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Serious Injury Determinations for Small Cetaceans and Pinnipeds Caught in Commercial Fisheries off the Northeast U.S. Coast, 2007-2011

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TABLE OF CONTENTS

Introduction	1
Methods	1
Results and Discussion.....	2
Small Cetaceans	2
Pinnipeds.....	3
Acknowledgements.....	4
References Cited	5
Appendix. Tables 2 and 3 from NMFS procedure manual	21
Table 2: Summary of Small Cetacean Injury Categories and Criteria	21
Table 3: Summary of Pinniped Injury Categories and Criteria.....	24

INTRODUCTION

The Marine Mammal Protection Act (MMPA) requires the National Marine Fisheries Service 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). Serious injury (SI) determinations were addressed at NMFS-convened workshops in 1997 and 2007 (Angliss and DeMaster 1998; Andersen et al. 2008), and in January 2012 the agency published new national guidelines for distinguishing serious from nonserious injuries of marine mammals (http://www.nmfs.noaa.gov/pr/pdfs/serious_injury_procedure.pdf). A major goal of the new guidelines was to establish national consistency and transparency in SI determinations. To implement the new guidelines, Science Center SI determination staff (SID) were required to review the 5-year (2007-2011) observer (OBS) and at sea monitor (ASM) records on all incidentally caught marine mammals that were released alive. Observer comments on the condition of released animals were compared by taxonomic group (e.g., large whales, small cetaceans, and pinnipeds) to specific injury categories described in the procedure manual. Based on these reviews, each animal was assigned an injury determination. Once completed, the SI determination table was independently reviewed by another center's SID (e.g., Northeast Fisheries Science Center [NEFSC] determinations were sent to Southwest Fisheries Science Center [SWFSC]), and differences are subsequently revisited. The revised determinations were subsequently reviewed by regional Scientific Review Groups (SRG) at their annual meeting, and final determinations are published.

METHODS

Electronic records of all small cetacean and pinniped bycatch that were coded as alive or condition unknown for the 5-year period (2007-2011) were extracted from the Northeast Fisheries Observer Program (NEFOP) database. A principal component of these records included OBS/ASM notes that provided information on entanglement characteristics (e.g., animal in codend), crew handling (e.g., rope tied to keel and crane, animals lifted overboard), animal condition (e.g., cut on dorsal flank, some blood), and state of released animal (e.g., swam away quickly, swimming sluggishly at surface, immediately sank). These data were independently compared to small cetacean (S) and pinniped (P) criteria contained in the aforementioned SI guidance document by 2 marine mammal researchers in the NEFSC Protected Species Branch. The 2 evaluators compared their determinations, and all differences were discussed to obtain agreement. In cases where a determination could not be made with the available data, the severity was prorated based on other determinations for that species or taxonomic group (Forney 2009). The "final" determination table and electronic copies of observer notes were transmitted to the SWFSC SID. Final injury determinations and mortality events were pooled over the 5 year time period to estimate the proportion of observed SI animals relative to the other observed determinations (e.g., nonserious injury (NSI), unknown (UN), and Dead) by gear type and species. In addition, final determinations were tabulated annually by gear type and species.

Species codes and gear codes used in this report are contained, respectively in Tables 1 and 2. The statistical area designations are presented in Figure 1.

RESULTS AND DISCUSSION

Small Cetaceans

For 2007, 3 pilot whale (*Globicephala* spp.) records were examined (Table 3). The animal condition for 2 whales was coded as alive, 1 each, in Atlantic herring (*Clupea harengus*) midwater trawl and longfin inshore squid (*Doryteuthis (Amerigo) pealeii*) bottom trawl fisheries. The animal in the midwater trawl swam away slowly when it was released from the net, the animal was seen floating after some tail slaps. The animal in the bottom trawl obtained a deep cut “almost to the bone” into the tail above the fluke during release from the net. The third animal taken in the Loligo fishery was coded as unknown. Based on evaluation of observer notes, the 2 live whales were designated as SI, and the unknown condition animal as cannot be determined (CBD; Table 4).

In May 2009, 2 pilot whales were taken in a single bottom trawl set targeting haddock (*Melanogrammus aeglefinus*) on Georges Bank. Both animals were designated SI because of crew handling (i.e., rope tied around tail stock to drag animals off the stern) and presence of blood and foam around the mouth (Tables 3-4).

In 2010, 1 Atlantic white-sided dolphin (*Lagenorhynchus acutus*) 2 short-beaked common dolphins (*Delphinus delphis*), and 1 pilot whale were coded as alive. The white-sided dolphin was taken in northeast sink gillnet, and when released, it sluggishly swam away. The 2 common dolphins were taken in autumn bottom trawl sets targeting haddock on Georges Bank. One animal (a dependent calf) taken in October was handled by the observer and dropped beak first overboard. The December animal was 1 of 4 common dolphins (3 dead) taken over the duration of the fishing trip. The distant photographs of this animal lying among the catch on the deck show blood on the head and flank; the crew said the animal was alive when they released it overboard. Based on OBS/ASM notes and new SID guidelines, the white-sided dolphin was coded as SI and the common dolphins were determined to be SI. The pilot whale was also determined to be SI, because it was bleeding from the fluke, and the crew tied a rope around the tail stock and dragged it down the deck (Tables 3-4).

In 2011, 1 white-sided dolphin, 3 common dolphins, and 2 pilot whales were recorded as alive. The condition of 1 each of white-sided dolphin, harbor porpoise (*Phocoena phocoena*), pilot whale, and unidentified small cetacean were recorded as unknown. The unidentified cetacean was taken in the Gulf of Maine sink gillnet fishery targeting pollock (*Pollachius virens*). All other takes were in bottom trawl fisheries. Based on OBS/ASM notes, both white-sided dolphins were designated as SI. The photographs of 1 animal showed broken teeth, blood, and abrasions dorsally and around the eye. The second remained on the deck with a rope tied around the tail stock for an extended period of time; crew stated that the animal was released alive. The at-sea monitor did not see the animal. The 2 common dolphins taken in January in the same tow were designated as NSI, as the observer stated they swam vigorously away and joined a group that was following the vessel. No injuries or signs of blood were reported. The third common dolphin taken in December, was wrapped “lightly” around the net reel, thus was considered a SI. The harbor porpoise was brought onboard, and the crew released it overboard. The crew stated that it was still alive, but the observer could not confirm. This animal was coded as SI. The 3 pilot whales were taken in December on Georges Bank, 2 from the same trip that was targeting redfish (*Sebastes* sp). The third was taken in a tow targeting haddock. The observer did not get a good look at the 2 animals on the redfish trip. As soon as the net was onboard the crew cut the animals out of codend, the animals were then hoisted overboard. The animal in the

haddock tow was also brought aboard the vessel. The crew cut the animal out of the net, then tied a rope around the tailstock, and hoisted it over the side. The dangling whale hit the boat, and the ASM saw blood flowing from the mouth. This single pilot whale was coded SI. The pair taken in the redfish trawl was coded as SI. The observer did not see 1 animal; crew cut it out of codend and said it swam away. The observer could not determine if the second animal was dead or in shock (Tables 3-4). In addition, captain/crew reported 2 alive and 1 dead “common dolphin” in a December 11 tow on Georges Bank. As the observer did not see the animals, they were coded as unknown species, and designated as SI. Four additional unidentified small cetaceans, three “dolphins” and one “porpoise/dolphin” were taken in bottom trawls. One dolphin had a fresh “propeller” cut on the dorsal fin; another was cut from the trawl belly prior to bring the net on deck; and the third animal was lightly wrapped around the net reel (Table 3). The 3 “dolphins” were designated as SI. The porpoise/dolphin” was released from the gear while the net was alongside the vessel. CBD was the determination assigned to this animal (Table 3).

In summary, from 2007-2011, 1, 13 and 1 observed small cetacean identified to species sustained serious injury in gillnet, bottom trawl and midwater trawl gear, respectively. Three common dolphins, 1 harbor porpoise, 7 pilot whales, and 2 white-sided dolphins were seriously injured as a result of interacting with bottom trawl gear. Five additional small cetaceans of unknown species sustained serious injury in trawl gear. One white-sided dolphin was seriously injured as a result of interacting with gillnets gear. One pilot whale was seriously injured as a result of interacting with midwater trawl gear (Table 4).

While more mortalities of small cetaceans occurred in gillnet fisheries during this time period, serious injury events were more common in bottom trawl gear (Table 5). In trawl gear during 2007-2011, 33% of observed harbor porpoises were seriously injured (out of a total of 3 bycaught animals) followed by 21% pilot whales (out of a total of 33 bycaught animals), 2% white-sided dolphins (out of a total of 95 bycaught animals), and 3% common dolphins (out of a total of 109 bycaught animals; Table 5).

Pinnipeds

Seals are the only pinnipeds normally found in waters off the northeast US coast. In 2007, observers recorded the condition of 2 unidentified seals as “unknown.” One animal was taken in a sink gillnet and fell out of the net at the surface; there were no obvious wounds or movement detected, and the body sank quickly. It was designated as an SI, but mortality cannot be ruled out. The second seal was entangled in a purse seine at the surface and breathing. The crew cut the net to free the seal. It was designated a NSI (Tables 3-4).

In 2008, 1 harbor seal (*Phoca vitulina concolor*) and 6 gray seals (*Halichoerus grypus grypus*) were recorded as alive in Atlantic herring purse seine nets. The harbor seal was designated as CBD, since the observer indicated that the animal had a deep laceration on its neck that did not appear fresh. The 6 gray seals escaped by swimming over the head rope, thus were designated as alive (Tables 3-4).

In 2009, 2 gray seals were recorded as alive; head in mesh, in a single gillnet set south of Cape Cod, MA. A subsequent review of the bycatch logs indicated that both seals were dead and returned to Woods Hole, MA, for necropsy (Tables 3-4).

In 2010, 4 gray seals and 1 unidentified seal were recorded as alive in Gulf of Maine herring purse seine sets. Two of the gray seals escaped by swimming over the head rope, and the other 3 swam out of the net with assistance of the crew. The 5 seals were designated as alive (Tables 3-4).

In 2011, 3 harbor seals, 34 gray seals, and 8 unidentified seals were recorded in Gulf of Maine purse seine sets. Twenty-eight of the gray seals were taken on the same trip. One harbor seal was designated as alive, and the other 2 were designated as NSI. The NSI seals were entrapped in the net and swam away when released. Twenty-eight of the gray seals were designated as alive, as they were observed swimming in and out of the net. Five were designated as NSI and 1 as CBD. Three of the NSI seals were entrapped in the net but escaped and swam away. Two animals came aboard the vessel. One climbed aboard from the net, then went overboard and swam away. The second came up in the net, the fishermen released the seal, and it went off the back of the vessel on its own. The CBD animal was observed swimming in and out of the net. It had a 6 in gash on the back, pink tissue was exposed, but no blood was visible. Four of the unidentified seals swam out of the net, whereas, the remaining 4 were released from the net after the fish were pumped out. All 8 unidentified seals were designated as alive (Tables 3-4).

One harbor seal and 2 unidentified seals were sublethal takes in sink gillnet fisheries in 2011. The harbor seal was alive when brought on deck, and there were no signs of injury. The crew cut the net off, and the seal was released and swam away. Therefore, it was designated as NSI (Tables 3-4). The 2 unidentified seals (coded as unknown) were taken on the same trip as 17 other seals that were coded as dead. The captain reportedly cut the animals out of the net. It seems likely that the 2 unseen seals shared the same fate as the observed animals. The 2 unseen seals were designated as SI, but it cannot be ruled out that they were dead.

The condition of 1 unidentified seal taken in bottom trawl gear in 2011 was coded as unknown. However, the ASM noted that there was a yellow tag attached to the seal, but the tag information could not be collected before the carcass was dropped overboard. Therefore, it was designated as dead; under the assumption this capture event was a recapture of a previously tagged carcass (Tables 3-4). However, we cannot rule out that the tag may have been attached to a stranded and rehabilitated/released seal or 1 that was captured and tagged during research operations.

In summary, from 2007-2011 a total of 65 pinnipeds were given serious injury review (i.e., were coded as nonmortality bycaught animals). The most common cases were gray seals interacting with purse seine gear (n=46), and all of those determinations were either Alive or NSI. No seals identified as harbor or gray seals were seriously injured from observed bycatch in purse seine, gillnet, bottom trawl or midwater trawl gear (Table 5). Three unidentified seals were determined to have serious injuries as a result of interactions with gillnet gear.

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Table 1. List of marine mammal codes, common names, and scientific names.

Code	Common Name	Scientific name
CODO	Short-beaked common dolphin	<i>Delphinus delphis</i>
HAPO	Harbor porpoise	<i>Phocoena phocoena</i>
UNPW	Long-finned or short-finned Pilot whale	<i>Globicephala</i> spp.
PPDO	Harbor porpoise or dolphin	
WSDO	Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>
UNDO	Unidentified dolphin	
GRSE	Gray seal	<i>Halichoerus grypus grypus</i>
HASE	Harbor seal	<i>Phoca vitulina concolor</i>
UNCE	Unidentified cetacean	
UNSE	Unidentified seal	

Table 2. Northeast region commercial fishery gear codes.

Gear code	Gear description
OTB	Otter trawl bottom
OTM	Otter trawl mid-water
OTR	Otter trawl Rhule
OTH	Otter trawl haddock separator
PSH	Purse seine
SGN	Sink gillnet

Table 3. Comparison of fishery observer or at-sea monitor animal condition codes and Protected Species Branch (PSB) injury determinations (SI =serious injury, NSI = nonserious injury, CBD = cannot be determined) for the 5-year period 2007-2011. Determinations are based on observer notes and small cetacean and pinniped criteria in the National Marine Fisheries Service Determination Directive (NMFS 2012). Northeast Gear (NEGEAR) codes are listed in Table 2, statistical areas are shown in Figure 1, and species codes are listed in Table 1.

NEGEAR	Statistical Area	Take Date	Species Code	Recorded Animal Condition	Revised Animal Condition ¹	PSB Determination	NMFS 2012 SI Determination Directive ²	PSB comments regarding determination
OTM	613	09-03-2007	UNPW	Alive	Unknown	SI	S7b	Animal swimming slowly when freed from trawl - animal seen floating after some tail slaps - dead?
OTB	525	02-02-2007	UNPW	Alive		SI	S4, S9	"Portion removed cutting into tail above fluke almost to bone."
OTB	562	16-01-2007	UNPW	Unknown	Unknown	CBD	S7b	Insufficient info for determination - pilot whale apparently fell out of net during haulback - no visual observations
SGN	514	05-03-2007	UNSE	Unknown	Unknown	SI	S7b	Seal fell out of net when at the surface, no obvious wounds, animal sank quickly, and no movements detected - mortality?
PSH	512	15-07-2007	UNSE	Alive	Unknown	NSI		Purse seine mesh around seal's head, animal at surface & breathing, crew cut net to free seal
PSH	512	20-07-2008	HASE	Alive		CBD	P9	Seal in purse seine, had visible wound on neck several cm wide and deep which tore blubber--bright pink, seal swam free
PSH	511	1-10-2008	GRSE	Alive		Alive		Purse seine catch - seal escaped by swimming over head rope
PSH	511	1-10-2008	GRSE	Alive		Alive		Purse seine catch - seal escaped by swimming over head rope
PSH	511	1-10-2008	GRSE	Alive		Alive		Purse seine catch - seal escaped by swimming over head rope
PSH	511	1-10-2008	GRSE	Alive		Alive		Purse seine catch - seal escaped by swimming over head rope
PSH	511	1-10-2008	GRSE	Alive		Alive		Purse seine catch - seal escaped by swimming over head rope
PSH	512	29-06-2008	GRSE	Alive	Unknown	Alive		purse seine - seal swam out

Table 3. Comparison of fishery observer or at-sea monitor animal condition codes and Protected Species Branch (PSB) injury determinations (SI =serious injury, NSI = nonserious injury, CBD = cannot be determined) for the 5-year period 2007-2011. Determinations are based on observer notes and small cetacean and pinniped criteria in the National Marine Fisheries Service Determination Directive (NMFS 2012). Northeast Gear (NEGEAR) codes are listed in Table 2, statistical areas are shown in Figure 1, and species codes are listed in Table 1.

NEGEAR	Statistical Area	Take Date	Species Code	Recorded Animal Condition	Revised Animal Condition ¹	PSB Determination	NMFS 2012 SI Determination Directive ²	PSB comments regarding determination
OTR	525	08-05-2009	UNPW	Alive		SI	S3, S4	Animal on deck, rope on tail stock used to drag whale off the boat, didn't float; blood & foam from mouth
OTR	525	08-05-2009	UNPW	Alive		SI	S3, S4	Animal on deck, rope on tail stock used to drag whale off the boat, didn't float; blood & foam from mouth
SGN	537	17-03-2009	GRSE	Alive, head in mesh	Dead			Animal was necropsied in Woods Hole, MA
SGN	537	17-03-2009	GRSE	Alive, head in mesh	Dead			Animal was necropsied in Woods Hole, MA
SGN	514	10-08-2010	WSDO	Alive	Unknown	SI	S7b	Once the dolphin was released it was very sluggish, swimming very slowly downwards
OTH	562	26-10-2010	CODO	Alive		SI	S4, S15	Observer lifted animal and dropped it over side beak first, it sunk.
OTR	525	19-12-2010	CODO	Alive CC		SI	S4	NEFOP photos, yes, if alive, lots of blood in photos
OTB	525	29-06-2010	UNPW	Alive		SI	S4, S6	Bleeding on fluke but no cut seen, animal dragged down deck & unclear is rope was still attached to tail stock
SGN	514	06-08-2010	UNSE	Unknown	Unknown	Alive		Captain & crew saw seal in net, it was released alive & swam away
PSH	513	30-08-2010	GRSE	Alive		Alive		Seal in purse seine, no injuries and animal swam free
PSH	513	31-08-2010	GRSE	Alive		Alive		Seal in purse seine, no injuries and animal swam free prior to pumping fish out
PSH	512	19-09-2010	GRSE	Alive		Alive		Purse seine - crew cut net while in water and seals swam out
PSH	512	19-09-2010	GRSE	Alive		Alive		Purse seine - crew cut net while in water and seals swam out

Table 3. Comparison of fishery observer or at-sea monitor animal condition codes and Protected Species Branch (PSB) injury determinations (SI =serious injury, NSI = nonserious injury, CBD = cannot be determined) for the 5-year period 2007-2011. Determinations are based on observer notes and small cetacean and pinniped criteria in the National Marine Fisheries Service Determination Directive (NMFS 2012). Northeast Gear (NEGEAR) codes are listed in Table 2, statistical areas are shown in Figure 1, and species codes are listed in Table 1.

NEGEAR	Statistical Area	Take Date	Species Code	Recorded Animal Condition	Revised Animal Condition ¹	PSB Determination	NMFS 2012 SI Determination Directive ²	PSB comments regarding determination
OTB	521	27-03-2011	WSDO	Alive		SI	S4, S7b, S9	NEFOP photos show broken teeth, blood, abrasions, dorsally and around eye
OTB	521	7-04-2011	WSDO	Unknown		SI	S4	Rope attached to keel to deposit dolphin onto deck for an extended time period, crew said animal released alive -ASM did not see animal
OTB	623	06-01-2011	CODO	Alive	Unknown	NSI	S7b	Snout, flipper tail, entangled in net, fishermen cut net and animal swam vigorously away & joined group following vessel
OTB	623	06-01-2011	CODO	Alive	Unknown	NSI	S7b	Snout, flipper tail, entangled in net, fishermen cut net and animal swam vigorously away & joined group following vessel
OTB	613	11-12-2011	CODO	Alive	Unknown	SI	S4	Wrapped around drum lightly provides little info on the compression pressure on the dolphin -
OTB	522	23-10-2011	HAPO	Unknown		SI	S4	Animal brought on deck, crew tossed over side since animals was still alive - observer could not confirm
SGN	513	01-01-2011	UNCE	Unknown		SI	S7b	Animal fell out of gear- floating on surface, no movement - Alive?
OTB	521	28-12-2011	UNPW	Alive		SI	S3, S4, S9	Animal brought aboard in net, rope tied to tailstock to hoist animal overboard, head hit side of boat at which point ASM believes blood began flowing from mouth,
OTB	522	16-12-2011	UNPW	Alive CC	Unknown	SI	S3, S4, S9	Observer did not see pilot whale (pw), crew stated it was in codend, net cut to free whale: other pw were taken on this trip and they were DOB
OTB	522	16-12-2011	UNPW	Unknown		SI	S4	Unable to determine dead or in shock

Table 3. Comparison of fishery observer or at-sea monitor animal condition codes and Protected Species Branch (PSB) injury determinations (SI =serious injury, NSI = nonserious injury, CBD = cannot be determined) for the 5-year period 2007-2011. Determinations are based on observer notes and small cetacean and pinniped criteria in the National Marine Fisheries Service Determination Directive (NMFS 2012). Northeast Gear (NEGEAR) codes are listed in Table 2, statistical areas are shown in Figure 1, and species codes are listed in Table 1.

NEGEAR	Statistical Area	Take Date	Species Code	Recorded Animal Condition	Revised Animal Condition ¹	PSB Determination	NMFS 2012 SI Determination Directive ²	PSB comments regarding determination
PSH	511	9-07-2011	UNSE	Alive		Alive		Seals were entrapped in purse, but swam out - no signs of injury
PSH	511	9-07-2011	UNSE	Alive		Alive		Seals were entrapped in purse, but swam out - no signs of injury
PSH	511	9-07-2011	UNSE	Alive		Alive		Seals were entrapped in purse, but swam out - no signs of injury
PSH	511	9-07-2011	UNSE	Alive		Alive		Seals were entrapped in purse, but swam out - no signs of injury
PSH	511	9-07-2011	UNSE	Alive		Alive		Seals were entrapped in purse, and released after fish pumped out - seals feeding on fish and no signs of injury
PSH	511	9-07-2011	UNSE	Alive		Alive		Seals were entrapped in purse, and released after fish pumped out - seals feeding on fish and no signs of injury
PSH	511	9-07-2011	UNSE	Alive		Alive		Seals were entrapped in purse, and released after fish pumped out - seals feeding on fish and no signs of injury
PSH	511	12-07-2011	UNSE	Alive		Alive		Seals were entrapped in purse and escaped during fish pumping out - no signs of injury
SGN	537	10-04-2011	UNSE	Unknown		SI	P7b	Captain cut seal out of net & did not bring it onboard - note: 17 out of 19 (89%) seals brought aboard this trip were dead
SGN	537	10-04-2011	UNSE	Unknown		SI	P7b	Captain cut seal out of net & did not bring it onboard - note: 17 out of 19 (89%) seals brought aboard this trip were dead
OTB	514	30-06-2011	UNSE	Unknown	Dead	NA - recapture		Monitor only glimpsed animal, but noted a yellow tag was attached, thus we assumed it was dead (i.e., tagged on previous tow)
PSH	512	24-08-2011	HASE	Alive		NSI	P7b	Purse seine catch - seal swam away after release

Table 3. Comparison of fishery observer or at-sea monitor animal condition codes and Protected Species Branch (PSB) injury determinations (SI =serious injury, NSI = nonserious injury, CBD = cannot be determined) for the 5-year period 2007-2011. Determinations are based on observer notes and small cetacean and pinniped criteria in the National Marine Fisheries Service Determination Directive (NMFS 2012). Northeast Gear (NEGEAR) codes are listed in Table 2, statistical areas are shown in Figure 1, and species codes are listed in Table 1.

NEGEAR	Statistical Area	Take Date	Species Code	Recorded Animal Condition	Revised Animal Condition ¹	PSB Determination	NMFS 2012 SI Determination Directive ²	PSB comments regarding determination
PSH	512	12-08-2011	HASE	Alive		NSI	P7b	Seals were entrapped in purse, but swam out - no signs of injury
PSH	512	19-07-2011	HASE	Alive		Alive		Purse seine - seal escaped over net
SGN	513	29-06-2011	HASE	Alive		NSI	P7b	Animal alive when brought on deck, no signs of injury; net cut off animal and it was released and swam away
PSH	512	16-08-2011	GRSE	Alive		NSI	P7b	Seal entangled in purse seine, brought aboard boat and fishermen released it from net, seal went off the back of the vessel- no external injuries
PSH	512	22-09-2011	GRSE	Alive		NSI	P7b	Purse seine - seals swimming in & out of net
PSH	512	23-09-2011	GRSE	Alive		CBD		Purse seine - seals swimming in & out of net, but seal had 6 inch gash on back, pink tissue exposed, no visible blood
PSH	512	23-09-2011	GRSE	Alive		Alive		Purse seine - seals swimming in & out of net
PSH	512	23-09-2011	GRSE	Alive		Alive		Purse seine - seals swimming in & out of net
PSH	512	23-09-2011	GRSE	Alive		Alive		Purse seine - seals swimming in & out of net
PSH	512	23-09-2011	GRSE	Alive		Alive		Purse seine - seals swimming in & out of net
PSH	512	23-09-2011	GRSE	Alive		Alive		Purse seine - seals swimming in & out of net
PSH	512	23-09-2011	GRSE	Alive		Alive		Purse seine - seals swimming in & out of net
PSH	512	23-09-2011	GRSE	Alive		Alive		Purse seine - seals swimming in & out of net
PSH	512	23-09-2011	GRSE	Alive		Alive		Purse seine - seals swimming in & out of net
PSH	512	23-09-2011	GRSE	Alive		Alive		Purse seine - seals swimming in & out of net

Table 3. Comparison of fishery observer or at-sea monitor animal condition codes and Protected Species Branch (PSB) injury determinations (SI =serious injury, NSI = nonserious injury, CBD = cannot be determined) for the 5-year period 2007-2011. Determinations are based on observer notes and small cetacean and pinniped criteria in the National Marine Fisheries Service Determination Directive (NMFS 2012). Northeast Gear (NEGEAR) codes are listed in Table 2, statistical areas are shown in Figure 1, and species codes are listed in Table 1.

NEGEAR	Statistical Area	Take Date	Species Code	Recorded Animal Condition	Revised Animal Condition ¹	PSB Determination	NMFS 2012 SI Determination Directive ²	PSB comments regarding determination
PSH	512	10-07-2011	GRSE	Alive		Alive		Purse seine- seal swam around inside of net, finally escaped after fish pumped out -
PSH	511	10-07-2011	GRSE	Alive		Alive		Purse seine- seal trapped in net, but remained calm, finally escaped after fish pumped out -
PSH	512	28-06-2011	GRSE	Alive		NSI	P7b	Purse seine - seals escape over net
PSH	512	28-06-2011	GRSE	Alive		NSI	P7b	Purse seine - seal climbed aboard vessel from net, they went back into water
PSH	512	19-07-2011	GRSE	Alive		NSI	P7b	Purse seine - seal escaped over net
OTB	522	06-12-2011	UNDO	Alive CC	Unknown	SI	S4	Observer did not see animals. Captain stated 3 common dolphins in net, 2 alive and one dead and all 3 dropped over the side; as observer did not see they are ID as UNDO
OTB	522	06-12-2011	UNDO	Alive CC	Unknown	SI	S4	Observer did not see animals. Captain stated 3 common dolphins in net, 2 alive and one dead and all 3 dropped over the side; as observer did not see they are ID as UNDO
OTB	623	29-01-2011	UNDO	Unknown		SI	S13a	Fresh cut (propeller?) dorsal fin was pulled from net - pod of common dolphins around vessel
OTB	513	14-04-2011	UNDO	Unknown	Unknown	SI	S4	Dolphin cut from trawl net belly prior to bringing net on deck - at-sea monitor was unable to ID dolphin
OTB	613	11-12-2011	UNDO	Alive CC	Unknown	SI	S4, S7b	May be more than one animal; animal lightly wrapped around net reel, animal dropped on deck and crew put into water

Table 3. Comparison of fishery observer or at-sea monitor animal condition codes and Protected Species Branch (PSB) injury determinations (SI =serious injury, NSI = nonserious injury, CBD = cannot be determined) for the 5-year period 2007-2011. Determinations are based on observer notes and small cetacean and pinniped criteria in the National Marine Fisheries Service Determination Directive (NMFS 2012). Northeast Gear (NEGEAR) codes are listed in Table 2, statistical areas are shown in Figure 1, and species codes are listed in Table 1.

NEGEAR	Statistical Area	Take Date	Species Code	Recorded Animal Condition	Revised Animal Condition¹	PSB Determination	NMFS 2012 SI Determination Directive²	PSB comments regarding determination
SGN	537	11-02-2011	PPDO	Alive CC	Unknown	SI	S7b	Only crew observations; 8 out of 9 (89%) of the animals caught on this trip were recorded as dead, captain cut animal from gillnet
OTB	512	12-12-2011	PPDO	Alive CC	Unknown	CBD		Only crew observations; animal released from gear while net in water, not brought onboard

Table 4. Summary of animal conditions (D=dead; DC=decomposed carcass; SI=serious injury; NSI=non-serious injury; UI=uninjured; CBD=could not be determined) by gear type, species and year.

Gear Type	Species	Year	Dead		Alive[1]			
			D[2]	DC[3]	SI	NSI	UI	CBD
Bottom Trawl	Bottlenose Dolphin (<i>Tursiops truncatus</i>)	2007						
		2008						
		2009	5					
		2010	6					
		2011	2					
	Common Dolphin (<i>Delphinus delphis</i>)	2007	2					
		2008	2					
		2009	17	1				
		2010	31		2			
		2011	52		1	2		
	Gray Seal (<i>Halichoerus grypus grypus</i>)	2007	9	1				
		2008	4					
		2009	8	2				
		2010	9	2				
		2011	22	3				
	Harbor Porpoise (<i>Phocoena phocoena</i>)	2007		1				
		2008	1					
		2009		2				
		2010		1				
		2011	1	3	1			
	Harbor Seal (<i>Phoca vitulina concolor</i>)	2007	1	2				
		2008						
		2009	1					
		2010	1	1				
		2011	3	2				
Harp Seal (<i>Pagophilus groenlandicus</i>)	2007							
	2008							
	2009	1	4					
	2010							
	2011	1						

Table 4. Summary of animal conditions (D=dead; DC=decomposed carcass; SI=serious injury; NSI=non-serious injury; UI=uninjured; CBD=could not be determined) by gear type, species and year.

Gear Type	Species	Year	Dead		Alive[1]			
			D[2]	DC[3]	SI	NSI	UI	CBD
Bottom Trawl (cont.)	Pilot Whale (<i>Globicephala</i> spp.)	2007	2	1	1			1
		2008	5	4				
		2009	1	4	2			
		2010	9	6	1			
		2011	9	2	3			
	Risso's Dolphin (<i>Grampus</i>)	2007						
		2008	1					
		2009		1				
		2010	16					
		2011	2					
	White-sided Dolphin (<i>Lagenorhynchus</i> <i>acutus</i>)	2007	4	2				
		2008	3	4				
		2009	31	4				
		2010	10	5				
		2011	45	11	2			
Gillnet	Common Dolphin (<i>Delphinus</i> <i>delphis</i>)	2007		1				
		2008	2					
		2009	2					
		2010	4	2				
		2011	5	4				
	Gray Seal (<i>Halichoerus</i> <i>grypus grypus</i>)	2007	60	20				
		2008	24	7				
		2009	35	9				
		2010	100	15				
		2011	209	15				
	Harbor Porpoise (<i>Phocoena</i> <i>phocoena</i>)	2007	28	8				
		2008	31	8				
		2009	31	9				
		2010	48	9				
		2011	60	17				
	Harbor Seal (<i>Phoca vitulina</i> <i>concolor</i>)	2007	5	1				
		2008	9	2				
		2009	19	4				
		2010	67	11				
		2011	85	6		1		
	Harp Seal (<i>Pagophilus</i> <i>groenlandicus</i>)	2007	10	2				
2008		17	1					
2009		23	3					
2010		3	5					

Table 4. Summary of animal conditions (D=dead; DC=decomposed carcass; SI=serious injury; NSI=non-serious injury; UI=uninjured; CBD=could not be determined) by gear type, species and year.

Gear Type	Species	Year	Dead		Alive[1]			
			D[2]	DC[3]	SI	NSI	UI	CBD
		2011	4					
Gillnets (cont.)	Pilot Whale (<i>Globicephala</i> spp.)	2007						
		2008						
		2009						
		2010	1					
		2011						
	Risso's Dolphin (<i>Grampus</i> <i>griseus</i>)	2007			1			
		2008						
		2009						
		2010						
		2011						
	White-sided Dolphin (<i>Lagenorhynchus</i> <i>acutus</i>)	2007						
		2008	4					
		2009						
		2010	5		1			
		2011	5					
Midwater Trawls	Common Dolphin (<i>Delphinus</i> <i>delphis</i>)	2007	1					
		2008						
		2009						
		2010	1					
		2011						
	Gray Seal (<i>Halichoerus</i> <i>grypus grypus</i>)	2007						
		2008						
		2009						
		2010	1					
		2011						
	Harbor Seal (<i>Phoca vitulina</i> <i>concolor</i>)	2007						
		2008						
		2009	1					
		2010	3					
		2011						
	Pilot Whale (<i>Globicephala</i> spp.)	2007				1		
		2008	6					
		2009						
		2010						
		2011	1					
White-sided Dolphin	2007	1						
	2008	3						

Table 4. Summary of animal conditions (D=dead; DC=decomposed carcass; SI=serious injury; NSI=non-serious injury; UI=uninjured; CBD=could not be determined) by gear type, species and year.

Gear Type	Species	Year	Dead		Alive[1]			
			D[2]	DC[3]	SI	NSI	UI	CBD
	<i>Lagenorhynchus acutus</i>	2009	1					
		2010						
		2011						
Purse Seines	Gray Seal <i>(Halichoerus grypus grypus)</i>	2007						
		2008					6	
		2009						
		2010					4	
		2011				5	28	1
	Harbor Seal <i>(Phoca vitulina concolor)</i>	2007						
		2008						1
		2009						
		2010						
		2011				2	1	
[1] Animals included under the alive category include animals with the following animal conditions: 0 – unknown; 1 – alive; 04 – Alive, hook/gear in/around mouth; 05 – alive, hook/gear in/around flipper; 06 – alive, hook/gear in/around another single body part; 07 – alive, hook/gear in/around several body parts; 08 – alive, seen by captain and/or crew only.								
[2] Animals included under the dead category include the following animal conditions: 10 – dead, condition – dead, fresh; 14 – dead, seen by captain/crew only.								
[3] Animals included under the decomposed carcass category include the following animal conditions: 12 – dead, – dead, severely decomposed.								

Table 5. Animal determination frequencies and relative proportions by gear type and species pooled over years 2007-2011: Gear types (BT=bottom trawls: OTB, OTR, OTH; SGN=gillnets; OTM=mid-water trawls; PSH=purse seines). Assignment codes: M=dead; SI=serious injury; NSI=non-serious injury; UI=uninjured.

Gear	Determination	Bottlenose Dolphin		Common Dolphin		Gray Seal		Harbor Porpoise		Harbor Seal		Harp Seal		Pilot Whale		Risso's Dolphin		White-sided Dolphin	
		Freq	Prop	Freq	Prop	Freq	Prop	Freq	Prop	Freq	Prop	Freq	Prop	Freq	Prop	Freq	Prop	Freq	Prop
BT	M*	13	1	104	0.9541	52	1	2	0.6667	6	1	2	1	26	0.7879	19	1	93	0.9789
	SI	0	0	3	0.0275	0	0	1	0.3333	0	0	0	0	7	0.2121	0	0	2	0.0211
	NSI	0	0	2	0.0183	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	13	1	109	1	52	1	3	1	6	1	2	1	33	1	19	1	95	1
GN	M**	0	0	20	1	494	1	249	1	209	0.9952	68	1	1	1	1	1	14	0.9333
	SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0667
	NSI	0	0	0	0	0	0	0	0	1	0.0048	0	0	0	0	0	0	0	0
	UI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	20	1	494	1	249	1	210	1	68	1	1	1	1	1	15	1
MWT	M*	0	0	2	1	1	1	0	0	4	1	0	0	7	0.8750	0	0	5	1
	SI	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1250	0	0	0	0
	NSI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	2	1	1	1	0	0	4	1	0	0	8	1	0	0	5	1
PS	M*	0	0	0	0	0	0	0	0	0	0.0000	0	0	0	0	0	0	0	0
	SI	0	0	0	0	0	0	0	0	0	0.0000	0	0	0	0	0	0	0	0
	NSI	0	0	0	0	5	0.1163	0	0	2	0.6667	0	0	0	0	0	0	0	0
	UI	0	0	0	0	38	0.8837	0	0	1	0.3333	0	0	0	0	0	0	0	0
	Total	0	0	0	0	43	1	0	0	3	1	0	0	0	0	0	0	0	0

*Excludes decomposed animals; **Includes decomposed animals

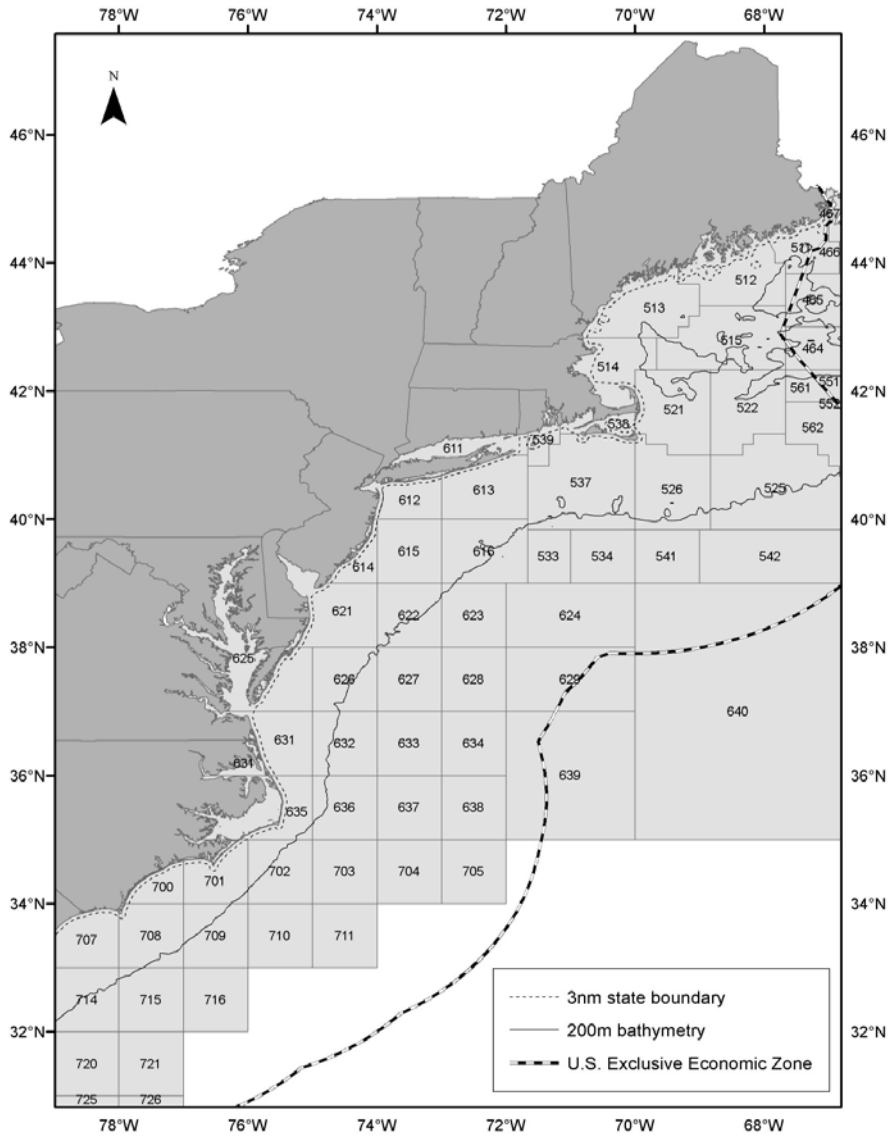


Figure 1. Fishery statistical areas.

APPENDIX. TABLES 2 AND 3 FROM NMFS PROCEDURE MANUAL

<http://www.nmfs.noaa.gov/directives/>

Table 2: Summary of Small Cetacean¹ Injury Categories and Criteria

Instructions: Each small cetacean injury event is recorded to the appropriate injury/information category using all available information and scientific judgment, as described in the Procedural Directive. For a single injury event to which several categories apply, the injury determination with the highest level of severity is assigned. More detailed information or extended observation on an individual case/animal may justify a determination differing from the guidance of this table. Any injury leading to apparent significant health decline (e.g., skin discoloration, fat loss) is a serious injury.			
Category	Injury/Information	Injury Determination ²	Additional factors for evaluating whether “case specific” injuries are serious or non-serious (additional factors at end of table) *
S1	A free-swimming animal observed at a date later than its human interaction, exhibiting signs of declining health believed to be resulting from initial injury (e.g., a marked skin discoloration, fat loss)	SI ³	
S2	Ingested gear ⁴ or hook(s)	SI	
S3	Visible blood loss	Case specific ⁵	Amount of blood, location of the bleeding injury, duration of bleeding
S4	Animal brought on vessel deck following entanglement/entrapment (excluding scientific research targeting marine mammals and authorized as such under a NMFS scientific research permit, where the animal is brought on and placed on the vessel deck in a controlled manner)	SI	
S5a	Hook(s) in head (excluding criterion S5b), regardless of the presence of gear	SI	
S5b	Hook(s) confirmed in lip only, external tissue outside of teeth, no trailing gear	Case specific	Prolonged restraint or struggle that could lead to capture myopathy, size of hook, depth of hooking, impairing ability to feed, presence of other injuries
S5c	Hook(s) in any body part, but hook(s) is removed or pulls out	Case specific	Prolonged restraint or struggle that could lead to capture myopathy, depth of hook, hook pulls out cleanly vs. causes further injury during dehooking, method used to remove hook, length of time hooked
S5d	Hook(s) in appendage or body (excluding criterion S5a), without trailing gear or with trailing gear that does not have the potential ⁶ to: 1) become a constricting wrap on animal; 2) be ingested; 3) accumulate drag; or 4) become snagged on something in the environment, anchoring the animal	Case specific	Prolonged restraint or struggle that could lead to capture myopathy, depth and location of hook, type and amount of gear attached
S6	Gear attached to free-swimming animal with potential ⁷ to: 1) become a constricting wrap on animal; 2) be ingested; 3) accumulate drag; or 4) become snagged on something in the environment, anchoring the animal	SI	

S7a	Anchored, immobilized, or entrapped and not freed	SI	
S7b	Anchored, immobilized, entangled, or entrapped before being freed without gear attached	Case specific	Duration of entanglement/entrapment, prolonged restraint or struggle that could lead to capture myopathy, gear type, where/how gear is attached to animal, associated injury (i.e., where directly or indirectly caused by initial entanglement), response of individual animal, method used by human to remove gear from animal
S8a	Gear wrapped and constricting on any body part or is likely to become constricting as the animal moves or grows	SI	
S8b	Gear wrapped and loose on any body part	Case specific	Gear type, amount of gear, potential for snag, potential to lead to criterion S8a, animal body size relative to gear (e.g., because of species or age), effect on animal movement, species sensitivity (e.g., frightens easily)
S9	Body trauma ⁸ not covered by any other criteria	Case specific	Location of wound, depth (e.g., superficial or to the bone, penetrating muscle or organs), length, number of lacerations, cleanliness (i.e., compression vs. tearing)
S10	Visible fracture(s), excluding pectoral fins (see criterion S13d for pectoral fin fractures)	SI	
S11	Vertebral transection, including fully severed flukes	SI	
S12	Body cavity penetration ⁹ by foreign object or body cavity exposure	SI	
S13a	Loss or disfigurement of dorsal fin	Case specific	Cleanliness (i.e., compression vs. tearing), nature of injury causing the loss, extent of fin loss (i.e., full or partial), amount and duration of blood loss
S13b	Partially severed flukes, transecting midline	SI	
S13c	Partially severed flukes, not transecting midline	Case specific	Cleanliness (i.e., compression vs. tearing), nature of injury causing the loss, amount and duration of blood loss
S13d	Partially or completely severed or fractured pectoral fin(s)	Case specific	Cleanliness (i.e., compression vs. tearing), nature of injury causing the loss, extent of fin loss (i.e., full or partial), amount and duration of blood loss, opened or closed fracture
S14	Social animal separated from group and/or released alone post-interaction (excluding criterion S15)	Case specific	Species (e.g., sensitivity, offshore vs. inshore), location of release (e.g., likelihood of animal locating its conspecifics)

S15	Dependent animal (i.e., calf, juvenile) released alone post-interaction or dependent animal left with a seriously injured or dead mother	SI	
S16	Observed or reported collision with vessel	Case specific	Speed of vessel, size of vessel, hull shape, part of vessel to strike the animal, size of animal compared to size of vessel, behavior of animal after collision, extent and location of wound(s) on animal

* ¹ For the purposes of this table, small cetaceans include all odontocetes except sperm whales.

* ² This table includes only those criteria determined to be serious injuries or case specific based on expert opinion at the 2007 Workshop (Andersen *et al.*, 2008) and by small cetacean experts on the NMFS Determination Staff working group. For the purposes of streamlining the information for the reader, criteria determined to be non-serious injuries are not included in this table.

* ³ SI = serious injury.

* ⁴ For the purposes of this table, gear is defined as any portion of fishing gear excluding the hook, which is considered separately. Lures are considered gear. Gear also generally refers to any type of debris entangling or attached to the animal.

* ⁵ Case specific = Could be a serious or non-serious injury, but either 1) there is insufficient information about the impact of a particular injury, or 2) additional factors must be considered on a case-by-case basis to determine the severity

* ⁶ For the purposes of this table, “potential” as it relates criterion S5d indicates that the trailing gear IS NOT capable of leading to any of the situations listed.

* ⁷ For the purposes of this table, potential as it relates criterion S6 indicates that the trailing gear IS capable of leading to any of the situations listed.

* ⁸ For the purposes of this table, “trauma” is defined as a wound or bodily harm caused by an extrinsic agent. Blunt trauma is an injury (abrasion, laceration, contusion or skeletal fracture) produced by a blunt object striking the body or impact of the body against a blunt object or surface. Sharp force trauma is an injury caused by a sharp or pointed object creating a penetrating (stab, chop or incision) wound.

* Laceration is defined as a ragged incision or a tearing of the skin. Lacerations are caused by blunt trauma that results in stretching, tearing, crushing, shearing, or avulsion of the tissue.

* ⁹ For the purposes of this table, “penetration” is defined as a wound occurring when a foreign object punctures the body. Penetrating wounds can be characterized as one of three types: stab (small external wound that is greater in length into the body than is apparent on the skin surface), incised (clean cuts into the skin which are longer on the skin surface than they are deep), or chop wounds (incised wounds that penetrate deep to the bone, leaving a groove or cut in the bone).

Table 3: Summary of Pinniped¹ Injury Categories and Criteria

Instructions: Each pinniped injury event is recorded to the appropriate injury/information category using all available information and scientific judgment, as described in the Procedural Directive. For a single injury event to which several categories apply, the injury determination with the highest level of severity is assigned. More detailed information or extended observation on an individual case/animal may justify a determination differing from the guidance of this table. Any injury leading to apparent significant health decline (e.g., skin discoloration, fat loss) is a serious injury.			
Category	Injury/Information	Injury Determination ²	Additional factors for evaluating whether “case specific” injuries are serious or non-serious (additional factors at end of table)
P1	A free-swimming animal observed at a date later than its human interaction, exhibiting signs of declining health believed to be resulting from initial injury (e.g., a marked change in body condition, tissue necrosis, emaciation, gangrene).	SI ³	
P2	Ingested gear ⁴ or hook(s)	SI	
P3	Visible blood loss	Case specific ⁵	Amount of blood, location of the bleeding injury, duration of bleeding
P4	Animal brought on vessel deck following entanglement/entrapment (excluding scientific research targeting marine mammals and authorized as such under a NMFS scientific research permit, where the animal is brought on and placed on the vessel deck in a controlled manner)	Case specific	Manner in which animal is brought on deck, length of time animal is on deck, environmental conditions (e.g., temperature)
P5a	Hook(s) in mouth (excluding criterion P5b), regardless of the presence of gear	SI	
P5b	Hook(s) confirmed in head (excluding criterion P5a), or in lip only (external tissue outside of teeth), no trailing gear	Case specific	Location on head (e.g., eye), depth of penetration, type of hook, prolonged restraint or struggle that could lead to capture myopathy, size of hook, impairing ability to feed
P5c	Hook(s) in any body part, but hook(s) is removed or pulls out	Case specific	Prolonged restraint or struggle that could lead to capture myopathy, location of hooking on the body, depth of hook, hook pulls out cleanly vs. causes further injury during dehooking, method used to remove hook, length of time hooked
P5d	Hook(s) in appendage or body (excluding criteria P5a-c and P12), without trailing gear or with trailing gear that does not have the potential ⁶ to: 1) become a constricting wrap on animal; 2) be ingested, 3) accumulate drag; or 4) become snagged on something in the environment, anchoring the animal	NSI ⁷	

P6	Gear attached in any manner to free-swimming animal with potential ⁸ to: 1) become a constricting wrap on animal; 2) be ingested; 3) accumulate drag; or 4) become snagged on something in the environment, anchoring the animal	SI	
P7a	Anchored/immobilized and not freed	SI	
P7b	Anchored, immobilized, or entangled before being freed without gear attached	Case specific	Duration of entanglement, prolonged restraint or struggle that could lead to capture myopathy, type of fishing gear, where/how gear immobilized animal, associated injury (where directly or indirectly caused by initial entanglement), response of individual
P8a	Gear wrapped and constricting any body part or likely to become constricting as the animal moves or grows	SI	
P8b	Gear wrapped loosely on any body part	Case specific	Type and amount of fishing gear, animal body size relative to gear (species, age), effect on movement, species sensitivity
P9	Body trauma ⁹ not covered by any other criteria	Case specific	Location of trauma on body, depth (superficial or to the bone, penetrating muscle or organs) length of laceration(s), number of lacerations, cleanliness (compression vs. tearing), amount and duration of blood loss, risk of infection or disease transmission (e.g., dog bites)
P10	Visible fracture(s), excluding broken appendages (see criterion P13 for broken appendages)	SI	
P11	Vertebral transection or fully severed flipper(s)	SI	
P12	Body cavity penetration ¹⁰ by foreign object or body cavity exposure	SI	
P13	Partially severed or fractured flipper(s)	Case specific	Cleanliness (clean cut vs. tear), nature of injury causing the loss, extent of fin or flipper loss, opened or closed fracture, dislocation, amount/duration of blood loss
P14	Dependent animal (i.e., pup, juvenile) released alone post-interaction or dependent animal left with a seriously injured or dead mother	SI	
P15	Observed or reported collision with vessel	Case specific	Speed of vessel, size of vessel, hull shape, part of vessel to strike the animal (e.g., propeller, hull), size of animal compared to size of vessel, location of strike on animal's body, extent and location of wound(s) to animal

¹ For the purposes of this table, pinnipeds include all pinniped species except walrus.

² This table includes on only those criteria determined to be serious injuries or case specific based on expert opinion at the 2007 Workshop

(Andersen *et al.*, 2008) and by pinniped experts on the NMFS Determination Staff working group. For the purposes of streamlining the information for the reader, criteria determined to be non-serious injuries are not included in this table.

³ SI = serious injury.

⁴ For the purposes of this table, gear is defined as any portion of fishing gear excluding the hook, which is considered separately. Lures are considered gear. Gear also generally refers to any type of debris entangling or attached to the animal.

⁵ Case specific = Could be a serious or non-serious injury, but either 1) there insufficient information about the impact of a particular injury, or 2) additional factors must be considered on a case-by-case basis to determine the severity.

⁶ For the purposes of this table, potential as it relates to criterion P5d indicates that the trailing gear IS NOT capable of leading to any of the situations listed.

⁷ NSI = non-serious injury.

⁸ For the purposes of this table, potential as it relates to criterion P6 indicates that the trailing gear IS capable of leading to any of the situations listed.

⁹ For the purposes of this table, “trauma” is defined as a wound or bodily harm caused by an extrinsic agent. Blunt trauma is an injury (abrasion, laceration, contusion or skeletal fracture) produced by a blunt object striking the body or impact of the body against a blunt object or surface. Sharp force trauma is an injury caused by a sharp or pointed object or a bullet from a gunshot creating a penetrating (stab, chop or incision) wound. Laceration is defined as a ragged incision or a tearing of the skin. Lacerations are caused by blunt trauma that results in stretching, tearing, crushing, shearing, or avulsion of the tissue.

¹⁰ For the purposes of this table, “penetration” is defined as a wound occurring when a foreign object punctures the body, such as a bullet from a gunshot. Penetrating wounds can be characterized as one of three types: stab (small external wound that is greater in length into the body than is apparent on the skin surface), incised (clean cuts into the skin which are longer on the skin surface than they are deep), or chop wounds (incised wounds that penetrate deep to the bone, leaving a groove or cut in the bone).

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The mission of NOAA's National Marine Fisheries Service (NMFS) is "stewardship of living marine resources for the benefit of the nation through their science-based conservation and management and promotion of the health of their environment." As the research arm of the NMFS's Northeast Region, the Northeast Fisheries Science Center (NEFSC) supports the NMFS mission by "conducting ecosystem-based research and assessments of living marine resources, with a focus on the Northeast Shelf, to promote the recovery and long-term sustainability of these resources and to generate social and economic opportunities and benefits from their use." Results of NEFSC research are largely reported in primary scientific media (*e.g.*, anonymously-peer-reviewed scientific journals). However, to assist itself in providing data, information, and advice to its constituents, the NEFSC occasionally releases its results in its own media. Currently, there are three such media:

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