

ICES Journal of Marine Science; doi:10.1093/icesjms/fsu008

Food for Thought

How we all kill whales

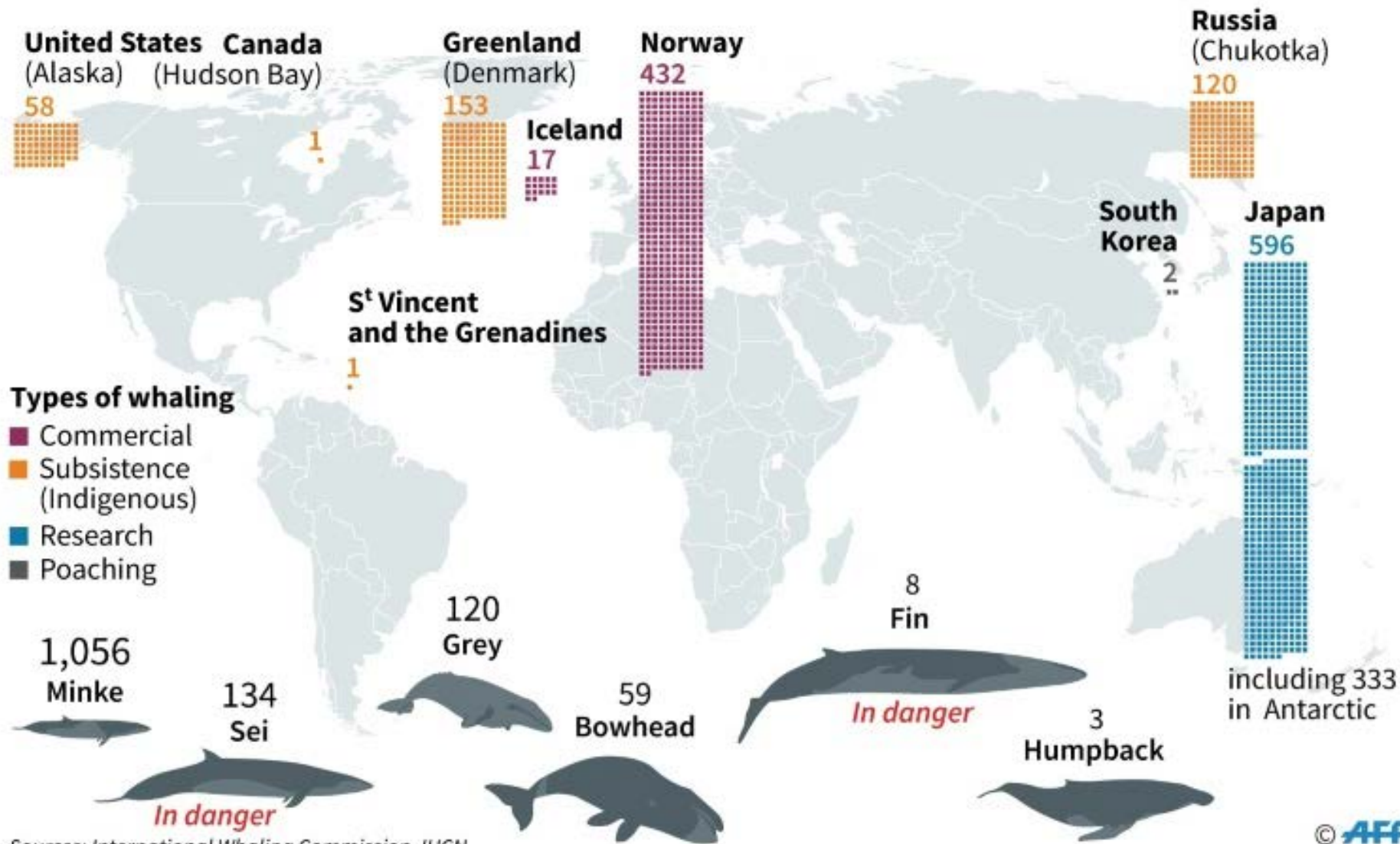
Michael J. Moore*

Open
Access!

Woods Hole
Oceanographic
INSTITUTION

1,380 whales caught around the world in 2017

Japan and Norway are the main whaling nations



Sources: International Whaling Commission, IUCN

© AFP

Oxford English Dictionary Definitions

‘Whaling’ – ‘The action, practice, or business of catching whales’

No consideration of intent or lack thereof: thus any act that results in the catching of a whale.

‘Catch’ – ‘To capture, esp. that which tries to escape; hence, to ensnare, surprise, overtake, reach, get at’

Thus modern industrial fishing practices, especially fixed gear trap fisheries, gill nets and mobile trawls, are all, albeit unintentionally, whaling if they catch a whale.

Whalers' Shipping List

MERCHANTS' AND TRANSCRIPT.

PUBLISHED EVERY TUESDAY MORNING BY
HENRY LINDSEY,

NO. 35, NORTH WATER STREET, NEW BEDFORD MASS.

IS—ONE DOLLAR per annum, PAYABLE IN ADVANCE. Single copies six cents



ADVERTISEMENTS inserted conspicuously at the customary rates. The Sheet has an extensive circulation in the principal cities and towns in New England, rendering it a medium for advertising.

A COMPLETE LIST OF AMERICAN WHALING SHIPS, with the latest arrivals, is contained in this paper.

L. X.

NEW-BEDFORD, OCTOBER 26, 1852.

NO

AGENTS.

EMUEL GODDARD, Esq., of London, COMMISSION MERCHANT, is our Agent, for the transaction of all business connected with the Shipping List, and for receiving and forwarding subscriptions for the

HERRY WATFORD, Esq., merchant, of Islands, New Zealand, is agent for the Shipping List in the South Pacific and to transact any business in connection with masters and officers of whale ships and wishing the Shipping List sent to them in the South Pacific, can have it forwarded by Overland Mail to the care of Mr W. who will deliver it to its delivery, or forward it thence as

ARRIVALS IN 1852.

[Table of Importations, showing the date of arrival, and the amount of Oils and Whalebone brought by each—corrected by the gaugers' and weighers' returns as soon as ascertained.]

DATE.	NAME AND PORT.	BLS SP.	BLS WH.	LB BONE.
Jan.				
17	Sappho, N Bedford	1077	860	
15	*Walter K. Provincetown	200		
24	*Ocean, Sandwich		15	
27	Millinoket, Warren	863		
30	Savannah, Boston	2402		
	Total	4541	875	
	Same time in '51	5560	19137	121,000
Feb.				
24	Jos Butler N Bedford	223	911	35,700
25	Amelia, Sandwich	115	1	
26	Byron, Stonington		249	1,867
26	Hudson, Mystic		2382	18,000
26	Washington, Mystic		10	
	Total,	338	3554	65,700
	Same time in 1851	2208	19721	138,100

23	To Boston	497		
21	Peruvian New London	15	2947	9,100
26	*Margaretta Salem	320	35	
29	Desdemona N Bed	1766		
30	*Hamilton Nantucket		60	
31	Herald N Bedford	1305	12	
31	Sharon Fairhaven	1131		
31	Boy Warren	205		
31	Leander, Mystic	408	311	1990
	Total	7751	4967	2900
	Same time in 1851	14571	11102	86,900
Aug.				
2	*Golden Fleece Boston	71		
6	*Palmyra Nantucket	47		
6	*Alexander Provincetown	160	5	
8	*R E Cook Provincetown	150	15	
9	Hector New Bedford	2278		
9	*Sarah Mattapoisett	425	200	1,500
10	Peruvian Nantucket	534		
12	Canton New Bedford	334	243	8,000
15	*Maria New Bedford	300	6	
	do on freight	50		
25	*Hamilton Nantucket		130	
29	*Dauntless Boston	75		
31	*Richd. Mitchell Nant.	1745		

GREENER'S WHALING GUN, AND DOUBLE SHANKED HARPOON.

THE great success attending the English Whaling ships in the Greenland and South Sea Fisheries, is owing to the use of Greener's Gun and superior doubled shanked Harpoons.

The following certificates from different Captains who have used them, speak volumes in their favor—no whaler leaves London now, without two or four of these Guns, their superiority over all others has been fully tested. The subscribers, agents for the sale of these Guns, are daily expecting a further supply, to which they would invite the attention of ship masters and owners.

SWIFT & ALLEN.
[From Captain ROBERT JARMAN, of the 'Favorite,' Sperm Whaler.]

In answer to your enquiry respecting the whales taken in the 'Favorite,' during the last voyage, by means of your Harpoons and Guns, I have to remind you, that as it was sent by way of trial, only three Harpoons were ordered, but with these three, I took eleven whales, after being struck at considerable distances, and under circumstances, that the whales would not permit the other boats to get sufficient for the usual manner by hand, this has amply, sufficiently proving the value of your improvements of the Gun Harpoon every success.

GEORGE HENSHAW, of the 'Frolic,' Sperm Whaler.]

In being able to add my testimony of your Harpoon Gun, having struck whales with it that never would have been provided with it, I have seen with it has been 18 fathoms, which is good darts for any man.

JOHN KEHEW, NAUTICAL INSTRUMENT

AND DEALER IN CHARTS, NAUTICAL BOOKS, NO 66 NORTH WATER ST., NEW



Where may be found all times, warrant Octants, Quadrants, Oleometers, Telescopes, ships, all kinds; hour, boat, and pocket log Glasses, Gun Parallel Rules, &c.

NAVIGATION BOOK

Horseburgh's East India Directory Navigator Shipmaster's Assistant; Pilot; Ward's, Turner's and Lyon's Nautical Almanacs as far as published; Seaman's Journals; ship's Account Slates; Stationary, &c. Also a comment of

CHARTS.

all of which will be sold as low as can be in town.

J. K. being a practical workman, personally to repairing and adjusting sextants, Quadrants, Spy Glasses, Compasses, will warrant his work and adjustment to the satisfaction.

Purchasers of Instruments may be assured their being accurately adjusted and in every respect. Experimental is usual to one who desires to

I am most happy in being able to add my testimony of the utility of your Harpoon Gun, having struck and saved 7 whales with it that never would have been alongside, had I not been provided with it. The farthest I have struck with it has been 18 fathoms.



Denmark Straits 1983

Behavioral and post mortem
observations on fin whales killed
with explosive harpoons...

Lambertsen and Moore
International Whaling
Commission 1984
TC/36/HK

Table I
Estimated Times of Terminal Unconsciousness (T_{tu})
and
Observed or Inferred Times of Terminal Movement (T_{tm})

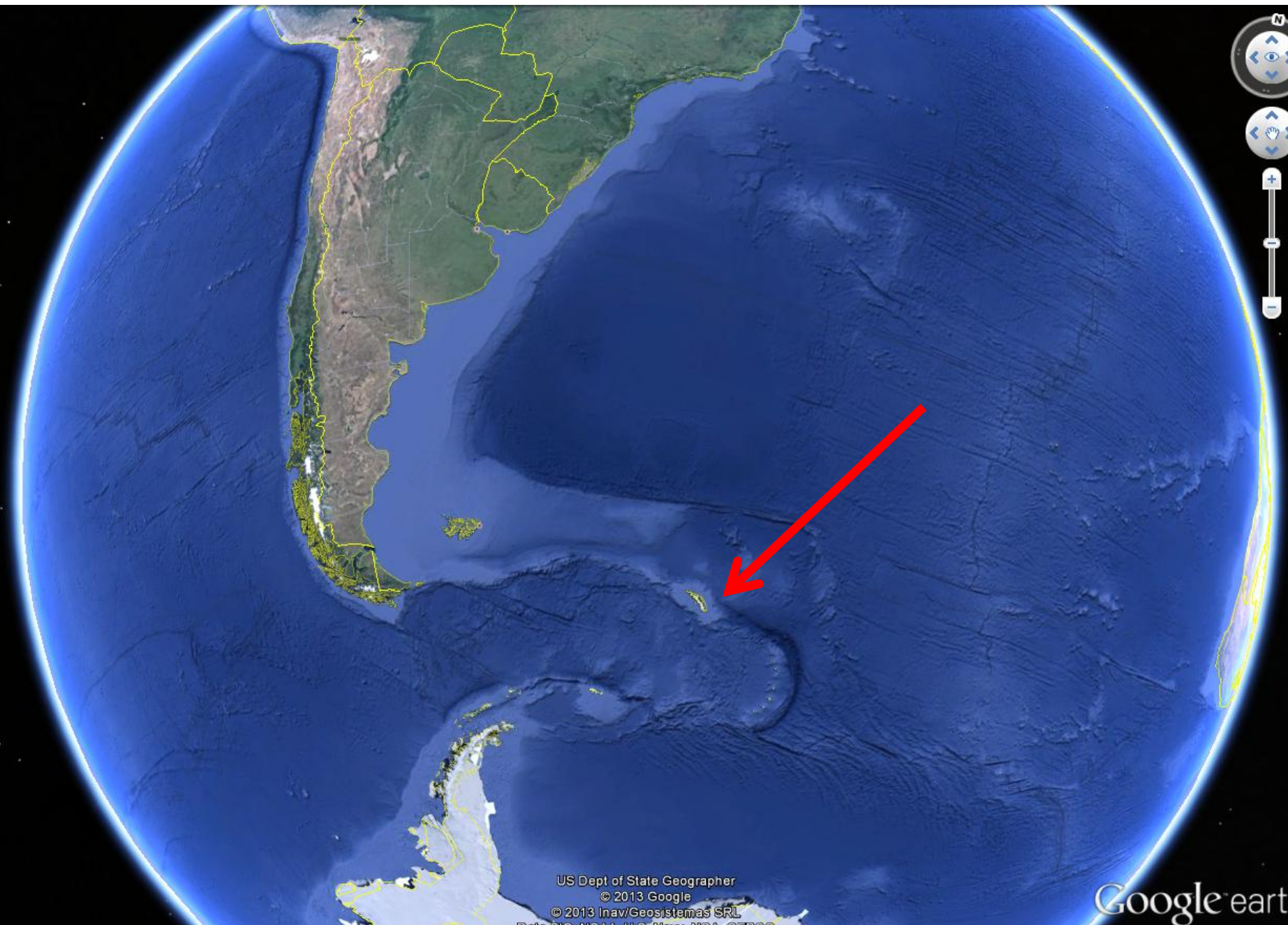
Whale No.	Sex	Length	T_{tu}	T_{tm}
24	M	57'	00.10	01.00 (i) ¹
25	M	55'	02.00	03.00
26	F	59'	00.00	09.34
27	M	62'	00.10	00.30 (f)
28	F	59'	00.10	00.25 (i)
29	M	53'	00.00	03.30
30	M	63'	00.00	00.22 (i)
31	M	59'	00.10	00.20 (i)
32	M	59'	07.00	07.00
33	M	56'	01.20	01.28 (i)
34	M	56'	07.32	07.32
35	F	64'	14.58	16.12
36	F	56'	02.00	02.11 (i)
37	F	59'	07.24	07.24
38	M	59'	00.10	00.47 (i)
39	F	60'	07.59	07.59
40	M	58'	02.30	02.30 (i)
41	M	62'	06.03	10.19
42	M	54'	11.38	11.38
Median			02.00	03.00
Mean			03.42	05.00

¹: Termination of movement was inferred for whales which died at depth by assessing the behavior of the harpoon line, as indicated by (i). Others were observed to cease all active movement at the times indicated.



- Female North Atlantic right whale (Catalog #2030)
- 13.5 m long. First sighted June 29th 1990
- First sighted entangled May 10th 1999
- Last seen alive, September 13th 1999
- Sighted dead October 20 1999
- 'Blubber coat dissected off by the **rope and gillnet** stretched over the dorsum between the two flippers'

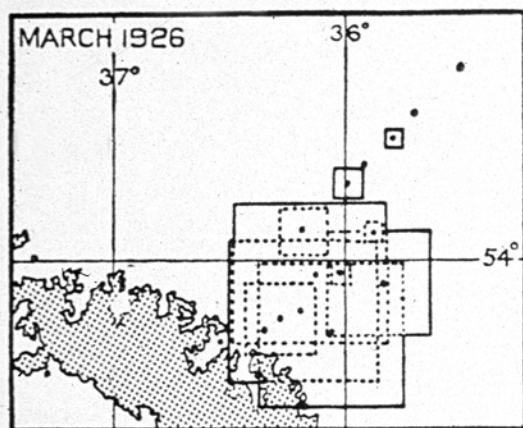
Photo Credit - Lisa Conger - New England Aquarium.



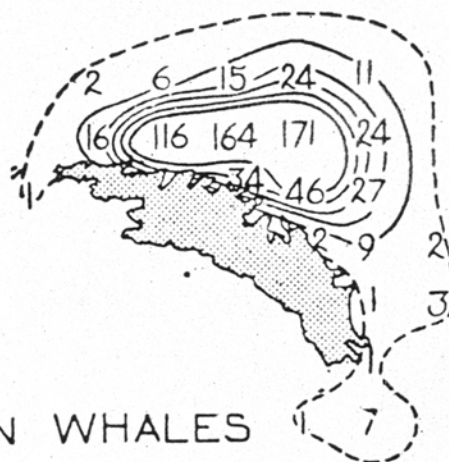
US Dept of State Geographer
© 2013 Google
© 2013 Inav/Geosistemas SRL
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Google earth

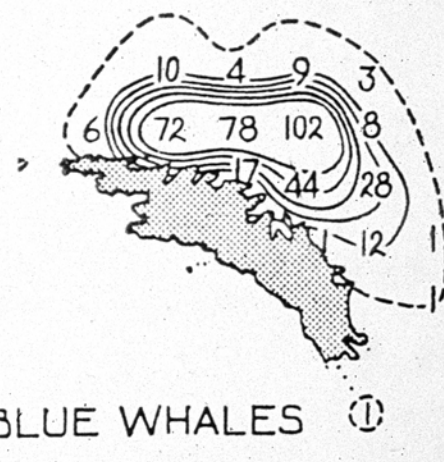
Imagery Date: 4/9/2013 lat -48.729416° lon -43.614985° elev -11131 ft eye alt 4414.66 mi



EUPHAUSIA
SUPERBA



FIN WHALES



BLUE WHALES

Fig. 143. *Euphausia superba* and whale distribution in March 1926 (whale distribution from Kemp and Bennett, 1932).

The Plankton of the South Georgia Whaling Grounds and Adjacent Waters 1926-1927
AC Hardy and ER Gunther. Discovery Reports Vol 11:1-456, 1935

Table 1. Subpopulations of baleen whales that were extirpated or severely reduced by commercial whaling, with no recovery evident since.

Species	Population	Subpopulation	Habitat type	Commercial exploitation began	Commercial extinction (CE)	Years elapsed since CE (to 2007)
<i>M. novaeangliae</i>	Antarctic (Area II)	South Georgia	Feeding ground	1904	1915	92
<i>M. novaeangliae</i>	Antarctic (Area V)	New Zealand	Migratory path	1912	1963	44
<i>M. novaeangliae</i>	Western North Atlantic	Southeastern Caribbean	Calving ground	1823	1926	81
<i>B. musculus</i>	Antarctic (Area II)	South Georgia	Feeding ground	1904	1935	72
<i>B. musculus</i>	Western North Pacific	Japan	Various	1906	1948	59
<i>B. physalus</i>	Spain-Portugal-British Isles	Straits of Gibraltar	Feeding/calving ground	1921	1927	80
<i>B. mysticetus</i>	Eastern North Atlantic	Spitsbergen	Feeding ground	1610	1900	107
<i>E. glacialis</i>	Eastern North Atlantic	Bay of Biscay	Calving ground	1050	1650	357
		Cintra Bay	Calving ground	1855	1860	147
		Northern Norway	Feeding ground	1613	1700	307
		Newfoundland/Labrador	Feeding ground	1530 ^b	1610	397
		British Isles	Feeding ground	1883 ^a	1914	93

^aAlthough right whales were present in this region at the time of the 16th century Basque fishery, the primary target of this fishery may have been the bowhead whale (see main text).

^bRight whales were certainly taken in British waters well prior to this date, but the well-documented Norwegian fishery that began in 1883 probably exploited a small population that had not been the subject of directed whaling in the region for some time.

Marine Mammal Bycatch

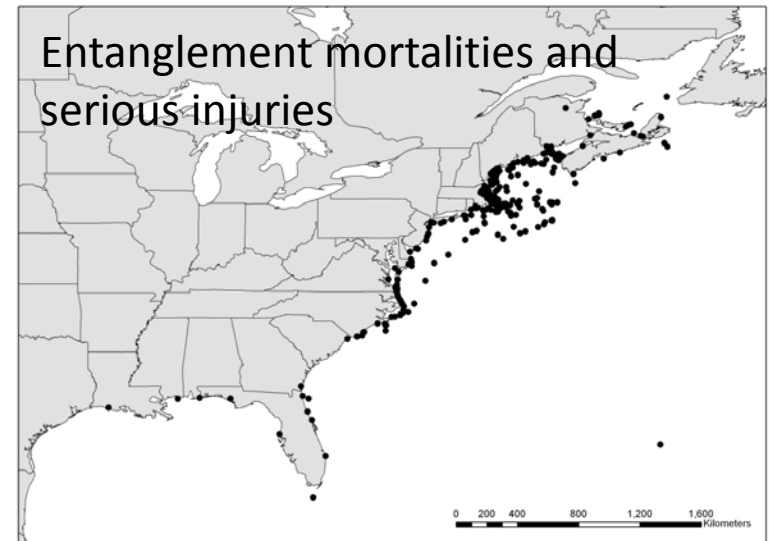
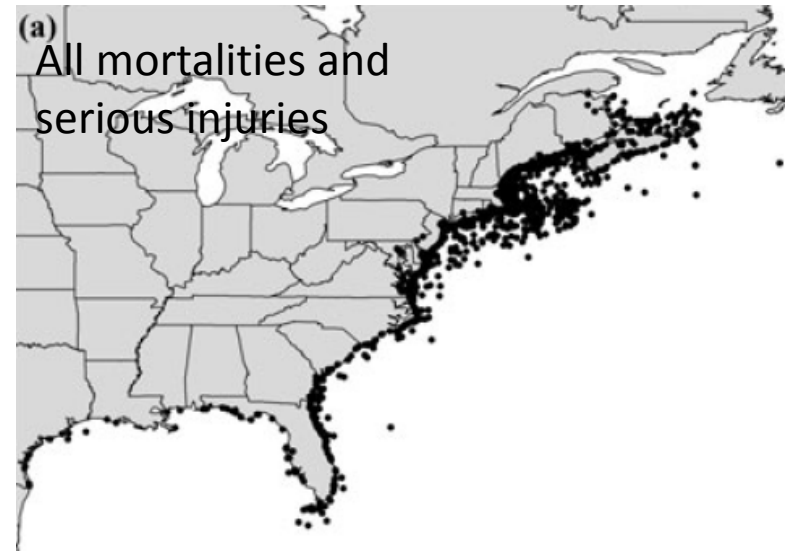
Table 3. Estimates of bycatch of marine mammals in the world's fisheries (number of vessels used to expand U.S. estimates to global totals).

<i>Fisbery type and year</i>	<i>No. of U.S. vessels</i>	<i>Total no. of vessels</i>	<i>Global cetacean bycatch</i>	<i>Global pinniped bycatch</i>	<i>Global marine mammal bycatch</i>
Gill net					
1990	2,140	203,598	466,392	182,763	649,154
1991	2,140	217,585	320,633	336,748	657,381
1992	2,160	218,272	239,766	568,518	808,283
1993	2,500	219,461	218,513	313,654	532,167
1994	2,500	220,500	258,250	312,228	570,478
Trawl					
1990	7,446	129,403	3,389	330	3,719
1991	7,440	130,128	5,198	630	5,828
1992	8,150	132,957	3,790	555	4,344
1993	8,290	137,720	2,213	166	2,379
1994	8,030	137,479	3,407	496	3,904
Other					
1990	3,220	77,640	72	3,645	3,717
1991	3,180	79,045	222	3,708	3,930
1992	3,230	80,606	6,382	3,698	10,079
1993	3,495	80,366	1,377	235	1,612
1994	3,430	80,991	9,164	685	9,849

Bycatch of Marine Mammals in US and Global Fisheries: Read, Drinker and Northridge, Conservation Biology 20: 163-9 (2006)

1970-2010

Most common diagnosed cause of death among 323 individuals from eight large whale species:
18% entangled,
10% vessel struck,
14% non-human related, and 57% undiagnosed in a sample of 323 animals



Last sighting prior to entanglement was on September 18, 2003 in the Bay of Fundy with her calf. Sighted entangled Sept 6 2004. Entangled for between 6 and 18 months.



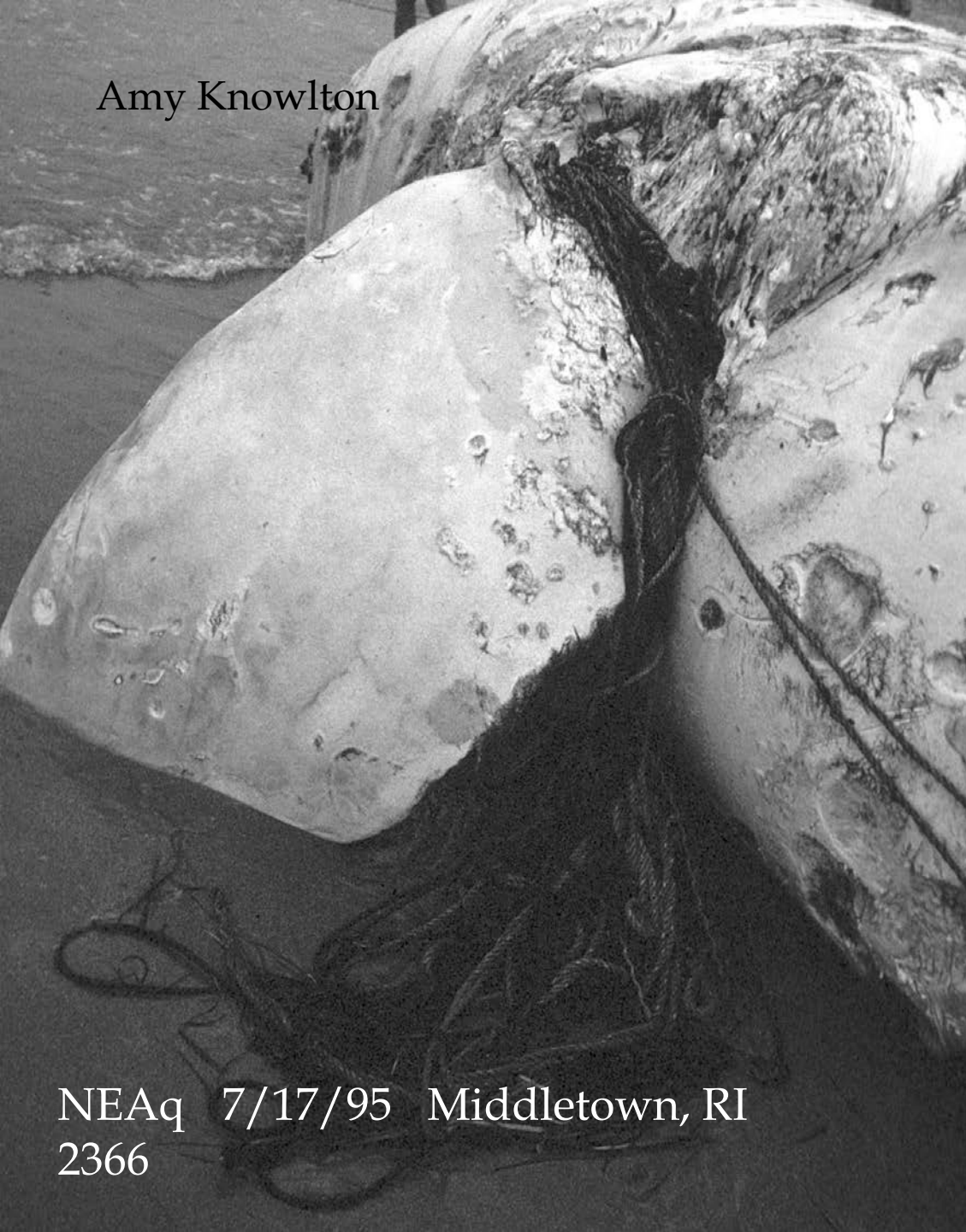
March 04 2005. Wreck Island, VA
Photograph: USCG



March 04 2005. Wreck Island, VA
Photograph: Moore



Amy Knowlton



NEAq 7/17/95 Middletown, RI
2366

Phillip Hamilton



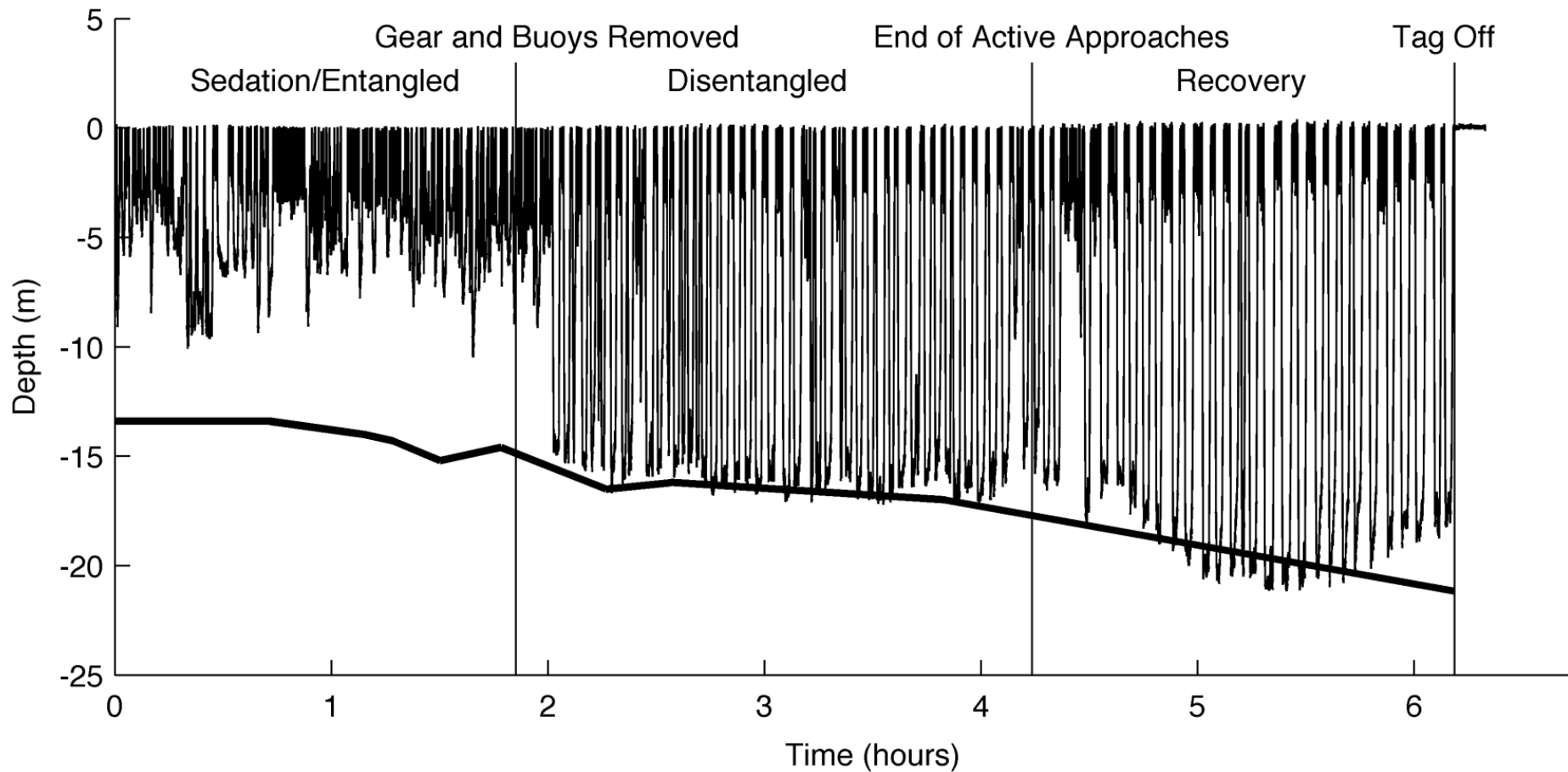
Bryde's whale (WAM 587)



Humpback whale (SC 01-18-Mn)

Live N Atlantic Right Whales

- *626 individual whales were assessed and 1032 unique entanglement events were documented.*
- *519 (82.9%) had been entangled at least once and 306 of the 519 (59.0%) had been entangled more than once.*
- *Males and females were entangled at similar rates.*
- *Juveniles were entangled at a higher rate than adults.*
- *On average, 25.9% of adequately photographed animals acquired new wounds or scars from fishing gear annually with no significant trend over time detected.*
- Knowlton et al Mar. Ecol. Prog. Ser. 466:293-302 (2013)



Mar. Mamm. Sci. van der Hoop et al. (MMS 2013)

OUTCOME	TIME ENTANGLED (Months)			NUMBER OF CASES
	MIN	MAX	MEAN	
Death	0.0	11.7	5.3	12
Death presumed	84.0	84.0	-----	3
Disentangled	0.8	4.0	2.4	4
Entangled	5.0	60.0	30.8	7
Gear free	4.0	48.0	23.9	9
Minor entanglement	3.0	3.0	-----	2
Possibly entangled	60.0	-----	-----	1
Unknown	0.5	9.0	4.8	6
TOTAL	0.0	84.0	13.44	44



Dec 31 2006 GA2006 0025 Eg Kate Jackson FMRI



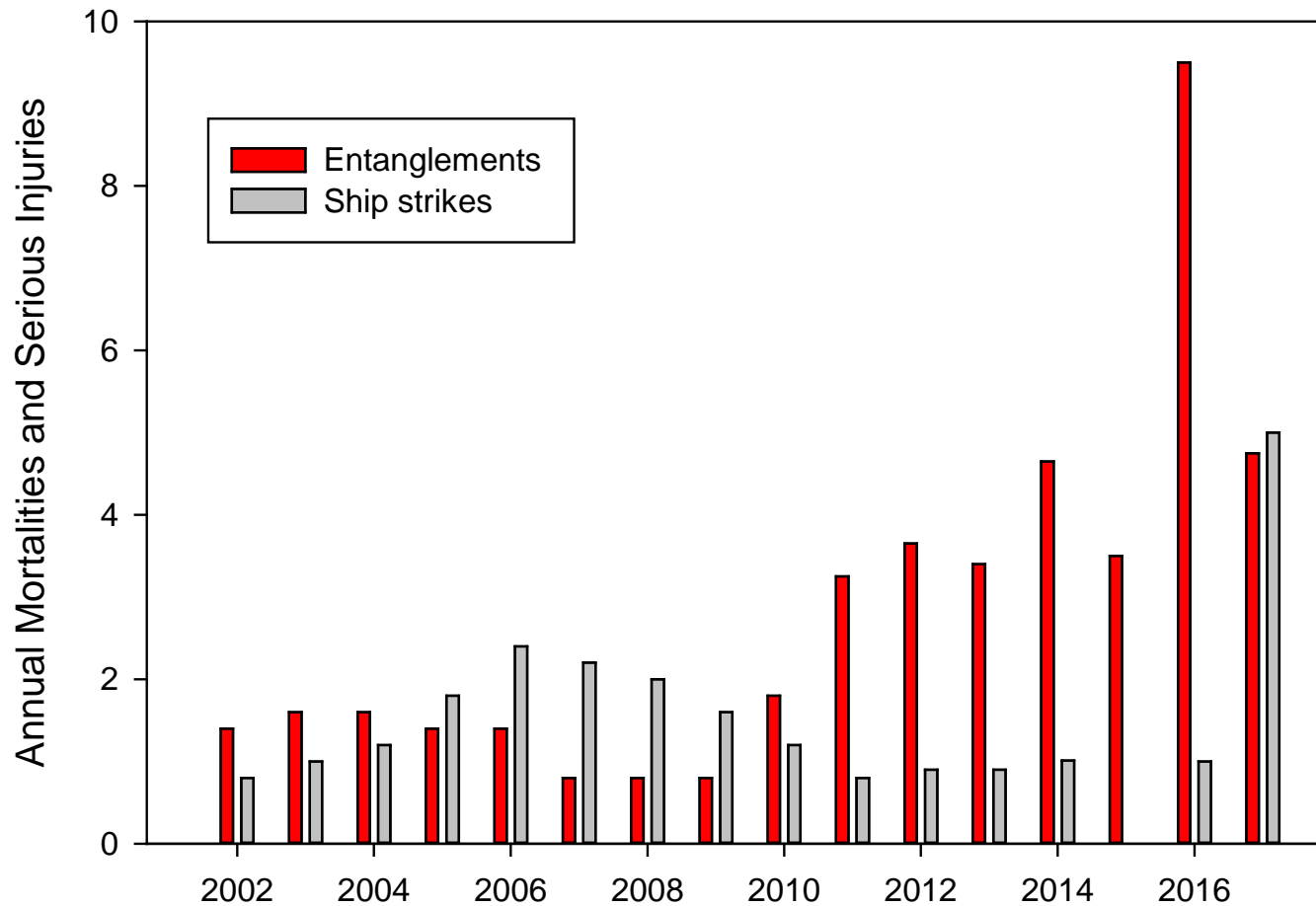
Moore - Barrow 2007



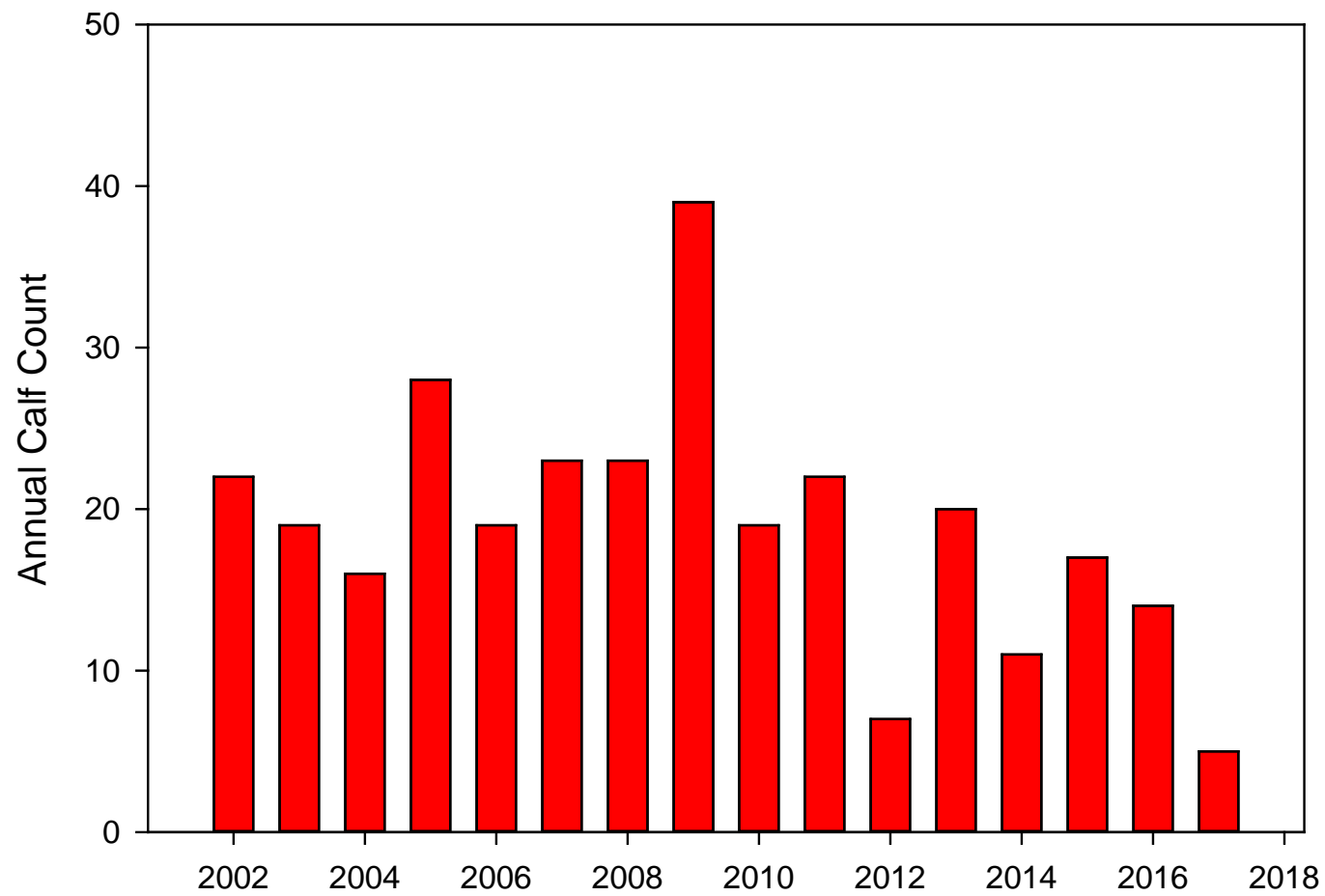
Moore - Barrow Alaska - 2007

	Sustainable?	Time to death
Commercial	Not good precedents	Seconds to minutes
Subsistence	Yes	Seconds to minutes
Entangled bycatch	Often not	Months
Vessel Collision	Often not	Usually seconds to minutes

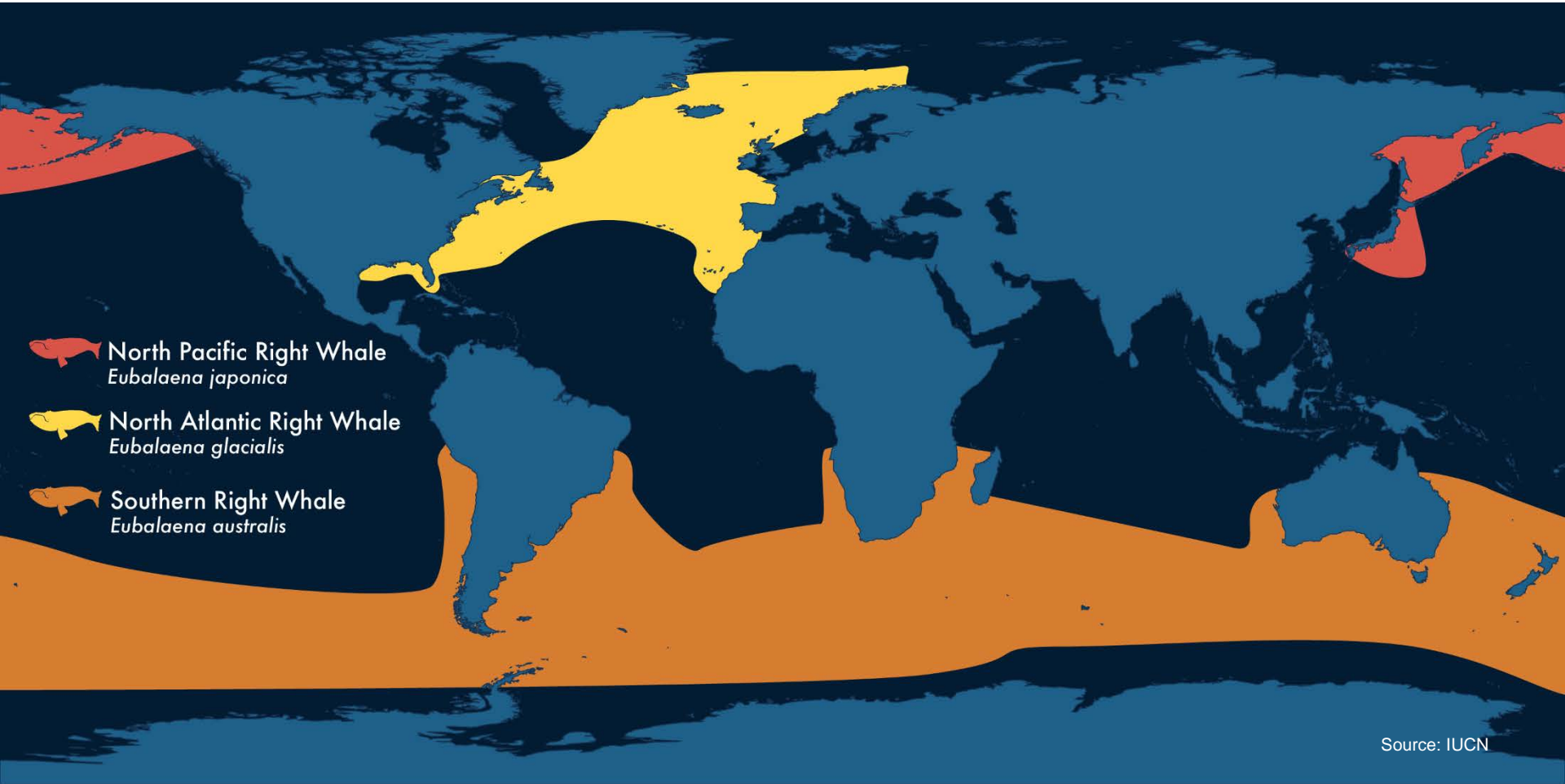
- Subsistence fisheries seem to strike a unique balance
- The local public expect beached live marine mammals to be treated humanely, yet those entangled out of sight offshore seem to be ignored

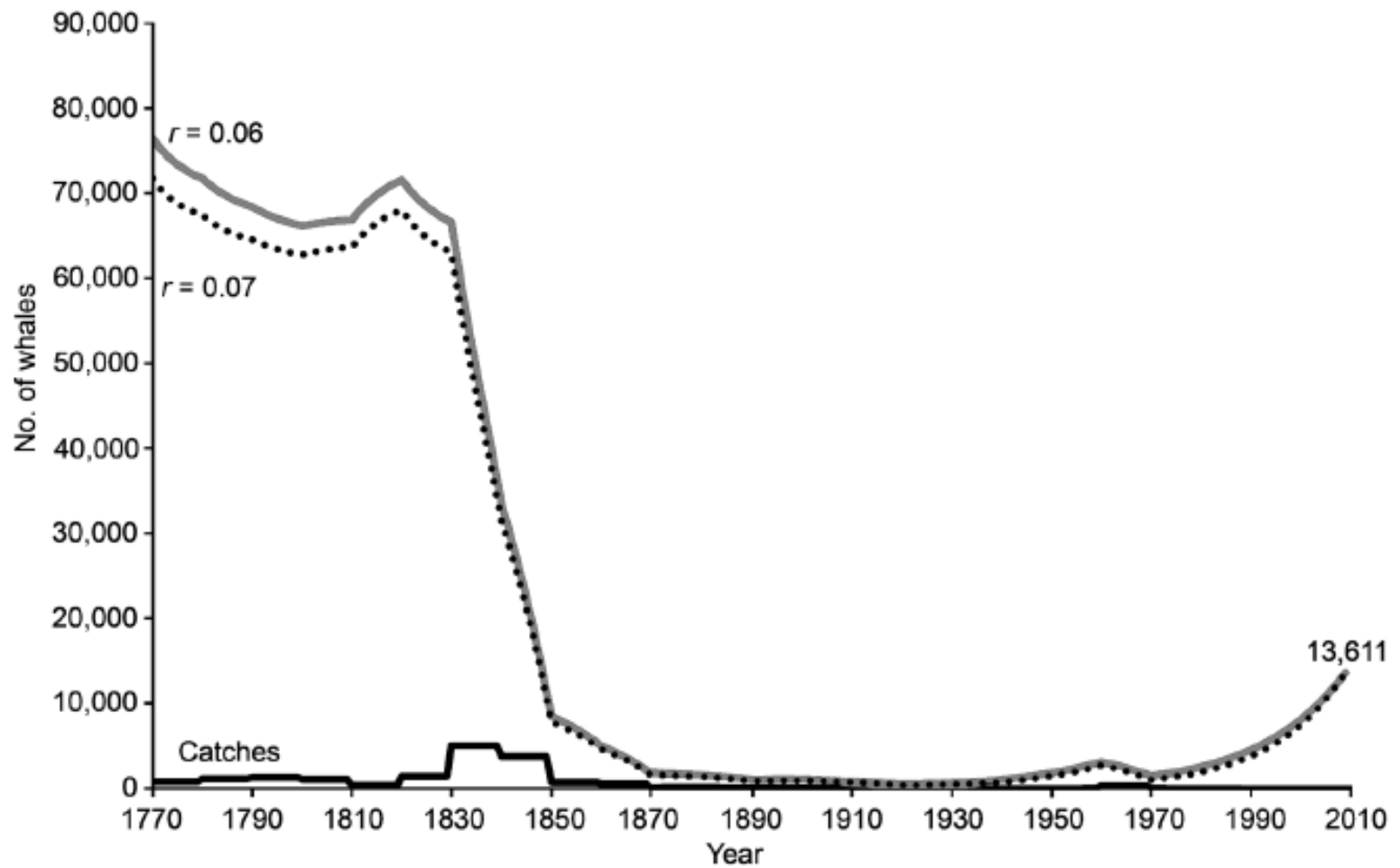


Mortality in US has grossly exceeded the legal limit of ≤ 1.4 whales per year since 1994

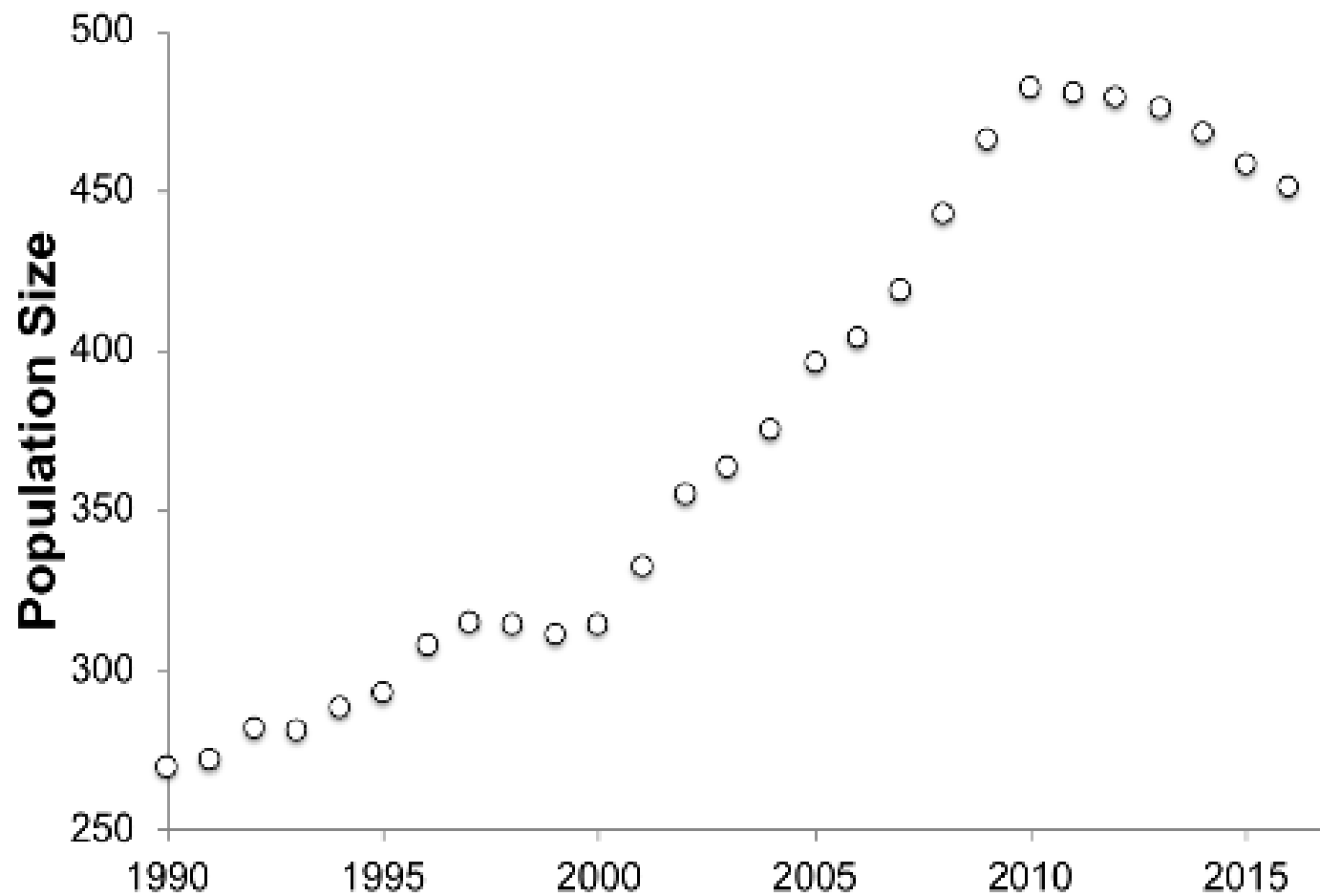


3 Distinct Right Whale Species

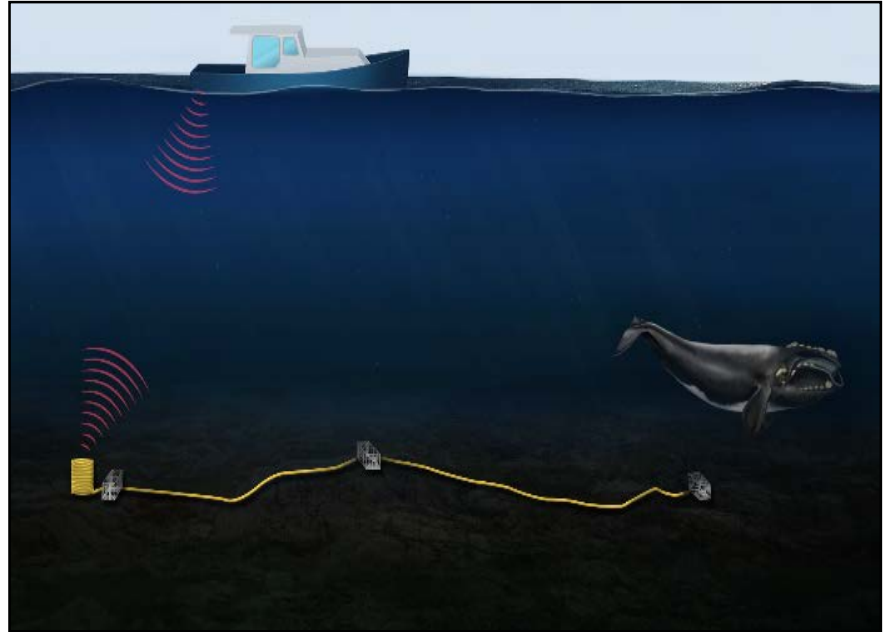
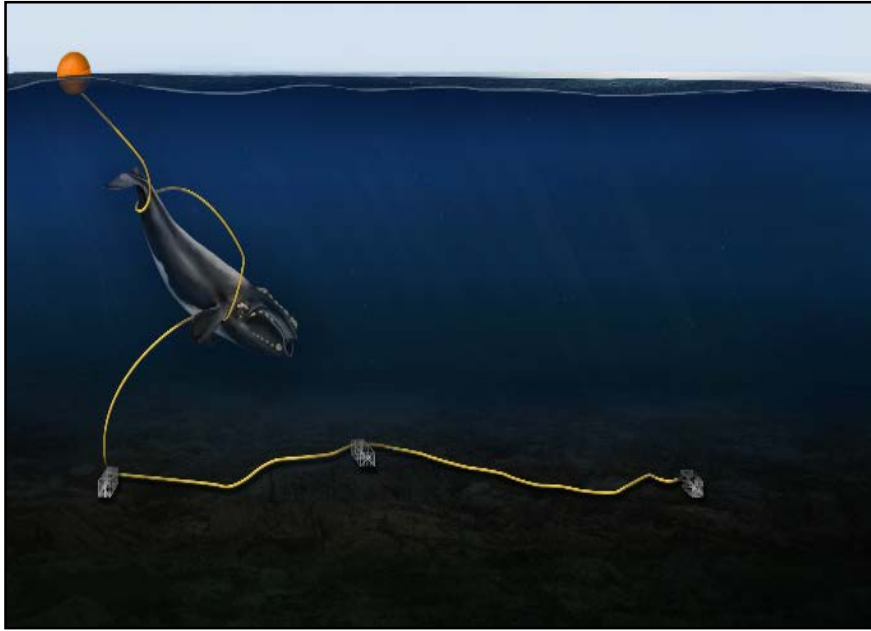


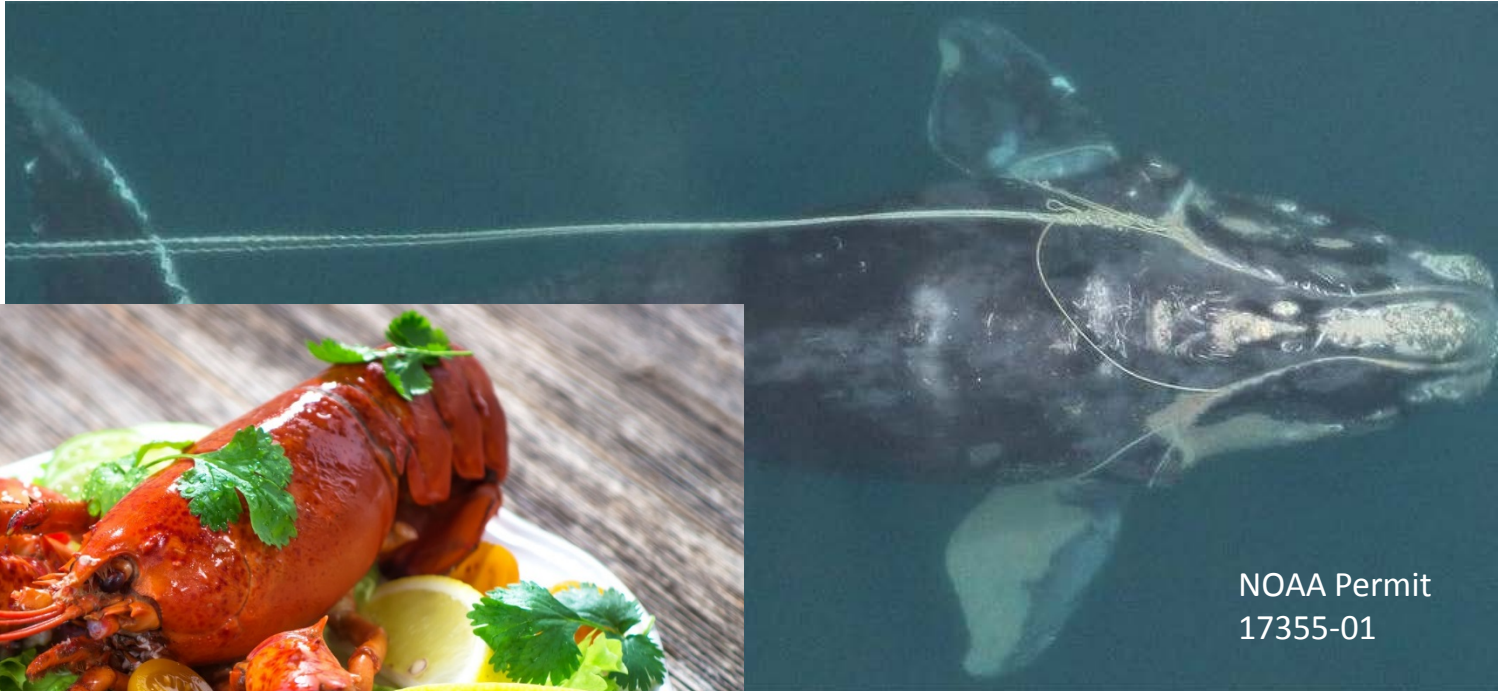


Source: J Cetacean Res. Manage. 14 (suppl.), 2013



Pace, Kraus and Corkeron 2017 – Ecology and Evolution (Creative Commons)





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Image: Shutterstock

