Eelgrass Beds
Northeast United States
November 29, 2017

Prepared for:
Northeast Regional Ocean Council (NROC)
www.northeastoceandata.org

Updated by:
Emily Shumchenia
Northeast Ocean Data Portal Working Group

from original July 1, 2014 version by:
Kate Longley
SeaPlan

1. INTRODUCTION

Eelgrass (*Zostera marina*) beds are critical wetlands components of shallow coastal ecosystems throughout the region. Eelgrass beds provide food and cover for a great variety of commercially and recreationally important fauna and their prey. Eelgrass and other seagrasses are often referred to as "Submerged Aquatic Vegetation" or SAV. This distinguishes them from algae, which are not classified as "plants" by biologists (rather they are often placed in the kingdom protista), and distinguishes them from the "emergent" saltwater plants found in salt marshes. In addition to the term SAV, some coastal managers use the term SRV or submerged rooted vegetation. EelgrassBeds was created from five separate datasets for the states of Connecticut, Rhode Island, Massachusetts, New Hampshire, and Maine. Where possible, polygon datasets depicting the most recent eelgrass surveys were used. Attributes with common themes for each dataset were integrated in order to better represent eelgrass density and year sampled. The data user is encouraged to read this and the metadata of each individual state's data carefully, as geometry, attribute details, and timeliness are not necessarily consistent among datasets used to develop this layer. Details of each state's data source are described in the data processing section.

2. PURPOSE

The purpose of mapping the distribution of eelgrass (Submerged Aquatic Vegetation - SAV) is to determine areas where eelgrass is present throughout coastal New England waters in order to support coastal and ocean planning.

3. SOURCES AND AUTHORITIES

- Maine Department of Marine Resources, Bureau of Resource Management
- Maine Office of GIS
- University of New Hampshire
- New Hampshire Department of Environmental Services

- NH GRANIT (New Hampshire Geographically Referenced Analysis and Information Transfer System)
- Massachusetts Department of Environmental Protection
- MassGIS
- Rhode Island Eelgrass Task Force
- Virginia Tech University/US Fish and Wildlife Inventory, National Wetlands Inventory Program
- Connecticut Department of Energy and Environmental Protection

4. DATABASE DESIGN AND CONTENT

Native storage format:

Feature types:
Eelgrass bed polygons

Data Dictionary:

Line	Name	Definition	Type	Size
1	OBJECTID	Uniquely identifies a feature	OBJECTID	*
2	Shape	Geometric representation of the feature	geometry	*
3	year	Year in which the eelgrass bed was documented	double	*
4	density	Estimated density of the eelgrass coverage in each eelgrass bed	text	50
5	state	State in which the eelgrass bed is located	text	2
6	areaHectares	Area of the eelgrass bed measured in hectares	double	*
7	areaAcres	Area of the eelgrass bed measured in acres	double	*
8	shape_Length	Length of polygon circumference in spherical coordinates	double	*
9	shape_Area	Area of polygon in spherical coordinates	double	*

Feature Class Name: EelgrassBeds

Total Number of Unique Features: 6749

Dataset Status: Complete

5. SPATIAL REPRESENTATION

Geometry Type: vector polygon
Reference System: GCS_North_American_1983
Horizontal Datum: North American Datum 1983
Ellipsoid: Geodetic Reference System 1980

XY Resolution: XY Scale is .000000001
Tolerance: 0.0000000089831583

Geographic extent: -72.48 to -66.97, 41.15 to 45.10

IS0 19115 Topic Category: environment, oceans, biota

Place Names: Place Names:
Atlantic Ocean, Beverly Harbor, Block Island, Blue Hill Bay, Boston Harbor, Broad Cove, Broad Sound, Buzzards Bay, Cape Cod Bay, Cape Neddick Harbor, Casco Bay, Chatham Harbor, Cobscook Bay, Cohasset Harbor, Connecticut, Dennys Bay, Duxbury Bay, Dyer Bay, Englishman Bay, Falmouth Harbor, Fishers Island Sound, Frenchman Bay, Gloucester Harbor, Goosefare Bay, Gouldsboro Bay, Great Bay, Gulf of Maine, Hingham Bay, Hull Bay, Ipswich Bay, Johns Bay, Little Narragansett Bay, Little Bay, Little Kennebec Bay, Little Machias Bay, Long Island Sound, Machias Bay, Maine, Manchester Bay, Massachusetts, Muscongus Bay, Nantucket Harbor, Nantucket Sound, Nauset Harbor, Narragansett Bay, Narraguagus Bay, Narrow River, New Hampshire, Ninigret Pond, Oarweed Cove, Passamaquoddy Bay, Penobscot Bay, Pigeon Hill Bay, Piscataqua River, Pleasant Bay, Plymouth Bay, Plymouth Harbor, Portsmouth Harbor, , Point Judith Pond, Portsmouth Harbor, Potter Pond, Prospect Harbor, Quonochontaug Pond, Rhode Island, Saco Bay, Sakonnet River, Salem Sound, Sandy Bay, Scituate Harbor, Seal Cove, Sheepscot Bay, Spinney Creek, Vineyard Sound, Westport River, York Harbor

Recommended Cartographic Properties:
(Using ArcGIS ArcMap nomenclature)

Simple Fill Symbol: .4 point, outline color: same as fill, color model: HSV 167-100-66
Scale range for optimal visualization: 5,000 to 3,000,000

6. DATA PROCESSING

A description of each states' datasets and the subsequent processing are described below.

Maine – Maine's "Eelgrass2010" dataset contained 5179 polygon features depicting eelgrass sites. These sites were documented through low-altitude aerial photographic surveys conducted between 2001 and 2010 along sections of the Maine coastline. Maine's "Eelgrass Beds 2013" contained 1056 polygons depicting updated data on Casco Bay eelgrass areas. These datasets were produced by Maine Department of Marine Resources (MEDMR) through on-screen digitization of eelgrass stands that also documented percent cover using a four category scale. Verification was carried out through various methods, including by foot, by boat and by plane. Casco Bay eelgrass data from the 2010 dataset were eliminated and replaced with the 2013 data. For inclusion in the regional dataset, the coded density values were converted to percent ranges specified in the dataset's metadata. Polygons containing a density value of 0 were described in the metadata as interior polygons containing no eelgrass. These polygons were eliminated. The location field in the original dataset was eliminated due to the lack of corresponding fields' in the other states' datasets.

Full documentation for Maine's Eelgrass2010 and Eelgrass Beds 2013 datasets can be found [here](#) and [here](#).

New Hampshire – New Hampshire's "Great Bay Estuary Eelgrass 2015" dataset contained 153 polygon features depicting eelgrass sites. These sites were documented through low-altitude aerial photographic surveys in the Great Bay Estuary in the late summer of 2015 as part of a yearly survey intended to track changes over time. The dataset was produced by New Hampshire Department of Environmental Services (NHDES) through on-screen digitization that also includes a qualitative assessment of percent cover. Ground-truthing of a subset of the mapped sites was done from a boat-based platform. For inclusion in the regional dataset, the qualitative codes used to describe percent cover were converted to percent ranges specified in the dataset's metadata.

Full documentation for New Hampshire's Great Bay Estuary Eelgrass, 2015 dataset can be found [here](#).

Massachusetts – Massachusetts eelgrass sites were compiled from five separate datasets containing data from five different survey years. Data from 2010, 2012, and 2013 together cover the entire Massachusetts coastline. The 2010 dataset contained 181 polygons depicting submerged aquatic vegetation (SAV) documented during a survey of the Nantucket Sound side of Cape Cod, Woods Hole to Chatham, including Pleasant Bay, and selected embayments of Buzzards Bay and Martha's Vineyard. The 2012 dataset contained 164 polygons depicting SAV documented during a survey of the Massachusetts Bay and Cape Cod Bay coastline from Ipswich Bay to Provincetown. The 2013 dataset contained 249 polygons depicting SAV documented during a survey of Buzzards Bay, the Elizabeth Islands, Martha's Vineyard and Nantucket. Data collected in Duxbury Bay, Kingston Bay, and Plymouth Bay in 2014 and in Salem Sound in 2016 replaced data collected in those embayments in 2012. All sites were documented through low-altitude aerial photographic surveys. Digitization of SAV sites was done through photointerpretation. Ground-truthing of the mapped sites was conducted using boats. The 2014 and 2016 data collection was conducted using acoustic methods. Source data distinguishes between eelgrass (*Zostera marina*) and widgeon grass (*Ruppia maritima*). For the purpose of this dataset, those sites which contained widgeon grass were removed.

Full documentation for Massachusetts' eelgrass datasets can be found [here](#).

Rhode Island – Rhode Island's "2016 Submerged Aquatic Vegetation" dataset contained 187 polygon features depicting eelgrass and other SAV, including widgeon grass. These data were developed by the Rhode Island Eelgrass Mapping Task Force and was provided by the University of Rhode Island Environmental Data Center. Polygons of submerged aquatic vegetation (SAV) were delineated from photo signatures identified on 4 band orthophotography. Ground-truthing was done after initial delineations where completed. Ground-truthing was done by boat using underwater video equipment and GPS. Final delineation and GIS database development was done using ground truth information. Before inclusion in the regional database, this dataset was edited such that only sites that contained

eelgrass were included. Additional attribute fields, including those describing ground-truthing status and methodology and site locations were eliminated due to lack of corresponding fields in the majority of the other states' datasets.

More information on eelgrass in Rhode Island can be found here.

Connecticut – Connecticut's "Eelgrass Beds 2012 Poly" dataset contains 470 polygon features depicting eelgrass beds along the eastern end of Long Island Sound. These sites were delineated through low-altitude aerial photographic surveys flown on August 2, 2012 at low tide. The density of eelgrass at each site was described qualitatively using categories of low, medium, and high density. Before inclusion in the database, attribute fields containing information on field checking were removed due to a lack of corresponding information in the majority of the other states' datasets.

Full documentation for Connecticut's Eelgrass Beds 2012 Poly dataset can be found here.

New York – A statewide eelgrass dataset is not available at this time; however, some eelgrass beds on the North Fork of Long Island were documented as part of the eastern Long Island Sound survey described above and included in the dataset available from Connecticut Department of Energy and Environmental Protection.

Processing environment: ArcGIS 10.3.1, Windows 7 Professional, Intel Core i7 CPU

	Process Steps Description
1	Available shapefiles were obtained from each state and loaded into ArcGIS, and if necessary converted to the GCS North American 1983 coordinate system using the PROJECT tool
2	In selected states, polygons that delineated SAV areas that were not eelgrass were deleted in the editing environment (see above descriptions for each state)
3	In selected states, polygons that did not represent the most current information were deleted in the editing environment (see above description for each state)
4	In selected states, attributes which described density or percent cover were converted from their codes to more detailed descriptions of density, where possible, using the field calculator (see above description for each state)
5	Datasets from each state were combined using the MERGE tool to create the regional eelgrass feature class
6	The feature class was imported into a file geodatabase and domains were added to better characterize the fields Year and Density

7. QUALITY PROCESS

Attribute Accuracy: Original content was acquired from authoritative sources. Any attribute editing was informed by specific information in the metadata.

Logical Consistency: This dataset integrates eelgrass habitat polygon features from five separate sources. Common themes were identified across attribute fields that unify the datasets, and these were incorporated to provide consistency and efficient communication of

information. Once merged, data were unified by field calculations and feature values were expanded upon via attribute domains in order to consistently identify density of bed and year sampled.

Completeness: Data are based upon the most recent available eelgrass habitat GIS datasets available for coastal New England states. Not all records have complete information for each field due to the differences in sampling and recording programs for each state.

Positional Accuracy: May vary by state. The user should consult the metadata of each individual state for positional accuracy information.

Timeliness: This dataset is based on best available information as of November 29, 2017; however, the timeliness of the dataset varies by state. Due to the biological characteristics of eelgrass, the user should not assume that all sites are up to date, and should consult each state's metadata for more detailed information as to the timeliness of the data.

Use restrictions: Data are presented as is. Users are responsible for understanding the metadata prior to use.

Distribution Liability: All parties receiving these data must be informed of caveats and limitations.