

# Large Whale Ship Strike Database

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## **Acknowledgments**

We recognize the work of those in the field, notably members of the marine mammal stranding network, some of whom are listed on the first page. Much information on ship strikes to large whales would not be available were it not for the dedication and expertise of those who assess the condition of stranded and floating dead animals and maintain these data. Our appreciation also to the efforts of the many NOAA Fisheries staff who searched out ship strike records in response to a request for data. David Laist and colleagues' Marine Mammal Science paper on collisions between whales and ships was an invaluable source for ship strike records and provided a significant portion of reports in this database, as was the work by Peter Best and others on the same subject. Finally, the authors recognize those conscientious mariners who willingly report strike occurrences and communicate the details of such incidents to marine mammal protection agencies and organizations. Donna Wieting encouraged us to undertake this work and helped provide the time for us to complete it.

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## **Introduction**

Some human-related threats to endangered large whale species are diminishing, and a number of large whale populations are increasing in abundance. However, injuries and deaths resulting from ship collisions with whales remain a significant threat. In North Atlantic right whales, for example, ship strikes are a primary culprit in the slowed recovery of a highly depleted population.

Several papers provide accounts of mortality in large whales due to ship strikes (Laist et al., 2001; Best et al., 2001; Knowlton and Kraus, 2001). These papers review ship strike records through 2000, 1997 and 1999, respectively. We have built on these accounts by assembling a data base of all known ship strikes worldwide through 2002; a number of our records do not appear in previous accounts. Likely, many ship strikes go undetected or unreported as they may occur in remote areas or struck whales may drift out to sea. Thus, the actual number of strikes is undoubtedly much greater than reported here. Nonetheless, the information we provide is, to our knowledge, the most comprehensive set of data to date on this subject. In the geographic scope and in the range of species effected, the data base illustrates the extent of the threat to large whale species.

The intention of this report is to make accessible the known information on ship strikes to large whales world-wide. We have not attempted to provide an extensive analysis of such records herein, as a thorough discussion of a number of these records can be found in Laist et al. (2001). Rather, we have synthesized ship strike reports to large whales into a comprehensive database to

centralize the knowledge base of such incidents. These records indicate that collisions between whales and ships are a world-wide phenomenon which warrants attention.

## **Materials and Methods**

This database is based on a public request for information that NOAA Fisheries received for large whale ship strike records from 1975 to present (2002). Agency staff from NOAA Fisheries' Northeast, Southeast, Northwest, Southwest, Alaska, and Hawaii Fisheries Science Centers and Regional Offices contributed records to this report. In addition, NOAA Fisheries Office of Law Enforcement regional offices provided records of ship strike based on agency investigations (pending cases excluded). Many agency staff worked to the best of their abilities to fulfill this request, but it is possible that some records were overlooked and thus are not included.

In compiling this database, records of ship strikes were drawn from ship reports, marine mammal stranding reports, and NOAA Office of Law Enforcement reports. Following the initial set of data received, additional ship strike records were sought for the purposes of this synthesis through personal communications and a review of the literature on this issue (in particular, Laist et al., 2001; Best et al., 2001). Our records include information through October 2002.

Direct reports from ships, crew and captains are the most reliable source of information on an actual ship strike incident. In these cases, wherein the ship's crew was aware of

the strike, it is often possible to obtain information on ship speed, damage to a ship, and relative degree of severity of the strike to the animal. Ship strike information can also be determined from stranded or floating dead whales in which definitive evidence of a massive internal or external trauma is documented (i.e., lacerations from propellers, fractures, hemorrhaging). However, these data are not always definitive as to whether the strike occurred pre- or post-mortem. In such cases, there generally is no information on how, when, or where the strike actually occurred. A dead stranded whale may drift considerable distance from the site of the actual impact. In the absence of a confirmed location for a ship strike incident, we have listed the site of stranding or site of discovery of the floating animal as the collision location in our database.

Another type of record is the occurrence of a ship entering port with a whale carcass draped across its bow. Generally, in these instances the ship's crew was unaware of the strike. Most often this occurs with large container, tanker and cruise ships, and a collision is only determined after the event when the whale is noticed pinned to a ship's bow by a pilot boarding the vessel or lookouts posted for harbor entry. In 42 of the known or probable cases of ship strike in our database, evidence of a collision was only noticed when a whale was brought into harbor on the bow of a large vessel. In certain rare instances, time and location of impact can be estimated by back-calculating to correlate with a previously unexplained decrease in vessel speed.

Given that crew of large vessels often do not detect the impact of striking a whale, animals may be hit and passed over without observation. Likewise, operators may be aware of a strike but choose not to report it. Therefore, as noted above, it is likely that far

more collisions actually have occurred than the number reported here.

For the purposes of this report, evidence of injury or mortality is defined as blood noted in water; animal seen with cuts, propeller gashes or severed tailstock; animal observed sinking after strike indicating death; fractured skull, jaw, vertebrae; hemorrhaging, massive bruising or other injuries noted during necropsy of animal.

## **Results**

The data base contains a total of 292 records of confirmed or possible ship strikes to large whales (Table 1). Where available, we have noted ancillary information such as vessel type, extent of injury, and vessel speed at time of impact.

### ***Ship Strikes by Species***

Eleven species were confirmed victims of ship strikes: blue, Bryde's, finback, gray, humpback, killer, minke, North Atlantic right, sei, southern right, and sperm whales (Figure 1). Finback whales are the most often reported species hit (75 records of strike), followed by humpback (44 records), North Atlantic right (38 records), gray (24 records), minke (19 records), southern right (15 records), and sperm whales (17 records). Far fewer reports exist of strikes to blue (8 records), Bryde's (3 records), sei (3 records) and killer whales (1 record). Several collision incidents were identified as general balaenopterid (3 records of strike), while a large proportion of reported strikes were not identified to species (42 unknown records). We note that coastal species (e.g., right and humpback whales) may be over represented in our data base, due to a greater likelihood of near-shore detection of a ship struck carcass than individuals that may have died

at great distances from shore.

### ***Geographic Distribution of Strikes***

Ship strikes to large whales occur world-wide. In our records (and those compiled by others), large whale ship strikes were recorded in waters off Antarctica, Australia, Brazil, Canada, the Canary Islands, France, Japan, Mexico, New Zealand, Panama, Peru, Puerto Rico, and South Africa; in the Caribbean, Mediterranean, and Yellow Seas; and in the Indian and South Pacific Oceans. Our records indicate that ship strikes are most common in North America (Figure 2), but this is almost certainly biased due to sources of data from North American stranding records and enforcement reports. This finding may also be related to the volume of ship traffic along North American coasts. Furthermore, our (the authors) northern hemisphere location increases the likelihood that we learn of reports from North America more readily than elsewhere.

Collision incidents in waters off the United States are recorded from almost every coastal state: Alaska, California, Delaware, Florida, Georgia, Hawaii, Maine, Maryland, Massachusetts, New Jersey, New York, North Carolina, Oregon, Rhode Island, South Carolina, Texas, Virginia, and Washington. Collisions also occurred in three National Marine Sanctuaries (NMS): Stellwagen Bank NMS (humpback, fin, and right whales), Channel Islands NMS (gray and several unidentified whales), and the Hawaiian Islands Humpback Whale NMS (humpback whales).

Records indicate that collisions between vessels and whales in U.S. waters are most common along the east coast, followed by the west coast and Alaska/Hawaii (Figure 3). Collisions were least common in the Gulf of Mexico.

### ***Severity of Strike***

Of the total 292 large whale ship strike reports, 48 (16.4%) resulted in injury to the animal and 198 (68.0%) were fatal. Thus, a total of 246 (84.3%) records indicate that whales that were hit or bear evidence of ship strike were in fact injured or killed by the interaction (Figure 4). In most cases the fate of injured whales is not known. Additionally, in 39 collision reports (13.3%), the impact to the whale was unknown, while in 7 reports (2.4%) there appeared to be no sign of injury.

It should be noted that the high injury and mortality figures for all whales in the database include numerous records of stranded or floating animals found dead. Injuries on a whale's dorsal side indicate that the animal was alive when hit, as dead whales generally float belly-up and are thus more likely to be injured ventrally if hit post-mortem. Although strong evidence indicates ship strike in the records included in this database (i.e., propeller marks, bruises, fractures, hemorrhaging, severed flukes), fatalities due to ship strike cannot always be confirmed because it is difficult or impossible to determine in some of these cases whether the strike occurred to the animal pre- or post-mortem. In addition, because many of our records come from dead stranded whales (as opposed to reports from mariners involved in or observing the striking), the database is weighted toward ship strikes resulting in death.

### ***Vessel Type***

Collisions between ships and whales are associated with a wide variety of vessel types. From our database, 134 of 292 cases of ship strike include information on vessel type, while in 158 cases the type of ship was

unknown. Of the 134 cases of known vessel type, there are 23 reported incidents (17.1%) of Navy vessels hitting whales, 20 reports (14.9%) of ship strike for container/cargo ships/freighters, 19 (14.2%) reports of ship strike for whale-watching vessels, and 17 reports (12.7%) for cruise ships/liners (Figure 5). Sixteen reports of ship strike (11.9%) are attributed to ferries. Nine cases of ship strike (6.7%) are reported for Coast Guard vessels and eight cases (6.0%) for tankers.

Recreational vessels and steamships were each responsible for seven collisions (5.2%) in the database, while fishing vessels were responsible for four records (3.0%) of strike. One collision (0.75 %) was reported from each of the following: dredge boat, research vessel, pilot boat, and whaling catcher boat.

Although these data provide valuable information regarding the wide range of vessels involved in collisions, care should be taken in interpreting these numbers. As noted earlier, captains of large ships, such as container ships, tankers, and cruise ships may not be aware that a collision with a whale has occurred and thus do not report the incident. It is also likely that captains of ships of all sizes who are under no obligation to report, in fact, do not, out of apathy or fear of enforcement consequences.

It should be carefully noted that the relatively high incidence of Navy and Coast Guard collision reports may be largely a factor of standardized military and government reporting practice rather than an actual higher frequency of collisions relative to other ship types. These two federal agencies are actively involved in large whale protection programs and reporting struck or dead whales to the National Marine Fisheries Service is now a part of standard operating practices.

### ***Ship Speed***

Vessel speed at the time of strike was reported for 58 (19.8%) of the 292 cases in our database (Figure 6). The range of speeds at which vessels were operating when a whale was hit was 2–51 knots; and the mean speed was 18.1 knots. The mean vessel speed which resulted in injury or mortality to the whale was 18.6 knots. Of the 58 cases, 19 (32.8%) resulted in injury to the whale and 20 (34.5%) resulted in mortality. Thus, a total of 39 incidents of ship strike (67.2%) with speed associated are known to have resulted in injury or mortality to the animal. When all 58 reports are grouped by speed, most vessels were traveling in the ranges of 13–15 knots, followed by speed ranges of 16–18 knots and 22–24 knots.

### ***Vessel Damage and Mariner Safety***

Thirteen records indicate damage to the vessel (as reported by the vessel), ranging from minor to extreme, as a result of impact with a whale. All of the incidents of vessel damage for which speeds were recorded were from collisions at an operating speed equal to or greater than 10 knots.

Many of these ships report cracked hulls or damaged propellers, propeller shafts and rudders. In one case, an 8 m recreational Bayliner traveling at 12 knots cracked its hull when it hit a humpback whale outside Juneau, Alaska. A 126 m Navy vessel sustained a 1.6 m tear in the leading edge of a propeller blade when it struck an undetermined whale species off southern California. By far the most extreme example was that of a 24 m high-speed Navy vessel, which hit an undetermined whale species at a speed over 40 knots off Key West, Florida, and reported severely damaged port and starboard aft strut actuators, broken steering arms, a warped

hull, and ruptured seawater piping which flooded the gas turbine (pers. comm. T. Tucker in Laist *et al.* 2001).

In addition to vessel damage, ship strikes to large whales can also pose a hazard to human safety. In several cases, particularly with small vessels and fast-moving vessels (e.g., ferries), passengers have been knocked off their feet or even thrown from the boat upon impact with a whale. Hazards can be even more severe; Andre *et al.* (1997) in Laist *et al.* (2001) reports a case in the Canary Islands in which a high-speed ferry collided with a sperm whale at 45 knots, killing it and reportedly killing one passenger as well.

## **Discussion**

Many ship strike fatalities almost certainly go undetected, so our database provides a minimum count of such occurrences. In fact, our records may represent only a fraction of the actual number of strikes. Nonetheless, they illustrate the scope and magnitude of the threat of ship strikes to endangered large whale species.

Ship strikes affect at least ten large whale species. Given the low abundance of North Atlantic right whales relative to other species, the frequency of occurrence of ship strikes to right whales suggests that the threat of ship strikes is proportionally greater to this species.

Ship strikes occur in all oceans and off nearly all continents. The small number of collision records from areas outside the United States is undoubtedly due to the much reduced likelihood that such strikes were made known to us. The geographic distribution of our records from North America may, in part, be attributed to the disproportionate amount of collision reporting among different regions,

as well as a function of high shipping traffic volume in some locations. All vessel classes are represented in our database, but it appears generally that relatively large and relatively fast moving vessels are most often involved.

For a variety of reasons, certain vessel classes are likely over-represented in our data. As noted, federal vessels are more likely to report a strike than commercial vessels due to their standardized reporting practice. In addition, awareness that an animal has been struck may depend upon the number of people on board. Federal ships carry substantial crew, a number of whom are generally on the bridge at any one time (bridge crew on Navy vessels often consists of a half dozen individuals or more). Such crews are more likely to spot a whale and/or register that a collision has occurred than a container ship or tanker with only one or two individuals at the helm. This may also be true for whale watch vessels that have passenger witnesses on board, and thus are more apt to report strikes than those vessels for which a collision may not be witnessed by parties other than captain and crew.

Numbers of ship strike reports in our database that appear high for Navy and Coast Guard vessels may also be factor of size and vessel configuration. A ship must register that a whale has been struck in order to report the incident. Most federal ships are smaller than those used for commerce and thus register impact when large ships may not (i.e., a 10,000 ton Naval ship has a greater likelihood of recognizing that a collision has occurred than does a 40,000 ton container ship). Smaller vessels are also more likely to notice collisions by nature of the location of a forward bridge. The bridges of tankers and container ships are generally located hundreds of feet aft and are high above the water; this can result in a line

of sight well beyond the bow that obscures the direct view in the immediate path of the vessel.

Finally, reporting may also be a factor of geography. Navy operations, for example, are often conducted along continental shelf areas, in the same regions where large whale species are likely to aggregate in pursuit, for example, of prey concentrated there. Thus, the frequency of these reports may be more a factor of geographic overlap than vessel class or mariner behavior. The same is likely true for whale watching vessels which are generally the only vessel class in the vicinity of whales expressly because the whales are there.

Figures reported here for death and injury to whales as a result of ship strike may not accurately reflect the true results of impact. Death as a result of a strike was much more common than injury in our database, but this could be an artifact of most records originating with dead/stranded whales. Likewise, records may not indicate the final condition or status of an injured whale. As an example, if an animal was seen bleeding after impact, dove and was not re-sighted, it was classified as an 'injury' in our database. The whale, in fact, may have died subsequently from the injury, but a lack of information in such cases prevents a final assessment of collision impact. In any case, death or injury, such impacts are capable of delivering significant trauma to the animal.

The factors that contribute to ship strikes of whales are not clear, nor is it understood why some species appear more vulnerable than others. Nonetheless, the number of known ship strikes indicate that deaths and injuries from ships and shipping activities remain a threat to endangered large whale species, right whales in particular. We believe the compilation and presentation of these data

will help in defining measures to reduce the incidence of such occurrences.

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In an effort to use this database as an effective tool in its protection and stewardship of marine mammals, NOAA Fisheries intends to continue adding to the existing information contained in this report as additional ship strike incidents occur. If you have data to contribute relating to a large whale ship collision, please contact:

Large Whale Conservation and Recovery Program *or*  
Marine Mammal Health and Stranding Program  
Office of Protected Resources  
National Marine Fisheries Service  
1315 East-West Highway  
Silver Spring, MD 20910  
301-713-2322



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Knowlton, A.R. and S.D. Kraus. 2001. Mortality and serious injury of northern right whales (*Eubalaena glacialis*) in the western North Atlantic Ocean. J. Cetacean Res. Manage. (Special Issue) 2:193-208.

Laist, D.W., A.R. Knowlton, J.G. Mead, A.S. Collet and M. Podesta. 2001. Collisions between ships and whales. Marine Mammal Science, 17(1):35-75.

Figure 1. The occurrence of ship strikes in eleven whale species.

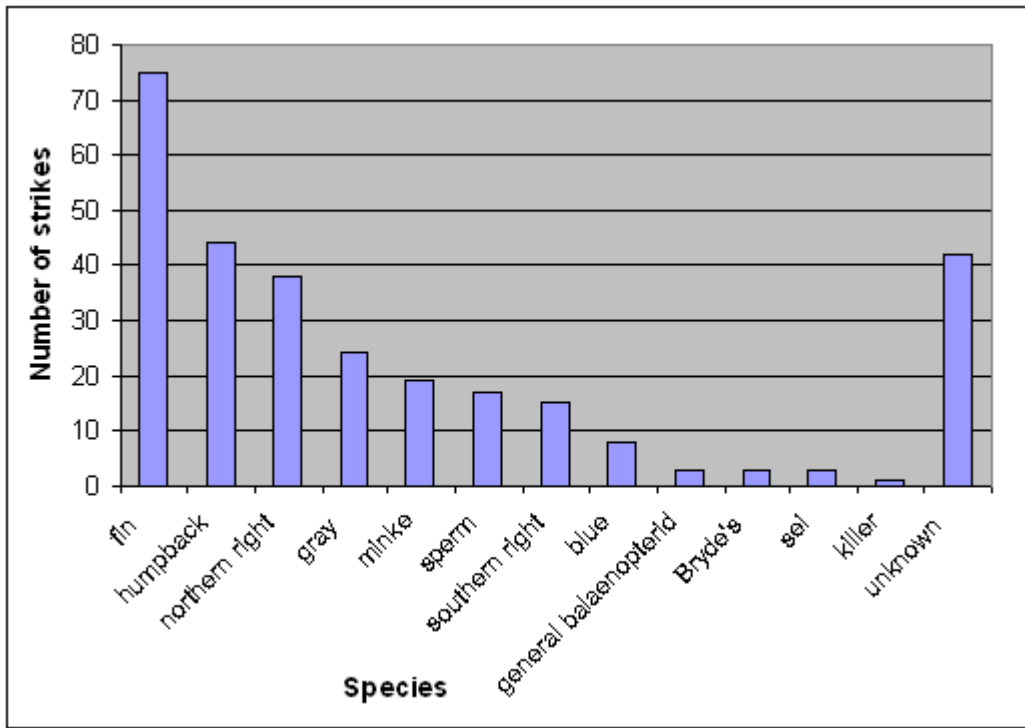


Figure 2. The geographic distribution of ship strikes to large whales world-wide.

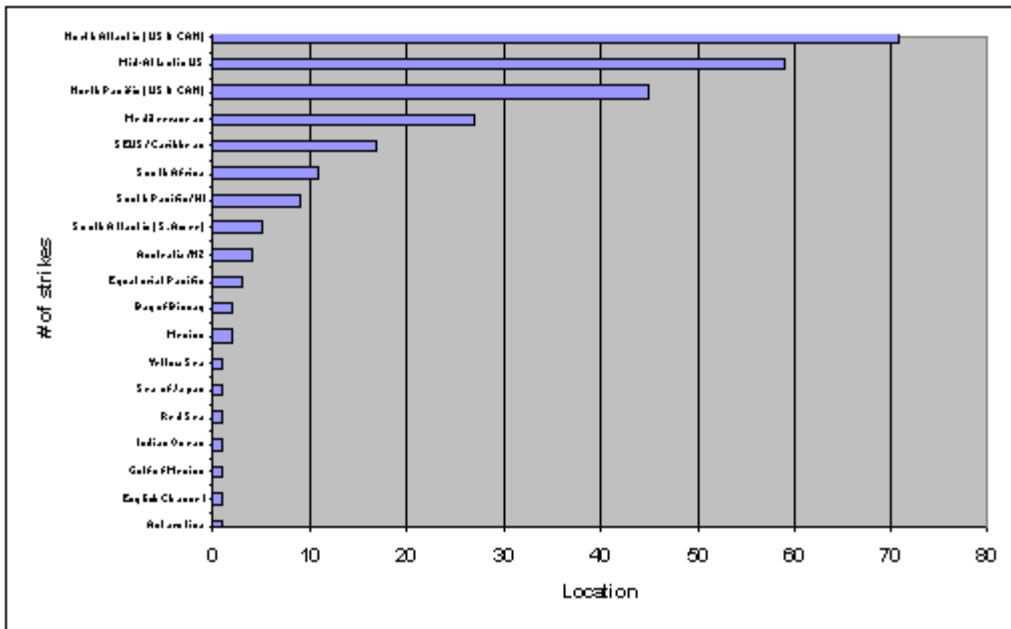


Figure 3. Distribution of vessel strikes to large whales in North America.

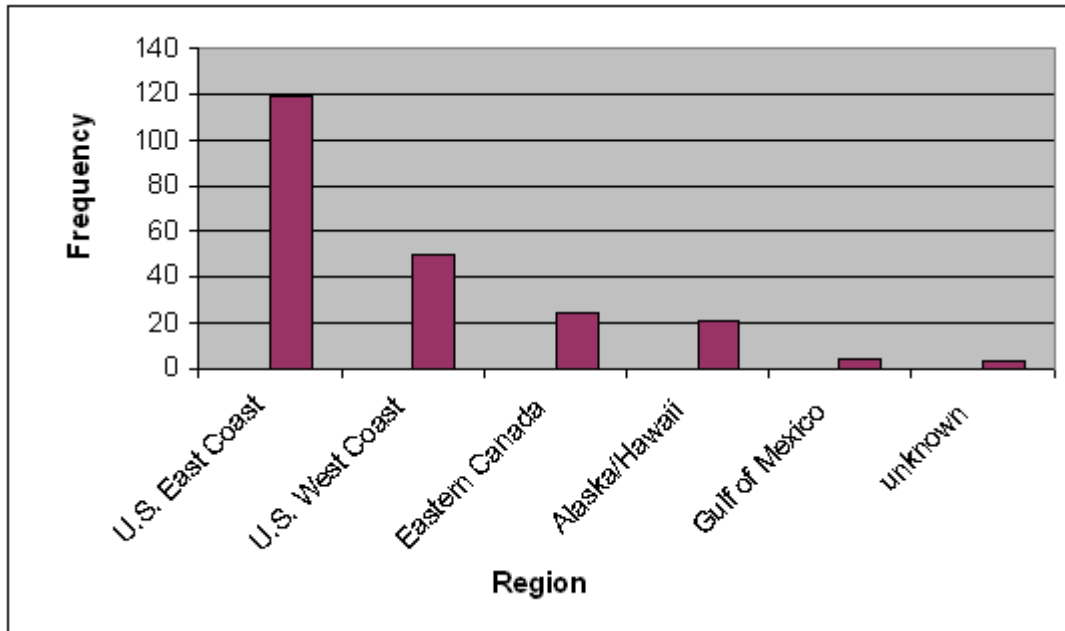


Figure 4. Result of ship strike to large whales.

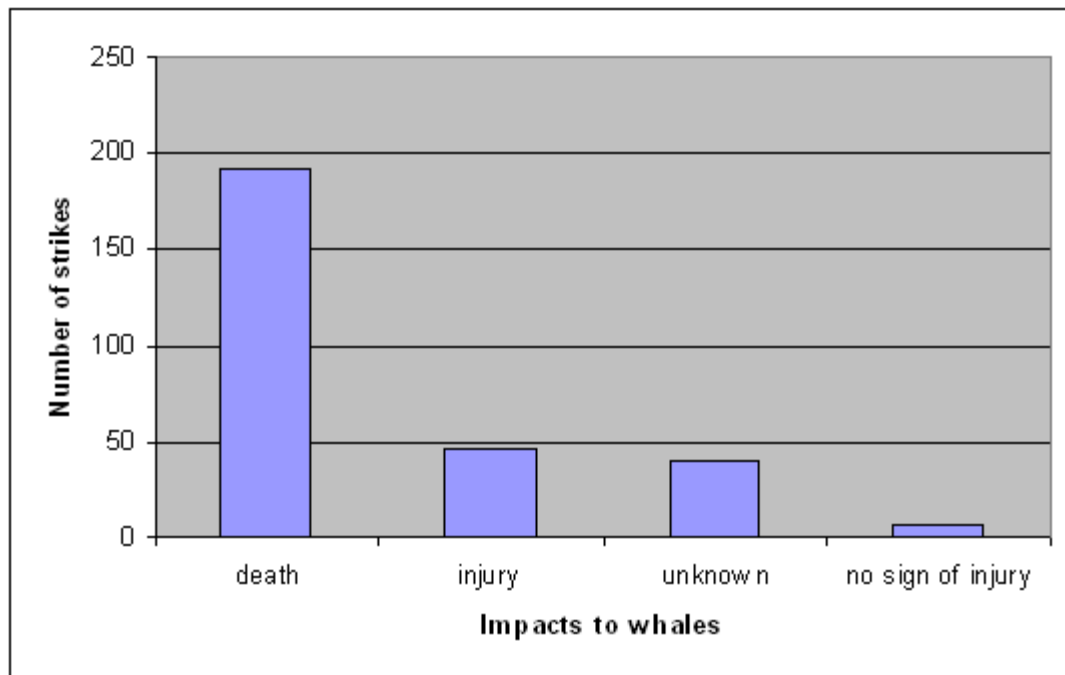
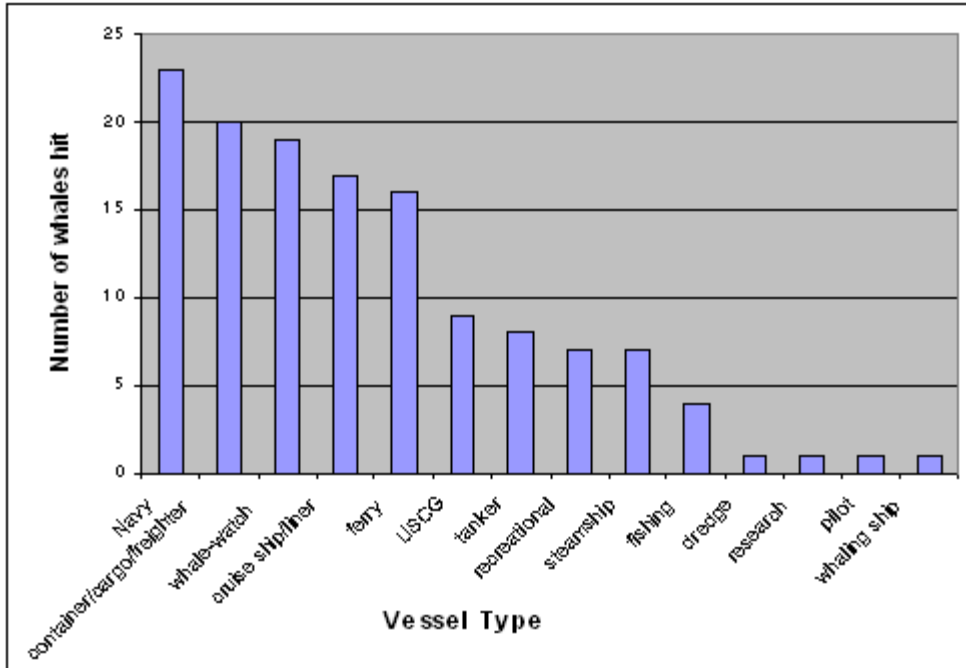
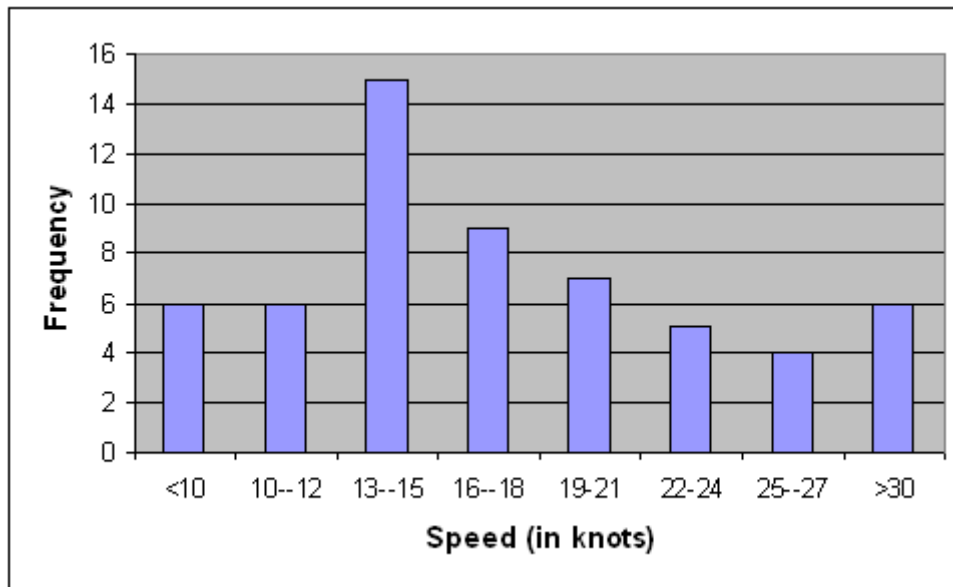


Figure 5. Types of vessel involved in collisions with large whales (where vessel type is reported).



**Note:** The high occurrence of Navy reports may reflect military and government reporting practice rather than an actual higher frequency of collisions relative to other ship types. Reporting struck or dead whales to NOAA Fisheries is now a part of standard operating practices for Navy and USCG.

Figure 6. The frequency of occurrence of ship speed in ship strike incidents in which ship speed was known.



**Source codes and abbreviations for ship strike spreadsheet records:**

\* = from *Laist et al.* 2001

BO = NOAA Fisheries Biological Opinion

IML = Institute de la Mer et du Littoral, La Rochelle, France

kts = knots

MMC = Marine Mammal Commission

NEFSC = NOAA Fisheries Northeast Fisheries Science Center

nm = nautical miles

NMS = National Marine Sanctuary

NP = National Park

NWFSC = NOAA Fisheries Northwest Fisheries Science Center

NWR = National Wildlife Refuge

OLE = NOAA Fisheries Office of Law Enforcement

SICDD = Smithsonian Institute Cetacean Distributional Database

USCG = U.S. Coast Guard

Vessel names available upon request.

**NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales**

| Date                 | Species          | Sex | Length (m) | Location (where struck, if known; if not, where found )      | Coordinates       | Mortality/ Injury | Field ID |
|----------------------|------------------|-----|------------|--|-------------------|-------------------|----------|
| <b>US East Coast</b> |                  |     |            |  |                   |                   |          |
| 02/08/02             | humpback         |     |            | Cape Henry, VA   |                   | mortality         |          |
| 10/04/01             | humpback         |     |            | Approx. 5 nm NW of Stellwagen Bank, MA                       |                   | injury            |          |
| 06/29/01             | minke/small sei  |     | 7.6        | 30 nm southeast of Cape Cod, inbound Boston traffic lane, MA | 41-30N, 069-27.5W | mortality         |          |
| 03/17/01             | right            |     |            | Assateague Is, VA  |                   | mortality         |          |
| 02/01/01             | finback          |     |            | Port Elizabeth, NJ Berthing Channel                          |                   | mortality         |          |
| 01/02/01             | finback          |     |            | New York Harbor  |                   | mortality         |          |
| 12/11/00             | finback          | F   | 10.8       | New York Harbor  |                   | mortality         |          |
| 12/04/00             | humpback         | M   | 8.5        | 0.5 nm offshore Cape Lookout, NJ                             |                   | mortality         |          |
| 07/29/00             | humpback         |     |            | Stellwagen Bank NMS, MA                                      |                   | unknown           |          |
| 05/16/00             | sperm            |     |            | Block Canyon, NJ   | 39-45N, 71-07W    | unknown           |          |
| 05/14/00             | humpback         |     |            | Stellwagen Bank NMS, MA                                      |                   | unknown           |          |
| 11/06/99             | finback          |     |            | Port Elizabeth, NJ   |                   | mortality         |          |
| 06/23/99             | minke            |     | 6 est      | Near reserve channel, Boston Harbor, MA                      | 42-19.8N, 70-60W  | mortality         |          |
| 04/20/99             | right (Staccato) | F   | 13.7       | 6 miles N of Griffin Island, Wellfleet, MA                   | 41-54.3N, 70-9.7W | mortality         |          |
| 02/10/99             | finback          | M   | 15.5       | False Cape State Park, VA                                    | 36-47N, 75.5W     | mortality         |          |
| 12/12/98             | minke            |     |            | Cape Cod Bay, MA   |                   | injury            |          |
| 10/07/98             | right            |     |            | NC/VA state line   |                   | mortality         |          |
| 09/12/98             | minke            |     | 6          | Barnstable, MA   |                   | mortality         |          |
| 08/02/98             | humpbacks        |     |            | Stellwagen Bank NMS, MA                                      |                   | unknown           |          |
| 06/07/98             | 2 humpbacks      |     |            | Boston Harbor, MA  |                   | unknown           |          |
| 05/24/98             | minke            |     |            | 6 nm N of Race Pt, MA  | 42-14N, 70-10W    | injury            |          |
| 03/21/98             | finback          |     |            | Approx. 7.5 nm off Cape Henry, VA                            | 36-5N, 75-48W     | mortality         |          |
| 03/21/98             | finback          | F   | 16.9       | Salvo, NC  | 35-28.4N, 75-29W  | mortality         |          |

**NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales**

| Vessel Type           | Vessel Size(m) | Speed (kts) | Vessel Damage | Source      | Comments   |
|-----------------------|----------------|-------------|---------------|-------------|--|
|                       |                |             |               |             |  |
|                       |                |             |               | OLE report  |  |
| whale-watch vessel    |                | 11.7        |               | NEFSC       | animal came up under keel of vessel, abrasion 1.5 ft long by 1 in wide seen anterior to dorsal fin                   |
| Navy                  | 253            | 15          | N             | ship report | crew heard impact and felt shudder, gray and white whale observed lodged on bow, whale sank after ship backed up     |
|                       |                |             |               | OLE report  |  |
|                       |                |             |               | OLE report  |  |
|                       |                |             |               | OLE report  |  |
|                       |                |             |               | NEFSC       | from necropsy: abrasions, bruising, large hemotoma, 4 broken ribs and broken vertebral processes                     |
|                       |                |             |               | NEFSC       | from necropsy: many focal hematomas on left side along ribs, but no pattern and no broken bones                      |
|                       |                |             |               | OLE report  |  |
|                       |                |             |               | OLE report  |  |
|                       |                |             |               | OLE report  |  |
|                       |                |             |               | OLE report  |  |
|                       |                |             |               | NEFSC       | badly decomposed whale floating in harbor, carcass towed out to sea by MA Environmental Police                       |
|                       |                |             |               | NEFSC       | mortality attributed to ship strike, necropsy points very strongly to traumatic incident that fractured the mandible |
|                       |                |             |               | NEFSC       | from necropsy: large wound on dorsal peduncle ridge, hemorrhaging, fractured vertebrae indicative of ship strike     |
| whale-watch vessel    |                |             |               | NEFSC       | body of whale seen in wake of whale watching vessel, blood reported  |
|                       |                |             |               | OLE report  |  |
| whale-watch vessel    | 24             | 25          | Y             | NEFSC       | whale swam under bow, impact felt, surfaced w/deep, bleeding gash, dead carcass sighted immediately afterward        |
| whale-watch catamaran | 36             | 18.3        |               | NEFSC       | whale surfaced in front of vessel, massive, fresh, bleeding wound across back from flipper to flipper                |
|                       |                |             |               | OLE report  |  |
|                       |                |             |               | NEFSC       |  |
|                       |                |             |               | NEFSC       |  |
|                       |                |             |               | NEFSC       | large hematoma evident from necropsy   |

**NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales**

| Date     | Species          | Sex | Length (m) | Location (where struck, if known; if not, where found ) | Coordinates         | Mortality/ Injury   | Field ID |
|----------|------------------|-----|------------|---|---------------------|---------------------|----------|
| 03/03/98 | blue             |     |            | approaching Narragansett Bay, RI                        |                     | mortality           |          |
| 01/03/98 | right            |     |            | Georgia   | 30-50.7N, 81-9.6W   | injury              |          |
| 08/10/97 | unknown          |     |            | Stellwagen Bank NMS, MA                                 |                     | unknown             |          |
| 12/10/97 | humpback         |     |            | Beaufort Inlet, NC                                      | 34-39N, 76-39W      | mortality           |          |
| 07/20/97 | humpback         |     |            | Cape Cod Bay, MA  | 42-09.6N, 069-12.9W | unknown             |          |
| 06/07/97 | minke            |     |            | Sandy Hook Natl. Seashore, NJ                           | 40-28N, 73-59.7W    | mortality           |          |
| 05/12/97 | finback          |     | 12 est     | Boston Harbor, MA                                       | 41-23N, 71-02.8W    | mortality           |          |
| 03/21/97 | finback          |     | 12 est     | 7.5 nm off VA Beach, VA                                 | 36-50N, 75-48.3W    | mortality           |          |
| 11/03/96 | humpback         | M   | 8.4        | Carrituk, NC  | 36-18N, 75-48W      | mortality           |          |
| 07/15/96 | minke            |     |            | Off Race Pt., MA  |                     | no sign of injury   |          |
| 07/14/96 | finback          | M   | 13.5       | Elizabeth Channel, NJ                                   | 40-41N, 74-09W      | mortality           |          |
| 05/09/96 | humpback         | F   | 7.3        | Cape Henelopen State Park, DE                           | 38-36.68N, 75-4.4W  | mortality           |          |
| 04/02/96 | humpback         | F   | 7          | Cape Story Beach, VA Beach, VA                          | 36-54N, 76-03W      | mortality           |          |
| 03/25/96 | right            | M   |            | Wellfleet, MA   |                     | mortality, stranded |          |
| 03/09/96 | right            | M   |            | MA  |                     | mortality           |          |
| 02/26/96 | finback          | F   | 18 est     | 9 nm off Sandy Hook, NJ                                 | 40-18N, 73-46W      | mortality           |          |
| 01/30/96 | right            |     | 13.7       | 10 nm east of Sapelo Island, GA                         |                     | mortality           |          |
| 11/14/95 | finback          | F   | 10         | Below Old Cooper River, Charleston, SC                  | 32-48N, 79-56W      | mortality           |          |
| 10/09/95 | minke            |     |            | 185 km E of Cape Cod, MA                                |                     | unknown             |          |
| 08/13/95 | right            | F   | adult      | Gulf of Maine   |                     | unknown             |          |
| 08/01/95 | finback          |     | 17         | 48 km SE of Cape Cod, MA                                |                     | mortality           |          |
| 06/10/95 | minke            | F   | 3.7        | Piney Point, MD   | 38-8N, 76-31.5W     | mortality           |          |
| 06/04/95 | humpback         | M   | 8.8        | 5 nm off Rudee Inlet, VA Beach, VA                      | 36-49N, 75-52W      | mortality           |          |
| 02/01/95 | unknown (right?) |     |            | Off NC  |                     | unknown             |          |



## NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

| Vessel Type             | Vessel Size(m) | Speed (kts) | Vessel Damage | Source           | Comments  |
|-------------------------|----------------|-------------|---------------|------------------|---|
| bulbous bow tanker      | 148            |             |               | Ford, pers comm  | whale found draped across vessel's bow by port pilot, hemorrhaging indicated whale was alive when struck                      |
|                         |                |             |               | NEFSC            | entire left fluke lobe extending beyond dorsal notch severed by propeller, wound healed, status good                          |
|                         |                |             |               | OLE report       |   |
|                         |                |             |               | NEFSC            | probable ship strike  |
| USCG                    | 82.3           | 20          | N             | USCG BO 6/8/98   | humpback observed 5-10 ft under surface, thump heard, ship felt shudder, whale struck on starboard, not re-sighted            |
|                         |                |             |               | NEFSC            | from necropsy: severely decomposed, spine broken, likely ship strike  |
|                         |                |             |               | NEFSC            | floater, moderate decomposition, possible ship strike   |
|                         |                |             |               | NEFSC            | ship strike account in initial report   |
|                         |                |             |               | NEFSC            | acute trauma to skull, blunt trauma to left peduncle, likely ship strike  |
| ferry (?)               |                | 15          |               | NEFSC            | whale hit, re-surfaced, no sign of injury   |
|                         |                |             |               | NEFSC            | ship strike (pre/post undetermined), adjacent to Maersk Shipping  |
|                         |                |             |               | NEFSC            | ship strike (pre/post undetermined)   |
|                         |                |             |               | NEFSC            | from necropsy: stranded, fractured left mandible, possible ship strike  |
|                         |                |             |               | NEFSC            | from necropsy: prop cuts along back, damaged baleen, thick area of skull broken indicating ship strike                        |
|                         |                |             |               | Best et al 2001  | broken skull and 3.3 m long gash on back  |
|                         |                |             |               | NEFSC            | floater, possible ship strike   |
| USCG                    | 64             | 15          | N             | Navy BO 5/15/97  | hemorrhaging, massive cranium fracturing, cervical vertebrae broken, indicates blunt trauma w/large vessel                    |
|                         |                |             |               | NEFSC            | from necropsy: fractures to skull and hemorrhaging indicative ship strike   |
| bulbous bow cruise ship | 173            |             |               | NEFSC            | whale sighted off starboard, thud and shudder felt, not re-sighted  |
|                         |                |             |               | Best et al 2001  | cut 60-90 cm deep on right side of head below rostrum and into lower lip, orange cyamids on tail and lip edge                 |
|                         |                |             |               | SICDD*           | vibration felt while ship underway off Cape Cod, whale found on ship's bow in Bermuda with broken spine and extensive bruises |
|                         |                |             |               | NEFSC            | stranding, large cut through skin on dorsal thorax, likely brought 12 mi up Potomac by ship                                   |
|                         |                |             |               | NMFS memo        | several major lacerations indicative of collision with a propeller, deepest 27cm., whale likely bled to death                 |
| Navy                    |                |             |               | Laist et al 2001 | whale breached in front of submarine, struck bow, slid down vessel's starboard, may have been injured on right side           |

**NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales**

| Date     | Species          | Sex | Length (m) | Location (where struck, if known; if not, where found ) | Coordinates          | Mortality/ Injury    | Field ID |
|----------|------------------|-----|------------|---|----------------------|----------------------|----------|
| 11/17/94 | sei              |     | 15 est     | Charlestown Harbor, Boston, MA                          |                      | mortality            |          |
| 08/15/94 | minke            |     | 2          | Hampton Roads, Chesapeake Bay, VA                       | 37N, 76-21.4W        | mortality            |          |
| 08/04/94 | right            |     |            | Gulf of Maine   |                      | unknown              |          |
| 07/19/94 | humpback         |     |            | Stellwagen Bank NMS, MA                                 |                      | unknown              |          |
| 04/18/94 | finback          |     |            | Penns Grove, NJ   |                      | mortality            |          |
| 04/10/94 | humpback         |     |            | Ocracoke, NC  |                      | mortality            |          |
| 03/12/94 | finback          | F   | 16 est     | Cape Henry, Chesapeake Bay, VA Beach                    | 36-56N, 76-01.6W     | mortality            |          |
| 02/22/94 | right whale calf |     |            | FL  |                      | mortality (presumed) |          |
| 12/31/93 | right            | F   |            | East of Cape Charles, VA                                |                      | mortality, floater   |          |
| 12/06/93 | right            | M   | 12--22     | NC/VA border, off False Cape                            |                      | mortality, floater   |          |
| 12/06/93 | right            | F   |            | VA  |                      | mortality            |          |
| 10/07/93 | humpback         |     |            | 2 km off Atlantic City, NJ                              |                      | injury               |          |
| 10/01/93 | minke            |     |            | Sandbridge, VA  |                      | mortality            |          |
| 09/27/93 | minke            | M   | 4.3        | Ocean City, NJ  | 38-26N, 75-04.1W     | mortality            |          |
| Aug-93   | finback          |     | 15         | Boston Harbor, MA                                       | 41-23N, 71-03W       | mortality            |          |
| 03/31/93 | minke            |     | 7.5        | New York Harbor, Staten Island, NY                      | 40-39N, 74-03W       | mortality            |          |
| 01/05/93 | right whale calf |     |            | In transit between Mayport and Ft. Pierce, FL           | 30-02.44N, 81-16.04W | mortality            |          |
| 10/09/92 | humpback         | F   | 8.7        | Metompkin Island, VA                                    | 37-46N, 75-32W       | mortality            |          |
| 07/31/92 | finback          | M   | 17         | Port Newark, NJ   | 42N, 74.09W          | mortality            |          |
| 06/02/92 | finback          | F   | 15.6       | Beach Haven Crest, NJ                                   | 39-36N, 74-12.5W     | mortality            |          |
| 04/22/92 | humpback         | F   | 9          | Hatteras National Seashore, NC                          | 35-11.4N, 75-46W     | mortality            |          |
| 04/16/92 | humpback         | F   | 9          | Assateague National Seashore, MD                        | 38-10N, 75-10W       | mortality            |          |
| 03/15/92 | minke            | F   | 6.8        | St. Johns River, FL                                     | 30-21.1N, 81-18W     | mortality            |          |
| 03/10/92 | humpback         | F   | 10.6       | Hatteras Natl. Seashore, NC                             | 35-20N, 75-21W       | mortality            |          |

## NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

| Vessel Type          | Vessel Size(m) | Speed (kts) | Vessel Damage | Source           | Comments   |
|----------------------|----------------|-------------|---------------|------------------|--|
| container ship       |                |             |               | NEFSC            | vessel collision, came in on bow of container ship   |
|                      |                |             |               | NEFSC            | lower jaw broken, had begun to heal, possible ship strike  |
|                      |                |             |               | OLE report       |  |
|                      |                |             |               | OLE report       |  |
|                      |                |             |               | Laist et al 2001 | floating in Delaware River, broken vertebrae, blunt trauma to right pectoral fin and surrounding area                  |
|                      |                |             |               | Laist et al 2001 | hemorrhaging in mandible and ventral to left pectoral  |
|                      |                |             |               | NEFSC            | flukes cut off, propeller marks in caudal area   |
|                      |                |             |               | Best et al 2001  | several deep cuts on head and lower lip regions, probable propeller cuts on both sides of dorsal flukes                |
|                      |                |             |               | NEFSC            |  |
|                      |                |             |               | stranding report | scar on leading edge of fluke near tip and line scar along right side of mid-body, may have been pre-mortem            |
|                      |                |             |               | Best et al 2001  | carcass floating belly up w/large straight gash running from right ventral to right lateral surface anterior to flukes |
| sport-fishing vessel | 10             | >10         | Y             | SICDD*           | animal hit while vessel accelerating, 15 min later animal observed "wobbling" while diving, blood seen in water        |
|                      |                |             |               | Laist et al 2001 | left mandible broken   |
|                      |                |             |               | NEFSC            | stranding, possible ship strike, pre/post mortem undetermined  |
|                      |                |             |               | NEFSC            | whale carried into harbor, likely ship strike  |
| Navy                 |                |             |               | NEFSC            | brought in on ship bow, reported to government as ship strike  |
| USCG                 | 25             | 15          | N             | Navy BO 5/15/97  | calf hit, lacerations observed, carcass found 4 days later w/ 2 series of large propeller cuts from twin engine        |
|                      |                |             |               | NEFSC            | stranding, extensive bruising on right side, internal hemorrhaging on left flank, ship strike                          |
|                      |                |             |               | NEFSC            | from necropsy: moderately decomposed, fractured vertebrae mid-section, death due to ship strike                        |
|                      |                |             |               | NEFSC            | stranding, several fractured vertebrae, possible ship strike   |
|                      |                |             |               | NEFSC            | stranding, internal damage extensive, possible ship strike   |
|                      |                |             |               | NEFSC            | stranding, skull disarticulated, blunt trauma left side, possible ship strike  |
|                      |                |             |               | NEFSC            | propeller wounds from large vessel   |
|                      |                |             |               | NEFSC            | stranding, net scars on caudal peduncle, possible propeller wounds on fluke  |

**NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales**

| <b>Date</b> | <b>Species</b>   | <b>Sex</b> | <b>Length (m)</b> | <b>Location (where struck, if known; if not, where found )</b> | <b>Coordinates</b>   | <b>Mortality/ Injury</b> | <b>Field ID</b> |
|-------------|------------------|------------|-------------------|--|----------------------|--------------------------|-----------------|
| 02/14/92    | humpback         | M          | 8.6               | Floating in mouth of Chesapeake Bay, Virginia Beach, VA        | 36-59N, 76-08W       | mortality                |                 |
| 11/08/91    | humpback         | M          | 9                 | Island Beach State Park, NJ                                    | 39-50N, 74-05W       | mortality                |                 |
| 08/08/91    | unknown          |            |                   | 25 nm south of Martha's Vineyard, MA                           |                      | unknown                  |                 |
| 07/06/91    | right whale calf |            | 4.6               | East of Delaware Bay, DE                                       | 38-21.30N, 73-06.30W | mortality                |                 |
| 06/21/91    | humpback         |            |                   | Stellwagen Bank NMS, MA  |                      | injury                   |                 |
| 03/12/91    | right            | F          | 2 years           | Off FL   |                      | mortality                |                 |
| 02/11/91    | right            | F          | calf              | Southeast US   |                      | injury                   |                 |
| 11/25/90    | finback          | F          | 13                | Curtis Bay, Baltimore, MD                                      | 39-40N, 76-40W       | mortality                |                 |
| 06/08/90    | humpback         |            |                   | Stellwagen Bank NMS, MA  |                      | unknown                  |                 |
| 02/05/90    | humpback         |            | 11                | S of 18 m marker, Nags Head, NC                                | 35-56.5N, 75-36.5W   | mortality                |                 |
| 07/14/89    | finback          |            |                   | North Kingstown, RI  |                      | mortality                |                 |
| 05/13/88    | minke            |            |                   | Duxbury Beach, MA  |                      | mortality                |                 |
| 05/13/88    | sei              |            |                   | Baltimore, MD  |                      | mortality                |                 |
| 05/04/88    | finback          |            |                   | Deal, NJ   |                      | mortality                |                 |
| 01/15/88    | finback          |            |                   | Marshfield, MA   |                      | mortality                |                 |
| 08/18/87    | finback          |            |                   | Boston, MA   |                      | mortality                |                 |
| 02/14/87    | right            | F          | calf              | Southeast US   |                      | injury                   |                 |
| 08/07/86    | right            | F          | 1 year            | Massachusetts Bay, MA  |                      | mortality                |                 |
| 07/02/86    | finback          |            |                   | Delaware River, NJ   |                      | mortality                |                 |
| 05/06/86    | finback          |            |                   | Hoboken, NJ  |                      | mortality                |                 |
| 08/27/85    | finback          |            |                   | Montauk, NY  |                      | mortality                |                 |
| 07/13/85    | finback          |            |                   | Stellwagen Bank NMS, MA  |                      | unknown                  |                 |
| Aug-84      | finback          |            |                   | Stellwagen Bank NMS, MA  |                      | injury                   |                 |
| 03/07/84    | finback          |            |                   | Baltimore, MD  |                      | mortality                |                 |

## NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

| Vessel Type        | Vessel Size(m) | Speed (kts) | Vessel Damage | Source              | Comments   |
|--------------------|----------------|-------------|---------------|---------------------|--|
|                    |                |             |               | NEFSC               | floater, propeller wounds, fractured mandible and eye socket, possible ship strike                                   |
|                    |                |             |               | NEFSC               | 3 propeller cuts observed on head, one cut fractured the right occipital condyle                                     |
|                    |                |             |               | OLE report          |  |
| USCG               | 84             | 22          | Y             | Navy BO 5/15/97     | 2 whales 50 yds off bow, calf rolled out from ship w/propeller gashes on body, sank rostrum up, obviously dead       |
| whale-watch vessel | 14             | 5-10        |               | Sullivan and Young* | bow struck and rode up over whale, fresh nick observed between nares and dorsal fin, subsequently re-sighted healthy |
|                    |                |             |               | Best et al 2001     | from necropsy: shattered skull from ship strike  |
|                    |                |             |               | Best et al 2001     | series of 3 propeller cuts, maximum 1.2 m long x 15 cm deep on left flank  |
|                    |                |             |               | NEFSC               | apparent boat/ship collision, whale likely killed shortly before being found, ship strike mark mid-lateral left side |
|                    |                |             |               | OLE report          |  |
|                    |                |             |               | NEFSC               | broken mandible, head damage   |
|                    |                |             |               | SICDD*              | stranding record, fractured lower jaw  |
|                    |                |             |               | SICDD*              | stranded, one large gash and three smaller gashes  |
|                    |                |             |               | SICDD*              | brought in on bow of ship, damaged skull   |
|                    |                |             |               | SICDD*              | boat hit, found floating   |
|                    |                |             |               | SICDD*              | identified as possible ship collision  |
|                    |                |             |               | SICDD*              | folded in half forward of dorsal fin on right side, likely brought into port on bow of ship                          |
|                    |                |             |               | Best et al 2001     | series of 5 propeller cuts approx 30 cm long and 8 cm deep on left fluke tip   |
|                    |                |             |               | Best et al 2001     | 2 propeller cuts, max. 4.5 m long x 1 m deep running longitudinally along body, severed spine                        |
| container ship     |                |             |               | SICDD*              | reported as struck by container ship   |
| cruise ship        |                |             |               | SICDD*              | brought into port on bow of ship   |
|                    |                |             |               | SICDD*              | floating with propeller slashes, possible ship strike  |
|                    |                |             |               | OLE report          |  |
| whale-watch vessel | 28             | 16          |               | Weinrich*           | whale surfaced immediately in front of vessel, after collision whale was not resighted but blood seen in water       |
|                    |                |             |               | SICDD*              | brought into port on bow of ship, bruising evident   |

**NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales**

| Date        | Species          | Sex | Length (m) | Location (where struck, if known; if not, where found ) | Coordinates | Mortality/ Injury | Field ID |
|-------------|------------------|-----|------------|---|-------------|-------------------|----------|
| 10/14/83    | finback          |     |            | Fire Island, NY   |             | mortality         |          |
| 07/31/83    | finback          |     |            | Manhattan, NY   |             | mortality         |          |
| 02/21/83    | right            | M   | 2 years    | New Jersey  |             | mortality         |          |
| 01/24/83    | finback          |     |            | Norfolk, VA   |             | mortality         |          |
| 01/25/83    | finback          |     |            | Norfolk, VA   |             | mortality         |          |
| 08/02/82    | finback          |     |            | Elizabeth City, NJ                                      |             | mortality         |          |
| 03/31/81    | finback          |     |            | Norfolk, VA   |             | mortality         |          |
| 08/13/80    | right            | M   |            | In transit between Mayport and Ft. Pierce, FL           |             | injury            |          |
| 05/25/80    | right            | M   |            | Great South Channel, MA                                 |             | injury            |          |
| 10/18/79    | finback          |     |            | Baltimore, MD   |             | mortality         |          |
| 03/05/79    | right            | M   | juv        | NY  |             | mortality         |          |
| 11/05/76    | right            |     |            | ME  |             | mortality         |          |
| 04/15/76    | right            | M   | calf       | MA  |             | mortality         |          |
| 07/08/75    | minke            |     |            | Boothbay, ME  |             | mortality         |          |
| winter 1972 | right (possibly) |     |            | Approx 97 km E of Boston, MA                            |             | mortality         |          |
| Aug-52      | unknown          |     | 15         | 139 km of Montauk, Long Island, NY                      |             | unknown           |          |
| 1940-45     | sperm            |     |            | North Atlantic  |             | mortality         |          |
| 1940        | baleen whale     |     |            | Off Cape Hatteras, NC                                   |             | mortality         |          |
| 1926        | unknown          |     |            | North Atlantic  |             | mortality         |          |
| 1912-1915   | unknown          |     |            | Off U.S. East Coast                                     |             | mortality         |          |
| 1906        | unknown          |     |            | Off Chatham, MA   |             | injured?          |          |
| 1896        | sperm whale?     |     |            | Off Sandy Hook, NJ                                      |             | mortality         |          |
| 1885        | unknown          |     |            | 32 km E of Nantucket, MA                                |             | injury            |          |
|             |                  |     |            |   |             |                   |          |

## NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

| Vessel Type                | Vessel Size(m) | Speed (kts) | Vessel Damage | Source              | Comments   |
|----------------------------|----------------|-------------|---------------|---------------------|--|
|                            |                |             |               | SICDD*              | slashes on ventral side, possible ship strike  |
|                            |                |             |               | SICDD*              | brought into port on bow of ship   |
|                            |                |             |               | Best et al 2001     | severed tail   |
|                            |                |             |               | SICDD*              | brought into port on bow of ship, bruising evident, reportedly hit off New York                          |
|                            |                |             |               | SICDD*              | floating near harbor, bruising evident   |
|                            |                |             |               | SICDD*              | brought in on bow of ship, hit off Boston, MA  |
|                            |                |             |               | SICDD*              | brought into port on bow of ship, later determined to have been hit off Atlantic City, NJ                |
|                            |                |             |               | Best et al 2001     | series of 8 propeller cuts running along left flank and over back, max. 1.2 m length x 15 cm deep        |
|                            |                |             |               | Best et al 2001     | cut along back crossing spine, 1.5 m long x 15 cm deep   |
| Russian cruise ship        |                |             |               | SICDD*              | brought into port of bow of ship   |
|                            |                |             |               | Best et al 2001     | tail severed   |
|                            |                |             |               | Best et al 2001     | severe lacerations observed on back  |
|                            |                |             |               | Best et al 2001     | large area of bruising observed behind skull, noted as probable ship collision                           |
|                            |                |             |               | Laist et al 2001    | stranded, body heavily bruised   |
| bulbous bow container ship | 207            | 21-23       |               | Murphy II*          | noticed whale draped across ship's bow in harbor, realized slow speed during night due to impaled animal |
| Navy                       | 93             | 14          | Y             | in Laist et al 2001 | whale seen off port, submerged a few seconds before impact, severe damage to vessel                      |
| Navy                       |                |             |               | Slipjer 1962*       |  |
| tanker                     |                |             |               | Burgess 1940*       |  |
| ocean liner                |                |             |               | Laist et al 2001    |  |
| steamship                  |                |             |               | Laist et al 2001    |  |
| steamship                  |                |             |               | Laist et al 2001    |  |
| ocean liner                |                |             |               | Laist et al 2001    |  |
| pilot boat                 |                | 13          | N             | Laist et al 2001    | vessel's port bow collided w/whale, whale then seen rolling as if in distress                            |
|                            |                |             |               |                     |  |

**NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales**

| Date                  | Species  | Sex | Length (m) | Location (where struck, if known; if not, where found ) | Coordinates    | Mortality/ Injury    | Field ID |
|-----------------------|----------|-----|------------|---|----------------|----------------------|----------|
| <b>Eastern Canada</b> |          |     |            |   |                |                      |          |
| 09/27/97              | humpback |     |            | St. Lawrence Estuary, Canada                            |                | injury               |          |
| 08/19/97              | right    | F   |            | Bay of Fundy, Canada                                    |                | mortality            |          |
| 09/27/00              | right    | F   |            | Bay of Fundy  |                | injury               |          |
| 07/23/00              | finback  |     |            |   | 41-52N, 71-22W | unknown              |          |
| 07/08/00              | right    | M   |            | Bay of Fundy, Canada                                    |                | unknown              |          |
| 10/19/95              | right    | M   |            | Bay of Fundy, Canada                                    |                | mortality            |          |
| 09/26/95              | minke    |     |            | Bergeronnes, St. Lawrence Estuary, Canada               |                | unknown              |          |
| 09/16/95              | right    | M   | 4 years    | Bay of Fundy, Canada                                    |                | injury               |          |
| 08/14/94              | finback  |     |            | Tadoussac, St Lawrence Estuary, Canada                  |                | injury               |          |
| 07/29/93              | finback  |     |            | Bergeronnes, St. Lawrence Estuary, Canada               |                | injury               |          |
| 09/05/92              | right    | F   | adult      | Bay of Fundy, Canada                                    |                | mortality            |          |
| 06/20/92              | finback  |     |            | Tadoussac, St. Lawrence Estuary, Canada                 |                | injury               |          |
| 08/28/87              | right    |     |            | Browns Bank, Canada                                     |                | injury               |          |
| 07/09/87              | right    | M   | juv        | Nova Scotia   |                | mortality            |          |
| 08/14/86              | right    | F   |            | Bay of Fundy, Canada                                    |                | mortality (presumed) |          |
| 08/05/84              | right    |     |            | Browns Bank, Canada                                     |                | mortality            |          |
| 10/09/67              | unknown  |     | 15-18      | Gaspé, Quebec, Canada                                   |                | mortality            |          |
| Jul-67                | unknown  |     |            | South of Halifax, Canada                                |                | mortality            |          |
| 1913                  | unknown  |     |            | Off Newfoundland, Canada                                |                | unknown              |          |
| 1910                  | unknown  |     |            | North Atlantic  |                | mortality            |          |
| 1908                  | sperm    |     |            | Off Newfoundland, Canada                                |                | mortality            |          |
| 1908                  | unknown  |     |            | Off Newfoundland, Canada                                |                | mortality?           |          |
| 1904                  | unknown  |     |            | Atlantic Ocean  |                | mortality            |          |



## NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

| Vessel Type        | Vessel Size(m) | Speed (kts) | Vessel Damage | Source              | Comments  |
|--------------------|----------------|-------------|---------------|---------------------|---|
| whale-watch vessel |                |             |               | Menard*             | vessel struck humpback after it surfaced off bow, whale much less active and appeared injured after collision |
|                    |                |             |               | Best et al 2001     | from necropsy: 6 m long haematoma on left side and broken right mandible, no external sign of injury          |
|                    |                |             |               | NEFSC               | seen in July quite healthy, re-sighted in September with deep wound on left side of head                      |
|                    |                |             |               | OLE report          |   |
|                    |                |             |               | NEFSC               | seen repeatedly w/ large deep gash on back, wound appears to be from ship strike between 09/99--07/00         |
|                    |                |             |               | Best et al 2001     | 4.8 m long gash in back, broken vertebral disks   |
| whale-watch vessel | 11             | >30         |               | Laist et al 2001    | rigid-hulled pneumatic craft collided w/whale, captain could not see directly in front due to high bow        |
|                    |                |             |               | Best et al 2001     | series of propeller cuts, max. 1 m long x 8 cm deep on tail stock and tail, fishing gear through mouth        |
| whale-watch vessel |                |             |               | Laist et al 2001    | vessel reported colliding w/whale, hull vibrated, wound seen on animal  |
| whale-watch vessel |                |             |               | Menard*             | whale surfaced and struck bow of vessel, wound subsequently observed on animal's back                         |
|                    |                |             |               | Best et al 2001     | necropsy revealed internal haemorrhaging from impact w/ship, no external sign of injury                       |
| whale-watch vessel |                |             |               | Menard*             | vessel collided w/whale while whale-watching, wound visible on animal's back in front of dorsal               |
|                    |                |             |               | Best et al 2001     | 1 m of right fluke tip missing, severed by propeller  |
|                    |                |             |               | Best et al 2001     | 2-3 propeller cuts on left flank, 20-25 cm deep, shallow gash and swelling on right flank                     |
|                    |                |             |               | Best et al 2001     | 1 m diameter necrotic wound approx 1 m behind blowholes   |
|                    |                |             |               | Best et al 2001     | series of 5 propeller cuts, approx 60 cm long x 10 cm deep on left flank and near spine                       |
| passenger ship     | 232            |             |               | in Laist et al 2001 | whale observed impaled on ship's bow, animal nearly cut in half as vessel backed to dislodge                  |
| Navy               | 219            |             |               | Cummings*           | whale stuck on bow after vessel speed registered too slow, whale sank when vessel backed down to remove it    |
| cargo ship         |                |             |               | Laist et al 2001    |   |
| steamship          |                |             |               | Laist et al 2001    |   |
| ocean liner        |                |             |               | Laist et al 2001    |   |
| ocean liner        |                |             |               | Laist et al 2001    |   |
| steamship          |                |             |               | Laist et al 2001    |   |

**NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales**

| Date                            | Species       | Sex     | Length (m)   | Location (where struck, if known; if not, where found) | Coordinates          | Mortality/Injury    | Field ID   |
|---------------------------------|---------------|---------|--------------|--|----------------------|---------------------|------------|
| 1903                            | unknown       |         |              | Placenta Bay, Newfoundland, Canada                     |                      | unknown             |            |
| <b>US and Canada West Coast</b> |               |         |              |  |                      |                     |            |
| 11/04/02                        | finback       | M       | 16           | Off Waldron Island, WA                                 |                      | mortality           |            |
| 10/02/02                        | finback       |         | 18.5         | Cherry Point, WA                                       |                      | mortality           |            |
| 08/09/02                        | finback       |         | 17           | Elliot Bay, Seattle, WA                                |                      | mortality           |            |
| 07/17/02                        | blue          |         | 22-25        | 8 mi NW of Point Benito, San Fran, CA                  |                      | mortality           |            |
| 10/10/01                        | balaenopterid |         | 15           | 4.5 mi south of San Nicolas Is., CA                    |                      | mortality           |            |
| 08/21/01                        | balaenopterid | F       | 15           | Los Angeles Harbor                                     |                      | mortality, stranded |            |
| 08/20/01                        | unknown       |         |              | Channel Islands, 25 nm off San Clemente Is., CA        | 32-23.5N, 118-50.3W  | injury              |            |
| 08/15/01                        | unknown       |         |              | Channel Islands off San Clemente Island, CA            | 32-34N, 118-25W      | injury              |            |
| 07/28/01                        | unknown       |         |              | 10 mi off Solana Beach, San Diego, CA                  |                      | unknown             |            |
| 01/09/01                        | gray          |         | 3.6          | 3 mi offshore Montana de Oro State Park, CA            | 35-20N, 120-56W      | injured             |            |
| 05/28/00                        | humpback      | F       | 12           | Fiddler's Cove, south of Pescadero State Beach, CA     |                      | mortality, stranded | C 124      |
| 03/19/00                        | gray          | M       | 12           | 2 mi W of Orick, Redwood National Park                 | 41-15N, 124-00W      | mortality, stranded | VM 2388    |
| 12/19/99                        | gray          | M       | 12           | Muir Beach, Golden Gate National Recreation Area       |                      | mortality           | C 101      |
| 05/05/99                        | unknown       |         |              | 3 nm offshore, Davenport, CA                           | 36-56.8N, 122-05.08W | unknown             |            |
| 04/30/98                        | gray          | F (juv) | 12           | Stinson Beach, Marin County, CA                        |                      | mortality, stranded | C 84       |
| 04/28/98                        | gray          |         | 6 est        | En route to San Diego, CA                              | 32-43N, 117-24W      | mortality           |            |
| 04/24/98                        | gray          |         | 9 est        | CA   | 31-58N, 118-35W      | mortality           |            |
| 01/02/98                        | gray          |         | 12 est       | San Pedro, LA county, CA                               | 33-14N, 118-08W      | injury              |            |
| 01/23/99                        | gray          |         | 7.6          | Off N Coronado Is, 5 mi from west end, CA              |                      | unknown             |            |
| 01/07/98                        | gray calf     | F       | 4.5          | Crescent City Harbor, CA                               |                      | injury              | C 79       |
| 08/31/97                        | unknown       |         |              | Dixon Entrance, Canadian waters                        |                      | unknown             | 97045      |
| 03/25/97                        | gray          |         | 6 (w/o head) | Vandenberg Airforce Base, 1.5 mi N of Purisma Pt., CA  |                      | mortality, stranded | VAFB 97-01 |

## NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

| Vessel Type    | Vessel Size(m) | Speed (kts) | Vessel Damage | Source                   | Comments   |
|----------------|----------------|-------------|---------------|--------------------------|--|
| steamship      |                |             |               | Laist et al 2001         |  |
|                |                |             |               |                          |  |
|                |                |             |               | <i>San Juan Islander</i> | necropsy indicated blunt trauma through massive hemorrhaging, symmetrical fractures, displaced spine                       |
| tanker         | 46,100 gr tons |             |               | NWFSC                    | ship was en route from Valdez, AK, strike was pre-mortem   |
| container ship | 75             |             |               | NWFSC                    | whale brought in on bow of ship, gored, strike was pre-mortem  |
|                |                |             |               | NOAA Fisheries           | four dorsal propeller gashes, animal eviscerated by encounter  |
| freighter      |                |             |               | stranding report         | animal initially sighted w/2 other whales prior to vessel collision w/freighter  |
|                |                |             |               | stranding report         | carcass floating on back, 35 ventral grooves visible, large gash in gular region   |
| Navy           | 57.3           |             |               | stranding report         | diving whale observed off starboard, shudder felt, blood observed in water, whale not resighted                            |
| Navy           | 153.9          |             |               | stranding report         | whale rolled over after collision, disappeared under ship, blood observed in water, whale not resighted                    |
| Navy           | 133            | 21          |               | stranding report         | prior to strike, whale observed 30 yds. off bow, after strike whale surfaced off port bow and swam away, no blood observed |
|                |                |             |               | stranding report         | animal sighted thrashing at surface, flukes completely severed, bleeding, final status unknown                             |
|                |                |             |               | stranding report         | skull smashed, suspect ship strike   |
|                |                |             |               | stranding report         | large gouge on dorsal surface behind blowhole, blood on palate and coming from blowhole                                    |
|                |                |             |               | stranding report         | carcass first found floating under Golden Gate Bridge on 12/18/99, rumor of boat strike                                    |
| USCG           |                |             |               | stranding report         | ship hit whale and it breached 2-3 times, no blood observed, no animal found on revisitation of site                       |
|                |                |             |               | stranding report         | blood pouring from mouth in surf, then stranded on beach w/massive hemorrhage in thoracic cavity                           |
| Navy           | 153.9          | 22          | N             | stranding report         | whale sighted at 2000 yds, 10 min later ship shuddered, whale observed wrapped around upper bow stem, then sank            |
| Navy           | 172.8          | 14          |               | stranding report         | whale sighted 1 nm off bow, 1.5 hrs later whale found wrapped around bow, ship backed down, whale sank                     |
| USCG           | 25             |             |               | stranding report         | collision resulted in six 1-ft gashes in animal's side, final status unknown   |
|                |                |             |               | stranding report         | eyewitness account; animal appeared stunned after collision but no blood observed, animal swam away                        |
|                |                |             |               | stranding report         | calf bleeding profusely on dorsal side, believed to be propeller wound   |
| cruise ship    | 214            |             |               | stranding report         | called in by passenger, audible sound of boat strike as whale surfaced directly in path of vessel                          |
|                |                |             |               | stranding report         | apparent clean cuts indicating vessel collision, head and left flipper missing   |

**NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales**

| Date        | Species  | Sex     | Length (m) | Location (where struck, if known; if not, where found ) | Coordinates           | Mortality/ Injury   | Field ID |
|-------------|----------|---------|------------|---|-----------------------|---------------------|----------|
| 02/15/97    | unknown  |         |            | 11 mi off Catalina Island, CA                           |                       | injury              |          |
| 02/11/97    | finback  |         | 7.6        | LA harbor, CA   | 33-44.30N, 118-17.00W | mortality           | JEH 483  |
| 09/17/96    | finback  |         | 14.5 est   | Huntington Beach, CA                                    |                       | mortality           |          |
| 03/07/95    | gray     |         |            | 2.5 mi SE of Point Loma, San Diego, CA                  |                       | unknown             |          |
| 03/05/95    | humpback |         | 15         | Westminster St., Venice, CA                             |                       | mortality, stranded | JEH 465  |
| 01/02/95    | gray     |         |            | Off Anacapa Island, Channel Islands, CA                 |                       | unknown             |          |
| 05/14/94    | gray     |         | 7.6 est    | Pismo Beach, San Luis Obispo, CA                        | 35-00N, 120-30W       | mortality, stranded | MZH 0005 |
| 08/02/93    | blue     | F       | 24.4       | San Nicolas Island, west end, Ventura County, CA        |                       | mortality, stranded | TDL 169  |
| 04/06/93    | gray     |         |            | En route from San Diego to Dana Pt, CA                  |                       | injury              |          |
| 08/12/91    | finback  | M       | 13.5       | LA harbor, CA   | 33-44N, 118-16W       | mortality           | JEH 434  |
| 08/06/91    | gray     |         | 10.7       | 8 mi off Oceanside, San Diego County, CA                | 33-08N, 117-31W       | mortality           |          |
| 04/13/91    | gray     | F (juv) | 9.6 est    | Point Richmond, East Bay Regional Park, CA              | 37-55N, 122-21W       | mortality, stranded | JC 1     |
| 04/03/91    | gray     | M       | 12         | Hamilton Air Force Base, Marin County, CA               | 38N, 122W             | mortality, stranded | RLD 382  |
| 04/17/91    | gray     | F       | 11.4       | San Francisco Bay NWR, north of Dunbarton Bridge, CA    | 37-31N, 122-06W       | mortality, stranded |          |
| 06/15/90    | unknown  |         |            | Open water S of Clemente Island, Channel Islands, CA    | 32-39N, 117-47W       | unknown             |          |
| 05/31/90    | unknown  |         | 12         | Open water S of Clemente Island, Channel Islands, CA    | 32-48.2N, 118-44.7W   | mortality           |          |
| late 1980's | finback  |         | 20         | Seattle, WA   |                       | mortality           |          |
| 06/11/89    | blue     |         | 20         | Tacoma, WA  |                       | mortality           |          |
| 03/05/88    | gray     |         |            | Outside Los Angeles Harbor, CA                          |                       | unknown             |          |
| 01/11/88    | gray     | F       | 8 (juv)    | Towed to NMFS dock, Marin County, CA                    |                       | mortality           | RLD 266  |
| 08/03/87    | blue     | F       | 14         | Long Beach Pier J container terminal, CA                |                       | mortality           | JEH 360  |
| 05/02/87    | gray     | F       | 11.5       | Ft. Baker, Sausalito, Marin County, CA                  |                       | mortality           | RLD 187  |
| 02/14/87    | gray     | M       | 4.3        | SE side of Ventura River, CA                            |                       | mortality           | 87-2     |
| 01/24/85    | unknown  |         |            | Off southern CA   |                       | injury              |          |

## NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

| Vessel Type             | Vessel Size(m) | Speed (kts) | Vessel Damage | Source               | Comments   |
|-------------------------|----------------|-------------|---------------|----------------------|--|
| rubber inflatable       | 6              | 34.8        |               | stranding report     | blood in water after collision, injury assumed   |
| freighter or container  |                |             |               | stranding report     | carcass brought in on bow of unknown freighter or container ship, head and tail missing                                      |
| freighter               |                |             |               | stranding report     | animal brought in to harbor on bow of freighter  |
| 24-ft runabout, private |                |             |               | stranding report     | eyewitness account, animal hit in tail stock area, no apparent injuries  |
|                         |                |             |               | stranding report     | boat collision   |
| whale-watch vessel      |                |             |               | stranding report     | eyewitness account, whale initially exhibited erratic behavior when hit, then swam away, no blood observed                   |
|                         |                |             |               | stranding report     | possible propeller marks   |
|                         |                |             |               | stranding report     | large hematoma on lower right jaw & gular region, 3-5 cuts through ventral pleats indicated propellers, apparent ship strike |
| Navy                    | 19.8           | 22          | Y             | OLE report           | whale received 7 x 3-4 in slice along back, circled after collision, bleeding profusely, rolled over, stopped moving         |
| American President Line |                |             |               | stranding report     | whale hit by ship north of LA harbor and brought in draped across bow  |
| Navy                    |                |             |               | stranding report     | animal suffered 7 x 3 x 4 in gash on dorsal surface from propeller, bled profusely after collision, then floated belly-up    |
|                         |                |             |               | stranding report     | 6-7 fresh cuts on back, appeared to have been made by propeller  |
|                         |                |             |               | stranding report     | 5 cuts on right side and dorsal, appear to have been made by propeller   |
|                         |                |             |               | stranding report     | possible vessel collision  |
| Navy                    |                |             |               | stranding report     | vessel collided w/whale, large blood pool observed, survival not probable  |
| Navy                    | 133.5          |             |               | stranding report     | ship struck left side of whale, large portions of whale's remains floated at surface in large pool of blood, then sank       |
| container ship          |                |             |               | Ford, pers comm      | ship en route from Japan arrived in harbor with whale draped across bow  |
| container ship          |                |             |               | Ford, pers comm      | whale found draped across bow of ship arriving from southern California  |
| tanker                  |                |             |               | Laist et al 2001     | pod of whales seen directly ahead, dove to avoid ship, last whale to dive was hit, ship did not change course or speed       |
|                         |                |             |               | stranding report     | whale killed by large ship's propeller which severed spinal cord dorsally at skull's occipital                               |
| container ship          | 176            |             |               | stranding report     | hit in Santa Barbara Channel, pushed into harbor   |
|                         |                |             |               | stranding report     | evidence of vessel collision, wound from large ship's propeller  |
|                         |                |             |               | stranding report     | propeller lacerations (4) through dorsal vertebra and base of tail   |
| Navy                    | 126            |             | Y             | Tucker in Laist 2001 | crew noted back and tail of large whale, large pool of blood astern, increase in aft vibration                               |

**NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales**

| Date                     | Species  | Sex | Length (m) | Location (where struck, if known; if not, where found ) | Coordinates           | Mortality/ Injury | Field ID    |
|--------------------------|----------|-----|------------|---|-----------------------|-------------------|-------------|
| 10/24/80                 | blue     |     | 18         | North Pacific   |                       | mortality         |             |
| 01/22/75                 | gray     |     |            | Off Pt. Loma, CA  |                       | mortality         |             |
| 12/26/73                 | orca     |     | calf       | Strait of Georgia, B.C., Canada                         |                       | injury            |             |
| 11/29/65                 | sperm    |     |            | 200 km W of San Francisco, CA                           | 37-30N, 123-31W       | injury            |             |
| <b>Alaska and Hawaii</b> |          |     |            |   |                       |                   |             |
| 04/04/02                 | humpback |     |            | Several nm off Maalaea Harbor, Maui, HI                 |                       | no sign of injury |             |
| 07/16/01                 | humpback | F   |            | Glacier Bay NP, AK                                      |                       | mortality         |             |
| 06/19/01                 | humpback |     |            | Dixon Entrance, AK                                      | 54-40N, 130-49W       |                   |             |
| 02/13/01                 | humpback |     | 5--6       | 1.5 nm E of Olowalu Pt, Maui, HI                        | 20-46.74N, 156-35.96W | injury            |             |
| 02/08/01                 | humpback |     |            | 2-3 nm S of Club Lanai, HI                              |                       | injury            |             |
| 08/16/00                 | finback  |     |            | Uyak Bay, AK  | 57-38.5N, 153-55.9W   | no sign of injury |             |
| 11/02/99                 | humpback |     |            | Metlakatla, AK  |                       | unknown           |             |
| 07/28/99                 | humpback |     | 10.6-13.7  | Stephens Passage, 60 nm S of Juneau, AK                 |                       | mortality         |             |
| 06/04/99                 | finback  |     | 20         | Vancouver, Canada                                       |                       | mortality         |             |
| 03/06/99                 | humpback |     | calf       | Waters between Maui and Lanai, HI                       |                       | injury            |             |
| 02/16/99                 | humpback |     | juv        | 2 mi S of Magregor Point, Maui, HI                      |                       | injury            |             |
| 09/24/98                 | humpback |     | 18         | North Pass, outside Juneau, SE AK                       |                       | unknown           |             |
| 08/11/98                 | humpback |     |            | North Pass, outside Juneau, SE AK                       |                       | no sign of injury |             |
| 03/30/98                 | unknown  |     | 3.6        | Near Pearl Harbor, HI                                   | 21-18.01N, 157-57.51W | unknown           | EN-98-06-OH |
| 10/12/97                 | sperm    |     | 12-15 est  | 60 mi SW of Middleton Is, Prince William Sound, AK      |                       | no sign of injury |             |
| 07/12/97                 | humpback |     |            | NW Shelter Is, outside Juneau, AK                       |                       | injury            |             |
| 05/30/97                 | unknown  |     |            | Resurrection Bay, Prince William Sound, AK              |                       | unknown           |             |
| 05/20/97                 | gray     | F   | 10.9       | 1/4 mi S of Kah Shakes Cove, AK                         | 55-02.00N, 13-00.00W  | mortality         |             |
| 05/16/96                 | unknown  |     |            | Blying Sound, Gulf of Alaska, AK                        | 59-23N, 145-09W       | injury            |             |

## NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

| Vessel Type                 | Vessel Size(m) | Speed (kts)  | Vessel Damage | Source           | Comments   |
|-----------------------------|----------------|--------------|---------------|------------------|--|
| bulbous bow freighter       | 174            |              |               | Laist et al 2001 | whale drifted free of bow upon arrival in harbor, thought to have been on bow for at least 5 days                        |
| Navy                        | 72 tons        | 51           | Y             | Laist et al 2001 | ship hit whale, vessel came to dead stop w/i 30 m, next day dead whale w/severed tail stranded near collision site       |
| commercial ferry            | 152            | 15-18        | N             | Ford et al 1994* | crunch heard at ship's stern, blood in wake, bull, cow and 2 calves, 1 calf bleeding profusely from visible prop slashes |
| whale catcher boat          | 41             |              | Y             | Cummings*        | vessel approached cow/calf pair, female dove and was hit while surfacing, thrashing whale seen in boat's wake            |
|                             |                |              |               |                  |  |
| whale-watch catamaran       | 19.8           |              | N             | OLE report       | vessel in neutral, whale surfaced underneath and lifted right stern of vessel several inches                             |
|                             |                |              |               | OLE report       |  |
| USCG                        | 33.5           | 12           |               | stranding report | whale surfaced 10 ft in front of vessel, ship backed down and came to all stop, crew heard thump                         |
| whale-watch catamaran       | 19.7           | 17           | N             | OLE report       | bump felt on starboard, vessel heeled slightly, young whale surfaced 75 yds away in wake, no blood observed              |
| whale-watch inflatable raft | 13.2           | 15.6         | N             | OLE report       | whale surfaced in front of vessel and was struck by keel, dove and swam away, blood seen in water                        |
| USCG                        | 33.5           | 17           |               | stranding report | whale surfaced and vessel came down on top of it, animal appeared to be uninjured and swam away                          |
| Bayliner pleasure craft     |                |              |               | stranding report | vessel struck whale while underway, skin left on bow, status unknown   |
| cruise ship                 | 243.8          | 19           | N             | stranding report | vibration felt while underway, whale observed wrapped around ship's bow, came loose and sank when ship slowed down       |
| cruise ship                 | 259.7          |              |               | Ford             | ship arrived in harbor en route from Alaska, carcass draped across bow, captain and crew unaware of strike               |
| high speed ferry            | 16.8           |              |               | OLE report       | vibration from strike felt on vessel, blood in wake as calf surfaced and disappeared, adult whale surfaced and dove      |
| Bertram fishing charter     | 9.4            | 12           | N             | OLE report       | boat made contact w/whale, animal surfaced w/blood in water then dove, cut observed on back behind dorsal fin            |
| Bayliner                    | 7.3            | 12           | Y             | stranding report | whale surfaced under bow as boat crossed its back, spasmed and dove, knocked vessel and cracked its hull                 |
| whale watch catamaran       | 23.8           | 2 (rev idle) |               | stranding report | whale surfaced under catamaran while idling, no evidence of injury   |
| Navy                        | 110.3          | 8            | N             | Navy report      | whale crossed 20 ft in front of ship's bow back and forth, vessel struck animal on 2nd crossing, animal swam away        |
| fishing vessel              |                | 6            | N             | stranding report | captain reported whale hit on tail, seemed unharmed, went back to feeding  |
| skiff                       |                |              |               | stranding report | whale hit skiff, turning it over and dumping two people into water   |
| whale-watch vessel          | 18             | 20           | Y             | NMFS memo        | large whale surfaced in front of vessel, captain throttled down but whale hit hard, not seen after collision             |
|                             |                |              |               | stranding report | deep gash on top of head indicative of vessel strike injury  |
| USCG                        | 115            | 15           | N             | NMFS memo        | whale surfaced 50 yds off vessel, attempt to turn unsuccessful, impact felt, blood in water, no carcass                  |

**NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales**

| Date                 | Species        | Sex | Length (m)  | Location (where struck, if known; if not, where found )    | Coordinates        | Mortality/ Injury | Field ID |
|----------------------|----------------|-----|-------------|--|--------------------|-------------------|----------|
| 01/16/96             | humpback       |     |             | Off Kihei, Maui, HI  |                    | no sign of injury |          |
| 06/01/95             | unknown        |     |             | Summer Sound, Southeast AK                                 |                    | injury            |          |
| <b>US Gulf Coast</b> |                |     |             |  |                    |                   |          |
| 04/10/99             | right          |     |             | Unknown  |                    | unknown           |          |
| 10/23/98             | sperm          |     |             | Ocean Shore Blvd, Ormond, FL                               | 29-21.1N, 81-4.5W  | mortality         |          |
| 07/22/97             | minke          |     |             |  |                    | unknown           |          |
| 12/20/96             | finback        | M   | 14          | Floating at port dock                                      | 32-07.3N, 81-07.9W | mortality         |          |
| 02/19/94             | humpback       |     | 8.2         | Gulf, Gordon Pass, FL                                      | 26-8N, 81-48W      | injury            |          |
| 04/09/90             | sperm          | F   | 8.4 est     | Grande Isle, LA  | 29-15N, 89W        | mortality         |          |
| 04/16/91             | unknown        |     |             | Off Key West, FL   |                    | unknown           |          |
| 30-Jan               | right          |     | calf        | Texas  |                    | mortality         |          |
| <b>International</b> |                |     |             |  |                    |                   |          |
| 08/07/02             | sperm          |     | 9           | 30 nm south of Marquesas                                   | 23-56.3N, 82-06.5W | injury            |          |
| 07/22/02             | southern right | M   | adult       | Argentina  |                    | mortality         |          |
| 06/18/01             | sperm          |     |             | 20 mi south of Puerto Rico, Caribbean Sea                  |                    | mortality         |          |
| 02/28/01             | humpback       |     |             | Off Enterprise Island, Antarctic Peninsula, Southern Ocean |                    | no sign of injury |          |
| 02/01/00             | humpback       | N/A |             | Off Antarctic Peninsula, Southern Ocean                    |                    | injury            |          |
| 01/11/00             | Bryde's        | N/A | 12.4        | SW of Bonaire, Caribbean Sea                               |                    | mortality         |          |
| 08/05/98             | unknown        | N/A |             | Mediterranean, Nice Harbor, France                         |                    | unknown           |          |
| 07/10/98             | southern right | F   | calf        | Die Dam, Quoin Point, S. Africa                            |                    | mortality         |          |
| 1997                 | sperm          | F   | cow/calf pr | Canary Islands   | 28-11N, 15-32W     | mortality         |          |
| 08/09/97             | sperm          |     |             | Ischia, Campania, Italy                                    |                    | mortality         |          |
| 07/31/97             | minke          |     |             | Genova, Liguria, Italy                                     |                    | mortality         |          |
| 02/24/97             | finback        | M   | 5.2         | Mediterranean Sea, Marseille                               |                    | mortality         |          |



## NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

| Vessel Type           | Vessel Size(m) | Speed (kts) | Vessel Damage | Source           | Comments   |
|-----------------------|----------------|-------------|---------------|------------------|--|
| whale-watch catamaran | 25             | 9           | N             | OLE report       | vessel came down on top of whale (three in close pod)  |
| fishing vessel        | 27             | 9           | N             | Laist et al 2001 | vessel struck whale head-on along port bow, whale observed swimming in circles before contact w/animal lost            |
|                       |                |             |               | OLE report       |  |
|                       |                |             |               | NEFSC            | head detached, possible boat propeller scar  |
| Navy                  | 169.5          |             |               | Navy memo        |  |
|                       |                |             |               | NEFSC            | found on ship's bow  |
|                       |                |             |               | NEFSC            | propeller wounds, seen from 2/19-2/21 swimming normally, likely ship strike  |
|                       |                |             |               | NEFSC            | deep cuts on dorsal surface indicate the ship strike was probably pre-mortem   |
| Navy                  | 24             | <40         | Y             | Tucker*          | ship struck whale, extensive damage to vessel, cost \$1 million  |
|                       |                |             |               | Best et al 2001  | body severed approx 1 m forward of tail stock  |
|                       |                |             |               | USCG             | whale's pectoral fin cut in half, swimming slowly, fate unknown  |
|                       |                |             |               | NMFS             |  |
| Navy                  | 154            | 27          | N             | MMC letter       | commanding officer felt shudder on impact, large blood slick in ship's wake, found dead whale upon circling back       |
| inflatable zodiac     | 5.8            | 13-15       | N             | ship report      | two whales surfaced immediately in front of zodiac, one hit just below dorsal fin, no sign of blood in water or injury |
| passenger ship        | 118            | 14.3        | N             | Wikander*        | 2 whales surfaced 14 m off bow, 1 came up directly under bow and was hit w/loud thud and shudder, blood in water       |
| cruise ship           | 214            | 22          | N             | De Meyer*        | harbor master observed whale on ship's bow, time/location of collision determined from decrease in speed during night  |
| high-speed ferry      |                | 30          | Y             | Collet*          | vessel hit unidentified whale  |
|                       |                |             |               | Laist et al 2001 | tail cut off   |
| commercial ferry      | 100            | 25          |               | Andre*           | cow/calf pair resting at surface, loud sound heard, bodies of both animals observed behind vessel amidst blood         |
|                       |                |             |               | Laist et al 2001 | stranded, 3 deep wounds  |
|                       |                |             |               | Laist et al 2001 | stranded w/fractured skull   |
|                       |                |             |               | Laist et al 2001 | stranded, large hematoma on right side of thorax, possible ship strike   |

**NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales**

| Date     | Species        | Sex | Length (m) | Location (where struck, if known; if not, where found ) | Coordinates    | Mortality/ Injury | Field ID |
|----------|----------------|-----|------------|---|----------------|-------------------|----------|
| 01/24/97 | sperm          |     |            | Messina, Sicily, Italy                                  |                | mortality         |          |
| 07/28/96 | southern right |     | 14.6       | Scarborough, Cape Peninsula, S. Africa                  |                | mortality         |          |
| 07/26/96 | finback        | M   | 14         | Mediterranean Sea, between France and Corsica           |                | mortality         |          |
| 09/26/95 | finback        | F   | 18         | Mediterranean Sea, Fos sur Mer                          |                | mortality         |          |
| 05/25/95 | finback        |     |            | Livorno, Tuscany, Italy                                 |                | mortality         |          |
| 06/17/95 | blue           |     |            | Approaching Hauraki Gulf, New Zealand                   |                | mortality         |          |
| 06/17/95 | finback        |     |            | Shearness Harbour, Kent, United Kingdom                 |                | mortality         |          |
| 11/10/94 | southern right |     | 10.7 juv   | Shell Bay, St. Helena Bay, S. Africa                    |                | mortality         |          |
| 10/31/94 | unknown        |     |            | 22 km W of Niigata, Japan, Sea of Japan                 |                | injury            |          |
| 09/22/94 | southern right |     | 11 juv     | Kabeljoubank, Breede River, S. Africa                   |                | mortality         |          |
| 07/19/94 | finback        | M   | 14.5       | Atlantic Ocean, English Channel, Le Havre               |                | mortality         |          |
| 05/20/94 | finback        |     |            | Cagliari, Sardinia, Italy                               |                | mortality         |          |
| 1994     | sei            |     |            | Approaching Hauraki Gulf, New Zealand                   |                | mortality         |          |
| 10/10/93 | southern right | F   | calf       | Lekkerwater, De Hoop, S. Africa                         |                | mortality         |          |
| Oct-93   | southern right |     |            | Rio Grande do Sul, Brazil                               |                | mortality         |          |
| 09/09/93 | finback        |     |            | Mediterranean, St. Tropez, France                       |                | mortality         |          |
| 09/09/93 | finback        | F   |            | Mediterranean, Toulon Harbor, France                    |                | mortality         |          |
| 08/16/93 | southern right |     | calf       | Between Long Beach and Koppie Alleen, S. Africa         |                | mortality         |          |
| 1992     | southern right |     |            | Rio Grande do Sul, Brazil                               |                | unknown           |          |
| 05/15/92 | bryde's        |     | 12         | Bass Strait, Australia                                  |                | mortality         |          |
| 04/04/92 | unknown        |     |            | 19 km W of Callao, Peru                                 |                | injury            |          |
| Feb-92   | sperm          |     |            | Canary Islands  | 27-56N, 14-34W | mortality         |          |
| 1991     | southern right |     |            | Rio Grande do Sul, Brazil                               |                | mortality         |          |
| 05/13/91 | finback        | M   | 18.8       | Atlantic Ocean, Bay of Biscay, Donges                   |                | mortality         |          |

## NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

| Vessel Type                | Vessel Size(m) | Speed (kts) | Vessel Damage | Source             | Comments  |
|----------------------------|----------------|-------------|---------------|--------------------|---|
|                            |                |             |               | Laist et al 2001   | stranded w/propeller wounds, fractured skull  |
|                            |                |             |               | Laist et al 2001   | broken rostrum and missing skull bones  |
| ferry                      |                |             |               | Laist et al 2001   | brought into port on bow of ship  |
| merchant ship              |                |             |               | Laist et al 2001   | brought into port on bow of ship  |
|                            |                |             |               | Laist et al 2001   | brought into port on bow of ship, fractured jaw and other wounds  |
| container ship             |                |             |               | Ford, pers comm    | ship entered Auckland harbor with whale on bow  |
| container ship             |                |             |               | Ford, pers comm    | whale found wrapped around bow in harbor, pre- or post-mortem strike undetermined                                   |
|                            |                |             |               | Laist et al 2001   | diagonal slashes across genital aperture  |
| high speed jetfoil ferry   | 31             |             |               | Honma et al. 1997* | after collision, tissue and bone indicative of marine mammal removed from waterjet suction pipe at vessel stern     |
|                            |                |             |               | Laist et al 2001   | cuts across back  |
| merchant ship              | 190            |             |               | Laist et al 2001   | brought into port on bow of ship  |
|                            |                |             |               | Laist et al 2001   | stranded w/propeller wounds on right side, fractured right flipper  |
| container ship             |                |             |               | Ford               | ship entered Auckland harbor with whale on bow  |
|                            |                |             |               | Laist et al 2001   | tail cut off  |
|                            |                |             |               | Best et al 2001    | whale stranded w/4 propeller cuts on tail stock   |
|                            |                |             |               | Laist et al 2001   | hit by ship, seen floating at sea   |
| bulbous bow ferry          | 159            | 20          |               | Collet*            | crew felt shock and strong vibrations, decrease in vessel speed, 3 hrs later observed whale caught on bow in harbor |
|                            |                |             |               | Laist et al 2001   | tail cut off  |
|                            |                |             |               | Best et al 2001    | trawler reported striking a right whale   |
| bulbous bow container ship | 121            | 14          |               | Wapstra*           | whale found draped around hull upon entering harbor, necropsy indicated whale alive when hit                        |
| research vessel            | 89             | 14          | N             | Ainley*            | shudder was felt, blood seen in ship's wake, numerous whales seen in area nearby                                    |
| high speed ferry           | 20             | 45          |               | Andre et al. 1997* | collision resulted in death of one passenger  |
|                            |                |             |               | Best et al 2001    | two halves of right whale found approx 1/2 mile apart   |
| tanker                     |                |             |               | Laist et al 2001   | brought into port on bow of ship, broken jaw  |

**NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales**

| Date     | Species        | Sex | Length (m) | Location (where struck, if known; if not, where found ) | Coordinates | Mortality/ Injury | Field ID |
|----------|----------------|-----|------------|---|-------------|-------------------|----------|
| 04/30/91 | finback        |     |            | Genova, Liguria, Italy                                  |             | mortality         |          |
| 28-Apr   | finback        |     |            | Porto Torres, Sardinia, Italy                           |             | mortality         |          |
| 1989     | southern right |     | juv        | Rio Grande do Sul, Brazil                               |             | mortality         |          |
| 05/20/89 | finback        |     |            | Olbia, Sardinia, Italy                                  |             | mortality         |          |
| 09/07/88 | southern right | M   | 14.1       | 7 km outside Port Elizabeth Harbor, S. Africa           |             | mortality         |          |
| 01/16/88 | sperm          |     |            | Cagliari, Sardinia, Italy                               |             | mortality         |          |
| 05/22/87 | finback        |     |            | Olbia, Sardinia, Italy                                  |             | mortality         |          |
| 04/27/87 | sperm          |     |            | Savona, Liguria, Italy                                  |             | mortality         |          |
| 11/06/86 | finback        |     | 16         | Mediterranean Sea, Fos sur Mer                          |             | mortality         |          |
| 06/28/86 | finback        |     |            | Livorno, Tuscany, Italy                                 |             | mortality         |          |
| 06/23/86 | finback        |     |            | Livorno, Tuscany, Italy                                 |             | mortality         |          |
| 01/21/85 | finback        | M   | 18         | Mediterranean Sea, Port La Nouvelle La Franqui          |             | mortality         |          |
| 10/16/84 | southern right |     | 7.2 calf   | East London Harbor, S. Africa                           |             | mortality         |          |
| 02/08/84 | southern right |     |            | Jakkalsfontein, S. Africa                               |             | mortality         |          |
| 07/27/83 | southern right |     | 14.3 adult | Beachview, Port Elizabeth, S. Africa                    |             | mortality         |          |
| 09/19/82 | finback        |     | 13.5       | Mediterranean Sea, Villeneuve les Maguelonnes           |             | mortality         |          |
| 07/05/80 | blue           |     |            | 64 km W of Ensenada, Mexico                             |             | mortality         |          |
| 10/19/76 | finback        | F   | 12.5       | Atlantic Ocean, Bay of Biscay, France                   |             | mortality         |          |
| 04/03/76 | finback        | M   | 14.3       | Mediterranean Sea, Toulon                               |             | mortality         |          |
| 1974     | unknown        |     |            | Cook Strait, N.Z.                                       |             | injury            |          |
| 09/10/74 | finback        |     | 15         | Mediterranean Sea, between Menton and Antibes           |             | mortality         |          |
| 04/23/74 | unknown        |     |            | <2 km off Baja Peninsula, Mexico                        |             | injury            |          |
| Oct-73   | unknown        |     |            | Bay of Bengal, Indian Ocean                             |             | mortality         |          |
| 08/30/73 | finback        |     | 15         | Mediterranean Sea, between France and Corsica           |             | mortality         |          |

**NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales**

| Vessel Type         | Vessel Size(m) | Speed (kts) | Vessel Damage | Source              | Comments  |
|---------------------|----------------|-------------|---------------|---------------------|---|
| ferry               |                |             |               | Laist et al 2001    | brought into port on bow of ferry   |
|                     |                |             |               | Laist et al 2001    | struck by ship 1.5 mi from port, seen alive w/deep wound on back, found dead a day later                                      |
|                     |                |             |               | Best et al 2001     | stranded w/propeller cuts on head   |
| ferry               |                |             |               | Laist et al 2001    | struck by ferry near entrance to harbor   |
| twin screw ferry    |                |             |               | Laist et al 2001    | impact with whale felt, blood in water, three days later whale stranded w/propeller gashes and damaged rostrum                |
|                     |                |             |               | Laist et al 2001    | stranded w/propeller wounds   |
|                     |                |             |               | Laist et al 2001    | brought into port on bow of ship  |
|                     |                |             |               | Laist et al 2001    | stranded w/propeller wounds   |
| tanker              |                |             |               | Laist et al 2001    | hit by tanker, brought into port on bow of ship   |
|                     |                |             |               | Laist et al 2001    | floating offshore with propeller wounds on back   |
|                     |                |             |               | Laist et al 2001    | floating 5 mi offshore with propeller wounds on back  |
|                     |                |             |               | Laist et al 2001    | stranded, large propeller cuts on back, probable ship strike  |
| Hopper dredge       | 110            |             |               | Best et al*         | cow/calf pair surfaced in front of dredge, calf took full brunt of impact, struck by propeller as ship passed, stranded, died |
|                     |                |             |               | Laist et al 2001    | major damage around midlength seen from air   |
|                     |                |             |               | Laist et al 2001    | five apparent propeller gashes  |
|                     |                |             |               | Laist et al 2001    | stranded, cut through middle of back, probable ship strike  |
| tanker              | 203 m          | 21          |               | Patten et al. 1980* | whale w/broken spine floated off ship's bow in LA harbor, collision location inferred from decrease in speed                  |
|                     |                |             |               | Laist et al 2001    | stranded, large propeller cuts on back, probable ship strike  |
| merchant ship       |                |             |               | Laist et al 2001    | brought into port on bow of ship, several ribs and cervical vertebra broken   |
| commercial ferry    | 4,000 tons     | 17          | N             | in Laist et al 2001 | struck and possibly killed whale, blood noticed in water after vessel passed  |
|                     |                |             |               | Laist et al 2001    | cut through middle, seen floating offshore  |
| private motor yacht | 18             | 10.5        | N             | in Laist et al 2001 | boat shook & veered to port, large whale surfaced at stern w/deep propeller gashes down mid-section, pool of blood seen       |
| Navy                | 133            |             | N             | Cummings*           | vessel collided w/large whale at night and sustained no damage  |
| ferry               |                |             |               | IML*                | brought into port on bow of ship  |

**NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales**

| <b>Date</b> | <b>Species</b> | <b>Sex</b> | <b>Length (m)</b> | <b>Location (where struck, if known; if not, where found )</b> | <b>Coordinates</b> | <b>Mortality/ Injury</b> | <b>Field ID</b> |
|-------------|----------------|------------|-------------------|--|--------------------|--------------------------|-----------------|
| 09/03/72    | finback        | M          | 12.6              | Mediterranean Sea, Nice  |                    | mortality                |                 |
| 07/05/72    | finback        | M          | 18                | Mediterranean Sea, off Calvi                                   |                    | mortality                |                 |
| Mar-72      | unknown        |            |                   | Las Perlas Islands, Panama, Pacific Ocean                      |                    | injury                   |                 |
| 1963        | unknown        |            |                   | Equatorial Pacific   |                    | injury                   |                 |
| Sep-61      | unknown        |            |                   | Caribbean Sea  |                    | injury                   |                 |
| 02/01/60    | unknown        |            |                   | W of Cape Reinga, North Island, New Zealand                    |                    | injury                   |                 |
| 03/22/55    | sperm          |            | 10                | 89 km W of Cape Gardafui, Canary Islands                       |                    | mortality                |                 |
| 12/25/54    | unknown        |            |                   | 11 km off Kaikoura, South Island, New Zealand                  |                    | unknown                  |                 |
| fall 1953   | unknown        |            |                   | N Yellow Sea   |                    | mortality                |                 |
| 1950        | Bryde's        |            |                   | Red Sea, Egypt   |                    | mortality                |                 |
| 1930's      | unknown        |            |                   | Near Raratonga, South Pacific                                  |                    | mortality                |                 |

## NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

| Vessel Type    | Vessel Size(m) | Speed (kts) | Vessel Damage | Source           | Comments   |
|----------------|----------------|-------------|---------------|------------------|--|
| ferry          |                |             |               | IML*             | brought into port on bow of ship   |
| ferry          |                |             |               | Laist et al 2001 | hit by ferry, seen floating at sea   |
| Boston whaler  | 4              | >25         |               | Cummings*        | boat struck whale and rode directly over the animal, after collision animal seen thrashing w/bloody wound      |
| passenger ship | 14,000 tons    | 18          | N             | Cummings*        | whale in front of vessel was struck, small amount of blood in water, whale appeared to swim away slowly        |
| cargo vessel   | 8,000 tons     | 14          |               | Laist et al 2001 | whale first sighted lying at surface, then seen thrashing in wake w/blood in water after collision             |
| passenger ship | 13,000 tons    |             |               | Cummings*        | vessel shuddered and slowed when propeller struck whale, animal then seen thrashing w/back sliced and bleeding |
| steamship      | 144            | 17          |               | Slipjer 1979*    | whale struck on head and body and became lodged on bow below water line  |
| passenger ship | 133            | 18          | Y             | Cummings*        | vessel collided w/large whale and sustained damage   |
| Navy           | 169            | ~20         | N             | Cummings*        | shudder was felt, object on bow identified as whale, ship backed down to dislodge whale which then sank        |
| tanker         |                |             |               | Laist et al 2001 |  |
| steamer        | 131            | 15          |               | Cummings*        | ship collided w/large whale and almost cut it in half  |