Cetaceans 4th Grade Curriculum Lesson 17—How Can We Reduce Threats to North Atlantic Right Whales?[1]

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Description

Students will learn about ways to minimize ship strikes and whale entanglements. Students will explore ways that they as individuals can help protect North Atlantic right whales.

Objectives

By the conclusion of the activities, students will:

- Be able to explain what some of the most significant threats to North Atlantic right whales are
- Be able to explain how these threats can affect the whales
- Be able to explain the threat posed by the New England lobster fishery to North Atlantic right whales, and steps that have been taken to make it safer for the whales while minimizing impact on the fishery. Students should be able to explain the advantages and disadvantages of newly developed "sinking" ropes, compared to more traditional "floating" ropes
- Be able to explain how ships pose a threat to North Atlantic right whales, and list two or three things that have been done to decrease this threat
- Explore the potential negative impacts of local actions and ways to reduce them

What You Will Need

- Computers with internet access (for individual students or groups of up to three students)
- Copies of *Right Whale Incident Data* student worksheet for each student

Standards

Sunshine State Standards

Mathematics

- **MA.4.AR.1.1** Solve real-world problems involving multiplication and division of whole numbers, including problems in which remainders must be interpreted within the context.

Science

- **SC.4.L.17.4** Recognize ways plants and animals, including humans, can impact the environment.
- **SC.4.N.1.1** Raise questions about the natural world, use appropriate reference materials that support understanding to obtain information (identifying the source), conduct both individual and team investigations through free exploration and systematic investigations, and generate appropriate explanations based on those explorations.

Common Core Standards

Mathematics

- **4.OA.A.1** Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

Procedure

1. Tell the students that today's lesson will cover threats facing North Atlantic right whales (and other cetaceans).
2. Discussion/Lesson:
    - It might be beneficial at this point to explain a bit about trap fishing off the northeastern US. Peak lobster fishing in the Gulf of Maine is in the summer and fall, but some lobstermen fish throughout the year. Typically, commercial boats fishing for lobster set lines of traps where each trap is connected by rope to the next trap. There can be as many as 15 to 30 traps per line, and a commercial lobsterman may set hundreds of traps at a time. Each line of traps has to have a buoy (attached by rope) at least at one end, but the specific requirements vary with location. Traditionally, the ropes that connected the traps

would float, making a loop of rope between traps. Fishermen are now required to use sinking ropes in certain areas. These sinking lines are hoped to reduce the entanglement risk to whales (see Figures 1 and 2.)

- Explain to students that 3/4 of North Atlantic right whales show evidence of entanglement (scars). Mention that fishermen have complained that sinking lines are more likely to get tangled on rocky bottoms, resulting in more broken rope and abandoned traps in the water. The idea of a low-density rope, which would float slightly and stay off the bottom, but would hopefully not float high enough in the water column to impact whales, is being considered.
- Review with students what they have learned about threats to right whales (from this lesson and Lessons 15 and 16). Ask students to list things that pose a threat to right whales and write these things on the board. Discuss the way each of the items listed affects the whales and write this next to each item. Your final list or table should include the threats/impact listed in Table 1.

3. Ask students if they think any of the threats could be prevented, and if so, how. Ideas include the prevention strategies listed in Table 2.

Table 1.

Threat	**Impact**
Ships or boats	Hit whales and injure or kill them.
Fishing gear or ropes	Entangle whales—may drown whales, may prevent them from feeding, may cause injury or infection.
Noise	Prevents whales from communicating, finding mates; mother whales may lose track of calves.
Trash	May be eaten by whales—not able to be digested, not nutritious.
Harassment or annoyance	Surfers, kayakers, paddleboarders, jet skiers, and smaller vessels may annoy right whales, change their behaviors (feeding, nursing, mating, etc.), and put them at risk of injury; mother and calves may be separated when trying to avoid annoyance.
Hunting	No longer a problem for North Atlantic right whales, but is the reason for their low numbers now.

Table 2.

Threat	**Ways to Prevent Threat**
Ships or boats	Ships need to slow down when whales are present or avoid areas where whales gather. Observers on boats can watch for whales in the water. Buoys that detect whale calls can indicate the presence of whales in an area. Shipping lanes can be rerouted.
Fishing gear or ropes	Floating ropes could be replaced with sinking ropes. Regulations could be developed to reduce the number of traps or the length of the fishing season. Fishermen could be allowed to only set traps when whales are not in the area (winter).
Noise	Avoid certain activities (e.g., drilling at sea) when whales are present in the area.
Trash	People can be more careful when disposing of trash to make sure it can't blow or wash into the water. People can reduce, reuse, and recycle more. People can buy products that come in biodegradable packaging.
Harassment or annoyance	People should always stay at least 500 yards away from a right whale. If you are swimming, surfing, kayaking, paddleboarding, jet skiing, or boating and you see a right whale, you should always move away immediately.
Hunting	Laws have been passed to protect right whales from hunting.

4. Discussion/Lesson:
5. Explain to students that there have been laws and regulations that have changed to help protect right whales.

- In 2009, the shipping channel into Boston was shifted slightly from an area where whales were abundant to an area where they were less common. The change is expected to reduce the number of ship strikes in that area by about 60 to 80%. The change only increased travel time by 10 to 22 minutes. Additionally, if a right whale call has been detected by one of the acoustic buoys in the channel, ships must slow to no more

than 10 knots (11.5 mph) and post a lookout to watch for whales. All ships traveling through right whale feeding areas must also slow to no more than 10 knots at certain times of year (the dates vary by location). Although not mandated at this time, ships traveling into the ports of Fernandina (FL), Jacksonville (FL), Brunswick (GA), and Cape Cod Bay (MA) are asked to use recommended vessel routes to reduce the risk of right whale strikes. Ships are required to slow down to 10 knots (about 11.5 mph) or fewer when traveling through the right whale calving area off southern Georgia and northeastern Florida between November 15 and April 15. They must also slow down in certain portions of the whales' migratory route (between Connecticut and Georgia) from November 1 through April 30.

- In 2009, the federal government required the use of sinking ropes for lobster traps set in certain geographic areas.
- In 1997, the federal government issued approach limits for right whales. It is illegal to approach and remain within 500 yards of a right whale.
- Hunting of right whales was banned in 1937. In US waters, all whales have been protected since 1972.
- Challenge students to think of any ideas that they, their families, or their communities could put into action to help protect whales, especially right whales. Here are a few possible ideas:
  - Go slowly if boating in the migratory or calving area between November and April, or in the feeding areas in the spring and summer (see maps at https://media.fisheries.noaa.gov/dam-migration/compliance_guide_for_right_whale_ship_strike_reduction.pdf).
  - Report right whale sightings—information about right whale locations is sent to ships traveling in the area so they know to slow down and look out for the whales. In parts of northeastern Florida, you can join a volunteer right whale sighting network (https://www.marinelandrightwhale.org/) or report sightings to 877-WHALE HELP (877-942-5343).
  - Recycle fishing line and dispose of other fishing gear properly. You can find more information at https://mrrp.myfwc.com/.
  - Pick up trash, volunteer for coastal or beach cleanups, or start a recycling campaign.
  - Do not approach a right whale, even if it is swimming close to shore. Remember to stay at least 500 yards away (that's more than five football fields in length!).
  - Raise money for right whale research, or sponsor or adopt a right whale (https://www.neaq.org/news-and-stories/right-whale-research-news-sponsorship/).
  - Report dead, injured, or entangled whales to 877-WHALE HELP (877-942-5343).

Activities

Activity 1: Right whale mortalities (data interpretation/math)

1. Give students copies of pages 17–10 through 17–12.
2. Ask students to complete the data sheet (Table 2) using the information from this table.

Activity 2: Lobsters vs. whales (suggested for advanced students)

1. Students will research how American lobster fishing in the New England region affects whales, specifically North Atlantic right whales.
2. Divide students into seven groups. Each group will be assigned a specific role: lobster fisherman, NOAA Fisheries Officer, right whale researcher, member of environmental activist group, member of local fishing coalition, ecotour operator (whale watch boat captain), and state wildlife official.
3. Each group will use the internet to research and formulate answers to questions listed below from the perspective of their assigned role.
4. Each group should select a spokesperson to represent them at a "public forum" (moderated by the teacher) to debate the statement "Current lobster fishing practices are more of a threat to lobstermen than to whales." (Remind students that they will be speaking in the "voice" of their assigned role, and not necessarily voicing their opinions.)
5. Questions to be researched:
   - What current regulations exist for commercial lobster fishermen?
   - How have these regulations changed in order to protect whales?
   - How has this affected lobster fishermen?
   - What do we know about the hazards of commercial lobster fishing to whales?

- What additional regulations have been suggested for lobster fishing?
- How are these likely to affect lobster fishermen? Whales?

Each group may wish to do additional research to support their position. Teachers who are interested in learning more about lobster fishing might want to read *The Secret Life of Lobsters* by Trevor Corson, or *The Lobster Chronicles: Life on a Very Small Island* by Linda Greenlaw.

Summary of North Atlantic Right Whale Incidents, 1999–2008

Compiled using data obtained from the National Marine Fisheries Service Office of Protected Resources' Marine Mammal Health and Stranding Response Program, Northeast Regional Office, and Southeast Regional Office, with assistance from the Provincetown Center for Coastal Studies, New England Aquarium, and Woods Hole Oceanographic Institution (refer to Table 3).

Right Whale Incident Data Student Worksheet

1. How many right whales are listed in Table 3?
2. How many years does the table cover?
3. What is the average number of right whale incidents per year? (Divide your answer to #1 by your answer to #2.) ÷ =
4. How many of the whales listed are female?
5. How many of the whales listed are male?
6. How many of the whales are calves?
7. Use information from the incident data to complete Table 4:

Table 4.

Cause	Number of Injured Whales	Number of Dead Whales
Vessel strike		
Entanglement		

8. What type of threat causes more deaths, vessel strikes or entanglement?
9. What type of threat causes more injuries, vessel strikes or entanglement?
10. Were most of the incidents in northern waters (Canada, MA, VA, MD, NY) or southern waters (NC, GA, FL, TX)?

Answer Key

1. How many right whales are listed in the table? **47**
2. How many years does the table cover? **9**
3. What is the average number of right whale incidents per year? (Divide your answer to #1 by your answer to #2.) **47 ÷ 9 = 5 remainder 2, 5 2/9, or 5.22**
4. How many of the whales listed are female? **25**
5. How many of the whales listed are male? **15**
6. How many of the whales are calves? **8**
7. Use information from the incident data to complete the following table:

Table 4 Answer Key,

Cause	Number of Injured Whales	Number of Dead Whales
Vessel strike	6	13 (or 14 if #31 is included here—in the table it is given as entanglement, possible vessel strike)
Entanglement	17	7

8. What type of threat causes more deaths, vessel strikes or entanglement? **Vessel strikes**

9. What type of threat causes more injuries, vessel strikes or entanglement? **Entanglement**
10. Were most of the incidents in northern waters (Canada, MA, VA, MD, NY) or southern waters (NC, GA, FL, TX)? **Northern waters (32 of the 47)**

Lobster Traps Floating vs. Sinking Ropes

a) Lobster traps set with sinking rope

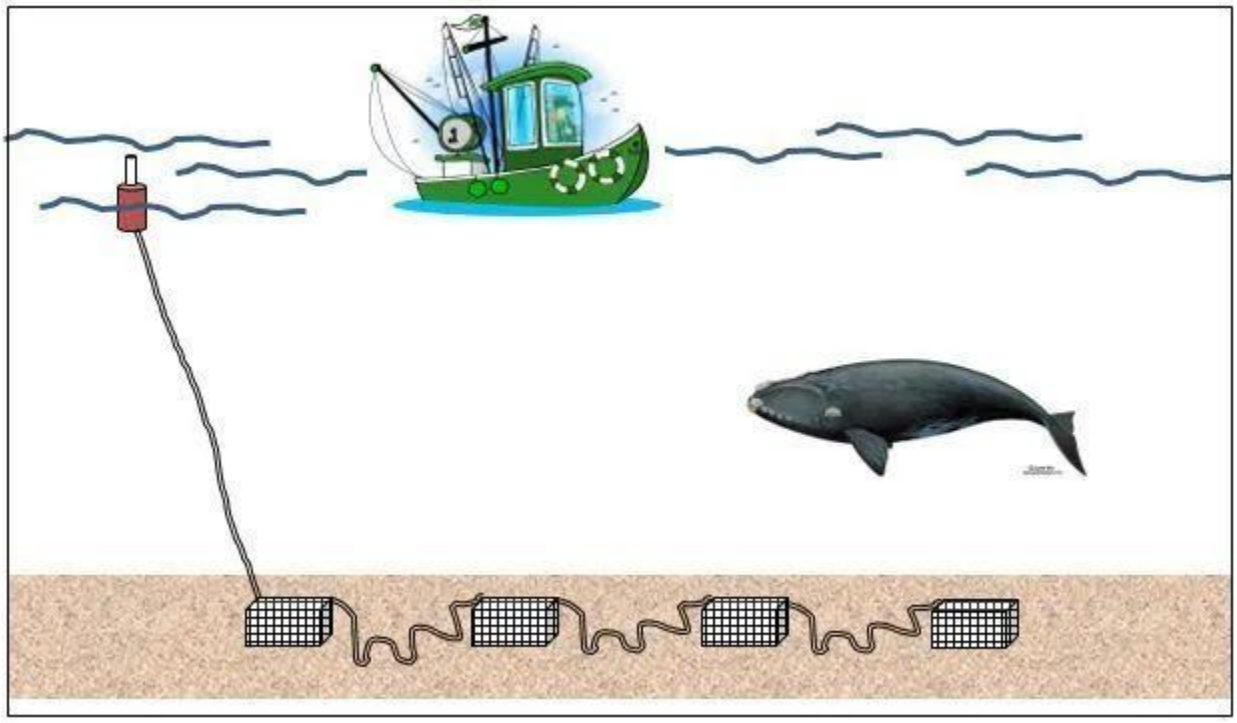


Figure 1.

b) Lobster traps set with floating rope

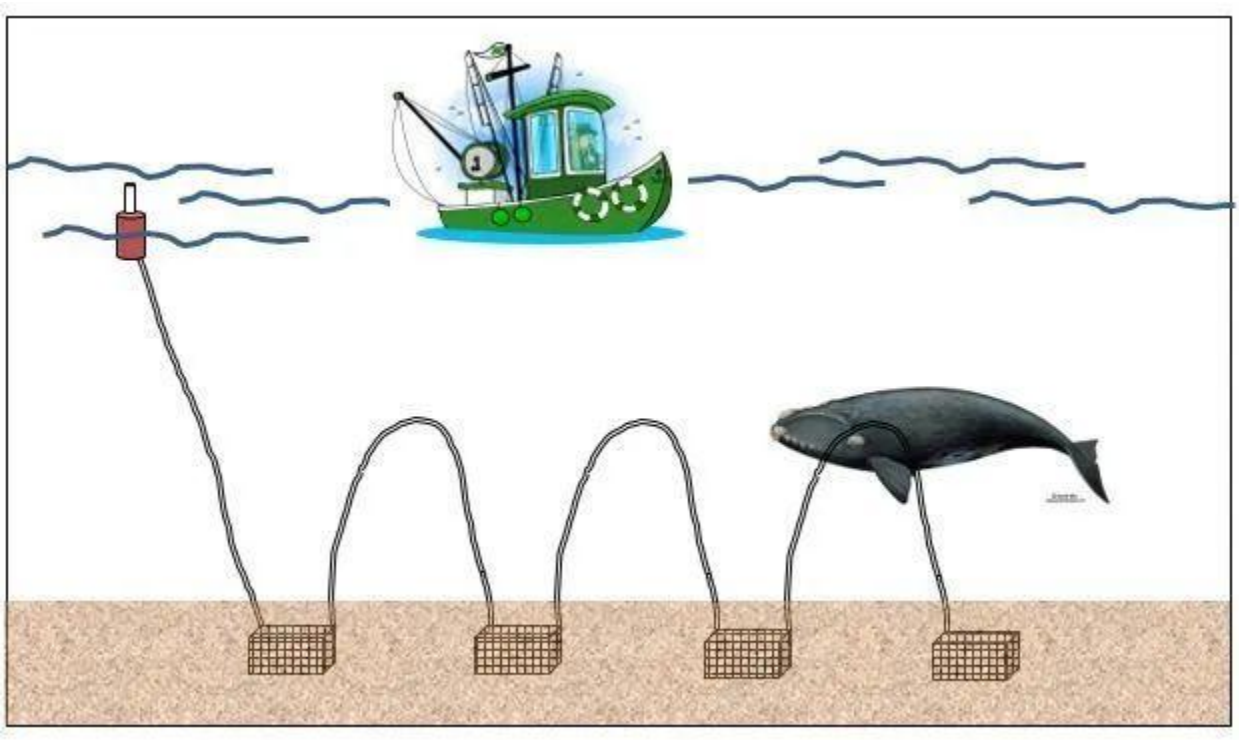


Figure 2.

Table 3. Information Current as of April 13, 2008

	Sex	Date	Location First Reported	Alive or Dead	Cause of Death
14	Female (adult, 29+ years old, pregnant) #1004 "Stumpy"	2/7/04	VA (Virginia Beach)	Dead	Vessel strike
15	Male (calf)	2/3/04	FL	Dead	Unknown
16	Male (juvenile, 1 year old) #3346 "Kingfisher"	3/17/04	FL (SE of St. Augustine)	Injury	Entanglement
17	Female (adult, 12 years old) #2301	9/6/04	Canada (Roseway Basin, Nova Scotia)	Dead (as of 3/3/2005 on Ship Shoal Island, VA)	Entanglement
18	Female (adult, 15 years old; pregnant) #1909	11/24/04	NC (Ocean Sands)	Dead	Vessel strike
19	Unknown	12/9/04	MA	Dead	Unknown
20	Female (adult)	1/9/05	MA	Dead	Unknown
21	Female (adult, 14 years old, pregnant) #2143 "Lucky"	1/12/05	GA (Cumberland Island)	Dead	Infection from previous vessel strike
22	Female (adult, 11 years old at time of injury) #2425	3/10/05	GA (Cumberland Island)	Serious injury	Vessel strike
23	Female (9 years old) #2617	4/28/05	MA (Monomoy Island)	Dead	Vessel strike
24	Male (adult, first seen 1981) #1167	6/8/05	MA (Great South Channel)	Injury	Entanglement—free of gear as of 3/30/07
25	Unknown	7/13/05	MA	Injury	Vessel strike
26	Female (1 year old) #3445	12/3/05	GA (St. Simons Island)	Injury	Entanglement
27	Male (calf, 5.4 m without fluke)	1/10/06	FL (off Jacksonville)	Dead	Vessel strike
28	Unknown (calf, ~5 m)	1/16/06	TX (Corpus Christi Bay)	Serious injury	Vessel strike
29	Female (calf, 5.6 m)	1/22/06	FL (off Ponte Vedra Beach)	Dead	Entanglement, monofilament fishing gear
30	Male (yearling) #3522	3/11/06	GA (off Cumberland Island)	Serious injury	Vessel strike
31	Female (subadult)	5/18/06	NY	Dead	Unknown

32	Female (unknown age, 9.6 m)	7/24/06	Canada (Campobello Island, New Brunswick)	Dead	Vessel strike
33	Unknown	8/16/06	Canada (Bay of Fundy)	Injury	Entanglement
34	Female (adult, 14.7 m)	8/24/06 (date of sighting, not reported until 9/3/06)	Canada (Roseway Basin, Nova Scotia)	Dead	Vessel strike
35	Male (adult, 22 years old) #1403 "Meridian"	9/17/06	Canada (14 m east of Swallowtail, Grand Manan Island)	Injury	Entanglement
36	Unknown	9/27/06	Canada (Bay of Fundy)	Injury	Entanglement
37	Male (2 years old, 12.6 m) #3508	12/30/06	GA (off Brunswick)	Dead	Vessel strike
38	Female (adult) #2029	3/9/07	MA (20 mi SE of Chatham)	Injury	Entanglement
39	Female (2 years old)	3/19/07	MA (Cape Cod Bay)	Injury	Vessel strike
40	Male (adult) #1424	3/25/07	MA (75 mi SW of Yarmouth)	Dead (originally entangled in 2002)	Entanglement
41	Male (calf)	3/30/07	NC (off Avon)	Dead	Entanglement, possible vessel strike
42	Female (5+ years old) #3260	5/8/07	MA (about 65 mi SE of Chatham)	Injury	Entanglement
43	Unknown (calf)	8/5/07	Canada (Bay of Fundy)	Injury	Vessel strike
44	Female (12 years old) #2645	1/12/08	MA (Cape Cod Bay)	Injury	Entanglement
45	Male (5 years old) #3333	1/29/08	GA (off Sapelo Island)	Injury	Entanglement
46	Male (2 years old) #1980	2/3/08	NC (Cape Hatteras)	Injury	Entanglement
47	Female (27+ years old) #1140 "Wart"	3/6/08	MA (Cape Cod Bay)	Injury	Entanglement

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