

2007

Marine Invaders in the Northeast: Rapid Assessment Survey of non-native and native marine species of floating dock communities, July 2007

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**Marine Invaders in the Northeast: Rapid Assessment Survey of non-native and native marine species
of floating dock communities, July 2007.**

The 2007 Rapid Assessment Survey (RAS) began in Buzzards Bay, Massachusetts on July 24 and was completed in Rockland, Maine on July 30. Seventeen coastal sites in Massachusetts, New Hampshire and Maine were surveyed, twelve of which were located within four National Estuary Program (NEP) study areas. The following NEPs were included in the study: Buzzards Bay Estuary Program, Massachusetts; Massachusetts Bays Program, Massachusetts; Piscataqua Region Estuaries Partnership, New Hampshire; Casco Bay Estuary Partnership, Maine. In all, twenty-five non-native marine species were recorded. Sampling locations are listed below, from south to north. Each listing includes sampling date, time (usually one hour sampling per site), a brief site description and the non-native species found at each location.

1. Marine Biological Laboratory (MBL), Falmouth, Massachusetts

July 24, 2007 14:00 (<http://www.mbl.edu/>)

The Woods Hole Marine Biological Laboratory, located in the study area of the Buzzards Bay Estuary Program (BBP), features a small dock on Eel Pond. The pond is relatively small, with an estimated area of 486 square meters and a maximum depth of 5 meters. Eel Pond serves as a protected harbor for numerous boats and can be accessed only via a narrow waterway under the Water St. drawbridge. The 2007 RAS recorded thirty-five total species, seven of which were non-native. (Note: this site was sampled without the entire field team).

Ascidians

Asciella aspersa
Botrylloides violaceus
Botryllus schlosseri
Didemnum vexillum
Styela clava

Crustaceans

Carcinus maenas
Hemigrapsus sanguineus

2. Woods Hole Coast Guard (WHC). Falmouth, Massachusetts

July 24, 2007 14:30 (<http://www.uscg.mil/d1>)

This Coast Guard Station, opened in 1857, operates as a year-round marina maintaining aids to navigation and supporting marine safety, national defense and pollution control. Thirty-seven total species and eleven non-natives were found here during the 2007 RAS. (Note: this site was sampled without the entire field team).

Ascidians

Asciella aspersa
Botrylloides violaceus
Botryllus schlosseri
Didemnum vexillum
Styela clava

Crustaceans

Caprella mutica
Carcinus maenas
Hemigrapsus sanguineus
Ianiropsis sp

Worms

Janua (Dexiospira)
pagenstecheri

Algae

Codium fragile fragile

3. **Sandwich Marina, Sandwich, Massachusetts**

July 25, 2007 10:00 (<http://www.sandwichmarina.com/>)

Sandwich Marina, opened in 1989, is located within the north end of the Cape Cod Canal and is an important site for monitoring the northerly progression of non-native species into Massachusetts Bay via the canal. The marina features a floating dock system which includes 140 seasonal slips, 42 commercial slips and 24 transient slips. Thirteen non-native species were found here during the 2007 RAS. The total number of species found was ninety.

Ascidians

Asciidiella aspersa
Botrylloides violaceus
Botryllus schlosseri
Didemnum vexillum
Styela clava

Crustaceans

Carcinus maenas

Algae

Bonnemaisonia hamifera
Codium fragile fragile
Grateloupia turuturu
Neosiphonia harveyi

Bryozoans

Membranipora membranacea

Sponges

Halichondria bowerbanki

Anenome

Diadumene lineata

4. **Massachusetts Maritime Academy (MMA), Buzzards Bay, Massachusetts**

July 25, 2007 12:30 (<http://www.maritime.edu/>)

The Massachusetts Maritime Academy is located within the Buzzards Bay NEP study area at the southern end of the Cape Cod Canal. The academy's private docking area features one permanent floating dock of approximately 70 meters. Several vessels are docked there including the *USTS Kennedy* which frequently travels around the world for training exercises. There are also seasonal floating docks for smaller vessels used for teaching cadets. The 2007 RAS recorded ninety-five species including sixteen non-natives.

Ascidians

Asciidiella aspersa
Botrylloides violaceus
Botryllus schlosseri
Didemnum vexillum
Styela clava

Crustaceans

Caprella mutica
Carcinus maenas
Hemigrapsus sanguineus
Ianiropsis sp.

Worms

Janua (Dexiospira) pagenstecheri

Algae

Bonnemaisonia hamifera
Codium fragile fragile
Grateloupia turuturu
Neosiphonia harveyi

Bryozoans

Membranipora membranacea

Sponges

Halichondria bowerbanki

5. **The Marina at Rows Wharf (ROW), Boston, Massachusetts**

July 26, 2007 09:30 (<http://themarinaatroweswharf.com/>)

The Marina at Rows Wharf is located along the highly developed waterfront of Boston's inner harbor and is part of the Rows Wharf luxury hotel and condominium complex. The marina features many floating docks frequented by international boaters. Of the seventy-eight species recorded here in 2007, ten were non-native.

Ascidians

Asciidiella aspersa
Botrylloides violaceus
Botryllus schlosseri
Styela clava

Crustaceans

Caprella mutica
Carcinus maenas

Algae

Grateloupia turuturu
Neosiphonia harveyi

Bryozoans

Membranipora membranacea

Sponges

Halichondria bowerbanki

3. Hawthorne Cove Marina (HCM), Salem, Massachusetts

July 26, 2007 12:30 (<http://www.hawthornecove.com/>)

Hawthorne Cove Marina, part of the historic Salem shipping port, features a floating dock system with 100 boat slips. The marina is located near a power plant and may be under the influence of a thermal plume. Previous records for the marina demonstrated a highly diverse floating dock community. The 2007 RAS reported eighty-eight total species. Sixteen non-native species were found including the purple anemone, *Sagartia elegans*, which was unique to this site.

Ascidians

Ascidiella aspersa
Botrylloides violaceus
Botryllus schlosseri
Diplosoma listerianum
Styela clava

Crustaceans

Caprella mutica
Carcinus maenas
Ianiropsis sp.
Praunus flexuosus

Algae

Codium fragile fragile
Neosiphonia harveyi

Bryozoans

Bugula neritina
Membranipora membranacea

Sponges

Halichondria bowerbanki

Anemone

Diadumene lineata
Sagartia elegans

4. Gloucester Coast Guard Station, Gloucester, Massachusetts

July 26, 2007 14:00 (<http://www.uscg.mil/d1>)

The Gloucester Coast Guard Station is located on the southwest portion of Cape Ann within the historic fishing port of Gloucester. Gloucester Harbor still maintains a vibrant commercial fishing industry. Twelve of the seventy-five total species recorded during the 2007 RAS were not native.

Ascidians

Ascidiella aspersa
Botrylloides violaceus
Botryllus schlosseri
Styela clava

Crustaceans

Caprella mutica
Carcinus maenas
Ianiropsis sp.
Praunus flexuosus

Algae

Melanosiphon intestinalis
Neosiphonia harveyi

Bryozoans

Membranipora membranacea

Sponges

Halichondria bowerbanki

5. Wentworth By The Sea Marina, Newcastle, New Hampshire

July 27, 2007 08:30 (<http://www.wentworthmarina.com/>)

Wentworth by the Sea Marina is located on Little Harbor east of Portsmouth, NH. The town of Newcastle is situated at the mouth of the Piscataqua River and the entrance to the Great Bay Estuary. The marina maintains four docks with 170 boat slips as well as a fuel dock. Ten non-native species were recorded during the 2007 RAS, eighty-eight species were found in total.

Ascidians

Botrylloides violaceus
Botryllus schlosseri
Styela clava

Crustaceans

Caprella mutica
Carcinus maenas
Praunus flexuosus

Algae

Neosiphonia harveyi

Bryozoans

Membranipora membranacea

Sponges

Halichondria bowerbanki

Mollusks

Littorina littorea

6. Hampton River Marina: Hampton State Pier (HSP), Hampton, New Hampshire

July 27, 2007 10:30 (<http://www.hamptonrivermarina.com/>)

Hampton River Marina is located within the Piscataqua River Estuary and is part of the Hampton Beach State Park. The Marina features 144 boat slips with floating docks and wooden pilings. The total number of species found here was seventy-eight, eleven of which were non-native.

Ascidians

Asciella aspersa
Botrylloides violaceus
Botryllus schlosseri
Styela canopus

Crustaceans

Caprella mutica
Carcinus maenas
Praunus flexuosus

Algae

Neosiphonia harveyi

Bryozoans

Membranipora membranacea

Sponges

Halichondria bowerbanki

Mollusks

Littorina littorea

7. Wells Harbor, Wells, Maine

July 27, 2007 12:45 (<http://www.wellstown.org/>)

This site is located at the mouth of the Webhannet River, just south of Kennebunk, Maine. Nearby marsh and beach areas provide nursery habitats for estuary-dependant species. Of the sixty-six species recorded here during the 2007 RAS, ten were non-native.

Ascidians

Botrylloides violaceus
Botryllus schlosseri

Crustaceans

Carcinus maenas

Praunus flexuosus

Algae

Bonnemaisonia hamifera
Melanosiphon intestinalis
Neosiphonia harveyi

Bryozoans

Membranipora membranacea

Sponges

Halichondria bowerbanki

Hexapods

Anurida maritima

8. Spring Point Marina, South Portland, Maine

July 28, 2007 08:30 (http://www.portharbormarine.com/info.php?info_id=42)

Spring Point Marina, Maine's largest full-service marina, hosts several fishing tournaments during the summer. With over 250 slips, Spring Point Marina can accommodate yachts up to 200 ft. in length. Eighty-two total species and eight non-native species were found here during the 2007 RAS.

Ascidians

Asciella aspersa
Botrylloides violaceus
Botryllus schlosseri
Styela clava

Crustaceans

Caprella mutica
Carcinus maenas

Bryozoans

Membranipora membranacea

Sponges

Halichondria bowerbanki

9. Brewer South Freeport Marine (BFM), South Freeport, Maine

July 28, 2007 12:30 (<http://www.byy.com/south%20freeport/index.cfm>)

A relatively large marina, located on the banks of the Harraseeket River on the edge of Casco Bay, Brewer South Freeport Marine served historically as a ship building port. The marina provides 15 moorings and 100 boat slips with dockside depths of 14 feet, while serving as a premier yacht yard, focusing on maintenance, repair, and restoration of commercial, recreational, and competitive yachts. Eighty-seven species and ten non-natives were found here during the 2007 RAS.

Ascidians

Botrylloides violaceus
Botryllus schlosseri

Crustaceans

Caprella mutica
Carcinus maenas
Ianiropsis sp.
Praunus flexuosus

Algae

Neosiphonia harveyi

Bryozoans

Membranipora membranacea

Sponges

Halichondria bowerbanki

Molluscs

Littorina littorea

10. Maine Yacht Center, Portland, Maine

July 28, 2007 15:00 (<http://www.maine yacht.com/>)

Maine Yacht Center is located at the mouth of the Presumpscot River within the Casco Bay Estuary. The marina features a 990 ft. dock with 80 boat slips for transient and recreational boaters. Of the sixty-seven species found here during the 2007 RAS, nine were non-natives.

Ascidians

Asciidiella aspersa
Botrylloides violaceus
Botryllus schlosseri
Styela clava

Crustaceans

Carcinus maenas
Praunus flexuosus

Bryozoans

Membranipora membranacea

Sponges

Halichondria bowerbanki

Molluscs

Littorina littorea

11. Darling Marine Center, University of Maine, Walpole, Maine

July 29, 2007 11:00 (<http://www.dmc.maine.edu>)

The Damariscotta River estuary is a tidally dominated embayment. During the 2007 RAS mussels, algae and ascidians were abundant on the floats. Eighty nine species were found in total and seven non-native species were recorded.

Ascidians

Botrylloides violaceus
Botryllus schlosseri
Didemnum vexillum
Styela clava

Crustaceans

Caprella mutica

Bryozoans

Membranipora membranacea

Sponges

Halichondria bowerbanki

12. Maine Department of Marine Resources Dock, West Boothbay, Maine

July 29, 14:00 (<http://www.maine.gov/dmr/library/>)

The Marine Resources Dock is part of the Bigelow Laboratory Facility and is located on Mckown Point in Boothbay Harbor. The facility maintains multiple wooden docks as well as microbiological and biotoxin laboratories, GIS mapping facilities, a wet lab, and a library. Eleven non-native species were found among seventy-eight total species.

Ascidians

Botrylloides violaceus
Botryllus schlosseri
Didemnum vexillum
Styela clava

Crustaceans

Caprella mutica
Carcinus maenas
Ianiropsis sp.
Praunus flexuosus

Algae

Neosiphonia harveyi

Bryozoans

Membranipora membranacea

Sponges

Halichondria bowerbanki

13. Wayfarer Marine, Camden, Maine

July 30, 2007 10:00 (<http://www.wayfarermarine.com/>)

The marina at this site was redesigned in 2006 at the head of Camden Harbor. The site features long piers with wooden pilings and floats for temporary dockage. Salinity and dissolved oxygen levels were lower than at any site visited during the 2007 RAS. Fifty-seven total species were found here, including seven non-natives.

Ascidians

Botrylloides violaceus
Botryllus schlosseri

Crustaceans

Carcinus maenas
Ianiropsis sp.

Algae

Neosiphonia harveyi

Bryozoans

Membranipora membranacea

Mollusks

Littorina littorea

14. Journey's End Marina, Rockland, Maine

July 30, 2007 11:30 (<http://www.oharabait.com/marina.php>)

On the shores of Penobscot Bay in historic Rockland, Maine, Journey's End Marina offers 75 deep water slips with transient dockage for up to 225 ft. Mussels, kelp, ascidians, hydroids were found on the docks during the 2003 RAS. In 2007, nine non-natives were reported out of a total of eighty-two species.

Ascidians

Botrylloides violaceus
Botryllus schlosseri
Styela clava

Crustaceans

Caprella mutica
Praunus flexuosus

Algae

Neosiphonia harveyi

Bryozoans

Membranipora membranacea

Sponges

Halichondria bowerbanki

Molluscs

Littorina littorea

Rapid Assessment Survey Sites, 2007



Table 1. List of non-native marine species identified during the 2007 Rapid Assessment Survey. National Estuary Program abbreviations: Buzzards Bay Program = BBP; Massachusetts Bays Program = MBP; Piscataqua Region Estuaries Partnership = PREP; Casco Bay Estuary Partnership = CBEP. Wells Harbor and sites north of Casco Bay are also listed.

Taxonomic Species	BBP	MBP	PREP	Wells Harbor	CBEP	North of CBEP
Chlorophyceae						
<i>Codium fragile</i> ssp.	x	x				
Rhodophyceae						
<i>Bonnemaisonia hamifera</i>	x	x		x		
<i>Grateloupia turuturu</i>	x	x				
<i>Neosiphonia harveyi</i>	x	x	x	x	x	x
Phaeocophycophyta						
<i>Melanosiphon intestinalis</i>		x		x		
Porifera						
<i>Halichondria bowerbanki</i>	x	x	x	x	x	x
Cnidaria						
<i>Diadumene lineata</i>		x				
<i>Sagartia elegans</i>		x				
Polychaeta						
<i>Janua pagenstecheri</i>	x					
Mollusca: Gastropoda						
<i>Littorina littorea</i>			x		x	x
Arthropoda: Isopoda						
<i>Ianiropsis</i> sp.	x	x			x	x
Arthropoda: Amphipoda						
<i>Caprella mutica</i>	x	x	x		x	x
Arthropoda: Mysidacea						
<i>Praunus flexuosus</i>		x	x	x	x	x
Arthropoda: Decapoda						
<i>Carcinus maenas</i>	x	x	x	x	x	x
<i>Hemigrapsus sanguineus</i>	x					
Arthropoda: Poduromorpha						
<i>Anurida maritima</i>				x		
Bryozoa						
<i>Bugula neritina</i>		x				
<i>Membranipora membranacea</i>	x	x	x	x	x	x
Urochordata: Tunicata						
<i>Didemnum vexillum</i>	x	x				x
<i>Diplosoma listerianum</i>		x				
<i>Asciella aspersa</i>	x	x	x		x	
<i>Botrylloides violaceus</i>	x	x	x	x	x	x
<i>Botryllus schlosseri</i>	x	x	x	x	x	x
<i>Styela canopus</i>			x			
<i>Styela clava</i>	x	x	x	x	x	x
Total Species/ Region	16	20	12	11	12	12

Table 2. List of study participants, their affiliation and areas of interest.

Participant Name	Affiliation	Area of Interest
<i>Field Team</i>		
Renee Bernier	Gulf Fisheries Centre	Fisheries and Oceans Canada
Chris Boyko	Museum of Natural History	Div. of Invertebrate Zoology
James Carlton	Williams College-Mystic Seaport	Ombudsman
Jennifer Dijkstra	University of New Hampshire	Support, scientist
Clinton Dawes	University of South Florida	University of South Florida
Adriaan Gittenberger	National Museum of Natural History	Photographer
Sara Grady	Massachusetts Bays Program	Water Quality
Larry Harris	University of New Hampshire	Ombudsman, Lab
Gretchen Lambert	University of Washington, Friday Lab	Tunicates
Charles Lambert	University of Washington, Friday Lab	Tunicates
Antonion Carlos Marques	University of Sao Paulo, Brazil	Cnidaria
Arthur Mathieson	University of New Hampshire	Phycologist
Judy Pederson	MIT Sea Grant College Program	Co-organizer
Jan Smith	Mass Bays Estuary Program	Co-organizer
Megan Tyrrell	Wells National Estuarine Research Reserve	Support, scientist
Erica Westermann	University of New Hampshire	Dept. of Zoology
Jason Williams	Hofstra University	Biologist
<i>Logistics/ Support Team</i>		
Jay Baker	MA Coastal Zone Management	Data Management
April Blakeslee	University of New Hampshire	New Hampshire
Valerie Diamond	EPA	Logistics
Becky Gladych	University of Connecticut	Support, scientist
Peter Hanlon	Mass Bays Program	Support, scientist
Lisa Martinielli	University of New Hampshire	Support, scientist
Jeremy Miller	Wells National Estuarine Research Reserve	Support, scientist
Adrienne Pappal	MA Coastal Zone Management	Data Management
Michael Callahan	University of Southern Maine	USM Aquatic Systems Group
Barbara Warren	Salem Sound Coastwatch	Logistics, Salem

Table 3. Surface and maximum depth temperatures, dissolved oxygen, and salinity. nd = no data.

Locations	Surface Temp (°C)	Max Depth Temp (°C)	Surface DO (mg/L)	Max DO (mg/L)	Max Salinity (psu)
Woods Hole, Eel Pond	23.4	22.9	nd	nd	31.0
Woods Hole USCG Station	24.0	24.2	8.53	5.42	31.1
Sandwich Marina	19.6	19.7	7.29	5.25	31.0
Mass. Maritime Academy	21.1	21.1	7.38	5.85	31.0
Rowes Wharf	19.1	19.1	8.88	6.49	30.6
Hawthorne Cove Marina	21.9	22.0	7.92	5.82	31.1
Gloucester USCG Station	21.5	21.5	7.79	5.71	30.7
Wentworth Marina	18.9	18.9	7.8	5.65	30.1
Hampton State Pier	20.3	20.3	6.74	5.23	30.5
Wells Harbor	21.1	21.2	7.94	6.03	30.4
Spring Harbor Marina	17.0	17.1	8.41	6.28	30.1
Brewer South Freeport Marine	23.2	26.2	7.26	5.10	30.8
Maine Yacht Center	18.9	18.9	8.21	6.00	28.7
Darling Marine Center	17.0	17.1	7.96	5.90	31.1
Maine Dept. of Marine Resources	19.3	19.44	8.84	6.62	31.2
Wayfarer Marina	20.0	20.1	6.11	4.92	10.8
Journey's End Marina	17.9	17.9	7.66	5.39	30.6