



Go Slow, Whales Below:

**VESSEL STRIKES
CONTINUE TO THREATEN
NORTH ATLANTIC RIGHT WHALES**

Go Slow, Whales Below:

VESSEL STRIKES CONTINUE TO THREATEN NORTH ATLANTIC RIGHT WHALES

OCTOBER 2023



Contents

In Memoriam	4
Executive Summary	6
Introduction	10
Overview of Vessel Speed Regulations	12
Speeding Vessels in Seasonal Management Areas	17
Speeding Vessels in Dynamic Management Areas and Slow Zones	25
Discussion	30
Conclusion and Recommendations	33
Methodology	36
References	38

Authors

Julia Singer
Patrick Mustain
Katie O'Donnell
Gib Brogan

Designer

Addison Bauer



IN MEMORIAM

Vessel Strike Case Studies

North Atlantic right whales are swimming on the edge of extinction. These large whales are prone to vessel strikes because they are dark in color, lack a dorsal fin, and tend to swim slowly near the water's surface, making them very difficult to spot.

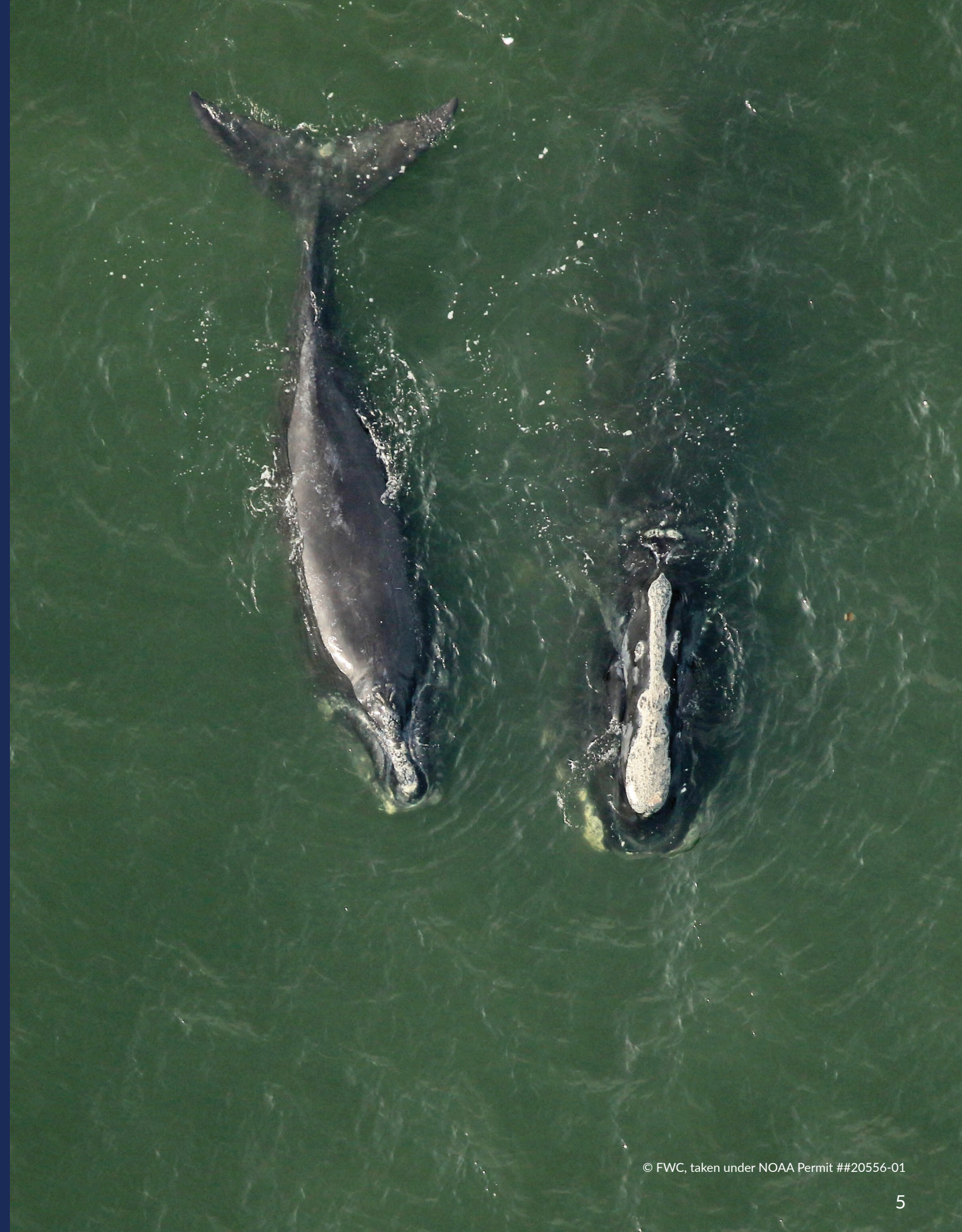
FEBRUARY 2021

On February 12, 2021, a 54-foot recreational fishing boat was returning home to St. Augustine, Florida, when it hit something in the water, abruptly stopping, flooding, and ultimately sinking the boat.¹ The next day, a North Atlantic right whale calf was found dead on the beach, with deep propeller cuts and a fractured skull.² That calf was the offspring of a North Atlantic right whale named "Infinity." Later that week, Infinity was seen by an aerial survey team alive but suffering from two new cuts that were consistent with a recent vessel strike.³ Unfortunately, she has not been seen since. Not only was this collision devastating for these critically endangered North Atlantic right whales, but also dangerous and costly to boaters.¹ In that area, the designated speed limit meant to protect North Atlantic right whales only applies to vessels 65 feet or longer.⁴ This 54-foot vessel was not subject to the speed requirement and free to travel at speeds unsafe for whales. Infinity and her calf were hit at about 21 knots — over two times the speed limit.¹

FEBRUARY 2023

Two years later to the day, officials received a report of a dead North Atlantic right whale washed up on Virginia Beach, Virginia.⁵ It was a 20-year-old male, identified as whale #3343. Scientists last spotted this whale off the coast of Georgia in December 2022.⁶ Sadly, he did not survive his migration along the East Coast. Multiple fractures and separations in his spine indicated a vessel strike. In the days before his body was found, between February 8 and 11, Oceana's analysis found that more than 75% of the boats traveling through the area where #3343 was struck and killed had not been complying with mandatory or voluntary speed limits established to protect North Atlantic right whales.⁷

THESE TRAGEDIES, ALONG WITH MANY OTHERS LIKE THEM, COULD HAVE BEEN PREVENTED. THIS REPORT EXPLAINS HOW.



Executive Summary

The North Atlantic right whale is one of the most endangered whales on the planet. Only around 340 remain. The two greatest threats to this species are vessel strikes and entanglements in fishing gear. To reduce the risk from the top threats and allow the species to recover, the U.S. government must require boats to slow down and reduce the number of vertical lines from fishing gear in the water, particularly in times and places where North Atlantic right whales are known to be present.

To address the vessel strike threat to North Atlantic right whales, the National Marine Fisheries Service (NMFS) issued regulations in 2008 known as the Vessel Speed Rule. This rule created two types of right whale conservation areas for vessels 65 feet or greater in length:

Seasonal Management Areas (SMAs)

SMA locations were chosen because they represented important times and areas for feeding, breeding, calving, and migratory habitats for the whales based on 2008 migration and behavior patterns. There are 10 seasonal, mandatory, and distinct predetermined areas, ranging from Massachusetts to Florida, where all vessels 65 feet and longer are required to reduce speeds to 10 knots or less. There are certain exemptions for safety reasons as well as federal vessels and state-affiliated vessels when carrying out law enforcement or search and rescue operations.

Dynamic Management Areas (DMAs)

DMAs are voluntary slow zones that are triggered by visual sightings of three or more North Atlantic right whales within an area. Boats 65 feet and longer are asked to avoid the area or slow down to 10 knots or less. These slow zones are temporary, lasting 15 days from the sighting, but are extended if the whales remain in the vicinity. DMAs are rectangular and extend 15 nautical miles around the core area of the whale detection and were intended to account for the variability in whale locations outside of SMAs.

Beginning in 2020, NMFS' Greater Atlantic Regional Fisheries Office added a "Right Whale Slow Zone" program throughout New England and the Mid-Atlantic. These Slow Zones function the same as voluntary DMAs, except they can also be triggered by acoustic detections.

Despite these safeguards, the whales are still at risk of being struck by vessels less than 65 feet in length inside SMAs and DMAs/Slow Zones, and by all vessels outside of the conservation areas, as the range of these whales has shifted since the regulations were established. Additionally, both mandatory SMAs and voluntary DMAs/Slow Zones are frequently ignored.

In 2021, Oceana released an analysis of vessel speeds in both SMAs and DMAs between 2017 and 2020. Vessels were considered speeding if they exceeded 10 knots at any point in an SMA or DMA. The results showed very high percentages of speeding vessels.

In 2023, Oceana analyzed vessel speeds in both SMAs and DMAs/Slow Zones to investigate if there have been improvements in compliance levels to protect these whales since the 2021 report. From November 1, 2020, to July 31, 2022, the analysis showed that once again, high percentages of vessels were speeding through both voluntary and mandatory management areas all along the Atlantic Coast.

Current vessel speed regulations are not sufficient to protect the North Atlantic right whale from extinction. NMFS proposed new regulations in 2022 that need to be finalized and should include the following changes:

- **Update slow zones to accurately reflect current whale habitat;**
- **Require mandatory slowdowns when whales are detected;**
- **Expand regulations to include all vessels 35 feet and greater; and**
- **Improve enforcement of violations and compliance with regulations.**

Mandatory Seasonal Management Areas (SMAs)

84%

84% of vessels exceeded the speed limit (10 knots) in all SMAs for both seasons.



SMAs with the most speeding vessels:

1. Ports of New York/New Jersey (86% average)
2. Wilmington, North Carolina, to Brunswick, Georgia (85% average)
3. Calving and nursery grounds from Georgia to Florida (74% average)
4. Entrance to the Chesapeake Bay (72% average)
5. Entrance to the Delaware Bay (66% average)



40% of all speeding vessels were cargo vessels, making them the worst offenders.



Vessels flagged to the United States, Panama, Marshall Islands, Liberia, and China had the most violations in SMAs.



In each SMA, there were examples of vessels traveling faster than 30 knots, at least three times the mandatory speed limit.

Voluntary Dynamic Management Areas (DMAs) and Slow Zones

82%

82% of vessels ignored the recommended speed limit (10 knots) in DMAs/Slow Zones. This action was not illegal due to the voluntary nature of DMAs/Slow Zones but is still highly dangerous because whales were known to recently be in the area.



More vessels cooperated with the speed limit in the Mid-Atlantic than any other region, but still had between 58% to 70% of vessels speeding.

An average of 82% of vessels ignored speed limits in the Southern States region in both seasons, making it the DMA/Slow Zone region with the worst cooperation.



Between 42% and 50% of all speeding vessels were cargo vessels, making them the worst offenders.



Vessels flagged to the United States, Marshall Islands, Panama, and Liberia ignored voluntary speed limits in DMAs/Slow Zones the most.



In each DMA, there were examples of vessels traveling faster than 37 knots, at least three and a half times the voluntary speed limit.

Current safeguards are not enough

The SMAs established in 2008 need to be updated to reflect the current location of these whales as their range has changed over the last 15 years, likely due to shifting food sources from climate-driven changes. Certain areas, such as the area south of New England, are now year-round socializing and feeding grounds due to an abundance of the whales' primary food source called copepods. Between this habitat change, the voluntary nature of DMAs/Slow Zones, vessels under 65 feet currently being excluded, and an overall lack of compliance, North Atlantic right whales remain under threat. They need stronger safeguards to be protected from boat strikes.

To protect this species,

Oceana recommends that NMFS promptly releases the final updated Vessel Speed Rule that would:

- Update the timing and location of seasonal mandatory slow zones to reflect the current footprint of North Atlantic right whales compared to where the whales were 15 years ago;
- Make compliance with voluntary Dynamic Management Areas mandatory; and
- Expand the rule to include vessels 35 feet or greater.

Additionally, Oceana recommends that NMFS strengthens the rule by:

- Improving the monitoring, compliance, and enforcement of ship speeds in slow zones;
- Narrowing the federal exemptions in the Vessel Speed Rule; and
- Requiring vessels 35 feet or greater to use Automatic Identification System (AIS) devices at all times.



Introduction



Decades of Decline and an Uncertain Recovery

North Atlantic right whales' precarious odds of survival are evident in their very name. Their proximity to shore, slow swimming speed, and tendency to float when killed led the whaling industry to dub them the "right" whale to kill.¹⁵ This once abundant species had as many as 9,000 to 21,000 individuals before commercial whaling, which brought the population to as low as an estimated 100 whales in the Atlantic Ocean by the early 20th century.^{16,17} The League of Nations, the predecessor to the United Nations, banned the whaling of this species in 1935, and its slow crawl to recovery began, rebounding to as many as 483 individuals in 2010.^{18,19}

The government has a legal mandate to protect this critically endangered species. However, their population has again been declining in the last decade, so expanded protections are needed. Today, North Atlantic right whales are still one of the most endangered large whales on the planet, with only around 340 individuals left.⁸ While whaling has ended, threats posed by humans have persisted:

- **Vessel strikes that leave them with broken bones, blunt force trauma, or lacerations from propellers;²³ and**
- **Entanglements in fishing gear, in which ropes wrap around their mouths, fins, tails, and bodies. Entanglements can lead to infections, starvation by preventing whales from feeding, exhaustion, and drowning from pulling heavy fishing gear through the water.²⁴**

These two threats have become such a problem that in 2017, the National Marine Fisheries Service (NMFS) declared an unusual mortality event for the species.²⁵ As outlined by the Marine Mammal Protection Act, an unusual mortality event is defined as a "stranding that is unexpected, involves a significant die-off of any marine mammal population, and demands immediate response."²⁶

Since 2017, in the United States and Canada, there have been at least:

- **Thirty-six deaths;**
- **Thirty-four serious injuries (where a whale is likely to die from the injury or illness); and**
- **Forty-five morbidities (injuries or illnesses that may impede health, growth, and reproduction but do not necessarily lead to death).²⁵**

As of August 2023, 115 North Atlantic right whales have been a part of the unusual mortality event.²⁵

Federal agencies have the authority and the responsibility to protect North Atlantic right whales under several laws, including the Endangered Species Act, the Marine Mammal Protection Act, and the Coast Guard Authorization Act of 2018.^{20,21,22}

North Atlantic right whales are one of the most endangered large whales on the planet, with only around 340 individuals left.

Low Birth Rates Threaten Chances of Recovery

North Atlantic right whales are not reproducing quickly enough to counter the rate of deaths. Of the approximately 340 remaining North Atlantic right whales, researchers estimated only around 70 are breeding females as of 2018.²⁷ NMFS estimates that 20 calves being born would be a relatively productive year.²⁸ However, 50 or more calves are needed to stop the decline and allow the whales to recover. Only 12 calves were seen in 2023, and unfortunately, not all 12 survived the season. In January 2023, a male calf of no more than a few weeks old was spotted underweight and in relatively poor health near Morehead City, North Carolina, and did not survive. The condition of the mother and why she was separated from her calf are unknown.²⁸

Three years is considered a healthy interval between calves, but now North Atlantic right whales are calving only every 7-10 years on average.²⁸ In 2022, there were no known first-time mothers, supporting recent research that fewer North Atlantic right whales are becoming reproductively active.⁸ Scientists suspect that chronic stress from human activity, such as vessel strikes and entanglements, may be causing this slowdown.^{29,30}



Births:	2016-2017	5 calves	2019-2020	10 calves	2021-2022	15 calves
	2017-2018	0 calves	2020-2021	20 calves	2022-2023	12 calves
	2018-2019	7 calves				

North Atlantic right whale calving seasons run mid-November through mid-April.²⁸

North Atlantic Right Whale Population Continues to Decline

Under the Marine Mammal Protection Act, NMFS is charged with estimating the maximum number of whales that can die from human causes per year, on average, without impacting recovery.³¹ This is called the potential biological removal level. For the North Atlantic right whale, that number is less than one whale per year.

In the last six years alone, 12 North Atlantic right whales have died from vessel strikes, and 36 dead North Atlantic right whales have been recorded.²⁵ It is important to note that the true number of North Atlantic right whales killed by vessel strikes and other causes is likely much higher, as researchers estimate that only about one-third of total North Atlantic right whale deaths are observed.³²

North Atlantic right whales are not on a path to recovery. This species needs increased protection now to have a chance at survival.

Number of North Atlantic right whale deaths and serious injuries from all documented causes, by year²⁵

Year	Confirmed Deaths	Serious Injuries – Likely to result in death	Total
2017	17	6	23
2018	3	6	9
2019	10	3	13
2020	2	6	8
2021	2	5	7
2022	0	4	4
2023, as of August	2	4	6

Overview of Vessel Speed Regulations



The 2008 Vessel Speed Rule

To address the threat of vessel strikes, NMFS issued the Vessel Speed Rule in 2008, which set a 10-knot (11.5 mph) speed restriction for vessels 65 feet and greater at certain times and locations where North Atlantic right whales are expected to be present or recently detected.⁴ The 2008 Vessel Speed Rule created two distinct types of protective areas:

Seasonal Management Areas (SMAs)

SMA locations were chosen because they represented important times and areas for feeding, breeding, calving, and migratory habitats for the whales based on 2008 migration and behavior patterns. There are 10 seasonal, mandatory, and distinct predetermined areas, ranging from Massachusetts to Florida, where all vessels 65 feet and longer are required to reduce speeds to 10 knots or less. There are certain exemptions for safety reasons as well as federal vessels and state-affiliated vessels when carrying out law enforcement or search and rescue operations.

Dynamic Management Areas (DMAs)

DMAs are voluntary slow zones that are triggered by visual sightings of three or more North Atlantic right whales within an area. Boats 65 feet and longer are asked to avoid the area or slow down to 10 knots or less. These slow zones are temporary, lasting 15 days from the sighting, but are extended if the whales remain in the vicinity. DMAs are rectangular and extend 15 nautical miles around the core area of the whale detection and were intended to account for the variability in whale locations outside of SMAs.

As with all federal regulations, NMFS solicited comments on their proposed rule from the public in 2006, including industry stakeholders, before issuing the final regulations in 2008.^{33,4} Some comments expressed concern that

vessels smaller than 65 feet could also strike and kill North Atlantic right whales.³³ While the final 2008 Vessel Speed Rule only applies to vessels 65 feet and greater, NMFS included in the rule that additional rulemaking would be considered, such as future regulations on smaller vessels.⁴

Extended Indefinitely

The 2008 rule was originally scheduled to sunset in 2013, but after finding that the Vessel Speed Rule reduced the risk and severity of vessel strikes, NMFS removed the end date.¹¹ Additional protections were not added at the time of the extension, but NMFS was tasked with publishing a report on the conservation value and human impacts of the rule.¹⁰

Adding Right Whale Slow Zones

In 2020, NMFS' Greater Atlantic Regional Fisheries Office added a "Right Whale Slow Zone" program throughout the New England and the Mid-Atlantic regions, in addition to DMAs that cover the entire Atlantic coast of the United States.¹¹ These zones are triggered by either visual or acoustic North Atlantic right whale detections and otherwise function the same as voluntary DMAs. They establish a boundary around the whale detection for 15 days and encourage vessels 65 feet and larger to transit at speeds below 10 knots. Similar to DMAs, they can be extended if whales are still detected in the area.

The Vessel Speed Rule Assessment

In early 2021, NMFS released a draft report evaluating the conservation benefits and human impacts of the Vessel Speed Rule.³⁴ The draft report and conservation recommendations were made available for public review and comment for 60 days and attracted hundreds of comments from interested parties. NMFS considered these comments and finalized the report later in 2021. The final report found some reduction in vessel strike risk since the implementation of the rule.

“While it is not possible to determine a direct causal link, the number of documented vessel strike mortalities and serious injuries decreased from 12 during the 10 years prior to the rule’s implementation to eight in the 10 years since implementation. This overall decline demonstrates progress but also indicates **additional action is warranted to further reduce the threat of vessel collisions.**”

– NMFS in its North Atlantic Right Whale Vessel Speed Rule Assessment³⁴



Oceana's Ship Speed Watch

In 2020, Oceana developed Ship Speed Watch, an online tool to track vessel speeds using self-reported information transmitted through a vessel's Automatic Identification System (AIS).⁵¹ Ship Speed Watch allows anyone, including the government, to see which vessels are speeding and where. Ship Speed Watch should be utilized as a powerful prevention and enforcement tool.



© CMA Research Institute, taken under NOAA Permit #20556

Notably, the investigation found that the rule did not negatively impact navigational safety.³⁴ The agency also found a “substantial amount of small vessel traffic” to be transiting above 10 knots through SMAs, though it indicated that this data should be viewed as preliminary due to smaller vessels not being required to report their speeds using Automatic Identification Systems (AIS).

The agency’s report included the following recommendations:

- **Modify the location, timing, and duration of some SMAs relative to current North Atlantic right whale distribution;**
- **Enhance enforcement and outreach to improve compliance with current regulations;**
- **Address the risk of strikes from vessels under 65 feet in length;**
- **Modify the DMA program due to low cooperation with voluntary speed recommendations; and**
- **Conduct additional research into vessel strikes and North Atlantic right whales.**

A New Proposed Rule to Save North Atlantic Right Whales from Speeding Boats

In August 2022, based on its 2021 report and related comments from interested parties, NMFS released proposed updates to the 2008 Vessel Speed Rule.¹¹ The proposed updates included:

- **Modifying the location and timing of mandatory seasonal speed zones (SSZs, currently known as SMAs) to better address areas and times where vessel strike risk is high;**
- **Expanding the rule to include vessels 35 feet and greater;**
- **Changing dynamic speed zones (DSZs, currently known as DMAs/Slow Zones) from voluntary to mandatory where whales are detected; and**
- **Updating the rule’s safety provisions by allowing vessels to exceed the 10-knot speed limit in some circumstances.**

The proposed rule underwent a 90-day comment period where NMFS received over 90,000 comments, including comments from conservation groups, commercial and recreational fishing communities, the shipping industry, and other interested parties.

NMFS has been reviewing these public comments and associated technical submissions since November 2022. NMFS indicated that a final rule amending and improving

the 2008 Vessel Speed Rule is expected by the end of 2023.³⁵

The 2022 NMFS proposed rule included needed improvements on existing protections while continuing to allow maritime activities to continue across the U.S. Atlantic Ocean.¹¹

The proposed seasonal slow zones are just that: seasonal and temporary, and they are only in place when the whales are expected to be passing through. Almost all of these seasonal slow zones (except a smaller zone near Nantucket and Georges Bank that runs through the end of June) would not impact U.S. boaters between Memorial Day and Labor Day as most of the whales are typically in Canada at those times.¹¹ Additionally, these changes will have no effect on boats smaller than 35 feet. While reducing speeds may add some travel time to trips during certain periods, these zones do not prohibit fishing, boating, or other activities and still allow mariners to utilize the areas. If safety is ever on the line, boaters are exempt from the speed limit.

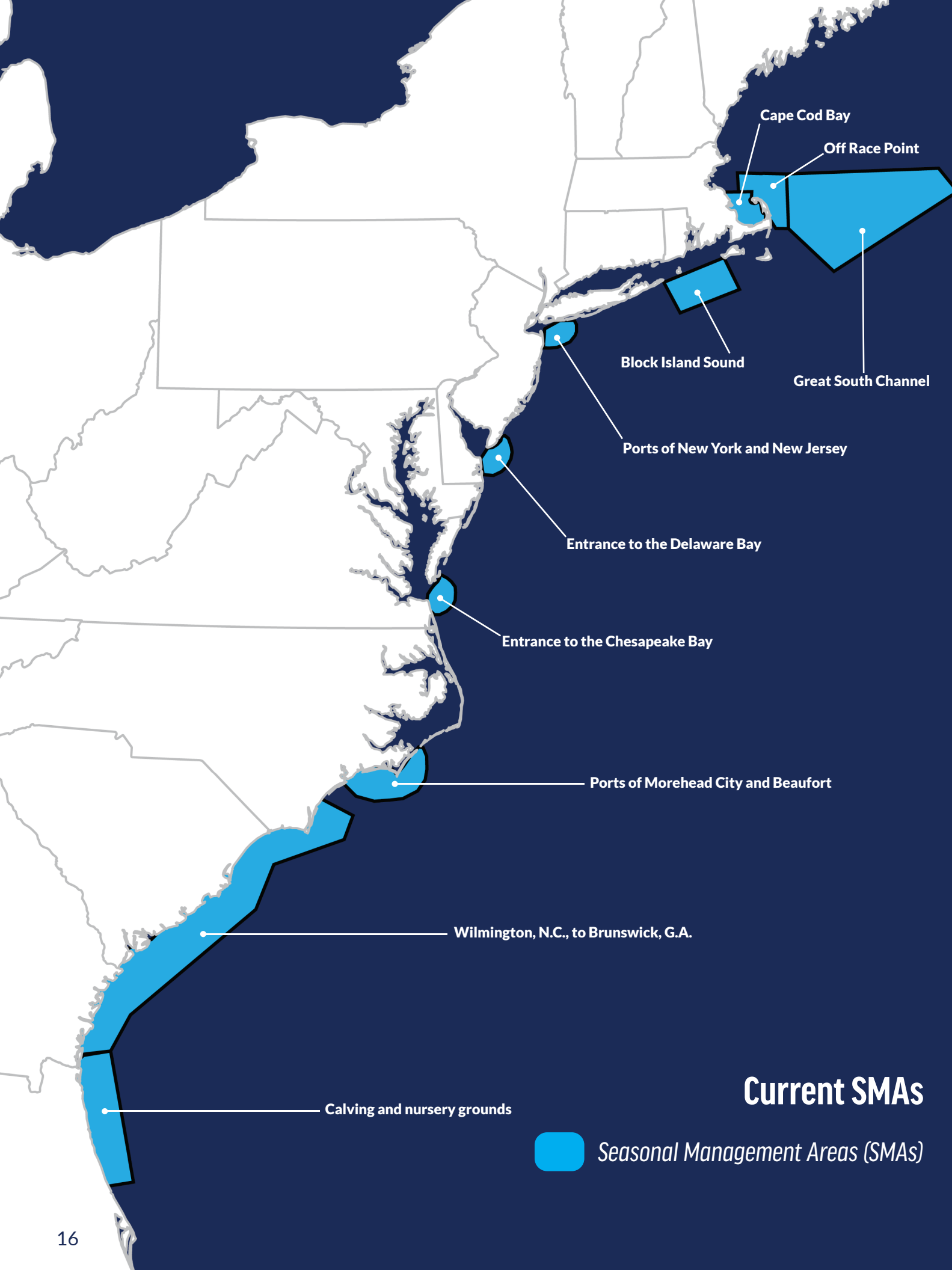
If finalized by the end of 2023, the amended safeguards will provide additional protection to mothers and calves — the most vulnerable group of North Atlantic right whales — in the United States southeast region this calving season and potentially prevent tragic deaths like the 2023 victim near Virginia Beach, Virginia.^{28,6}

Speeding Toward Extinction: Oceana’s 2021 Report

In 2021, Oceana released a report investigating vessel speeds in areas where U.S. regulations require or encourage speeds of 10 knots or less to protect whales and found that most vessels were not slowing down.¹³ Oceana found that between 2017-2020, 33% to 90% of vessels were speeding in mandatory SMAs, with the worst area being the SMA ranging from North Carolina to Georgia. In voluntary DMAs, the percentage of speeding vessels ranged from 49% to 84%, with the worst region being the southern states from Cape May, New Jersey, to central Atlantic Florida.

Since the release of the 2021 report, far too many vessels are still speeding through SMAs and DMAs/Slow Zones, continuing to endanger North Atlantic right whales.

Speeding Vessels in Seasonal Management Areas



There are 10 Seasonal Management Areas (SMAs) along the East Coast of the United States that require all vessels 65 feet or greater to slow down to 10 knots or less to reduce the risk of death or serious injury to North Atlantic right whales from vessel strikes.⁴

The mandatory SMAs are active for a distinct part of the year when North Atlantic right whales are expected to be present. From north to south, the SMAs are:^{4,36}

- **Cape Cod Bay** (from January 1 to May 15)
- **Off Race Point** (from March 1 to April 30)
- **Great South Channel** (from April 1 to July 31)
- **Block Island Sound** (from November 1 to April 30)
- **Ports of New York and New Jersey** (from November 1 to April 30)
- **Entrance to the Delaware Bay** (from November 1 to April 30)
- **Entrance to the Chesapeake Bay** (from November 1 to April 30)
- **Ports of Morehead City and Beaufort** (from November 1 to April 30)
- **Wilmington, North Carolina, to Brunswick, Georgia** (from November 1 to April 30)
- **Calving and nursery grounds (Brunswick, Georgia, to northern Florida)** (from November 15 to April 15)

Oceana analyzed the speed of vessels that transited through each SMA and noted those that exceeded the 10-knot mandatory speed limit at any given point. We reviewed two seasons of data from November 1, 2020, to July 31, 2021, and November 1, 2021, to July 31, 2022. We chose to organize SMAs into seasons rather

than calendar years because several SMAs span the January 1 calendar year start point, and seasons allow for a continuous analysis of an area's entire active period. These dates align with the expected seasonal migration of whales, beginning with their calving season in the southeast United States and ending once many of the whales have entered Canadian waters. As vessels below 65 feet are not subject to the current Vessel Speed Rule requirements, only vessels 65 feet and above were analyzed.

We defined speeding vessels as those that exceeded the 10-knot speed limit relative to all vessels that transited the area. Oceana found that:

- A total of **8,690** unique vessels made **99,992** transits through at least one SMA over both seasons.
- **84%** of vessels exceeded the speed limit in all SMAs for both years.
- Across all SMAs and both seasons, the percentage of speeding vessels ranged from **38% to 87%**.
- Overall, the SMA for the ports of New York and New Jersey exhibited the worst percentage of speeding vessels: More than **85%** of vessels, on average, violated the speed limit across both SMA seasons. Following closely behind was the Wilmington, North Carolina, to Brunswick, Georgia, SMA, with an average of **84%** of vessels speeding across both seasons.
- **40%** of all speeding vessels were cargo vessels, making them the worst offenders.

Percent of Vessels Speeding Through Mandatory 10-Knot Speed Zones

Seasonal Management Area	November 2020 — July 2021 Season	November 2021 — July 2022 Season
CAPE COD BAY	58.6% (143)	50.7% (149)
OFF RACE POINT	37.8% (59)	39.3% (70)
GREAT SOUTH CHANNEL	40.4% (185)	38.6% (196)
BLOCK ISLAND SOUND	46.5% (322)	47.0% (433)
PORTS OF NEW YORK & NEW JERSEY	85.4% (1,232)	87.1% (1,817)
ENTRANCE TO THE DELAWARE BAY	63.7% (729)	68.0% (1,092)
ENTRANCE TO THE CHESAPEAKE BAY	71.2% (1,208)	72.4% (1,729)
PORTS OF MOREHEAD CITY & BEAUFORT	61.2% (375)	62.9% (507)
WILMINGTON, NORTH CAROLINA, TO BRUNSWICK, GEORGIA	85.1% (1,644)	83.9% (2,311)
CALVING & NURSING GROUNDS (BRUNSWICK, GEORGIA, TO NORTHERN FLORIDA)	76.3% (806)	72.7% (1,054)

Number of speeding vessels in SMAs in parentheses.

Top Recorded Vessel Speeds in Mandatory 10-Knot Speed Zones (in Knots)

Seasonal Management Area	November 2020 — July 2021 Season	November 2021 — July 2022 Season
CAPE COD BAY	38.4	36.7
OFF RACE POINT	31.1	34.3
GREAT SOUTH CHANNEL	38.2	37.5
BLOCK ISLAND SOUND	39.2	39.0
PORTS OF NEW YORK & NEW JERSEY	39.5	39.7
ENTRANCE TO THE DELAWARE BAY	39.3	39.0
ENTRANCE TO THE CHESAPEAKE BAY	37.4	39.7
PORTS OF MOREHEAD CITY & BEAUFORT	38.0	39.9
WILMINGTON, NORTH CAROLINA, TO BRUNSWICK, GEORGIA	40.0	39.8
CALVING & NURSING GROUNDS (BRUNSWICK, GEORGIA, TO NORTHERN FLORIDA)	39.2	40.0

In each SMA, there were examples of vessels traveling faster than 30 knots, at least three times the mandatory 10-knot speed limit designed to protect these endangered whales. Note: analysis was limited to vessels traveling 40 knots or less.



Flags of Convenience

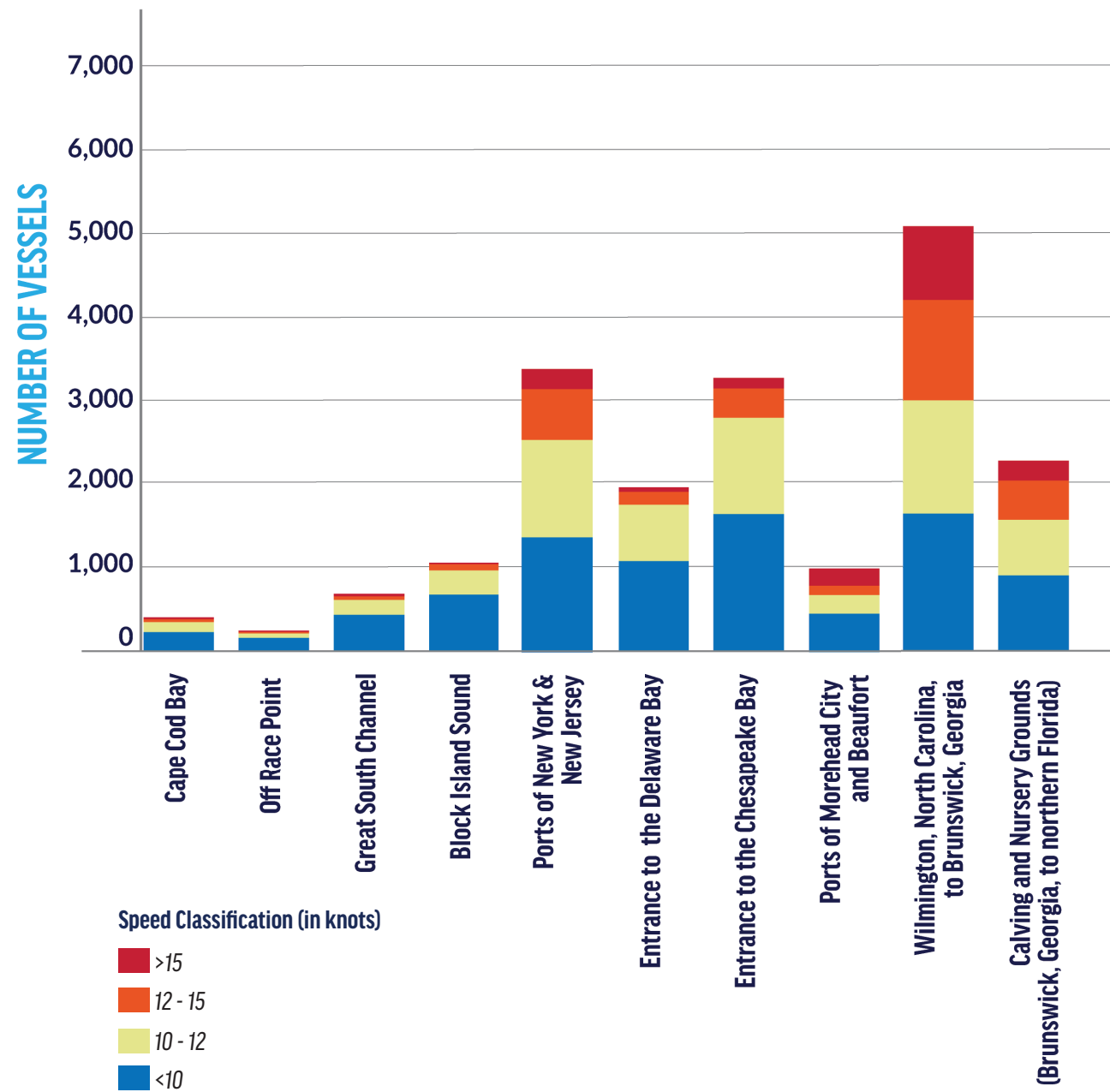
Almost two-thirds of speeding vessels were foreign-flagged, while U.S.-flagged vessels accounted for the rest (about 36%). The top five flag states for vessels violating the SMA speed limits were the United States, Panama, Marshall Islands, Liberia, and China.



All vessels are required to be registered to a country. However, vessels do not have to be flagged to the country in which the owners or operators reside. Some countries profit from the use of their flag in return for fewer regulations and more lax enforcement.³⁷ When vessels fly flags that do not belong to their country of ownership, it is known as a “flag of convenience.” For example, a vessel owned by a U.S. company can be flagged to a different flag state to avoid being subjected to stricter social and employment conditions.³⁸ The International Transport Workers’ Federation has identified flag states that are commonly used as flags of convenience, including Panama, Marshall Islands, and Liberia.³⁷ Regardless of flag state, the United States has jurisdiction over both U.S. and foreign-flagged vessels while within their ports and national waters.³⁹

Number of Speeding Vessels in Mandatory 10-Knot Speed Zones

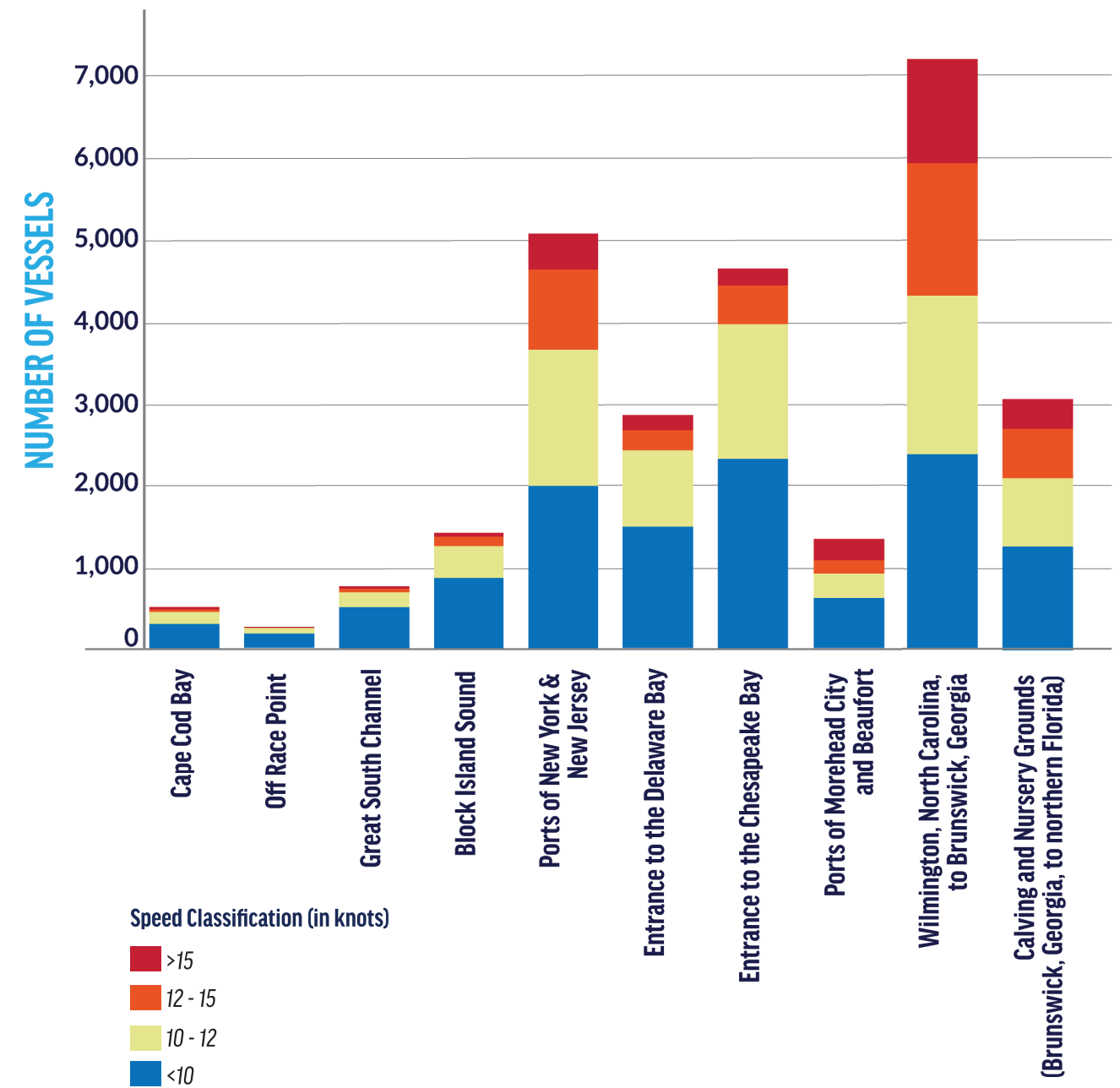
2020 - 2021



The blue bars indicate vessels complying with mandatory speed zones of 10 knots. All other colors show differing levels of speeding, with red indicating speeds greater than 15 knots.

Number of Speeding Vessels in Mandatory 10-Knot Speed Zones

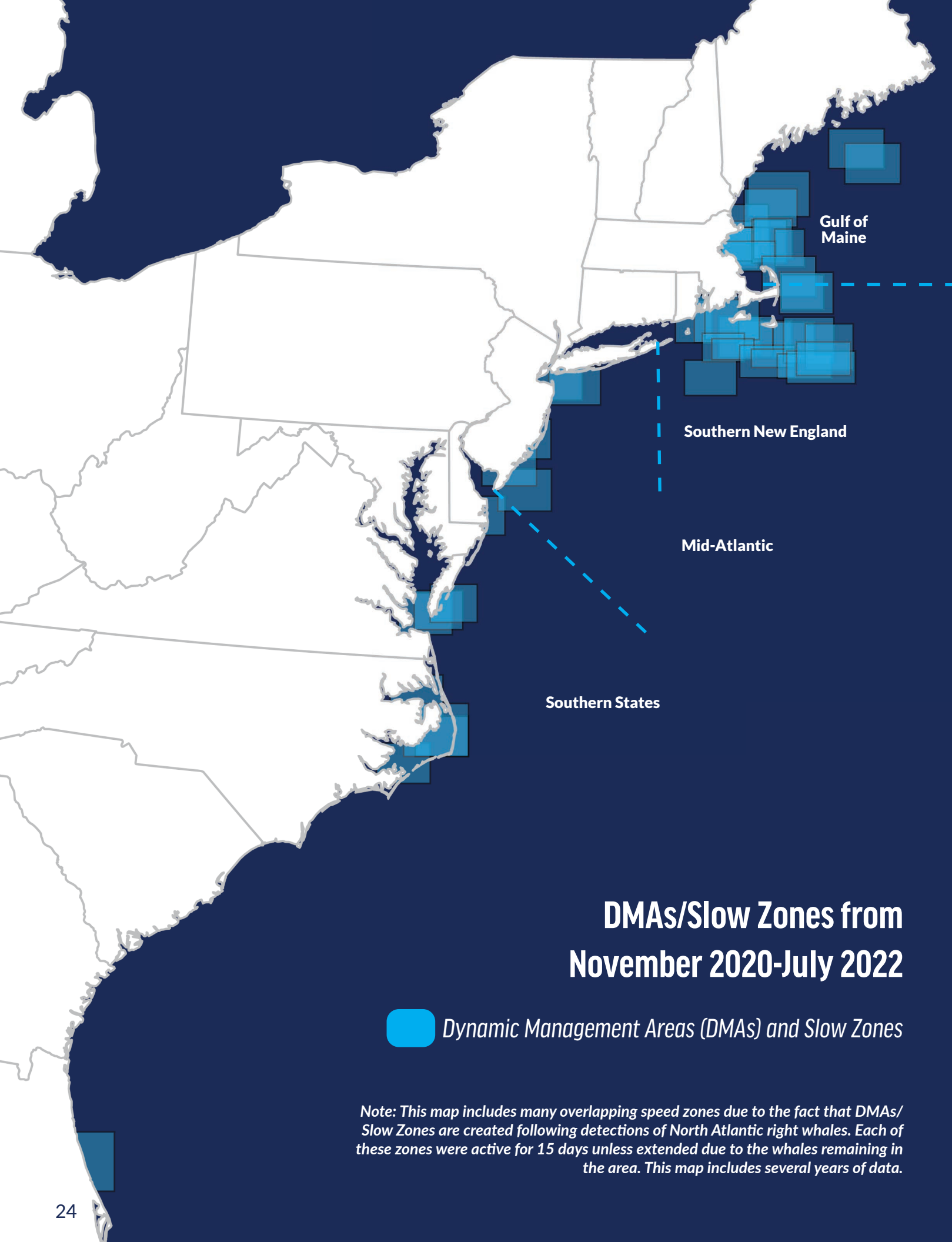
2021 - 2022



The blue bars indicate vessels complying with mandatory speed zones of 10 knots. All other colors show differing levels of speeding, with red indicating speeds greater than 15 knots.



Speeding Vessels in Dynamic Management Areas and Slow Zones



DMAs/Slow Zones from November 2020-July 2022

 Dynamic Management Areas (DMAs) and Slow Zones

Note: This map includes many overlapping speed zones due to the fact that DMAs/Slow Zones are created following detections of North Atlantic right whales. Each of these zones were active for 15 days unless extended due to the whales remaining in the area. This map includes several years of data.

Dynamic Management Area (DMAs) and Slow Zones are voluntary slow zones where vessels 65 feet and greater are requested to travel at 10 knots or less.⁴ DMAs are triggered by visual sightings of three or more North Atlantic right whales within an area and are temporary – lasting 15 days from the sighting.⁴ DMAs can also be extended if three or more whales remain in the area during the effective period.¹¹ Slow Zones function the same as DMAs but can also be triggered by acoustic detections.¹¹

DMAs/Slow Zones are intended to account for the whales' variable range outside of the static seasonal areas.⁴ NMFS alerts mariners to DMA/Slow Zone activations using radio, websites, email, and fax distribution lists.⁴⁰ Additionally, NMFS allows anyone to enroll in email or text notifications to receive information on North Atlantic right whale DMAs/Slow Zones.⁴⁰ Oceana analyzed speeding vessels that transited through each DMA/Slow Zone exceeding the 10-knot voluntary speed limit at any given point over two seasons from November 1, 2020, to July 31, 2021, and November 1, 2021, to July 31, 2022. As vessels below 65 feet are not subject to the current Vessel Speed Rule requirements, only vessels 65 feet and above were analyzed.

In our analysis, **4,080** vessels made a total of **34,072** transits through DMAs/Slow Zones during these years. A total of **83** DMAs/Slow Zones were triggered over this period, which were grouped by region. The four regions are:

- **Gulf of Maine** (Maine through the tip of Cape Cod, Massachusetts)
- **Southern New England** (the tip of Cape Cod, Massachusetts, to Montauk, New York)
- **Mid-Atlantic** (Montauk, New York, to Cape May, New Jersey)
- **Southern States** (Cape May, New Jersey, through central Atlantic Florida)

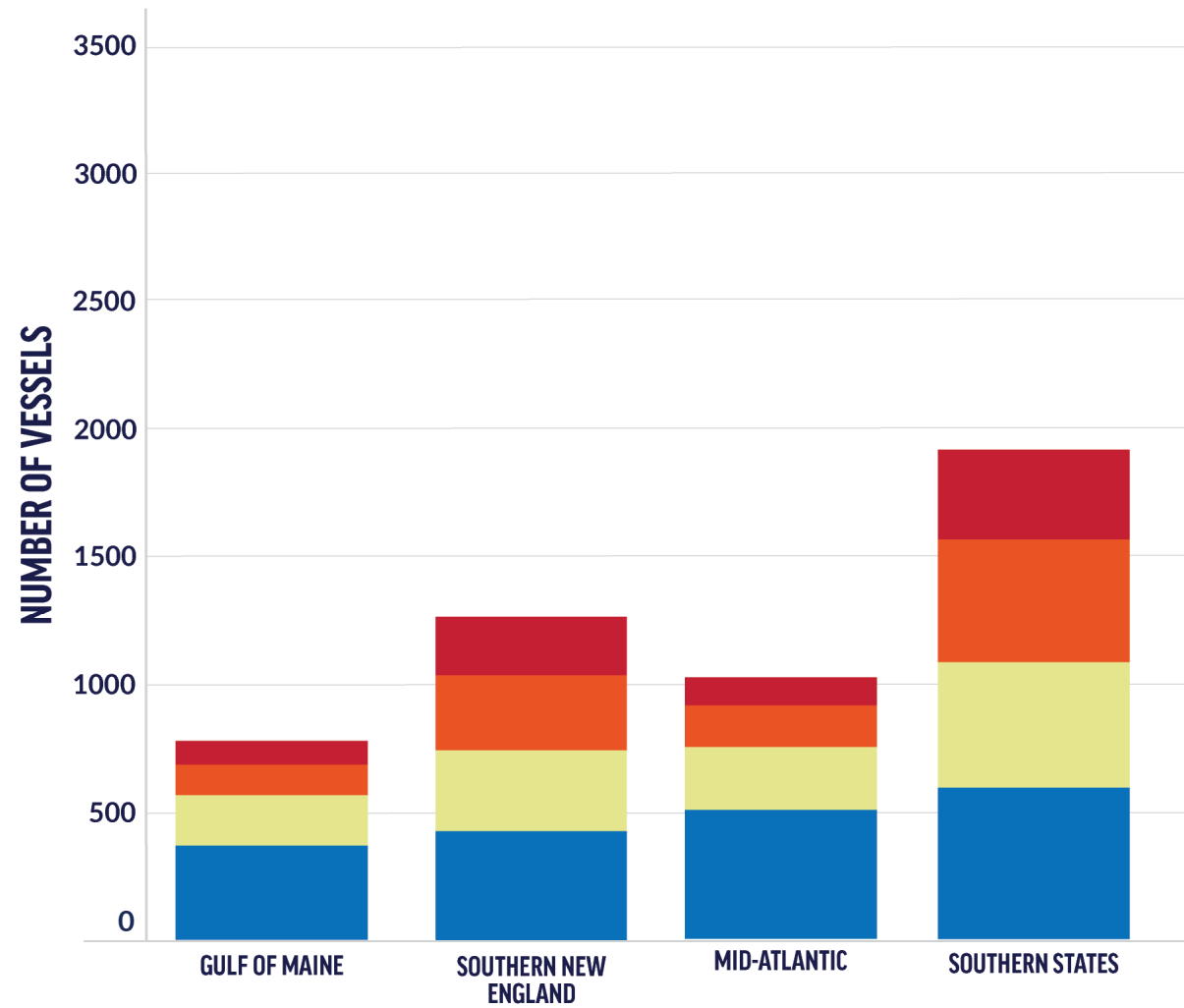
Number of Speeding Vessels in Voluntary 10-Knot Speed Zones

2020 - 2021



Number of Speeding Vessels in Voluntary 10-Knot Speed Zones

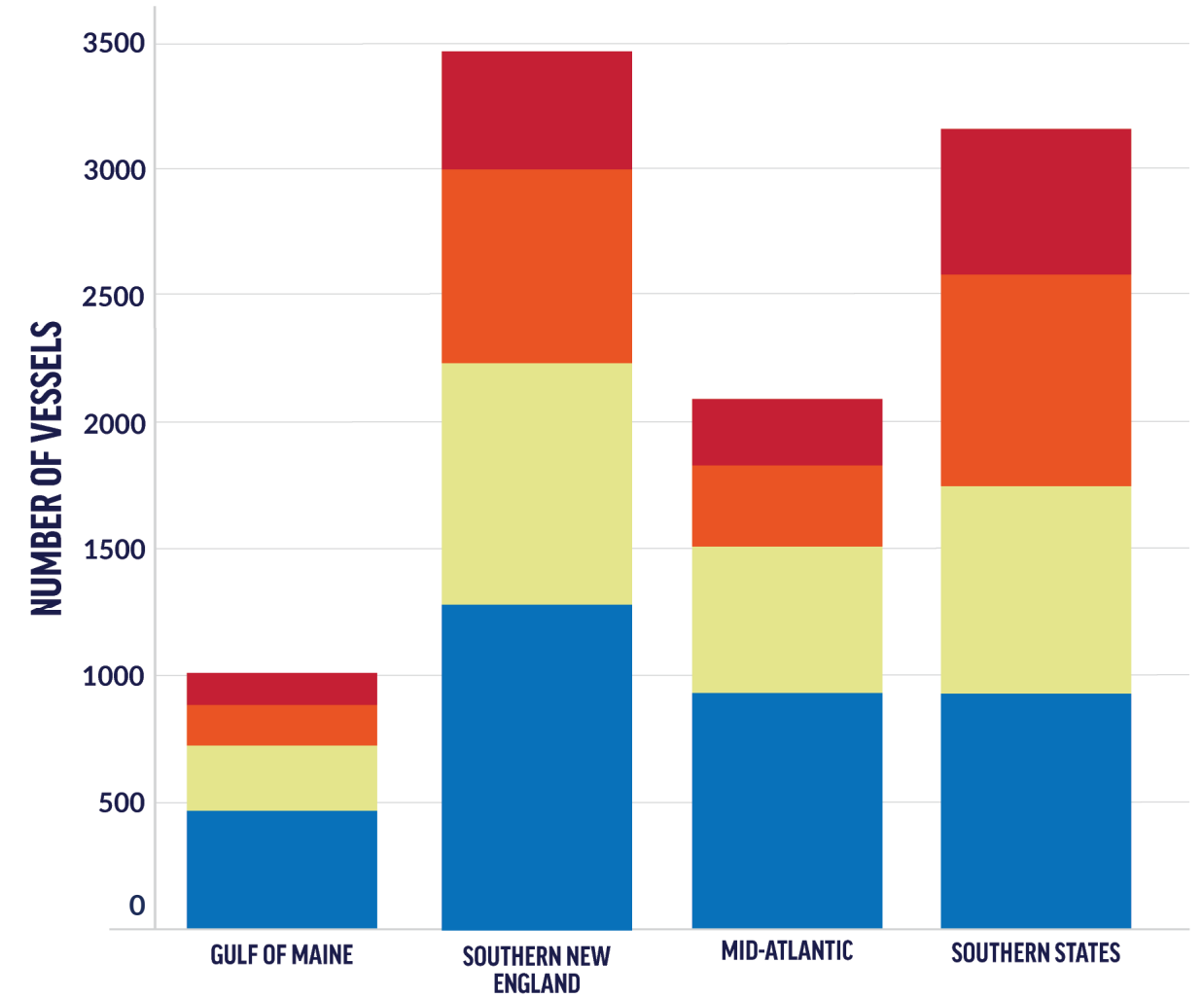
2021 - 2022



Speed Classification (in knots)

- >15
- 12 - 15
- 10 - 12
- <10

The blue bars indicate vessels complying with voluntary speed zones of 10 knots. All other colors show differing levels of speeding, with red indicating speeds greater than 15 knots.



Speed Classification (in knots)

- >15
- 12 - 15
- 10 - 12
- <10

The blue bars indicate vessels complying with voluntary speed zones of 10 knots. All other colors show differing levels of speeding, with red indicating speeds greater than 15 knots.

Percent of Vessels Speeding Through Voluntary 10-Knot Speed Zones

Dynamic Management Area and Slow Zone Region	November 2020 — July 2021 Season	November 2021 — July 2022 Season
Gulf of Maine (Maine through the tip of Cape Cod, Massachusetts)	64.1% (245)	65.2% (326)
Southern New England (the tip of Cape Cod, Massachusetts, to Montauk, New York)	76.2% (496)	78.8% (1,171)
Mid-Atlantic (Montauk, New York, to Cape May, New Jersey)	58.2% (366)	70.3% (801)
Southern States (Cape May, New Jersey, through central Atlantic Florida)	84.0% (756)	82.8% (1,316)

Number of speeding vessels in parentheses.

Top Recorded Vessel Speeds in Voluntary 10-Knot Speed Zones (in Knots)

Dynamic Management Area and Slow Zone Region	November 2020 — July 2021 Season	November 2021 — July 2022 Season
Gulf of Maine (Maine through the tip of Cape Cod, Massachusetts)	37.4	39.6
Southern New England (the tip of Cape Cod, Massachusetts, to Montauk, New York)	38.4	39.3
Mid-Atlantic (Montauk, New York, to Cape May, New Jersey)	39.6	38.8
Southern States (Cape May, New Jersey, through central Atlantic Florida)	40.0	37.6

In each DMA/Slow Zone, there were examples of vessels traveling faster than 37 knots, at least three and a half times the voluntary 10-knot speed limit designed to protect these endangered whales. Note: analysis was limited to vessels traveling 40 knots or less.

Fifty percent of speeding vessels through DMAs/Slow Zones in the 2020-2021 season and 42% of speeding vessels in the 2021-2022 season were cargo vessels.

Vessels flagged to the United States, Marshall Islands, Panama, and Liberia ignored voluntary speed limits in DMAs/Slow Zones the most.



Discussion

Speeding vessels continue to threaten North Atlantic right whales. The number of vessels ignoring the slow zones was consistently high in both SMAs (38%-87%) and DMAs/Slow Zones (58%). There were examples of vessels traveling faster than 30 knots, at least three times the 10-knot speed limit, in each SMA and DMA/Slow Zone region. But vessels breaking speed limits are not the only problem.

The current SMAs do not reflect all new locations where North Atlantic right whales are now regularly observed, such as some areas of New England.¹¹ Additionally, the exclusion of smaller vessels less than 65 feet, and exemptions for federal vessels continue to leave these critically endangered whales vulnerable to deadly strikes.^{41,42} To save the North Atlantic right whale from extinction, the federal government must update existing slow zones in time and location, reduce loopholes and exemptions to the speed limit, and enhance compliance and enforcement across the board.

Update Timing and Location of SMAs

North Atlantic right whales are altering their range, likely due to shifting food sources.¹²

The current SMAs were developed by NMFS as part of the 2008 Vessel Speed Rule — over 15 years ago.⁴ Since then, new regions have become increasingly important to the species, such as the area south of New England, where North Atlantic right whales are found socializing and feeding year-round due to an abundance of their primary food source, called copepods.¹⁴ North Atlantic right whales are also present in areas off the coasts of Massachusetts and Rhode Island where the whales are not adequately protected by current timing and location of SMAs.⁴³

In the 2022 proposed rule, NMFS proposed updates to both the timing and locations of SMAs — renamed Seasonal Speed Zones (SSZs) — to better protect whales in their current range.¹¹ Locations of these new SSZs were considered in areas where DMAs/Slow Zones had been triggered in the past, based on the detection of three or more whales. If implemented as proposed, more

than 80% (54 of 67) of DMAs/Slow Zones triggered in 2021 would be included in the proposed expanded SSZs.¹¹ This would protect whales and reduce uncertainty while navigating through these areas because the designated slow zones would be known ahead of time instead of captains having to keep track of as many new dynamic slow zones popping up as whales are spotted.

While the 2022 proposed rule includes needed improvements, NMFS should strengthen this rule by adding the area south of Cape Cod, especially south of Martha's Vineyard and Nantucket, as a year-round slow zone since North Atlantic right whales frequent this area throughout the year.⁴³ The Gulf of Maine should also be included as an SSZ as it represents an increasingly important habitat. In 2020, there were 224 North Atlantic right whale sightings in the Gulf of Maine between January to March and July to December.⁸

The expansion of these seasonal slow zones is vital to protect North Atlantic right whales.

Mandating Speed Limits in DMAs and Slow Zones

With only around 340 whales left and more than 82% of vessels exceeding the voluntary speed limit, it is time to take action: NMFS must make slowing down to 10 knots or less mandatory in areas where North Atlantic right whales are found.

In this report and past analyses, Oceana has shown that an alarmingly high number of vessels violated the voluntary speed restrictions in DMAs/Slow Zones. This was also shown in NMFS' 2021 assessment of the Vessel Speed Rule.³⁴ This lack of compliance is likely due in part to DMAs/Slow Zones having voluntary speed limits, which seem to be treated as suggestions instead of limits. The maritime shipping industry is rigidly scheduled, with companies possibly facing fees for missed deadlines at port, which provides little incentive to abide by voluntary speed limits. Making speed restrictions in dynamic management zones mandatory, rather than voluntary, may remove the incentive for speeding in these areas.

During the 2008 rulemaking for the Vessel Speed Rule, NMFS stated that if DMAs were not successful at getting vessels to slow down, it would “consider making them mandatory, through a subsequent rulemaking.”⁴ In the 2022 proposed rule, NMFS proposed a new mandatory Dynamic Speed Zone (DSZ) framework to replace the current voluntary DMA/Slow Zone regulation.¹¹ These DSZs would offer added protection when whales are spotted outside of current SMAs and future SSZs. While this is encouraging, Oceana recommends additional protection by including a DSZ trigger for mother-calf pair sightings in addition to the three-whale sightings and acoustic detections that trigger current DMAs/Slow Zones.

Length Requirements

The current slow zones only apply to vessels 65 feet and over, meaning smaller boats were not included in this report. However, evidence shows that boats of all sizes can and do seriously injure or kill right whales.⁴³

This was sadly demonstrated as described earlier in this report when a 54-foot vessel, not subject to the Vessel Speed Rule, was traveling at 21 knots when it struck a young calf, leaving it with propeller cuts and a fractured skull — injuries that ultimately proved fatal.² The boat also struck and injured the mother, named “Infinity,” and she has not been seen since.

Vessels under 65 feet accounted for five of the 12 documented lethal strike events in U.S. waters since 2008, demonstrating the significant risk this currently unregulated vessel size class can present to right whales.¹¹ To an individual boater, the risk of striking a whale may seem low, but a single boat collision with a North Atlantic right whale has existential implications for the entire population. Considering the amount of vessel traffic in and around North Atlantic right whale habitats that stretch along the Atlantic coast, the risk to the population from a vessel strike is dangerously high.

Precedent for changing vessel length requirements exists. To protect the whales in Cape Cod Bay, the state of Massachusetts imposed seasonal speed limits on all vessels, including those smaller than 65 feet.⁴⁴ Additionally, in 2021, Canada implemented protections for the North Atlantic right whale by expanding their 10-knot speed zones to include vessels as small as 43 feet long.⁴⁵ In the original 2008 rule, NMFS stated that it would consider additional rulemaking to address vessels under 65 feet.⁴ Now, NMFS has included this change in its 2022 proposed rule.¹¹

By expanding the final rule to include smaller boats, North Atlantic right whales will be better protected from fatal vessel strikes by mid-sized vessels.

Federal Exemptions

The federal vessel exemption must be narrowed to cover only those government activities that involve national security or safety concerns. Currently, all federal vessels — regardless of agency, type of vessel, or vessel activity — are exempt from the Vessel Speed Rule, purportedly to prevent some agencies from compromising navigation, human safety, or even national security.¹¹ While an exemption along these lines may be warranted, an overly broad application of this could leave whales at unneeded risk. Canada has this kind of narrow exemption for federal vessels actively carrying out search and rescue, law enforcement, and for crew competency and readiness purposes.⁴⁵ In 2019, the government fined two Canadian Coast Guard vessels for speeding in a mandatory slow zone.⁴⁶

Enforcement

Compliance with the Vessel Speed Rule is alarmingly low in both SMAs and DMAs/Slow Zones. The National Oceanic and Atmospheric Administration (NOAA) Office of Law Enforcement and the U.S. Coast Guard are responsible for investigating, enforcing, and issuing penalties for violations of the Vessel Speed Rule.⁴ If a vessel exceeds a 10-knot speed limit within an SMA for reasons beyond the scope of navigational safety exemptions, a range of enforcement measures can be issued, including written warnings, educational letters, and/or monetary fines and penalties.⁴

During the 2021-2022 SMA season, the NOAA Office of Law Enforcement issued fines in only 46 cases, as of March 2023 — a stark contrast to the thousands of vessels found speeding in our analysis over a similar time frame.⁴⁷ The lack of enforcement drives a lack of compliance, but this is a solvable problem.

To save this species, NMFS must not only expand mandatory protections, but also ensure that the existing regulations are well-enforced. There are several ways to improve compliance and enforcement, including:

- [Tracking vessels using Automatic Identification System \(AIS\) to identify vessels that are not obeying mandatory speed limits;](#)
- [Ensuring that exemptions to the Vessel Speed Rule are not abused;](#)
- [Issuing sufficient penalties for speeding;](#)
- [Communicating locations of slow zones with mariners; and](#)
- [Increasing funding and support to agencies, such as NOAA's Office of Law Enforcement and the U.S. Coast Guard, to ensure they have the necessary resources to promptly enforce the Vessel Speed Rule.](#)



Conclusion and Recommendations

To protect this species, Oceana recommends that NMFS promptly releases the final updated Vessel Speed Rule that would:



Update the timing and location of seasonal mandatory slow zones to reflect the current footprint of North Atlantic right whales



Make compliance with voluntary Dynamic Management Areas mandatory



Expand the rule to include vessels 35 feet or greater

Additionally, Oceana recommends that NMFS strengthens the rule by:

- Improving the monitoring, compliance, and enforcement of ship speeds in slow zones;
- Narrowing the federal exemptions in the Vessel Speed Rule; and
- Requiring vessels 35 feet or greater to use Automatic Identification System (AIS) devices at all times.

Acknowledgements

Oceana would like to thank Sean Brilliant, Ph.D., for his helpful contributions during the development and review of this report.

We would also like to thank the many Oceana team members who helped with this report, including Alex Aines, Sarah Bedolfe, Dustin Cranor, Claudia Deeg, Nancy Downes, Kim Elmslie, Connor Fagan, Hermina Glass-Hill, Anne Jastrzebski, Raigan Johnson, Megan Jordan, Beth Lowell, Katie Matthews, Ph.D., Hunter Miller, Andres Perotti, Kailie Scott, Chloe Shader, and Max Valentine, Ph.D.

Note: All photos of North Atlantic right whales were taken under permits from NOAA or Fisheries and Oceans Canada where required.



Methodology



This analysis was conducted using the Global Fishing Watch (GFW) mapping platform, which provides a powerful tool for ocean governance, empowering anyone to view or download data and investigate global fishing activity in near real-time for free.⁴⁸ Oceana utilized GFW data to analyze vessel speeds in North Atlantic right whale conservation areas. The GFW database compiles data from Automatic Identification System (AIS) transmissions and vessel registries, including the vessel's unique Maritime Mobile Service Identity (MMSI), location, speed, class, length, flag state, timestamp, and date. AIS data is pulled from both terrestrial and satellite sources.

GFW uses machine learning to classify vessel behavior and combine databases with identifying information.⁴⁸ The flag state of a vessel is first determined by what is listed in government vessel registries. If this is not known, GFW uses the first three digits of the vessel's MMSI, known as the Maritime Identification Digits (MIDs), which serves as an identifier of the country responsible for the vessel.⁴⁹ If the flag is missing from the registry and the vessel's MMSI does not have a valid three-digit country code, the vessel's flag is designated as "unknown." Similarly, vessel length is first assigned based on registry information. If a vessel's length is not available from a registry, GFW uses machine learning to infer its length based on its movement patterns.⁵⁰

Vessel class is assigned by GFW's neural net, which uses behavioral and registry data to determine the class to which each vessel belongs. Non-fishing vessel classes in this analysis include: cargo, tanker, passenger, tug, non-fishing, patrol vessel, cargo or reefer, supply vessel, cargo or tanker, container reefer, seismic vessel, specialized reefer, other not fishing, bunker, well boat, bunker or tanker, reefer, research, dive vessel, dredge non-fishing, and unknown. Fishing vessel classes in this analysis include: fishing, trawlers, pole and line, drifting longlines, set longlines, tuna purse seines, fixed gear, pots and traps, set gillnets, dredge fishing, other purse seines,

gear, trollers, and unknown. If the neural net cannot give any class a probability of greater than 50%, the vessel is assigned a more general class, such as "fishing" or "non-fishing." The coordinates for the speed restriction zones and the time periods when they were active were obtained from NMFS.

Seasonal management areas span calendar years. For this report, compliance was calculated across seasons to allow for a continuous analysis of the entire open period of the SMA. SMA seasons for this report are:

- **November 1, 2020, to July 31, 2021; and**
- **November 1, 2021, to July 31, 2022.**

As DMAs/Slow Zones are triggered by the presence of whales, compliance was calculated by region rather than season. The DMAs/Slow Zones were divided into four regions:

- **Gulf of Maine (Maine through the tip of Cape Cod, Massachusetts);**
- **Southern New England (The tip of Cape Cod, Massachusetts, to Montauk, New York);**
- **Mid-Atlantic (Montauk, New York, to Cape May, New Jersey); and**
- **Southern States (Cape May, New Jersey, through central Atlantic Florida).**

Oceana calculated the percentage of speeding vessels in a particular area as the number of MMSIs with at least one AIS signal exceeding 10 knots divided by the total number of MMSIs detected in the area over the relevant time span. The data was filtered to only include vessels that recorded at least two AIS signals during transit through a speed zone. Furthermore, any erroneous speeds that do not follow the consecutive speeds for a journey of a vessel were removed. This means any speeds that are 25 knots more than the speeds before and after any other speed in a vessel's voyage through an SMA or DMA/Slow Zone were removed. For this analysis, 404

data points were removed, which is 0.01% of the data. In its January 2021 report, NMFS conducted its own analysis of vessel speed compliance using distance-weighted average speed.³⁴ Distance-weighted average speed totals the distance a vessel travels and records the speed during each segment of its transit. Each speed segment is then multiplied by the fraction of the total distance traveled and summed to produce an average speed weighted by each segment's contribution.

This method of reporting compliance is notably different from the method used here, in which a vessel was determined to be speeding if at least one position message exceeded 10 knots. For example, the NMFS report method smooths out short bursts of fast speeds, while this report uses a binary system of compliance — a vessel either has or has not exceeded the 10-knot speed limit.

GFW, a provider of open data for use in this report, is an international nonprofit organization dedicated to advancing ocean governance through increased transparency of human activities at sea.⁴⁸ The views and opinions expressed in this report are those of the authors, which are not connected with or sponsored, endorsed, or granted official status by GFW. By creating and publicly sharing map visualizations, data, and analysis tools, GFW aims to enable scientific research and transform the way our ocean is managed.

Oceana's online tool, called Ship Speed Watch, allows anyone to track vessel speeds in speed zones designed to protect North Atlantic right whales along the East Coast of the United States and Canada.⁵¹ Ship Speed Watch uses vessel information from the GFW database. This information is transmitted from a vessel's AIS device, which is collected via satellites and terrestrial receivers. Faulty AIS devices, user error, intentional manipulation, crowded areas, poor satellite reception, and transmission flaws are factors that contribute to noise and errors in AIS data, and sometimes those inaccuracies can be

reflected in the speed and location of a vessel. Vessel operators can accidentally or purposefully enter false information into their ship's AIS, thus concealing their identity or location. In crowded areas, such as ports, the massive number of radio transmissions can crowd the bandwidth of satellite and terrestrial receivers, leading to inaccuracies as well. For these reasons, Ship Speed Watch information must be relied upon solely at your own risk.

Our analysis cannot determine which vessels fall under exemptions to the Vessel Speed Rule (e.g., for U.S. federal government vessels, foreign-flagged vessels engaging in joint exercises with the U.S. Navy, and vessels deviating to maintain safe maneuvering speed due to inclement wind and current conditions), so some speeding vessels counted in this analysis may have legal exemptions. See 50 C.F.R. § 224.105(a) (providing an exemption for U.S. vessels owned or operated by, or under contract to, the Federal Government and for foreign sovereign vessels when engaging in joint exercises with the U.S. Navy); 50 C.F.R. § 224.105(c) (allowing for deviations from the 10-knot speed limit to maintain safe maneuvering speed and the requirement to enter the deviation into the vessel's logbook).

While Oceana's report uses slightly different methodology for analyzing compliance, Oceana's findings and policy recommendations are consistent with those of NMFS. The data clearly shows the need for effective enforcement with penalties that deter violations. Both NMFS and Oceana's findings underscore the immediate need for the Vessel Speed Rule to be updated and improved to reflect current analyses of the danger of high vessel speeds to North Atlantic right whales.

References

1. Moore, K. (2022). Florida sportfishing captain describes fatal right whale strike. <https://www.nationalfisherman.com/gulf-south-atlantic/florida-sportfishing-captain-describes-fatal-right-whale-strike>
2. Georgia DNR, Wildlife Resources Division. (2022). Looking back: Capt. recalls whale collision – Georgia Wildlife blog [Georgia Department of Natural Resources]. <https://georgiawildlife.blog/2022/02/11/looking-back-capt-recalls-whale-collision/>
3. NOAA Fisheries. (2021). North Atlantic right whale calf stranded dead in Florida | NOAA Fisheries. NOAA. <https://www.fisheries.noaa.gov/feature-story/north-atlantic-right-whale-calf-stranded-dead-florida>
4. National Oceanic and Atmospheric Administration. (2008). Endangered fish and wildlife; final rule to implement speed restrictions to reduce the threat of ship collisions with North Atlantic right whales. Federal Register. <https://www.federalregister.gov/documents/2008/10/10/E8-24177/endangered-fish-and-wildlife-final-rule-to-implement-speed-restrictions-to-reduce-the-threat-of-ship>
5. NOAA Fisheries. (2023). North Atlantic right whale updates | NOAA Fisheries. NOAA. <https://www.fisheries.noaa.gov/national/endangered-species-conservation/north-atlantic-right-whale-updates>
6. New England Aquarium. (2023). Aquarium reacts to death of critically endangered North Atlantic right whale on Virginia coast. <https://www.neaq.org/about-us/press-room/press-releases/aquarium-reacts-to-death-of-critically-endangered-north-atlantic-right-whale-on-virginia-coast/>
7. Oceana. (2023). Oceana confirms hundreds of speeding boats off Virginia Beach prior to North Atlantic right whale death. Oceana USA. <https://usa.oceana.org/press-releases/oceana-confirms-hundreds-of-speeding-boats-off-virginia-beach-prior-to-north-atlantic-right-whale-death/>
8. Pettis, H. M., Pace, R. M., & Hamilton, P. K. (2023). North Atlantic Right Whale Consortium 2022 Annual Report Card. <https://www.narwc.org/uploads/1/1/6/6/116623219/2022reportcardfinal.pdf>
9. NOAA Fisheries. (2023). North Atlantic right whale | NOAA Fisheries. <https://www.fisheries.noaa.gov/species/north-atlantic-right-whale>
10. Speed restrictions to protect North Atlantic Right Whales., 50 CFR § 224.105 (2014).
11. National Marine Fisheries Service, National Oceanic and Atmospheric Administration, & Department of Commerce. (2022). Amendments to the North Atlantic right whale vessel strike reduction rule. Federal Register. <https://www.federalregister.gov/documents/2022/08/01/2022-16211/amendments-to-the-north-atlantic-right-whale-vessel-strike-reduction-rule>
12. Record, N. R., Runge, J. A., Pendleton, D. E., Balch, W. M., Davies, K. T. A., Pershing, A. J., Johnson, C. L., Stamieszkin, K., Ji, R., Feng, Z., Kraus, S. D., Kenney, R. D., Hudak, C. A., Mayo, C. A., Chen, C., Salisbury, J. E., & Thompson, C. R. S. (2019). Rapid climate-driven circulation changes threaten conservation of endangered North Atlantic right whales. *Oceanography*, 32(2), 162–169. <https://www.jstor.org/stable/26651192>
13. Pflieger, M., Mustain, P., Valentine, M., Gee, E., Webber, W., & Fenty, B. (2021). Speeding Toward Extinction: Vessel Strikes Threaten North Atlantic Right Whales. Oceana. https://usa.oceana.org/wp-content/uploads/sites/4/4046/narw-21-0002_narw_ship_speed_compliance_report_m1_digital_singlepages_doi_web.pdf
14. Ganley, L. C., Brault, S., & Mayo, C. A. (2019). What we see is not what there is: Estimating North Atlantic right whale *Eubalaena glacialis* local abundance. *Endangered Species Research*, 38, 101–113. <https://doi.org/10.3354/esr00938>
15. Buck, E. H. (2001). The North Atlantic right whale: Federal management issues. <http://congressionalresearch.com/RL30907/document.php?study=THE+NORTH+ATLANTIC+RIGHT+WHALE+FEDERAL+MANAGEMENT+ISSUES>
16. Marine Mammal Commission. (n.d.). North Atlantic right whale. Marine Mammal Commission. Retrieved July 10, 2023, from <https://www.mmc.gov/priority-topics/species-of-concern/north-atlantic-right-whale/>
17. Monsarrat, S., Pennino, M. G., Smith, T. D., Reeves, R. R., Meynard, C. N., Kaplan, D. M., & Rodrigues, A. S. L. (2016). A spatially explicit estimate of the prewhaling abundance of the endangered North Atlantic right whale. *Conservation Biology: The Journal of the Society for Conservation Biology*, 30(4), 783–791. <https://doi.org/10.1111/cobi.12664>
18. Fisheries and Oceans Canada. (2016). Protecting the Right Whale in the north-Atlantic Ocean. <https://www.dfo-mpo.gc.ca/species-especies/publications/sara-lep/recovering-retablissement/2008-08-eng.html>
19. Pace, R. M., Corkeron, P. J., & Kraus, S. D. (2017). State-space mark-recapture estimates reveal a recent decline in abundance of North Atlantic right whales. *Ecology and Evolution*, 7(21), 8730–8741. <https://doi.org/10.1002/ece3.3406>
20. Endangered Species Act of 1973, 16 U.S.C. §§ 1531–44 (2018)
21. Marine Mammal Protection Act, 16 U.S.C. §§ 1361–1423
22. Coast Guard Authorization Act of 2018, as amended, 14 U.S.C. §§ 101 et seq.
23. Sharp, S. M., McLellan, W. A., Rotstein, D. S., Costidis, A. M., Barco, S. G., Durham, K., Pitchford, T. D., Jackson, K. A., Daoust, P.-Y., Wimmer, T., Couture, E. L., Bourque, L., Frasier, T., Frasier, B., Fauquier, D., Rowles, T. K., Hamilton, P. K., Pettis, H., & Moore, M. J. (2019). Gross and histopathologic diagnoses from North Atlantic right whale *Eubalaena glacialis* mortalities between 2003 and 2018. *Diseases of Aquatic Organisms*, 135(1), 1–31. <https://doi.org/10.3354/dao03376>
24. Cassoff, R. M., Moore, K. M., McLellan, W. A., Barco, S. G., Rotsteins, D. S., & Moore, M. J. (2011). Lethal entanglement in baleen whales. *Diseases of Aquatic Organisms*, 96(3), 175–185. <https://doi.org/10.3354/dao02385>
25. NOAA Fisheries. (2023). 2017–2023 North Atlantic right whale Unusual Mortality Event | NOAA Fisheries. NOAA. <https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2023-north-atlantic-right-whale-unusual-mortality-event>
26. NOAA Fisheries. (2023). Understanding Marine Mammal Unusual Mortality Events | NOAA Fisheries. <https://www.fisheries.noaa.gov/insight/understanding-marine-mammal-unusual-mortality-events>
27. Reed, J., New, L., Corkeron, P., & Harcourt, R. (2022). Multi-event modeling of true reproductive states of individual female right whales provides new insights into their decline. *Frontiers in Marine Science*, 9. <https://www.frontiersin.org/articles/10.3389/fmars.2022.994481>

References

28. NOAA Fisheries. (2023). North Atlantic right whale calving season 2023 | NOAA Fisheries. NOAA. <https://www.fisheries.noaa.gov/national/endangered-species-conservation/north-atlantic-right-whale-calving-season-2023>
29. Stewart, J. D., Durban, J. W., Knowlton, A. R., Lynn, M. S., Fearnbach, H., Barbaro, J., Perryman, W. L., Miller, C. A., & Moore, M. J. (2021). Decreasing body lengths in North Atlantic right whales. *Current Biology: CB*, 31(14), 3174-3179.e3. <https://doi.org/10.1016/j.cub.2021.04.067>
30. Stewart, J. D., Durban, J. W., Europe, H., Fearnbach, H., Hamilton, P. K., Knowlton, A. R., Lynn, M. S., Miller, C. A., Perryman, W. L., Tao, B. W. H., & Moore, M. J. (2022). Larger females have more calves: Influence of maternal body length on fecundity in North Atlantic right whales. *Marine Ecology Progress Series*, 689, 179–189. <https://doi.org/10.3354/meps14040>
31. NOAA Fisheries. (2022). North Atlantic Right Whale (*Eubalaena glacialis*): Western Atlantic Stock. https://media.fisheries.noaa.gov/2022-08/N%20Atl%20Right%20Whale-West%20Atl%20Stock_SAR%202021.pdf
32. Pace, R. M., Williams, R., Kraus, S. D., Knowlton, A. R., & Pettis, H. M. (2021). Cryptic mortality of North Atlantic right whales. *Conservation Science and Practice*, 3(2). <https://doi.org/10.1111/csp2.346>
33. Endangered fish and wildlife; proposed rule to implement speed restrictions to reduce the threat of ship collisions with North Atlantic right whales. (2006). *Federal Register*. <https://www.federalregister.gov/documents/2006/06/26/06-5669/endangered-fish-and-wildlife-proposed-rule-to-implement-speed-restrictions-to-reduce-the-threat-of>
34. NOAA Fisheries, Office of Protected Resources. (2021). North Atlantic Right Whale (*Eubalaena glacialis*) Vessel Speed Rule Assessment. <https://media.fisheries.noaa.gov/2021>
35. Executive Office of the President. (2023). Amendments to the North Atlantic Right Whale Vessel Strike Reduction Rule. Office of Information and Regulatory Affairs. <https://www.reginfo.gov/public/do/eAgendaViewRule?publd=202304&RIN=0648-BI88>
36. NOAA Fisheries. (2021). North Atlantic right whale seasonal management areas (SMA) map & GIS data | NOAA Fisheries. NOAA. <https://www.fisheries.noaa.gov/resource/map/north-atlantic-right-whale-seasonal-management-areas-sma-map-gis-data>
37. Zwinge, T. (2010). Duties of flag states to implement and enforce international standards and regulations – and measures to counter their failure to do so. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.1682193>
38. Alderton, T., & Winchester, N. (2002). Globalisation and de-regulation in the maritime industry. *Marine Policy*, 26(1), 35. https://www.academia.edu/6863673/Globalisation_and_de_regulation_in_the_maritime_industry
39. Flags of convenience. (n.d.). Retrieved July 10, 2023, from <https://www.itfglobal.org/en/sector/seafarers/flags-of-convenience>
40. NOAA Fisheries. (2023). Reducing vessel strikes to North Atlantic right whales | NOAA Fisheries. NOAA. <https://www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-vessel-strikes-north-atlantic-right-whales>
41. Conn, P. B., & Silber, G. K. (2013). Vessel speed restrictions reduce risk of collision-related mortality for North Atlantic right whales. *Ecosphere*, 4(4), art43. <https://doi.org/10.1890/ES13-00004.1>
42. Kelley, D. E., Vlastic, J. P., & Brillant, S. W. (2020). Assessing the lethality of ship strikes on whales using simple biophysical models. *Marine Mammal Science*, 37(1), 251–267. <https://doi.org/10.1111/mms.12745>
43. Johnson H., Morrison D., Taggart C. (2021). WhaleMap: a tool to collate and display whale survey results in near real-time. *Journal of Open Source Software*, 6(62), 3094, <https://joss.theoj.org/papers/10.21105/joss.03094>
44. Speed Restrictions to Protect North Atlantic Right Whales, 322 Code of Massachusetts Regulations 12.05 (2016). <https://www.law.cornell.edu/regulations/massachusetts/322-CMR-12-05>
45. Transport Canada. (2021). Background: Protecting North Atlantic right whales. <https://tc.canada.ca/en/background-protecting-north-atlantic-right-whales-0>
46. CBC. (2019). 2 Canadian Coast Guard ships fined for speeding in right whale slowdown zone | CBC News. CBC. <https://www.cbc.ca/news/canada/new-brunswick/coast-guard-right-whales-speeding-1.5244462>
47. NOAA Office of Law Enforcement. (2023). Council Report – Second Quarter, FY 2023. https://d23h0vhsm26o6d.cloudfront.net/2ndQuarterFY23_NEFMCRReport_Final_2023-07-06-173930_mphz.pdf
48. Ocean governance through transparency. (n.d.). Global Fishing Watch. Retrieved August 8, 2023, from <https://globalfishingwatch.org/about-us/>
49. U.S. Coast Guard. (n.d.). MMSI formats | Navigation Center. United States Coast Guard | U.S. Department of Homeland Security. Retrieved August 14, 2023, from <https://www.navcen.uscg.gov/mmsi-formats>
50. United States Coast Guard. (n.d.). Navigation center. Retrieved July 10, 2023, from <https://www.navcen.uscg.gov/?pageName=mtmmsi>
51. Ship speed watch. (n.d.). Oceana USA. Retrieved August 8, 2023, from <https://usa.oceana.org/illegal-fishing-ship-speed-watch/>

#RightWhaleToSave

[Oceana.org/SpeedingVessels](https://oceana.org/SpeedingVessels)

OCEANA Protecting the
World's Oceans

Oceana is the largest international advocacy organization dedicated solely to ocean conservation. Oceana is rebuilding abundant and biodiverse oceans by winning science-based policies in countries that control one-quarter of the world's wild fish catch. With more than 275 victories that stop overfishing, habitat destruction, oil and plastic pollution, and the killing of threatened species like turtles, whales, and sharks, Oceana's campaigns are delivering results. A restored ocean means that 1 billion people can enjoy a healthy seafood meal every day, forever. Together, we can save the oceans and help feed the world. Visit [Oceana.org](https://oceana.org) to learn more.