NOAA FISHERIES

Protected Resources

Right Whales in the Gulf of Maine

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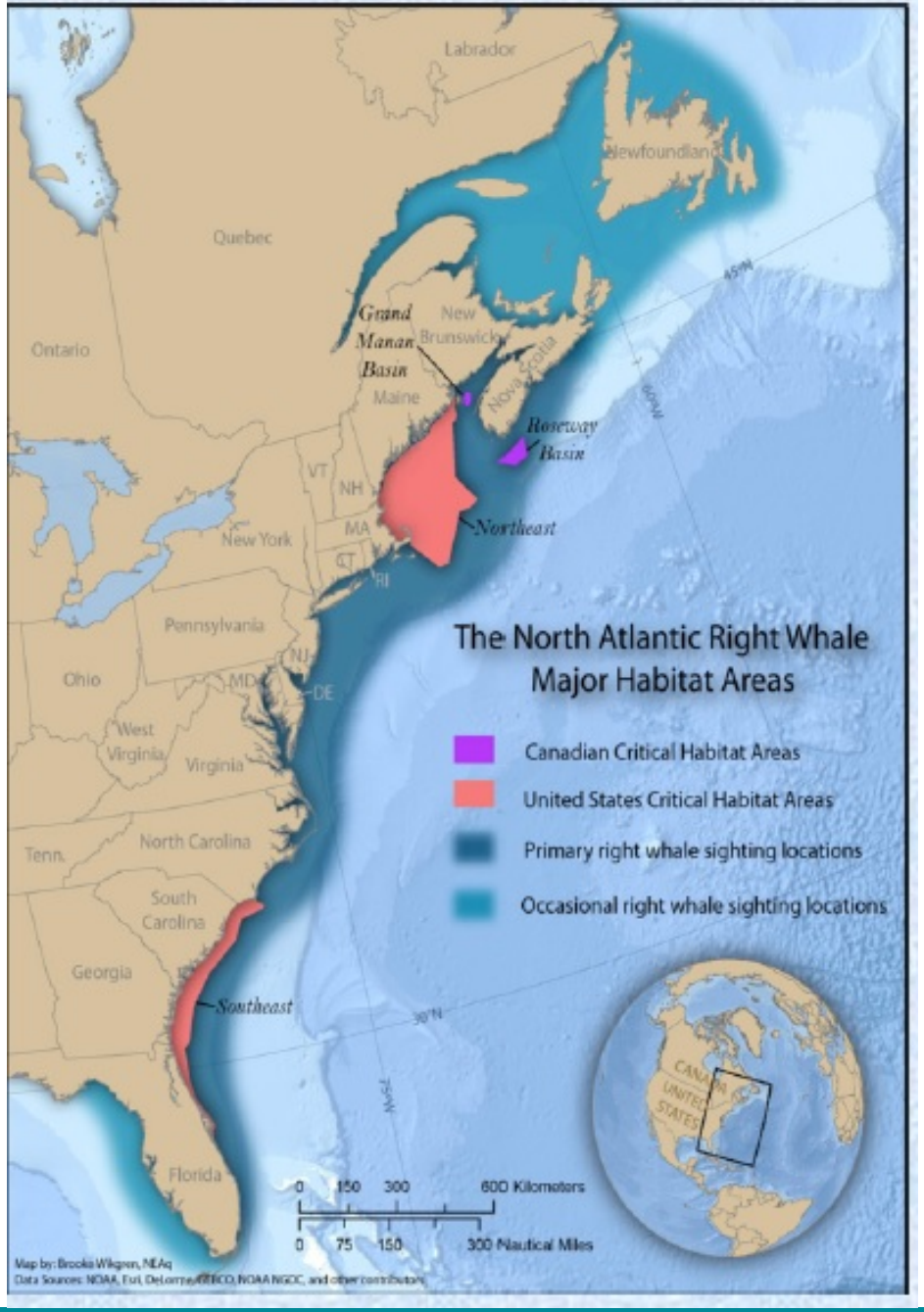
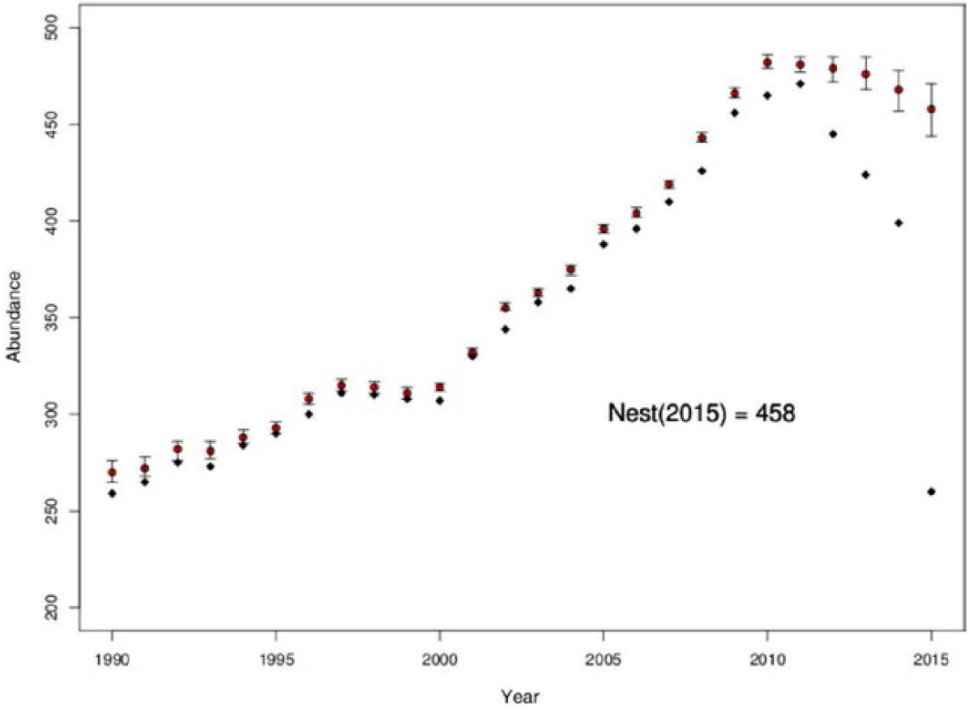
Greater Atlantic Regional
Fisheries Office

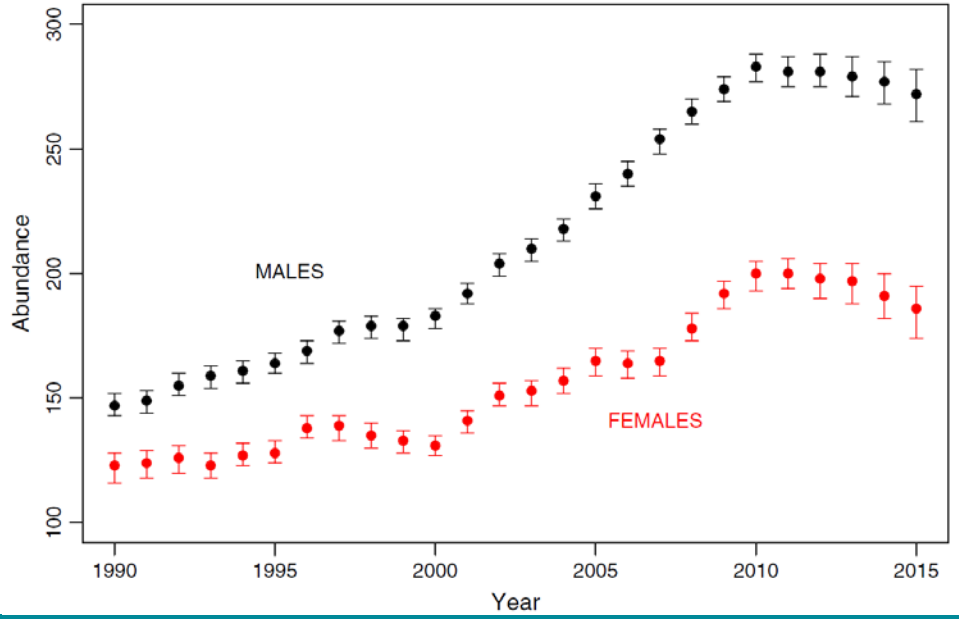
June 6, 2018


Labrador
Newfoundland
Quebec
Ontario
Grand Manan Basin
New Brunswick
Nova Scotia
Maine
Roseway Basin
VT
NH
MA
CT
RI
New York
Northeast
Pennsylvania
NJ
MD
DE
Ohio
West Virginia
Virginia
North Carolina
Tenn.
South Carolina
Georgia
Southeast
Florida
45°N
60°W
30°N
75°W
The North Atlantic Right Whale
Major Habitat Areas
Canadian Critical Habitat Areas
United States Critical Habitat Areas
Primary right whale sighting locations
Occasional right whale sighting locations
0 150 300 600 Kilometers
0 75 150 300 Nautical Miles
Map by: Brooke Wikgren, NEAq
Data Sources: NOAA, Esri, DeLorme, GEBCO, NOAA NGDC, and other contributors

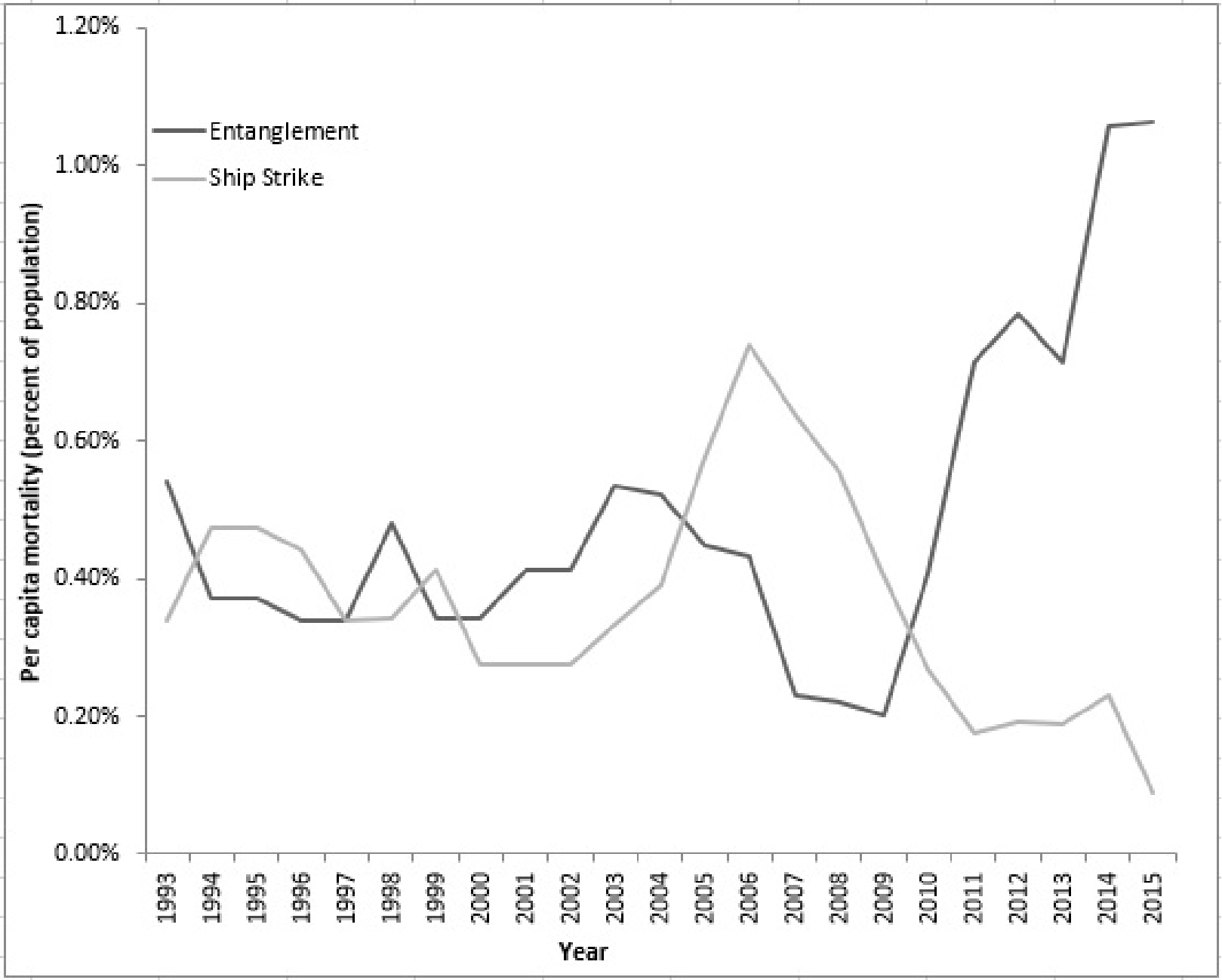
Right Whale 5-Year Review

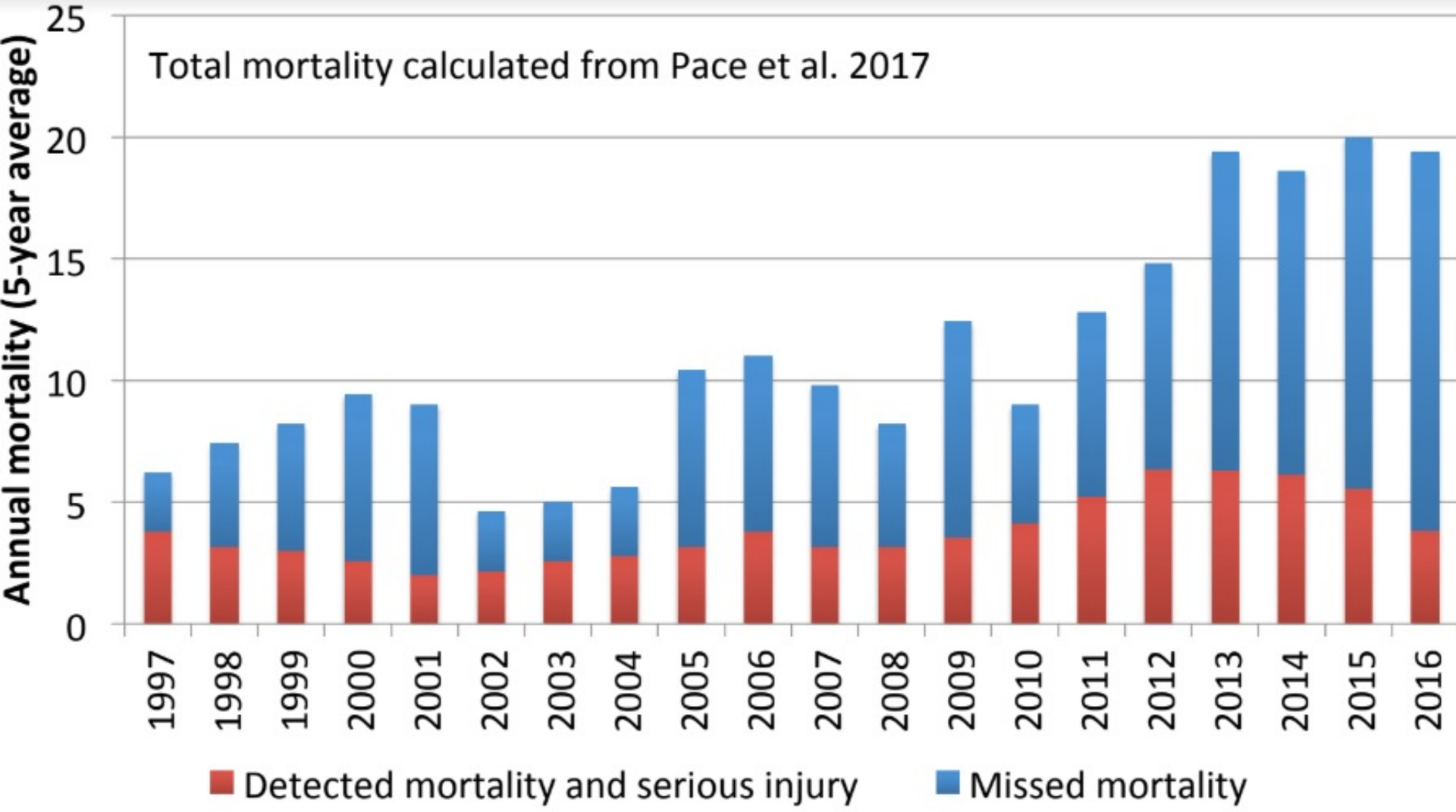
- A Requirement of the Endangered Species Act; follow-on from the North Atlantic Right Whale Recovery Plan
- Findings of the 2017 5-year review:
    - A low rate of reproduction,
    - Longer calving intervals,
    - Declining population abundance,
    - Continued mortality from vessel and fishing gear interactions,
    - Changes in prey availability, and
    - Increased transboundary movement and risk.
- Confirms endangered status

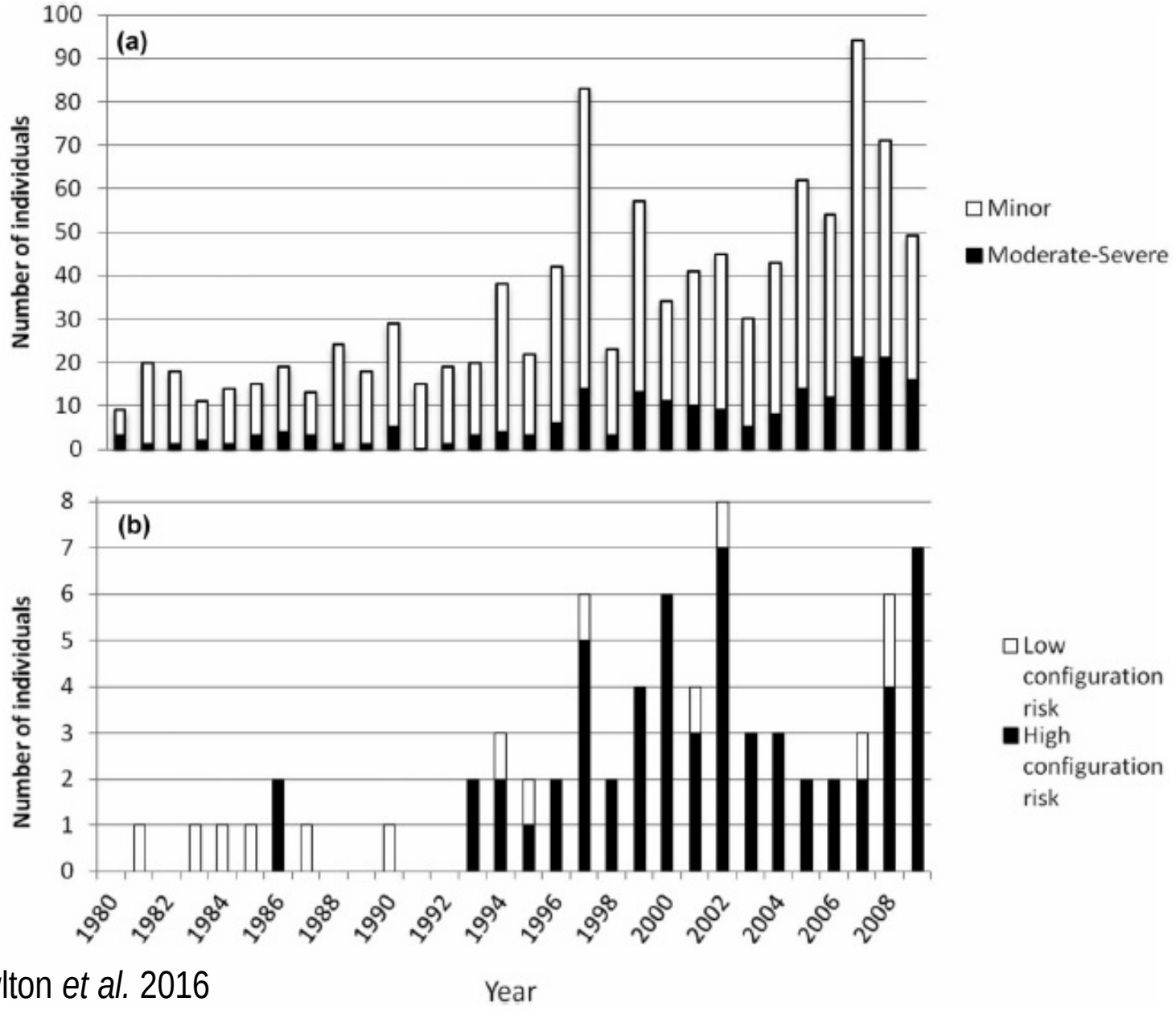




Source: Pace *et al.* 2017


1.20%
1.00%
0.80%
0.60%
0.40%
0.20%
0.00%
Per capita mortality (percent of population)
Entanglement
Ship Strike
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Year


Total mortality calculated from Pace et al. 2017
Annual mortality (5-year average)
25
20
15
10
5
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Detected mortality and serious injury
Missed mortality



Source: Knowlton *et al.* 2016

Scar coding

Entanglement levels

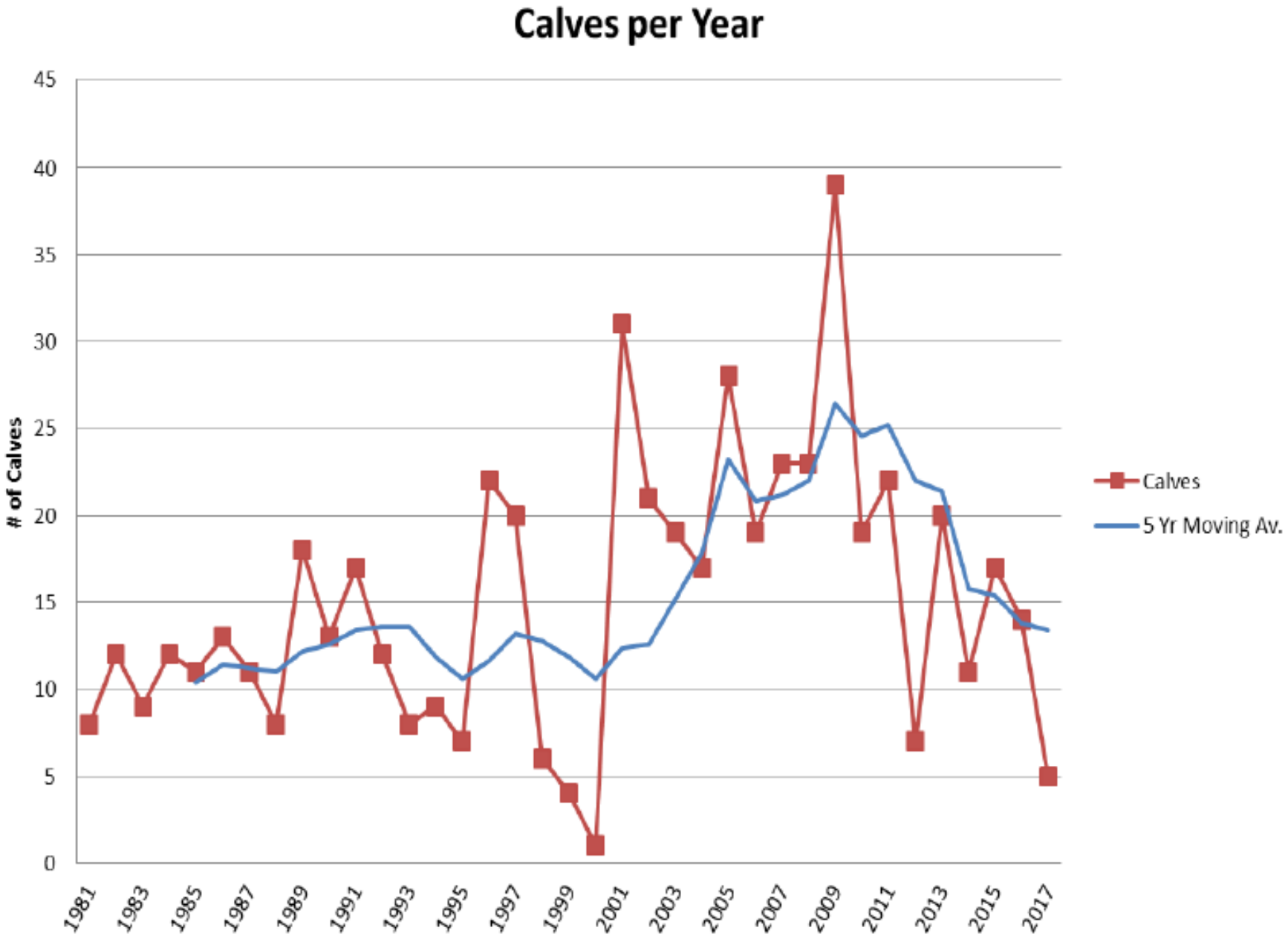
3 injury severity levels (based on extensiveness and depth of wounds)

+

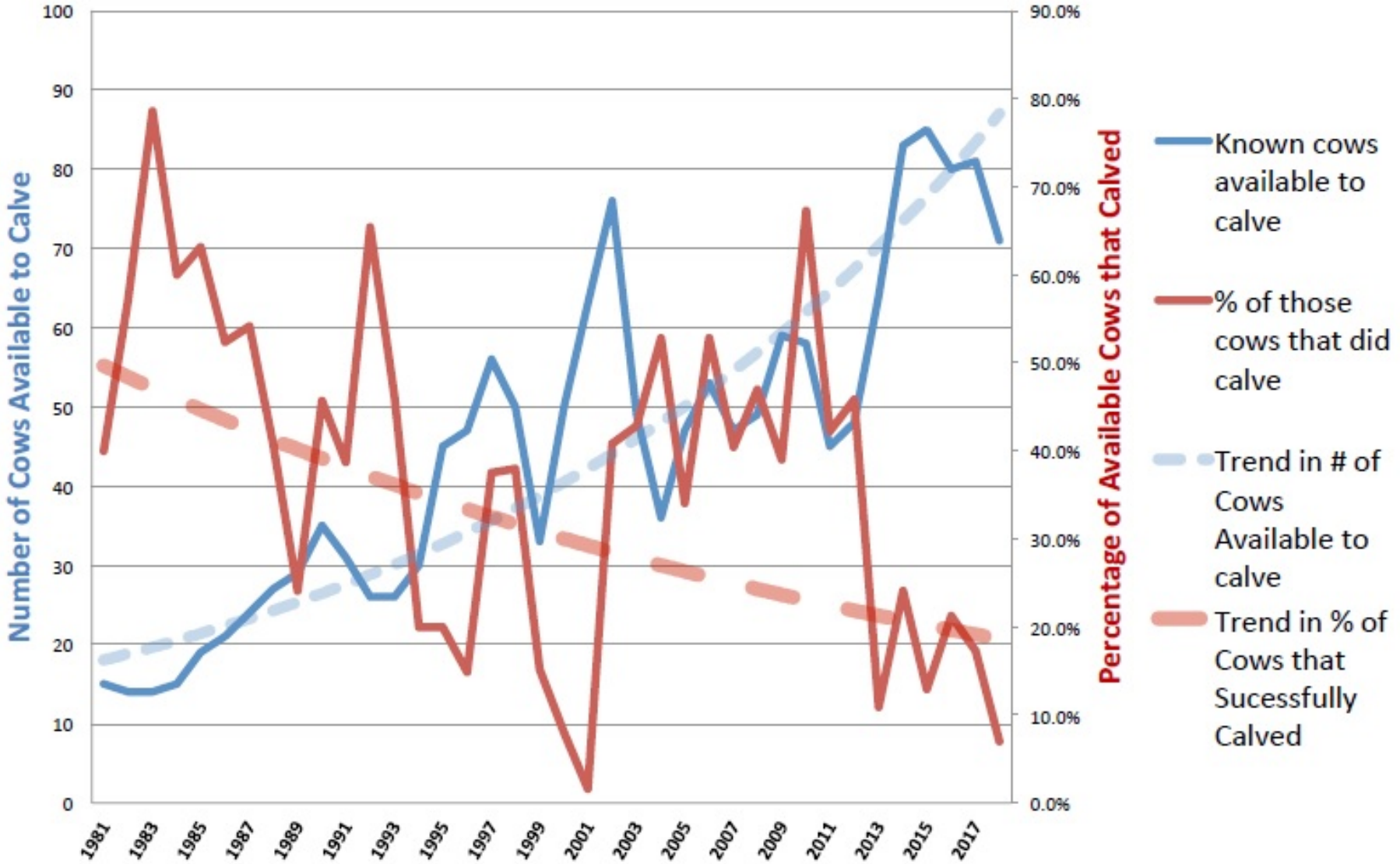
With or without attached gear

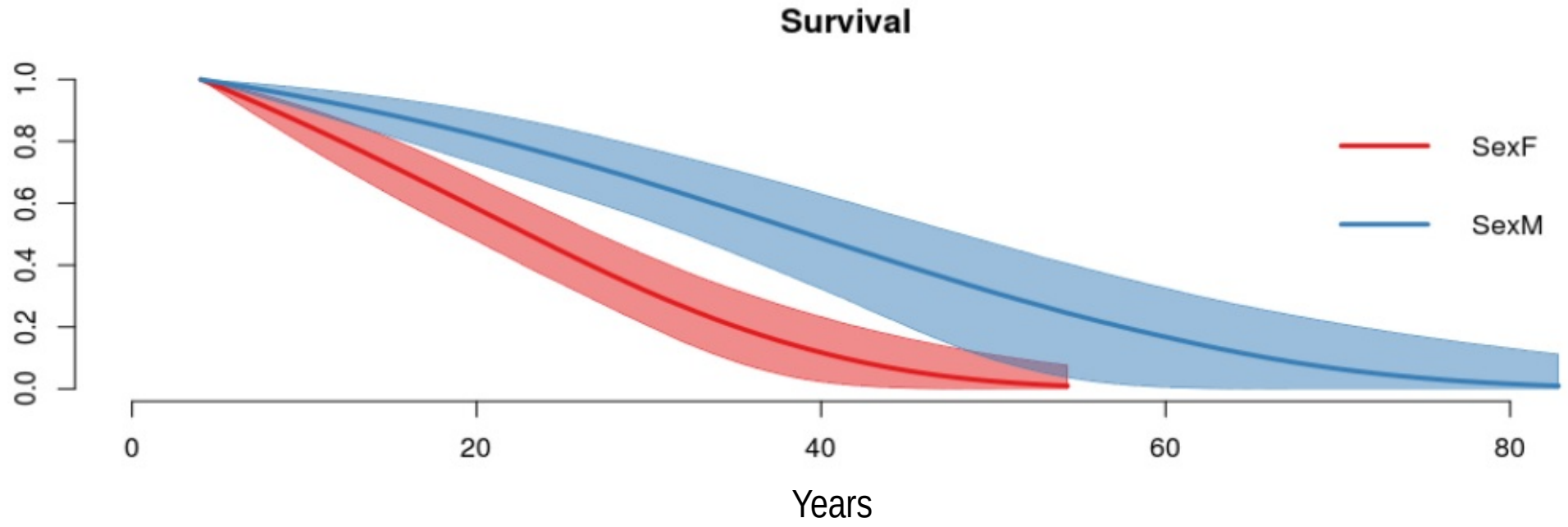
=

6 levels


Calves per Year
# of Calves
45
40
35
30
25
20
15
10
5
0
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
Calves
5 Yr Moving Av.

Number of Right Whale Cows Available to Calve (blue line) vs % of Cows that Successfully Calved (red line)

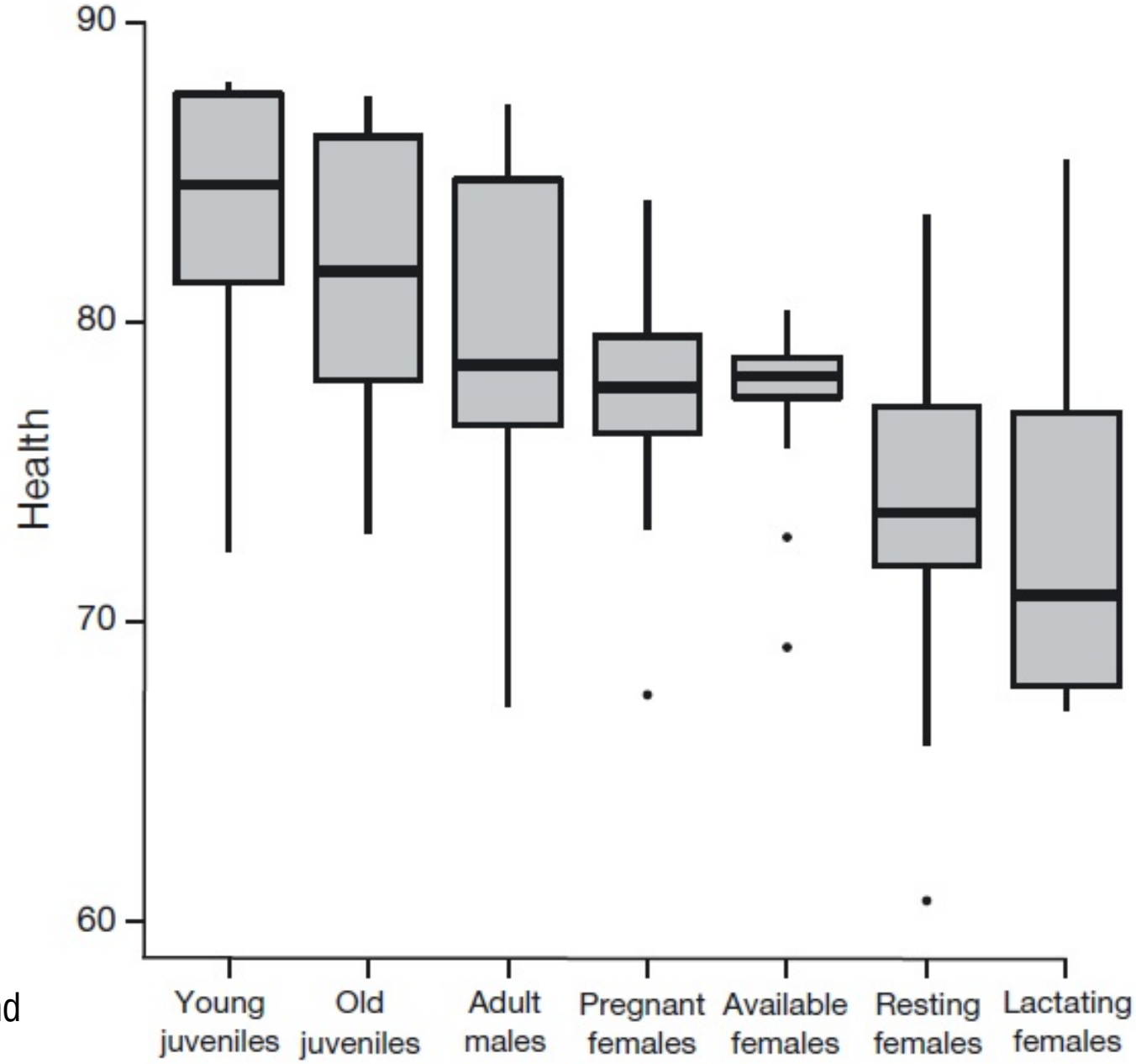




Source: P. Corkeron, NOAA Northeast Fisheries Science Center

Fig. 1. (a) A North Atlantic right whale (EG# 3911) in good health observed on 10 February 2010 (Photo credit: Florida Fish and Wildlife Conservation Commission, NOAA Permit No. 775-1875). (b) The same right whale, observed on 15 January 2011, in poor health after a severe fishing gear entanglement that resulted in her death (Photo credit: Georgia Department of Natural Resources, NOAA Permit No. 932-1905/MA-009526). Poor body condition was evident from concavity in the dorsal profile in the post-blowhole area (denoted by white arrow), skin lesions and widespread orange cyamid coverage (yellow circles), orange cyamids along the margins of the blowholes (white circle), and rake marks anterior to the blowholes (yellow arrow). A white fishing line can be seen exiting the margin of the lips next to the yellow circle on the left

Source: Rolland *et al.* 2016



Source: Rolland *et al.* 2016

Received: 19 July 2016 | Revised: 13 October 2016 | Accepted: 25 October 2016

DOI: 10.1002/ece3.2615

ORIGINAL RESEARCH

WILEY Ecology and Evolution Open Access

Entanglement is a costly life-history stage in large whales

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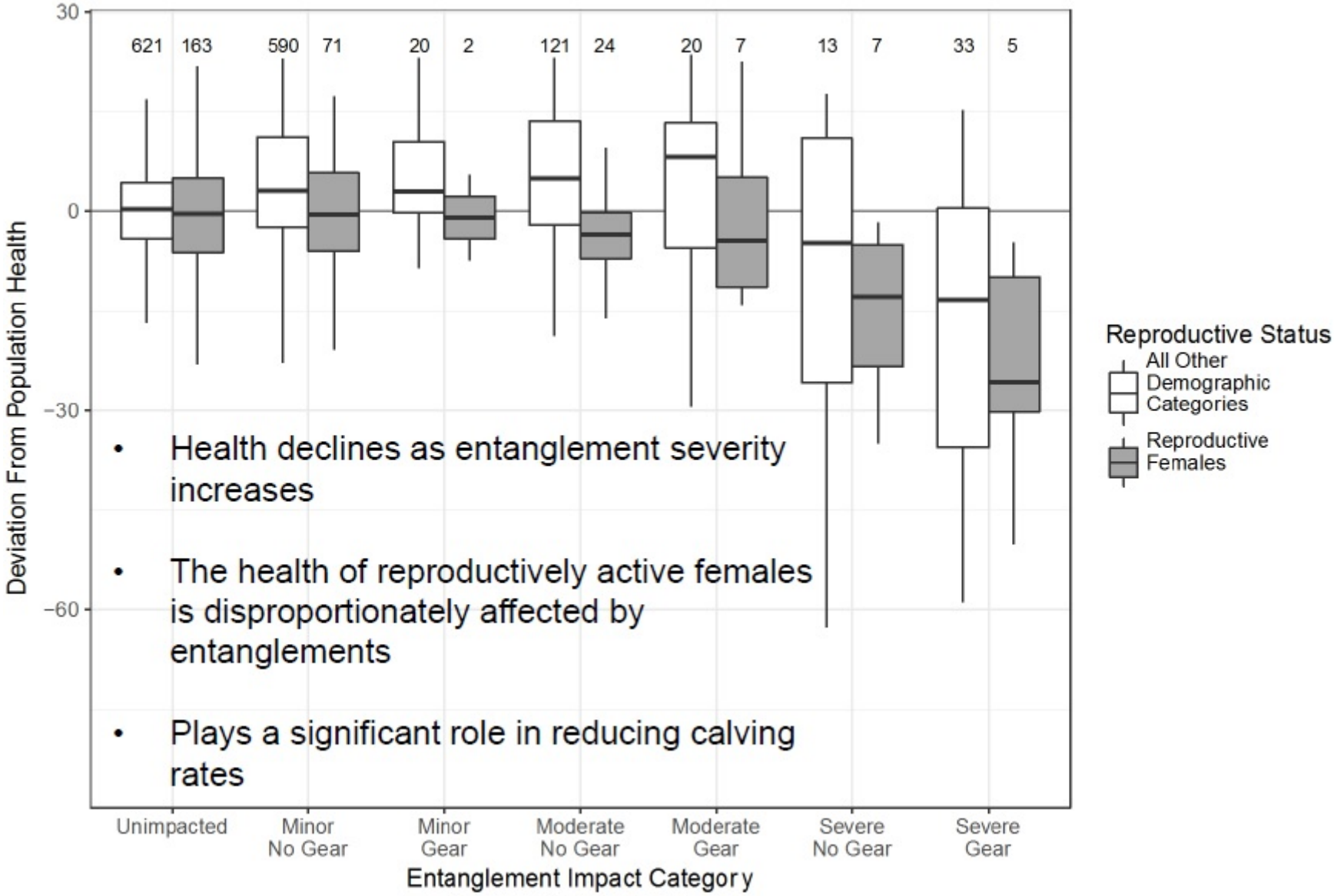
[3]NOAA Fisheries, Northeast Fisheries Science Center, Woods Hole, MA, USA

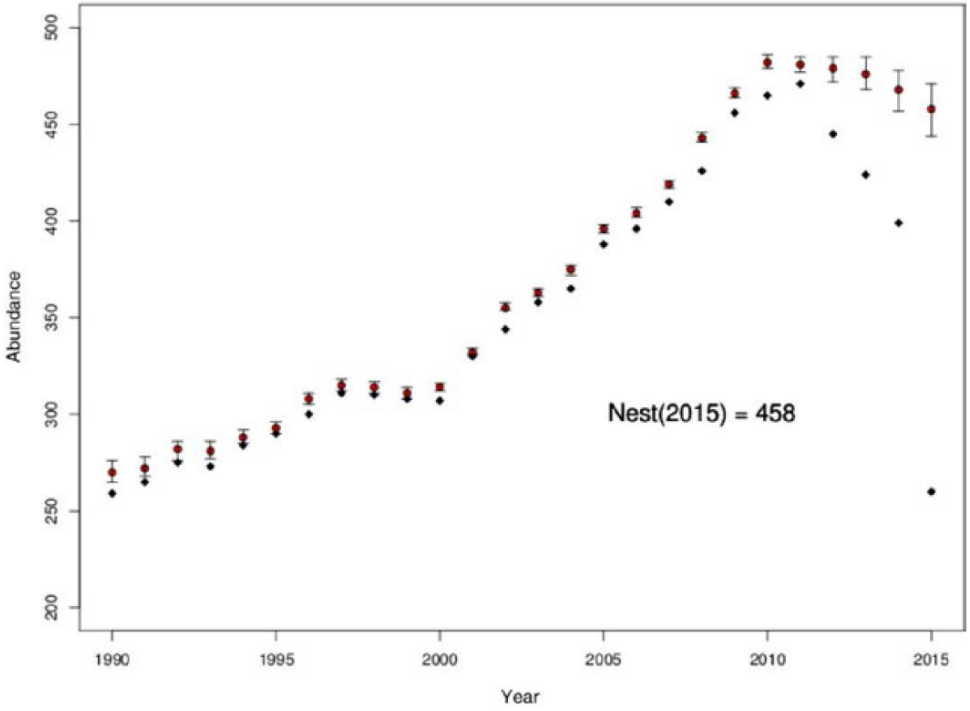
Abstract

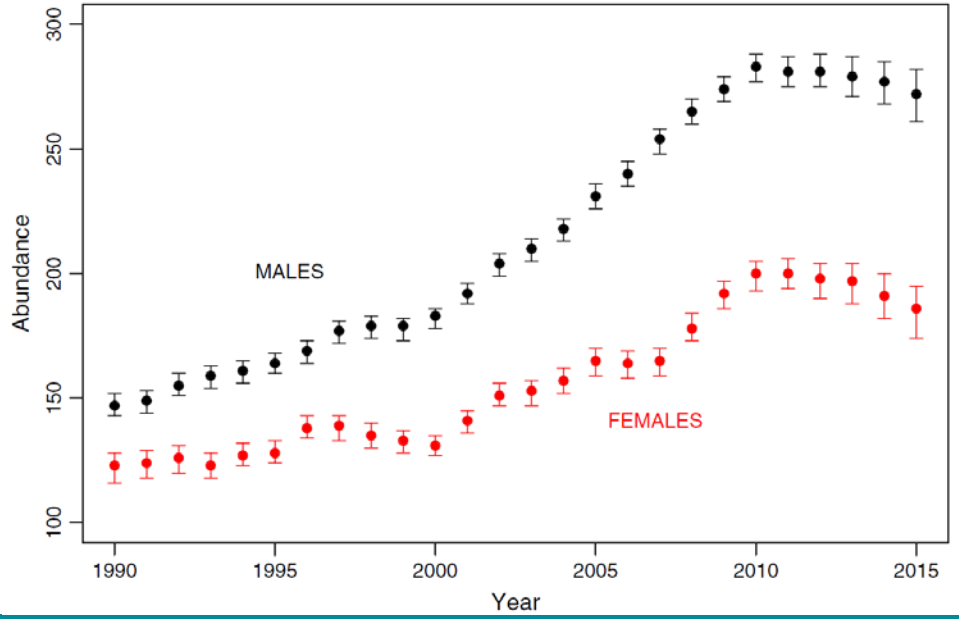
Individuals store energy to balance deficits in natural cycles; however, unnatural events can also lead to unbalanced energy budgets. Entanglement in fishing gear is one example of an unnatural but relatively common circumstance that imposes energetic demands of a similar order of magnitude and duration of life-history events such as migration and pregnancy in large whales. We present two complementary bioenergetic approaches to estimate the energy associated with entanglement in North

Source: Van der Hoop *et al.* 2016



Source: Knowlton *et al. in press*





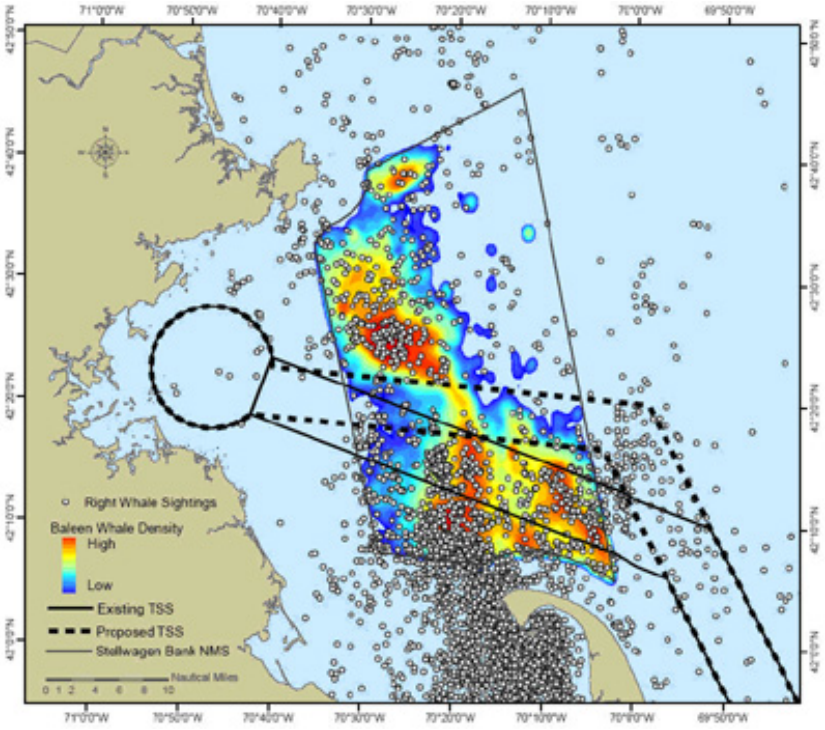
Source: Pace *et al.* 2017

Recent Right Whale Mortalities

- 12 whales from June 7 – September 15, 2017 in the Gulf of St. Lawrence, Canada
  - 7 necropsies completed
    - Causes of death: 2 entanglement, 4 blunt force trauma, 1 unknown
- 5 whales from April 13 – November 26, 2017 near Massachusetts, USA
  - 4 necropsies completed
    - Causes of death: 2 pending, with evidence of entanglement, 1 blunt force trauma, 1 unknown
- 2 dead right whales observed in US waters in 2018

Right Whale Ship Strike Reduction under the Endangered Species Act

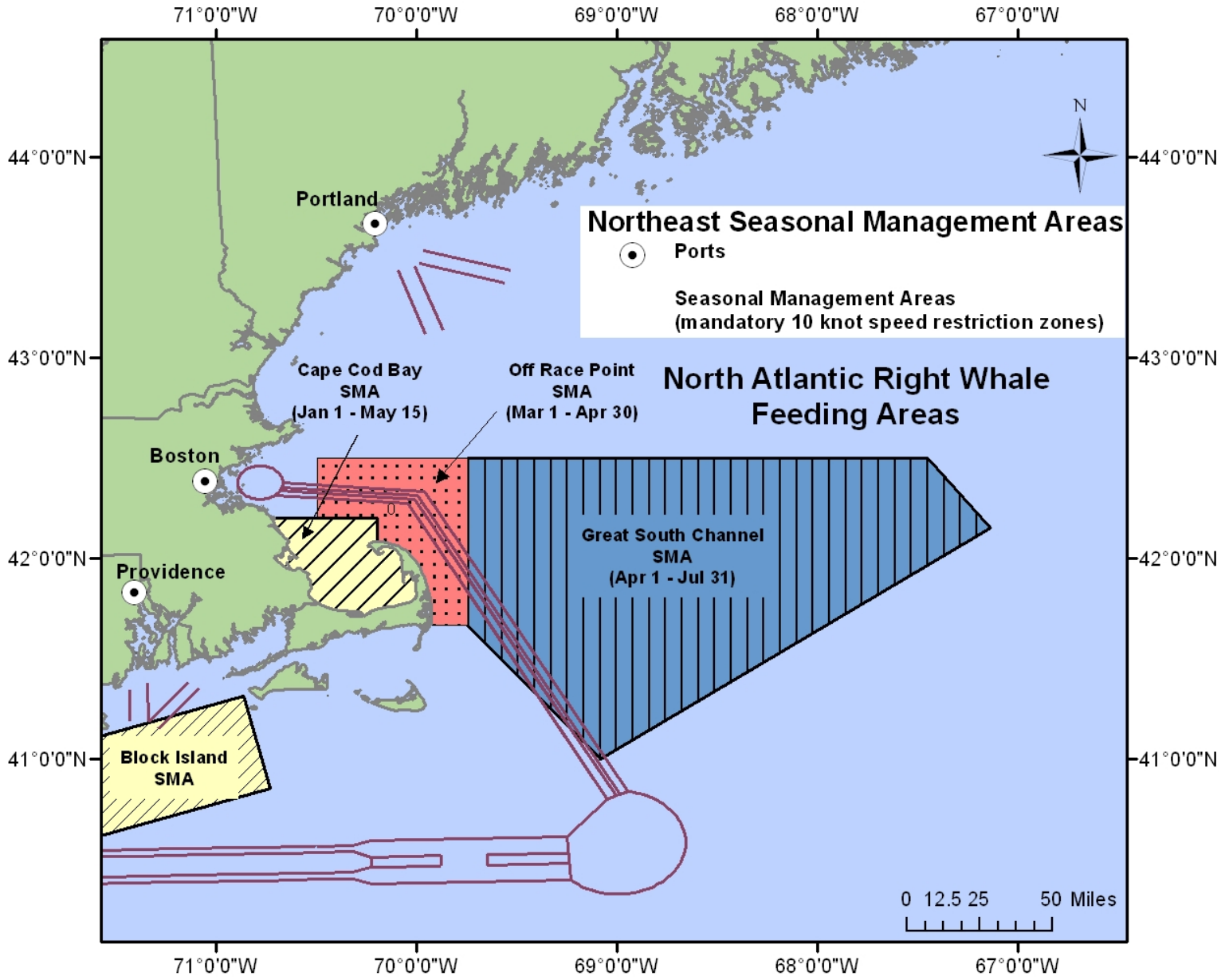
Traffic Separation Scheme into Boston

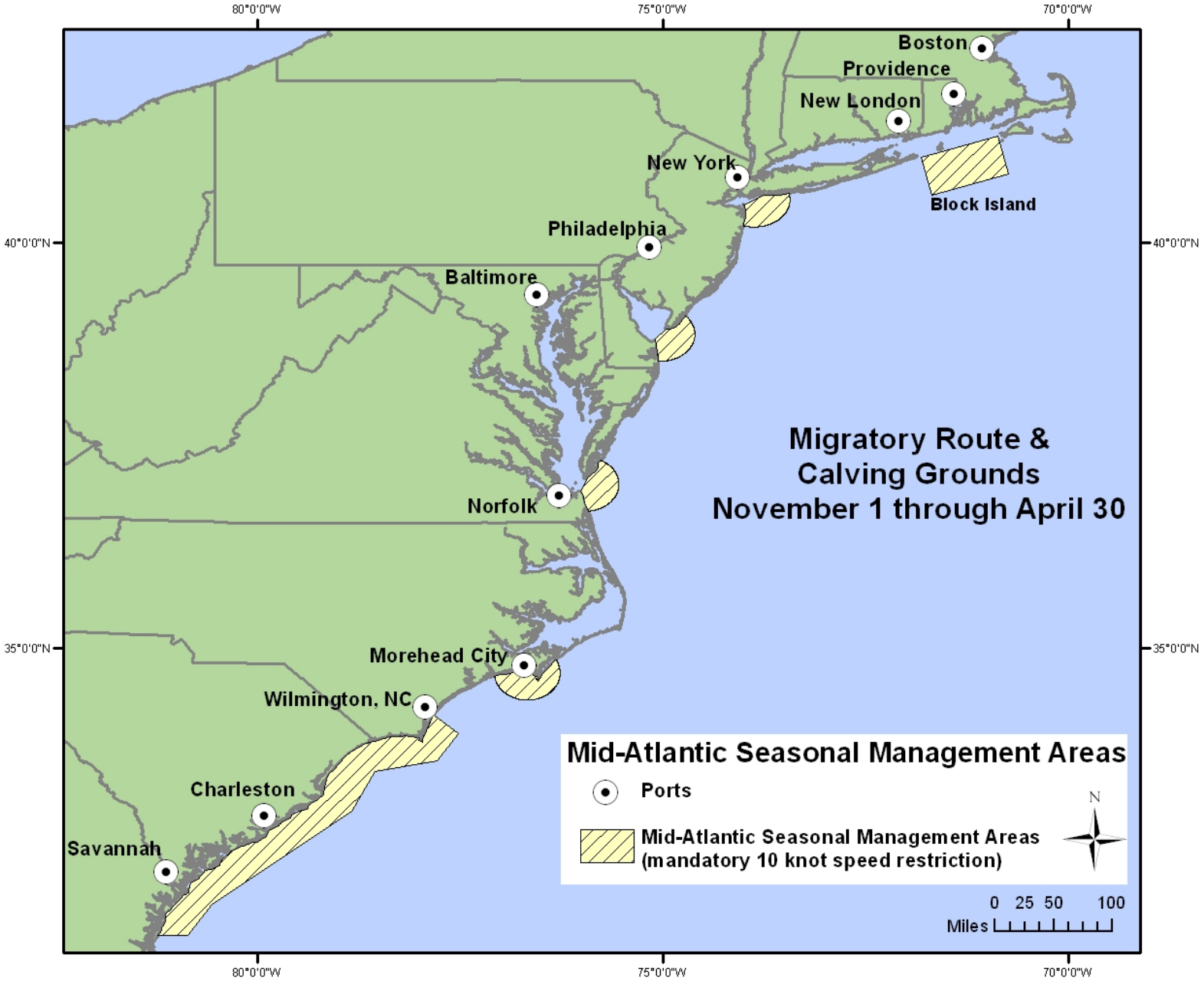


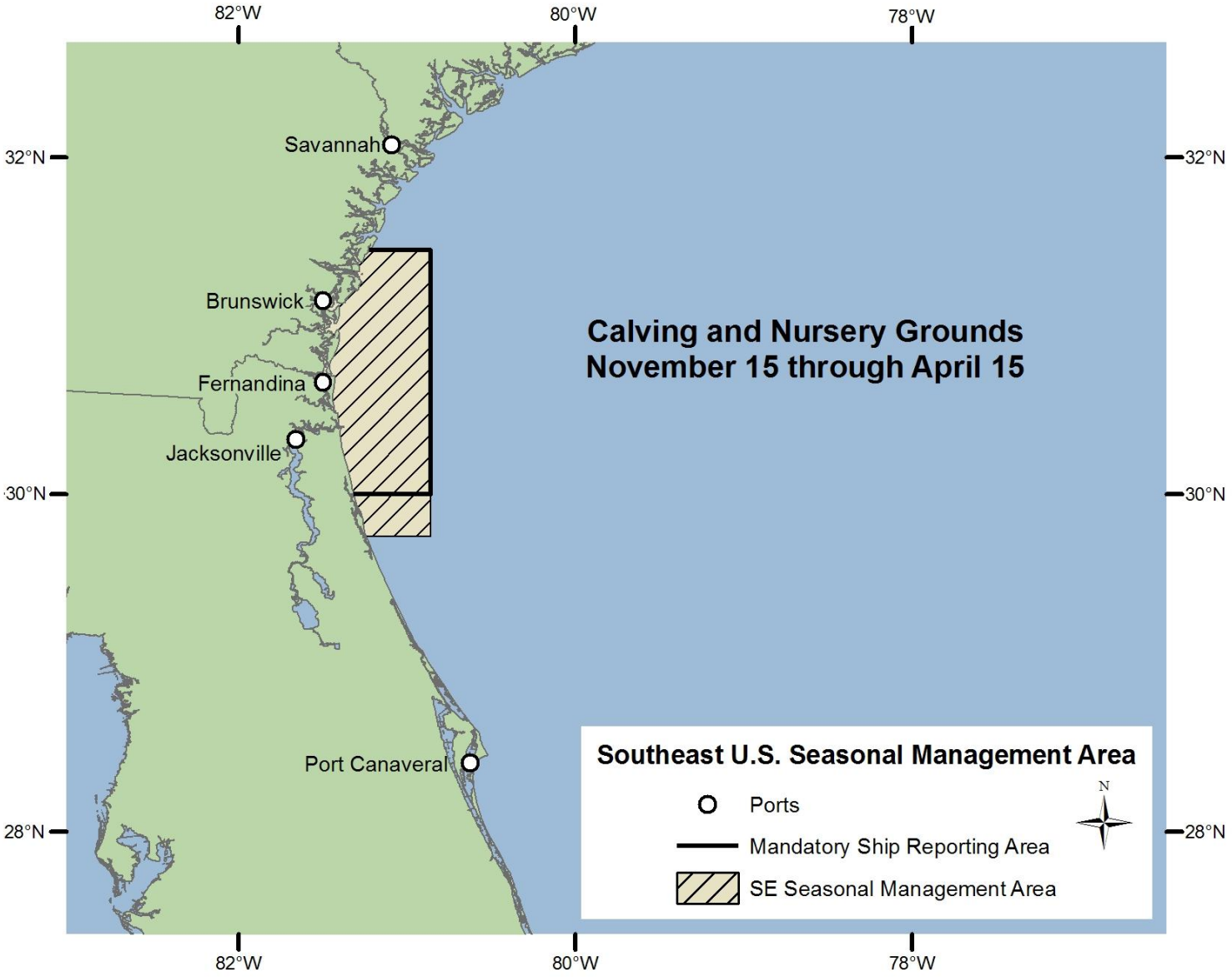
- In 2007, rotating the scheme 12 degrees to the north may reduce risk of ship strikes to endangered right whales by 58% and to all baleen whales by 81%.
- Right whale sightings over a 24 year period were analyzed.
- Transit time were estimated to increase from 9-22 minutes.
- In 2009, TSS into Boston was also narrowed – each lane reduced from 2 miles to 1.5 miles wide.

Ship Speed Rule

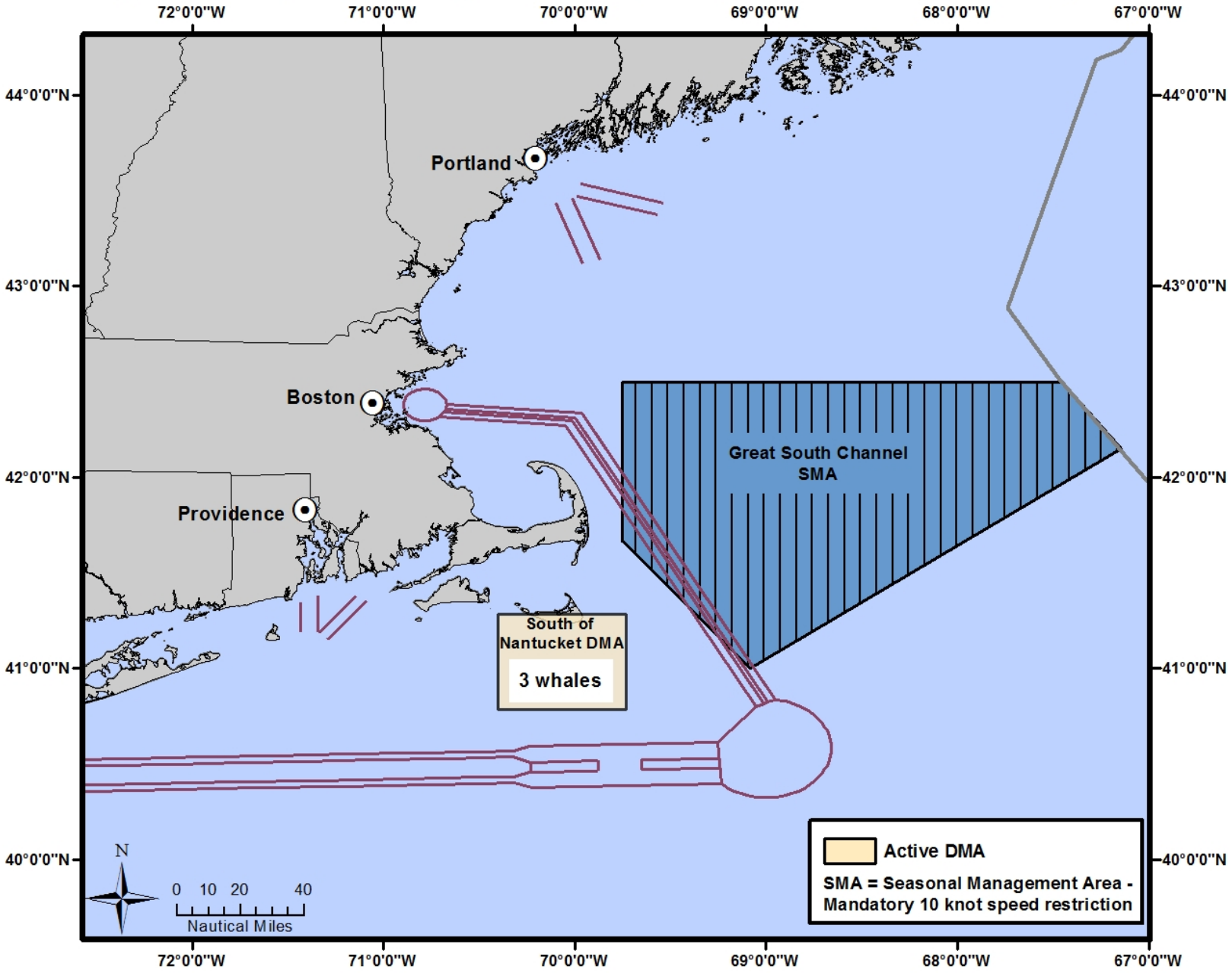
- Since 2008, a two-part strategy of Seasonal Management Areas (SMAs) and Dynamic Management Areas (DMAs)
- Seasonal Management Areas:
  - Mandatory 10-knot speed restrictions for vessels 65 feet in length or greater on the US East Coast
- Dynamic Management Areas:
  - Voluntary, 15-day speed restriction areas triggered by 3 or more right whales


71°0'0"W
70°0'0"W
69°0'0"W
68°0'0"W
67°0'0"W
44°0'0"N
43°0'0"N
42°0'0"N
41°0'0"N
N
Portland
Boston
Providence
Northeast Seasonal Management Areas
Ports
Seasonal Management Areas
(mandatory 10 knot speed restriction zones)
North Atlantic Right Whale
Feeding Areas
Cape Cod Bay
SMA
(Jan 1 - May 15)
Off Race Point
SMA
(Mar 1 - Apr 30)
Great South Channel
SMA
(Apr 1 - Jul 31)
Block Island
SMA
0 12.5 25 50 Miles


80°0'0"W
75°0'0"W
70°0'0"W
40°0'0"N
35°0'0"N
Boston
Providence
New London
New York
Block Island
Philadelphia
Baltimore
Norfolk
Morehead City
Wilmington, NC
Charleston
Savannah
Migratory Route &
Calving Grounds
November 1 through April 30
Mid-Atlantic Seasonal Management Areas
Ports
Mid-Atlantic Seasonal Management Areas
(mandatory 10 knot speed restriction)
N
0 25 50 100
Miles


82°W
80°W
78°W
32°N
30°N
28°N
Savannah
Brunswick
Fernandina
Jacksonville
Port Canaveral
Calving and Nursery Grounds
November 15 through April 15
Southeast U.S. Seasonal Management Area
Ports
Mandatory Ship Reporting Area
SE Seasonal Management Area
N

Right Whale Dynamic Management Area (DMA) in effect through June 30, 2017



Atlantic Large Whale Take Reduction Plan under the Marine Mammal Protection Act

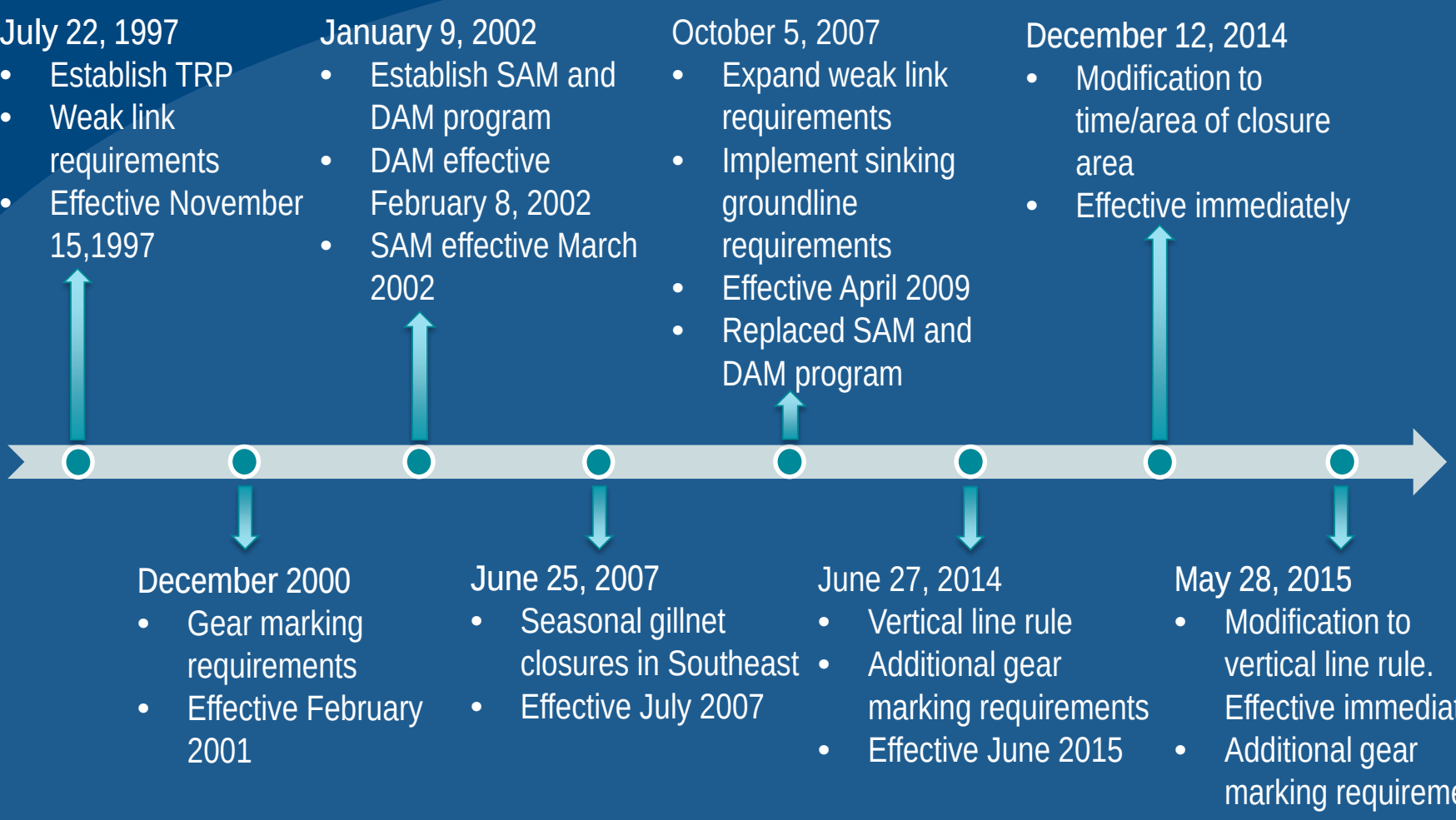
Atlantic Large Whale Take Reduction Team

- Established in 1996 under MMPA
  - Purpose: to develop a take reduction plan for reducing the incidental take of right whales, humpback whales, fin whales and minke whales in commercial trap/pot and gillnet gear in U.S. waters from Maine to Florida
  - Goal: reduce serious injuries and mortalities to < PBR (PBR=0 for Right Whales at that time)

Team Membership

Group	Number
Trap/Pot Industry	18
Gillnet Industry	5*
Conservation/Environmental	6
Academic/Scientific	9
State Managers	14
Federal Managers	5
Fishery Mgmt Organizations	4
Total	61

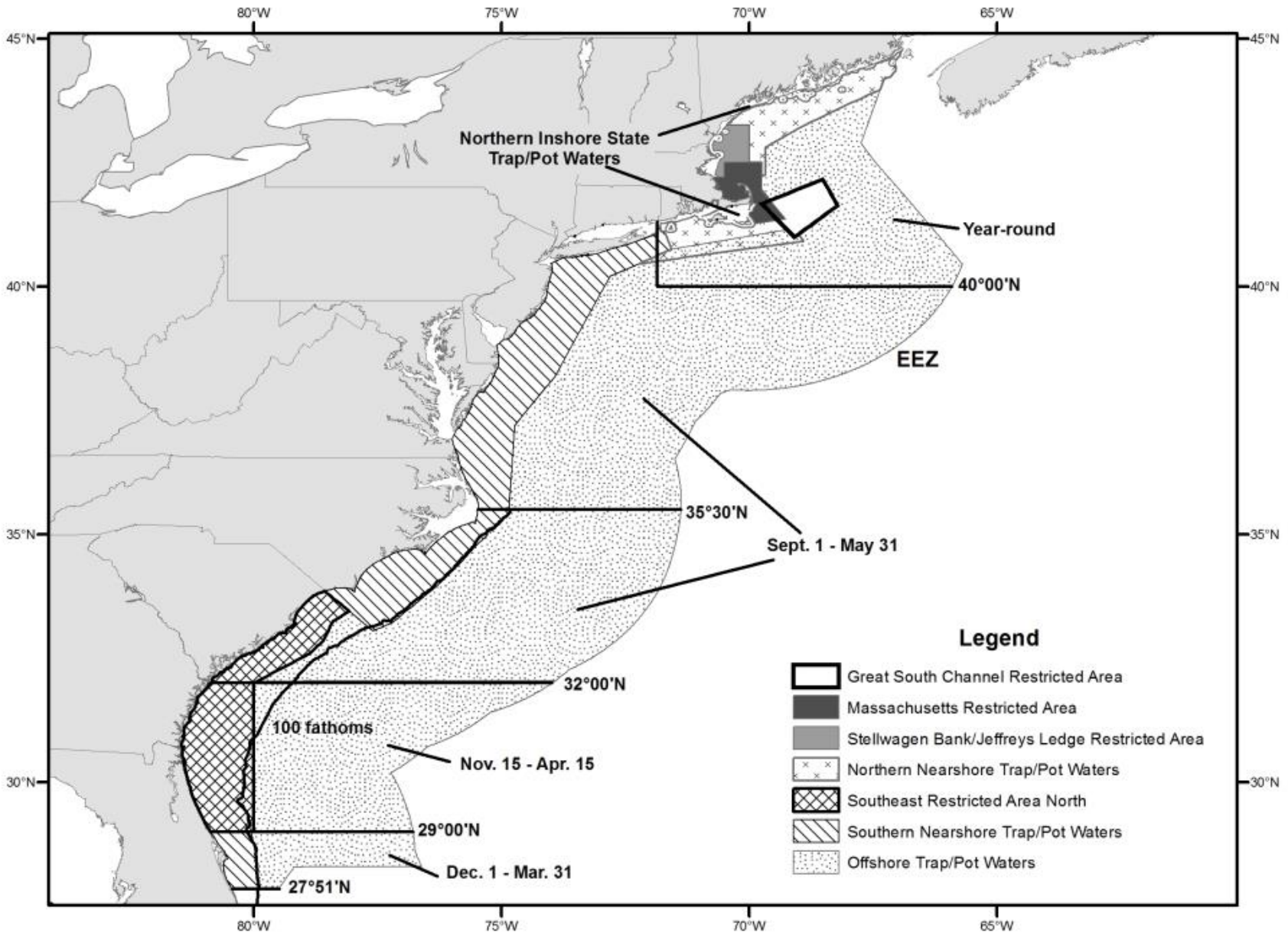
* Some trap/pot member represent gillnet as well

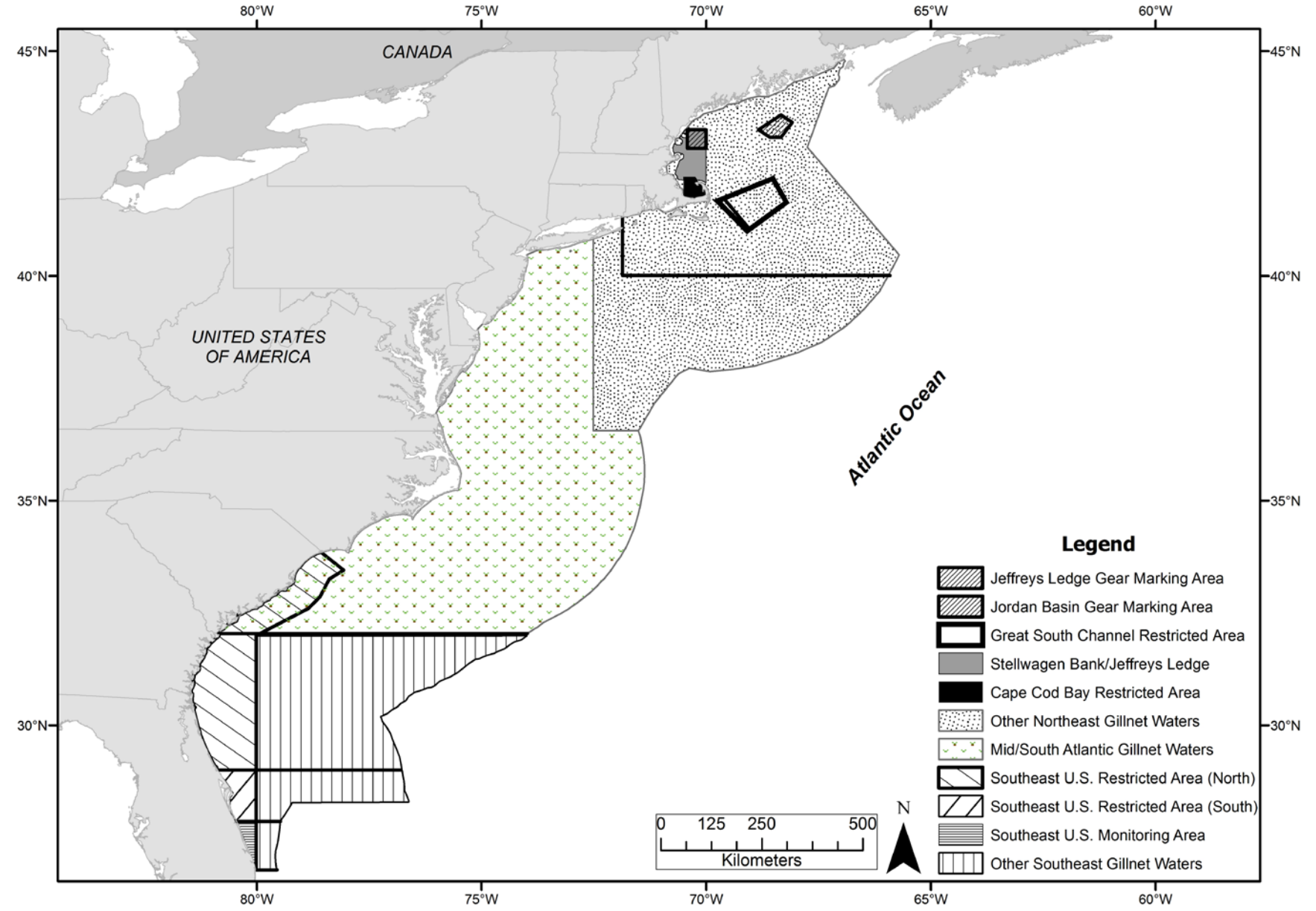

July 22, 1997
• Establish TRP
• Weak link requirements
• Effective November 15,1997
December 2000
• Gear marking requirements
• Effective February 2001
January 9, 2002
• Establish SAM and DAM program
• DAM effective February 8, 2002
• SAM effective March 2002
June 25, 2007
• Seasonal gillnet closures in Southeast
• Effective July 2007
October 5, 2007
• Expand weak link requirements
• Implement sinking groundline requirements
• Effective April 2009
• Replaced SAM and DAM program
June 27, 2014
• Vertical line rule
• Additional gear marking requirements
• Effective June 2015
December 12, 2014
• Modification to time/area of closure area
• Effective immediately
May 28, 2015
• Modification to vertical line rule. Effective immediately
• Additional gear marking requirements

Weak Links and Gear Marking

- Weak links are required coastwide

- Gear marking is required coastwide
  - Including two areas of importance for right whales with specific marks (Jordan Basin and Jeffreys Ledge)
  - 4,008 vessels are required to gear mark with three 12” marks


80°W
75°W
70°W
65°W
45°N
40°N
35°N
30°N
Northern Inshore State Trap/Pot Waters
Year-round
40°00'N
EEZ
35°30'N
Sept. 1 - May 31
32°00'N
100 fathoms
Nov. 15 - Apr. 15
29°00'N
Dec. 1 - Mar. 31
27°51'N
Legend
Great South Channel Restricted Area
Massachusetts Restricted Area
Stellwagen Bank/Jeffreys Ledge Restricted Area
Northern Nearshore Trap/Pot Waters
Southeast Restricted Area North
Southern Nearshore Trap/Pot Waters
Offshore Trap/Pot Waters


80°W
75°W
70°W
65°W
60°W
45°N
40°N
35°N
30°N
CANADA
UNITED STATES
OF AMERICA
Atlantic Ocean
Legend
Jeffreys Ledge Gear Marking Area
Jordan Basin Gear Marking Area
Great South Channel Restricted Area
Stellwagen Bank/Jeffreys Ledge
Cape Cod Bay Restricted Area
Other Northeast Gillnet Waters
Mid/South Atlantic Gillnet Waters
Southeast U.S. Restricted Area (North)
Southeast U.S. Restricted Area (South)
Southeast U.S. Monitoring Area
Other Southeast Gillnet Waters
0 125 250 500
Kilometers
N

Trap/Pot and Gillnet Closure areas

31,916 TOTAL SQ MILES of seasonal closures

MA Restricted Area (trap/pot, Feb-April)

- 3,073 sq mile

Great South Channel (trap/pot and gillnet, April-June)

- 3,232 sq mile

Cape Cod Bay Restricted Area (gillnet, Jan-May)

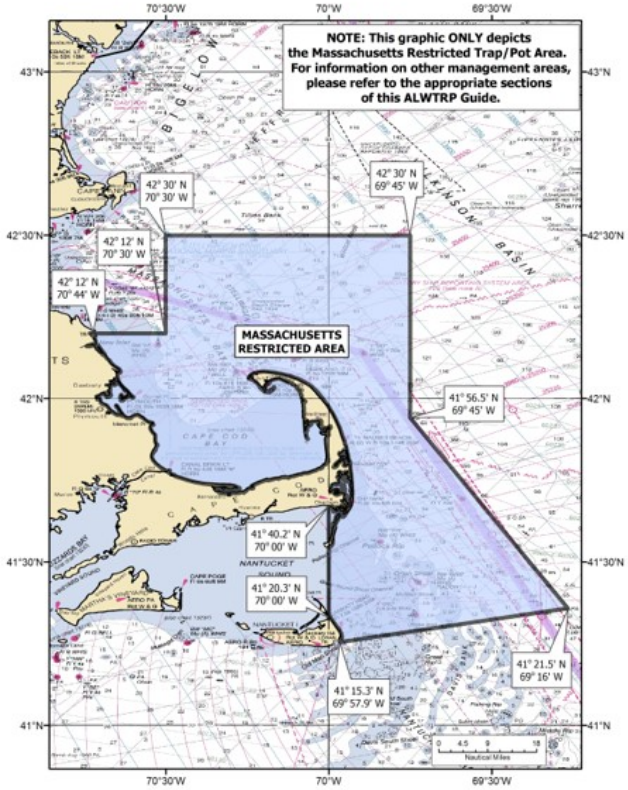
- 664 sq mile

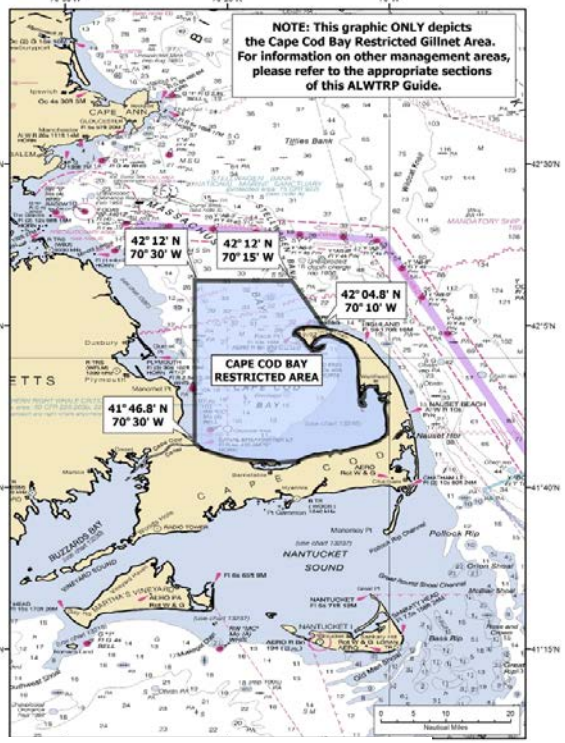
Southeast Restricted Area North (gillnet, Nov 15- April 15)

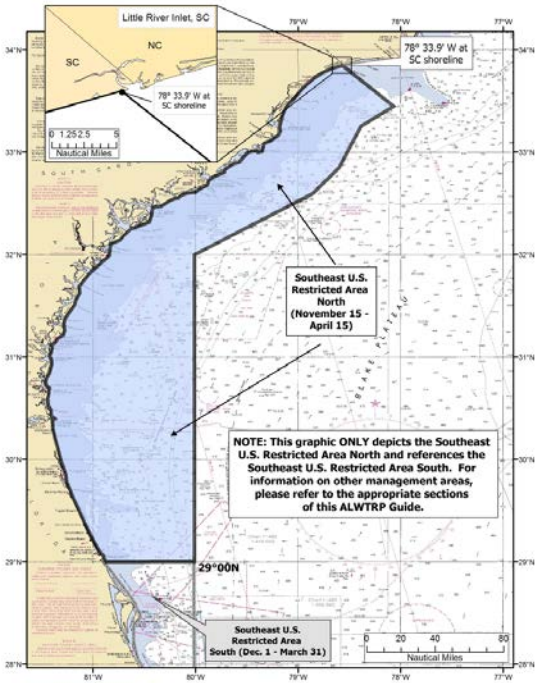
- 21,996 sq mile

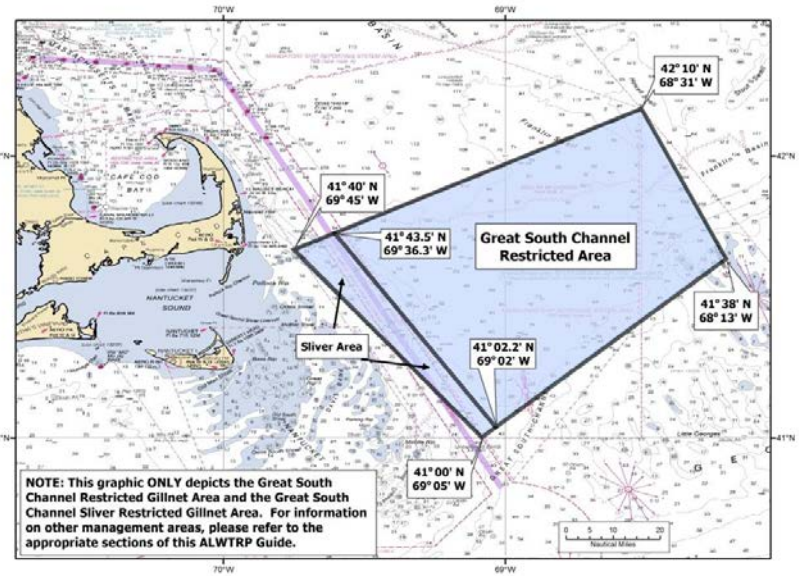
Southeast Restricted Area South (gillnet, Dec-March)

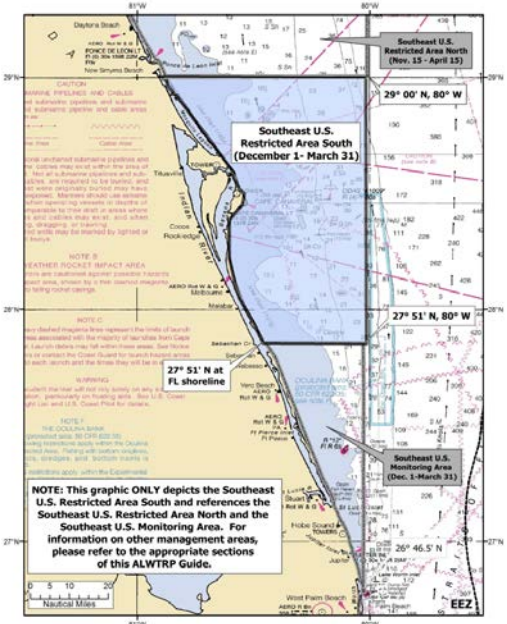
- 2,951 sq mile


NOTE: This graphic ONLY depicts the Massachusetts Restricted Trap/Pot Area. For information on other management areas, please refer to the appropriate sections of this ALWTRP Guide.
MASSACHUSETTS RESTRICTED AREA
42° 30' N 70° 30' W
42° 12' N 70° 30' W
42° 12' N 70° 44' W
42° 30' N 69° 45' W
41° 56.5' N 69° 45' W
41° 40.2' N 70° 00' W
41° 20.3' N 70° 00' W
41° 15.3' N 69° 57.9' W
41° 21.5' N 69° 16' W
70°30'W
70°W
69°30'W
43°N
42°30'N
42°N
41°30'N
41°N


NOTE: This graphic ONLY depicts the Cape Cod Bay Restricted Area. For information on other management areas, please refer to the appropriate sections of this ALWTRP Guide.
CAPE COD BAY RESTRICTED AREA
42° 12' N 70° 30' W
42° 12' N 70° 15' W
42° 04.8' N 70° 10' W
41° 46.8' N 70° 30' W
70°50'W
70°25'W
70°W
42°30'N
42°5'N
41°40'N
41°15'N


Little River Inlet, SC
NC
SC
78° 33.9' W at SC shoreline
Southeast U.S. Restricted Area North (November 15 - April 15)
NOTE: This graphic ONLY depicts the Southeast U.S. Restricted Area North and references the Southeast U.S. Restricted Area South. For information on other management areas, please refer to the appropriate sections of this ALWTRP Guide.
29°00N
Southeast U.S. Restricted Area South (Dec. 1 - March 31)
Nautical Miles
79°W
78°W
77°W
34°N
33°N
32°N
31°N
30°N
29°N
28°N
81°W
80°W


Great South Channel Restricted Area
42° 10' N 68° 31' W
41° 40' N 69° 45' W
41° 43.5' N 69° 36.3' W
41° 38' N 68° 13' W
41° 02.2' N 69° 02' W
41° 00' N 69° 05' W
Sliver Area
NOTE: This graphic ONLY depicts the Great South Channel Restricted Gillnet Area and the Great South Channel Sliver Restricted Gillnet Area. For information on other management areas, please refer to the appropriate sections of this ALWTRP Guide.
70°W
69°W
42°N
41°N

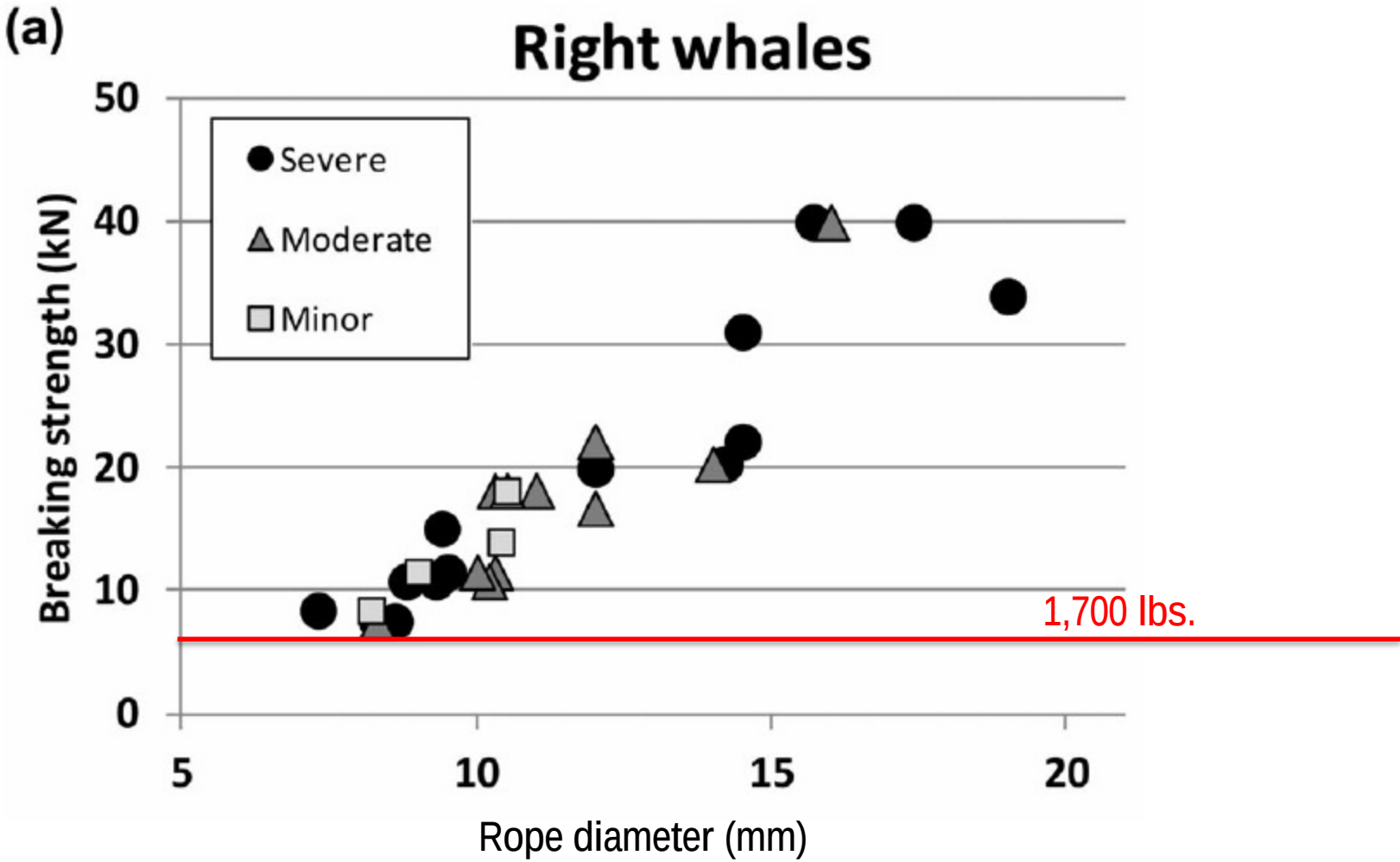

Southeast U.S. Restricted Area North (Nov. 15 - April 15)
29° 00' N, 80° W
Southeast U.S. Restricted Area South (December 1- March 31)
27° 51' N, 80° W
27° 51' N at FL shoreline
Southeast U.S. Monitoring Area (Dec. 1-March 31)
26° 46.5' N
NOTE: This graphic ONLY depicts the Southeast U.S. Restricted Area South and references the Southeast U.S. Restricted Area North and the Southeast U.S. Monitoring Area. For information on other management areas, please refer to the appropriate sections of this ALWTRP Guide.
EEZ
Nautical Miles
81°W
80°W
29°N
28°N
27°N

TRT Activities in 2018

- **Planned:** Fall 2018 Full TRT meeting to consider measures that may be necessary to reduce the effects of gillnet and trap/pot gear entanglements on right whales

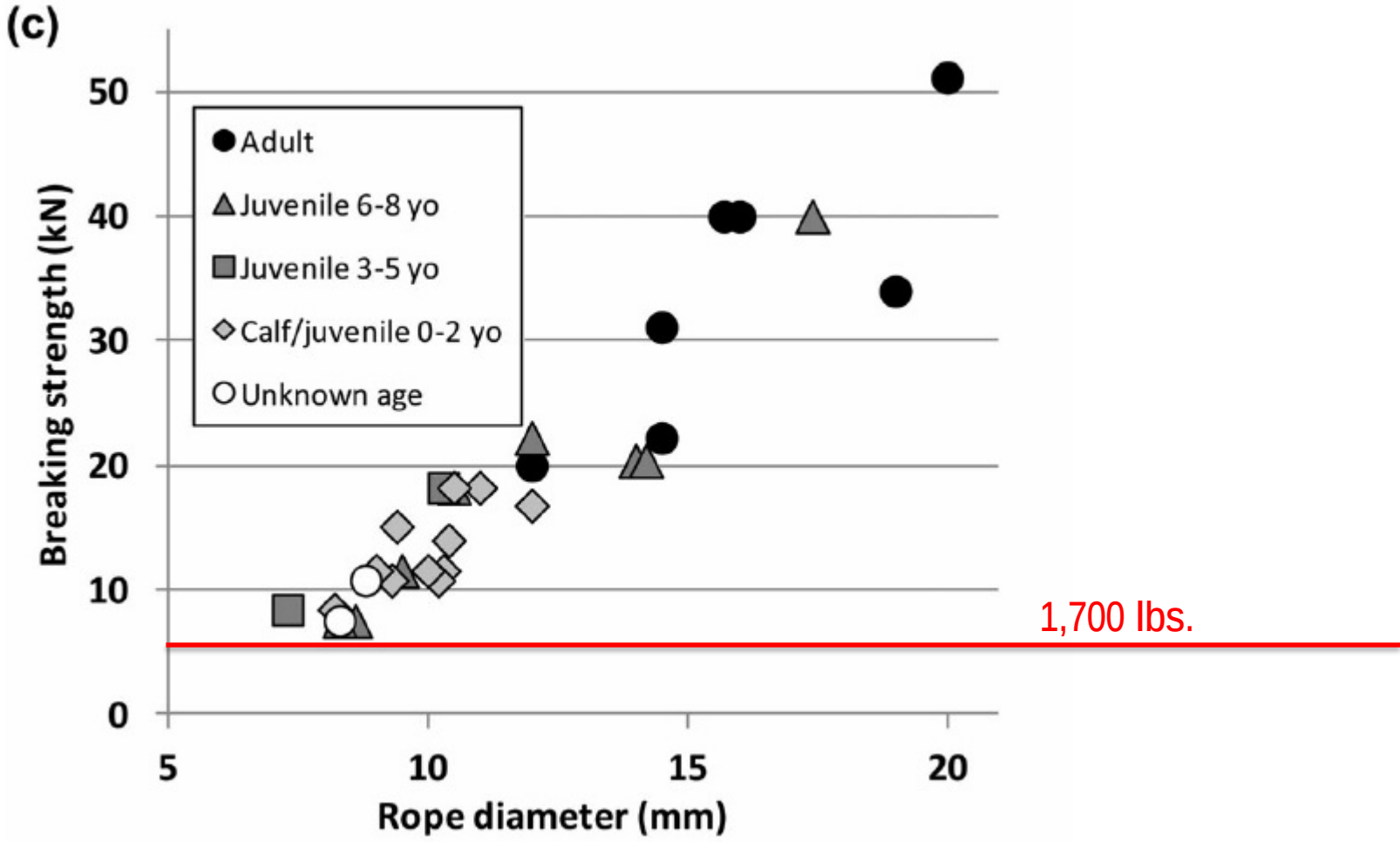
- **Ongoing:** Two TRT Subgroups investigating the feasibility of:
  1. Ropeless fishing
  2. Whale release rope & gear marking

1,700 lb. Breaking Strength Rope



Source: Knowlton *et al.* 2016

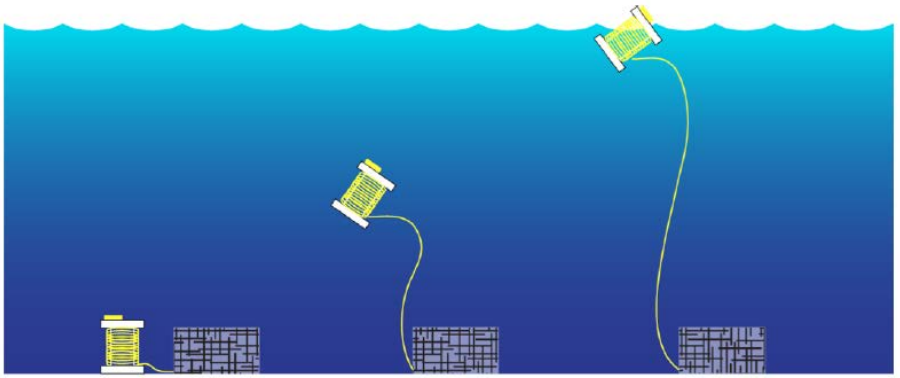
1,700 lb. Breaking Strength Rope

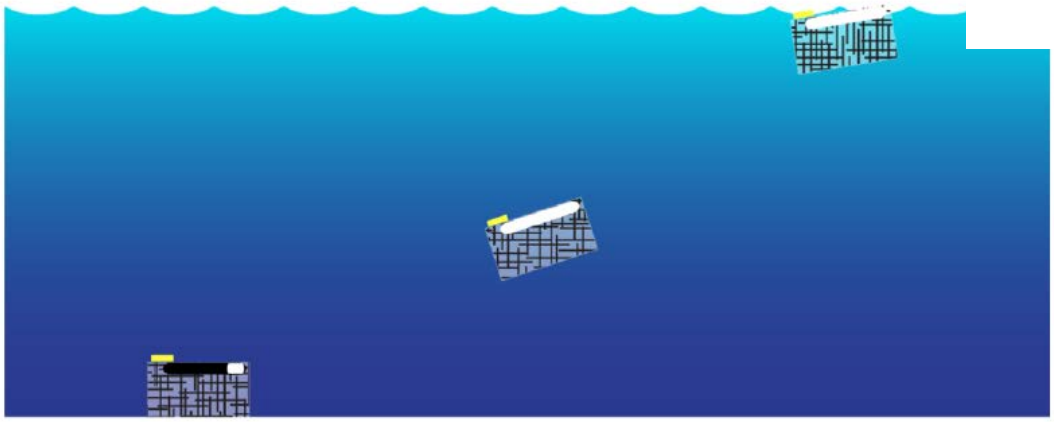


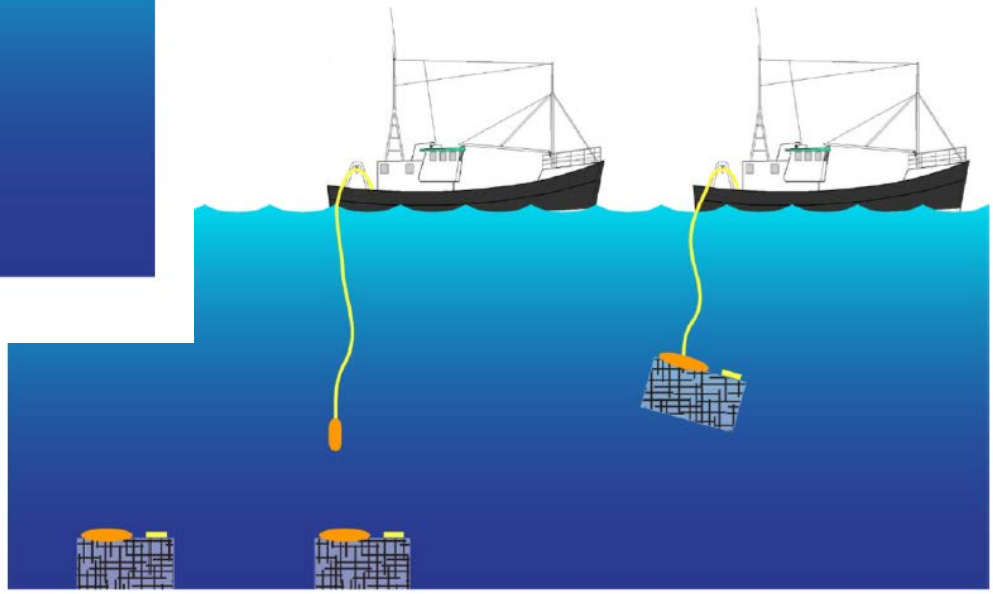
Source: Knowlton *et al.* 2016

Ropeless Fishing

Figure 4. Trap recovery methods, including (top) bottom-stowed rope, (middle) variable buoyancy traps, and (bottom docking system.







Source: Baumgartner *et al.*

TRT Subgroups

Focused on feasibility

1. Technological feasibility: Does the tech exist?
2. Functional feasibility: Will it work?
3. Economic feasibility: Is it cost-effective?

Questions?

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