peak abundance from April through mid-June and from the end of August through mid-November. They were seen in every season except winter (Dec-Feb) in Washington and Oregon. To date, there has not been a statistical analysis to detect trends in abundance for the CA/OR/WA stock of sperm whales. Although populations are expected to have increased due to the cessation of whaling, determining population trends has been difficult. This is in part because sperm whale migration patterns are not well understood (patterns seem to vary with age and sex) and because sperm whales occur in larger groups and tend to range more widely, making abundance estimates more variable than those of other large whales with similar population sizes. The population of the CA/OR/WA sperm whale stock has fluctuated since 1979/80 without apparent trend and appears relatively stable (Barlow 1994).

The total fisheries-related serious injury and mortality for both the 14- and 5-year annual average is greater than 0.1 PBR, (PBR=1.5 animals/year) and the average annual fisheries-related mortality and serious injury for this stock is greater than PBR for both the 14- and 5-year annual averages. NMFS convened the Pacific Offshore Cetacean Take Reduction Team (Team) on July 31 and August 7, 2013. The Team was charged with developing recommendations to reduce sperm whale serious injury and mortality in the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh). NMFS considered the Team's recommendations and developed an emergency rule (RIN 0648-BD57) to modify the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh) to reduce the risk of mortality and serious injury of sperm whales incidental to the fishery such that the negligible impact determination conditions of the MMPA section 101(a)(5)(E) could be met; thereby allowing NMFS to provide incidental take authorization for fishers within the fishery under the ESA and MMPA for the 2013-2014 fishing season. NMFS intends to reconvene the Team to consider long-term measures for reducing sperm whale mortality and serious injury in the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh) in subsequent fishing seasons. It is expected that any future changes to the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) that may occur as a result of modifying the Pacific Offshore Cetacean Take Reduction Plan would not change the negligible impact analysis. During the 2013/2014 fishing season, the Emergency Rule (RIN 0648-BD57) will be in effect until January 31, 2014. The Emergency Rule provides for immediate closure of the DGN fishery ( $\geq 14$  in mesh) if one sperm whale is observed killed or seriously injured in DGN gear and requires all DGN fishing vessels to carry a

NMFS-trained observer from August 15, 2013 to January 31, 2014 in a 100% observer coverage area. The 100% observer coverage area includes nearly all areas in the U.S. EEZ deeper than the 1,100 fm (2,012 m) depth contour. Owners and operators of vessels intending to fish in the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) will be required to install, activate, carry, and operate a VMS during the period of this emergency rule. NMFS intends to reconvene the Team to consider long-term measures for reducing sperm whale mortality and serious injury in the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh) in subsequent fishing seasons. NMFS expects that the future bycatch of sperm whales by the CA thresher shark/swordfish DGN fishery ( $\geq 14$  inch mesh) will not exceed PBR and Criterion 3 will still be satisfied. The time frame for the negligible impact authorization presented here is for a period of up to three years. NMFS expects that any future changes to the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) that may occur during that time will not change the negligible impact analysis. However, if a take of a sperm whale (CA/OR/WA stock) occurs in any commercial fishery, and the take is a serious injury or mortality, that take is included in the total fishery-related serious injury or mortality considered under Criterion 3 of the negligible impact determination. The underlying data indicate that there is a very low likelihood that another fishery may take a sperm whale, but in the unlikely event that a mortality or serious injury occurs during the three-year time frame for this authorization, the negligible impact determination would be re-evaluated pursuant to section 101(a)(5)(E)(iii), (iv), and (v) of the MMPA (16 U.S.C. §1371(a)(5)(E)(iii), (iv), and (v)).

Accordingly, Criterion 3 is satisfied (Table 8) in determining that serious injuries and mortality of the CA/OR/WA sperm whale stock incidental to commercial fishing would have a negligible impact on the stock because of individual review of data regarding the stock, including growth rate of the stock, limited increases in serious injury and mortality due to the relevant fisheries, and the level of human-caused mortality and serious injury is expected to be below the estimated PBR. Given the infrequency of sperm whale interactions in the last 14 years and the modifications to the CA thresher shark/swordfish DGN, the likelihood that another sperm whale would be taken by the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) is low (sperm whales have not interacted with any of the other Category II fisheries, such as the WA/OR/CA sablefish pot fishery, that overlap with this stock's distribution). Based on this information and the conditional applicability of Criterion 3 (Table 8), NMFS determines that the mortality and serious injury incidental to commercial fisheries will have a negligible impact on the CA/OR/WA stock of sperm whales. However, if one sperm whale is seriously injured or killed in any fishery during the three-year time frame for which this determination is authorized, then the negligible impact determination would be re-evaluated pursuant to section 101(a)(5)(E)(iii), (iv), and (v) of the MMPA (16 U.S.C. §1371(a)(5)(E)(iii), (iv), & (v)).

**Table 1. Result for the Application of the Negligible Impact Determination Criterion by stock.**

<b>CA/OR/WA stock</b>	<b>Is Criterion 1 Satisfied?</b> Total human-related serious injuries and mortalities are less than 0.1 PBR	<b>Is Criterion 2 Satisfied?</b> Total human-related SI/M > PBR, and fisheries-related mortality is less than 0.1 PBR	<b>Is Criterion 3 Satisfied?</b> Total fisheries-related SI/M > 0.1 PBR and less than PBR and the population is stable or increasing	<b>Is Criterion 4 Satisfied?</b> If abundance is declining, the threshold level of 0.1 PBR will continue to be used and a more conservative criterion is warranted.	<b>Is Criterion 5 Satisfied?</b> If total fisheries-related SI/M > PBR, permits may not be issued
Fin whale	<b>No.</b> Not Satisfied, go to Criterion 2	<b>Yes.</b> The total 5-year fishery-related mortality is >0.1 PBR (3.8 %) and the total 14-year fishery-related mortality is >0.1 PBR (3.6%), but total human-caused SI/M is less than PBR (PBR=16). The population is increasing. Criterion 2 is considered to be satisfied.	<i>Previous Criterion Already Satisfied</i>	<i>Previous Criterion Already Satisfied</i>	<i>Previous Criterion Already Satisfied</i>
Humpback whale	<b>No.</b> Not Satisfied, go to Criterion 2	<b>No.</b> Not Satisfied, go to Criterion 3	<b>Yes.</b> The total 5-year fishery-related SI/M is >0.1 PBR (53.1%) and the total 14-year fishery-related SI/M is >0.1 PBR (31.6% PBR), but less than PBR (PBR=11.3). The population is increasing.	<i>Previous Criterion Already Satisfied</i>	<i>Previous Criterion Already Satisfied</i>
Sperm whale	<b>No.</b> Not Satisfied, go to Criterion 2	<b>No.</b> Not Satisfied, go to Criterion 3	<b>Yes.</b> The total 5-year fishery-related SI/M is 253.3% PBR and the total 14-year fishery-related SI/M is 119.3%, both greater than 0.1 PBR (PBR=1.5). The population is stable. Modifications to the fishery (Emergency Rule; RIN 0648-BD57) are expected to reduce the bycatch of sperm whales to be less than PBR. Criterion 3 is satisfied conditioned upon the Emergency Rule.	<i>Previous Criterion Already Satisfied</i>	<i>Previous Criterion Already Satisfied</i>

## 14.0 Negligible Impact Determination

Based on the review of the available data and applying the 1999 criteria for making a negligible impact determination under MMPA Section 101(a)(5)(E), the conditions of Criterion 2 are considered to be met by the available serious injury and mortality data for the CA/OR/WA stock of fin whales, and all conditions of Criterion 3 are met by the available data for the CA/OR/WA stock of humpback whales. Total fishery-related serious injury and mortality for the CA/OR/WA stock of sperm whales is greater than 0.1 PBR and is anticipated to be less than PBR following implementation of the Emergency Rule (RIN 0648-BD57), and the population is stable; thus, the conditions of Criterion 3 are anticipated to be met for this stock and could be modified pursuant to section 101(a)(5)(E)(iii), (iv), and (v) of the MMPA. For the following stocks, NMFS has determined that the mortality and serious injury incidental to the CA thresher shark/swordfish DGN fishery ( $\geq 14$  in mesh) will have a negligible impact for purposes of issuing a permit under section 101(a)(5)(E) of the MMPA:

Fin whale, California/Oregon/Washington stock  
Humpback whale, California/Oregon/Washington stock  
Sperm whale, California/Oregon/Washington stock

For the following stocks, NMFS has determined that the mortality and serious injury incidental to the WA/OR/CA sablefish pot fishery will have a negligible impact for purposes of issuing a permit under section 101(a)(5)(E) of the MMPA:

Humpback whale, California/Oregon/Washington stock

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James V. Carretta, National Marine Fisheries Service, Southwest Regional Office, La Jolla, CA.  
Review of human-caused strandings to determine if resulted in a serious injury or mortality to

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Lauren Saez, Contractor for Ocean Associates for the National Marine Fisheries Service, Southwest Regional Office, May 2012.

## 16.0 APPENDIX 1

### Marine Mammal Stock Assessment Terminology

Under section 117 of the MMPA, NMFS and the U.S. Fish and Wildlife Service are required to publish stock assessment reports for all stocks of marine mammals within U.S. waters, to review new information every year for strategic stocks and every three years for non-strategic stocks, and to update the stock assessment reports when significant new information becomes available. Under MMPA Section 3(19), a strategic stock is defined as a marine mammal stock:

- (A) for which the level of direct human-caused mortality exceeds the potential biological removal [(PBR)] level;
- (B) which, based on the best available scientific information, is declining and is likely to be listed as a threatened species under the [ESA] within the foreseeable future; or
- (C) which is listed as a threatened species or endangered species under the [ESA], or is designated as depleted under [the MMPA].

Under MMPA Section 3, the PBR level means the maximum number of animals, not including natural mortality, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimal sustainable population (OSP). Optimum sustainable population means the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element. The PBR level is the product of the following factors: 1) The minimum population estimate of the stock ( $N_{MIN}$ ); 2) One-half the maximum theoretical or estimated net productivity rate of the stock at a small population size, where net productivity rate is the annual per capita rate of increase in a stock resulting from additions due to reproduction, less losses due to mortality ( $\frac{1}{2} R_{MAX}$ ); and 3) A recovery factor ( $R_F$ ) or “safety factor” of between 0.1 and 1.0 to hasten the recovery of depleted populations and to account for additional uncertainties. The use of PBR as a management scheme is a conservative approach that will allow populations to recover to or remain above OSP. Wade (1998), using simulation models, demonstrated that a PBR calculated with a recovery factor of 0.1 would meet two performance goals: 1) 95% of simulations would equilibrate within 95% of carrying capacity (K), and 2) there would be no more than a 10% delay in recovery. Mortality limits were evaluated based on whether at least 95% of the simulated populations met two criteria: 1) the populations starting at the maximum net productivity levels (MNPL) stayed there or above after 20 years, and 2) that populations starting at 30% of K recovered to at least MNPL after 100 years (Wade 1998).

When calculating PBRs, NMFS chose to use a value of 0.1 for the safety factor for species listed as endangered under the ESA, based partly on the rationale that this would not cause more than a 10% increase in the time to recovery (Barlow *et al.* 1995). Using 0.1 as a safety factor in the PBR equation would allow a large fraction of the net production of the population to contribute to population increase and eventual recovery, and thus, have a relatively insignificant negative impact upon the population (Wade 1998). For depleted and threatened stocks and stocks of unknown status, a recovery factor of 0.5 is used, and for stocks thought to be within OSP, a

recovery factor of 1.0 is used (Barlow *et al.* 1995). However, before the recovery factor is set as high as 1.0, reasonable scientific justification needs to be provided that the estimates of abundance and mortality are not severely biased and have estimated coefficients of variation (CVs) less than or equal to 0.8 for the abundance estimate and 0.3 for the mortality estimates (Barlow *et al.* 1995).

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## 17.0 APPENDIX 2

### Measures implemented under the Highly Migratory Species (HMS) Fishery Management Plan

The NMFS Biological Opinion, dated February 4, 2004, on the adoption of the proposed HMS FMP includes the following description of final rules to implement the HMS FMP (pages 7-16).

The measures that would be implemented under the HMS FMP are:

1. Owners and operators of vessels registered for use of longline gear may not use longline gear to fish for or target swordfish (*Xiphias gladius*) west of 150<sup>0</sup> W. long. and north of the equator (0<sup>0</sup> N. lat.).
2. A person aboard a vessel registered for use of longline gear fishing for HMS west of 150<sup>0</sup> W. long. and north of the equator (0<sup>0</sup> N. lat.) may not possess or deploy any float line that is shorter than or equal to 20 m (65.6 ft or 10.9 fm). As used here, float line means a line used to suspend the main longline beneath a float.
3. From April 1 through May 31, owners and operators of vessels registered for use of longline gear may not use longline gear in waters bounded on the south by 0<sup>0</sup> lat., on the north by 15<sup>0</sup> N. lat., on the east by 145<sup>0</sup> W. long., and on the west by 180<sup>0</sup> long.
4. From April 1 through May 31, owners and operators of vessels registered for use of longline gear may not receive from another vessel HMS that were harvested by longline gear in waters bounded on the south by 0<sup>0</sup> lat., on the north by 15<sup>0</sup> N. lat., on the east by 145<sup>0</sup> W. long., and on the west by 180<sup>0</sup> long.
5. From April 1 through May 31, owners and operators of vessels registered for use of longline gear may not land or transship HMS that were harvested by longline gear in waters bounded on the south by 0<sup>0</sup> lat., on the north by 15<sup>0</sup> N. lat., on the east by 145<sup>0</sup> W. long., and on the west by 180<sup>0</sup> long.
6. No light stick may be possessed on board a vessel registered for use of longline gear during fishing trips that include any fishing west of 150<sup>0</sup> W. long. and north of the equator (0<sup>0</sup> N. lat.). A light stick as used in this paragraph is any type of light emitting device, including any florescent glow bead, chemical, or electrically powered light that is affixed underwater to the longline gear.
7. When a conventional monofilament longline is deployed in waters west of 150<sup>0</sup> W. long. and north of the equator (0<sup>0</sup> N. lat.) by a vessel registered for use of longline gear, no fewer than 15 branch lines may be set between any two floats. Vessel operators using basket-style longline gear must set a minimum of 10 branch lines between any 2 floats when fishing in waters north of the equator.
8. Longline gear deployed west of 150<sup>0</sup> W. long. and north of the equator (0<sup>0</sup> N. lat.) by a

vessel registered for use of longline gear must be deployed such that the deepest point of the main longline between any two floats, i.e., the deepest point in each sag of the main line, is at a depth greater than 100 m (328.1 ft or 54.6 fm) below the sea surface.

9. Owners and operators of longline vessels registered for use of longline gear may land or possess no more than 10 swordfish from a fishing trip where any part of the trip included fishing west of 150<sup>0</sup> W. long. and north of the equator (0<sup>0</sup> N. lat.).

10. Fishing vessels that use longline gear to catch managed species beyond the EEZ and east of 150<sup>0</sup> W. longitude are not prohibited from making shallow water sets of the type used to target swordfish and are not subject to the limitations of items 2, 6, 7, 8, and 9 above.

\* \* \*

### Drift Gillnet Controls

The proposed regulations would not affect the gear restrictions resulting from the Pacific Offshore Cetacean Take Reduction Plan established under the authority of the Marine Mammal Protection Act of 1972. These measures can be found at 50 CFR 229.31.

The proposed regulations would maintain, but under MSA authority, conservation and management measures now in place under the authority of the Endangered Species Act and the State of California Fish and Game Code as follows:

1. The maximum length of a drift gillnet on board a vessel shall not exceed 6,000 feet.
2. Up to 1,500 feet of drift gillnet in separate panels of 600 feet may be on board the vessel in a storage area.

### Protected Resource Area Closures:

1. No person may fish with, set, or haul back drift gillnet gear in U.S. waters of the Pacific Ocean from August 15 through November 15 in the area bounded by straight lines connecting the following coordinates in the order listed:
  - (a) Pt. Sur at 36<sup>0</sup> 18.5' N. lat., to
  - (b) 34<sup>0</sup> 27' N. lat. 123<sup>0</sup> 35' W. long.;
  - (c) 34<sup>0</sup> 27' N. lat. 129<sup>0</sup> W. long.;
  - (d) 45<sup>0</sup> N. lat. 129<sup>0</sup> W. long., thence
  - (e) to the point where 45<sup>0</sup> N. lat. intersects the Oregon coast.
2. No person may fish with, set, or haul back drift gillnet gear in U.S. waters of the Pacific Ocean east of 120<sup>0</sup> W. long. during the months of June, July, and August, during a forecasted or occurring El Nino event off Southern California. The Assistant Administrator will publish a notification in the Federal Register that an El Nino event is occurring off, or is forecast for off, the coast of southern California and the requirement for time area closures in the Pacific loggerhead conservation zone. The notification will also be announced in summary form by

other methods as the Assistant Administrator determines necessary and appropriate to provide notice to the California/Oregon drift gillnet fishery. The Assistant Administrator will rely on information developed by NOAA offices that monitor El Niño events, such as NOAA's Coast Watch program, and developed by the State of California, to determine if such a notice should be published. The requirement for the area closures from June 1 through August 31 will remain effective until the Assistant Administrator issues a notice that the El Niño event is no longer occurring.

Mainland area closures:

The following areas off the Pacific coast are closed to driftnet gear:

1. Within the U.S. EEZ from the United States-Mexico International Boundary to the California-Oregon border from February 1 through April 30.
2. In the portion of the U.S. EEZ within 75 nautical miles (nm) from the mainland shore from the United States-Mexico International Boundary to the California-Oregon border from May 1 through August 14.
3. In the portion of the U.S. EEZ within 25 miles of the coastline from December 15 through January 31 of the following year from the United States-Mexico International Boundary to the California-Oregon border.
4. In the portion of the U.S. EEZ from August 15 through September 30 within the area bounded by line extending from Dana Point to Church Rock on Santa Catalina Island, to Point La Jolla.
5. In the portion of the U.S. EEZ within 12 nautical miles from the mainland shore north of a line extending west of Point Arguello to the California-Oregon border.
6. In the portion of the U.S. EEZ within the area bounded by a line from the lighthouse at Point Reyes, California to Noonday Rock, to Southeast Farallon Island to Pillar Point.
7. In the portion of the U.S. EEZ off the Oregon coast east of a line approximating 1000 fathoms as defined by the following coordinates:
  - 42<sup>0</sup> 00' 00" N. lat. 125<sup>0</sup> 10' 30" W. long.
  - 42<sup>0</sup> 25' 39" N. lat. 124<sup>0</sup> 59' 09" W. long.
  - 42<sup>0</sup> 30' 42" N. lat. 125<sup>0</sup> 00' 46" W. long.
  - 42<sup>0</sup> 30' 23" N. lat. 125<sup>0</sup> 04' 14" W. long.
  - 43<sup>0</sup> 02' 56" N. lat. 125<sup>0</sup> 06' 57" W. long.
  - 43<sup>0</sup> 01' 29" N. lat. 125<sup>0</sup> 10' 55" W. long.
  - 43<sup>0</sup> 50' 11" N. lat. 125<sup>0</sup> 19' 14" W. long.
  - 44<sup>0</sup> 03' 23" N. lat. 125<sup>0</sup> 12' 22" W. long.
  - 45<sup>0</sup> 00' 06" N. lat. 125<sup>0</sup> 16' 42" W. long.
  - 45<sup>0</sup> 25' 27" N. lat. 125<sup>0</sup> 16' 29" W. long.
  - 45<sup>0</sup> 45' 37" N. lat. 125<sup>0</sup> 15' 19" W. long.
  - 46<sup>0</sup> 04' 45" N. lat. 125<sup>0</sup> 24' 41" W. long.

46<sup>0</sup> 16' 00" N. lat. 125<sup>0</sup> 20' 32" W. long.

8. In the portion of the U.S. EEZ north of 46<sup>0</sup> 16' N. latitude (Washington coast).

Channel Islands area closures:

The following areas off the Channel Islands are closed to driftnet gear:

1. San Miguel Island closures.
  - (a) Within the portion of the U.S. EEZ north of San Miguel Island between a line extending 6 nm west of Point Bennett and a line extending 6 nm east of Cardwell Point.
  - (b) Within the portion of the U.S. EEZ south of San Miguel Island between a line extending 10 nm west of Point Bennett and a line extending 10 nm east of Cardwell Point.
2. Santa Rosa Island Closure. Within the portion of the U.S. EEZ north of San Miguel Island between a line extending 6 nm west from Sandy Point and a line extending 6 nm east of Skunk Point from May 1 through July 31.
3. San Nicolas Island closure. In the portion of the U.S. EEZ within a radius of 10 nm of 33<sup>0</sup> 16' 41" N. lat., 119<sup>0</sup> 34' 39" W. long. (west end) from May 1 through July 31.
4. San Clemente Island closure. In the portion of the U.S. EEZ within 6 nm of the coastline on the easterly side of San Clemente Island within a line extending 6 nm west from 33<sup>0</sup> 02' 16" N. lat., 118<sup>0</sup> 35' 27" W. long. and a line extending 6 nm east from the light at Pyramid Head

Regulations in place under the MMPA would be unchanged. The Take Reduction Team process would continue to be the principal mechanism for considering regulatory changes to meet MMPA requirements.

\* \* \* \* \*