

Figure 1.1 The Massachusetts ocean management planning area



Massachusetts ocean management planning area<sup>1</sup>

Bathymetry (depth in meters)<sup>1</sup>

Above 15

15 to 25

25 to 40

40 to 90

90 to 200

Below 200

Data source: <sup>1</sup>Massachusetts Office of Coastal Zone Management.



Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.

Figure 1.2 Municipalities adjacent to the Massachusetts ocean management planning area



- - - Massachusetts ocean management planning area boundary<sup>1</sup>
- Municipality adjacent to the Massachusetts ocean management planning area<sup>2</sup>

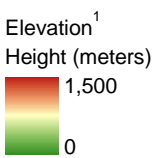
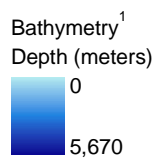
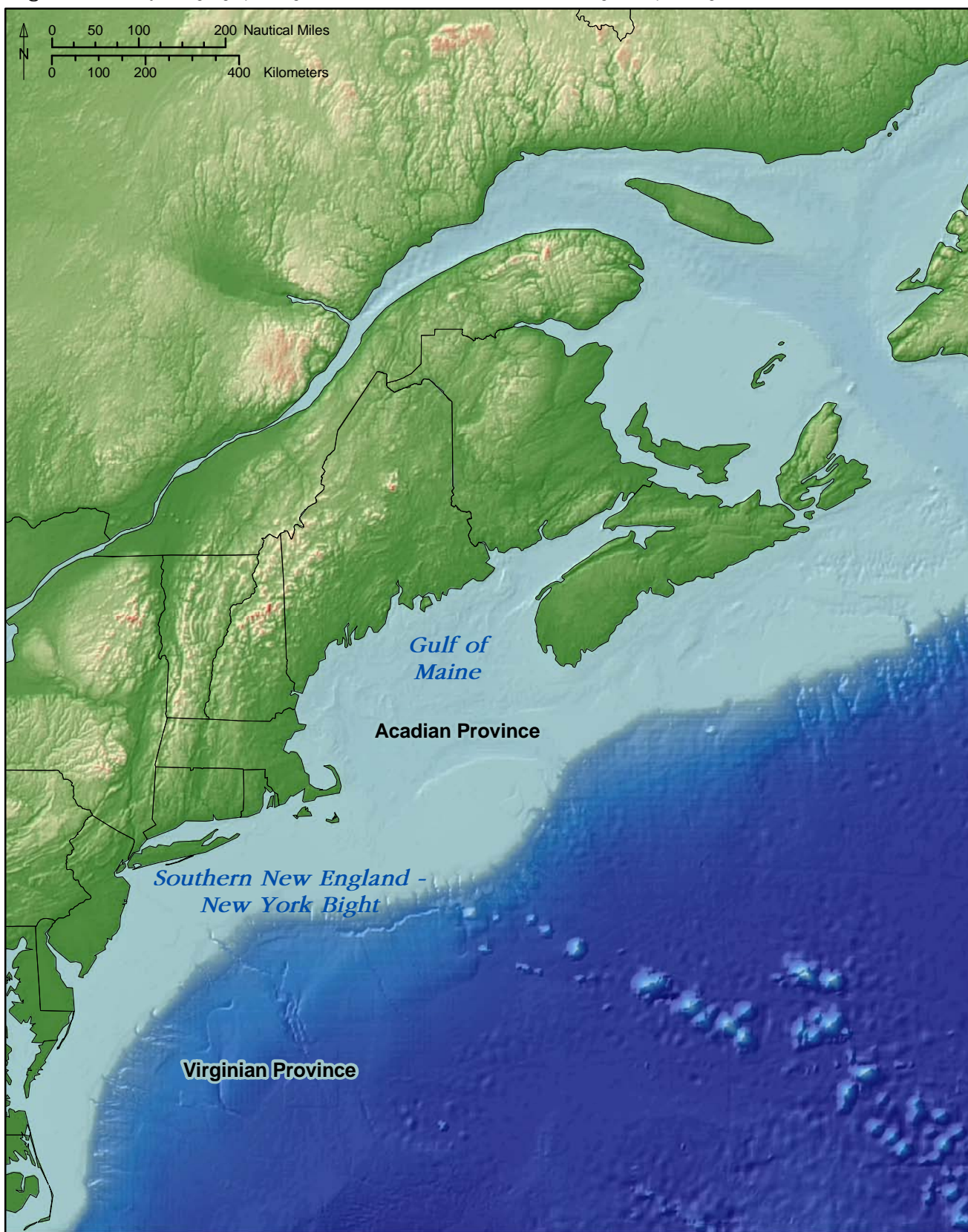
Data sources: <sup>1</sup>Massachusetts Office of Coastal Zone Management, <sup>2</sup>Massachusetts Office of Geographic and Environmental Information (MassGIS).



Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.



Figure 1.3 Major biogeographic regions within the Massachusetts ocean management planning area



Data source: <sup>1</sup>Amante, C. and B.W. Eakins, ETOPO1 1 Arc-Minute Global Relief Model: Procedures, Data Sources and Analysis. NOAA Technical Memorandum NESDIS NGDC-24, 19 pp, March 2009.



Map projection: World Geodetic System 1984 (WGS 84), Mercator Projection.

Figure 1.4 The Gulf of Maine

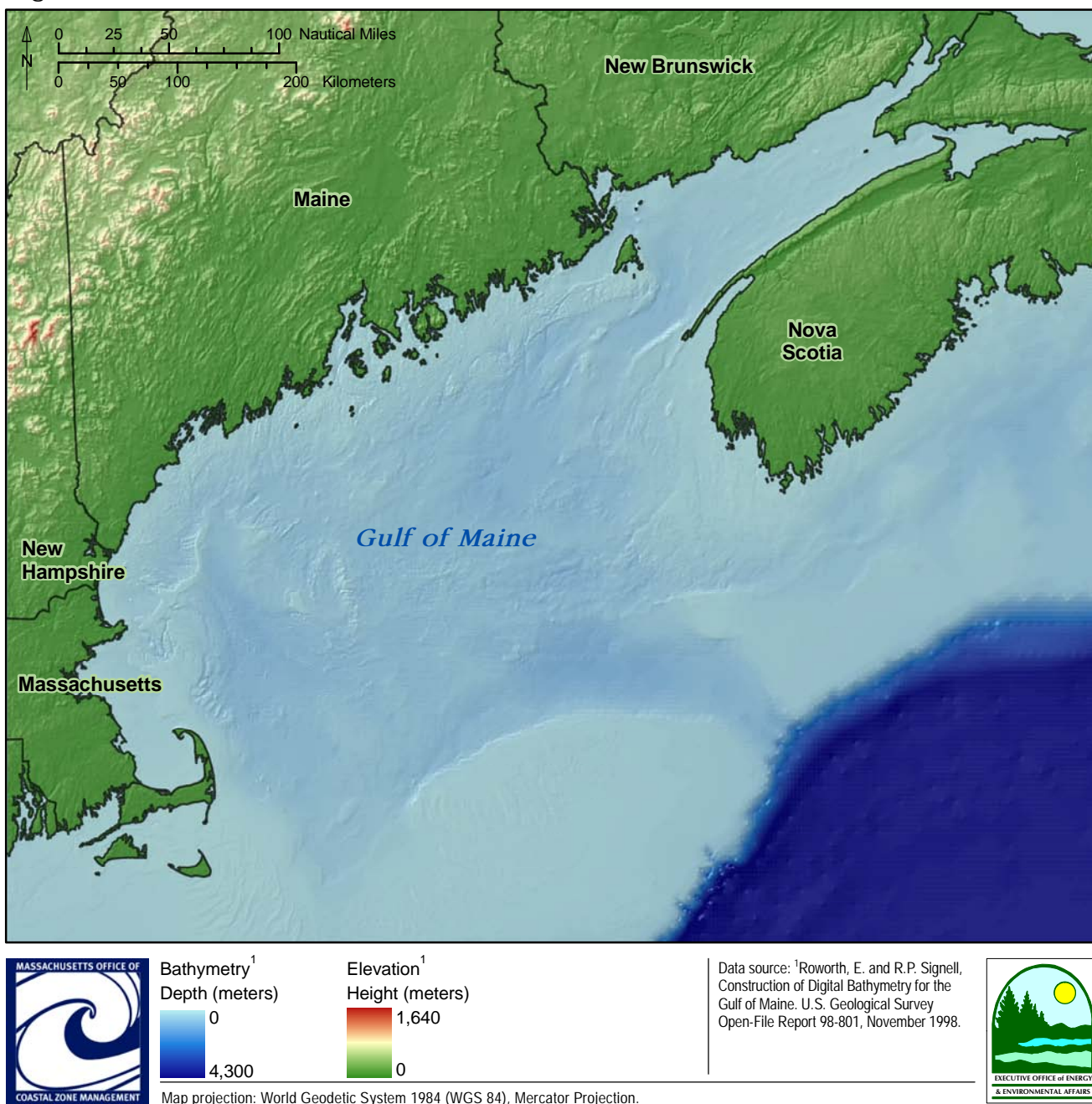
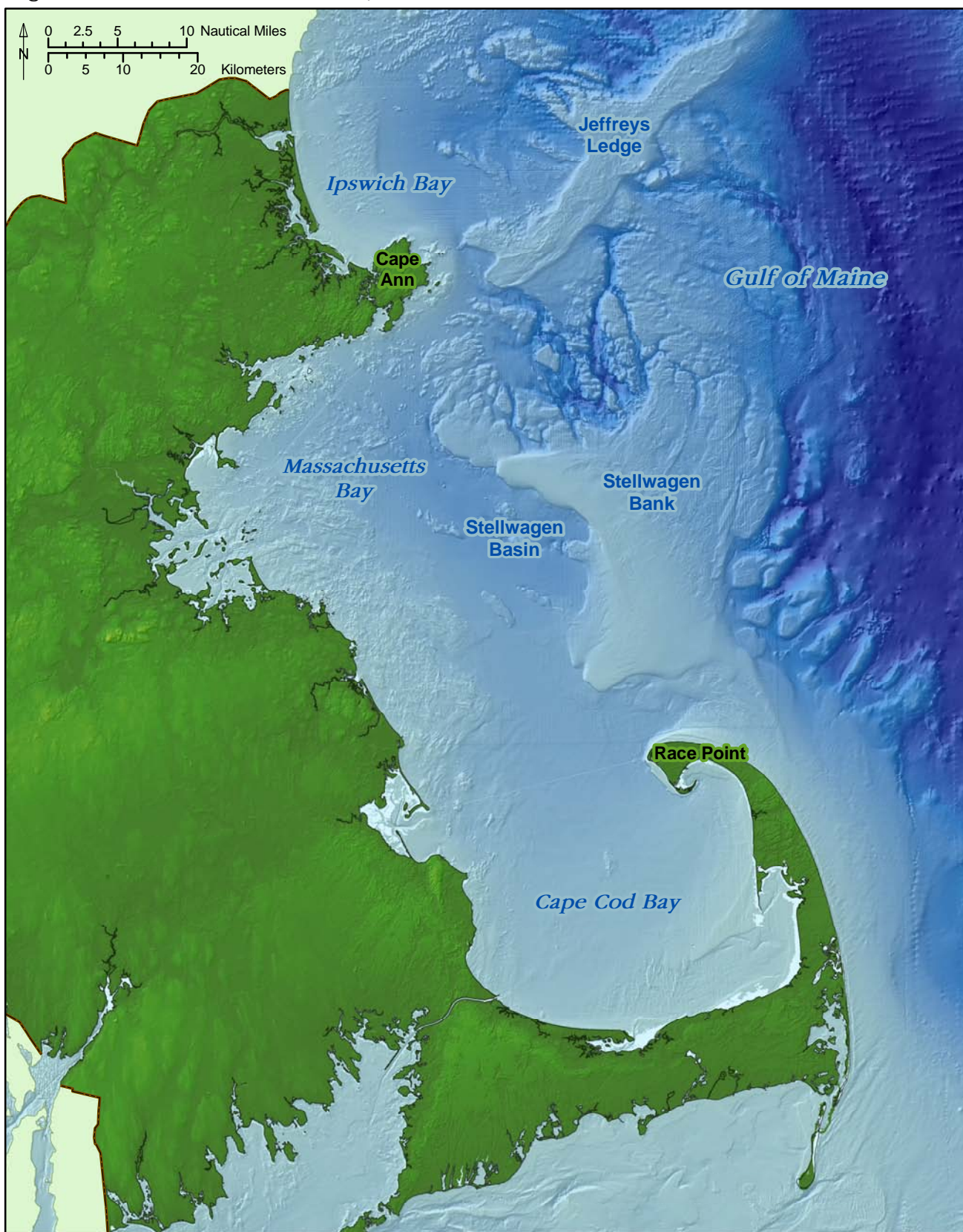




Figure 1.5 Massachusetts waters north of Cape Cod

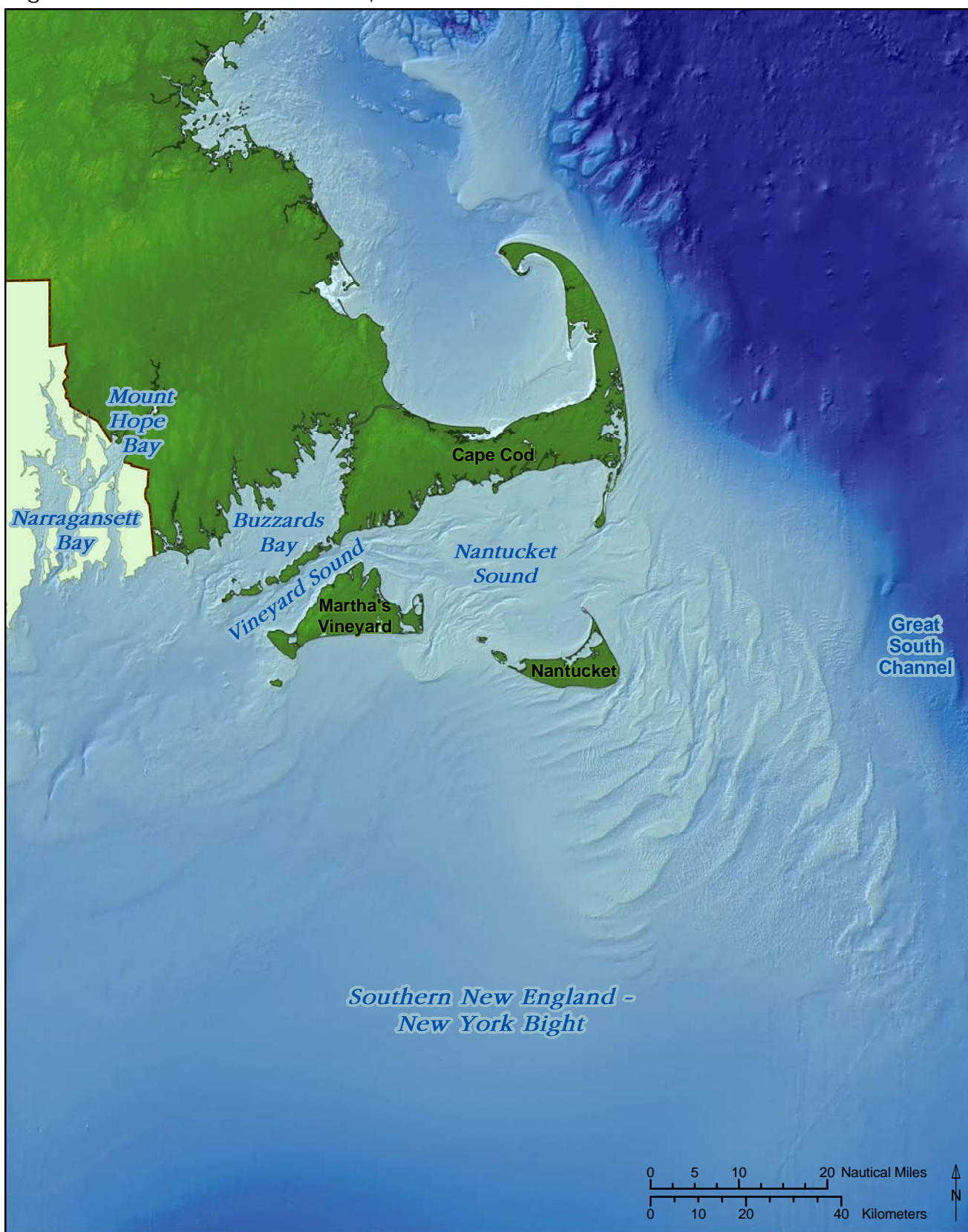


Data source: <sup>1</sup>Massachusetts Office of Coastal Zone Management.

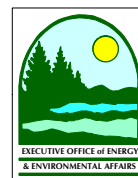


Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.

Figure 1.6 Massachusetts waters south of Cape Cod



Data source: <sup>1</sup>Massachusetts Office of Coastal Zone Management.



Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.



Figure 2.1 Currents in the Gulf of Maine (from Anderson et al. 2007)

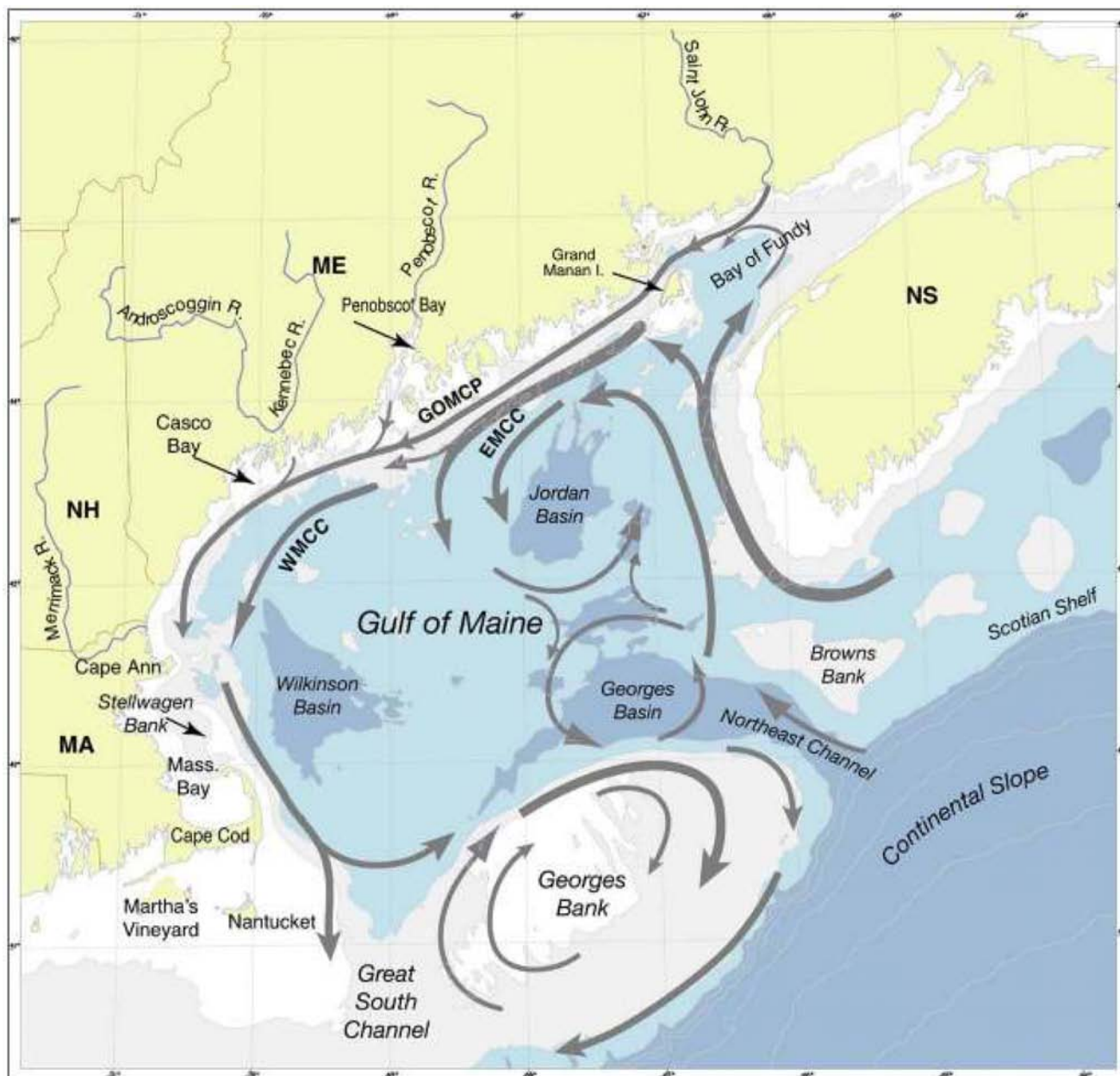
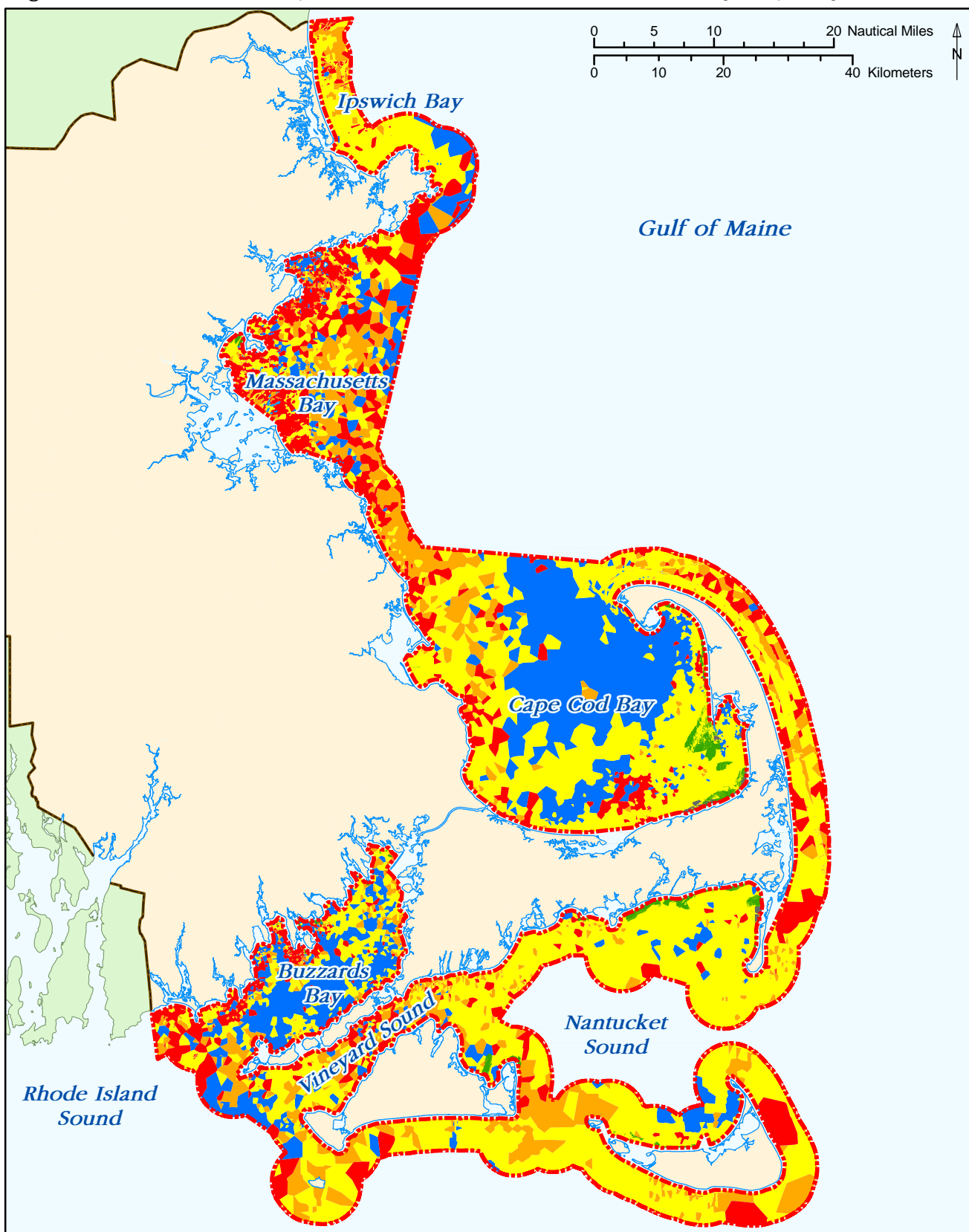


Figure 4.1 Surficial sediments and protected benthic habitats in the Massachusetts ocean management planning area



Massachusetts ocean management planning area boundary<sup>1</sup>

Surficial sediments<sup>1,2</sup>

Generally mud

Generally sand

Protected benthic habitats

Eelgrass<sup>3</sup>

Generally gravel

Generally hard bottom

Intertidal flats<sup>3</sup>

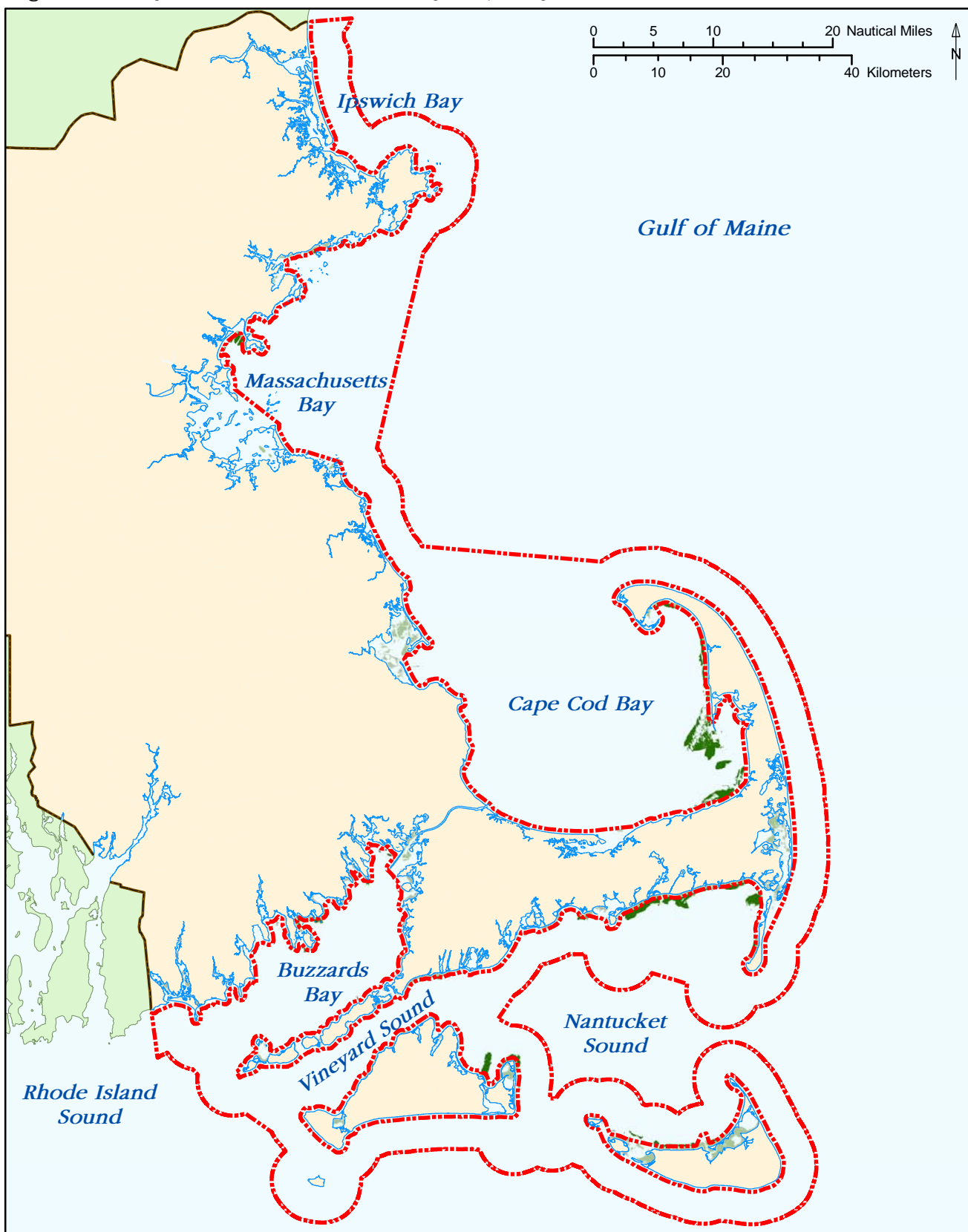
Data sources: <sup>1</sup>Massachusetts Office of Coastal Zone Management, <sup>2</sup>Massachusetts Division of Marine Fisheries, <sup>3</sup>Massachusetts Department of Environmental Protection, Wetlands Conservancy Program.



Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.



Figure 4.2 Eelgrass in the Massachusetts ocean management planning area



Massachusetts ocean management planning area boundary<sup>1</sup>

Eelgrass<sup>2,\*</sup>

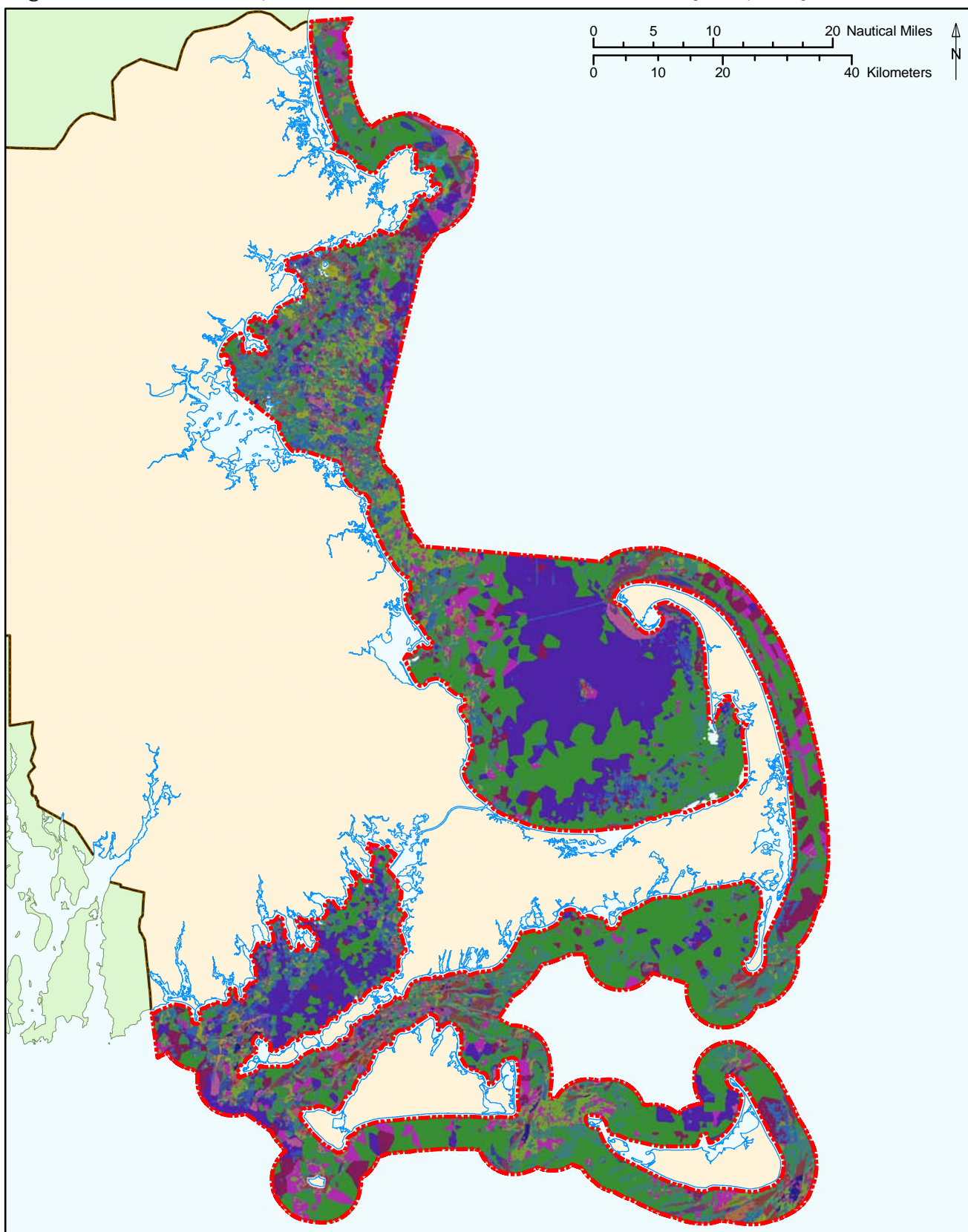
Data sources: <sup>1</sup>Massachusetts Office of Coastal Zone Management, <sup>2</sup>Massachusetts Department of Environmental Protection, Wetlands Conservancy Program.

\*A mask has been applied so that data layers outside of the Massachusetts ocean management planning area appear lighter.

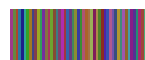


Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.

Figure 4.3 Distribution of unique seafloor habitat classes in the Massachusetts ocean management planning area



 Massachusetts ocean management planning area boundary<sup>1</sup>

 Colors represent 51 unique combinations of seafloor terrain, rugosity, and seabed sediments<sup>1</sup>

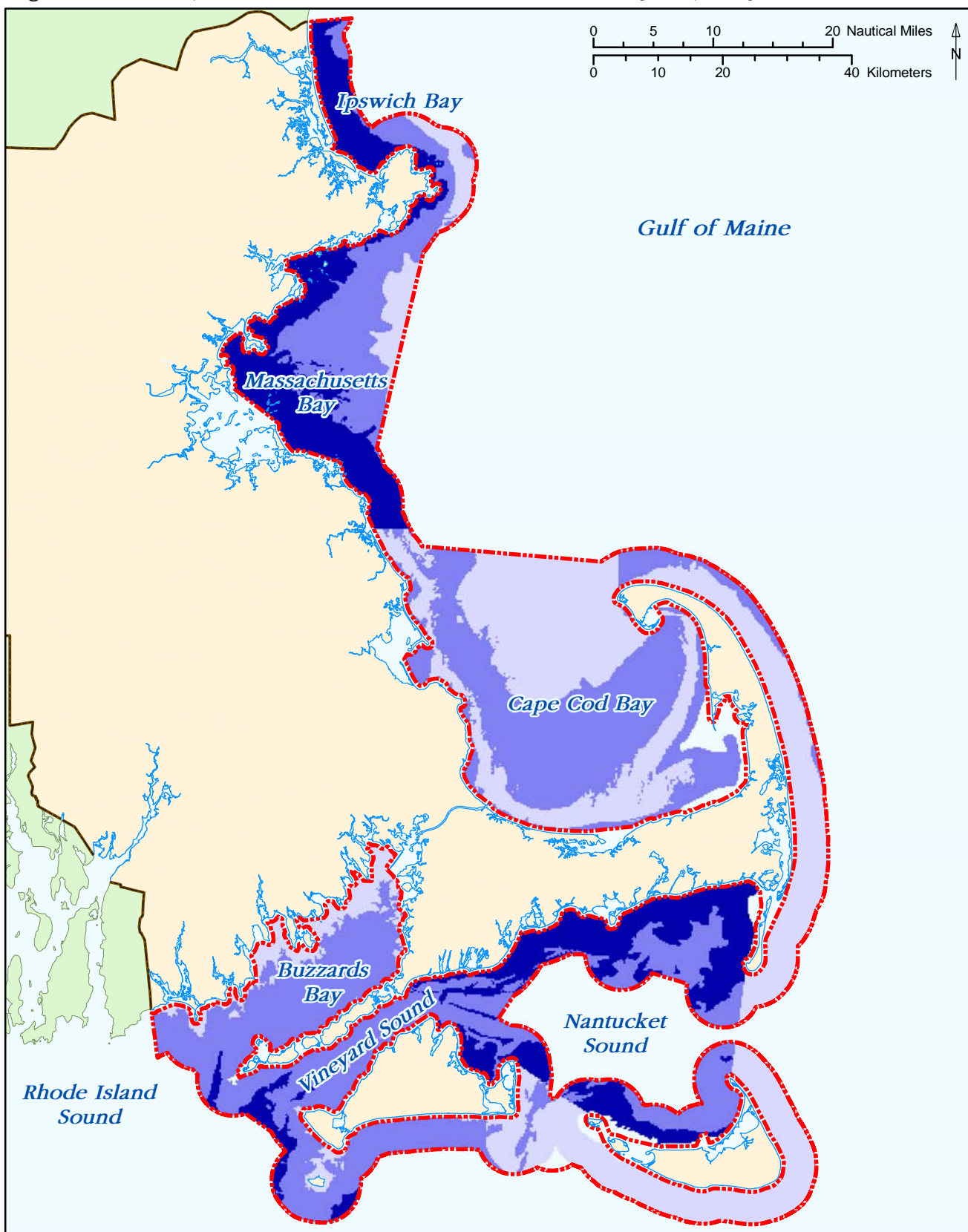
Data source: <sup>1</sup>Massachusetts Office of Coastal Zone Management.



Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.



Figure 4.4 Areas important to fisheries resources in the Massachusetts ocean management planning area



Massachusetts ocean management planning area boundary<sup>1</sup>

Fisheries resources<sup>2</sup>

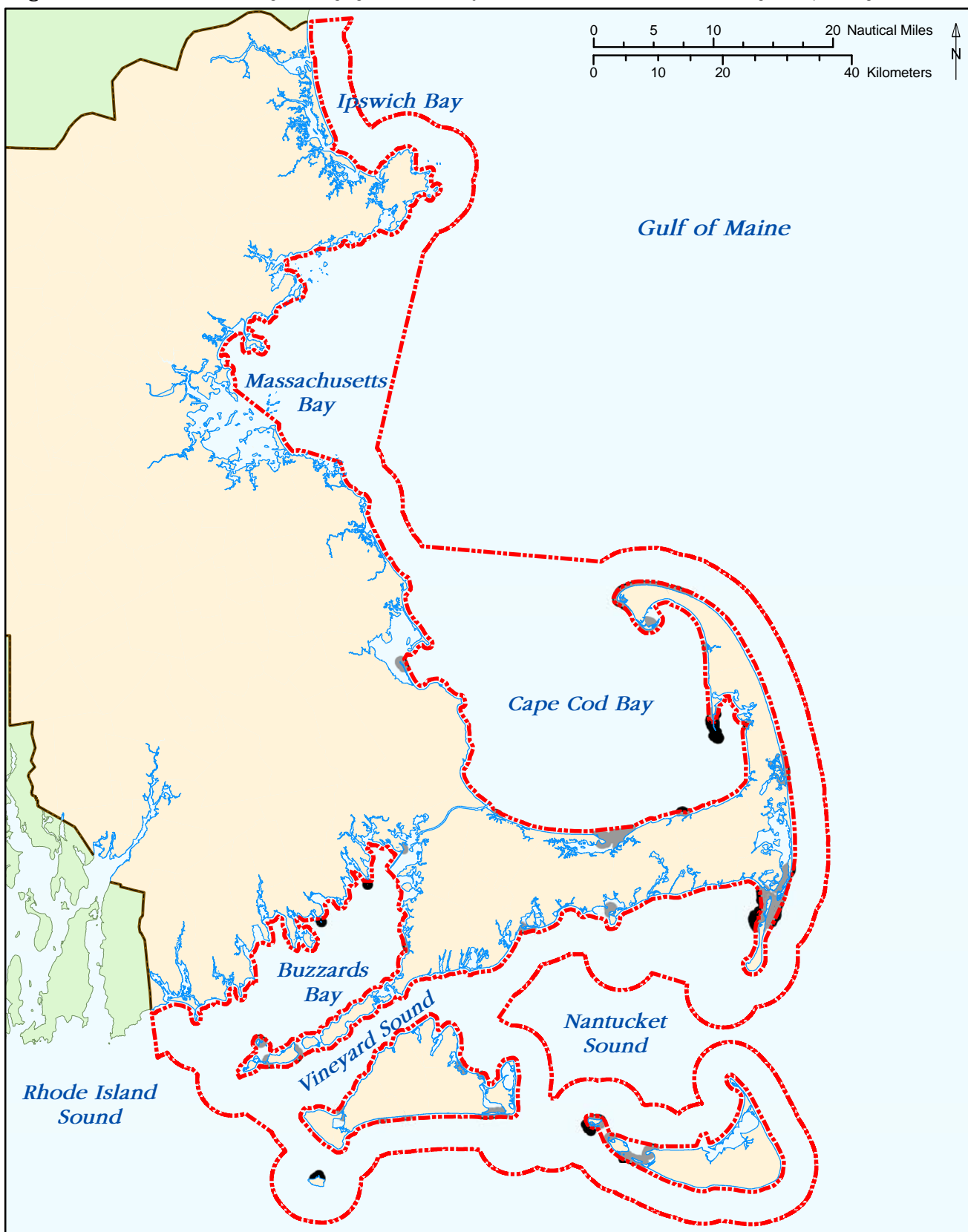
High  
Medium  
Low

Data sources: <sup>1</sup>Massachusetts Office of Coastal Zone Management, <sup>2</sup>Massachusetts Division of Marine Fisheries.



Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.

Figure 4.5 Roseate Tern nesting and staging areas in and adjacent to the Massachusetts ocean management planning area



 Massachusetts ocean management planning area boundary<sup>1</sup>

 Roseate Tern nesting and staging area<sup>2,\*</sup>

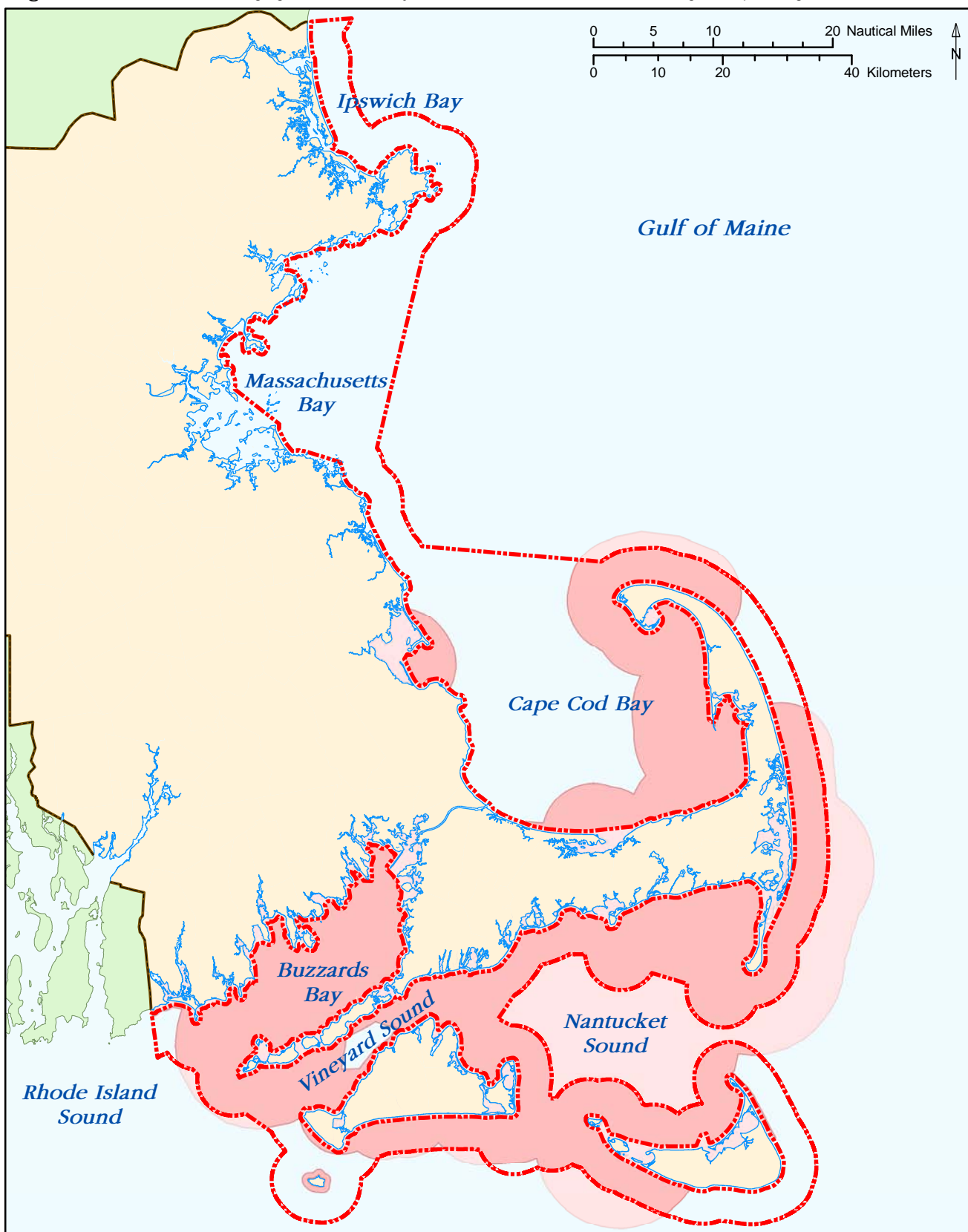
Data sources: <sup>1</sup>Massachusetts Office of Coastal Zone Management, <sup>2</sup>Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program.  
\*A mask has been applied so that data layers outside of the Massachusetts ocean management planning area appear lighter.





Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.



Figure 4.6 Roseate Tern foraging habitat in and adjacent to the Massachusetts ocean management planning area



 Massachusetts ocean management planning area boundary<sup>1</sup>

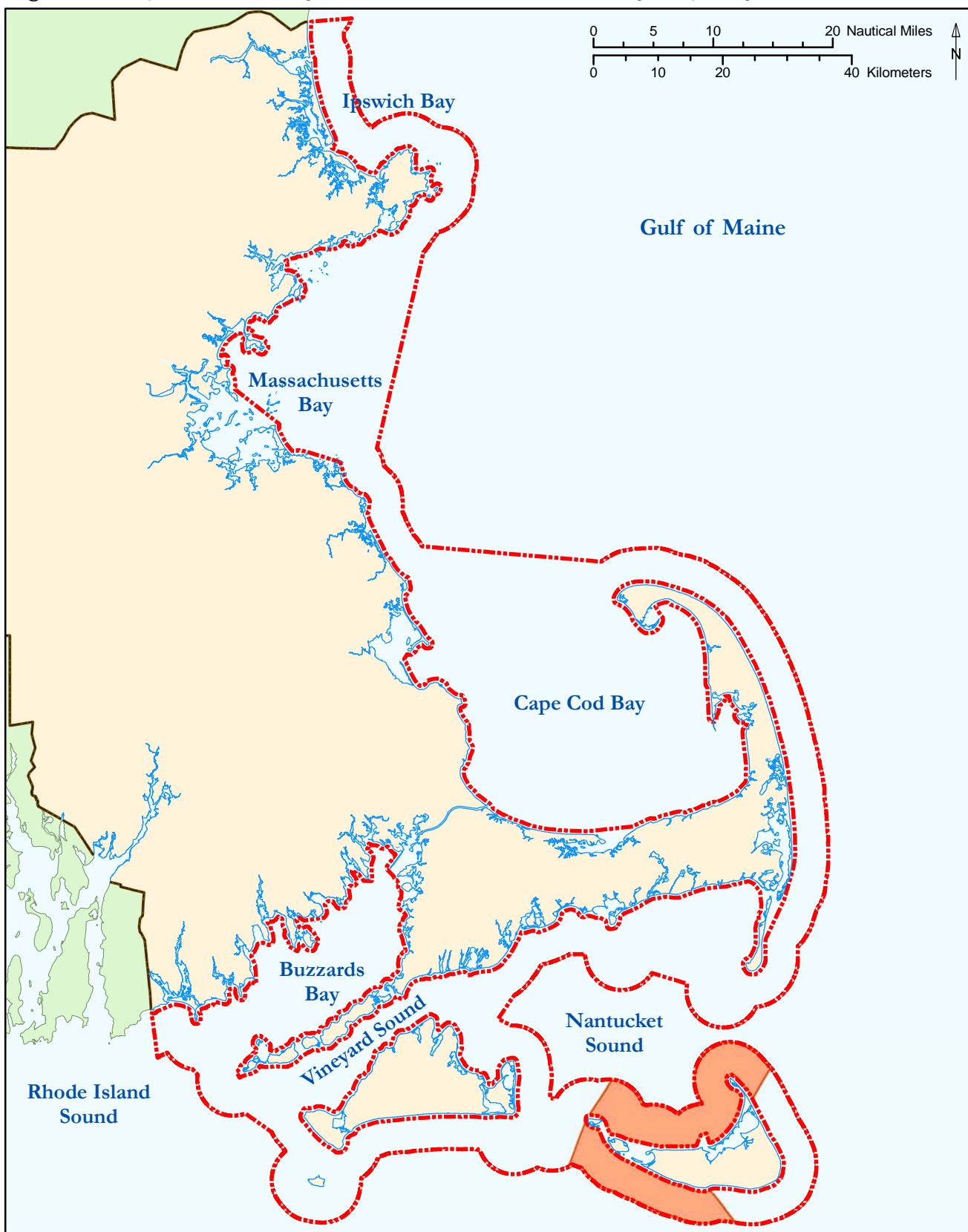
 Roseate Tern foraging habitat<sup>2,\*</sup>

Data sources: <sup>1</sup>Massachusetts Office of Coastal Zone Management, <sup>2</sup>Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program.  
\*A mask has been applied so that data layers outside of the Massachusetts ocean management planning area appear lighter.



Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.

Figure 4.7 Important habitat for Long-tailed Duck in the Massachusetts ocean management planning area



--- Massachusetts ocean management planning area boundary<sup>1</sup>

■ Important Long-tailed Duck habitat<sup>2,3</sup>

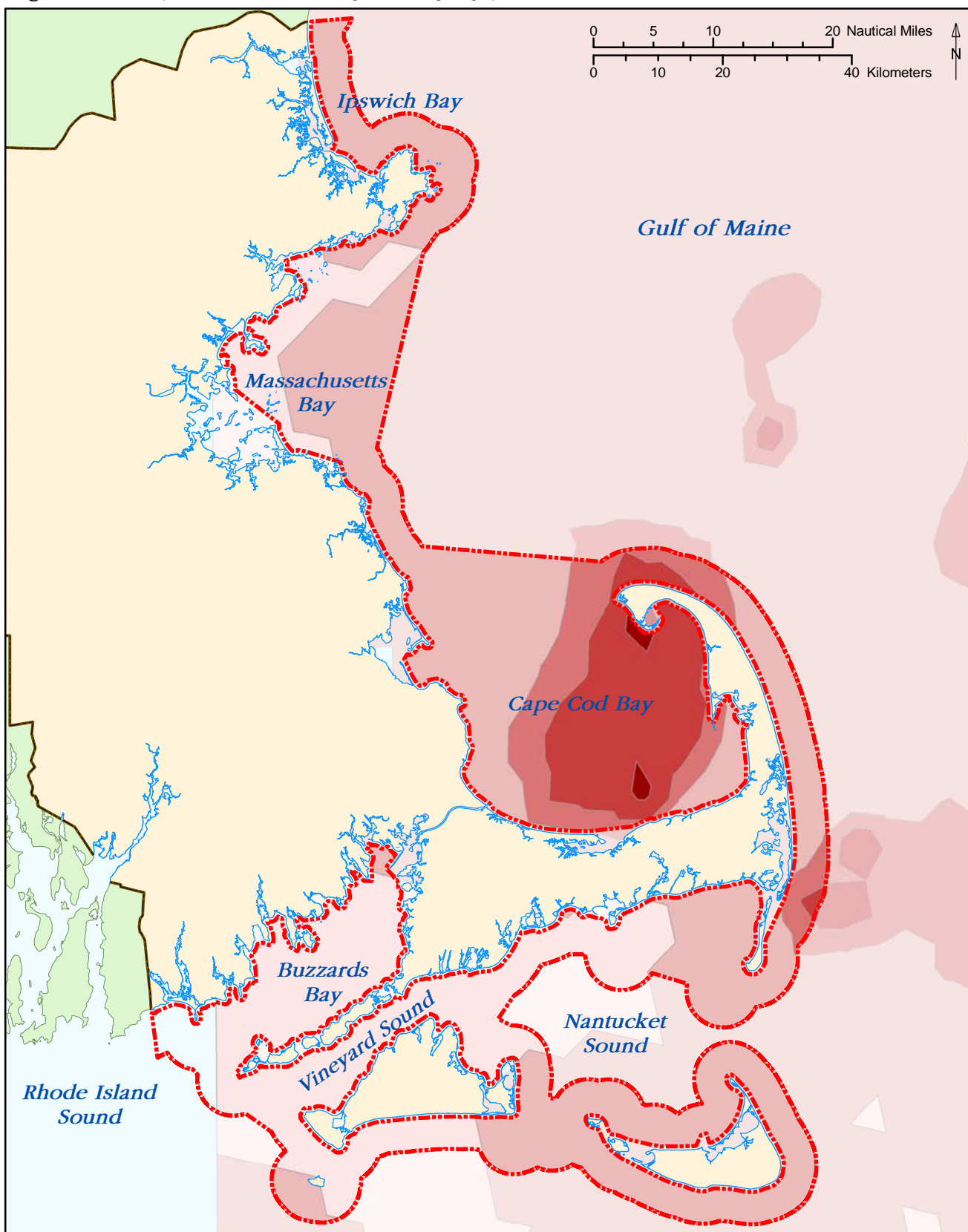
Data sources: <sup>1</sup>Massachusetts Office of Coastal Zone Management, <sup>2</sup>Massachusetts Audubon Society, <sup>3</sup>Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program.



Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.



Figure 4.8 Interpolation of North Atlantic right whale sightings-per-unit-effort (SPUE) data for all seasons



Massachusetts ocean management planning area boundary<sup>1</sup>

North Atlantic right whales in the southern Gulf of Maine<sup>2,\*</sup>  
Interpolation of sightings-per-unit-effort data (quantile)

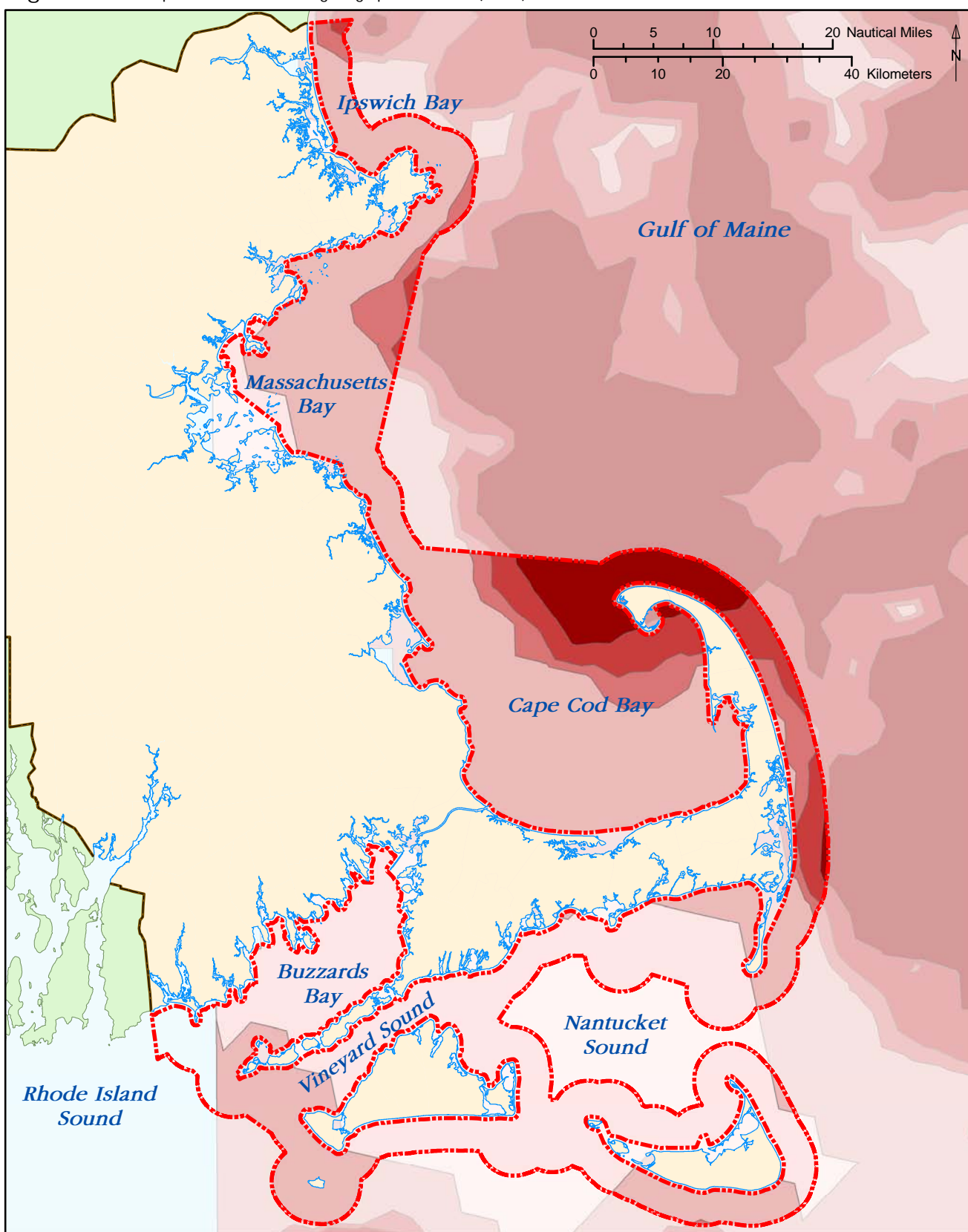
0	8.3 to 16.5	Greater than 33.8
0.1 to 8.2	16.6 to 33.8	

Data sources: <sup>1</sup>Massachusetts Office of Coastal Zone Management, <sup>2</sup>National Oceanic and Atmospheric Administration (NOAA) National Centers for Coastal Ocean Science (NCCOS) 2006. An Ecological Characterization of the Stellwagen Bank National Marine Sanctuary Region: Oceanographic, Biogeographic, and Contaminants Assessment. Prepared by NCCOS's Biogeography Team in cooperation with the National Marine Sanctuary Program. Silver Spring, MD: NOAA Technical Memorandum NOS NCCOS 45. 356 pp.  
\*A mask has been applied so that data layers outside of the Massachusetts ocean management planning area appear lighter.



Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.

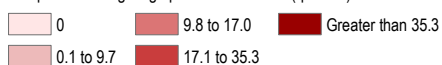
Figure 4.9 Interpolation of fin whale sightings-per-unit-effort (SPUE) data for all seasons



Massachusetts ocean management planning area boundary<sup>1</sup>

Fin whales in the southern Gulf of Maine<sup>2,\*</sup>

Interpolation of sightings-per-unit-effort data (quantile)



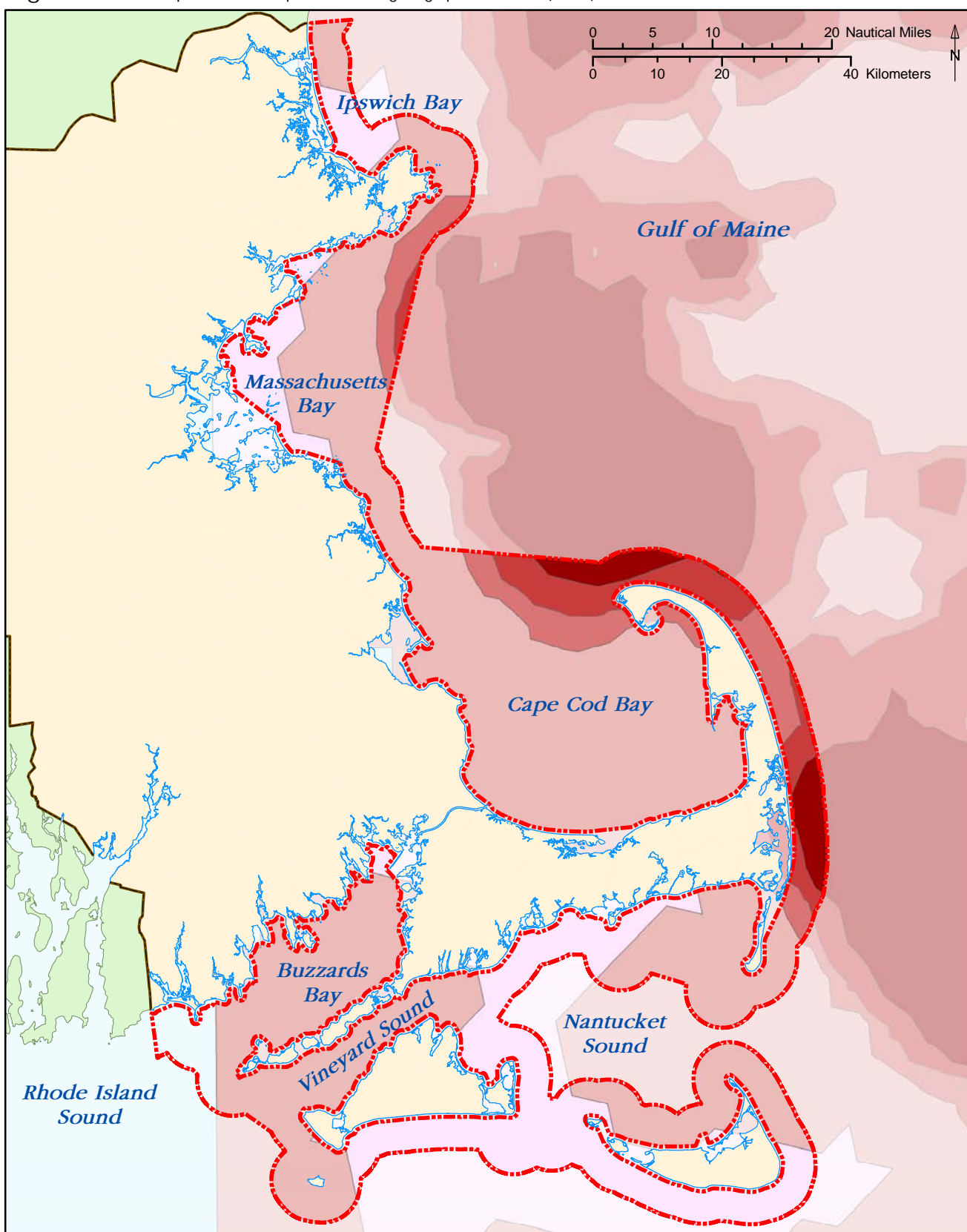
Data sources: <sup>1</sup>Massachusetts Office of Coastal Zone Management, <sup>2</sup>National Oceanic and Atmospheric Administration (NOAA) National Centers for Coastal Ocean Science (NCCOS) 2006. An Ecological Characterization of the Stellwagen Bank National Marine Sanctuary Region: Oceanographic, Biogeographic, and Contaminants Assessment. Prepared by NCCOS's Biogeography Team in cooperation with the National Marine Sanctuary Program. Silver Spring, MD: NOAA Technical Memorandum NOS NCCOS 45. 356 pp.  
\*A mask has been applied so that data layers outside of the Massachusetts ocean management planning area appear lighter.

Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.



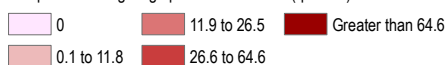


Figure 4.10 Interpolation of humpback whale sightings-per-unit-effort (SPUE) data for all seasons



Massachusetts ocean management planning area boundary<sup>1</sup>

Humpback whales in the southern Gulf of Maine<sup>2,\*</sup>  
Interpolation of sightings-per-unit-effort data (quantile)

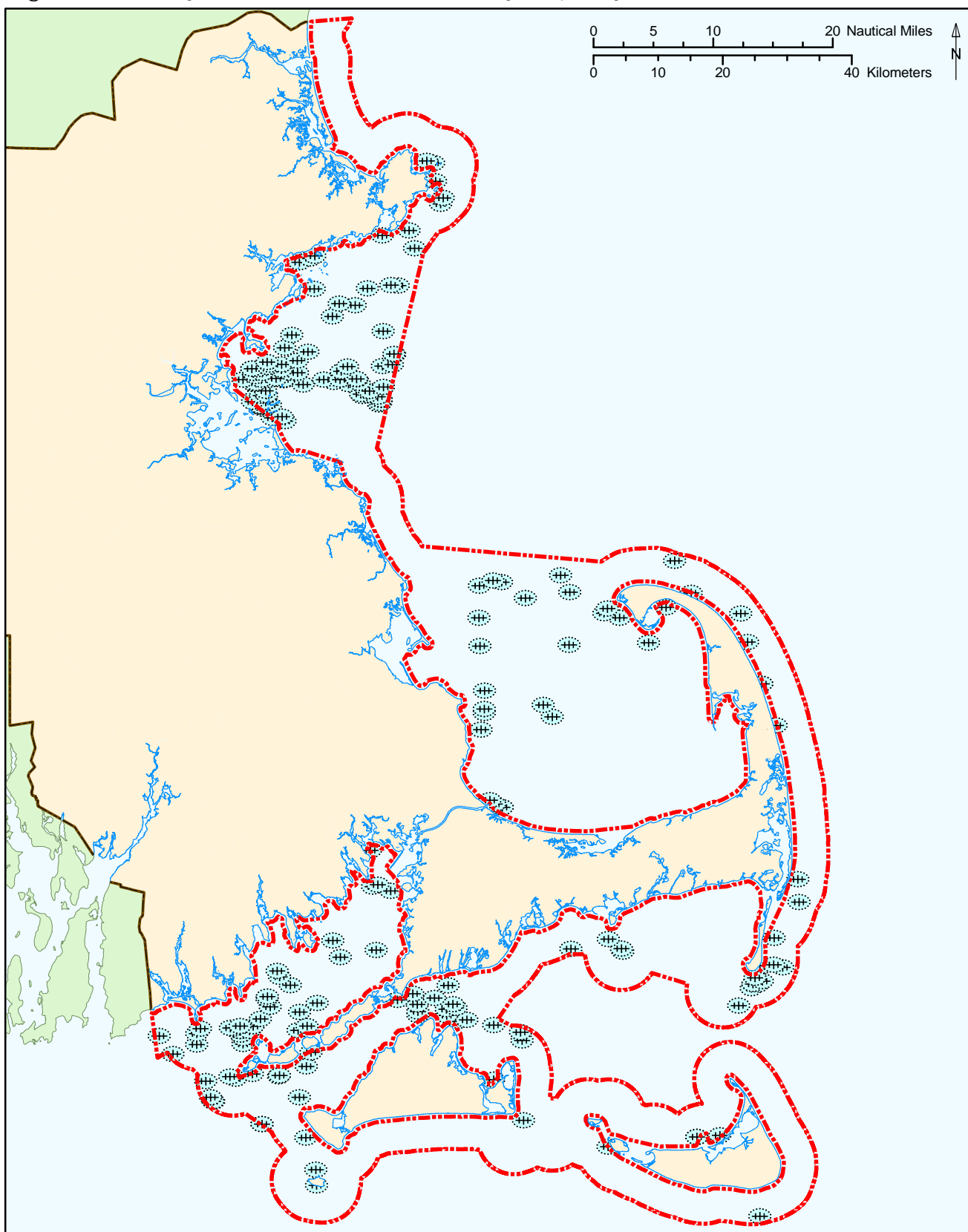


Data sources: <sup>1</sup>Massachusetts Office of Coastal Zone Management, <sup>2</sup>National Oceanic and Atmospheric Administration (NOAA) National Centers for Coastal Ocean Science (NCCOS) 2006. An Ecological Characterization of the Stellwagen Bank National Marine Sanctuary Region: Oceanographic, Biogeographic, and Contaminants Assessment. Prepared by NCCOS's Biogeography Team in cooperation with the National Marine Sanctuary Program. Silver Spring, MD: NOAA Technical Memorandum NOS NCCOS 45. 356 pp.  
\*A mask has been applied so that data layers outside of the Massachusetts ocean management planning area appear lighter.



Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.

Figure 5.1 Submerged wrecks in the Massachusetts ocean management planning area



Massachusetts ocean management planning area boundary<sup>1</sup>

Submerged wreck<sup>2</sup>

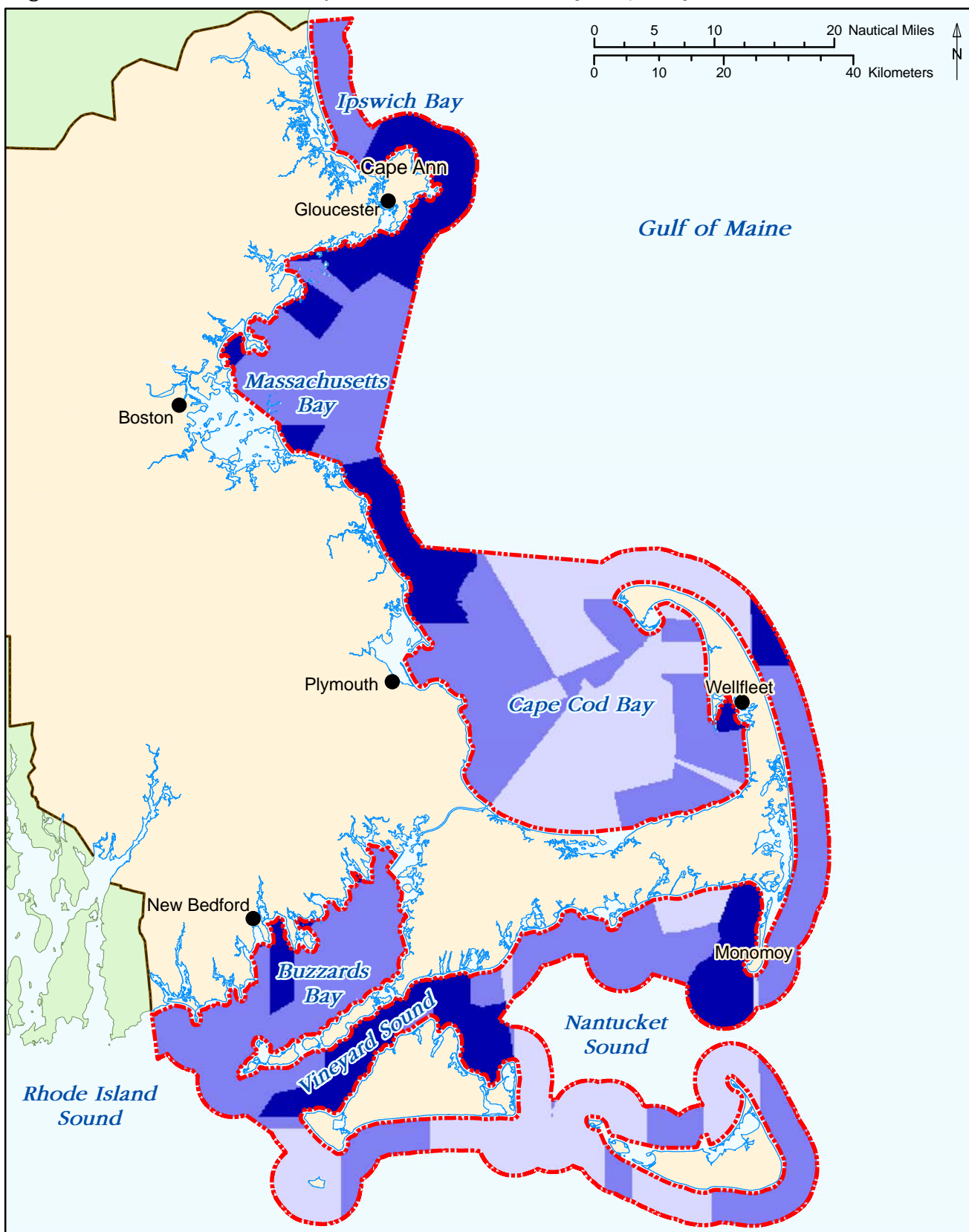
Data sources: <sup>1</sup>Massachusetts Office of Coastal Zone Management, <sup>2</sup>National Oceanic and Atmospheric Administration (NOAA) Office of Coast Survey's Automated Wreck and Obstruction Information System (AWOIS) (data downloaded 5/1/2009 from [www.nauticalcharts.noaa.gov/hds/awois.html](http://www.nauticalcharts.noaa.gov/hds/awois.html)).

Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.





Figure 6.1 Commercial fisheries activity in the Massachusetts ocean management planning area



--- Massachusetts ocean management planning area boundary<sup>1</sup>

Commercial fisheries activity<sup>2</sup>

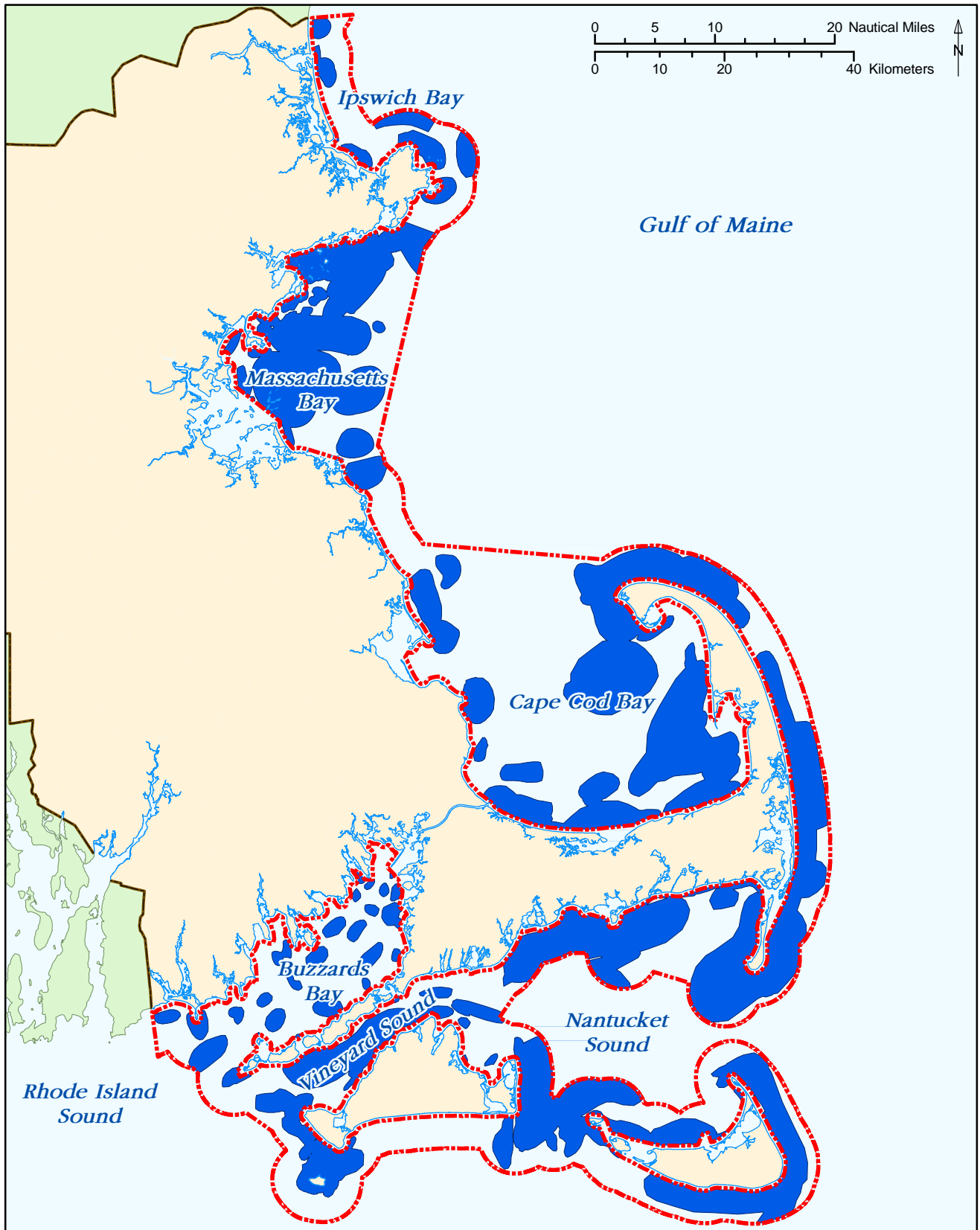
- High
- Medium
- Low

Data sources: <sup>1</sup>Massachusetts Office of Coastal Zone Management, <sup>2</sup>Massachusetts Division of Marine Fisheries.



Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.

Figure 6.2 Recreational fishing areas classified as “high importance” in the Massachusetts ocean management planning area



- - - Massachusetts ocean management planning area boundary<sup>1</sup>
- Recreational fishing area based on a Massachusetts Division of Marine Fisheries survey<sup>2</sup>

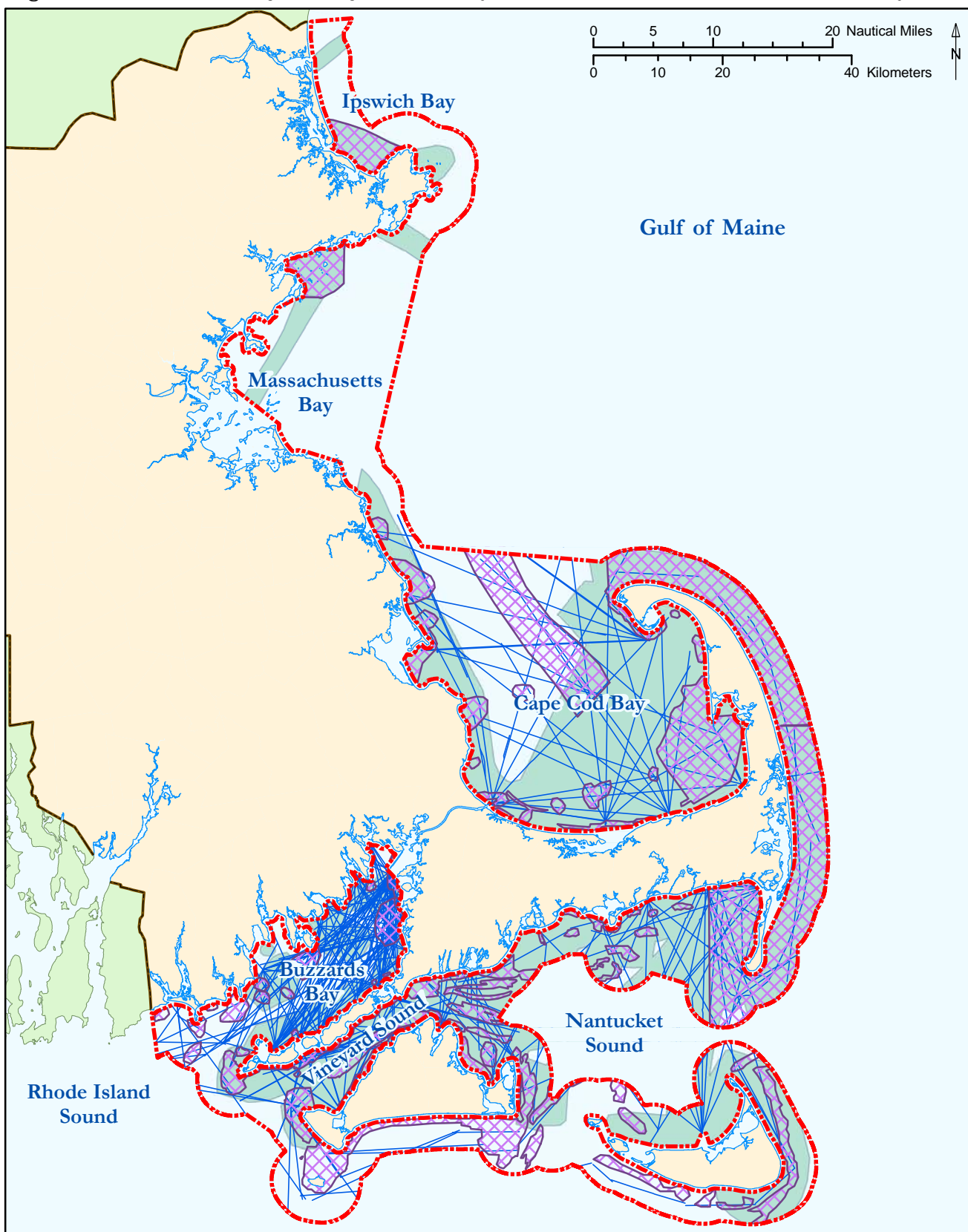
Data sources: <sup>1</sup>Massachusetts Office of Coastal Zone Management, <sup>2</sup>Massachusetts Division of Marine Fisheries.



Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.



Figure 6.3 Recreational boating and fishing areas identified by a Massachusetts Marine Trades Association (MMTA) survey



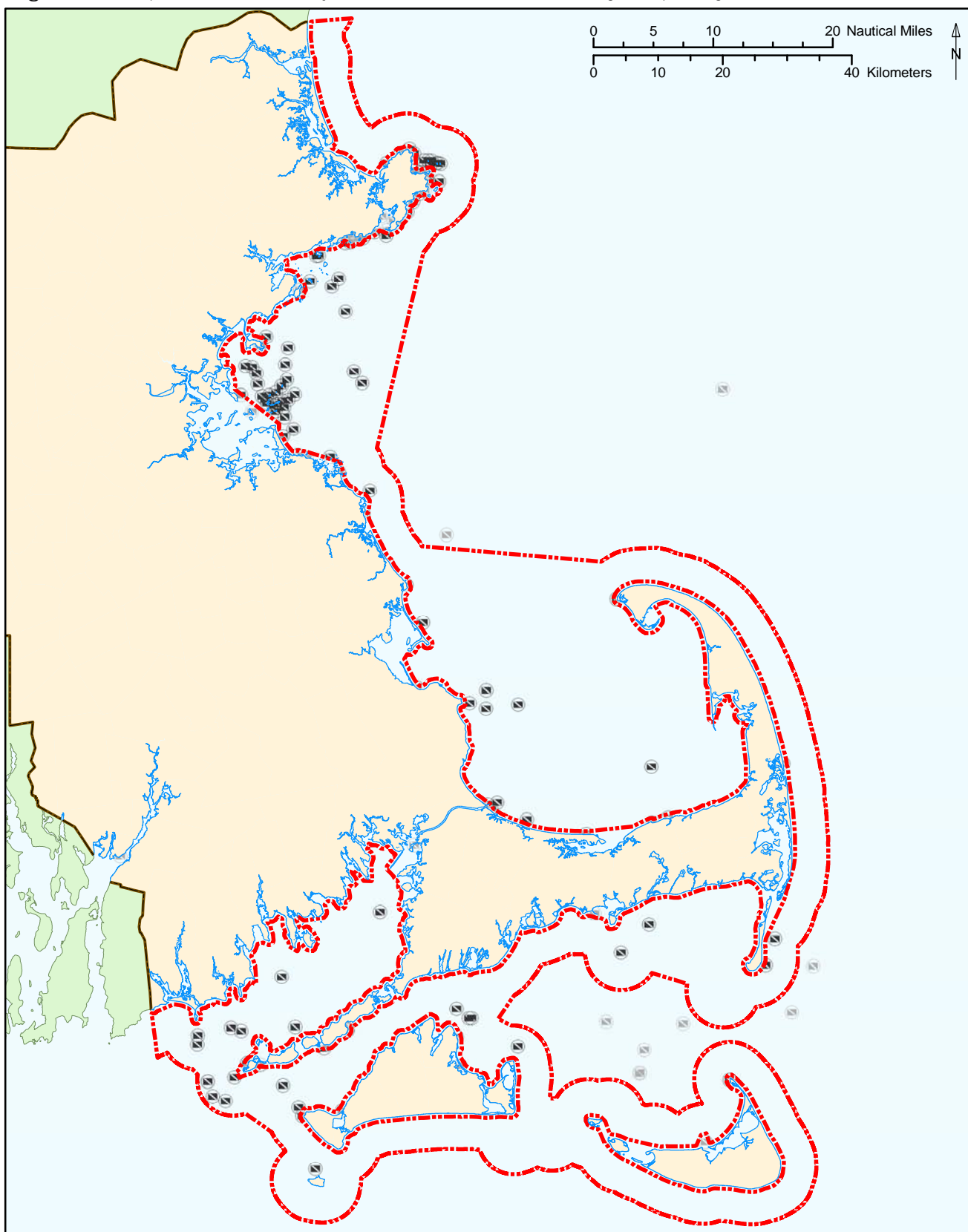
- - - Massachusetts ocean management planning area boundary<sup>1</sup>
- Recreational boating area identified by MMTA survey of boaters<sup>2</sup>
- — — Recreational boating routes identified by MMTA survey of boaters<sup>2</sup>
- Recreational fishing area identified by MMTA survey of fishermen<sup>2</sup>

Data sources: <sup>1</sup>Massachusetts Office of Coastal Zone Management, <sup>2</sup>Massachusetts Marine Trades Association.



Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.

Figure 6.4 Popular dive sites in and adjacent to the Massachusetts ocean management planning area



--- Massachusetts ocean management planning area boundary<sup>1</sup>

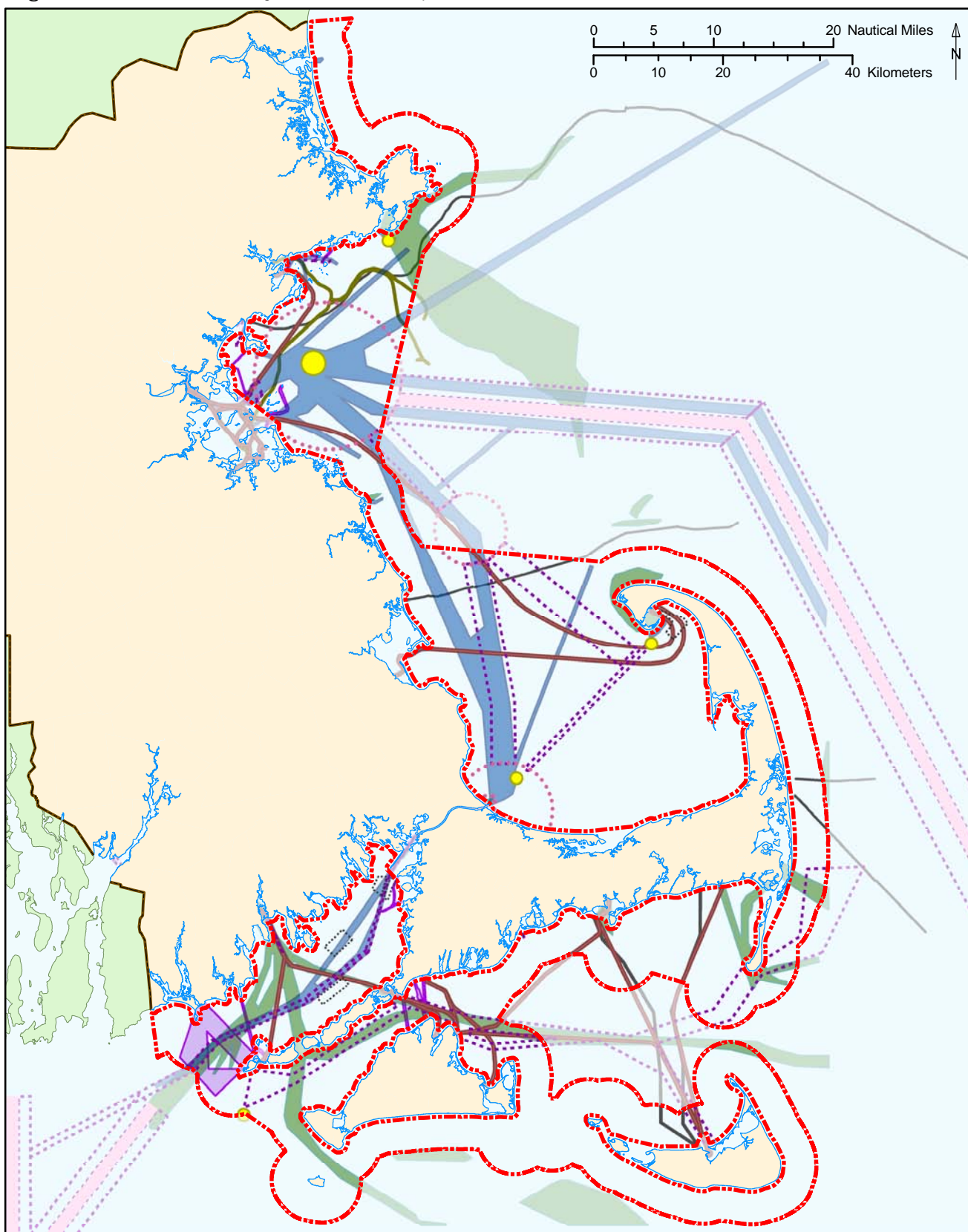
☒ Recreational dive site<sup>1,\*</sup>

Data source: <sup>1</sup>Massachusetts Office of Coastal Zone Management.  
\*A mask has been applied so that data layers outside of the Massachusetts ocean management planning area appear lighter.



Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.

Figure 6.5 Infrastructure, navigation lanes, and transportation routes



- - - Planning area boundary<sup>1</sup>
- - - Anchorage area<sup>1,2,3</sup>
- Automatic Identification System (AIS)<sup>4,\*</sup>
- Cable<sup>1,\*</sup>
- Cable area<sup>3,\*</sup>
- Ferry route<sup>5,\*</sup>

- Gas pipeline<sup>1,\*</sup>
- Pilot boarding area<sup>1,\*</sup>
- - - Precautionary area<sup>3,\*</sup>
- - - Separation zone<sup>3,\*</sup>
- - - Shipping lane<sup>1,\*</sup>
- - - Vessel Monitoring System (VMS)<sup>6,\*</sup>

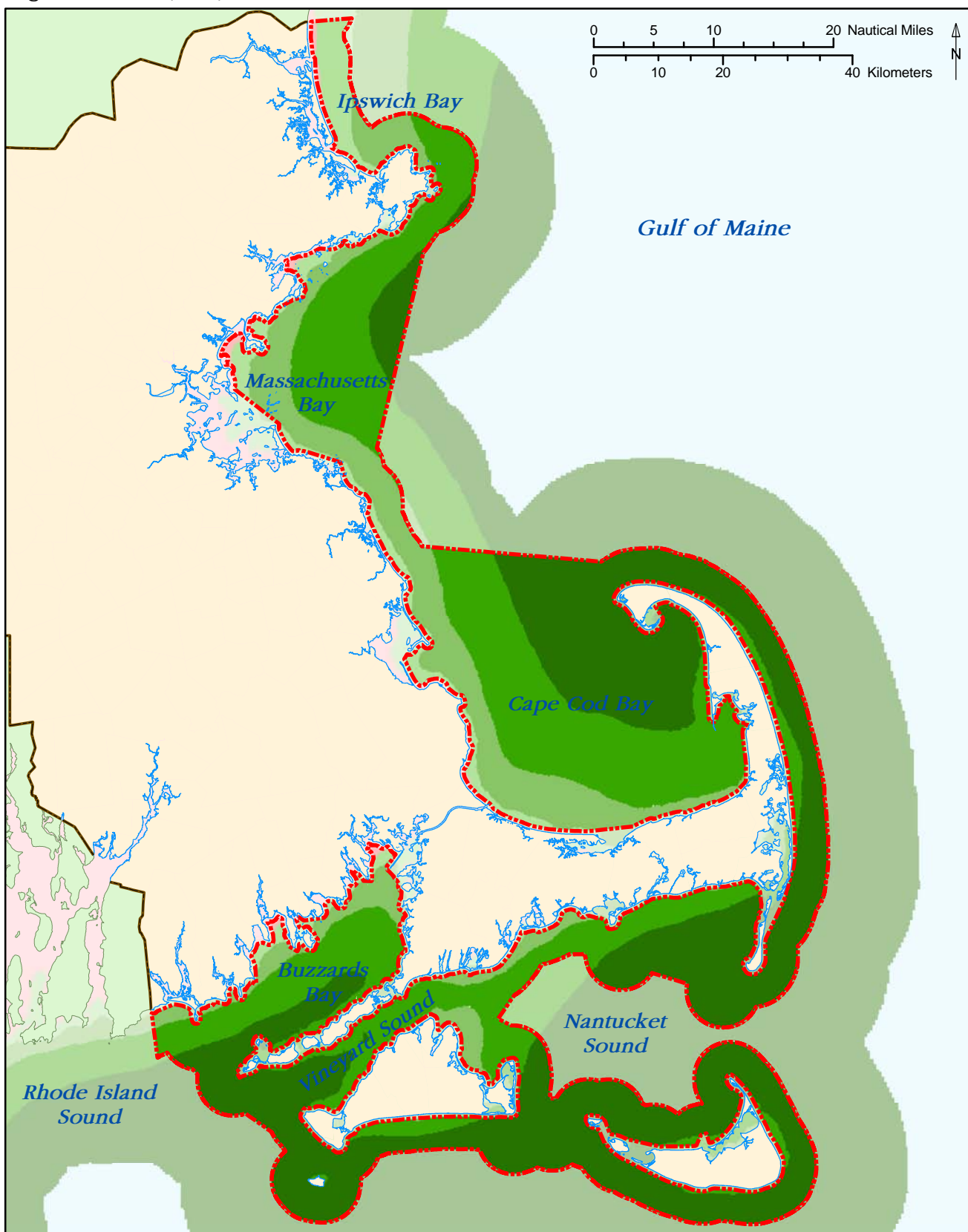
Data sources: <sup>1</sup>Massachusetts Office of Coastal Zone Management, <sup>2</sup>MassGIS, <sup>3</sup>National Oceanic and Atmospheric Administration, <sup>4</sup>Stellwagen Bank National Marine Sanctuary, <sup>5</sup>Massachusetts Department of Transportation, <sup>6</sup>National Marine Fisheries Service Northeast Regional Office.  
\*A mask has been applied so that data layers outside of the Massachusetts ocean management planning area appear lighter.



Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.



Figure 6.6 Wind power potential off of the Massachusetts coast



--- Massachusetts ocean management planning area boundary<sup>1</sup>

Wind speed (meters/second)<sup>2,\*</sup>

Less than 7.0	7.5 to 8.0	Greater than 8.5
7.0 to 7.5	8.0 to 8.5	

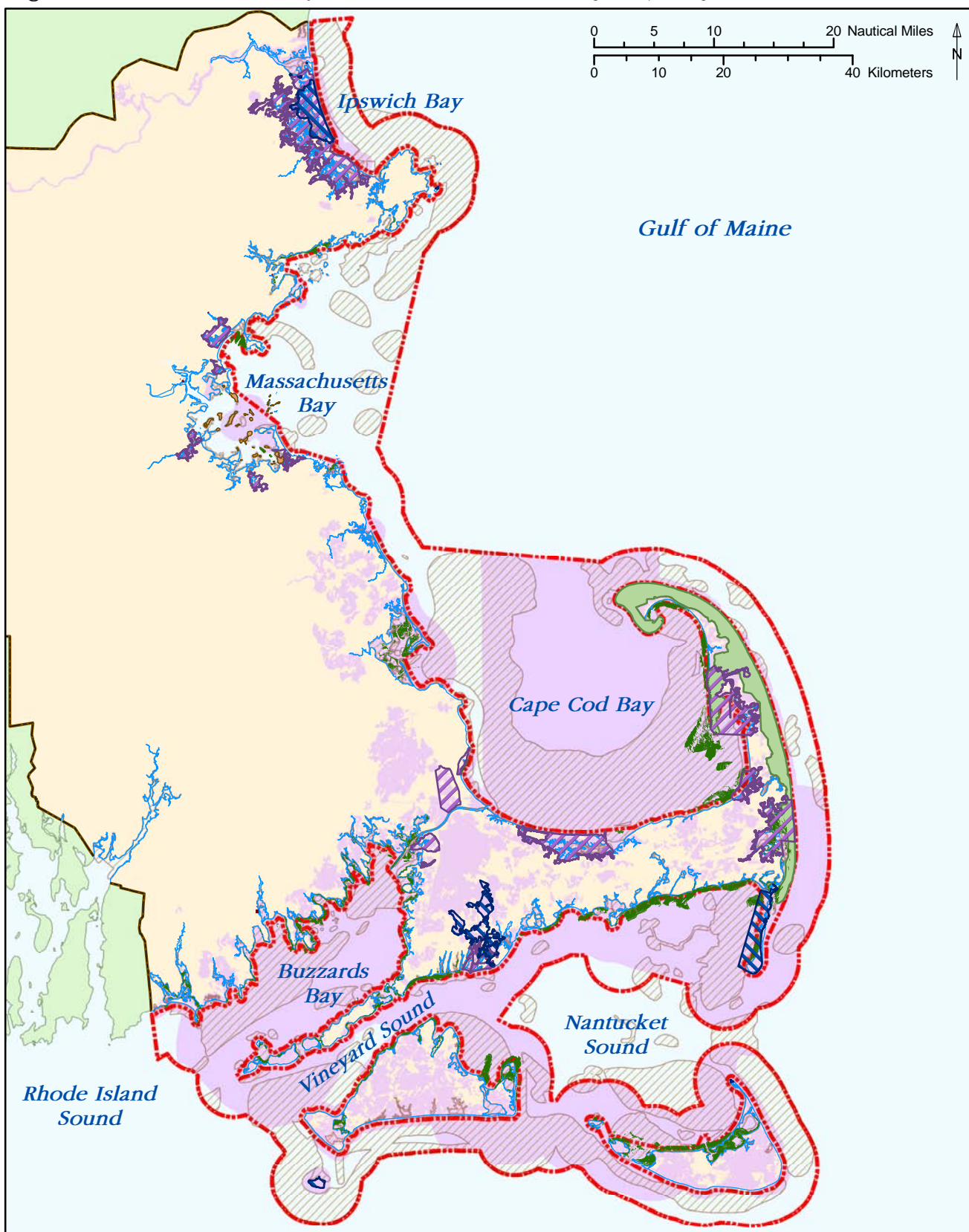
Data sources: <sup>1</sup>Massachusetts Office of Coastal Zone Management, <sup>2</sup>Truewind Solutions, LLC.

\*A mask has been applied so that data layers outside of the Massachusetts ocean management planning area appear lighter.

Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.



Figure 6.7 Protected areas in and adjacent to the Massachusetts ocean management planning area



Planning area boundary<sup>1</sup>

Area of Critical Environmental Concern<sup>2</sup>  
 Boston Harbor Islands National Rec Area<sup>3</sup>  
 Cape Cod National Seashore<sup>3</sup>  
 Eelgrass<sup>4</sup>

National Park Service<sup>3</sup>

National Wildlife Refuge<sup>5</sup>

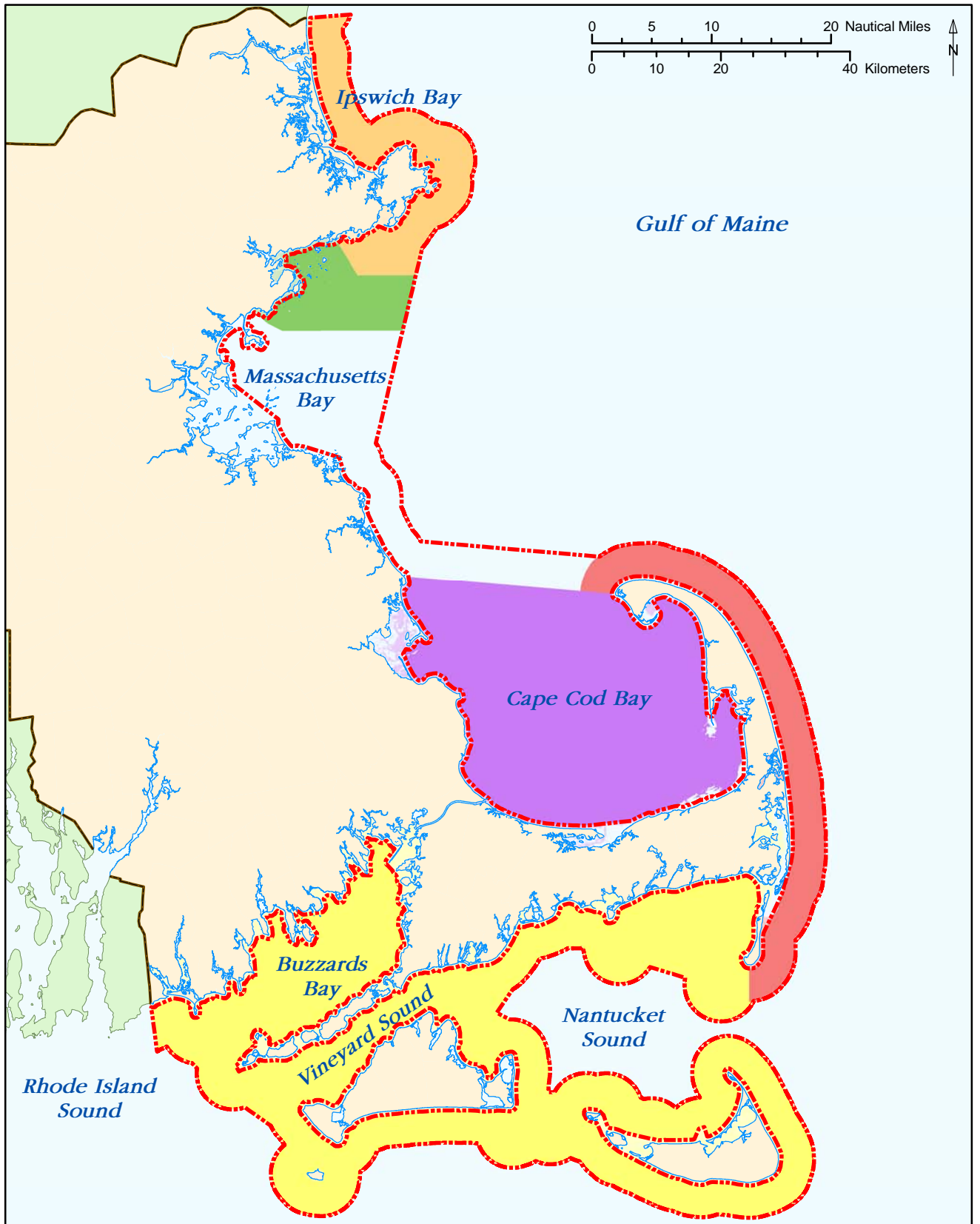
Natural Heritage and Endangered Species  
 Program Priority Habitat of Rare Species<sup>6</sup>  
 Shellfish Suitability Area<sup>7</sup>

Data sources: <sup>1</sup>MA Office of Coastal Zone Management, <sup>2</sup>MA Department of Conservation and Recreation, <sup>3</sup>National Park Service, <sup>4</sup>MA Department of Environmental Protection, Wetlands Conservancy Program, <sup>5</sup>U.S. Fish and Wildlife Service, <sup>6</sup>MA Natural Heritage and Endangered Species Program, <sup>7</sup>MA Division of Marine Fisheries.

Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.



Figure 6.8 Locations of the five Ocean Sanctuaries in Massachusetts



- Massachusetts ocean management planning area boundary<sup>1</sup>
- Massachusetts Ocean Sanctuaries<sup>1</sup>
- Cape and Islands
  - Cape Cod Bay
  - South Essex
  - Cape Cod
  - North Shore

Data source: <sup>1</sup>Massachusetts Office of Coastal Zone Management.



Map coordinate system: North American Datum of 1983 (NAD83), Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.