NJ Department of Environmental Protection
Water Monitoring and Standards

Reappraisal Report of Shellfish Classification for Growing Area SE7 (Jarvis Sound to Cape May Harbor)

January 2018

State of New Jersey
Philip D. Murphy, Governor
Sheila Y. Oliver, Lt. Governor

NJ Department of Environmental Protection
Catherine R. McCabe, Acting Commissioner
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Reappraisal Report of Shellfish Classification for Growing Area SE7 (Jarvis Sound to Cape May Harbor)

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Cover Photo – The Ocean Drive Bridge spanning Middle Thorofare, north of the Cape May Harbor. Photograph was taken on March 19, 2018.

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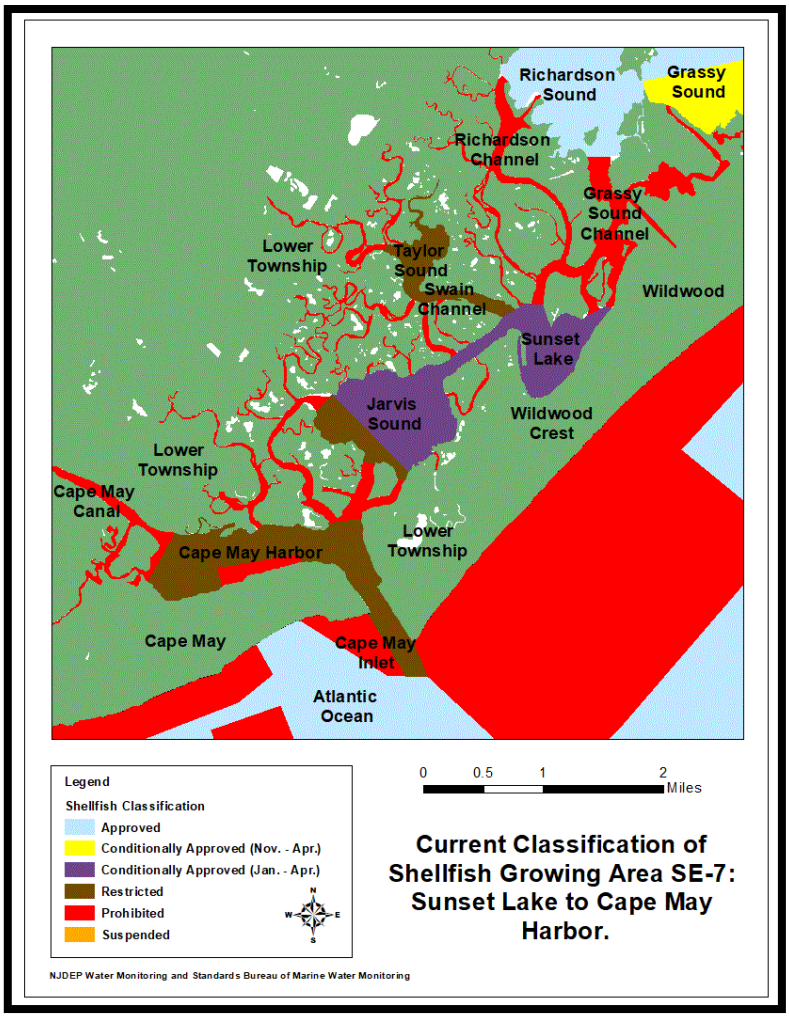
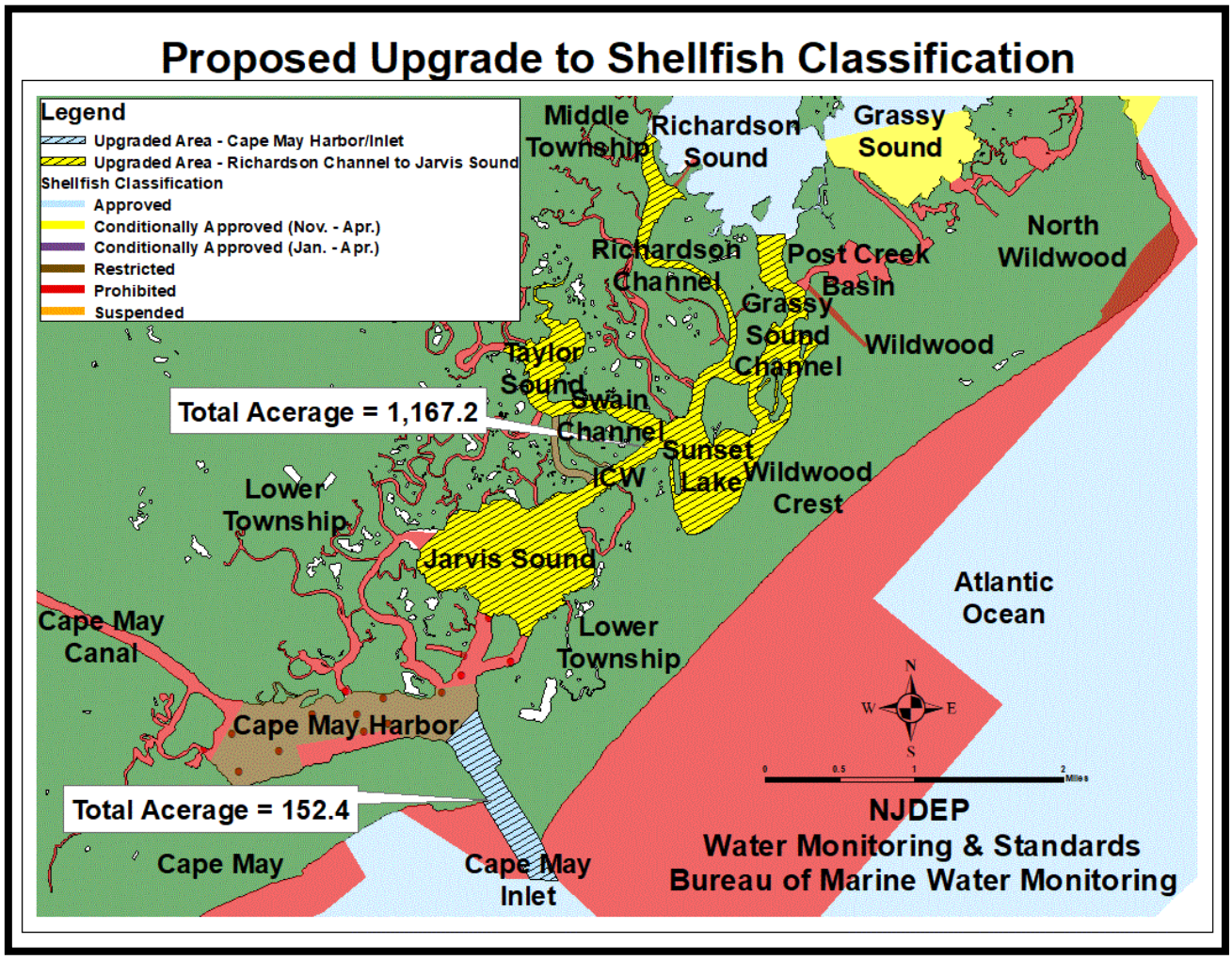
EXECUTIVE SUMMARY

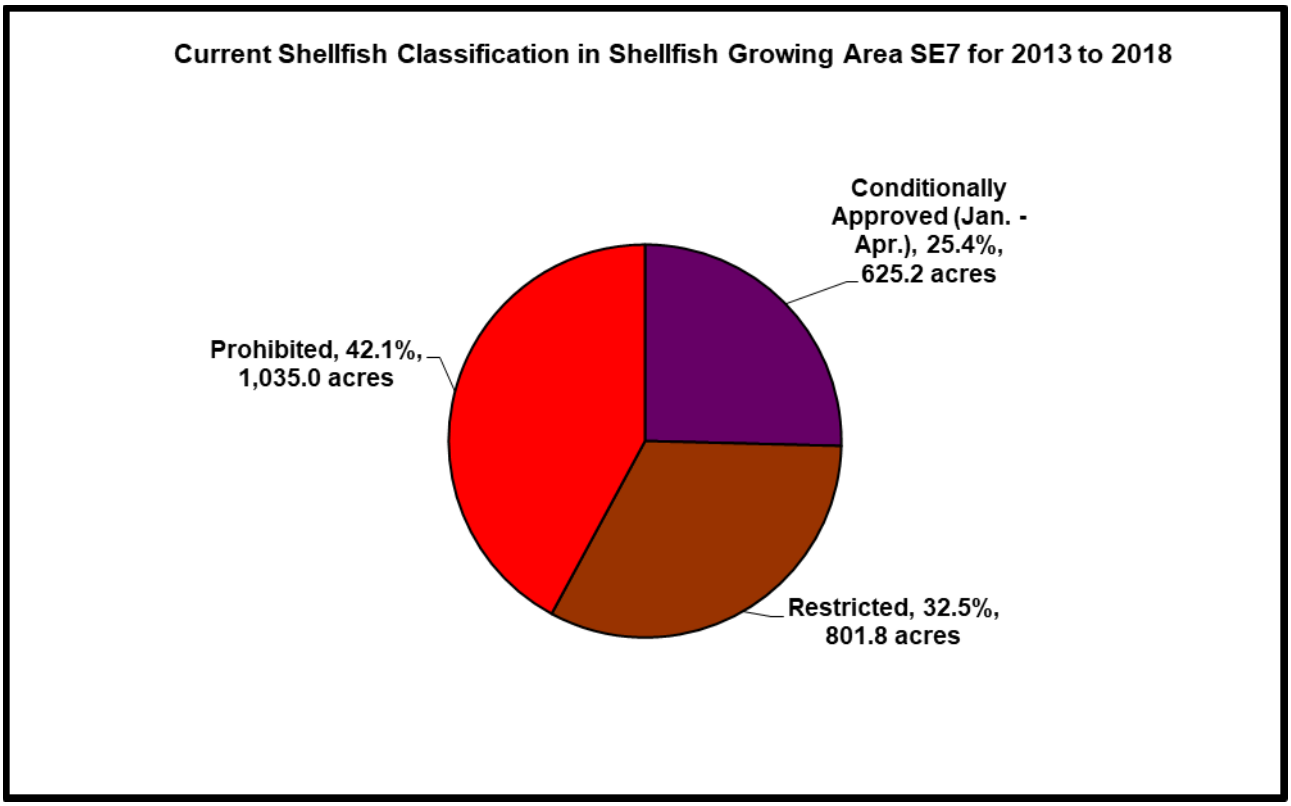
Shellfish Growing Area SE7; Sunset Lake to Cape May Harbor, is located in the southern part of New Jersey, north of the city of Cape May and southwest of the city of Wildwood, in Cape May County. The municipalities adjacent to this shellfish growing area include Wildwood, Wildwood Crest, Lower Township, and the city of Cape May. This area includes the shellfish growing waters from Richardson Channel and the south part of Grassy Sound Channel in the north, to the Cape May Canal and the Cape May Harbor in the south. Waters within this shellfish growing area are currently classified as *Conditionally Approved (January to April) (24.8%)*, *Restricted (31.7%),* and *Prohibited (43.5%)* (as seen in the figure to the right and the pie chart on page 3) and the approximate size of this shellfish growing area is 2,462 acres.

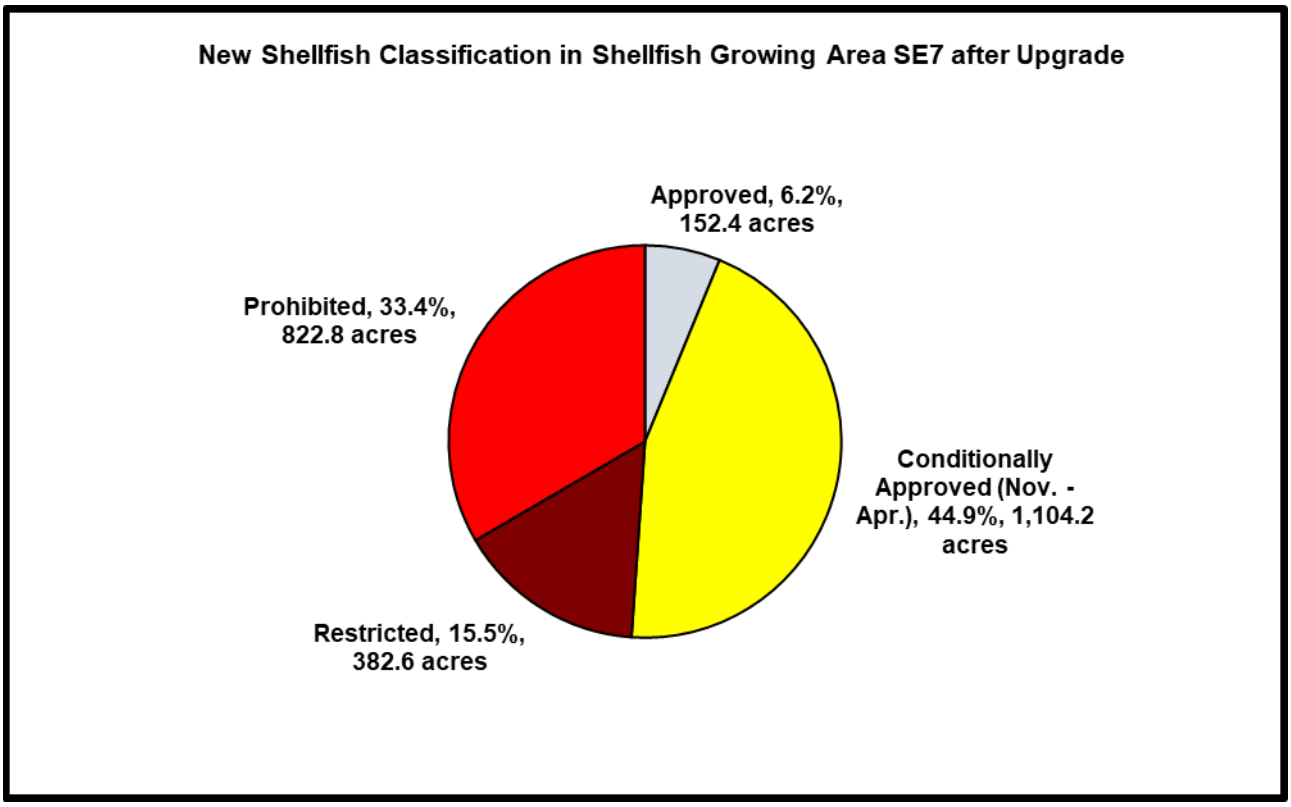


The water quality data presented in this Reappraisal of Shellfish Growing Area SE7, Sunset Lake to Cape May Harbor, were collected between January 2013 and January 2018. This shellfish growing area is sampled using the Systematic Random Sampling (SRS) strategy for all of the sampling stations in this growing area. Approximately 1,936 water samples are analyzed for fecal coliform bacteria from 44 monitoring stations. The overall water quality for this growing area is good. All the sampling stations meet their current classifications. However, the bacteria levels at all the sampling stations in Richardson Channel, Taylor Sound, Swain Channel, South Grassy Sound Channel, Post Creek Basin, Sunset Lake, the Intracoastal Waterway between Sunset Lake and Jarvis Sound, Jarvis Sound, and a portion of the waters inside the Cape May Inlet showed an improvement in water quality. Therefore, approximately 1,167.2 acres of shellfish waters in Richardson Channel, Taylor Sound, Swain Channel, the south part of Grassy Sound Channel, Sunset Lake, the Intracoastal Waterway between Sunset Lake and Jarvis Sound, and Jarvis Sound will be recommended for an upgrade from *Conditionally Approved (January to April), Restricted,* and *Prohibited* to *Conditionally Approved (November to April),* and approximately 152.4 acres of shellfish waters inside the Cape May Inlet will be recommended for an upgrade from *Restricted* to *Approved* (see figure on page 2). Of the total acreage (1.167.2 acres) of the *Conditionally Approved (November to April)* upgrade, 1,104.2 acres are in Shellfish Growing Area SE7 and 63.0 acres are in Shellfish

Growing Area SE6. There were no significant changes to landuse patterns, hydrography, or pollution discharges to this area that would change the shellfish classification of the shellfish waters in other parts of this shellfish growing area, as documented in the shoreline survey included in this report.



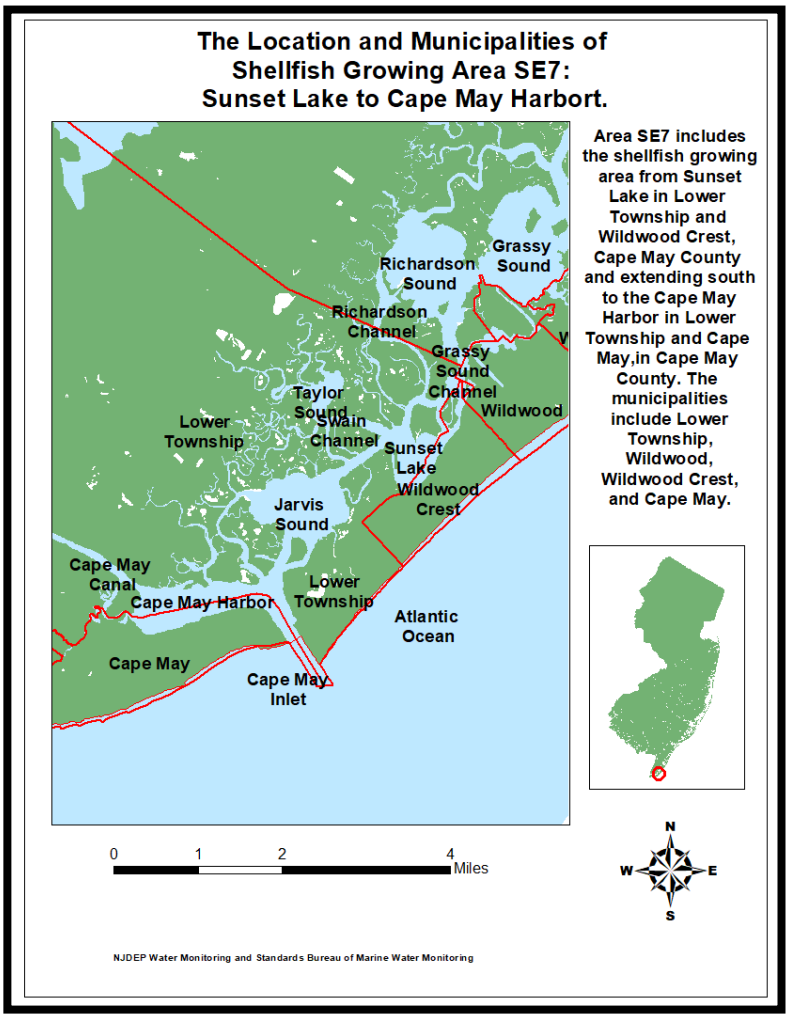

Current Shellfish Classification in Shellfish Growing Area SE7 for 2013 to 2018
Conditionally Approved (Jan. - Apr.), 25.4%, 625.2 acres
Prohibited, 42.1%, 1,035.0 acres
Restricted, 32.5%, 801.8 acres


New Shellfish Classification in Shellfish Growing Area SE7 after Upgrade
Approved, 6.2%, 152.4 acres
Prohibited, 33.4%, 822.8 acres
Conditionally Approved (Nov. - Apr.), 44.9%, 1,104.2 acres
Restricted, 15.5%, 382.6 acres

DESCRIPTION OF GROWING AREA

Location & Description

Shellfish Growing Area SE7; Sunset Lake to Cape May Harbor, is located in the southern part of New Jersey, north and northeast of the city of Cape May and west and southwest of the city of Wildwood, in Cape May County. Wildwood Crest is located east, and Lower Township is located southeast; southwest and west of this shellfish growing area.



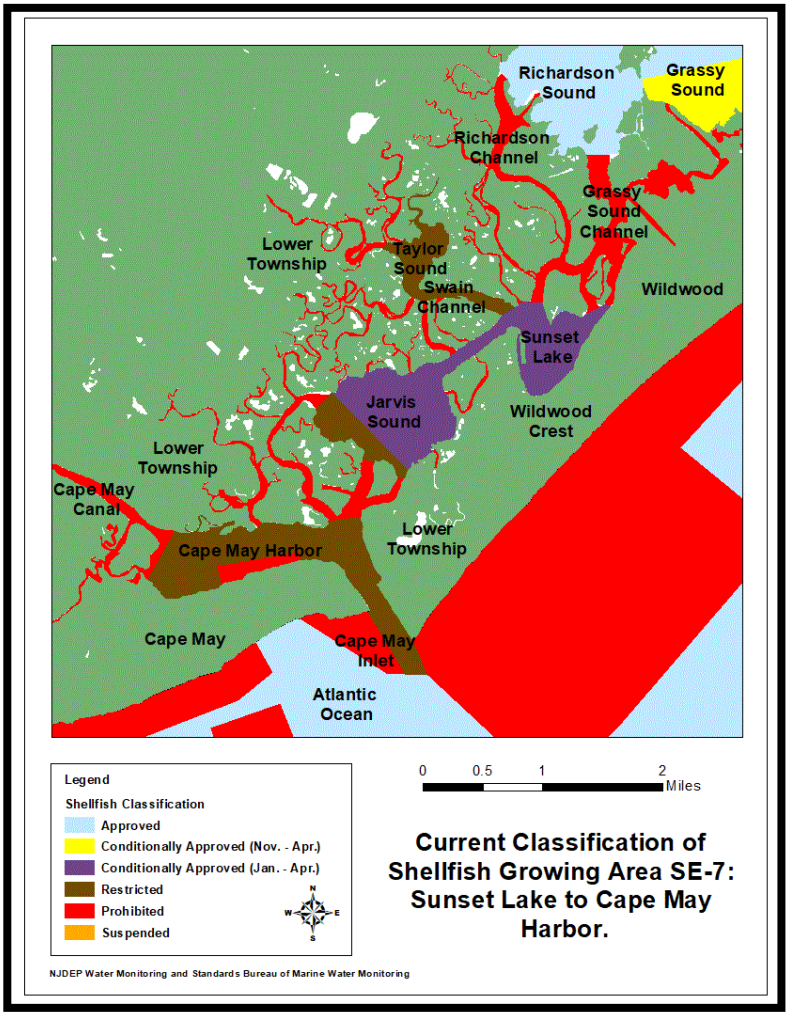
The shellfish classification of the waters in this growing area are *Conditionally Approved (January to April)*, *Restricted*, and *Prohibited*, and the approximate size of this shellfish growing area is 2,462 acres. There are approximately 625.2 acres of *Conditionally Approved (January to April)* waters, 801.8 acres of *Restricted* waters, and 1,035.0 acres of *Prohibited* waters in this shellfish growing area.

The municipalities adjacent to this shellfish growing area include Lower Township to the west and southwest; Wildwood, Wildwood Crest, and Lower Township to the northeast, east, and southeast; and the city of Cape May south and southwest of this shellfish growing area in Cape May County. The locations of these municipalities are shown in the figure to the right.

In Cape May County, this shellfish growing area drains through the Cape May Inlet. This area can be found on Chart 17 of the "2017 State of New Jersey – Shellfish Growing Water Classification Charts" (NJDEP, 2017). The figure on the next page shows the current classification of this shellfish growing area.

Growing Area Classification

The waters of this shellfish growing area are primarily classified as *Conditionally Approved (January-April), Restricted,* and *Prohibited* (NJDEP, 2017). The *Conditionally Approved (January-April)* waters are in Sunset Lake, the Intracoastal Waterway (ICW) between Sunset Lake and Jarvis Sound, and in the north part of Jarvis Sound. The *Restricted* waters are located in Taylor Sound, Swain Channel, the south part of Jarvis Sound, the Cape May harbor (excluding the Prohibited buffer near the docks for the U.S. Coast Guard Receiving Station), and the Cape May Inlet. The *Prohibited* waters include the rest of the waters in this shellfish growing area.



A reappraisal report for Shellfish Growing Area SE7, using water quality data from 2009 to 2013, was written in April 2014. In this report, two of the sampling stations (Sampling Stations 3605C and 3606A) located in the Restricted waters of the ICW between Jarvis Sound and Sunset Lake showed an improvement in water quality and met the Conditionally Approved (January to April) shellfish classification criteria. Therefore, approximately 54.9 acres of shellfish waters between Jarvis Sound and Sunset Lake were upgraded from *Restricted* to *Conditionally Approved (January to April)*. In this report, 11 sampling stations were affected by a seasonal component during the summer, and 20 sampling stations were affected by a rainfall component during dry conditions.

The last sanitary survey report for Shellfish Growing Area SE7, using water quality data from 2010 to 2015, was written in May 2015. In this report, all of the sampling stations in this shellfish growing area meet their existing *Seasonally Approved (January to April)*, *Special Restricted*, and *Prohibited* fecal coliform shellfish classification criteria for water quality year-round, in the summer months, and in the winter months. In this report, 17 sampling stations were affected by a seasonal component during the summer, and seven (7) sampling stations were affected by a rainfall component during wet conditions.

In the 2017 Annual Review of Shellfish Growing Area SE7 for the Jarvis Sound to Cape May Harbor area, all of the sampling stations in this growing area met their existing shellfish classification criteria, and also met the *Conditionally Approved (November to April)* shellfish classification in the winter. Therefore, the sampling stations in Richardson Channel, the south part of Grassy Sound Channel, Taylor Sound, Swain Channel, Sunset Lake, the Intracoastal Waterway (ICW) between Sunset Lake and Jarvis Sound, and Jarvis Sound were recommended for an upgrade from the *Conditionally Approved (January to April)*, *Restricted*, and *Prohibited* waters to the *Conditionally Approved (November to April)* shellfish classification for approximately 1,167.2 acres of shellfish waters, and the sampling stations inside the Cape May Inlet were recommended for an upgrade from the *Restricted* to the *Approved* shellfish classification for approximately 152.3 acres of these shellfish waters In this report, 30 sampling stations were affected by a seasonal component during the summer, and 21 sampling stations were affected by a rainfall component during wet conditions.

Evaluation of Biological Resources

This growing area has a wide diversity of biological resources. Hard clams (*Mercenaria Mercenaria*) exist in high densities and are privately and commercially harvested. Blue crabs (*Callinectes sapidus*) are also harvested in this shellfish growing area. Taylor Sound, Sunset Lake, Jarvis Sound, the Cape May Harbor, and the Cape May Inlet are also utilized for fishing, clamming, crabbing, and boating. Striped bass, bluefish, eels, summer flounder (fluke), weakfish, and other species of fish are caught in this shellfish growing area. The first table on the next page shows the total New Jersey hard clam landings data from 2013 to 2017. Shellfish landings statistics had not been verified and posted for 2017 at the time this reappraisal report was written.

The second table on the next page shows the total New Jersey shellfish landings data from 2013 to 2017 (NMFS, 2018). Shellfish landing statistics had not been verified and posted for 2017 at the time this reappraisal report was written. These shellfish species include blue crabs (*Callinectes sapidus*), blue crabs – peelers, hard clams (*Mercenaria mercenaria*), blue mussels (*Mytilus edulis*), bay scallops (*Aequipecten irradians*), oysters (*Crassostrea virginica*), ocean quahogs (*Arctica islandica*), surf clams (*Spisula solidissima*), and sea scallops (*Placopecten magellanicus*) (Morris, 1975, Gosner, 1978). However, this report primarily focuses on bivalve mollusks, such as clams, quahogs, oysters, and mussels, and does not include crustaceans, such as blue crabs.

Many species of animals and vegetation can be found in the marshes of this shellfish growing area, including sea birds, waterfowl, salt-tolerant grasses, muskrats, field mice, turtles, etc. Wildlife populations of birds and animals are actual contributors to the water quality in the Townsend Sound area, and potential contributors to the water quality in the Stites Sound and Townsends Inlet areas.

New Jersey Hard Clam Landings - 2013 to 2017 (NMFS, 2018).

NEW JERSEY HARD CLAM LANDINGS 2013 to 2017		
YEAR	POUNDS OF MEAT (millions)	$ VALUE (exvessel)
2013	17,231,460	$12,044,144
2014	17,504,960	$12,765,696
2015	16,237,760	$13,288,656
2016	18,127,360	$16,275,260
2017	*	*

***No Data**

New Jersey Shellfish Landings - 2013 to 2017 (NMFS, 2018).

NEW JERSEY SHELLFISH LANDINGS 2013 to 2017		
YEAR	POUNDS OF MEAT (millions)	$ VALUE (exvessel)
2013	45,992,234	$96,264,744
2014	55,569,046	$120,369,860
2015	53,147,052	$143,441,691
2016	52,020,116	$157,214,415
2017	*	*

***No Data**

SHORELINE SURVEY: EVALUATION OF POTENTIAL POLLUTION SOURCES

Shoreline Survey

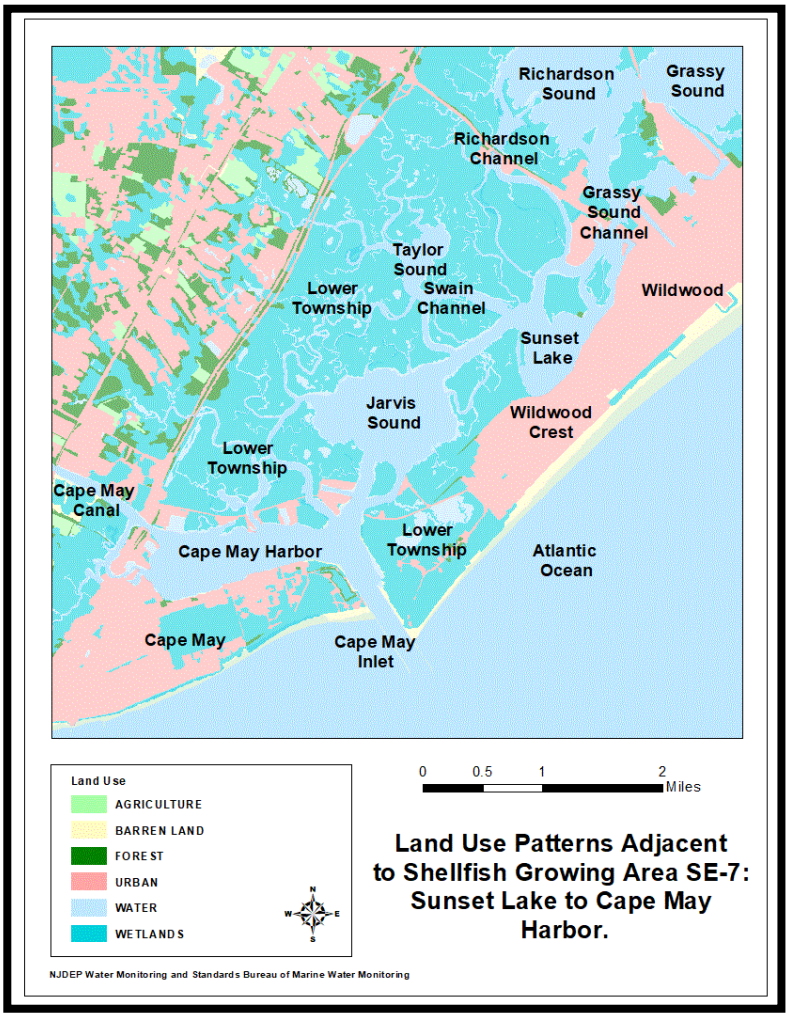
The shoreline survey that was performed for this area on March 19, 2018 determined that there have been no significant changes to the land use patterns, hydrography, or pollution discharges in this area since the last reappraisal of this area, as documented in the shoreline survey included in this report.

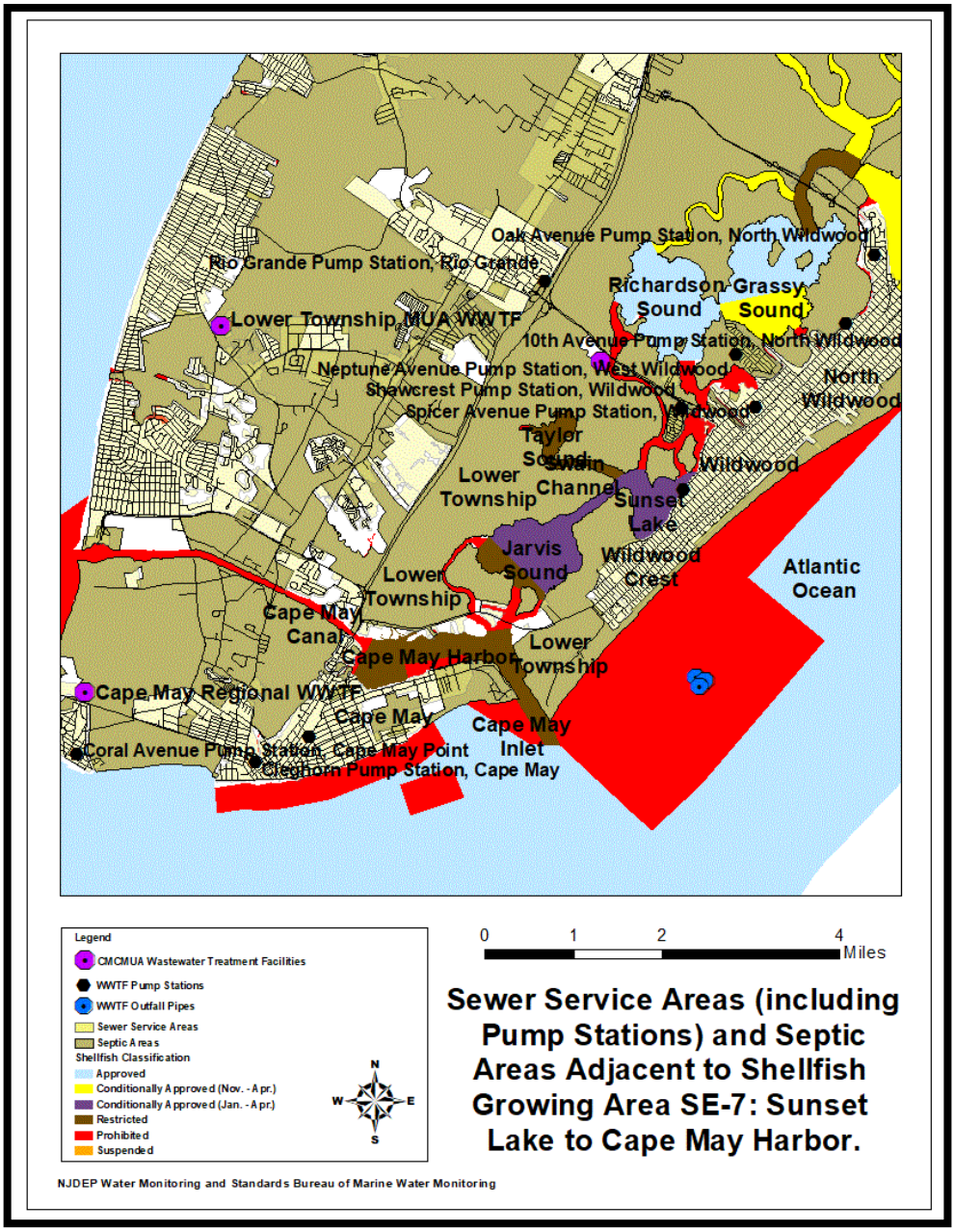
There were no noticeable changes to the existing marinas in this shellfish growing area during the shoreline survey on March 19, 2018. On this date, most of the marinas were still closed for the winter and there were very few boats docked at these marinas. However, dredge barges were seen near the Cape May/ Route 109 Bridge spanning the Cape May Canal and near the Wildwood Boulevard/ Route 47 Bascule Bridge spanning the south section of Grassy Sound Channel west of Wildwood. The areas for the proposed upgrade of the water quality in this shellfish growing area (Jarvis Sound, the Intracoastal Waterway between Jarvis Sound and Sunset Lake, Sunset Lake, the south section of Grassy Sound Channel, Swain Channel, Taylor Sound, Richardson Channel, and a section of the Cape May Harbor inside the Cape May Inlet) were observed and photographs were taken of these areas.

There were many photographs (64) taken during the shoreline survey of this shellfish growing area on March 19, 2018. The photograph on the front cover shows the Ocean Drive Bridge spanning Middle Thorofare, north of the Cape May Harbor. Some of the additional photos taken during the shoreline survey of this area are attached at the end of this report in the Supporting Documentation section.

Land Use

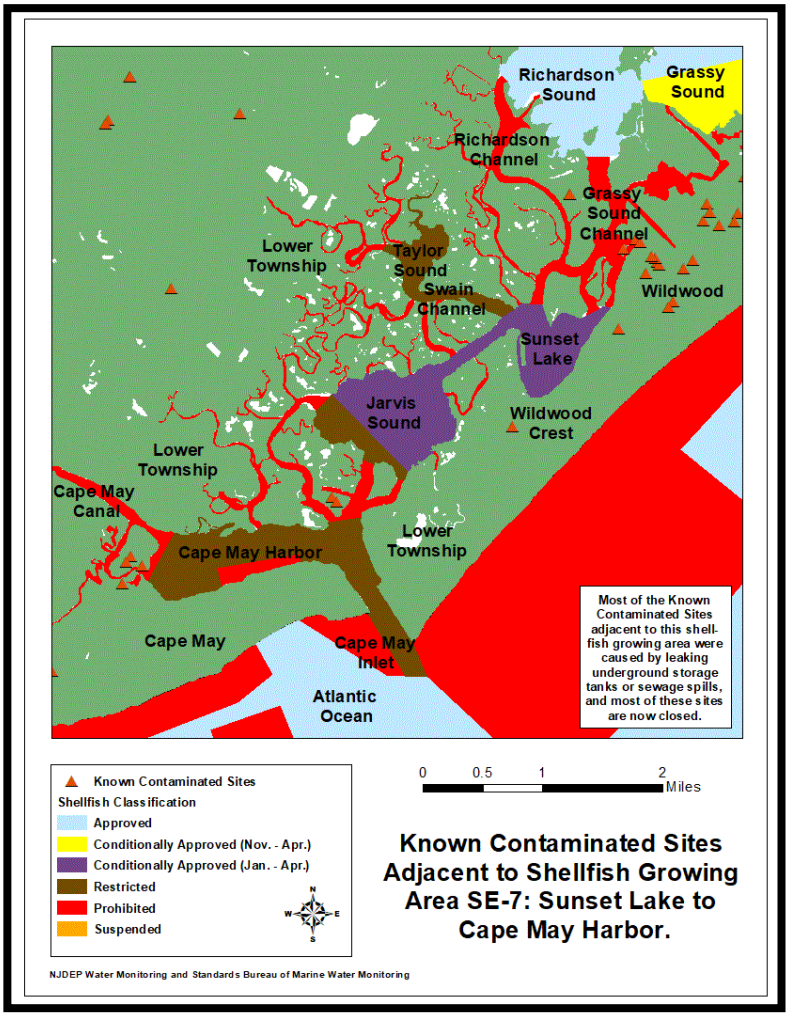
An extensively urbanized area to the east, northeast, southeast, and south and tidal wetlands to the southwest and west border much of this area. The urban areas to the northeast, east, south, and southwest are resort areas (Wildwood, Wildwood Crest, and Cape May) with significant boating and marine activities during the summer months. There are currently 32 marinas in this area. The wetlands to the west of the growing area act as a buffer for the communities on the western side of the bays. Taylor Creek, Jones Creek, and Mill Creek cross the Garden State Parkway into these communities, and are upstream of this shellfish growing area. Since some of these communities are still on septic systems, there is a potential for pollutant inputs into these shellfish growing waters, which is why continued monitoring of the water quality in these waters is very important. The figure on this page shows the land use and municipalities that surround this shellfish growing area. The figure on page 9 shows the sewer service areas (including the three (3) wastewater treatment facilities and ten (10) pump stations) and the septic areas throughout this area that are adjacent to this shellfish growing area.




Oak Avenue Pump Station, North Wildwood
Rio Grande Pump Station, Rio Grande
Richardson Sound
Grassy Sound
Lower Township MUA WWTF
10th Avenue Pump Station, North Wildwood
Neptune Avenue Pump Station, West Wildwood
Shawcrest Pump Station, Wildwood
North Wildwood
Spicer Avenue Pump Station, Wildwood
Taylor Sound
Swain Channel
Wildwood
Lower Township
Sunset Lake
Jarvis Sound
Wildwood Crest
Atlantic Ocean
Lower Township
Cape May Canal
Cape May Harbor
Lower Township
Cape May Regional WWTF
Cape May
Cape May Inlet
Coral Avenue Pump Station, Cape May Point
Cleghorn Pump Station, Cape May
Legend
CMCMUA Wastewater Treatment Facilities
WWTF Pump Stations
WWTF Outfall Pipes
Sewer Service Areas
Septic Areas
Shellfish Classification
Approved
Conditionally Approved (Nov. - Apr.)
Conditionally Approved (Jan. - Apr.)
Restricted
Prohibited
Suspended
N
W
E
S
0
1
2
4
Miles
Sewer Service Areas (including Pump Stations) and Septic Areas Adjacent to Shellfish Growing Area SE-7: Sunset Lake to Cape May Harbor.
NJDEP Water Monitoring and Standards Bureau of Marine Water Monitoring

Known Contaminated Sites

NJDEP, Site Remediation Program (SRP) has established a list of the Known Contaminated Sites (KCSNJ), Classification Exception Area (CEA) and Currently Known Extent (CKE) of groundwater pollution. KCSNJ are those non-residential sites and properties within the state where contamination of soil or groundwater has been confirmed at levels equal to or greater than applicable standards. This list of Known Contaminated Sites may include sites where remediation is either currently under way, required but not yet initiated or has been completed. CEA and CKE areas are geographically defined areas within which the local groundwater resources are known to be compromised because the water quality exceeds drinking water and groundwater quality standards for specific contaminants (NJDEP).



This shellfish growing area, which extends from Jarvis Sound to the Cape May Harbor, has several known contaminated sites located in the adjacent areas (see figure on this page). The major concentrations of these known contaminated sites are located to the east in Wildwood and Wildwood Crest, to the northwest and west in Lower Township, and to the south in Lower Township and Cape May. The primary causes of these known contaminated sites are from leaking underground storage tanks. Most of these known contaminated sites are now closed.

Surface Water Discharges

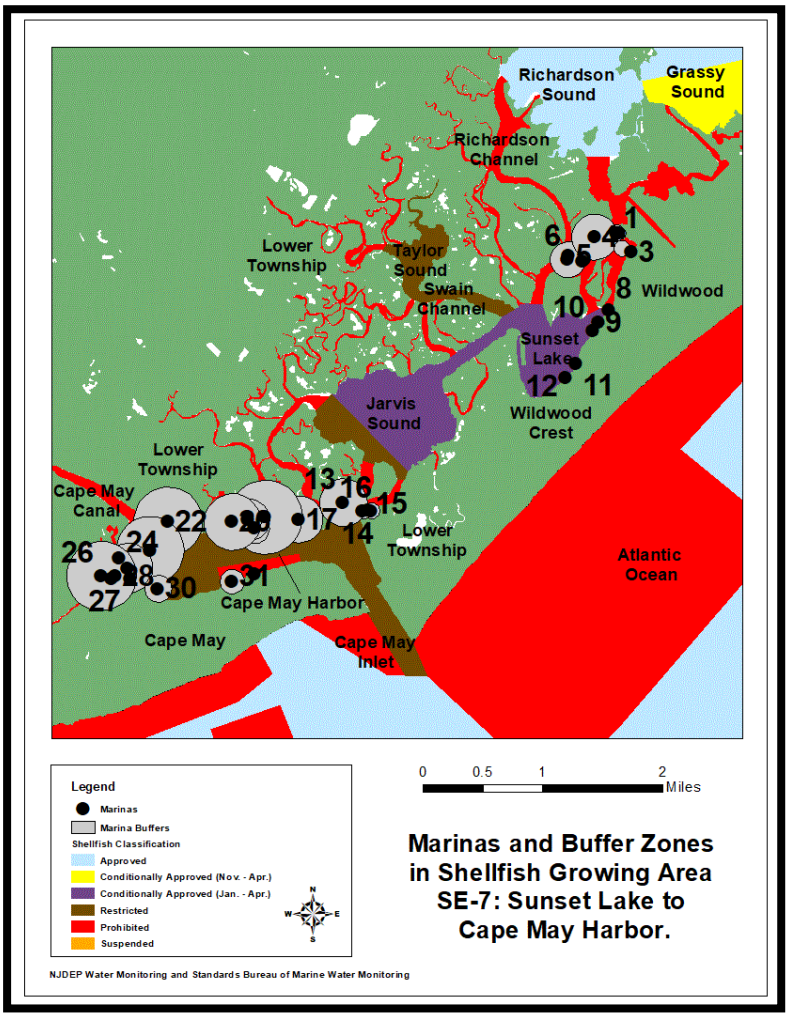
The discharge of pollutant from a point source is authorized under New Jersey Pollutant Elimination System (NJPDES), and the regulations are found at N.J.A.C. 7:14A. The main purpose of the NJPDES program is to ensure proper treatment and discharges of wastewater. By doing so, the permit limits the amount or concentration of pollutants that can be discharged into ground water, streams, rivers, and the ocean. Facilities regulated under this program include mines, schools, hospitals, large corporate office buildings, industrial manufacturing facilities, campgrounds, mobile home parks, food processor, potable water treatment plants, sewage treatment plants, or any dischargers that may have the potential to impact water quality. As of December 2010, there were 6,752 active permits. The number of active permits includes permits for all NJPDES permit classes, including Discharge to Surface Water (DSW), Discharge to Groundwater (DGW), Significant Indirect User (SIU), Discharge of Stormwater (DST), and Residuals (RES), (NJDEP, Division of Water Quality).

A surface water discharge involves the release of treated effluent from various municipal and industrial facilities directly into a river, stream, or the ocean. According to the NJPDES program, there was no surface discharger found in this shellfish growing area.

Marinas

Marina facilities have the potential to affect the suitability of shellfish growing areas for the harvest of shellfish. The biological and chemical contamination associated with marina facilities can be of public health significance. The discharge of sewage from vessels into the waterways can contribute to the degradation of the marine environment by introducing disease-causing microorganisms (pathogens), such as bacteria, protozoan, and viruses into the marine environment. In addition, sewage released in the vicinity of shellfish beds poses a public health problem. Because shellfish are filter feeders, they concentrate the pathogens in their tissue, thereby causing the shellfish to be unsafe for human consumption. The most notable diseases potentially transmitted by the ingestion of shellfish contaminated with the pathogens are gastroenteritis, dysentery, infectious hepatitis, and typhoid fever. Chemical compounds, such as oil and gasoline resulting from spills or leaks from vessels, can poison fish and other marine organisms. Research has shown that by-products from the biological breakdown of petroleum products can harm fish and wildlife and pose threats to human health if ingested.

In this growing area, there are 32 known marinas. The table on the next page lists the facility name and the number of boat slips that are available at each facility. The location of these facilities can be found on the figure on this page. The waters enclosed by the marina (the marina basin) are classified as *Prohibited*. Depending on the size of the marina, the water quality, flushing rates, and the depth of the water, shellfish waters immediately adjacent to each marina may be classified as *Prohibited*, *Restricted*, or *Conditionally Approved* (no harvest during summer months when the marina is normally active).

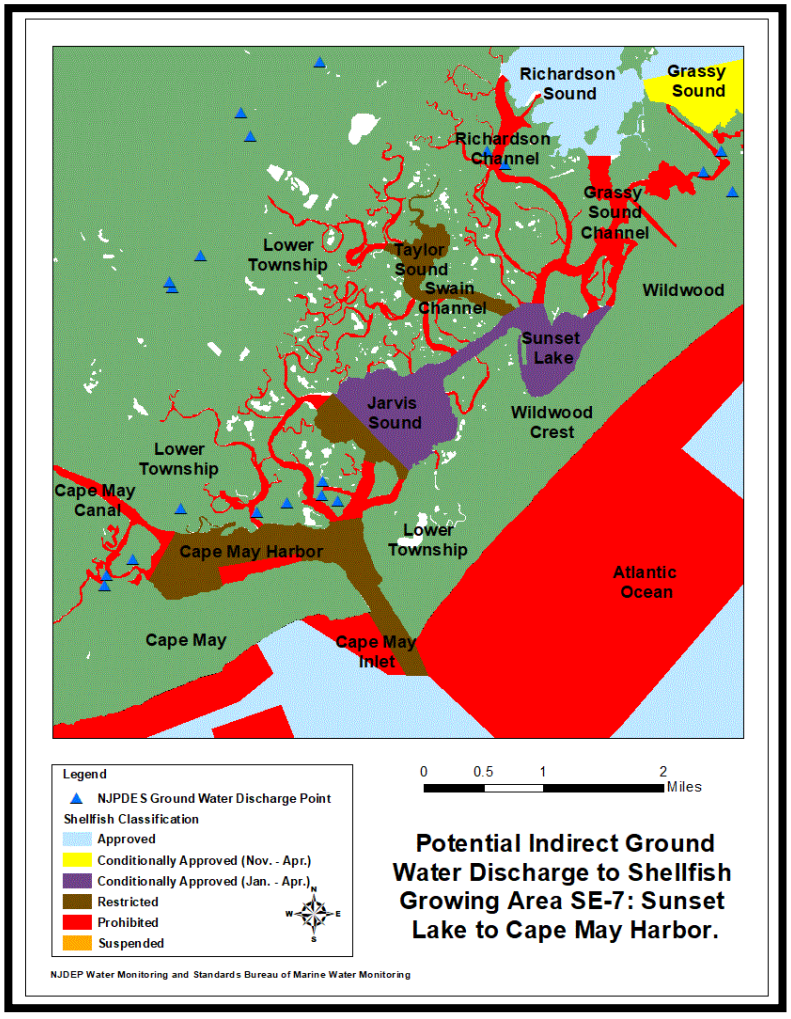


NJDEP has implemented the New Jersey Clean Marina Program. This program aims to protect waters from being polluted by marina activities. This is a volunteer based program for marinas. The program provides assistance and guidance to marina owners as well as boaters on ways to reduce pollution, including sewage facility management, fueling operations, fish and solid waste management and boat cleaning. Currently, there are only a small percentage of marinas in the state that participate in this program. A list of marinas that are certified and/or have pledged under this program are listed on the New Jersey Clean Marina Program website (www.njcleanmarina.org).

Map Key	Marina Name	Location	# of Wet Slips Total/Boats > 24ft.	*Size of Buffer Area* (radius; feet)	*Average Water Depth (ft)*	*Pumpout Facility*
1	Mocean Water Sports	Wildwood	12/12	347	8	No
2	Sea Raider Charter	Wildwood	7/7	265	8	No
3	Schooner Island Marina	Wildwood	310/310	2231	5	Yes
4	Lighthouse Pointe Marina	Wildwood	165/165	1010	13	Yes
5	Shawcrest Marina I	Lower Township	36/36	471	13	No
6	Shawcrest Marina II	Lower Township	89/75	697	13	No
7	Starcrest Marina	Wildwood	10/1	211	6	No
8	Royal Flush Fleet	Wildwood Crest	3/3	174	8	No
9	Captain Sinns Marina	Wildwood Crest	3/3	174	8	No
10	Greater Wildwood Yacht	Wildwood Crest	7/0	144	7	No
11	Lakeview Docks & Jet-ski Rental	Wildwood Crest	4/0	102	8	No
12	Greater Wildwood Yacht	Wildwood Crest	20/0	215	9	No
13	Hinch's Marina	Lower Township	110/110	1051	8	Yes
14	Two Mile Landing Marina	Lower Township	64/64	585	15	Yes
15	Two Mile Landing (Co.)	Lower Township	5/5	164	15	No
16	Cape Harbor Yacht Club	Lower Township	25/25	366	15	No
17	BreeZee Lee Yacht Club	Lower Township	450/200	2062	5	Yes
18	Mill Creek Marina	Lower Township	100/100	1636	3	Yes
19	McDuell's Marina	Lower Township	31/14	854	2	No
20	Snug Harbor Marina (was Cedar Creek Marina)	Lower Township	65/30	1253	2	Yes
21	Harbor View Marina	Lower Township	25/20	654	4	Yes
22	Canyon Club Resort Marina	Lower Township	257/211	1410	9	Yes
23	Utsch's Marina	Lower Township	300/250	1531	9	No
24	Miss Chris Fishing Center	Lower Township	11/11	420	5	Yes
25	South Jersey Marina	Lower Township	66/66	1151	4	Yes
26	Cape May Marine	Cape May	165/140	1534	5	No
27	Roseman's Boat Yard	Cape May	20/5	423	4	Yes
28	Cape May Marina	Cape May	210/210	1552	7	Yes
29	Yacht Lodge Marina	Cape May	12/12	371	7	No
30	Harbor Village & Yacht	Cape May	26/26	590	6	No
31	Corinthian Yacht Club	Cape May	18/18	538	5	No
32	U.S. Coast Guard	Cape May	8/8	200	16	No

Groundwater Discharges

According to NJPDES, there are several facilities with active Discharge to Groundwater (DGW) permits in this area. Besides groundwater discharger, septic systems are widely used in remote area where public sewer lines are inaccessible. When septic systems fail to function properly, it could lead to groundwater contamination. The location of groundwater injection, surface water discharge (stormwater), areas are shown in the figure below.



Spills, Unpermitted Discharges, and Closures

Spills

On July 12, 2013, a sewage spill was reported for the area of Tranquility Drive and Route 109 near the Cape May Canal in Lower Township, Cape May County. According to the report sent to WM&S' Bureau of Marine Water Monitoring, an unknown amount of sewage was discharged into the Cape May Canal at this location when a 24-inch sewer main ruptured. The shellfish classification of the Cape May Canal in this area is *Prohibited* to shellfish harvesting. However, the edge of the nearest shellfish harvest area is located east of this spill in the *Restricted* waters of the Cape May Harbor. On July 17, 2013, the clean-up of this sewage discharge was reported as pending at 9:17 AM and most of this sewage spill was reported as cleaned up.

On July 21, 2013, a diesel fuel spill was reported for the area of 2900 Lake Avenue in Wildwood, Cape May County. According to the report sent to WM&S' Bureau of Marine Water Monitoring, an unknown amount of diesel fuel was discharged into the street and into a storm drain next to the house at this location. The shellfish classification of the lagoon next to this area is *Prohibited* to shellfish harvesting. However, the edge of the nearest shellfish harvest area is located 0.7 miles northeast of this spill in the *Conditionally Approved (November to April)* shellfish waters of Grassy Sound. On July 23, 2013, this diesel fuel spill was reported as terminated at 10:47 AM.

On August 3, 2013 a raw sewage spill was reported for the area of the Ocean Drive Bridge north of the Cape May Harbor in Lower Township, Cape May County. According to the report sent to WM&S' Bureau of Marine Water Monitoring, approximately 1.000 gallons of raw sewage was reported as being discharged into the waters of Middle Thorofare, and the Cape May Harbor and the Cape May Inlet near this location when a caller reported that they smelled very strong odors of sewage and suspected a spill of raw sewage into this area from an unknown source. The shellfish classification of Middle Thorofare near the bridge is *Prohibited* to shellfish harvesting, and the shellfish classification of the Cape May Harbor, and the Cape May Inlet areas south and southeast of the bridge are *Restricted* to shellfish harvesting. However, the edge of the nearest shellfish harvest area is located 0.5 miles north of this spill in the *Conditionally Approved (January to April)* waters of Jarvis Sound. On this date, this spill was reported as not contained and the clean-up of this area was reported as pending at the time this report was received.

On August 9, 2013, a gasoline spill was reported for the area of 5100 Lake Avenue at Schooner Island Marina in Wildwood, Cape May County. According to the report sent to WM&S' Bureau of Marine Water Monitoring, an unknown amount of gasoline was discharged into the waters of this marina at this location from an unknown source. The shellfish classification of the water in and around this marina is *Prohibited* to shellfish harvesting. However, the edge of the nearest shellfish harvest area is located 0.45 miles southwest of this spill in the *Conditionally Approved (January to April)* shellfish waters of Sunset Lake. On this date, this gasoline spill was reported as not contained and the clean-up of the area pending at the time this report was received.

On November 5, 2013, a diesel fuel spill was reported for the area of the U.S. Coast Guard Training Center at 1 Monroe Avenue in Cape May City, Cape May County. According to the report sent to WM&S' Bureau of Marine Water Monitoring, an unknown amount of diesel fuel was discharged

into the Cape May Harbor at this location from the U.S.C.G. vessel, the Dependable. The shellfish classification of the Cape May Harbor next to this area is *Prohibited* to shellfish harvesting. However, the edge of the nearest *Restricted* shellfish waters in this area are located 0.11 miles (187.9 yards) north of this spill in the Cape May Harbor. On this date, this diesel fuel spill was reported as not contained and the clean-up of the area pending at the time this report was received.

On July 19, 2014, a gasoline and motor oil spill was reported for the area of 429 Tacony Road in Wildwood, Cape May County. According to the report sent to WM&S' Bureau of Marine Water Monitoring, an unknown amount of gasoline and motor oil were discharged from an unknown vessel into the waters of this area, as reported to the NJDEP by the NJ State Police Marine Unit. This spill was responsible for an unrecoverable oil sheen on the waters of this reported area. The shellfish classification of the water in this area is *Prohibited* to shellfish harvesting. However, the edge of the nearest shellfish harvest area is located 0.4 miles northeast of this spill in the *Approved* shellfish waters of Richardson Sound. On this date, this gasoline and motor oil spill was reported as continuous, not contained, and the clean-up of the area pending at the time this report was received.

On May 22, 2015, a motor oil spill was reported for the area of 4500 Park Boulevard in Wildwood, Cape May County. According to the report sent to WM&S' Bureau of Marine Water Monitoring, approximately 165 gallons of motor oil (three 55-gallon drums) leaked at the docks and into the waters of this area, as reported to the NJDEP by the U.S. Coast Guard during an inspection of this area. The shellfish classification of the water in this area is *Prohibited* to shellfish harvesting. However, the edge of the nearest shellfish harvest area is located 0.4 miles northeast of this spill in the *Approved* shellfish waters of Richardson Sound. On this date, this motor oil spill was reported as intermittent, not contained, and the clean-up of the area pending at the time this report was received.

On July 26, 2015, a diesel fuel spill was reported for the area of Ottens Harbor in Wildwood, Cape May County. According to the report sent to WM&S' Bureau of Marine Water Monitoring, an unknown amount of diesel fuel was discharged from the bilge of the fishing vessel Kim Ann into the waters of this area, as reported to the NJDEP by the NRC. The shellfish classification of the water in this area is *Prohibited* to shellfish harvesting. However, the edge of the nearest shellfish harvest area is located 0.4 miles northeast of this spill in the *Approved* shellfish waters of Richardson Sound. On this date, this diesel fuel spill was reported as not contained and the clean-up of the area was reported as undetermined at the time this report was received.

On June 1, 2016, a fuel oil spill was reported for the area inside the Cape May Inlet (Latitude 38 degrees 56.74" N, Longitude 74 degrees 52.21" W) in Cape May, Cape May County. According to the report sent to WM&S' Bureau of Marine Water Monitoring, approximately 825 gallons of fuel oil was discharged from a 40-foot cabin cruiser that sank due to a hole in the boat and into the waters of this area, as reported to the NJDEP by the U.S. Coast Guard. The USCG also reported that ten 55-gallon fuel drums floated off the boat and to the shore. It was unknown if any of the fuel drums were leaking or if the vessel was leaking any fluids. The shellfish classification of the water inside the Cape May Inlet is *Restricted* to shellfish harvesting. However, the edge of the nearest shellfish harvest area is located 0.74 miles east of this spill in the *Approved* shellfish waters of the Atlantic Ocean outside the inlet. On this date, this fuel oil spill was reported as terminated but not contained, and the clean-up of the area was reported as pending at the time this report was received.

On November 23, 2016, a sewage spill was reported for the area of the intersection of Pacific Avenue and Roberts Avenue in Wildwood, Cape May County. According to the report sent to WM&S' Bureau of Marine Water Monitoring, approximately 100 gallons of sewage was reported as being discharged onto the street near a storm water drain at this location due to a 8 inch sewer main break. The sewage was reported as not reaching the sewer basin. The shellfish classification of the Ottens Harbor area west of this location is *Prohibited* to shellfish harvesting However, the edge of the nearest shellfish harvest area is located 0.95 miles southwest of this spill in the *Conditionally Approved (January to April)* waters of Sunset lake. On this date, this spill was reported as contained and the clean-up of this area was reported as completed at the time this report was received.

On November 27, 2016, a spill of a fluorine mix was reported for the area of 171 West Schellenger Avenue in Wildwood, Cape May County. According to the report sent to WM&S' Bureau of Marine Water Monitoring, an unknown amount of a fluorine mix was discharged from the business at this address into a storm water drain in the street near this address. This spill was reported to be going on for 2 years. The storm water drain near this address flows into the Ottens Harbor area and the shellfish classification of the water in Ottens Harbor is *Prohibited* to shellfish harvesting. However, the edge of the nearest shellfish harvest area is located 0.7 miles northwest of this spill in the *Conditionally Approved (November to April)* shellfish waters of Grassy Sound. On this date, this gasoline and motor oil spill was reported as continuous, not contained, and the clean-up of the area pending at the time this report was received.

On March 26, 2017, a motor oil spill was reported for the area of Ottens Harbor in Wildwood, Cape May County. According to the report sent to WM&S' Bureau of Marine Water Monitoring, an unknown amount of motor oil was discharged from the fishing vessel Two Brothers into the waters of this area when this vessel blew its engine. The shellfish classification of the water in this area is *Prohibited* to shellfish harvesting. However, the edge of the nearest shellfish harvest area is located 0.4 miles northwest of this spill in the *Approved* shellfish waters of Richardson Sound. On this date, this motor oil spill was reported as not contained and the cleanup of the area was reported as undetermined at the time this report was received. On March 27, 2017, a similar petroleum product spill was reported for this same area along 788 West Montgomery Avenue, across Ottens Harbor from the spill of March 26, 2017. According to this report sent to WM&S' Bureau of Marine Water Monitoring, an unknown amount of a petroleum product was discharged from a vessel tied off at a dock into the waters of this area. However, this spill was reported as terminated and contained, and the clean-up of the area was going on at the time this report was received.

On April 7, 2017, a diesel fuel spill was reported for the area of the Atlantic Cape Fisheries on Mud Hen Gut, 985 Ocean Drive, in Lower Township, Cape May County. According to the report sent to WM&S' Bureau of Marine Water Monitoring, approximately 100 gallons of diesel fuel leaked into the waters of Mud Hen Gut when the fishing vessel My Girl was transferring the diesel fuel from a tank to another tank onboard another vessel. The shellfish classification of the water in this area is *Prohibited* to shellfish harvesting. However, the edge of the nearest shellfish harvest area is located 0.3 miles northeast of this spill in the *Restricted* shellfish waters of Jarvis Sound. On this date, this diesel fuel spill was reported as terminated, not contained, and the clean-up of the area pending at the time this report was received.

On July 24, 2017, a raw sewage spill was reported for the area of the Grassy Sound Channel area near 1 South Boardwalk, in Middle Township, Cape May County. According to the report sent to

WM&S' Bureau of Marine Water Monitoring, an unknown amount of raw sewage was reported as being discharged into the waters of a lagoon near this location and across the bay from the Grassy Sound Marina by an anonymous caller reported that they smelled very strong odors of sewage and suspected a spill of raw sewage into this area. The homes along Grassy Sound are on septic systems and this area is known by the Cape May County Department of Environmental Health and NJDEP Southern Enforcement for their septic systems that have been discharging sewage into the waters of Grassy Sound Channel for years. The shellfish classification of Grassy Sound Channel is *Restricted* to shellfish harvesting. However, the edge of the nearest shellfish harvest area is located 0.4 miles southwest of this spill in the *Conditionally Approved (January to April)* waters of Old Turtle Thorofare. On this date, this spill was reported as intermittent, not contained, and the clean-up of this area was reported as pending at the time this report was received.

Closures

On October 2, 2015, the State of New Jersey Department of Environmental Protection put into effect a precautionary closure for all shellfish waters in New Jersey due to the approach of a nor'easter predicted to impact the State from October 2 through 4, 2015 'to assure that the public health is not imperiled by the consumption of shellfish that may be subject to pollution or to any other conditions which may render shellfish dangerous.' All shellfish waters in this shellfish growing area were closed to shellfish harvesting. On October 5, 2015, 'the Department returned all waters of the State to their prior classification and opened them to all shellfish harvesting in accordance with their classification.'

There were no emergency closures of shellfish waters in area SE7 due to major spills or unpermitted discharges for the time from January 2013 to January 2018.

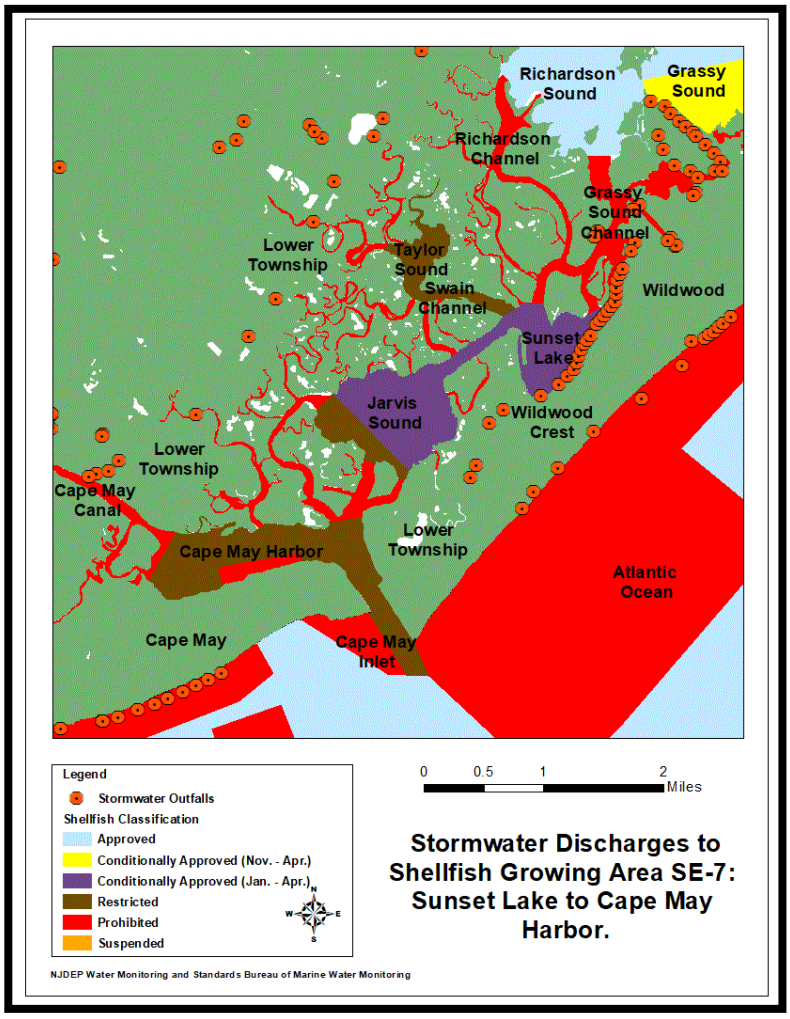
Dredging

The process of dredging can impair water quality and contaminate shellfish beds that are near dredging and disposal sites. WM&S/BMWM is given the opportunity to review such project through CAFRA submission and will deny a project if the proposed dredging or disposal site can potentially contaminate shellfish beds or impair water quality. The bureau's comments are taken into consideration by the NJDEP, Division of Land Use Regulations (DLUR) when approving or denying a permit. It is unknown if any dredging projects were submitted to DLUR between 2013 and 2018 for this area.

Stormwater Discharges

Stormwater runoff is generated when precipitation from rain and snowmelt flows over land or impervious surfaces and does not percolate into the ground. As the runoff flows over the land or impervious surfaces (paved streets, parking lots, and building rooftops), it accumulates debris, chemicals, sediment or other pollutants that could adversely affect water quality if the runoff is discharged untreated. The typical pollutants that are associated with stormwater run-off are bacteria, heavy metals, pesticides, herbicides, chlorides, petroleum, and nutrients. (NJStormwater.Org) Most of the stormwater outfalls within this growing area are near residential and urbanized district. About 112 outfalls in this area have the potential to impact water quality. The bulk of these outfalls are in Wildwood, Wildwood Crest, Lower Township, and some in Cape May.

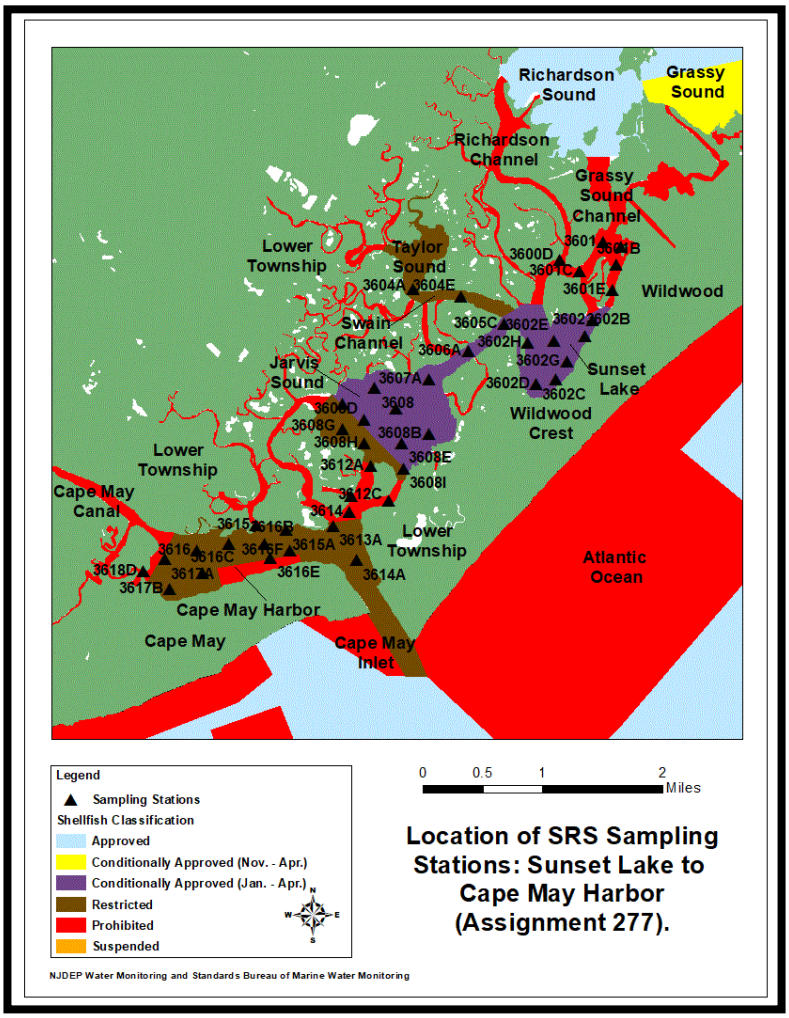
These outfalls usually discharge to nearby creeks and lagoon systems. For this reason, shellfish harvesting is condemned (*Prohibited* shellfish classification) in all lagoon system.



WATER QUALITIES STUDIES

Sampling Strategy

The State Shellfish Control Authority has the option of choosing one of two water monitoring sampling strategies for each growing area. For additional information on the types of sampling strategies, see the *Shellfish Growing Area Report Guidance Document, 2007*. This shellfish growing area is not impacted by discharges from sewage treatment facilities or combined sewer overflows. Therefore, it was sampled using the Systematic Random Sampling (SRS).



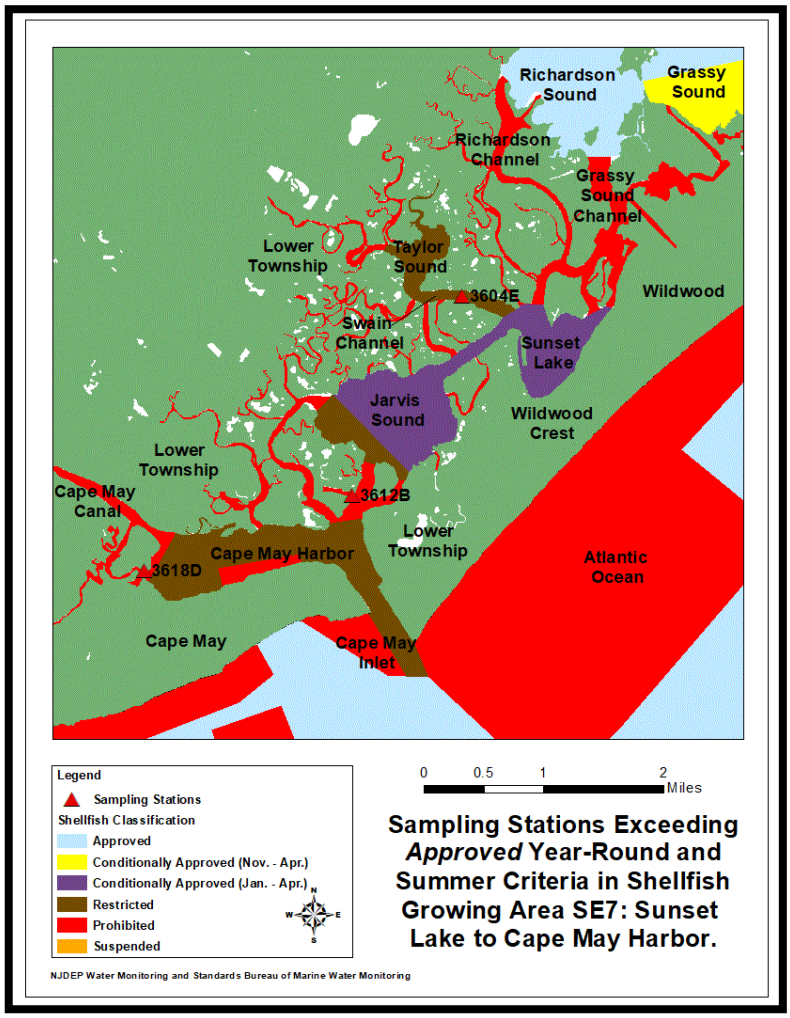
Water sampling was performed in accordance with the Field Procedures Manual (NJDEP, 2005). From 2013 through 2018, approximately 1,936 water samples were collected for fecal coliform bacteria from 44 monitoring stations. The locations of these stations are shown in the map to the right. These samples were analyzed by using the fecal coliform mTEC method (APHA, 1970). Water quality sampling, shoreline and watershed surveys were conducted in accordance with the NSSP *Guide for the Control of Molluscan Shellfish,* Revision 2013. Data management and analysis was accomplished using database applications developed for the Bureau. Mapping of pollution data was performed with the Geographic Information System (GIS: ARC map).

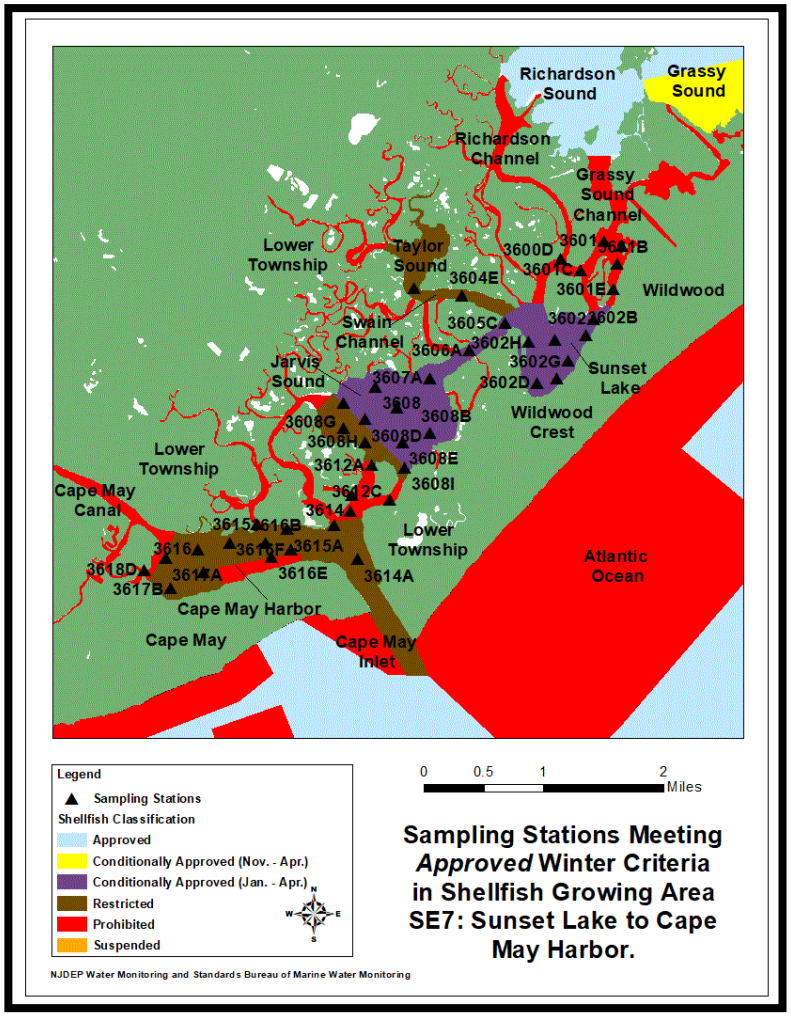
Bacteriological Quality

This report includes data analyzed from January 2013 to January 2018. This shellfish growing area is composed of one assignment area, Assignment 277 (Jarvis Sound and Cape May Harbor) and is sampled using the SRS sampling strategy year-round. The figure on page 16 shows all the sampling stations for this area. The raw data listings for each sampling station, in accordance with the National Shellfish Sanitation Program (NSSP), is attached to the end of this report.

Compliance with NSSP SRS Criteria

Three of the sampling stations (Sampling Stations **3604E**, **3612B**, and **3618D**) in this shellfish growing area exceeded the SRS *Approved* shellfish classification year-round and in the summer. However, these three sampling stations meet their existing *Restricted* and *Prohibited* shellfish classification criteria year-round and in the summer (see figure to the right). All the sampling stations in this growing area meet the *Approved* shellfish classification in the winter (see figure on next page). Therefore, the overall water quality for this growing area is good. All the sampling stations meet their current classification criteria. However, the bacteria levels at all the sampling stations in Richardson Channel, Taylor Sound, Swain Channel, South Grassy Sound Channel, Sunset Lake, the Intracoastal Waterway between Sunset Lake and Jarvis Sound, Jarvis Sound, and a portion of the waters inside the Cape May Inlet showed an improvement in water quality. Therefore, approximately 1,167.2 acres of shellfish waters in Richardson Channel, Taylor Sound, Swain Channel, the south part of Grassy Sound Channel, Sunset Lake, the Intracoastal Waterway between Sunset Lake and Jarvis Sound, and Jarvis Sound are recommended for an upgrade from *Conditionally Approved (January to April), Restricted,* and *Prohibited* to *Seasonally Approved (November to April),* and approximately 152.4 acres of shellfish waters inside the Cape May Inlet are recommended for an upgrade from *Restricted* to *Approved* (see figure on page 2).

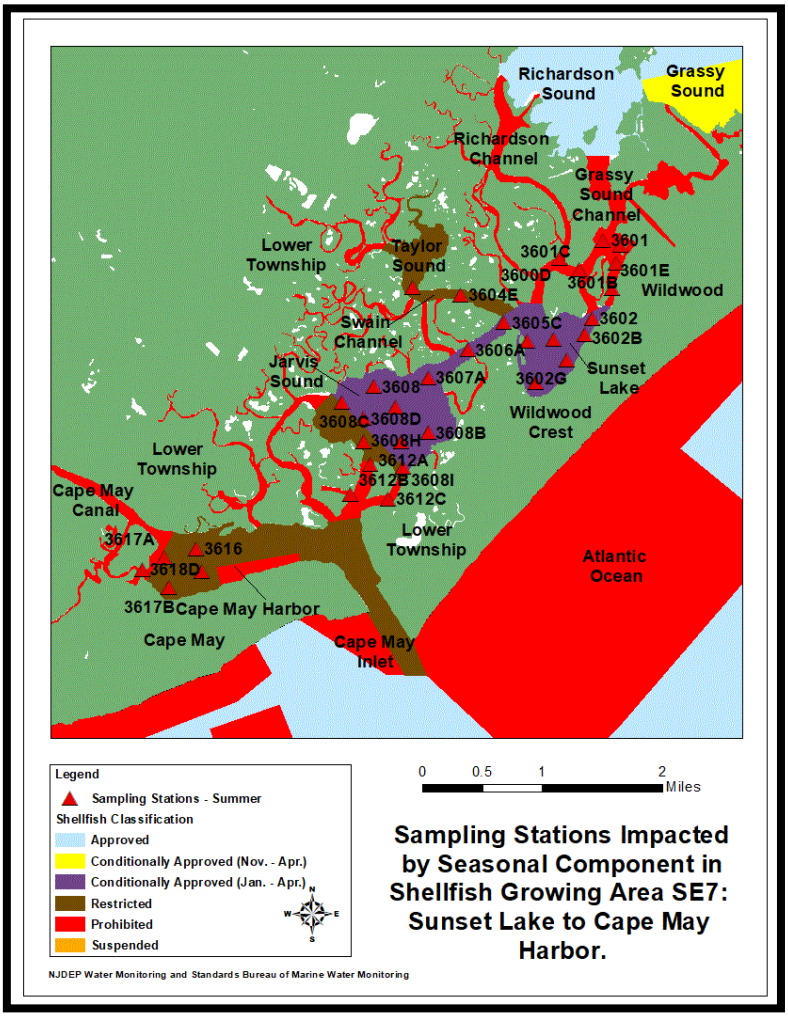



Richardson Sound
Grassy Sound
Richardson Channel
Grassy Sound Channel
Lower Township
Taylor Sound
3600D
3601
3601B
3601C
3604E
3601E
Wildwood
Swain Channel
3605C
3602
3602B
3602H
3606A
3602G
Jarvis Sound
3607A
3602D
Sunset Lake
3608
3608B
Wildwood Crest
3608G
3608H
3608D
Lower Township
3612A
3608E
Cape May Canal
3612C
3608I
3614
3615
3616B
Lower Township
3616
3615A
3618D
3614A
3616E
3614A
Atlantic Ocean
3617B
Cape May Harbor
Cape May
Cape May Inlet
Legend
Sampling Stations
Shellfish Classification
Approved
Conditionally Approved (Nov. - Apr.)
Conditionally Approved (Jan. - Apr.)
Restricted
Prohibited
Suspended
0
0.5
1
2
Miles
Sampling Stations Meeting Approved Winter Criteria in Shellfish Growing Area SE7: Sunset Lake to Cape May Harbor.
NJDEP Water Monitoring and Standards Bureau of Marine Water Monitoring

Seasonal Effects

As the earth experiences variations in the tilt of its axis and its revolution around the sun, it goes through seasonal phases of summer, spring, autumn, and winter. These seasonal phases cause much variation in the atmosphere of the earth, resulting in changes in weather patterns. Temperature, precipitation, wind, and the general circulation of the atmosphere have seasonal variations that also affect the marine environment (Ingmanson and Wallace, 1989). Seasonal variation may also be the result of a variety of conditions, including specific agricultural land-use practices, biological activity, stream flow and/or sediment.

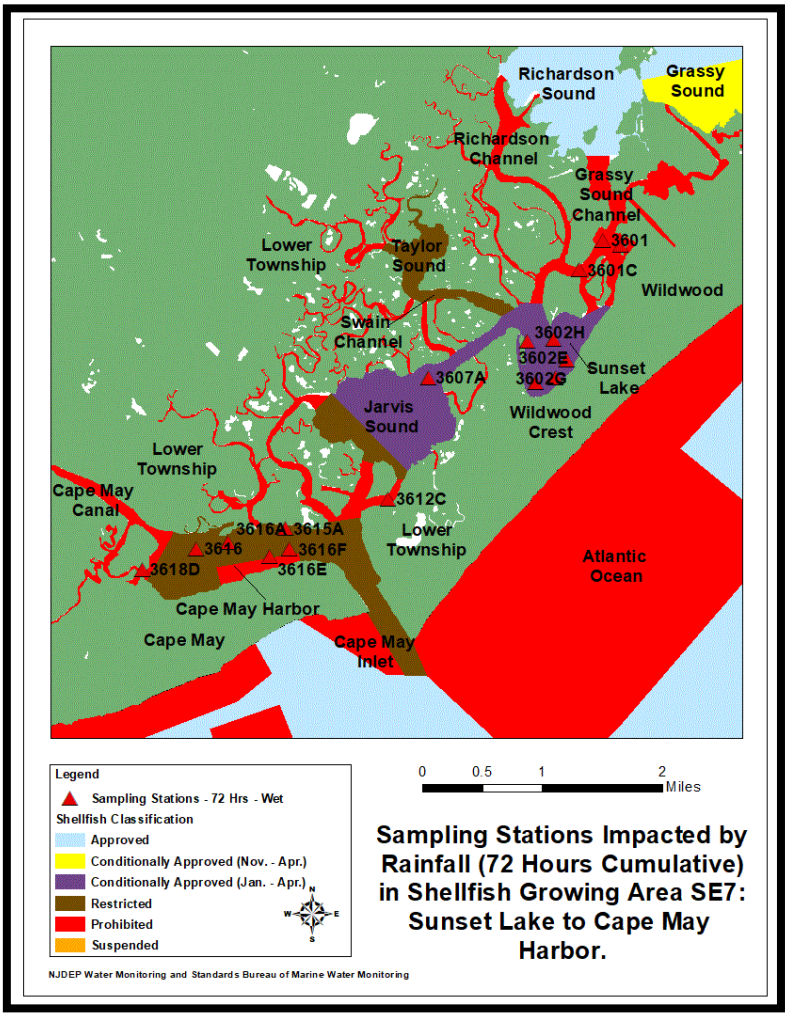
To determine whether seasonal variation can influence bacteria counts, WM&S/BMWM uses a t-test to compare the fecal coliform MPN values from samples collected during the summer season versus samples collected during the winter months. Based on the t-test results, 33 monitoring stations had a t-statistical probability of less than 0.05. These monitoring stations showed a higher geometric mean during the summer. This shellfish growing area was sampled with no seasonal preference.



Rainfall Effects

Non-point source pressures on shellfish beds in New Jersey originate in materials that enter the water via stormwater. These materials include bacteria, as well as other waste that enters the stormwater collection system.

Rainfall impacts were assessed by using a t-test to compare the fecal coliform MPN values from water samples collected during wet weather to water samples collected during dry weather from 1/1/2013 to 1/1/2018. The Wet/Dry Statistics were calculated based on a post impact time of 72 hours prior to the day of sampling and a wet/dry cutoff of 1.0 inches of rain. Any rainfall amounts above 1.0 inches are considered to be a wet condition. A sampling station is considered to be impacted by rainfall when the t-statistic probability is 0.05 or less, but not zero. Using these parameters for the rainfall data, sixteen (16) sampling stations showed an impact from rainfall for this shellfish growing area from 1/1/2013 to 1/1/2018.



Based on a significant correlation between fecal coliform values from wet/dry data for 1/1/2013 to 1/1/2018, an impact from rainfall was found to occur at sixteen (16) sampling stations throughout this shellfish growing area. These SRS sampling stations are located throughout this shellfish growing area, in *Conditionally Approved (January to April)*, *Restricted, and Prohibited* shellfish waters and showed a higher fecal coliform geometric mean during wet than dry conditions. However, the fecal coliform levels still meet the existing shellfish classification criteria for these shellfish waters. Since the water quality in this shellfish growing area is slightly impacted by rainfall but not enough to affect the shellfish classification, this area will continue to be sampled using the Systematic Random Sampling (SRS) strategy.

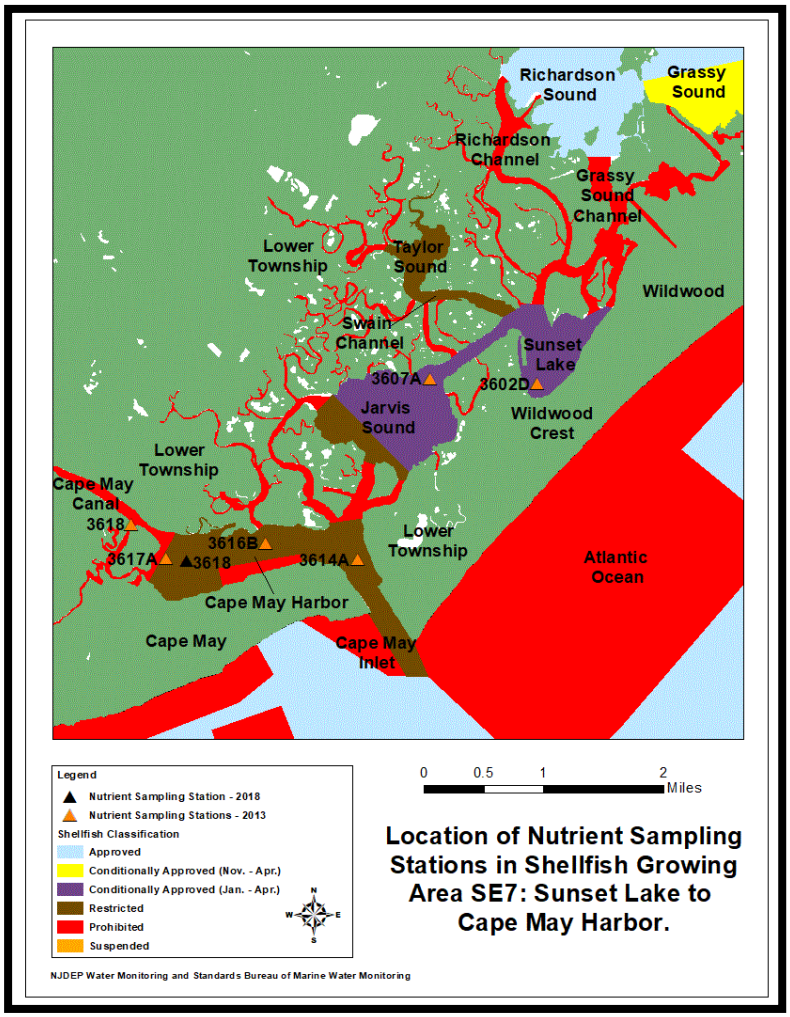
The Bureau of Marine Water Monitoring has begun to identify particular stormwater outfalls that discharge excessive bacteriological loads during storm events. In some cases, specific discharge points can be identified. When specific outfalls are identified as significant sources, the Department

works with the county and municipality to further refine the source(s) of the contamination and implement remediation activities.

RELATED STUDIES

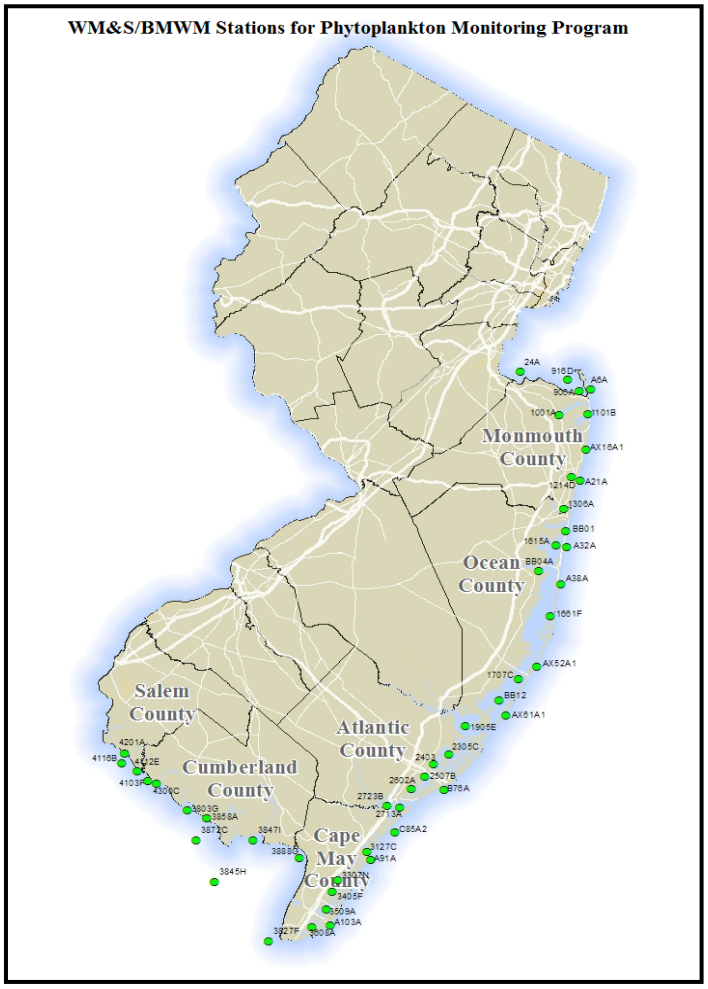
Nutrients

In this growing area for 2018, one (1) nutrient monitoring site was sampled under the estuarine monitoring program (Station 3618). At this nutrient monitoring site, various parameters were measured including water temperature, salinity levels, secchi depth, total suspended solids, dissolved oxygen levels, ammonia levels, nitrate and nitrite levels, orthophosphate levels, total nitrogen levels, and the inorganic nitrogen to phosphorus ratios. In this growing area for 2013, seven (7) nutrient monitoring sites were sampled under the estuarine monitoring program (Stations 3602D, 3607A, 3614A, 3616B, 3617A, and 3618). Between 2013 and 2018, water samples were analyzed for these nutrient parameters in this growing area. For full nutrient assessment, see the Estuarine Monitoring Reports, available electronically at:
http://www.state.nj.us/dep/bmw/reports.htm



Toxic Monitoring

The DWM&S/BMWM collects samples at regular intervals throughout the summer to determine the occurrence of marine algae that produce biotoxins (see figure to the right for the location of the 48 phytoplankton sampling stations in New Jersey). Certain planktonic species have the potential to adversely affect the suitability of shellfish for human consumption and can adversely affect the respiratory function of people. These planktonic species cause algal blooms that deplete the dissolved oxygen levels in the water.



Since 2007, algal blooms are also identified by the DWM&S/BMWM with the aid of a remote chlorophyll flight sensor. Coastal monitoring flights with remote aircraft sensing have taken place from Coyle Field in Burlington County, north to the Raritan Bay, south to the Little Egg Harbor Inlet, and back to Coyle Field (short flights), and from Coyle Field, north to the Raritan Bay, south to Cape May Point, west into the Delaware Bay, and north through the back bays of New Jersey back to Coyle Field (long flights). In a partnership between the DWM&S/BMWM, the New Jersey Forest Fire Service (aviation operations and maintenance), Rutgers University (data management), and USEPA Region 2 (funding), these flights (4 short flights and 2 long flights a week) are scheduled for six days a week from May to September of each year. Flight observers are also on these flights to observe conditions that could adversely affect bathing beach and water quality, such as the presence of algal foam from algal blooms, floating trash or debris, broken sewer lines, and the presence or absence of marine life and fish kills The sensor data from these remote aircraft sensing flights provide estimates of coastal chlorophyll 'a' levels and a perspective on bloom conditions/trends. If estimates of coastal chlorophyll 'a' levels come up high in specific areas during a coastal monitoring flight, this enables the Bureau to target boat sampling to locations where algal blooms might be occurring. The NJDEP and Rutgers University Chlorophyll Remote Sensing flights in the waters of New Jersey are available electronically at: http://njdep.marine.rutgers.edu/aircraft/.

Generally, no toxic species associated with large algal blooms over long periods have been recorded for the Ludlam Bay to Townsends Inlet Area. The phytoplankton monitoring of sampling stations in New Jersey waters is available electronically at: http://www.nj.gov/dep/bmw/phytoplankton.htm.

CONCLUSIONS

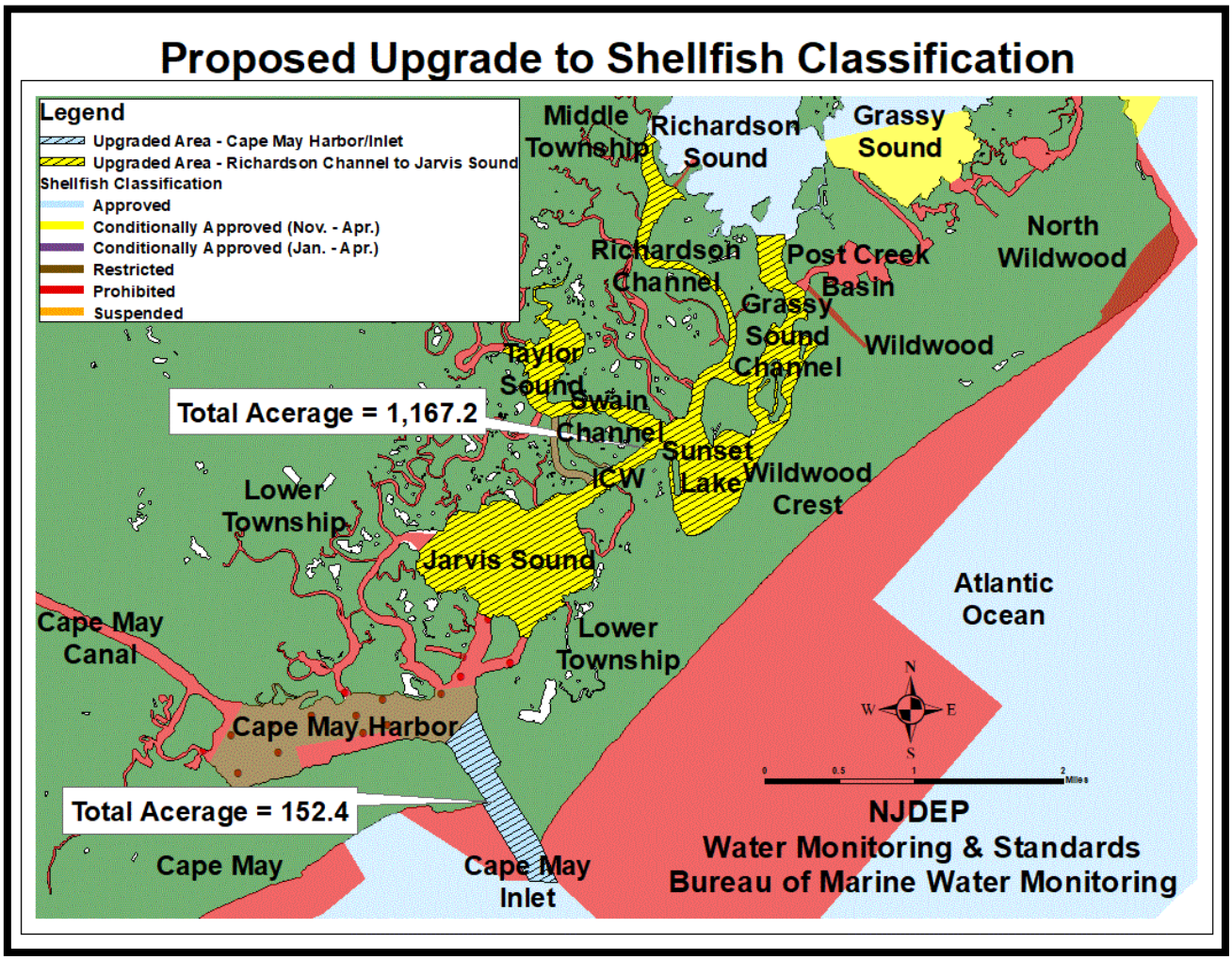
Based on the bacteriological data assessed, the overall water quality for this growing area is good. All the sampling stations meet their current classification criteria. However, the bacteria levels at all the sampling stations in Richardson Channel, Taylor Sound, Swain Channel, South Grassy Sound Channel, Sunset Lake, the Intracoastal Waterway between Sunset Lake and Jarvis Sound, Jarvis Sound, and a portion of the waters inside the Cape May Inlet showed an improvement in water quality. Therefore, approximately 1,167.2 acres of shellfish waters in Richardson Channel, Taylor Sound, Swain Channel, the south part of Grassy Sound Channel, Sunset Lake, the Intracoastal Waterway between Sunset Lake and Jarvis Sound, and Jarvis Sound are recommended for an upgrade from *Conditionally Approved (January to April), Restricted* and *Prohibited* to *Seasonally Approved (November to April),* and approximately 152.4 acres of shellfish waters inside the Cape May Inlet are recommended for an upgrade from *Restricted* to *Approved* (see figure on page 2).

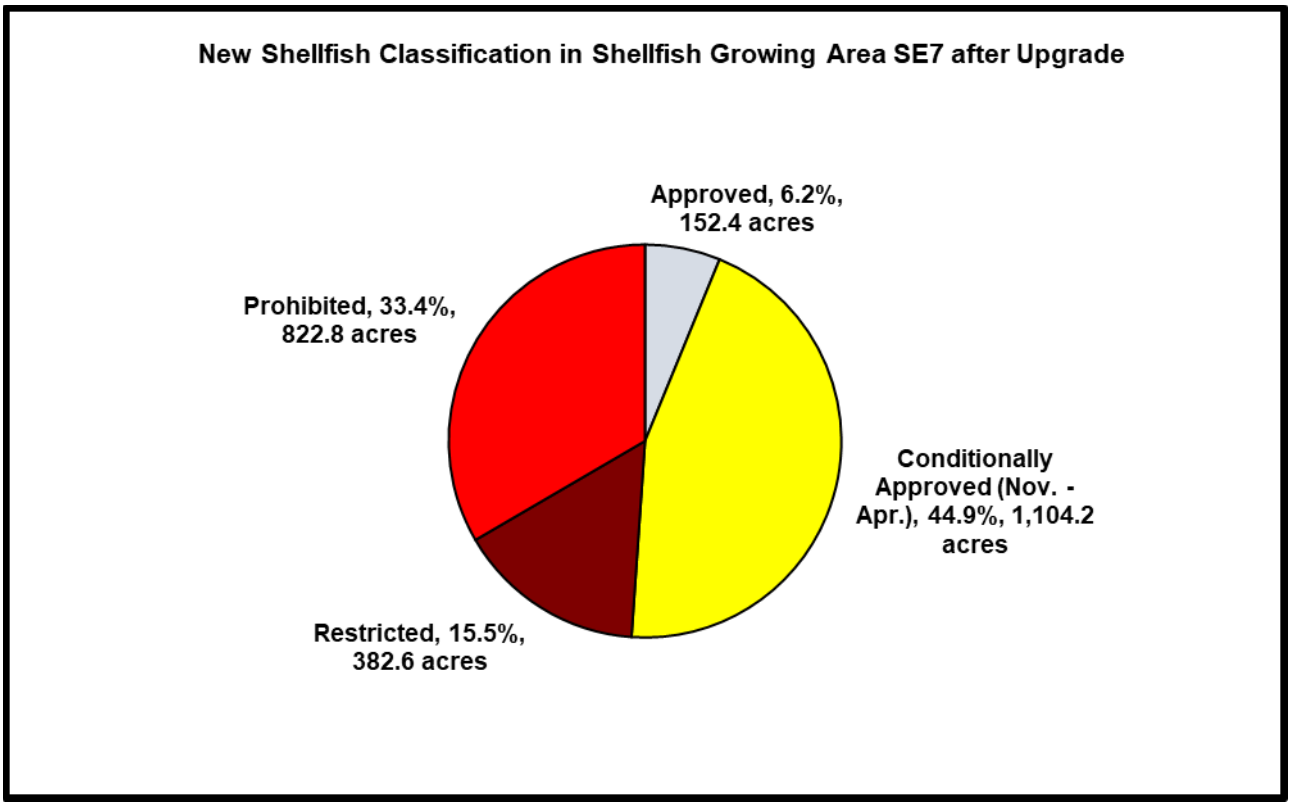
RECOMMENDATIONS

Continue sampling using the existing Systematic Random Sampling (SRS) Strategy for Assignment 277.

It is recommended that approximately 1,167.2 acres of *Conditionally Approved (January to April), Restricted,* and *Prohibited* shellfish waters in Richardson Channel, Taylor Sound, Swain Channel, the south part of Grassy Sound Channel, Sunset Lake, the Intracoastal Waterway between Sunset Lake and Jarvis Sound, and Jarvis Sound will be upgraded to the *Seasonally Approved (November to April)* shellfish classification, and approximately 152.4 acres of *Restricted* shellfish waters inside the Cape May Inlet will be upgraded to the *Approved* shellfish classification. The area to be reclassified is shown in the figure on page 29.

The New Jersey Administrative Code (N.J.A.C. 7:12) Shellfish Water Classification & Special Permit Rules need to be revised to show the change in this shellfish water classification.


Proposed Upgrade to Shellfish Classification
Legend
Upgraded Area - Cape May Harbor/Inlet
Upgraded Area - Richardson Channel to Jarvis Sound
Shellfish Classification
Approved
Conditionally Approved (Nov. - Apr.)
Conditionally Approved (Jan. - Apr.)
Restricted
Prohibited
Suspended
Middle Township
Richardson Sound
Grassy Sound
North Wildwood
Richardson Channel
Post Creek Basin
Grassy Sound Channel
Wildwood
Taylor Sound
Swain Channel
Total Acerage = 1,167.2
Sunset Lake
ICW
Wildwood Crest
Lower Township
Jarvis Sound
Atlantic Ocean
Cape May Canal
Lower Township
N
W
E
S
Cape May Harbor
0
0.5
1
2
Miles
Total Acerage = 152.4
NJDEP
Water Monitoring & Standards
Bureau of Marine Water Monitoring
Cape May
Cape May Inlet



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SUPPORTING DOCUMENTATION

A. Statistical Summaries

Year-round/ Summer/ Winter - rptStatSummary_Approved_SRS.pdf,rptStatSummary_SpecialRestricted_SRS.pdf, rptStatSummary_Approved_SRS_-_Extended_to_2009_for_Summer.pdf, rptStatSummary_Approved_SRS_-_Extended_to_2007_for_Winter.pdf

B. Seasonal Evaluation – rptStatSummary_Seasonal.pdf

C. Precipitation -

Cumulative Rainfall - rptStatsSummary_Rainfall.pdf

Wet/Dry Weather Statistical Summary – rptWetDry_24HrStats.pdf, rptWetDry_48HrStats.pdf, rptWetDry_72HrStats.pdf

D. Data Listing -2013 through 2018 - rpt_DataListing.pdf, rpt_DataListing_-_Extended_to_2009_for_Summer.pdf, rpt_DataListing_-_Extended_to_2007_for_Winter.pdf

E. Shoreline Survey photographs –Shoreline Survey of Shellfish Growing Area SE7 on March 19, 2018.docx

F. Shoreline Survey Sheets - Shoreline Survey of SE7 on March 19, 2018\Shoreline Survey of SE7 on 03-19-2018 01.pdf, Shoreline Survey of SE7 on March 19, 2018\Shoreline Survey of SE7 on 03-19-2018 02.pdf