

## Injury determinations for humpback whales and other cetaceans reported to the Pacific Islands Region Marine Mammal Response Network during 2007-2011<sup>1</sup>

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### INTRODUCTION

The Marine Mammal Protection Act (MMPA) requires the National Marine Fishery Service (NMFS) to prepare Stock Assessment Reports (SAR) for marine mammal stocks occurring in U.S. waters. Along with information on stock abundance and status, the SAR should include an estimate of the annual human-caused mortality and serious injury by source. The definition of a serious injury, as used by NMFS, is any injury that is more likely than not to result in mortality (NMFS Policy Directive PD 02-238). The process for distinguishing serious from non-serious injuries pursuant to the MMPA was recently revised (77 Federal Register 3233 (23 January 2012), NMFS 2012). Estimates of human-caused mortality and serious injury (M&SI) are compiled and averaged over five-year periods for inclusion in the SAR. The current SAR year (2013) requires estimates of M&SI from 2007 to 2011.

Previously, determinations of injury severity (i.e., serious or non-serious) for injured cetaceans in the U.S. Exclusive Economic Zone of the Hawaiian Islands (Hawaiian EEZ) have only been made for cetaceans observed interacting with the Hawaii pelagic longline fishery (e.g., Forney 2010). However, reports of injured and dead cetaceans are received each year by the Pacific Islands Region Marine Mammal Response Network (PIR-MMRN), which is coordinated by the Pacific Islands Regional Office (PIRO), and the Hawaiian Islands Entanglement Response Network (HIERN), which is coordinated by the Hawaiian Islands Humpback Whale National Marine Sanctuary and works closely with and is a part of the larger PIR-MMRN. Most of the injury reports involve humpback whales (*Megaptera novaeangliae*) that are entangled in fishing or other gear or have been struck by a vessel, but occasionally reports of other species are received. While response efforts are mobilized as appropriate for reported cetaceans, injury determinations have not been made or accounted for in estimates of M&SI for the affected stocks.

To address this gap, the present report provides a summary of injury determinations for cetaceans in and around the Hawaiian EEZ reported injured by human-causes to the PIR-MMRN and HIERN during 2007-2011. As these reports are opportunistic and not a part of a quantifiable and directed sampling scheme, resulting determinations of serious injury cannot be used to estimate undocumented M&SI of the same type. However, these serious injury determinations can serve as minimum estimates of M&SI by source and should be included in the relevant SAR. Most cetacean species that occur in the Hawaiian EEZ are recognized as Hawaiian stocks, with differentiation as pelagic and island-associated stocks for some species. However, humpback whales that overwinter in the Hawaiian EEZ are part of the central North Pacific stock. Whereas Hawaiian stocks of cetaceans are

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researched and managed by the Pacific Islands Fisheries Science Center (PIFSC) and PIRO, respectively, the central North Pacific stock of humpback whales is under the purview of the Alaska Fisheries Science Center (AFSC) and the Alaska Regional Office. Therefore, in terms of SAR preparation, the determinations contained herein are directed at AFSC for humpback whales and at PIFSC for all other cetaceans.

## METHODS

The PIR-MMRN maintains an electronic database of over 1,000 records with summary information (e.g., date, species, location, condition) for each stranded or injured marine mammal report made from 1848 to the present. Generally, these records are associated with case-specific documentation, such as a Level A Form, a necropsy report, or photographs. The PIR-MMRN database was obtained and cetacean records in and around the Hawaiian EEZ from 1848 to 2011 (n=552) were extracted. These records were reviewed for two purposes: 1) to identify reports from 2007-2011 of cetaceans injured by human causes so that injury determinations could be made and incorporated into M&SI estimates for the affected stocks; and 2) to identify reports from previous years of cetaceans other than humpback whales with evidence of human-caused injury so that additional qualitative information could be obtained on injury sources and the species involved. The second objective did not consider humpback whales because their susceptibility to gear entanglement and vessel collisions in Hawaiian waters and elsewhere is well established (e.g., Lammers *et al.* 2007, Robbins *et al.* 2007), whereas, outside of the pelagic longline fishery, less is known about anthropogenic injuries for other Hawaiian cetaceans.

The reports identified as part of the first objective were supplemented with 78 confirmed injury reports (i.e., containing sufficient descriptive information from a reliable source) maintained in the HIERN database. The HIERN database records overlapped in large part with those in the PIR-MMRN, but were more complete because the HIERN was the primary data source. The merged set of 2007-2011 injury reports were evaluated and the injury severity of each injured animal was determined using the revised guidelines and criteria presented in NMFS (2012). When mitigation or follow-up of injured animals occurred, which was often the case for entangled humpback whales, a pre- and post-mitigation injury determination was made, so that the appropriate number of serious injuries will be considered for classifying the MMPA-mandated List of Fisheries (LOF) and for comparing the Potential Biological Removal (PBR) value reported in the SAR. That is, pre-mitigations determinations are relevant to the LOF classification and post-mitigations are relevant to the PBR comparisons (NMFS 2012). Injury determinations were made by both ALB and EL, with EL taking the lead on the humpback whale reports and ALB on the reports of other cetaceans.

## RESULTS AND DISCUSSION

In total, 82 reports of injured cetaceans from 2007-2011 were identified. The reports involve 37 humpback whales struck by vessels (Table 1), 39 humpback whales entangled in fishing gear (Table 2), and one other cetacean struck by a vessel and six more hooked or entangled in fishing gear (Table 3). The other cetaceans include a bottlenose dolphin (*Tursiops truncatus*), two spinner dolphins (*Stenella longirostris*), a sperm whale (*Physeter macrocephalus*), a pantropical spotted dolphin (*Stenella attenuata*), a sei whale (*Baleanoptera borealis*), and an unidentified large whale (Table 3). The vessel collisions with humpback whales led to 12.16 serious injuries (note that some large whale injury categories involve prorating injuries as proportionally serious; NMFS 2010) for comparison to PBR (Table 1). The humpback whale entanglements led to 28.75 serious injuries for consideration with the LOF and 23.75 serious injuries for comparison to PBR (Table 2). Overall, there were 35.91 serious injuries

relevant to the PBR comparison of central North Pacific humpback whales, which is an average of 7.18 serious injuries per year.

For the other cetaceans (Table 3), there were 5.00 serious injuries for consideration with the LOF and 4.00 serious injuries for comparison with PBR values for Oahu/4-Islands spinner dolphins (n=1), Hawaii Island spinner dolphins (n=1), 4-Islands Region spotted dolphins (n=1), and Hawaiian sei whales (n=1). An additional 0.56 serious injury would have been relevant to the PBR comparison, but this value was associated with the unidentified large whale.

Of the 408 PIR-MMRN database records from before 2007, 26 reports of cetaceans (other than humpback whales) with evidence of human-caused injuries were identified (Table 4). The injury sources range from fishery-related (n=22), vessel collision (n=3, including a collision with an entangled individual), possible shooting (n=1), and unknown object (n=1). The injuries involved three bottlenose dolphins, one Cuvier's beaked whale (*Ziphius cavirostris*), three pygmy sperm whales (*Kogia breviceps*), one sperm whale, six spinner dolphins, two striped dolphins (*Stenella coeruleoalba*), and 10 unidentified cetaceans.

Cetaceans in Hawaiian waters, particularly humpback whales, are subject to human-caused injuries from a variety of sources. For cetaceans other than humpback whales, more effort is needed to report, document, and monitor animals injured from sources other than the pelagic longline fishery. The PIR-MMRN is already expanding its efforts in this regard. Currently, the specific fishery involved in most of the fishery-related injuries is unknown. The next step in the present assessment is to further examine the compiled reports for additional insight into the gear types and fishery associated with each injury.

#### ACKNOWLEDGEMENTS

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*Table 1.* Injury determinations for humpback whales reported to be struck by vessels in Hawaiian waters during 2007-2011, using the most recent established criteria for distinguishing serious from non-serious injury of large whales (Table 1 in NMFS 2012).

Report date	Age class	Vessel length	Vessel speed	Injury determination	Injury categories	Justification	Value for PBR
02/07/07	Unknown	65	20	SI	L6a, L11	Vessel was 65 feet long and traveling approximately 20 kts. While animal was not observed, blood was seen in the water.	1
03/08/07	Subadult	30	0	NS	L6c	Contact between a 30-foot stationary vessel going less than 10 kts (0 reported) and a subadult humpback whale with no indications of injuries or harm to animal after 20 minutes of observation.	0
04/01/07	Subadult	65	10	NS	L6c	Contact between a 65-foot vessel reported going 10 kts, and a subadult humpback whale. No injuries or indications of harm observed and reported after 20 minutes of observation.	0
04/13/07	Calf	51	18	SI	L6b (calf), L5b	Case involved a humpback calf being struck by a larger vessel less than or equal to 65 feet and going faster than 10 kts. Superficial lacerations observed. A strike to a calf at more than 10 kts by a vessel of any size is serious.	1
01/10/08	Adult	30	13	PR = 0.20	L6b	Vessel strike to an adult humpback whale from a 30-foot vessel reported doing approximately 13 kts. No opportunity to observe animal and thus no indications of harm observed.	0.2
01/28/08	Calf	44	6	NS	L6c	Strike between 44-foot vessel going 6 kts or less and a humpback whale calf. No indication of injuries after 1 hr of observation.	0
02/05/08	Subadult	34	8	NS	L6c	Strike between a 34-foot vessel going reported 8 kts and a subadult humpback. No indication of injuries or blood seen in water after over 1 hr of observation.	0
02/27/08	Adult	?	?	PR= 0.36	L12	Strike to adult humpback whale from unknown sized vessel at unknown reported speed. No indications of injuries observed.	0.36
02/28/08	Subadult	65	< 12.5	NS	L5b, L6c	Contact made between a 65-foot vessel at a speed under 10 kts (inferred from report) at time of contact and a subadult humpback whale. A superficial wound was observed forward of the dorsal fin.	0
03/04/08	Calf	29	13	SI	L6b (calf), L11	Case involved a humpback calf being struck by a larger vessel less than or equal to 65 feet and going faster than 10 kts. A strike to a calf at more than 10 kts by a vessel of any size is serious. Blood in the water observed.	1
03/05/08	Adult	64	?	PR = 0.14	L7b	Contact between a 64-foot vessel at unknown speed and a mother humpback whale with no injuries observed.	0.14
03/05/08	Calf	64	?	PR = 0.14	L8	Dependent calf of injured mother.	0.14
03/21/08	Adult	65	3	NS	L6c	Contact between a 65-foot vessel reported going 3 kts, and an adult humpback whale. No injuries or indications of harm observed.	0
03/27/08	Adult	30	19	PR = 0.20	L6b	Vessel strike to an adult humpback whale from a 30-foot vessel reported doing approximately 19 kts. No indications of injury observed during two surfacings.	0.2
03/27/08	Calf	30	19	SI	L6b (calf)	Vessel doing greater than 10 kts so serious injury to calf.	1
04/11/08	Calf	?	?	SI	L5b, L12 (calf)	Strike of calf by unknown vessel at unknown speed. Superficial lacerations observed.	1

Table 1. Continued.

Report date	Age class	Vessel length	Vessel speed	Injury determination	Injury categories	Justification	Value for PBR
04/16/08	Calf	?	?	SI	L5b, L12 (calf)	Strike of calf by unknown vessel at unknown speed. Superficial lacerations observed.	1
02/05/09	Calf	65	?	SI	L7a (calf), L11	Contact between large (65-foot) vessel and unknown speed and a humpback calf. No injuries observed in failing light, but blood observed in water.	1
02/21/09	Calf	50	8	NS	L6c	Contact between 50-foot vessel going reported 8 kts or less and a humpback whale calf. No indication of injuries.	0
02/27/09	Adult	28	1	NS	L6c	Contact between a nearly stationary 28-foot vessel and an adult humpback whale, who deliberately hit the vessel with its pectoral flipper. No injuries observed to animal.	0
03/01/09	Calf	65	0	NS	L5b, L6c	Contact between a 65-foot, drifting vessel and a humpback calf. Calf showed signs of a superficial wound, possibly from contact.	0
03/22/09	Subadult	24	20	PR= 0.20	L6B	Contact made between 24-foot vessel going 20 kts and a subadult humpback whale. No injuries observed, but only viewed during one surfacing. Contact may have been significant.	0.2
03/23/09	Calf	15	10	NS	L6c	Contact made between a 15-foot RHI doing approximately 10 kts and a humpback calf doing a peduncle throw. No injuries observed, but little light available.	0
03/27/09	Adult	34	5	NS	L6c	Contact made between a 34-foot vessel doing approximately 5kts and an adult humpback whale in a competitive group. Contact represented a pectoral slap. No injuries observed during significant observation.	0
03/29/09	Subadult	15	5	NS	L6c	Contact made between a 15-foot vessel doing approximately 5kts and a subadult humpback whale. Contact represented a peduncle throw. No injuries observed, but observations limited by darkness.	0
12/08/09	Subadult	30	25	PR= 0.20	L6b	Vessel strike to a subadult humpback whale from a 30-foot vessel reported doing approximately 25 kts. Animal observed during two surfacings. No indications of injury observed.	0.2
01/08/10	Subadult	65	13	SI	L6a	Contact between 65-foot vessel going approximately 13 kts. No injuries observed.	1
02/14/10	Adult	32	10	NS	L6c	Contact made between a 32-foot vessel going approximately 10 kts and an adult humpback whale. No injuries observed, but only one surfacing observed.	0
02/24/10	Calf	65	10	NS	L6c	Contact made between a 65-foot vessel going approximately 10 kts and a calf humpback whale. No injuries observed.	0
02/28/10	Calf	?	?	SI	L11, L12 (calf)	Calf humpback whale with apparently superficial wounds from strike of unknown vessel going unknown speed.	1
02/13/11	Subadult	31	9	NS	L6c	Contact made between a 31-foot vessel going approximately 9 kts and a subadult humpback whale. No injuries observed.	0
02/15/11	Calf	65	<15	CBD	Possibly L7a (calf)	Possible contact between a 65-foot vessel doing an unknown speed at time of contact. A strike to a calf by vessel of any size when speed is unknown is considered a serious injury.	CBD
02/16/11	Adult	31	?	PR = 0.52	L7b, L11	Contact between 31-foot vessel going unknown speed, and an adult humpback whale. Blood observed in water.	0.52

Table 1. Continued.

Report date	Age class	Vessel length	Vessel speed	Injury determination	Injury categories	Justification	Value for PBR
02/16/11	Calf	31	?	SI	L7b (calf), L11	A strike to a calf by vessel of any size when speed is unknown is considered a serious injury. Uncertain about severity of lacerations.	1
02/21/11	Subadult	25	26	PR = 0.20	L6b	Contact between 25-foot vessel going approximately 26 knots and subadult humpback whale. Contact significant, but no injuries observed.	0.2
03/08/11	Adult	55	4	NS	L5b, L6c	Contact between 55-foot vessel doing around 4 kts and an adult humpback whale. Animal appeared to make contact after close approach. Small scratches observed on dorsal fin, but these may have also been from competitive behavior.	0

*Table 2.* Injury determinations for humpback whales reported to be entangled in fishing gear in Hawaiian waters during 2007-2011, using the most recent established criteria for distinguishing serious from non-serious injury of large whales (Table 1 in NMFS 2012).

Report date	Age class	Pre-mitigation injury determination	Pre-mitigation injury categories	Justification	Value for LOF	Mitigation outcome	Post-mitigation Injury determination	Post-mitigation injury categories	Justification	Value for PBR
01/11/07	Adult	SI	L3	Animal entangled in moderate amount of gear and showing indications of health decline, including: emaciation, cyamid carpet, and rough-skinned. Any injury leading to apparent significant health decline is serious.	1	Partially disentangled.	SI	L3	Gear remains on animal. Animal has indications that health has significantly declined, including emaciation, cyamid carpet, and rough-skinned. Any injury leading to apparent significant health decline is serious.	1
02/06/07	Adult	SI	L2, L5b	Animal entangled in significant amount of gear from several point on body. Involves wraps and wounds around body and insertion of flipper. Also showing indications of health decline, including: emaciation, cyamid carpet, and rough-skinned. Any injury leading to apparent significant health decline is serious.	1	Partially disentangled.	SI	L3, L5b	Significant amount of gear removed, but gear remains. Wounds still exist at insertion of flipper. Overall health significantly compromised and animal severely emaciated. Any injury leading to apparent significant health decline is serious.	1
02/23/07	Subadult	SI	L2, L5b	Animal not showing significant indications of health decline. However, significant amount of gear entangled whale with tight, constricting wraps around peduncle that would likely impact subadult animal significantly over time.	1	Fully disentangled.	NS	L5b	All gear removed. Animal in good health. Wounds left behind from entanglement not deemed life threatening.	0
03/02/07	Adult	SI	L3, L5b	Animal entangled in significant amount of heavy gauge line through mouth. No tight wraps and wounds superficial. Indications that health impacted (moderately emaciated, cyamids, rough skin). Any injury leading to apparent significant health decline is serious.	1	Fully disentangled.	SI	L5b	All gear removed. However, some indications of entanglement's impact to health still exist and animal is on breeding ground. Any injury leading to apparent significant health decline is serious.	1
03/17/07	Subadult	SI	L2, L5a	Little information and no documentation on impact or health assessment of animal. However, heavy gauge line tightly wrapped and perhaps weighted on a subadult animal.	1	No response.	SI	L2, L5a	Animal remained entangled with indications of impact to health that are likely to deteriorate further.	1

Table 2. Continued.

Report date	Age class	Pre-mitigation injury determination	Pre-mitigation injury categories	Justification	Value for LOF	Mitigation outcome	Post-mitigation Injury determination	Post-mitigation injury categories	Justification	Value for PBR
12/09/07	Subadult	SI	L2, L5b	Little indication of present impact to animal, but entanglement represents several wraps and significant amount of large gauge (high test) monofilament line. Wraps are constricting and animal is a subadult.	1	No response.	SI	L2, L5b	Animal remained entangled. Uncertain whether gear would be shed. Little indication of present impact to animal, but entanglement represents several wraps and significant amount of large gauge (high test) monofilament line. Wraps are constricting and animal is a subadult.	1
01/02/08	Calf	NS	L3	No indications of decline in health. Entanglement recent due to fact that animal is a calf. Entanglement involves small quantity (~2-4 feet), low test (strength) monofilament line in mouth and not wrapped. No indications of ingestion.	0	No response.	NS	L3	No indications of decline in health. Entanglement recent due to fact that animal is a calf. Entanglement involves small quantity (~2-4 feet), low test (strength) monofilament line in mouth and not wrapped. No indications of ingestion.	0
01/26/08	Subadult	PR = 0.75	L10	No reported indications of decline in health. However, little information on entanglement and how it might impact animal was obtained.	0.75	No response.	PR = 0.75	L10	Animal remains entangled. No reported indications of decline in health. However, little information on entanglement and how it might impact animal obtained.	0.75
02/10/08	Adult	NS	L3, L5b	No reported indications of decline in health and no constricting wraps or deep wounds. However, entanglement involves the mouth and a significant amount of gear does trail.	0	Animal relocated. Remained entangled.	NS	L3, L5b	No gear removed. No reported indications of decline in health and no constricting wraps or deep wounds. However, entanglement involves the mouth and a significant amount of gear does trail.	0
04/25/08	Calf	PR = 0.75	L10	No reported indications of decline in health and no deep wounds. Entanglement appears to have involved a recently draped line over back and forward of flippers.	0.75	Animal self-released or telemetry package pulled gear off animal (gear recovered).	NS	n/a	Animal totally free of gear. No reported indications of decline in health and no deep wounds.	0
12/13/08	Adult	NS	L3, L5b	Animal has only slight indications of impact to health. Entanglement represents loosely draped gear with no wraps. All wounds represent chafe and line scars. Some scars indicate that entanglement has already improved (i.e. gear shed or wraps lost).	0	Animal relocated. Remained entangled.	NS	L3, L5b	Animal remained entangled, but has only slight indications of impact to health. Entanglement represents loosely draped gear with no wraps. All wounds represent chafe and line scars. Some scars indicate that entanglement has already improved (i.e. gear shed or wraps lost).	0



Table 2. Continued.

Report date	Age class	Pre-mitigation injury determination	Pre-mitigation injury categories	Justification	Value for LOF	Mitigation outcome	Post-mitigation Injury determination	Post-mitigation injury categories	Justification	Value for PBR
12/28/08	Subadult	SI	L2, L5a	Animal has constricting wrap and deep wound at tail stock. Physical trauma to fluke has occurred. Other indication of decline in health include: large number of cyamids, severe emaciation, and rough skin.	1	No response.	SI	L2, L5a	No gear was removed. Animal has constricting wrap and deep wound at tail stock. Physical trauma to fluke has occurred. Other indication of decline in health include: large number of cyamids, severe emaciation, and rough skin.	1
01/12/09	Subadult	PR = 0.75	L10	Little information on nature of entanglement, as well as, condition of animal.	0.75	Animal not re-located.	PR = 0.75	L10	Animal remains entangled. Little information on nature of entanglement, as well as, condition of animal.	0.75
01/13/09	Subadult	PR = 0.75	L5b, L10	Little information on nature of entanglement, as well as, condition of animal. However, animal very likely anchored or weighted by gear.	0.75	Partially disentangled by fisherman.	PR = 0.75	L5b, L10	Animal remains entangled with gear that may likely still impact it. However, little detail on nature of entanglement, as well as, condition of animal is known.	0.75
01/19/09	Adult	PR = 0.75	L10	Report based on aerial observation with no documentation. Condition of animal is uncertain. Unknown how animal is entangled or how entanglement might impact animal.	0.75	Animal not re-located.	PR = 0.75	L10	Animal remains entangled with gear that may likely still impact it. However, little detail on nature of entanglement, as well as, condition of animal is known.	0.75
02/01/09	Subadult	SI	L2, L5b	Animal has a constricting wrap of gear with superficial wounds, and shows signs of decline in health (moderate cyamid load, emaciation, skin condition) from entanglement.	1	Fully disentangled.	SI	L5b	Animal fully disentangled and has only superficial wounds. However, signs of decline in health, mainly its emaciated state, indicate that impact of entanglement still life threatening to animal. Any injury leading to apparent significant health decline is serious.	1
02/20/09	Adult	NS	L3	Animal has a pair of loosely draped bridles from mouth and over back. While a fair amount of gear is involved, no wounds and very little impact to health observed.	1	Animal relocated. Remained entangled.	NS	L3	Animal remains entangled with a pair of loosely draped bridles from mouth and over back. While a fair amount of gear is involved, no wounds and very little impact to health observed.	0
03/11/09	Adult	PR = 0.75	L10	Little information on nature of entanglement, as well as, condition of animal.	0.75	Animal not re-located.	PR = 0.75	L10	Animal remains entangled. Little information on nature of entanglement, as well as, condition of animal.	0.75
12/01/09	Subadult	SI	L2, L5b	Animal has tight bridle from mouth and over back, along with superficial wounds. Very little indication of impact to health.	1	Fully disentangled.	NS	L5b	All entangling gear removed. Little indication in decline in health. Animal just slightly emaciated no cyamids, healthy skin, with only superficial wounds.	0

Table 2. Continued.

Report date	Age class	Pre-mitigation injury determination	Pre-mitigation injury categories	Justification	Value for LOF	Mitigation outcome	Post-mitigation Injury determination	Post-mitigation injury categories	Justification	Value for PBR
12/24/09	Subadult	SI	L2	Subadult animal with tight wrap around tailstock that was anchored or at least weighted. Little detail on impact to health provided.	1	Animal not re-located.	PR = 0.75	L10	Searched for animal in spot where it was confirmed anchored or weighted, but animal was not re-located. No indication that animal became free of all gear. Presumed that animal somehow became free of anchoring gear, but was still entangled. Nature of entanglement uncertain and little detail on impact to health known.	0.75
12/25/09	Subadult	SI	L2, L5a	Subadult animal with significant amount of gear, wrapped several times, deeply around tail stock, and showing several indications of decline in health.	1	Fully disentangled.	SI	L5a	Animal freed of all gear; however, deep laceration to tailstock region and overall impact to health remain.	1
12/30/09	Unknown	PR = 0.75	L10	Little information on nature of entanglement, as well as, condition of animal.	0.75	No response.	PR = 0.75	L10	Little information on nature of entanglement, as well as, condition of animal.	0.75
01/04/10	Adult	SI	L2, L5a	Animal has several tight wraps around body that are cutting into flesh. Significant amount of gear involved. Animal shows signs of decline in health.	1	Animal relocated. Remained entangled.	SI	L2, L5a	Animal remained entangled with several tight wraps around body that are cutting into flesh. Significant amount of gear involved. Animal shows signs of decline in health.	1
01/07/10	Adult	NS	L3	Animal had loosely draped gear over rostrum and pectoral flipper, with no indications of impact or decline in health.	0	Animal self-released gear.	NS	n/a	Animal no longer entangled and no indications of impact from entanglement.	0
01/24/10	Adult	PR = 0.75	L10	Animal has a loosely draped bridle from mouth and over back, but could not confirm lack of constricting gear. While a fair amount of gear is involved, no wounds and impact to health observed.	0.75	Animal relocated. Remained entangled.	PR = 0.75	L10	Animal remains entangled with a loosely draped bridle from mouth and over back. Lack of constricting gear not confirmed. While a fair amount of gear is involved, no wounds and impact to health observed.	0.75
01/31/10	Subadult	NS	L4	Animal observed getting hooked in gear. No wraps indicated. No immediate impact.	0	No response.	NS	L4	Animal remained hooked in gear with little moderate test line trailing. Not considered life threatening.	0
02/07/10	Unknown	PR = 0.75	L10	Little information on nature of entanglement, as well as, condition of animal.	0.75	No response.	PR = 0.75	L10	Animal remains entangled. Little information on nature of entanglement, as well as, condition of animal.	0.75

Table 2. Continued.

Report date	Age class	Pre-mitigation injury determination	Pre-mitigation injury categories	Justification	Value for LOF	Mitigation outcome	Post-mitigation Injury determination	Post-mitigation injury categories	Justification	Value for PBR
02/21/10	Subadult	SI	L2, L5b	Animal has tight, constricting wrap around right fluke blade with associated wound. No indications of decline in health.	1	Animal relocated. Remained entangled.	SI	L2, L5b	Animal remains entangled with tight, constricting wrap around right fluke blade with associated wound. No indications of decline in health.	1
04/07/10	Subadult	SI	L2, L5b	Subadult animal with tight and loose wraps of line around both flipper insertions and body. Only superficial wounds and no indications of decline in health.	1	Fully disentangled.	NS	L5b	Animal freed of all gear. Only superficial wounds remain and no indications in decline in health.	0
12/16/10	Adult	PR = 0.75	L10	At time of report animal does not appear impacted by entanglement. No indications in decline of health. However, the nature of entanglement was not ascertained and thus the impact that entanglement might have.	0.75	Animal not re-located.	PR = 0.75	L10	Animal remained entangled and had no indications in decline of health. However, the nature of entanglement and the impact it might have was not ascertained.	0.75
12/16/10	Calf	PR = 0.75	L8	Dependent calf to an entangled mother.	0.75	Entangled mother not re-located.	PR = 0.75	L8	Dependent calf to an entangled mother.	0.75
01/18/11	Subadult	PR = 0.75	L10	Little information on nature of entanglement. Animal showing some signs in decline of health.	0.75	No response.	PR = 0.75	L10	Animal remained entangled. Little information on nature of entanglement. Animal showing some signs in decline of health.	0.75
01/28/11	Adult	PR = 0.75	L10	Little information on nature of entanglement. Animal showing no signs of decline in health.	0.75	Animal not re-located.	PR = 0.75	L10	Animal remained entangled. Little information on nature of entanglement. Animal showing no signs of decline in health.	0.75
02/16/11	Subadult	PR = 0.75	L10	Little information on nature of entanglement, as well as, condition of animal.	0.75	No response.	PR = 0.75	L10	Animal remained entangled. Little information on nature of entanglement, as well as, condition of animal.	0.75
02/19/11	Subadult	PR = 0.75	L10	Little information on nature of entanglement. Animal showing some signs of decline in health.	0.75	Partially disentangled by mariner.	PR = 0.75	L10	Animal partially disentangled, but some gear remains. Little information on nature of entanglement. Animal showing some signs of decline in health.	0.75
02/25/11	Adult	NS	L3	Animal with a loose wrap of gear over rostrum with no indications of decline in health.	0	Animal self-released gear.	NS	n/a	No longer entangled. No indication of impact or decline in health.	0

Table 2. Continued.

Report date	Age class	Pre-mitigation injury determination	Pre-mitigation injury categories	Justification	Value for LOF	Mitigation outcome	Post-mitigation Injury determination	Post-mitigation injury categories	Justification	Value for PBR
03/30/11	Adult	PR = 0.75	L10	Animal has moderate gauge monofilament line likely hooked on body, but lack of entanglement could not be confirmed. No indications of decline in health.	0.75	No response.	PR = 0.75	L10	Animal remained hooked and possibly entangled in moderate gauge monofilament line. No indications of decline in health.	0.75
03/30/11	Calf	PR = 0.75	L8	Dependent calf to a possibly entangled mother.	0.75	No response mounted for possibly entangled mother.	PR = 0.75	L8	Dependent calf to a possibly entangled mother.	0.75
11/05/11	Subadult	SI	L2, L5b	Subadult animal has tight and loose wraps around body and flipper. Superficial wounds and some indications in decline of health.	1	Animal not re-located.	SI	L2, L5b	Subadult animal remained entangled with tight and loose wraps around body and flipper. Superficial wounds and some indications in decline of health.	1

*Table 3.* Injury determinations for cetaceans other than humpback whales reported to be injured in Hawaiian waters during 2007-2011, using the most recent established criteria for distinguishing serious from non-serious injury of cetaceans (Tables 1-2 in NMFS 2012). Note the vessel collision on 01/24/11 occurred outside the Hawaiian EEZ.

Report date	Species	Stock	Age class	Pre-mitigation injury determination	Pre-mitigation injury categories	Justification	Value for LOF	Mitigation outcome	Post-mitigation determination	Post-mitigation injury categories	Justification	Value for PBR
08/15/09	Bottlenose dolphin	Hawaii Island	Adult?	Serious	S5a	Hooked in right corner of mouth with fouling growth on hook. Animal underweight.	1	Animal was seen around 02/20/12 without the hook and in normal body condition.	Non-serious	S5c	Follow-up observations indicated that the serious injury did not lead to mortality in this individual and that the individual recovered enough to appear healthy to an experienced observer.	0
11/26/09	Spinner dolphin	Oahu/4-Islands	Unknown	Serious	S5a	Hooked in right lower jaw pinning animal's mouth open. Leader attached to hook. Criteria S6 possibly also applies, but length of leader unknown.	1	No response.	Serious	S5a	Hooked in right lower jaw pinning animal's mouth open. Leader attached to hook. Criteria S6 possibly also applies, but length of leader unknown.	1
09/13/10	Sperm whale	Hawaii	Adult	Non-serious	L3	Whale was observed extracting itself from line and net in mouth area, but there is currently not a criterion to cover this scenario.	0	Animal self-released gear.	Non-serious	L3	Whale was observed extracting itself from line and net in mouth area, but there is currently not a criterion to cover this scenario.	0
09/20/10	Spotted dolphin	4-Islands Region	Unknown	Serious	S8b	Several wraps of line on body along with a bundle of gear. The amount and placement of gear has the potential to snag or create drag. Line on the dorsal fin is beginning to pinch in indicating the potential to lead to criterion S8a.	1	No response.	Serious	S8b	Several wraps of line on body along with a bundle of gear. The amount and placement of gear has the potential to snag or create drag. Line on the dorsal fin is beginning to pinch in indicating the potential to lead to criterion S8a.	1
01/24/11	Unidentified large whale	n/a	Unknown	Prorate 0.56 Serious	L7a, L11	Vessel is 667 ft traveling at unknown speed and no information on whale injury. Blood was observed in the water.	0	No response.	Prorate 0.56 Serious	L7a, L11	Vessel is 667 ft traveling at unknown speed and no information on whale injury. Blood was observed in the water.	0.56

Table 3. Continued.

Report date	Species	Stock	Age class	Pre-mitigation injury determination	Pre-mitigation injury categories	Justification	Value for LOF	Mitigation outcome	Post-mitigation determination	Post-mitigation injury categories	Justification	Value for PBR
03/18/11	Sei whale	Hawaii	Subadult	Serious	L2	One to two wraps around tailstock before trailing large bundle of line with heavy barnacle growth indicate whale is heavily weighted, which is sufficient evidence of constricting gear. Remaining line has the potential to snag and anchor the whale. Animal emaciated and in poor health.	1	Animal relocated. Remained entangled.	Serious	L2	Although it is possible that the entangled gear separated from the whale with the attached telemetry package, this could not be confirmed, so the injury determination remains unchanged post-mitigation.	1
09/04/11	Spinner dolphin	Hawaii Island	Unknown	Serious	S8a	Net entangled around rostrum (unable to open mouth) and trailing length of dolphin.	1	No response.	Serious	S8a	Net entangled around rostrum (unable to open mouth) and trailing length of dolphin.	1

*Table 4.* Summary of PIR-MMRN reports (1848-2006) of cetaceans in Hawaiian waters (other than humpback whales) with evidence of human-caused injuries.

Species	Stock	Year	Evidence of human interaction
Bottlenose dolphin	4-Islands Region	1991	Drowned animal found dead with imprint of gillnet on body.
Bottlenose dolphin	4-Islands Region	1998	Entangled animal found dead.
Bottlenose dolphin	4-Islands Region	2006	Entangled animal seen alive at sea.
Cuvier's beaked whale	Hawaiian	1998	Possibly entangled animal (with scars and cuts from fishing gear) found dead.
Pygmy killer whale	Hawaiian	2006	Hook and line scars on the mouth of an animal found dead (not likely related to morbidity).
Pygmy sperm whale	Hawaiian	1947	Hooked animal caught on handline (status of animal unknown).
Pygmy sperm whale	Hawaiian	1994	Entangled animal stranded alive and transferred to Sea Life Park (subsequently died).
Sperm whale	Hawaiian	1990	Animal stranded alive (subsequently died) that had ingested gear (line and net in stomach).
Spinner dolphin	Hawaii Island	1991	Animal seen alive at sea entangled in fishing line.
Spinner dolphin	Kauai/Niihau	1993	Animal stranded alive (subsequently died) that had possibly been hooked and had a fractured jaw bone.
Spinner dolphin	Oahu/4-Islands	1994	Animal found dead that had possibly been shot with an arrow.
Spinner dolphin	Kure/Midway	2000	Animal seen alive at sea entangled in fishing net.
Spinner dolphin	Hawaii Island	2005	Animal seen alive at sea entangled in fishing line.
Spinner dolphin	Oahu/4-Islands	2006	Entangled animal seen alive at sea.
Striped dolphin	Hawaiian	1993	Animal stranded alive (subsequently died) that had multiple lesions possibly related to a fishery interaction.
Striped dolphin	Hawaiian	2005	Animal stranded alive (subsequently died) that was entangled.
Unidentified cetacean	n/a	1990	Entangled stenellid found dead.
Unidentified cetacean	n/a	1994	Entangled animal seen alive at sea.
Unidentified cetacean	n/a	1997	Entangled baleanopterid struck by vessel.
Unidentified cetacean	n/a	1998	Animal struck by vessel.
Unidentified cetacean	n/a	1998	Entangled animal seen alive at sea.
Unidentified cetacean	n/a	1998	Animal struck by vessel.
Unidentified cetacean	n/a	2002	Animal seen alive at sea with steel rod protruding from back.
Unidentified cetacean	n/a	2002	Delphinid seen alive at sea hooked on buoy and with plastic coming out of mouth.
Unidentified cetacean	n/a	2002	Entangled whale found dead.
Unidentified cetacean	n/a	2005	Possibly entangled whale seen alive at sea.