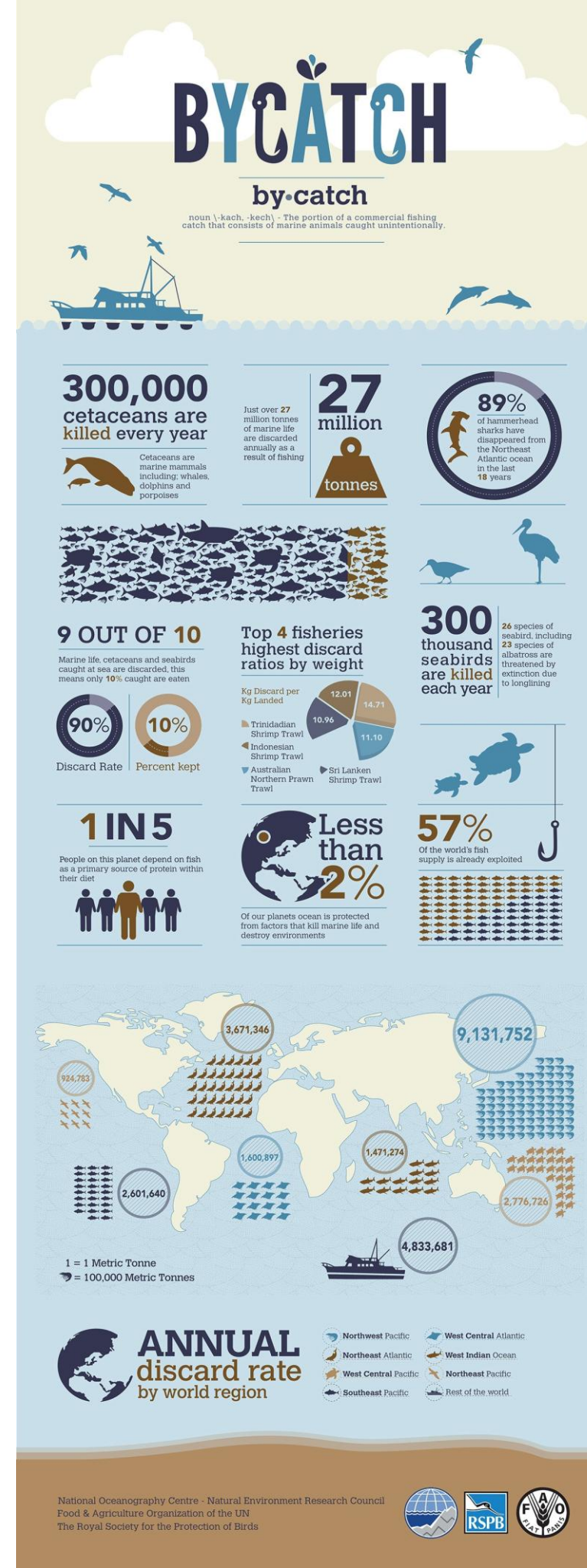


Marine Mammal By-Catch in U.S. and Global Fisheries

Marine Mammal Commission Annual Meeting
Washington, D.C.
May 7th 2014

Andrew J. Read
Duke University



Definitions

By-Catch: That portion of the capture that is discarded at sea dead, or injured to an extent that death is the most likely outcome.

Hall (1996) Reviews in Fish Biology & Fisheries 6: 319-352

Serious Injury and Mortality: Death or any injury that presents a greater than 50 percent chance of death to a marine mammal.

NMFS Policy Directive PD 02-038 77 FR 3233

The U.S. Approach Since 1994

Stock Assessment: Formal requirement for agencies to assess the status of each stock of marine mammals on a regular basis, including estimation of by-catch in commercial fisheries

Biological Reference Points: Stock-specific *Potential Biological Removal* (PBR) and *Zero Mortality Rate Goal* (ZMRG) levels

Take Reduction Process: Consensus-based, multi-stakeholder negotiated rule-making process to develop plans to reduce by-catch to levels below PBR for strategic stocks

By-Catches in U.S. Fisheries

Table 1

Estimates of annual marine mammal bycatch in U.S. fisheries stratified by taxon and fishery type.

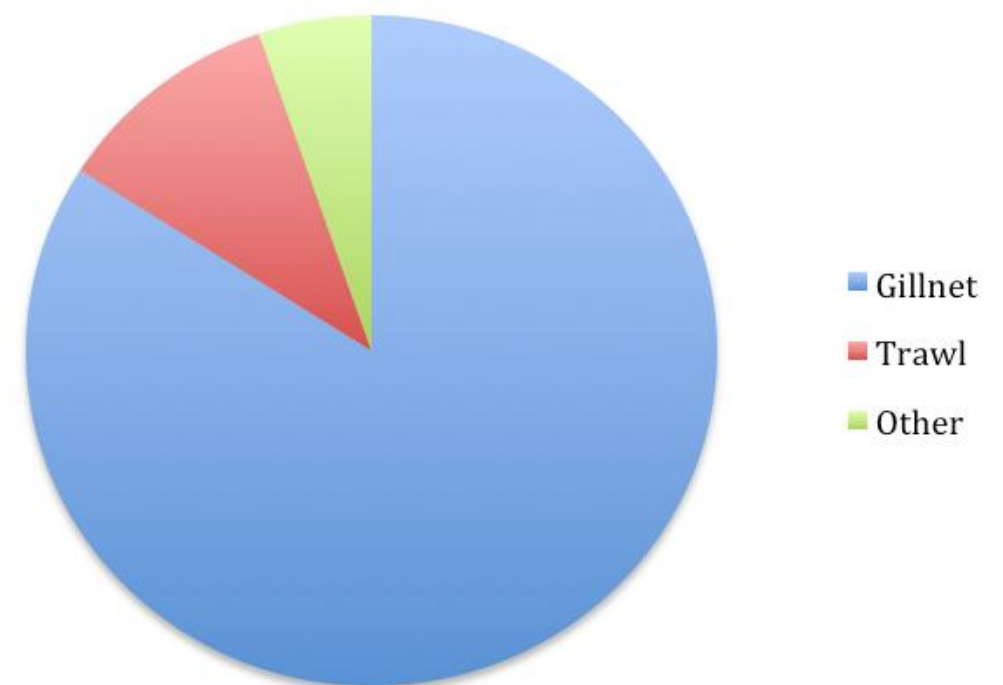
Taxon and fishery type	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
<i>Cetaceans</i>													
Gillnet	2928	2261	2624	2095	1481	1051	1139	262	649	886	900	1362	1136
Trawl	199	195	999	436	116	332	343	529	372	509	598	599	477
Other	388	475	114	11	70	408	234	205	115	181	138	315	216
<i>Pinnipeds</i>													
Gillnet	3540	3136	2472	2873	2323	2344	3034	3249	1222	1026	1784	1392	427
Trawl	29	3	15	17	14	11	22	79	18	37	23	25	36
Other	29	30	6	20	15	0	7	3	4	0	1	0	6

Mean Annual Marine Mammal By-Catch 1994 - 2006

Total 4,356 (\pm 424)

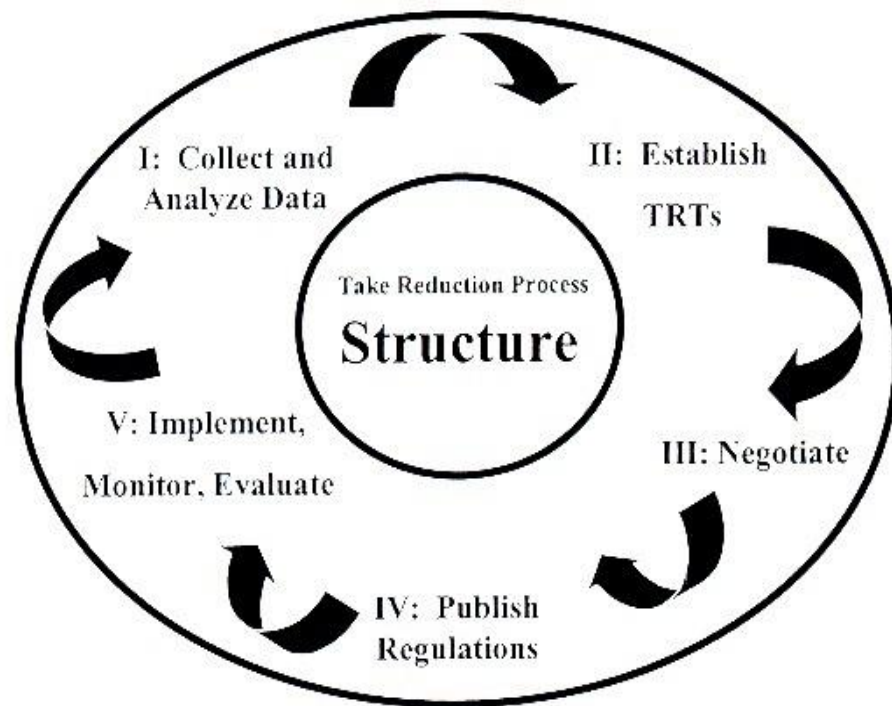
Cetaceans 2,104 (\pm 237)

Pinnipeds 2,252 (\pm 271)



Read *et al.* (2006); Geijer & Read (2013)

Take Reduction Process



The Secretary shall develop and implement a take reduction plan designed to assist in the recovery or prevent the depletion of each strategic stock which interacts with a commercial fishery...

Harbor Porpoise TRT (1996)

Atlantic Offshore Cetacean TRT (1996)

Atlantic Large Whale TRT (1996)

Pacific Offshore Cetacean TRT (1996)

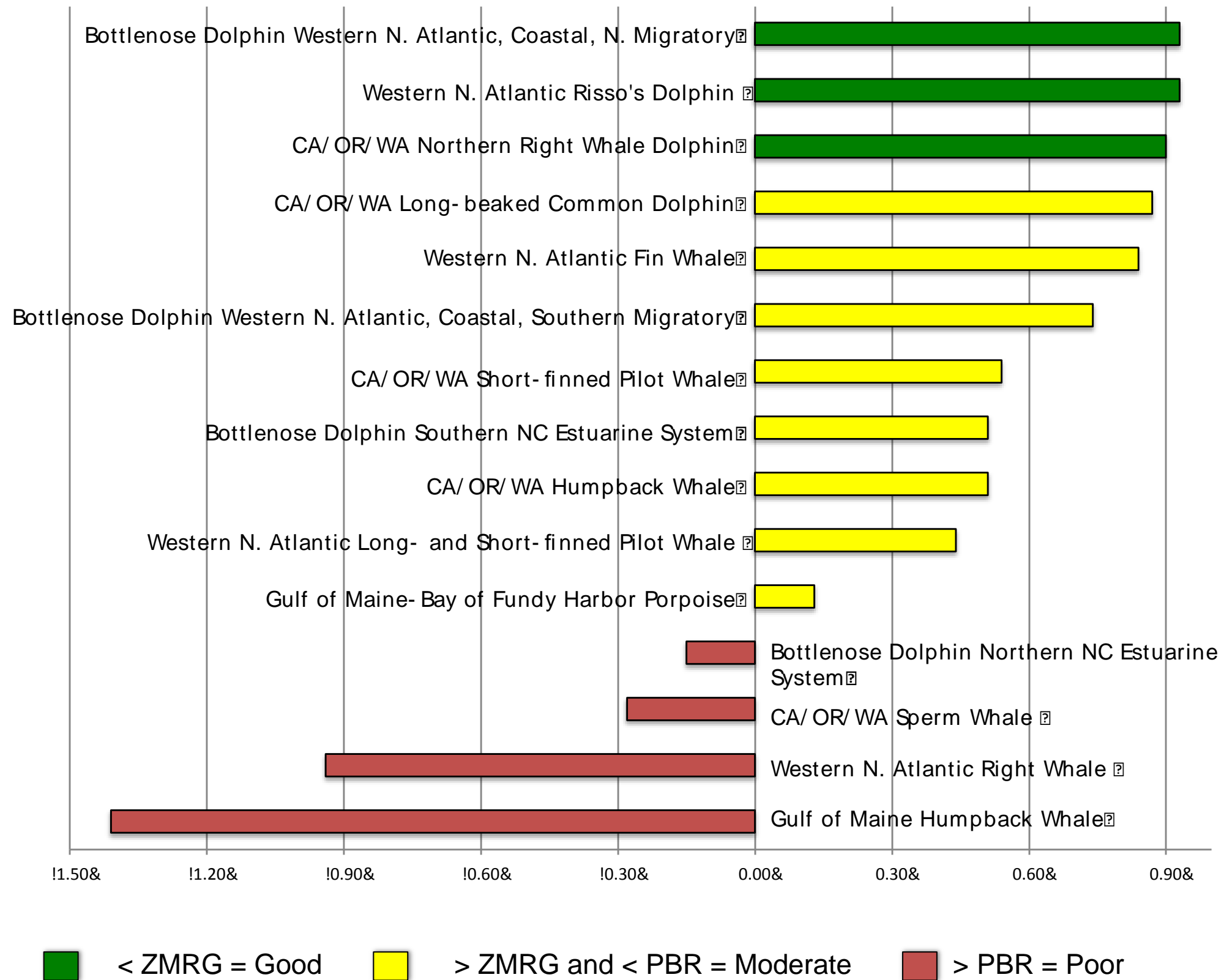
Bottlenose Dolphin TRT (2002)

Pelagic Longline TRT (2005)

Atlantic Trawl Gear TRT (2006)

Hawaiian False Killer Whale TRT (2009)

Bycatch of Marine Mammal Stocks Ranked by Metric2





Contributed Paper

Assessment of Management to Mitigate Anthropogenic Effects on Large Whales

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REPORT OF THE
NORTH ATLANTIC RIGHT WHALE
PROGRAM REVIEW

13–17 March 2006, Woods Hole, Massachusetts

Report prepared for the
Marine Mammal Commission by

Randall R. Reeves
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2007

POLICY FORUM

ECOLOGY

North Atlantic Right Whales
in Crisis

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Masami Fujiwara,⁴ Philip K. Hamilton,¹ Robert D. Kenney,⁵ Amy R. Knowlton,¹
Scott Landry,⁶ Charles A. Mayo,⁴ William A. McLellan,⁷ Michael J. Moore,⁸
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Despite international protection from commercial whaling since 1935, the North Atlantic right whale (*Eubalaena glacialis*) remains one of the most endangered whales in the world (1). Whaling for almost 1000 years brought this species close to extinction in the early 20th century (2). Right whales range in the coastal waters of eastern North America from Florida to the Canadian Maritimes, regions that are heavily used by the shipping and fishing industries and by the military. A low reproductive rate and recently declining survival probabilities (1, 3), particularly for breeding females (4), appear to have prevented this population from recovering over the last 25 years (5). Most right whale mortalities are due to collisions with ships and entanglements in fishing gear (5). The right whale population growth rate has declined since 1980, and the total population now appears to be diminishing in size (4). This is in stark contrast to southern hemisphere right whales (*Eubalaena australis*), whose population is estimated to be over 10,000 animals and appears to be increasing at 7.2% per year (6).

Recent mortalities demonstrate the serious problem facing the North Atlantic right whale. In the past 16 months, there have been eight recorded deaths, including six adult females (three were carrying near-term fetuses). Four of these whales were killed by human activities (three by ships and one by fishing gear), a fifth whale was probably killed by a ship, two whales were offshore and could not be retrieved for examination, and a young calf died on the beach in Florida. The loss of this number of whales, and particularly this number of reproductive females, in such a short period, is unprecedented in 25 years of study of this species (7). Four of these females were just starting to bear calves, and since the average lifetime calf production is 5.25 calves (4), the deaths of these females represent a lost reproductive potential of as many as 21 animals.

The most recently published estimates of right whale survival (4, 8) suggest that the mortality rate increased between 1980 and 1998 to a level of 4 (±1%). From recent population estimates of 350 right whales (1), a 4% mortality rate implies 14 animals dying per year. In the last 20 years, an average of 2.4 dead whales has been reported each year, representing a detection rate of 17%. The eight deaths reported in the last 16 months is 2.9 times the average annual rate. Calculations based on demographic data through 1999 (4) show that this increase in mortality would reduce population growth by 3.5 to 12% per year. (The range reflects different choices in the details of model selection; the best model

constant, as many as 47 right whales could have died in the last 16 months.

Of the 50 dead right whales reported since 1986, at least 19 were killed by vessel collisions, and at least six were killed by fishing gear entanglements (7). Also during this period, there were 61 confirmed cases of whales carrying fishing gear, including the mortalities. Outcomes of the remaining cases and the fate of individual whales varied. Death is suspected in 12 cases, because of an animal's subsequent disappearance and/or the extremely poor health condition observed at the time of last sighting. Another eight animals are still entangled; their fate is uncertain. Thirty-three animals either shed the gear or were disentangled, and the remaining cases involved unidentified individuals. Chronically entangled whales lose weight, so they sink after death, unlike healthy animals that float if killed. Thus, right whale mortality from fishing gear is probably underestimated to a greater degree than ship kills (5).

Calf production has increased recently, raising doubts in some quarters about the urgency of the mortality problem. Annual calf production averaged 12 calves up until 2000 (1), but totaled 31, 21, 19, 16, and 28 in 2001 to 2005, respectively. However, the increase in the birth rate will have a small positive impact on population growth rate, as a hypothetical doubling of the per capita birth rate would increase population growth rate by at most 1.6% per year. The population is estimated to have been declining at about 2% per year before 2000 (1, 4, 8). Thus, the effects of recent increases in birth rate are too small to overcome this decline.

Federal managers in the National Oceanic and Atmospheric Administration (NOAA) Fisheries are charged by the Endangered Species Act and the Marine Mammal Protection Act to ensure that there is no human-induced mortality of right whales. There have been efforts to minimize the risk of ship strikes with mandatory ship location reporting, extensive aerial survey efforts, and mariner education. But without requiring changes in the operation of ships within right whale habitats and migratory corridors, this increased awareness has not



increase a reduction in mortality.

growth rate partly reportation station maintained

22 JULY 2005

561

United States Government Accountability Office

GAO

Report to the Chairman, Committee on Natural Resources, House of Representatives

December 2008

NATIONAL MARINE FISHERIES SERVICE

Improvements Are Needed in the Federal Process Used to Protect Marine Mammals from Commercial Fishing

Correlates of Failure

Small stocks

Large teams

Complicated plans

Lack of compliance

Political interference

Litigation

ICES Journal of Marine Science Advance Access published February 14, 2014

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Marine Science

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CIEM
International Council for the Exploration of the Sea

ICES Journal of Marine Science; doi:10.1093/icesjms/fbu008

Food for Thought

How we all kill whales

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moore.mji.edu. How we all kill whales. – ICES Journal of Marine Science, doi:10.1093/icesjms/fbu008

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Today there is enormous popular interest in marine mammals. Western media whaling by Japan, Norway and Iceland. There is, however, relative silence as to if marine countries are also catching and sometimes killing whales, albeit unintentionally. Development and increase in fishing and shipping in continental shelf waters, esse strength have increased in recent decades. The ways in which these animals die, es and swim off with, would raise substantial concern with consumers of seafood.

Keywords: animal welfare, bycatch, entanglement, mortality, whaling.



December 21, 2004

Courtesy of Wildlife Trust/NOAA

The Good News

The MMPA provides a robust framework with which to address by-catch

We have quantitative metrics of success and failure

By-catch has been reduced to below PBR for some stocks

The Bad News

Funding is inadequate for both the stock assessment and TRT processes

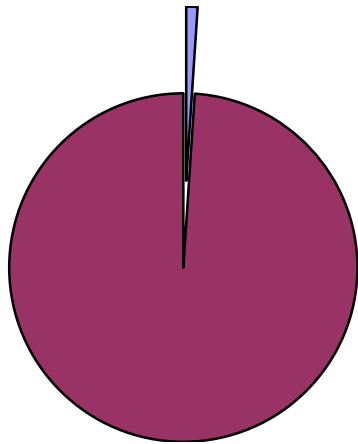
Defining stocks has proven difficult for continuously distributed species

Failure to reduce by-catch to below PBR for some stocks

Failure to address ZMRG

Global By-Catch 1990 - 1994

U.S. gill net vessels



Global gill net vessels

Scaling up from U.S. by-catch using available metrics of fishing effort from FAO yields crude estimates of:

570,000 – 649,000 marine mammals per year

Most by-catch occurs in gill net fisheries

Global Conservation Problems

Twelve Critically Endangered *Populations* of Small Cetaceans (IUCN Red List)

Vaquita

Maui's Dolphin

Yangtze Finless Porpoise

Mekong River Dolphin

Mahakam River Dolphin

Ayeyarwady River Dolphin

Malampaya Sound Dolphin

Songkhla Lake Dolphin

Fiordland Bottlenose Dolphin

Baltic Sea Harbor Porpoise

Cook Inlet Beluga

Eastern Taiwan Strait Humpback Dolphin



A Few Concluding Thoughts

1. By-catch poses a serious threat to the conservation of marine mammal diversity
2. By-catch in artisanal gill net fisheries has proven to be particularly intractable
3. Mitigating by-catch of small populations is very difficult without eliminating fisheries
4. Most serious by-catch issues occur within the EEZs of individual states
5. Many of these conservation issues are yet to be fully addressed





CENTER *for* BIOLOGICAL DIVERSITY



NATURAL RESOURCES DEFENSE COUNCIL
THE EARTH'S BEST DEFENSE



NOAA FISHERIES
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Collaboration on Smart Gear Prize for Marine Mammal Bycatch Reduction

The Marine Mammal Commission is pleased to announce that we, along with NMFS, the International Seafood Sustainability Foundation, the Natural Resources Defense Council, and the Center for Biological Diversity, are supporting a special prize as part of the WWF Global Smart Gear Competition. This special prize will be awarded to the winning proposal for gear modifications or alternative fishing gear designed to reduce marine mammal bycatch in gillnet fisheries.