

Species Status Assessment

Common Name: Blue mussel

Date Updated: March 2025

Scientific Name: *Mytilus edulis*

Minor Edits by: NYSDEC Wildlife Section

Class: Bivalvia

Family: Mytilidae

Species Synopsis (*a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York*):

The blue mussel, *Mytilus edulis* is a semi-sessile bivalve common on rocky intertidal habitats. On the eastern coast of North America this species ranges from Labrador to Cape Hatteras, North Carolina (Newell 1989). In New York, a small amount of mussels are commercially harvested each year (J. O'Dwyer, pers. comm.). Although never a large commercial fishery in New York, blue mussel harvest has decreased in recent years, most likely due to a change in harvest pressure rather than a lack of abundance (NYSDEC 2005). The abundance and distribution of blue mussels has not been well-documented throughout the years, making it difficult to assess trends. Some threats to blue mussels have been identified and include: increase in predators, ocean acidification, harmful algal blooms, and lack of optimal food.

DEC is not aware of any additional data or new information on population trends or threats to this species since the last SWAP revision in 2015 to indicate a need for change in SGCN status.

I. Status

a. Current legal protected Status

i. **Federal:** Not listed **Candidate:** No

ii. **New York:** Not listed

b. Natural Heritage Program

i. **Global:** Not ranked

ii. **New York:** Not ranked **Tracked by NYNHP?:** No

Other Ranks:

-New York 2025 SGCN status: Species of Greatest Conservation Need

-IUCN Red List: Not listed

-Northeast Regional SGCN: Not listed

Status Discussion:

The abundance of blue mussels in New York is unknown making it difficult to determine their status. They have not received any state or federal protection status and have not been given a global or New York state Natural Heritage Program rank.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			-
Northeastern US	Yes	Unknown	Unknown			No
New York	Yes	Unknown	Unknown			Yes
Connecticut	No data	-	-			-
Massachusetts	No data	-	-			-
New Jersey	No data	-	-			-
Pennsylvania	No	-	-			-
Vermont	No	-	-			-
Ontario	No	-	-			-
Quebec	No data	-	-			-

Column options

Present?: Yes; No; Unknown; No data; (blank) or Choose an Item

Abundance and Distribution: Declining; Increasing; Stable; Unknown; Extirpated; N/A; (blank) or Choose an item

SGCN?: Yes; No; Unknown; (blank) or Choose an item

Monitoring in New York (*specify any monitoring activities or regular surveys that are conducted in New York*):

There are no monitoring activities or regular surveys conducted in New York that are specific to the blue mussel. The NYSDEC does collect harvest data from shellfish shippers as well as production reports from aquaculturists who grow shellfish. However, not many blue mussels are taken each year commercially. Although not a function of resource management but rather for public safety reasons, the NYSDEC also conducts water quality and biotoxin monitoring to regulate shellfish harvest areas (J. O'Dwyer, pers. comm.).

Trends Discussion (*insert map of North American/regional distribution and status*):

Historically, blue mussels have been harvested from New York but never with as much pressure as other shellfish species. Abundance trends are not well documented throughout this species range. Commercially, a small amount of mussels are taken each year from New York compared to other states

(J. O'Dwyer, pers. comm., Newell 1989). The NYSDEC's commercial harvest numbers do not separate mussels by species; however, in 2011 and 2012, 150 and 527 bushels of mussels were harvested, respectively (NYSDEC 2012). In 1973, 68,233 bushels were harvested commercially (NYSDEC 2005). It has been noted that this is most likely due to changes in harvest pressure rather than an actual representation of abundance. Anecdotal evidence suggests that blue mussels were once more abundant in New York than they currently are (NYSDEC 2005). A lack of data makes this difficult to assess with great certainty.

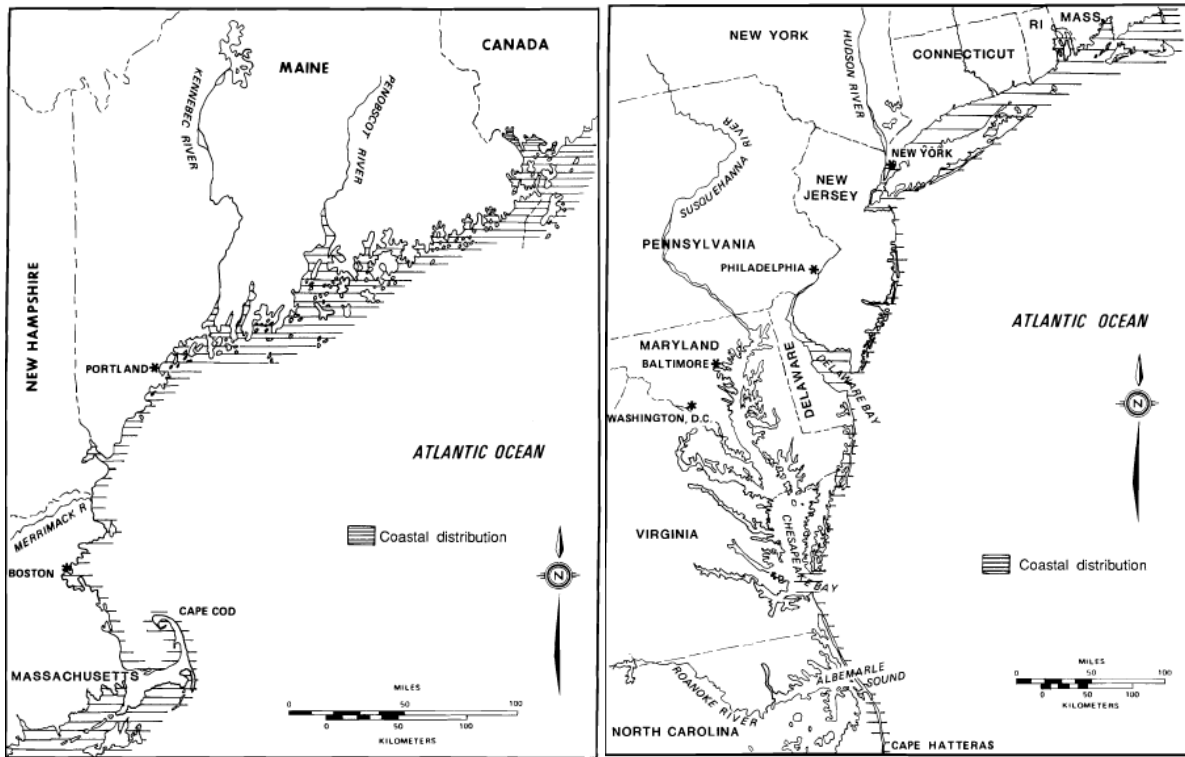


Figure 1. North Atlantic (left) and Mid-Atlantic (right) coastal distribution of the blue mussel, *Mytilus edulis* (Newell 1989).



Figure 2. Conservation status of blue mussel in North America (NatureServe 2024).

III. New York Rarity (provide map, numbers, and percent of state occupied)

Details of historic and current occurrence:

Details of historic and current and occurrence of blue mussels in New York are not discussed in the literature. They have been cited as having historically occurred in Long Island Bays and the Atlantic Ocean in the NY Bight (NYSDEC 2005).

New York’s Contribution to Species North American Range:

Percent of North American Range in NY	Classification of NY Range	Distance to core population, if not in NY
1-25%	Peripheral	

Column options

Percent of North American Range in NY: 100% (endemic); 76-99%; 51-75%; 26-50%; 1-25%; 0%; Choose an item

Classification of NY Range: Core; Peripheral; Disjunct; (blank) or Choose an item

IV. Primary Habitat or Community Type (from NY crosswalk of NE Aquatic, Marine, or Terrestrial Habitat Classification Systems):

- a. Marine, Intertidal, Benthic Geomorphology, Shellfish Bed
- b. Marine, Shallow Subtidal, Benthic Geomorphology, Shellfish Bed

- c. Estuarine, Brackish Intertidal, Benthic Geomorphology, Shellfish Bed
- d. Estuarine, Brackish Shallow Subtidal, Benthic Geomorphology, Shellfish Bed

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/Community Trend	Time frame of Decline/Increase
Yes	Yes	Unknown	

Column options

Habitat Specialist and Indicator Species: Yes; No; Unknown; (blank) or Choose an item

Habitat/Community Trend: Declining; Stable; Increasing; Unknown; (blank) or Choose an item

Habitat Discussion:

Mytilus edulis is found in the Arctic, North Pacific, and North Atlantic. Along the eastern coast of North America they are found from Labrador to Cape Hatteras, North Carolina but are most common in the North and mid-Atlantic (Newell 1989). Blue mussels are generally found in the subtidal and intertidal zones and are generally found at depths of five to ten meters (Zagata et al. 2008). They are semi-sessile organisms and upon settlement can attach to a variety of substrates (Newell 1989). They are considered epibenthic since they attach to objects such as pebbles, rocks, or other mussels rather than the seafloor (Newell 1989). Due to this aggregating behavior, dense mussel beds are often formed, and this in turn provides shelter for a variety of other invertebrates (Newell 1989). Since mussels attach to other mussels shells rather than a firm substrate, storms or strong wave action can sometimes result in the loss of a large portion of the mussel bed (Newell 1989).

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/Catadromous?
Yes	Choose an item.	Choose an item.	Yes	Yes	Choose an item.

Column options

First 5 fields: Yes; No; Unknown; (blank) or Choose an item

Anadromous/Catadromous: Anadromous; Catadromous; (blank) or Choose an item

Species Demographics and Life History Discussion (include information about species life span, reproductive longevity, reproductive capacity, age to maturity, and ability to disperse and colonize):

Blue mussels reportedly have a potential lifespan of 18 to 24 years, but average life span varies greatly depending on location within the intertidal zone (Zagata et al. 2008). Exact fecundity of blue mussels is apparently difficult to obtain but Newell (1989) has cited estimates of females releasing eight to ten million eggs per spawn. Blue mussels are dieocious, meaning that the two sexes are separate. Hermaphroditism can occur, although not as commonly (Newell 1989). Blue mussels generally reach sexual maturation at one year, but this timing is dependent upon environmental conditions (Newell 1989). Gametogenesis, or formation of eggs and sperm, occurs during the winter months when food availability is low. This species has a special energy reserve that they use for gametogenesis, which is different than the one used for maintaining regular metabolic activities (Newell 1989). Spawning is

typically started by the male and the presence of sperm in the water then stimulates the females to spawn (Newell 1989).

Once fertilized, the eggs develop into a non-feeding trocophore after just five hours. This is then followed by the veliger larval stage after an additional 24 hours. Anywhere from 15 to 35 days after fertilization begins the process of primary settlement. If the veliger larvae find a suitable place for attachment, metamorphosis into juvenile spat occurs. Once reaching 1.5 mm the spat detaches and migrates to adult mussel beds where they will settle. Blue mussels are considered semi-sessile because they are capable of moving slightly within their final settlement habitat (Newell 1989).

The growth rate of blue mussels is another process dictated by environmental conditions. During blue mussels' various life stages, optimal water temperatures and salinities exist (Newell 1989). Predation on blue mussels is highest during their first three weeks as planktonic larvae. As the mussels increase in size and their shells become stronger predation pressure decreases. Adult mussels are typically preyed upon by larger starfish, crustaceans, and a variety of shore birds (Newell 1989). Blue mussels filter out a variety of organic material from the water, primarily feeding on phytoplankton and detritus (Newell 1989). Evidence suggests that blue mussels can derive nutrients from the bacteria present on detrital material (Newell 1989).

VI.Threats (from NY 2015 SWAP or newly described)

Threat Level 1	Threat Level 2	Threat Level 3	Spatial Extent	Severity	Immediacy	Trend	Certainty
5. Biological Resource Use	5.4 Fishing & Harvesting Aquatic Resources	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
8. Invasive & Other Problematic Species	8.1 Invasive Non-Native Plants & Animals	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
9. Pollution	9.1 Domestic & Urban Wastewater	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
9. Pollution	9.3 Agricultural & Forestry Effluents	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
11. Climate Change	11.2 Changes in Geological Regimes	11.2.1 Changes in pH of habitats	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

Table 2: Threats to blue mussel

Threats specific to blue mussels in New York are not discussed at great length in the literature. General threats to shellfish species include: changes in food supply, harmful algal blooms (HABs), water quality degradation, increase in predators, and habitat loss due to dredging, storms, or other physical disturbances (NYSDEC 2005). In 1985, a dense algal bloom, comprised of extremely small algae, caused massive mortality, reduced feeding capacity, and reproductive failure in blue mussels (Tracey 1988). Although this bloom occurred in Rhode Island, HABs in New York waters could potentially have the same effects on blue mussel populations.

One study done by Lohrer and Whitlatch (2002) documented the historic and current distribution of invasive crab species in Long Island Sound and their effects on blue mussels. The historically introduced green crab, *Carcinus maenus* and the recently introduced Asian shore crab, *Hemigrapsus sanguineus* both prey on blue mussels (Lohrer and Whitlatch 2002). The recent decline of green crabs would have benefitted mussel populations; however, the subsequent increase in Asian shore crabs contributes to a continued high predation pressure on blue mussels (Lohrer and Whitlatch 2002).

Gazeau *et al.*(2010) found ocean acidification, as caused by increasing concentrations of CO₂, results in decreased shell thickness, decreased hatching rates, and decreases in shell growth in blue mussels. It has been suggested that these occurrences could significantly decrease settlement success (Gazeau *et al.* 2010). Additionally, ocean acidification appears to affect byssal threads, the means by which mussels attach to substrates (Dybas 2013). The effects of decreasing pH on byssal threads include: weakening of the threads, reduced ability to stretch, and reduced ability to form firm attachments to rocks (Dybas 2013). Under high levels of CO₂, mussels are only able to withstand 40 percent of the force from winds and waves that they can currently withstand (Dybas 2013).

Are there regulatory mechanisms that protect the species or its habitat in New York?

Yes:

No:

Unknown:

If yes, describe mechanism and whether adequate to protect species/habitat:

New York has in place several recreational and commercial harvest restrictions for blue mussels. There is no size limit for blue mussels and they may be taken throughout the year. The recreational limit is a half bushel per day, however, no more than one bushel per day (combined volume) of oysters, clams, and mussels is allowed. There is no limit for commercial harvest and mussels may not be taken by mechanical means. However, in some areas 15 bushels per person are allowed to be harvested by dredge. As with other shellfish in New York, blue mussels may only be harvested from DEC certified harvest areas, primarily for public safety reasons (NYSDEC 2013).

Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:

Although a small amount of blue mussels are commercially harvested from New York waters each year, proper management measures are key in order to avoid any future overharvest. A baseline of current abundance should be estimated in order to better assess the year-to-year trends of the blue mussel. Ongoing surveys to gather yearly abundance data should also be implemented. Effects on blue mussels from storm damage, changing weather patterns, HABs, and changing predator distributions should be studied.

Action Category	Action	Description
C.8 Research and Monitoring	C.8.1.1.1 Characterization, demographic study, population, or inventory	
C.8 Research and Monitoring	C.8.1.5.1 Species monitoring	
C.8 Research and Monitoring	C.8.1.5.3 Analyzing threats or their impacts	

Table 2: Recommended conservation actions for blue mussel.

VII. References

- Dybas, C. 2013. Blue Mussels “Hang On” Along Rocky Shores: For How Long. National Science Foundation. http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=127342. Accessed 18 June 2013.
- Gazeau, F., J.-P. Gattuse, C. Dawber, A.E. Pronker, F. Peene, J. Peene, C.H.R. Heip, and J.J. Middelburg. 2010. Effect of ocean acidification on the early life stages of the blue mussel *Mytilus edulis*. *Biogeosciences*. 7:2051-2060.
- Gouletquer, P. 2004. Cultured Aquatic Species Information Programme. *Mytilus edulis*. Cultured Aquatic Species Information Programme. In: *FAO Fisheries and Aquaculture Department* [online]. Rome. Accessed 30 May 2013.
- Lohrer, A.M., and R.B. Whitlatch. 2002. Relative impacts of two exotic brachyuran species on blue mussel populations in Long Island Sound. *Marine Ecology Progress Series*. 227:135-144.
- NatureServe. 2024. NatureServe Explorer. Page last published 11/1/2024. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.802381/Mytilus_edulis. Accessed November 12, 2024
- Newell, R.I.E. 1989. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (North and Mid-Atlantic)--blue mussel. U.S. Fish. Wildl. Serv. Biol. Rep. 82(11. 102). U.S. Army Corps of Engineers, TR EI-82-4.
- New York State Department of Environmental Conservation (NYSDEC). 2005. New York State Comprehensive Wildlife Conservation Strategy. <http://www.dec.ny.gov/index.html>. Accessed 29 May 2013.
- New York State Department of Environmental Conservation (NYSDEC). 2013. Shellfish Harvest Limits. <http://www.dec.ny.gov/outdoor/29870.html>. Accessed 14 June 2013.
- New York State Department of Environmental Conservation (NYSDEC). 2012. Shellfish Landings History 1946-2012.

- Tracey, G.A. 1988. Feeding reduction, reproductive failure, and mortality in *Mytilus edulis* during the 1985 "brown tide" in Narragansett Bay, Rhode Island. Marine Ecology Progress Series. 50:73-81.
- Zagata, C.; C. Young; J. Sountis and M. Kuehl. 2008. "Mytilus edulis" (On-line), Animal Diversity Web. http://animaldiversity.ummz.umich.edu/accounts/Mytilus_edulis/. Accessed 18 June 2013.
- Craig, Caitlin. 2013. Blue mussel Status Assessment for the 2015 New York State Wildlife Action Plan. NYSDEC. Albany, New York.