

Executive Office of Energy and Environmental Affairs
Massachusetts Office of Coastal Zone Management

CULTURAL HERITAGE AND RECREATIONAL USES
Work Group Report

2015 Massachusetts Ocean Management Plan Review

December 2020

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Work Group Leads' Acknowledgement

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CHAPTER 1 - INTRODUCTION

The Oceans Act of 2008 requires development of a comprehensive ocean plan for Massachusetts waters. The first Massachusetts Ocean Management Plan (ocean plan) was promulgated in December 2009 and revised and updated in 2015. A baseline assessment was also developed and revised in conjunction with the ocean plan. The foundation of the ocean plan was the identification of management areas within state waters with specific siting and performance standards established to protect existing natural resources as well as commercial and recreational uses. Twelve habitat types were designated as Special, Sensitive, or Unique (SSU) natural resources, while five uses were designated as areas of concentrated water-dependent use. Spatial analyses of the best data available at that time resulted in the development of maps for the ocean plan.

The Oceans Act requires that the ocean plan and baseline assessment be reviewed at least once every five years. Six technical work groups were convened to review and update the data and maps in the current plan. At a series of meetings starting in October 2019, the Cultural Heritage and Recreational Uses Work Group (CRWG) initiated discussions on the current representation of cultural heritage and recreational resources and uses in the plan. The work group included experts in various recreational and cultural/archaeological fields, as well as representatives from the Massachusetts Commission on Indian Affairs and the tribal historic preservation offices of the Commonwealth's two federally-recognized Indian Tribes (i.e., the Mashpee Wampanoag Tribe and the Wampanoag Tribe of Gay Head [Aquinnah]) (see Chapter 1).

The work group discussions focused on:

1. Revising the current representation of recreational resources and cultural heritage in the 2015 ocean plan.
2. Identifying and characterizing new data to add to and/or change the representation of these services.
3. Describing significant trends in the status or condition of recreational services and cultural resources in the Plan and Baseline Assessment.
4. Identifying and discussing new science that advances the characterization of the planning area and its resources and uses.
5. Reviewing the science and data priorities in the 2015 ocean plan and developing recommendations for priority research and data acquisition for the next five years.

Cultural heritage and recreational uses discussed by the work group are outlined in Table 1. This table also summarizes how each topic is addressed and/or described in the ocean plan.

CHAPTER 2 - DATA RESOURCES AND RECOMMENDATIONS

The CRWG discussed available and use of data relating to recreational use and cultural heritage that fall within the purview of the ocean plan. Recreational uses include boating, whale watching, diving, recreational fishing and beachgoing. Recreational fishing was discussed by the Fisheries Work Group. Cultural heritage was divided into: 1) tribal concerns and submerged paleocultural landscapes, and 2) shipwrecks and other submerged cultural heritage aspects. During these meetings the CRWG discussed how data gathered could be used to describe changes and trends in knowledge and conditions of these uses and resources since 2015, and to make recommendation to inform the ocean plan update as well as the update of the baseline assessment. Spatial data, where available, were checked and used to develop maps with spatial representation of the resource and use.

Several data gaps were highlighted, and the work group identified a list of priorities for further research. The CRWG suggested that the importance of these data in providing information for ocean planning, resource protection, and community wellbeing makes these activities ideal candidates for future research but depends on support by the Commonwealth. Information related to human uses serves to inform various aspects of ocean planning, from use in compatibility analysis to determination of appropriate mitigation measures associated with a specific project.

Although the ocean planning area starts approximately 1,500 ft below Mean High Water (MHW), the work group agreed that the linkages between cultural and recreational activities on land, the intertidal zone, and along the coast are integral to and part of a continuum of the submerged cultural resources and recreational activities that extend into and take place within the Ocean Management Planning area.

The CRWG discussions resulted in a list of recommendations. These recommendations are based on a review of the 2015 ocean plan and the information in the baseline assessment, assessment of new data to inform the revision/update of the ocean plan, and a gap analysis to identify research and data priorities to inform future updates of the ocean plan. The recommendations include short-term actions using available (and new) data for the current ocean plan review/update process; and longer-term actions referring to activities that require resources for further analyses and data mining of existing data, and for research priorities.

Table 1: Recreational use and cultural resources addressed in the 2015 ocean plan and discussed by CRWG.

Topic	Details	Data/info in the 2015 plan
Recreational Uses		
Boating	Ancillary (including ramps, marinas, mooring fields, boat races)	Volume 2 (Chapter 6; Coastal boat ramps, marinas, and mooring fields in Massachusetts Figure 31)
	Spatial navigational patterns for the 2015 ocean plan, recreational boating was addressed by the Navigation and Transportation Work Group. For the current review of the ocean plan as well as potential update, this use will be addressed by the CRWG. In addition, some aspects will be addressed by the Navigation and Transportation Work Group.	<i>Areas of existing water-dependent uses: concentrated recreational boating activity</i> (Volume 1 Figure 20). 2015: Concentrated recreational boating was mapped using new data collected from two surveys of recreational boaters conducted in 2010 and 2012 and from a 2013 survey of expert boaters. The updated data resulted in a revision of the recreational boating spatial representation.
Fishing	Addressed by the Fisheries Work Group	<i>Areas of existing water-dependent uses: concentrated recreational fishing</i> (Volume 1 Figure 17) Volume 2 (Chapter 6; Concentrated recreational fishing water-dependent use areas of the 2015 ocean plan and the 2009 ocean plan Figure 28)
Marine beaches		Volume 2 (Chapter 6; Marine public and semi-public beaches in MA Figure 32)
Diving	In absence of a comprehensive inventory of diving locations, the “exempted sites” list compiled by NOAA MPAs was provided by BUAR to use as proxy for dive sites until better data become available.	Volume 2 (Chapter 6; “Exempted Sites” for public access and use Figure 27).
Wildlife viewing	Whale watching	Volume 2 (Chapter 6; Wildlife viewing locations reported by recreational boaters in 2012 Figure 33)
Public access infrastructure	See Boating: Ancillary (above)	Volume 2 (Chapter 6; Coastal boat ramps, marinas, and mooring fields in Massachusetts Figure 31)
Land use and scenic landscape		Volume 2 (Chapter 6; Scenic landscape inventory 2012 Figure 34)
Cultural Heritage		
Submerged paleocultural landscapes	Archaeologically sensitive submerged geological landforms previously exposed during lower sea-levels and available for human habitation, and the	Volume 2 (Chapter 5; Sensitivity map depicting Massachusetts reported vessels lost as recorded by nearest town (1640s to present)) (Figure 25).

	ancient Native cultural and archaeological sites located within them.	
Tribal use and access		Tribal engagement memo developed as part of the CRWG report.
Shipwrecks	Updated to include publicly-available location data incorporated into the hard/complex seafloor data layer and subject to the same siting and management standards.	<i>Special, sensitive, or unique resource: Hard/complex seafloor.</i> Volume 1 Figure 12. 2015: This SSU captures seabed characterized as hard seafloor, complex seafloor, artificial reefs, biogenic reefs, or shipwrecks and obstructions.

2.1 RECREATIONAL USES

The CRWG discussed the existing uses depicted in the 2015 ocean plan and the baseline assessment. Most recreational uses take place outside the planning boundary, which starts approximately 1,500 feet from MHW and excludes most harbors and embayments. However, nearshore and coastal activities often have direct and indirect impacts on resources and activities within the planning area. Conversely certain uses and activities in the planning area may affect, or are dependent on, nearshore and coastal resources and uses. Chapter 6 of the Baseline Assessment includes a comprehensive description of recreational uses in Massachusetts state waters. This Chapter will be revised as part of the baseline assessment review to include changes and trends over the last five years.

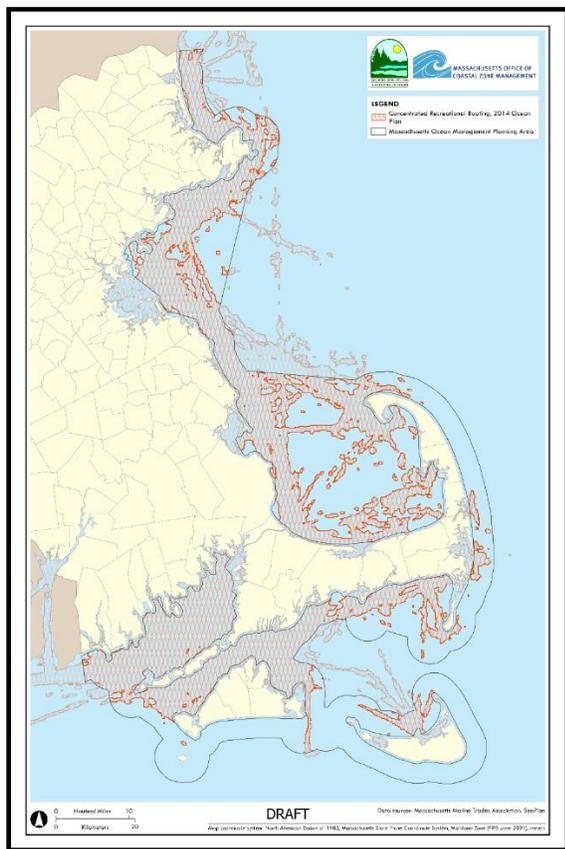
Recreational boating

The 2015 ocean plan included a water-dependent use map for recreational boating. Spatial data were gathered from two surveys of recreational boaters using motorized vessels conducted in 2010¹ and 2012², as well as a more limited survey of 2013 expert recreational boaters. The datasets were analyzed to include the areas with the highest concentration of boaters as hotspots for the development of the Water Dependent Use: Concentrated Recreational Boating map in the 2015 ocean plan (Volume 1 Figure 20, shown as Figure 2.1 in this report). Additional information on recreational boating including non-motorized boating, races, and location of infrastructure related to boating such as marinas and mooring fields was captured in the baseline assessment. The baseline assessment will be updated based on the availability of updated data on races and associated event. The information in the baseline assessment was mainly provided by Massachusetts Marine Trade Association and the Massachusetts Boating and Yacht Clubs Association.

¹ 2010 Massachusetts Recreational Boaters Survey
https://scholarworks.umb.edu/cgi/viewcontent.cgi?article=1000&context=uhi_pubs

² 2012 Northeast Recreational Boater Survey: A Socioeconomic Spatial Characterization of Recreational Boating in the Coastal and Ocean Waters of the Northeast U.S.
<https://www.openchannels.org/sites/default/files/literature/2012%20Northeast%20Recreational%20Boater%20Survey.pdf>

No recreational boating survey has been conducted since 2015 and therefore CRWG concluded that the water-dependent use layer for recreational boating will not change, i.e. the map in Figure 2.1 will be used in the 2021 ocean plan.



Recreational data for the Northeast Ocean Data Portal include about 20 recreational activities and some of these data are going to be updated in the short-term. CRWG will work with the Portal team to examine, and if feasible incorporate, any new data on recreational boating sectors (motorized and non-motorized) that may be identified for the portal into the updated ocean plan.

Figure 2.1. Water Dependent Use: Concentrated Recreational Boating (2015 ocean plan Volume 1 Figure 20)

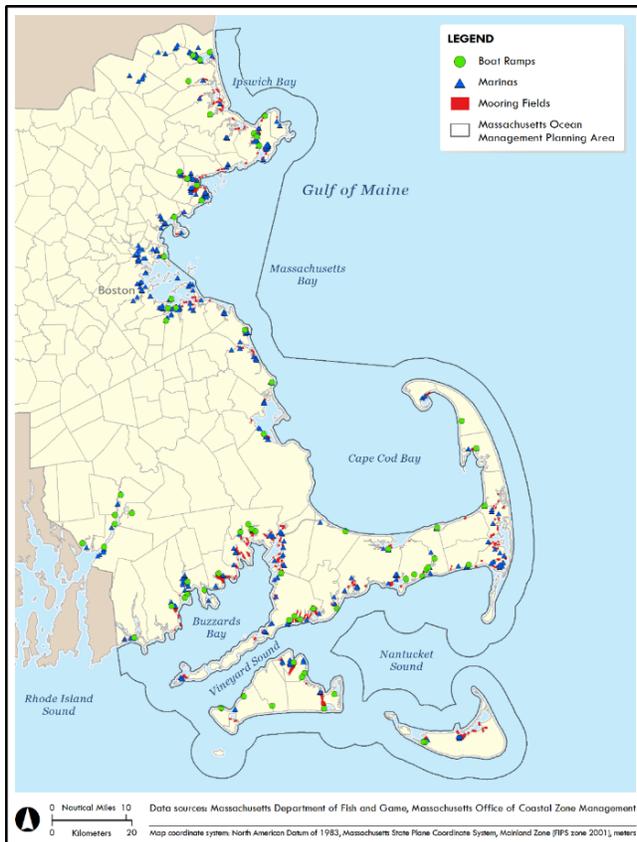
Recommendations for the 2021 ocean plan:

- (1) Data changes: Keep the map of concentrations of water-dependent use area: concentrated recreational boating unchanged for the next ocean plan (Volume 1, Figure 20 shown as Figure 4.1 in this report).
- (2) Data changes: Keep the concentrated recreational boating map (Volume 2, Figure 30) unchanged for the next baseline assessment.
- (3) Data changes: Coordinate with the Northeast Ocean Data Portal to use any recreational boating data that may be gathered for Massachusetts and beyond. This is especially important in view of the potential for renewable energy in the Gulf of Maine being explored in the coming years. Importantly, collect ancillary information that may inform the water-dependent uses and related activities.

Public Access

Chapter 6 of the 2015 baseline assessment provides detailed on recreational vessels registered in Massachusetts and on ancillary structures including public and private marinas, mooring fields, boat

ramps and related infrastructure. In 2018, the MA Office of Coastal Zone Management (CZM) developed an online coast guide³ that includes location of boat ramps, beaches, and other public access points in Massachusetts. The data from the coast guide will be used to update the data for the 2021 ocean plan and baseline assessment. Infrastructure such as boat ramps included in the MA coast guide will be used to update the map in the 2015 baseline assessment (Volume 2 Figure 31 shown as Figure 2.2 in this report) and will serve to indicate access points for the public. Sources of these data include Department of Fish and Game, DCR, CZM and Surfrider Foundation.



Although a popular recreational area for many users, marine beaches in Massachusetts are located outside of the planning area. The 2015 ocean plan includes a map developed from data from the Department of Public Health. The layer shows lines. It was recommended that using a layer with access points and infrastructure would be a better representation for ocean planning purposes. The recently published Massachusetts coast guide provides spatial information on marine public beaches in Massachusetts. Figure 4.2 shows the proposed map depicting public access for the 2021 ocean plan.

Figure 2.2. Coastal boat ramps, marinas, and mooring fields in Massachusetts (2015 ocean plan Volume 2 Figure 31).

Recommendations for the 2021 ocean plan:

- (1) Data changes: Replace the 2015 baseline assessment map (Volume 2 Figure 31) with a map containing information from the online Massachusetts coast guide (Figure 4.2 in this report).
- (2) Data changes: Remove the map of public beaches used in the 2015 baseline assessment (Volume 2 Figure 32) as the information on ramps, marinas and moorings is more pertinent to spatial planning. Replace with Figure 4.2 in this report.
- (3) Science and Data Priority: Examine recent inventory of mooring fields, marinas and boat slips to update public access map.

³ Coast Guide Online

<https://mass-eoeea.maps.arcgis.com/apps/MapSeries/index.html?appid=35ba833bdc704d49b71a71c511224eb6>

- (4) Science and data priority: Incorporate historic right-of-ways in the Massachusetts coast guide based on information provided by tribes.

Recreational fishing

Recreational fishing is being addressed by the Fisheries Work Group. A detailed description of how this recreational water-dependent use will be addressed in the ocean plan review and update as well as any associated recommendations will be provided in the Fisheries Work Group report. In brief, the Recreational Fishing Advisory Group discussed the existing Water Dependent Use:

Concentrated Recreational Fishing map in the 2015 ocean plan (Volume 1 Figure 17). The data for the map were collected from a survey of 25 expert recreational fishermen who identified hotspots in Massachusetts waters. The Advisory Group recommended that a better survey is needed to collect more statistically robust data and until that is available, the existing map will be retained in the 2021 ocean plan. The 2015 map will be included without changes in the 2021 ocean plan.

Recommendations:

- (1) Data changes: Retain map from the 2015 ocean plan (Volume 1 Figure 17) for Water Dependent Use: Concentrated Recreational Fishing.
- (2) Science and data priority: Develop a comprehensive survey to gather spatial data of recreational fishing hotspots, including by species, for the next ocean plan.

Whale Watching

Whale watching forms a significant component of the coastal and marine tourism and recreation industry in Massachusetts. The 2015 ocean plan incorporated data from the 2012 and 2015 recreational boating surveys which provided information on activities conducted by recreational boaters, including wildlife viewing. At the same time, data for the commercial aspect of whale watching are provided by the industry that operates out of Newburyport, Gloucester, Boston, Plymouth, Hyannis and Provincetown and fans out to different locations in offshore waters that serve as hotspots for marine mammals. Examples include Stellwagen Bank National Marine Sanctuary and Jeffrey's Ledge. Most whale watching data are related to whale watching as a commercial activity. The CRWG and the Science Advisory Council recommended that a method to update the data while making sure that the recreational aspect of this activity is captured, is essential.



AIS datasets include data by year and vessels size. As of 2016, all whale watch vessels over 65 feet are required to carry AIS. Figure 3A below shows passenger vessel AIS data for 2016 and 2017 for waters of Ipswich, Massachusetts, and Cape Cod Bays. The highest density data (shown in green, yellow, and red tracks) reveals the repeated tracks of whale watch vessels and thus the main hotspots for whale watching which are the northwest, southwest, and southeast corners of Stellwagen Bank and off of Race Point, Cape Cod. The work group recommended that using AIS data to information provide on whale watching trips but also figure out an approach to describe and quantify the recreational component of this activity.

Figure 2.3. Wildlife Viewing Locations Reported by Recreational Boaters (2015 ocean plan Volume 2 Figure 33.).

CRWG is working with developers of the Northeast Ocean Data Portal to gather updated data from the whale watching community that may be used to develop a map of whale watch hotspots in

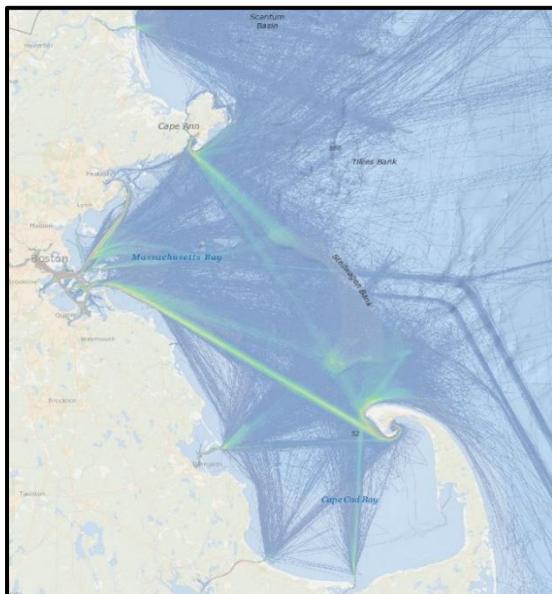


Figure 2.4. AIS data for passenger vessels 2016-2017 (tracks show whale watch

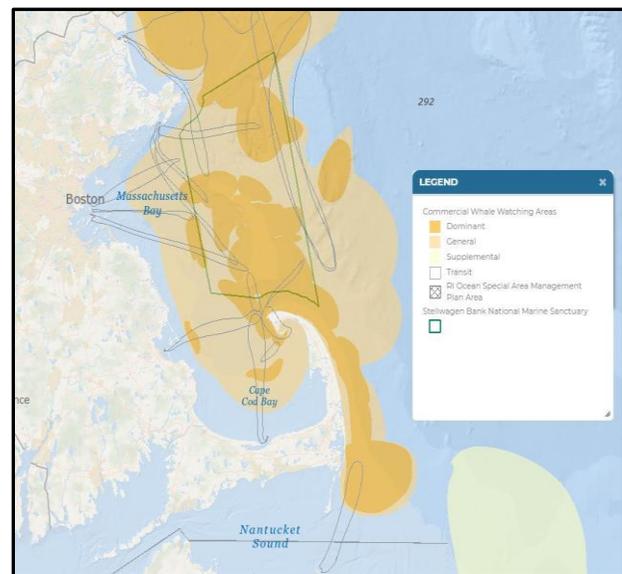


Figure 2.5. Data for whale watch tracks 2010-2014 (Source: Northeast ocean data

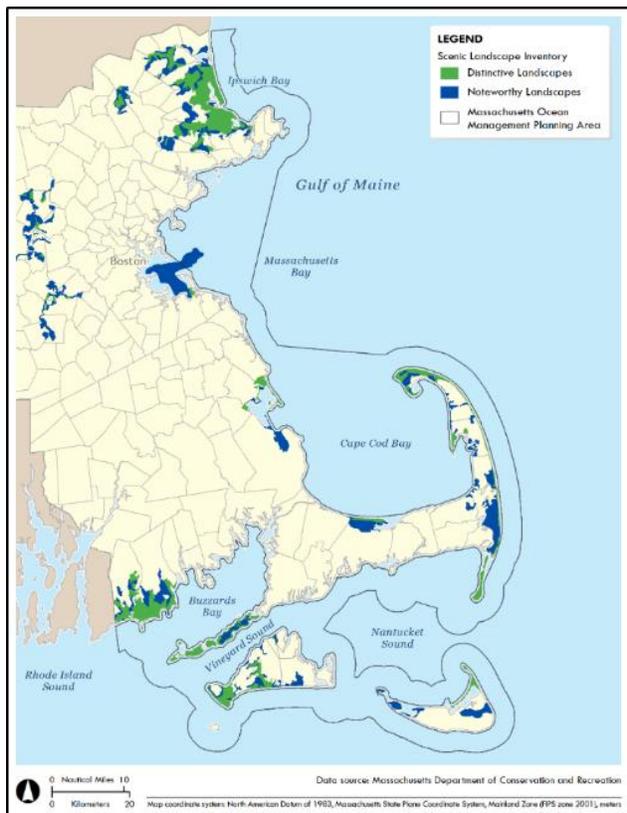
Massachusetts. The current whale watching data layer in the Portal is a participatory-GIS layer and the proposal is to add AIS data for whale watching vessels and create activity layers using those or a combination of AIS and participatory methods. The updated layer was not available at the time this report was written but if a new layer is available in 2021, it will be incorporated in the Baseline

Assessment. If such a layer is created, CRWG suggested examining whether there is a relationship between whale watch vessel hotspots and the whale SSUs as updated by the Habitat Work Group.

Recommendations:

- (1) Work with Northeast Data Portal team to integrate new data as these become available from the whale watching industry that may be used to develop a spatial map representing hotspots for the activity.

Land use/Scenic Landscape



The scenic landscape inventory developed by DCR was used to develop the map in the 2015 Baseline Assessment (Volume 2 Figure 34). The map showed distinctive areas and noteworthy landscapes. DCR indicated that the inventory has not been updated since the 2015 ocean plan was published.

Recommendations:

- (1) Data change: Develop a land use/land cover map that is more comprehensive. This will replace the map in the 2015 baseline assessment (Volume 2 Figure 34). This proposed map is included in Figure 5.4.

Figure 2.6. Scenic landscape inventory 2012. Distinctive areas have the highest scenic quality, while noteworthy landscapes are of a lesser, but important, visual quality (2015 ocean plan Volume 2 Figure 34).

Recreational Diving

Although there is no comprehensive database on recreational diving in Massachusetts, SCUBA diving often takes place in areas offering opportunity for viewing shipwreck and recreational extraction of lobsters and scallops. In addition to its importance as a recreational activity, diving has been instrumental in providing information on submerged wrecks and other historic artifacts, fish censuses and invasive species monitoring.

The 2015 ocean plan includes a list of sites associated with underwater archaeological resources that because of their location, condition, history, or resource value are best left in the public domain. These sites, drawn from a list of Marine Protected Areas compiled by NOAA for U.S. waters, are



designated as “exempted sites” and there are 40 of them in Massachusetts. These “exempted sites” refer to underwater archaeological resource sites that due to their location, condition, history, or resource value are intended for the continued enjoyment of recreational diving as a water-dependent human use.

Recreational diving activities at these locations do not require a permit but any major disruption is prohibited (MGL c.6.s.180) and c.91.s.63).

Figure 2.7. Shipwreck sites designated in 1985 as “Exempted Sites” for public access and use (2015 ocean plan Volume 2 Figure 27).

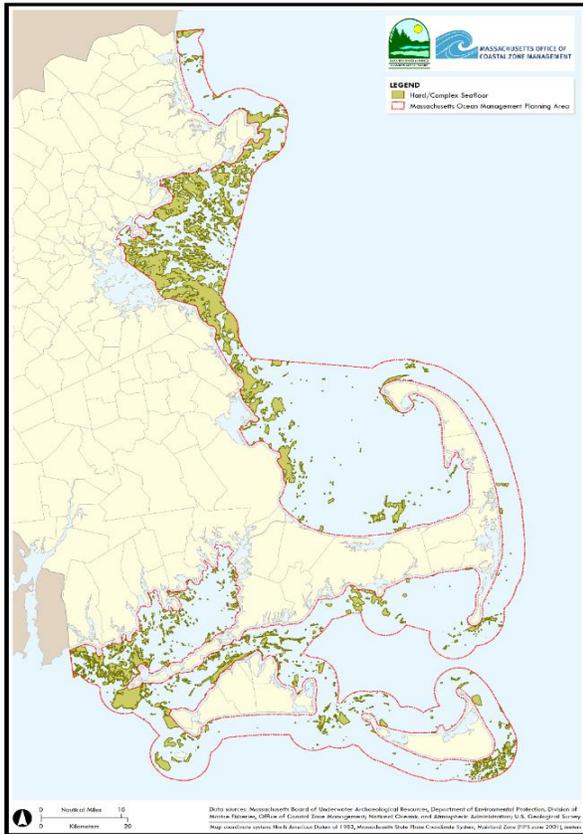
A map of these sites was incorporated in the 2015 baseline assessment as a proxy for diving sites (Volume 2 Figure 27 shown as Figure 2.7 in this report). Until better data are available, this map will be retained in the baseline assessment. A science priority that describes the need to develop a comprehensive inventory of dive sites based on information from diving schools and clubs in Massachusetts will be compiled possibly via a detailed survey of the diving community.

Recommendations:

- (1) Retain map in 2015 ocean plan (Volume 2 Figure 27) until better data are available.
- (1) Science and data priority: Conduct a survey of the diving community to collect data on diving hotspots to create a spatial map. Additional data on number of visits as well as number of visitors will be collected. Spatial data may then be used to develop a water-dependent use for recreational diving and also to enhance the information for the shipwrecks SSU.

2.2 CULTURAL HERITAGE

The CRWG discussed the three main elements of the cultural aspect of ocean planning: traditional and current tribal access and use; submerged paleocultural landscapes; and shipwrecks. Chapter 5 of the 2015 Baseline Assessment provided an overview of these elements and stresses the importance of giving due consideration to the submerged maritime legacy within Massachusetts waters. This chapter will be revised to incorporate new data available since 2015.



Shipwrecks

CZM updated and expanded the reported shipwreck location data included in the hard/complex seafloor SSU in the 2015 ocean plan to include not only NOAA AWOIS and the BUAR's Exempted Sites datasets, but also data from several additional publicly-available sources. The map on the left shows the SSU: Hard/Complex Seafloor in the 2015 ocean plan (Volume 1 Figure 12). The SSU will be updated with newer data based on input from the Sediment and Geology Work Group and it is anticipated that the areal extent of the SSU increase by 2%. The shipwreck locations remain unchanged.

Figure 2.8. Special, Sensitive or Unique Resource: Hard/Complex Seafloor (2015 ocean plan Volume 1 Figure 12). Includes selected shipwreck data.

As in the case of the 2015 ocean plan, the updated shipwreck location data do not represent a comprehensive inventory of shipwrecks, but rather only include shipwreck locations that are publicly available from multiple sources. The locational information associated with these data is often imprecise and temporally biased towards documenting steel-hulled shipwrecks found along major travel routes that were listed in the archaeological record more recently (i.e., post-1900). Furthermore, neither the location data and their relative degree of precision, nor their resource descriptions have been confirmed through on-site inspections by BUAR or CZM.

Data collected by USGS for CZM may become increasingly useful as a potential source of information on shipwrecks. However, although the data acquired may be at a resolution suitable for broad-based seafloor mapping, it may not be good enough for shipwreck identification, so that some shipwrecks are not going to be visible in the data.

CRWG suggested that the diving community can collect valuable data on shipwrecks and historical artifacts that they visit regularly and/or new discoveries that they may encounter. An approach to develop an inventory of available shipwreck and dive site information from the technical recreational diving sector will be developed that will allow data to be added to the shipwrecks database and recreational dive-site mapping.

Recommendations:

- (2) Data change: The 2021 ocean plan should include the new publicly available shipwreck locations. The CRWG recommends establishing a shipwrecks SSU. Since only XX% of the shipwrecks constitute areas of hard/complex bottom (e.g., older wooden shipwrecks that are buried), this SSU will be protected more specifically by siting and management standards.
- (3) Data change: The updated shipwreck data should be incorporated into a revised sensitivity map to replace Volume 2 Figure 26.
- (4) Science and data priority: Coordinate with USGS to explore the possibility of synthesizing legacy data and acquired new data at resolution allowing confirmation of shipwreck locations in database and identification of “new” shipwrecks.
- (5) Science and data priority: Review 2020 BUAR-CZM shipwreck database; eliminate duplicate entries and assess locational accuracy.

Submerged paleocultural landscapes

In 2019, the Bureau of Energy Management (BOEM) and the University of Rhode Island (URI) completed a multiyear submerged paleocultural landscapes research project that included development of a regional model as a study deliverable. In this model, a regional seafloor sedimentary deposit mapped by the USGS as “Qfe” (Quaternary fluvial estuarine) was identified by URI as potentially archaeologically sensitive for containing submerged paleocultural landscapes and ancient Native archaeological deposits.

Over the past decade, work in Buzzards Bay and Vineyard Sound by USGS also uncovered the possibility to detect and re-create now submerged and buried ancient post-glacial landscapes. Using sub-bottom profiling, images of sediment layers and bedrock beneath the seafloor were obtained. From these geophysical data USGS was able to identify fluvial channels, lakes, shorelines, and other geomorphological features, the data support the Qfe research, the influence of sea level change and sediment volume on coastal evolution, and efforts to understand the type, distribution, and quality of subtidal marine habitats in coastal Massachusetts.

Recommendations:

- (1) Science and data priority: Compile and synthesize USGS seafloor mapping and legacy data to identify potentially archaeologically sensitive areas as priority research areas
- (2) Science and data priority: Obtain and synthesize Massachusetts Historical Commission’s MACRIS data and develop a coastal archaeological site sensitivity map for pre-contact cultural resources. Integrate this sensitivity map with CZM’s coastal erosion mapping to identify coastal areas where pre-contact cultural resources are most at risk of being destroyed by erosion associated with sea level rise.

Heritage infrastructure, tribal use and access

CZM’s online coast guide includes about 2000 access points across coastal Massachusetts. These include mostly ramps and other ways to access the water especially for activities such as fishing,

navigation and recreation. CRWG discussed in depth the lack of information on myriad historical right-of-ways (ROWs) traditionally (and currently in some cases) used by tribes to access water for reasons of sustenance. Some of these pathways are little known, others have been lost, and still others have been prohibited access by private landowners. These sites are important for cultural and historic value as well as practical importance of some of these sites.

The CRWG discussed the results of various climate change models which indicate that impacts to shoreline by sea level rise as well as erosion from increased storms may drastically affect coastal cultural resources. In face of these threats the group recommended the need for further discussions on types of resources at risk, their locations, and what the anticipated impacts may be. Further discussion on the needs and capabilities to assess these resources and address anticipated impacts are needed. This would constitute a long-term science priority.

Recommendations:

- (1) Science and data priority: Work with MA Commission on Indian Affairs and MA Tribes to develop maps of Traditional Tribal ROWs and current activity (i.e., fishing and hunting) areas. These traditional and current Tribal ROWs should be acknowledged and considered during future coastal and ocean spatial planning. Incorporate the ROWs in the Massachusetts coast guide with the help of CZM staff.

CHAPTER 4: MAPS

Proposed draft maps to be included in the 2021 ocean plan. These maps together with the recommendations were presented to the SAC and feedback from the SAC was addressed.

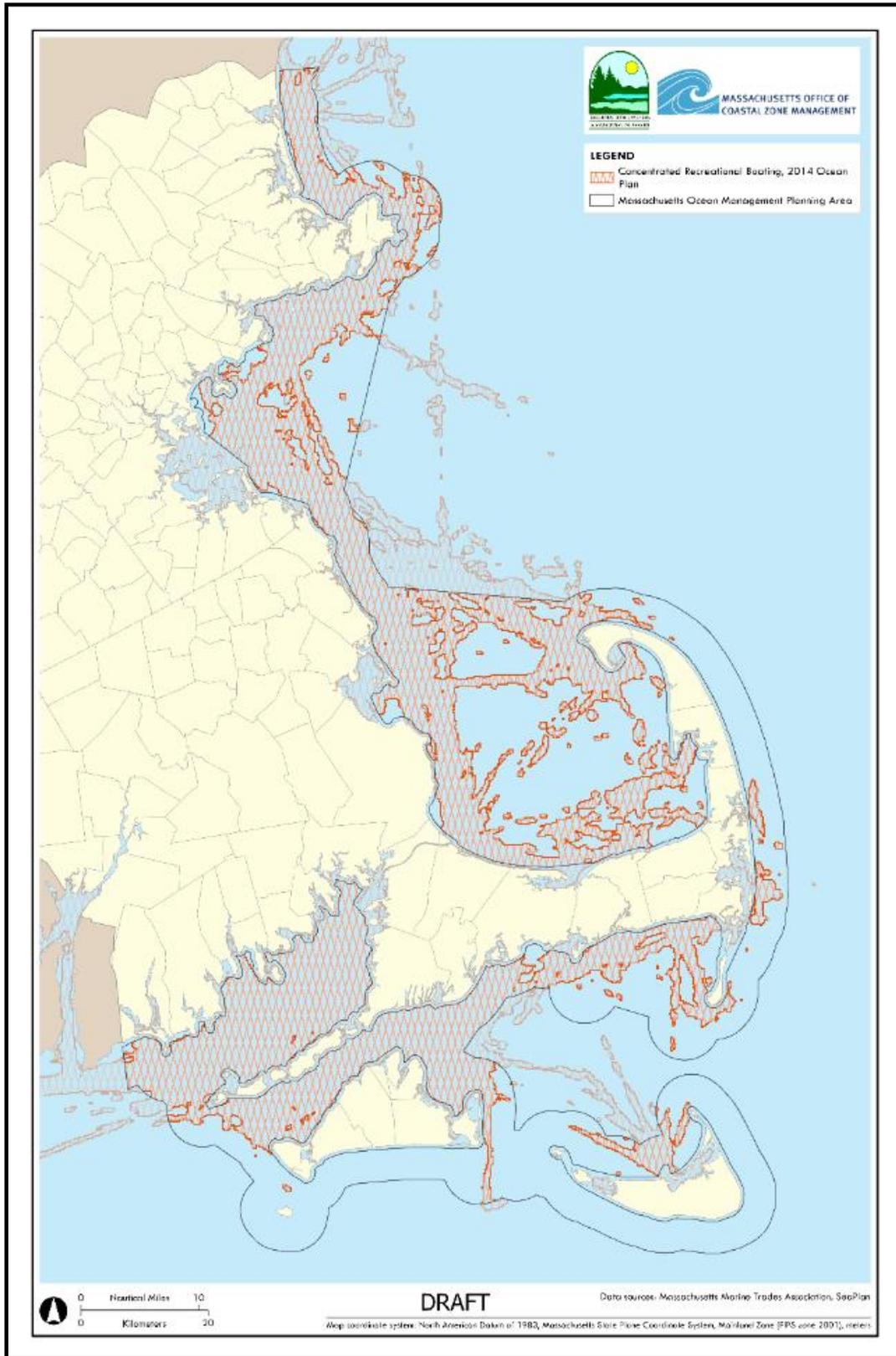


Figure 4.1. Water dependent use: Concentrated Recreational Boating. Map is from the 2015 ocean plan and will be included unchanged in the 2021 ocean

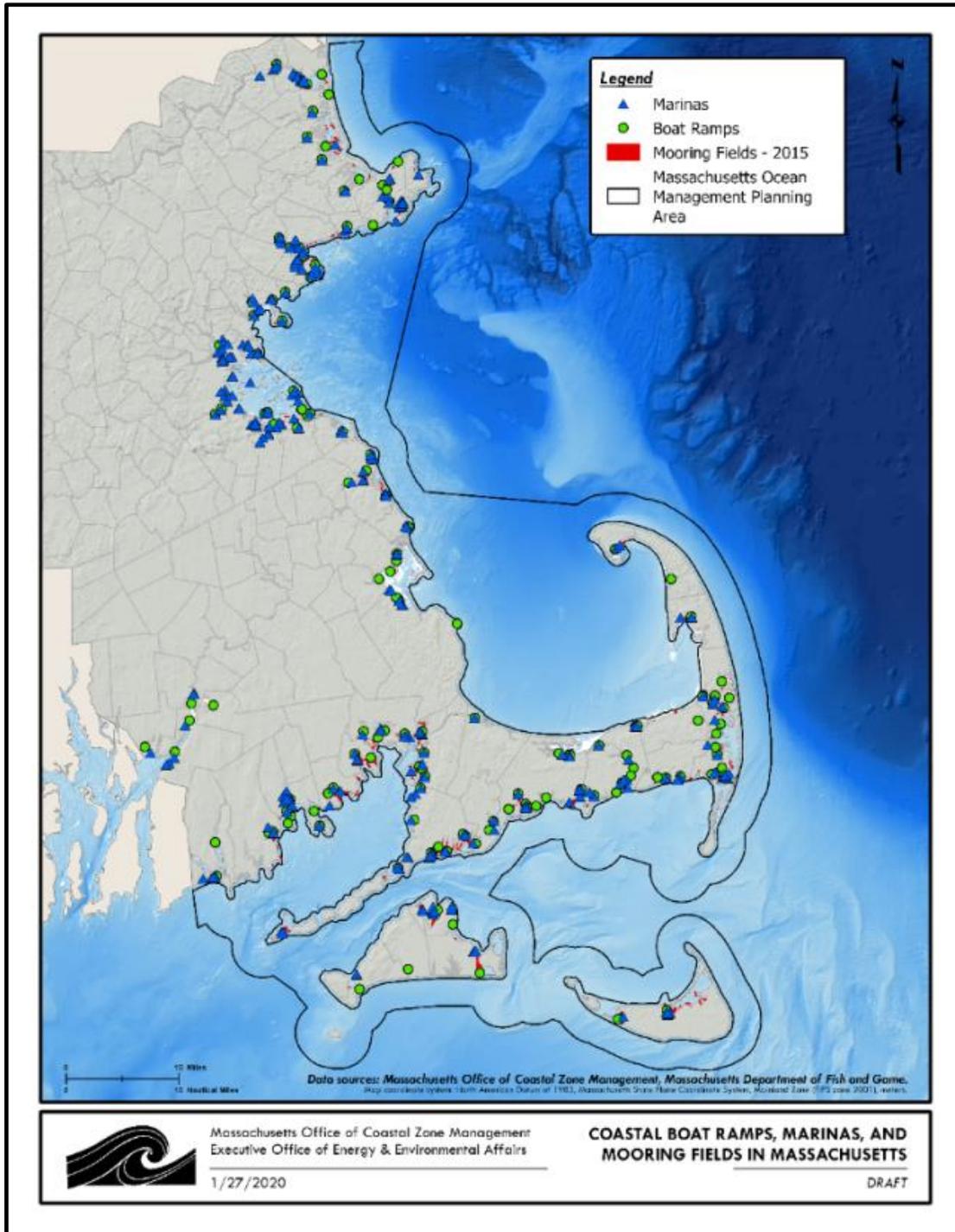


Figure 4.2. Map of public access infrastructure. This will replace the map in the 2015 ocean plan.

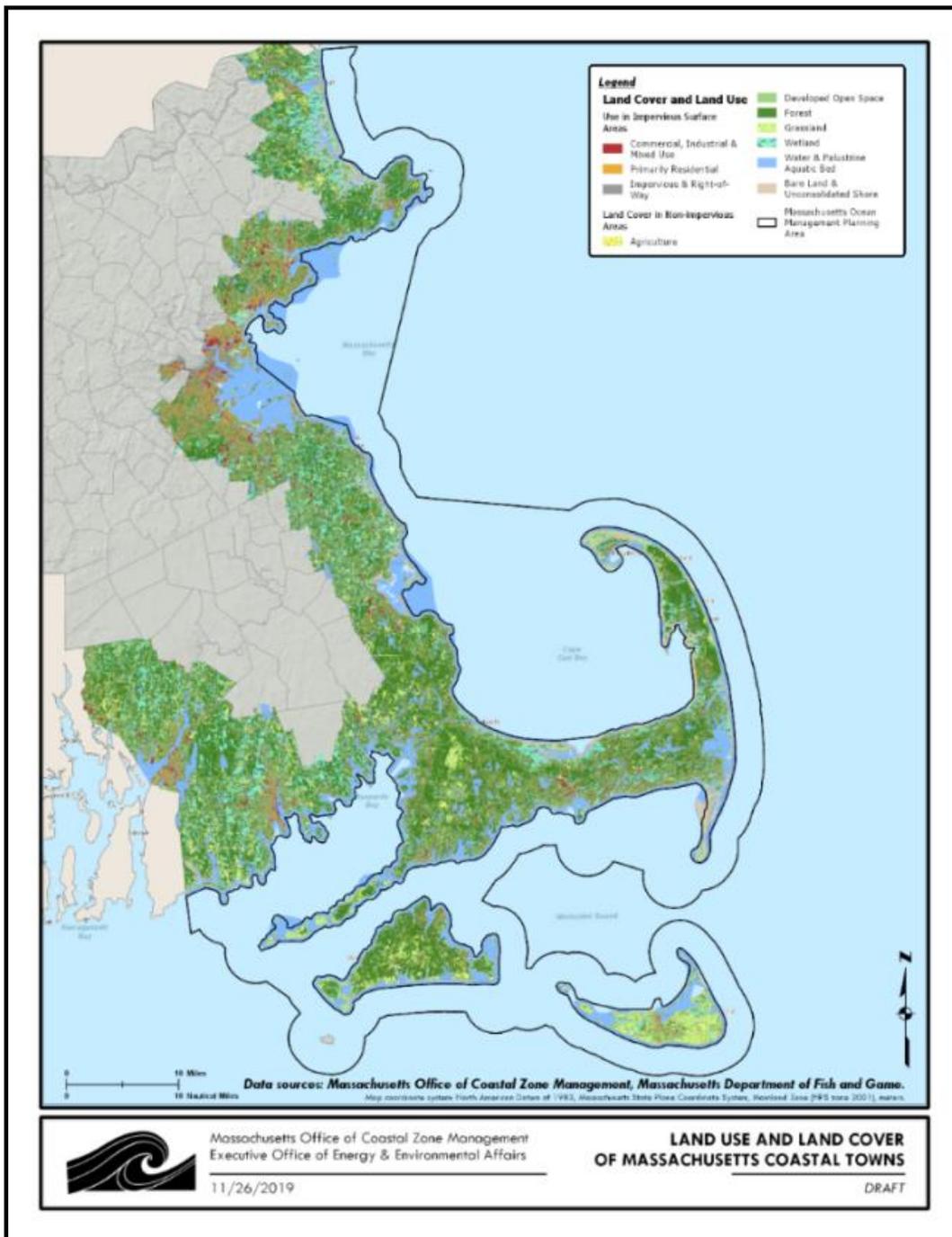


Figure 4.3. Map of land use and land cover. This will replace the map in the 2015 ocean plan.

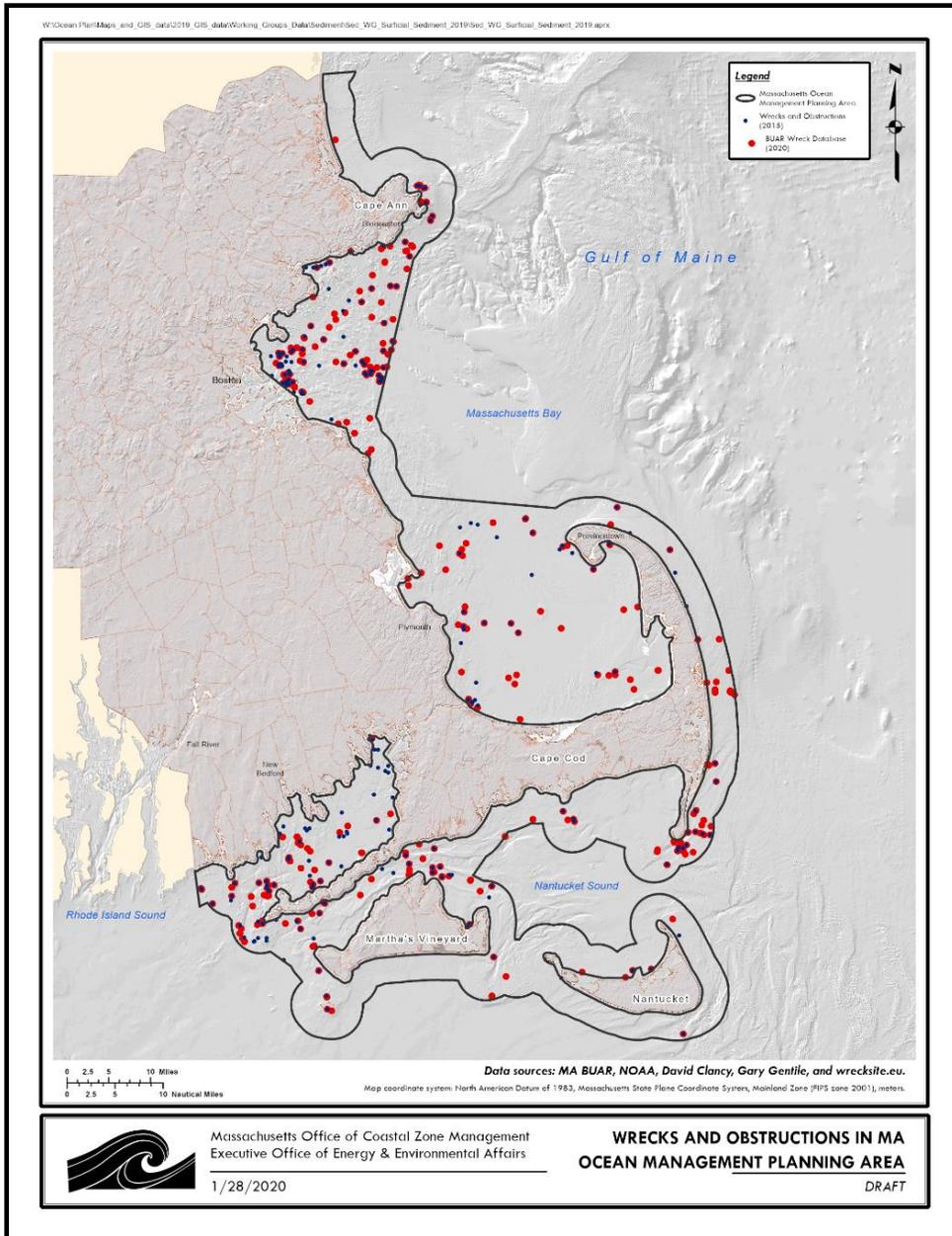


Figure 4.4. Map of wrecks and obstructions in MA. This map is the first step at extracting the wrecks from the SSU: Hard/complex seafloor layer and eventually leading to a shipwreck SSU.