



Injury Determinations for Humpback Whales and Other Cetaceans Reported to NOAA Response Networks in the Hawaiian Islands During 2017

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Abstract

Reports of cetaceans with human-caused injuries in Hawaiian waters are made each year to the Pacific Islands Region Marine Mammal Response Network (PIR-MMRN, coordinated by the NOAA National Marine Fisheries Service (NMFS) Pacific Islands Regional Office) and the Hawaiian Islands Entanglement Response Network (HIERN, coordinated by the NOAA Hawaiian Islands Humpback Whale National Marine Sanctuary). These injury reports largely involve humpback whales that were entangled in fishing gear or marine debris or were struck by or otherwise made contact with a vessel. Bradford and Lyman (2015, 2018) made determinations of injury severity (i.e., serious or non-serious) for cetaceans in Hawaii reported injured by human causes during 2007–2016. Prior to this work, most human-caused injuries reported to PIR-MMRN and HIERN were not accounted for in the mortality and serious injury (M&SI) estimates that are a key component of the Stock Assessment Reports (SARs) for cetaceans in Hawaiian waters. The present paper provides a summary of injury determinations for cetaceans in Hawaii reported injured by human causes during 2017. Injury determinations were made using a nationally standardized process and criteria for distinguishing serious from non-serious injuries (NMFS 2012). During 2017, there were 12 reports of cetaceans with human-caused injuries, including 4 humpback whales involved in vessel collisions, 7 humpback whales entangled in presumed fishing gear or marine debris, and 1 pantropical spotted dolphin of the 4-Islands¹ stock entangled in marine debris. The 11 humpback whale vessel collisions and entanglements led to 6.45 serious injuries, and the entangled spotted dolphin was determined to be seriously injured. Estimates of M&SI in the SARs are considered over five-year periods. The 2017 M&SI estimates can thus be compiled and averaged with those from 2013–2016 (Bradford and Lyman 2018) for the relevant 2019 SARs. While accounting for injuries reported to PIR-MMRN and HIERN has improved the stock assessment process for some populations, significantly more effort is needed to report, document, and monitor injured cetaceans in Hawaiian waters, particularly species other than humpback whales.

¹ The 4-Islands region comprises the islands of Maui, Molokai, Lanai, and Kahoolawe.

Introduction

The Marine Mammal Protection Act (MMPA) requires the NOAA National Marine Fisheries Service (NMFS) to prepare Stock Assessment Reports (SARs) for marine mammal stocks occurring in U.S. waters. Along with information on stock abundance and status, the SARs include an estimate of the annual human-caused mortality and serious injury (M&SI) by source. Regulations define serious injury as one that will likely result in mortality.² In 2012, NMFS clarified its interpretation of this definition as any injury that is more likely than not to result in mortality.³ The process for distinguishing serious from non-serious injuries pursuant to the MMPA was also revised (NMFS 2012).⁴ These revisions were aimed at making the injury determination process more consistent and transparent, as well as providing additional guidance for cases that would have previously been classified as “cannot be determined.” Estimates of human-caused M&SI are compiled and averaged over five-year periods for inclusion in the SARs. However, the process of injury determination, including internal and external peer review, and the MMPA-specified SAR public review leads to a 2-year lag between the M&SI estimation period and the SAR year. The 2019 SARs require estimates of M&SI from 2013 to 2017.

Reports of injured and dead cetaceans in the U.S. Exclusive Economic Zone around the Hawaiian Islands (Hawaiian EEZ) are received each year by the Pacific Islands Region Marine Mammal Response Network (PIR-MMRN), which is coordinated by the NMFS Pacific Islands Regional Office (PIRO), and the Hawaiian Islands Entanglement Response Network (HIERN), which is coordinated by the NOAA Hawaiian Islands Humpback Whale National Marine Sanctuary. These two agencies work closely together and are part of the greater NMFS Marine Mammal Health and Stranding Response Program. Most of the injury reports involve humpback whales (*Megaptera novaeangliae*) that are entangled in fishing gear or marine debris or have been struck by or otherwise made contact with a vessel. Occasionally, however, reports of other species are received. While reported cetaceans have traditionally been assessed for injury and impact by PIR-MMRN or HIERN, and response efforts mobilized as appropriate, determinations of injury severity (i.e., serious or non-serious) were only recently initiated (Bradford and Lyman 2015). Prior to that effort, injury determinations based on reports to PIR-MMRN or HIERN had not previously been accounted for in estimates of M&SI for the affected stocks.

Bradford and Lyman (2015, 2018) provided a summary of injury determinations for cetaceans in and around the Hawaiian EEZ reported injured by human causes to PIR-MMRN and HIERN during 2007–2016. The present paper extends this time series of injury determinations through 2017. These determinations are based on injury reports that are opportunistic and not a part of a quantifiable and directed sampling scheme. Thus, the resulting determinations of serious injury (or mortality) cannot be used to estimate undocumented M&SI from the same source. However, these serious injuries and mortalities can serve as minimum estimates of M&SI by source and should be included in the relevant SARs (NMFS 2016).

² 50 CFR 229.2

³ NMFS Policy Directive PD 02-238

⁴ 77 Federal Register 3233 (23 January 2012)

Most cetacean species that occur in the Hawaiian EEZ are recognized as Hawaii stocks, with differentiation as pelagic and island-associated stocks for some species. Hawaiian stocks of cetaceans are assessed and managed by the NMFS Pacific Islands Fisheries Science Center (PIFSC) and PIRO, respectively. However, humpback whales that overwinter in the Hawaiian EEZ are part of the central North Pacific (CNP) stock, which falls under the purview of the NMFS Alaska Fisheries Science Center (AFSC) for assessment and the NMFS Alaska Regional Office and PIRO for management. 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 1,400 records with summary information (e.g., date, species, location, condition) for each stranded or injured marine mammal reported 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 accessed and cetacean records in and around the Hawaiian EEZ during 2017 (n = 16) were extracted. These records were reviewed to identify reports of cetaceans injured by human causes so that injury determinations could be made and incorporated into M&SI estimates for the affected stocks.

The identified PIR-MMRN reports were supplemented with 12 confirmed injury reports (i.e., containing sufficient descriptive information from a reliable source) from 2017 maintained in the HIERN database, which dates back to 2002 and contains over 850 records also associated with case-specific documentation. Database records from HIERN occasionally overlap with those from PIR-MMRN, but are considered more complete because HIERN was the primary data source. The merged set of 2017 injury reports was evaluated, and the injury severity of each cetacean injured by human causes was determined using the revised guidelines and criteria presented in NMFS (2012). When follow-up (observation or response) of injured individuals occurred, which was often the case for entangled humpback whales, an injury determination was made both before and after follow-up and any mitigation efforts. This differentiation ensures that the appropriate number of mortalities and serious injuries can be considered when classifying commercial fisheries on the MMPA-mandated List of Fisheries (LOF) and when comparing M&SI estimates with the Potential Biological Removal (PBR) value reported in the SARs. That is, initial injury determinations prior to follow-up and mitigation are used in LOF classifications, and determinations after these efforts are relevant to the PBR comparisons (NMFS 2012).

Injury determinations were made collaboratively by the authors, with EGL taking the lead on the reports of humpback whales and ALB on the reports of other cetaceans. Additional interpretation or consideration was required in the application of some of the injury categories for injured large whales (see Appendix A for details of how these categories were applied). As directed by NMFS (2012), the preliminary injury determinations were then sent for independent review to members of the NMFS Determination Staff Working Group with applicable expertise (Forney 2010; Henry et al. 2017). The humpback injury determinations were reviewed by A. Henry (NMFS Northeast Fisheries Science Center), and the other cetacean injury determinations were reviewed by K. Forney (NMFS Southwest Fisheries Science Center). Differences between the preliminary

and reviewer determinations were discussed and reconciled by ALB and EGL, with input from the reviewers as needed.

Follow-up and mitigation efforts of entangled cetaceans, particularly disentanglement activities by the HIERN, often involved the photo-documentation and occasionally the collection of entangling gear. The HIERN made substantial efforts, in collaboration with PIRO and other partner agencies, to identify the gear type and associated fishery (if applicable) for the humpback entanglement cases. However, unlike other regions where there are dedicated gear specialists, staff resources in the Pacific Islands are challenged to systematically review the gear in all cases. A summary of the information available for a systematic gear review for all the cetacean entanglements is included along with the injury determinations. For the humpback entanglements, the details and available results of gear reviews conducted to date are included along with assessment of the possibility of further classification from additional review efforts.

Results and Discussion

In total, 12 reports of cetaceans with human-caused injuries from 2017 were identified. The reports consist of 4 humpback whales involved in vessel collisions (Table 1), 7 humpback whales entangled in presumed fishing gear or marine debris (Table 2), and 1 pantropical spotted dolphin (*Stenella attenuata*) of the 4-Islands stock entangled in marine debris (Table 3). As in Bradford and Lyman (2015, 2018), the review process highlighted the challenging nature of some of the humpback whale injury events and revealed regional differences in the ways some injury categories are applied to large whales (Appendix A). For the 11 humpback whale vessel collisions and entanglements, the injury determinations by the reviewer differed from the preliminary determinations in 2 (18.2%) cases (both entanglements; Table 4). Follow-up discussions led to changing one of the preliminary entanglement injury determinations (Table 4). The reviewer was in agreement with the preliminary determination for the injured spotted dolphin.

The 4 humpback whale vessel collisions led to 1.2 serious injuries (note that some large whale injury categories involve prorating injuries as proportionally serious; NMFS 2012) for comparison to PBR (Table 1). The 7 humpback whale entanglements led to 5.25 serious injuries for consideration with the LOF and for comparison to PBR (Table 2). The spotted dolphin entanglement led to 1 serious injury for comparison to PBR (Table 3). These M&SI estimates can be combined with those from 2013–2016 (Bradford and Lyman 2018) for use in the applicable SARs.

HIERN attempts to cross-match the injured humpback whales that were adequately photo-identified with other photo-identified whales in its database and with other CNP humpback whale photo-identification catalogs. However, there are not dedicated personnel to systematically pursue identification of injured individuals to the greatest extent possible, and the CNP stock of humpback whales numbers in the thousands of individuals (Muto et al. 2018). Additionally, many reports are made without images suitable for photo-identification. Based on identification efforts to date, there are no individuals of any cetacean species known to have been injured more than once between 2013 and 2017. Thus, for the purposes of establishing minimum estimates of M&SI, all injured cetaceans summarized here and in Bradford and Lyman (2018) are considered separate individuals. There may be cases where a given individual is associated with more than

one injury report, which would lead to a positive bias in the resulting minimum M&SI estimates. However, any positive bias is unlikely to exceed the level of undocumented M&SI from vessel collisions and fishing gear entanglement.

Gear type and fishery are currently unknown for the 7 entangled humpback whales, although one case is considered to have involved marine debris (not from an active set) and another coaxial cable possibly used as a fish aggregating device (Table 2). Although a substantial effort was made to review the photographed and collected gear, staff resources did not allow a complete review in all cases. However, the best assessment of available gear and photographs suggests that there is limited possibility of further classification from additional review effort for any of the humpback whale entanglement cases. The spotted dolphin was entangled in marine debris that was not considered to be fishery-related (Table 3).

Part of the process of reviewing the PIR-MMRN database for reports of cetaceans injured by human causes involved following up on stranding records where there was noted or suggested evidence of human-caused injury. This follow-up can require obtaining information from necropsy reports prepared by the marine mammal stranding program led by K. West (University of Hawaii at Manoa). If the injury was determined to be the cause of death, the associated record was added to the subset of injury reports of relevance to the human-caused M&SI estimates and summarized herein. If the injury could not be confirmed or was determined not to be the cause of death, the associated record was excluded from the subset of injury reports compiled for the present paper. Yet, the excluded reports merit mention, as they contain qualitative information on potential injury sources and susceptible species, which is important given how little is known about anthropogenic injuries for Hawaiian cetaceans other than humpback whales (Bradford and Lyman 2015, 2018).

During 2017, there were no PIR-MMRN stranding records where a human-caused injury was determined to be the cause of death. However, there were 2 stranding records during this period where a human-caused injury was documented but determined not to be the cause of death. These cases involve 2 short-finned pilot whales (*Globicephala macrorhynchus*) that were part of a mass stranding event, one that had 12–15lbs of nylon line and plastic in its forestomach and another that had scarring on its upper right jaw suggestive of a previous fishery interaction (K. West, personal communication).

Cetaceans in Hawaiian waters, particularly humpback whales, are subject to human-caused injuries from a variety of sources, which should continue to be accounted for in the SARs. For cetacean species other than humpback whales, significantly more effort and resources are needed to report, document, and monitor individuals with anthropogenic injuries. PIR-MMRN and HIERN have been expanding their efforts in this regard, primarily by communicating to various partners and stakeholders and highlighting the value of reporting injured cetaceans. Continued progress in soliciting and documenting such injuries will inform and improve assessments of the affected cetacean stocks.

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Literature Cited

Bradford AL, Lyman E. 2015. Injury determinations for humpback whales and other cetaceans reported to the Hawaiian Islands Disentanglement and Pacific Islands Marine Mammal Response Networks during 2007–2012. NOAA Tech Memo. NMFS-PIFSC-45. 37 pp.

Bradford AL, Lyman E. 2018. Injury determinations for humpback whales and other cetaceans reported to the Hawaiian Islands Disentanglement and Pacific Islands Marine Mammal Response Networks during 2013–2016. NOAA Tech Memo. NMFS-PIFSC-75. 24 pp.

Forney KA. 2010. Serious injury determinations for cetaceans caught in Hawaii longline fisheries during 1994–2008. NOAA Tech Memo NOAA-TM-NMFS-SWFSC-462. 24 pp.

Henry AG, Cole TVN, Garron M, Ledwell W, Morin D, Reid A. 2017. Serious injury and mortality determinations for baleen whale stocks along the Gulf of Mexico, United States East Coast, and Atlantic Canadian Provinces, 2011-2015. NOAA Northeast Fisheries Science Center Reference Document 17-19. 63 pp.

Muto MM, Helker VT, Angliss RP, Allen BA, Boveng PL, Breiwick JM, Cameron MF, Clapham PJ, Dahle SP, Dalheim ME, Fadely BS, Ferguson MC, Fritz LW, Hobbs RC, Ivashchenko YV, Kennedy AS, London JM, Mizroch SA, Ream RR, Richmond EL, Shelden KEW, Towell RG, Wade PR, Waite JM, Zerbini AN. 2018. Alaska marine mammal stock assessments, 2017. NOAA Tech Memo. NMFS-AFSC-378. 391 pp.

[NMFS] National Marine Fisheries Service. 2012. NOAA Fisheries Policy Directive 02-238-01: Process for distinguishing serious from non-serious injury of marine mammals. 42 pp. [accessed 2018 December 11]. <https://www.fisheries.noaa.gov/national/laws-and-policies/protected-resources-policy-directives>.

[NMFS] National Marine Fisheries Service. 2016. NMFS Instruction 02-204-01: Guidelines for preparing stock assessment reports pursuant to the 1994 amendments to the MMPA. 24 pp. [accessed 2018 December 11]. <https://www.fisheries.noaa.gov/national/laws-and-policies/protected-resources-policy-directives>.

Table 1. Injury determinations for humpback whales reported to be involved in vessel collisions in Hawaiian waters during 2017, 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 (ft)	Vessel speed (kn)	Event summary	Observed injury	Injury categories	Injury determination	Value for PBR
01/16/17	Subadult	65	>10	Tour vessel slowed from 15kts when whale surfaced 50ft ahead, but still struck whale. Whale observed for unspecified period of time and did not show signs of injury.	None observed	L6a	Serious	1
03/14/17	Adult	38	17	Tour vessel struck whale. Whale observed for 15 minutes and did not show signs of injury.	None observed	L6b	Prorate 0.2 Serious	0.2
03/16/17	Adult	54	10	Tour catamaran struck whale (assumed to be the mother with associated calf). Whales observed for unspecified period of time and did not show signs of injury.	None observed	L6c	Non-serious	0
03/16/17	Calf	54	10	Tour catamaran presumably struck mother of this associated calf. Whales observed for unspecified period of time and did not show signs of injury.	None observed	L8	Non-serious	0

Table 2. Injury determinations for humpback whales reported to be entangled in presumed fishing gear or marine debris in Hawaiian waters during 2017, using the most recent established criteria for distinguishing serious from non-serious injury of large whales (Table 1 in NMFS 2012). The “initial” injury determination is associated with the condition of the whale prior to any follow-up and mitigation efforts and may be used for List of Fisheries (LOF) fisheries classifications. The condition of the whale following a change in entanglement status, whether by mitigation or self-release, is reflected in the “follow-up” injury determination, which is used for Potential Biological Removal (PBR) comparison. Note that in cases where there were no follow-up or mitigation efforts, the initial and follow-up determinations are the same. An injury determination of serious followed by an asterisk indicates that the basis of the determination was the significant health decline caused by the injury (NMFS 2012). Table continues on following page.

Report date	Age class	Event summary	Initial injury categories	Initial injury determination	Value for LOF	Response outcome	Follow-up injury categories	Follow-up injury determination	Value for PBR	Gear type	Fishery	Fishery review details
03/02/17	Adult	Line wrapped multiple times around peduncle before trailing 20ft behind whale, with a buoy at end. Lack of constricting gear not confirmed.	L10	Prorate 0.75 Serious	0.75	No response	L10	Prorate 0.75 Serious	0.75	Unknown	Unknown	Video showing gear reviewed by a level 5 responder. Little identifying information on gear to identify gear type or fishery. Limited possibility of further classification from additional review effort.
03/05/17	Adult	Scarring indicates line wrapped tightly through mouth and around body and peduncle, but fat loss loosened wrap. Lines trailed 30ft and 80ft behind whale, with the longer line ending in a bundle of over 200ft of line. Whale had superficial wounds from line. Whale was extremely emaciated with cyanid carpets and light and rough skin and was considered to be in significant health decline.	L2, L5b	Serious*	1	Response mounted, but whale not tagged or disentangled.	L2, L5b	Serious*	1	Unknown	Unknown	Photographed gear reviewed by a level 5 responder. Little identifying information on gear to identify gear type or fishery. Limited possibility of further classification from additional review effort.
03/11/17	Adult	Netting (6-8ft) draped over rostrum of whale. Lack of constricting gear not confirmed.	L10	Prorate 0.75 Serious	0.75	No response	L10	Prorate 0.75 Serious	0.75	Unknown	Unknown	Photographed gear reviewed by a level 5 responder. Little identifying information on gear to identify gear type or fishery. Gear likely marine debris and not from an active set. Limited possibility of further classification from additional review effort.
03/11/17	Subadult	Heavy gauge electrical cable went through mouth forming a bridle. The two trailing lines involved 850ft of cable. Whale had superficial wounds from line. While the line did not form a constricting wrap, the gear type, kinking of cable, and fixed location in mouth suggests that movement and ultimately feeding of the whale would be impacted.	L2, L5b	Serious	1	Partially disentangled; 790ft of cable removed from whale. Superficial wounds remained.	L2, L5b	Serious	1	Unknown	Unknown	Recovered gear reviewed by level 5 responder. This type of coaxial cable (terrestrial, not marine) has not been used in the U.S. in almost 2 decades, so assumption is that gear had been repurposed, likely as a fish aggregating device. Limited possibility of further classification from additional review effort.

Report date	Age class	Event summary	Initial injury categories	Initial injury determination	Value for LOF	Response outcome	Follow-up injury categories	Follow-up injury determination	Value for PBR	Gear type	Fishery	Fishery review details
12/08/17	Subadult	Line wrapped around peduncle before trailing at least 30ft behind, with the possibility of being weighted. Lack of constricting gear not confirmed. Whale was moderately emaciated with cyanid carpet and light skin and was considered to be in significant health decline.	L10	Serious*	1	No response	L10	Serious*	1	Unknown	Unknown	No gear recovered and gear not documented enough for a review of gear type and fishery.
12/22/17	Subadult	Line draped over peduncle from right side of body, potentially involving the mouth or right pectoral flipper. Lack of constricting gear not confirmed. Whale was slightly emaciated.	L10	Prorate 0.75 Serious	0.75	No response	L10	Prorate 0.75 Serious	0.75	Unknown	Unknown	No gear recovered and gear not documented enough for a review of gear type and fishery.
12/25/17	Adult	Bundle of 55ft of line loosely wrapped around mouth before trailing almost 300ft behind.	L3	Non-serious	0	Fully disentangled.	n/a	Non-serious	0	Unknown	Unknown	Recovered gear reviewed by a level 5 responder. Little identifying information on gear to identify gear type or fishery. Limited possibility of further classification from additional review effort.

Table 3. Injury determinations for cetaceans other than humpback whales reported to be injured in Hawaiian waters during 2017, using the most recent established criteria for distinguishing serious from non-serious injury of cetaceans (Tables 1–2 in NMFS 2012). The “initial” injury determination is associated with the condition of the whale or dolphin prior to any follow-up and mitigation efforts. For presumed fishery-related injuries, the initial determination is used for List of Fisheries (LOF) classification. The final known condition of the individual, regardless of injury type, follow-up, or mitigation, is reflected in the “follow-up” injury determination, which is used for Potential Biological Removal (PBR) comparison.

Report date	Species	Stock	Age class	Event summary	Initial injury categories	Initial injury determination	Value for LOF	Response outcome	Follow-up injury categories	Follow-up injury determination	Value for PBR	Gear type and fishery summary
09/25/17	Spotted dolphin	4-Islands	Unknown	Dolphin observed with a ring or band of debris around its rostrum (preventing mouth from opening).	S8a	Serious	n/a	No response	S8a	Serious	1	n/a

Table 4. Summary of humpback whale vessel collisions and entanglements in Hawaiian waters during 2017 that resulted in different preliminary and reviewer injury determinations. The final injury determinations resulting from follow-up discussions are shown along with a rationale for the determination. The injury determination “categories” are based on the most recent established criteria for distinguishing serious from non-serious injury of large whales (Table 1 in NMFS 2012). The injury determination “values” refer to the number of serious injuries relevant to either List of Fisheries classification or Potential Biological Removal comparison. For entanglements, “|” is used to separate the initial and follow-up injury determination categories and values. An injury determination value of 1 followed by an asterisk indicates that the basis of the determination was the significant health decline caused by the injury (NMFS 2012).

Report date	Injury type	<u>Preliminary injury determination</u>		<u>Reviewer injury determination</u>		<u>Final injury determination</u>		Final determination rationale
		Categories	Value	Categories	Value	Categories	Value	
03/05/17	Entanglement	L2, L5b L2, L5b	1* 1*	L2 L10	1* 1*	L2, L5b L2, L5b	1* 1*	Considered that there was sufficient supporting evidence to use L2 for the follow-up determination since configuration did not change after response.
03/11/17	Entanglement	L3, L5b L3, L5b	1 1	L2 L2	1 1	L2, L5b L2, L5b	1 1	Agreed with reviewer that there was sufficient supporting evidence to use L2 for the initial and follow-up determinations.

Appendix A:

Additional interpretation or consideration required in the application of some of the injury categories (NMFS 2012) to large whales injured in Hawaiian waters during 2017. L = large whale category (Table 1 in NMFS 2012).

Injury categories ¹	Application of categories
L2, L3, L10	<p>1) Although not the practice of all members of the NMFS Determination Staff Working Group, particularly members assessing injured whales on their feeding grounds, an entangled humpback whale that showed signs of a significant health decline was still considered to be seriously injured after partial or full disentanglement. The rationale for the serious determination in such cases is that the whales are on their breeding grounds and still have to migrate in order to improve their nutritive condition.</p> <p>2) When follow-up observations indicated that a whale had self-released from entangling gear, the observed entanglement was still reflected in the initial injury determination that may be used for List of Fisheries classification. This approach is different than that used for marine mammals released from gear by fishermen in real-time (i.e., when the injury determination is made after the fisherman releases the animal from the gear; NMFS 2012). However, in the present context, an initial injury determination is needed to account for the unknown duration of the entanglement and the resulting impact to the whale.</p>
L5a, L5b	Although not the practice of all members of the NMFS Determination Staff Working Group, these categories were applied whenever lacerations were reported, even for fishery-related injuries. This use accounted for one or more injuries resulting from an entanglement in the event that the whale was disentangled. That is, if an entanglement caused a deep laceration, that laceration would remain, even if all gear was removed from the whale.
L8	Along with other members of the NMFS Determination Staff Working group, a dependent calf of a mother with an injury of prorated severity was assigned the same prorated injury determination as the mother.
L12	Although not the practice of all members of the NMFS Determination Staff Working Group, this category was applied along with L5a, L5b, or L11 when a whale was observed with clear vessel collision injuries, even if the actual collision was not reported. The rationale for this use is that it prevents a bias in the injury determination process for calves. That is, if a calf was reported struck by a vessel of any size and unknown speed, even with no resulting visible injuries, it would be considered seriously injured because “a strike to a calf by a vessel of any size when speed is unknown will be considered a serious injury” (NMFS 2012). However, a calf with superficial injuries clearly indicating a vessel collision (L5a) would be considered non-seriously injured if the collision itself was not reported. To avoid this determination bias from unreported collisions, L12 was used when observed injuries were sufficient confirmation that a collision had occurred.

¹Description of injury categories (from Table 1 in NMFS 2012): L2 – constricting wrap; L3 – loose wrap, bridled or draped gear; L5a – deep laceration; L5b – superficial laceration; L8 – dependent calf of a dead or seriously injured mother; L10 – evidence of entanglement; and L12 – vessel strike observed.