NJ Department of Environmental Protection
Water Monitoring and Standards

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

April 2014

State of New Jersey
Chris Christie, Governor
Kim Guadagno, Lt. Governor

NJ Department of Environmental Protection
Bob Martin, Commissioner

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

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Cover Photo – Bridge along Route 47, north of Sunset Lake and west of Wildwood.

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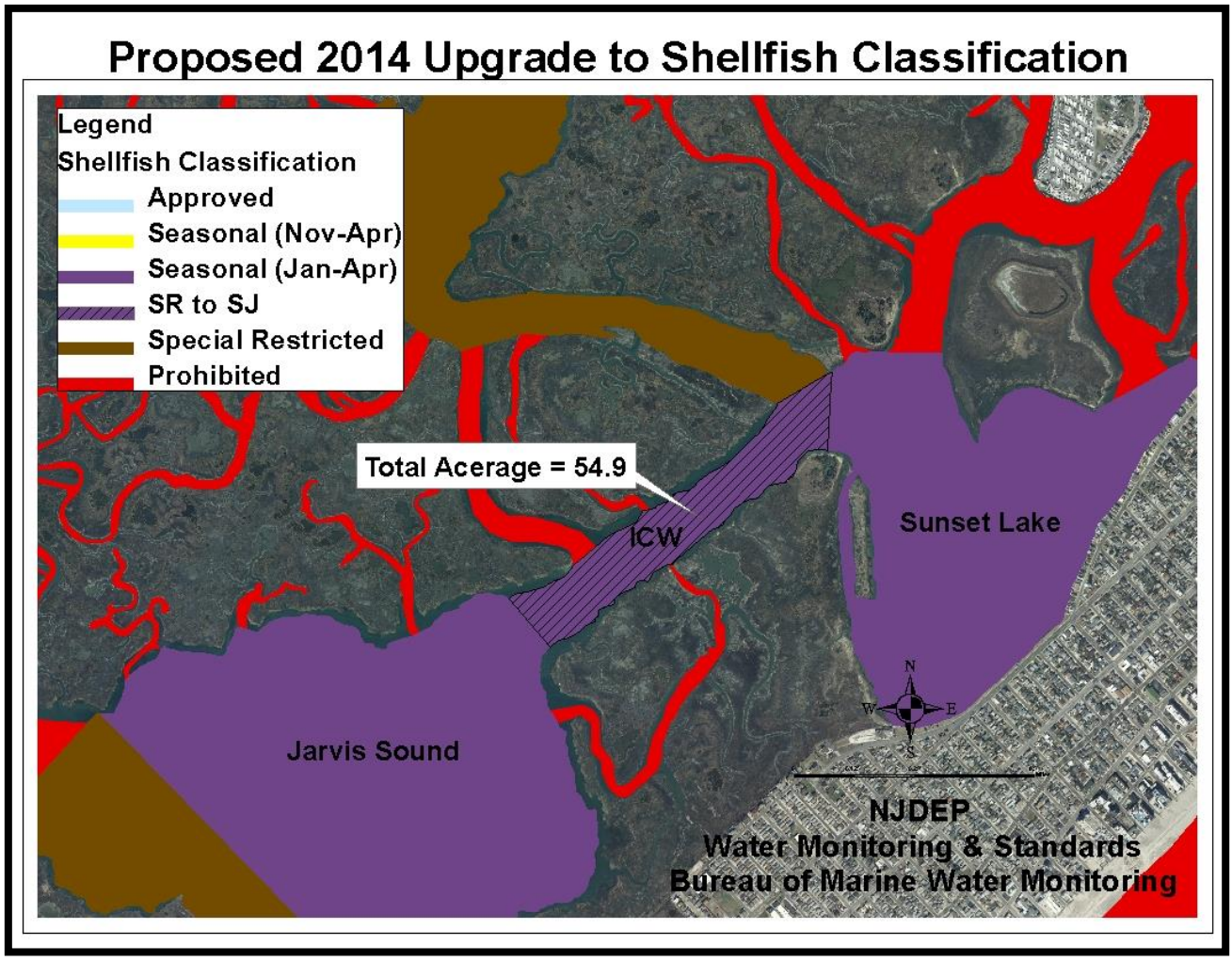
EXECUTIVE SUMMARY

Shellfish Growing Area SE-7; 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, Middle Township, and the city of Cape May. This area includes the shellfish growing waters from Sunset Lake and Taylor Sound 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 *Seasonally Approved (January to April) (24.8%), Special Restricted (31.7%),* and *Prohibited (43.5%)* (as seen in the figure on page 2 and the pie chart on page 3). The approximate size of this shellfish growing area is 2,525 acres.

This report includes water quality data collected between January 2009 and August 2013 using the Systematic Random Sampling (SRS) strategy for all of the sampling stations in this growing area. Approximately 1,604 water samples are analyzed for fecal coliform bacteria from 44 monitoring stations. The overall water quality for this growing area is good. All of the sampling stations meet their current classifications. However, bacteria levels at SRS Sampling Stations **3605C** and **3606A**, located in the *Special Restricted* waters of the ICW between Jarvis Sound and Sunset Lake, showed an improvement in water quality and met the Seasonally Approved (January to April) shellfish classification criteria. Therefore, approximately 54.9 acres of shellfish waters between Jarvis Sound and Sunset Lake will be recommended for an upgraded from *Special Restricted* to *Seasonally Approved (January to April)* (see figure on page 2). 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.


Proposed 2014 Upgrade to Shellfish Classification
Legend
Shellfish Classification
Approved
Seasonal (Nov-Apr)
Seasonal (Jan-Apr)
SR to SJ
Special Restricted
Prohibited
Total Acerage = 54.9
ICW
Sunset Lake
Jarvis Sound
N
W
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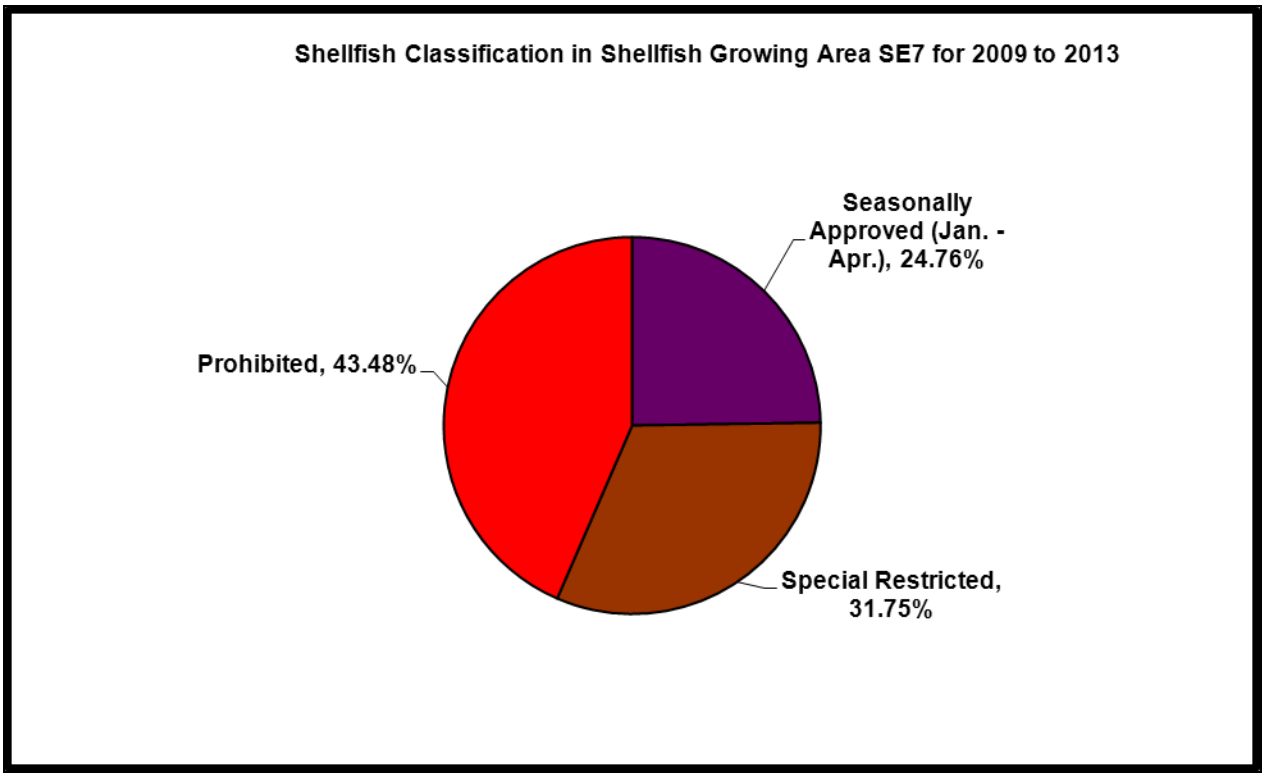
NJDEP
Water Monitoring & Standards
Bureau of Marine Water Monitoring


Shellfish Classification in Shellfish Growing Area SE7 for 2009 to 2013
Seasonally Approved (Jan. - Apr.), 24.76%
Prohibited, 43.48%
Special Restricted, 31.75%

DESCRIPTION OF GROWING AREA

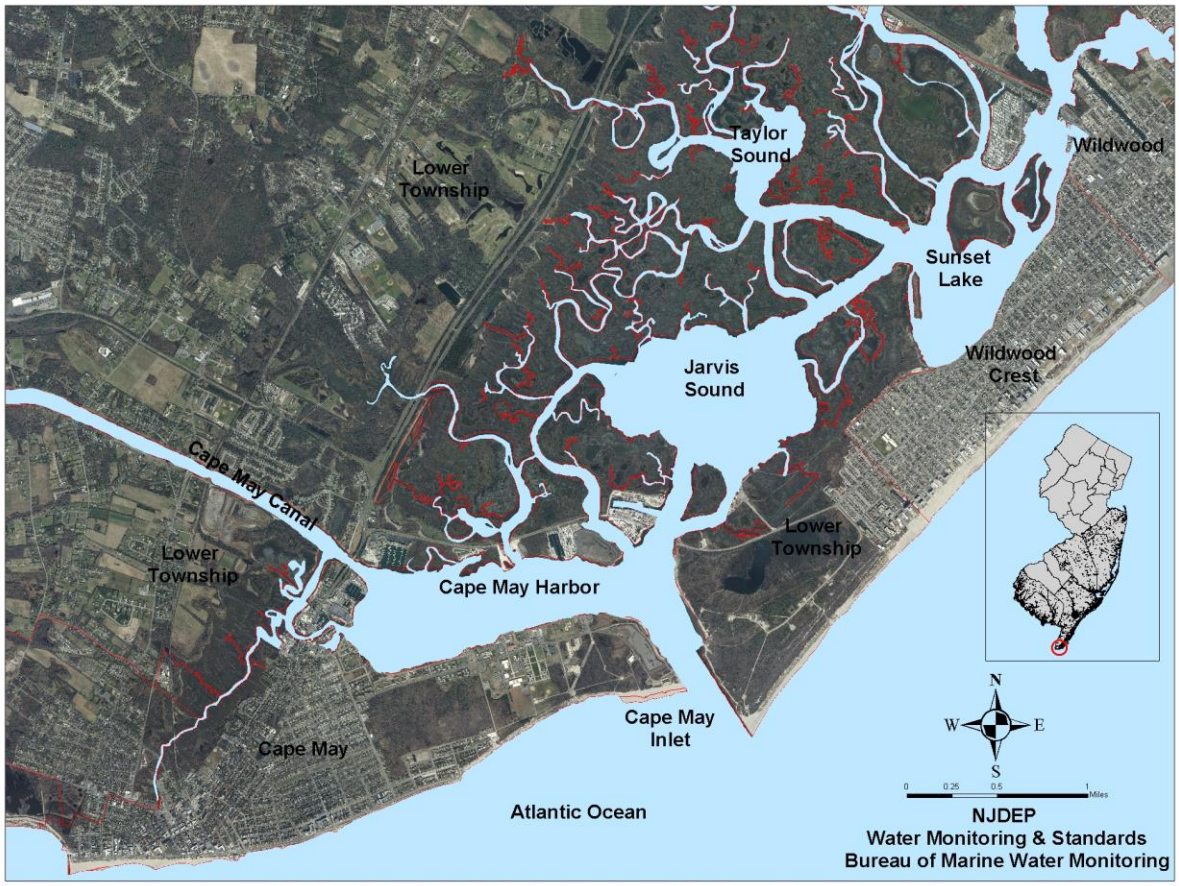
Location & Description

Shellfish Growing Area SE7 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 shellfish waters in this growing area are bordered to the north by Middle Township, to the east by Wildwood, Wildwood Crest, and Lower Township, to the west by Lower Township, and to the south by Lower Township and Cape May.

The principal bodies of water in this area are Taylor Sound, Sunset Lake, Jarvis Sound, the Cape May Canal, the Cape May Harbor, and the Cape May Inlet. This area also includes Richardson Channel, Grassy Sound Channel, Shaw Cutoff, Sedge Creek, Stites Creek, Stingaree Creek, Swain Channel, Taylor Creek, Terrapin Thorofare, Jones Creek, Old Turtle Creek, Jarvis Sound Thorofare, Reubens Thorofare, Punyard Creek, Haulover Creek, York Creek, Meadow Creek, Shell Thorofare, Upper Thorofare, Bennett Creek, Mill Creek, Skunk Sound, Ford Creek, Middle Thorofare, Duck Gut, Mud Hen Gut, Lower Thorofare, Old Lower Thorofare, Schellenger Creek, Spicer Creek, and Cape Island Creek.

The approximate size of this shellfish growing area is about 2,525 acres. The shellfish classification for this growing area is *Seasonally Approved (January to April)*, *Special Restricted*, and *Prohibited* for shellfish harvesting. The *Seasonally Approved (January-April)* waters are located in the north part of Jarvis Sound and Sunset Lake. The *Special Restricted* waters are located in Taylor Sound, Swain Channel, the Intercoastal Waterway from Swain Channel to Jarvis Sound, the south part of Jarvis Sound, the Cape May Harbor (not including a *Prohibited* buffer area south of the Cape May Harbor at the docks for the U.S. Coast Guard Receiving Center, and a *Prohibited* buffer area west of the Cape May Harbor at the docks for Utsch's Marina), and the Cape May Inlet. The *Prohibited* waters include the rest of the waters in this shellfish growing area.

Location and Municipalities



Sunset Lake west of Wildwood

Jarvis Sound near Two Mile Landing

Cape May Harbor north of Cape May

Growing Area Classification

The waters of this shellfish growing area are classified as *Seasonally Approved (January-April), Special Restricted* and *Prohibited.* There are approximately 625.2 acres of *Seasonally Approved (January to April)* waters, 801.8 acres of *Special Restricted* waters, and 1,098.0 acres of *Prohibited* waters in this shellfish growing area.

Before 1970, this entire shellfish growing area was classified as *Prohibited* waters. It was not until 1970 that certain parts of this area were upgraded to the *Special Restricted* classification based on water quality.

Prior to 1996, this shellfish growing area was composed of two sampling assignment areas (assignments 277 and 278). An assignment area includes all of the sampling stations that can reasonably be sampled in a day in a specified area, which are sampled using the same sampling strategy. In the 1996-1997 scheduled runs for this area, both assignment areas were consolidated into one assignment area (assignment 277) and this area was sampled using the Adverse Pollution Condition (APC) Strategy (the adverse condition was rainfall priority).

In October 1996, a reevaluation of this shellfish growing area was written using data from 1988 to 1996, and 325 acres of *Prohibited* shellfish waters were upgraded to the *Special Restricted* shellfish classification. In 1998, the sampling strategy was changed from the Adverse Pollution Condition

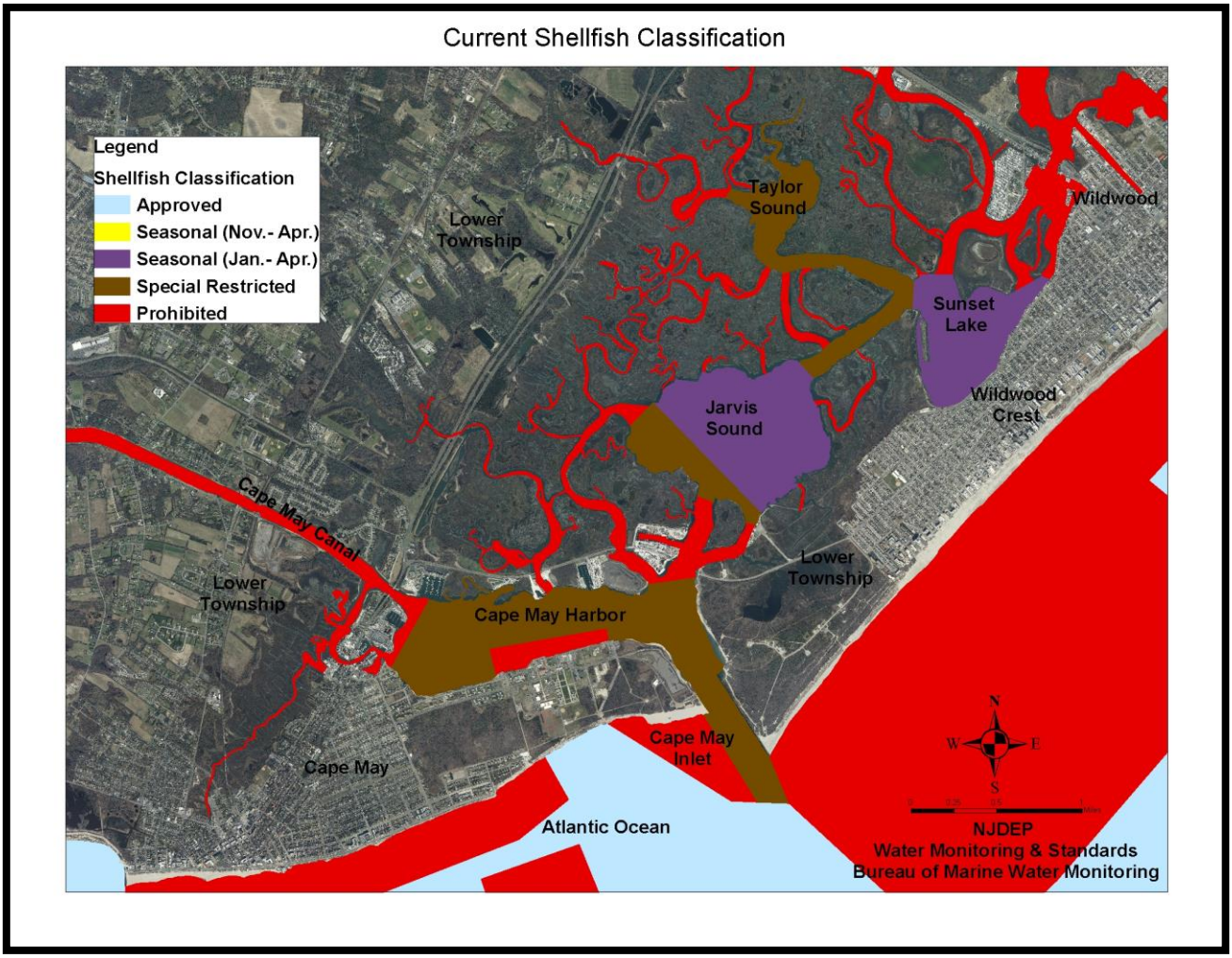
(APC) to Systematic Random Sampling (SRS) Strategy due to the improvement in the water quality of Sunset Lake.

The last Sanitary Survey for Shellfish Growing Area SE-7 (Jarvis Sound and Cape May Harbor) was written in 2003. In this report, 349 acres of *Special Restricted* waters in the north part of Jarvis Sound were upgraded to the *Seasonally Approved (January to April)* shellfish classification based on an improvement in the water quality of this area (Wesighan, 2003).

In October 2008, a reevaluation report of this shellfish growing area was written using data from 2003 to 2008 and an upgrade in the shellfish classification from *Special Restricted* to *Seasonally Approved (January to April)* was recommended for Sunset Lake. There were also no observed changes to the pollution sources of this area, as documented in the shoreline survey conducted for this shellfish growing area (Wesighan, 2008).

In the 2010 and 2011 Annual Review of Shellfish Growing Area SE-7, no classification change was proposed for this shellfish growing area (NJDEP, 2011). No sampling stations in this shellfish growing area exceeded the existing shellfish classification criteria, and the data supports the existing shellfish classifications for this area.

The figure on the next page illustrates the shellfish classification for this growing area. The shellfish classification of this area can be seen in the 2012 State of New Jersey Shellfish Growing Water Classification Charts on chart number 17, or on WM&S/BMWM's website at http://www.state.nj.us/dep/bmw/.



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 (Morris, 1975, Gosner, 1978).

Blue crabs (*Callinectes sapidus*) are also harvested in this area. Taylor Sound, Sunset Lake, Jarvis Sound, the Cape May Harbor, and the Cape May Inlet are also utilized for fishing, boating, and other marine activities. Many species of fish can be found in the waters of this shellfish growing area. The important fish species caught by marine recreational anglers are: Bluefish (*Pomatomus saltatrix*); Striped Bass (*Morone saxatillis*); Weakfish (*Cynoscion regalis*); Winter Flounder (*Pseudpleuronectes americanus*); Summer Flounder (Fluke) (*Paralichthys dentatus*); Tautog (*Tautoga onitis*); Scup (Porgy) (*Stenotomus chrysops*); Black Sea Bass (*Centropristus striata*); Northern Searobin (*Prionotus carolinus*); Northern Puffer (*Spheroides maculatus*); Atlantic Silverside (*Menidia menidia*); and Mummichog (killies, minnows) (*Fundulus heteroclitus*) (The Richard Stockton College of New Jersey, 2002). In 1991, the Striped Bass (*Morone saxatillis*) was

classified as a gamefish in New Jersey, and this status prevents the commercial harvest or sale of this first coastal saltwater species designated as such in New Jersey (Bochenek, 2000).

Many species of animals and vegetation can be found in the marshes of this shellfish growing area. Wildlife populations (birds and animals) are actual contributors to water quality in Richardson Channel, Grassy Sound Channel, Taylor Sound, Swain Channel, Sunset Lake, Jarvis Sound, Upper Thorofare, Middle Thorofare, and Lower Thorofare. Large numbers of gulls are usually observed feeding near the marinas at the east end of the Cape May Canal in Cape May Harbor (east side of the bridge going into Cape May). Birds sometimes may accumulate around the groins, jetties, seawalls, and bulkheads on the coast of this ocean shellfish growing area, and fecal matter from these birds could affect the water quality.

This shellfish growing area is almost completely surrounded by a shoreline of marshes, with areas of bulkheads, erodable shorelines, rock shorelines, and beaches composing the remainder of the shoreline. Bulkheads are located along the northeast shoreline of Sunset Lake (west of Wildwood Crest), along part of the south shoreline of Grassy Sound Channel, along the north shore of Shaw Cutoff, along part of the north shoreline of the Cape May Harbor, and along all of the west and south shorelines of the Cape May Harbor. Areas with an erodable shoreline include the southeast shoreline of Sunset Lake and part of the shoreline of Richardson Channel. Beaches and jetties border the Cape May Inlet area, and the Cape May Canal is bordered by a shoreline of rock (concrete walls).

This area also includes a wide variety of marsh types and vegetation, including vegetated salt marshes, tidal waters, non-wetlands, non-tidal ponds, sandy developed beaches, developed areas, and small areas of coastal scrub shrub (see figure on page 7). These marsh types and vegetation are located throughout the adjacent shoreline of this shellfish growing area. The north shoreline of the Cape May Inlet is sandy developed beaches and non-wetlands, while the south shoreline of the Cape May Inlet is sandy developed beaches and developed areas. Vegetated salt marshes, tidal waters, non-wetlands, and non-tidal ponds primarily border Richardson Channel, Taylor Sound, Swain Channel, Sunset Lake, Jarvis Sound, Upper Thorofare, Middle Thorofare, and Lower Thorofare.

SHORELINE SURVEY: EVALUATION OF POTENTIAL POLLUTION SOURCES

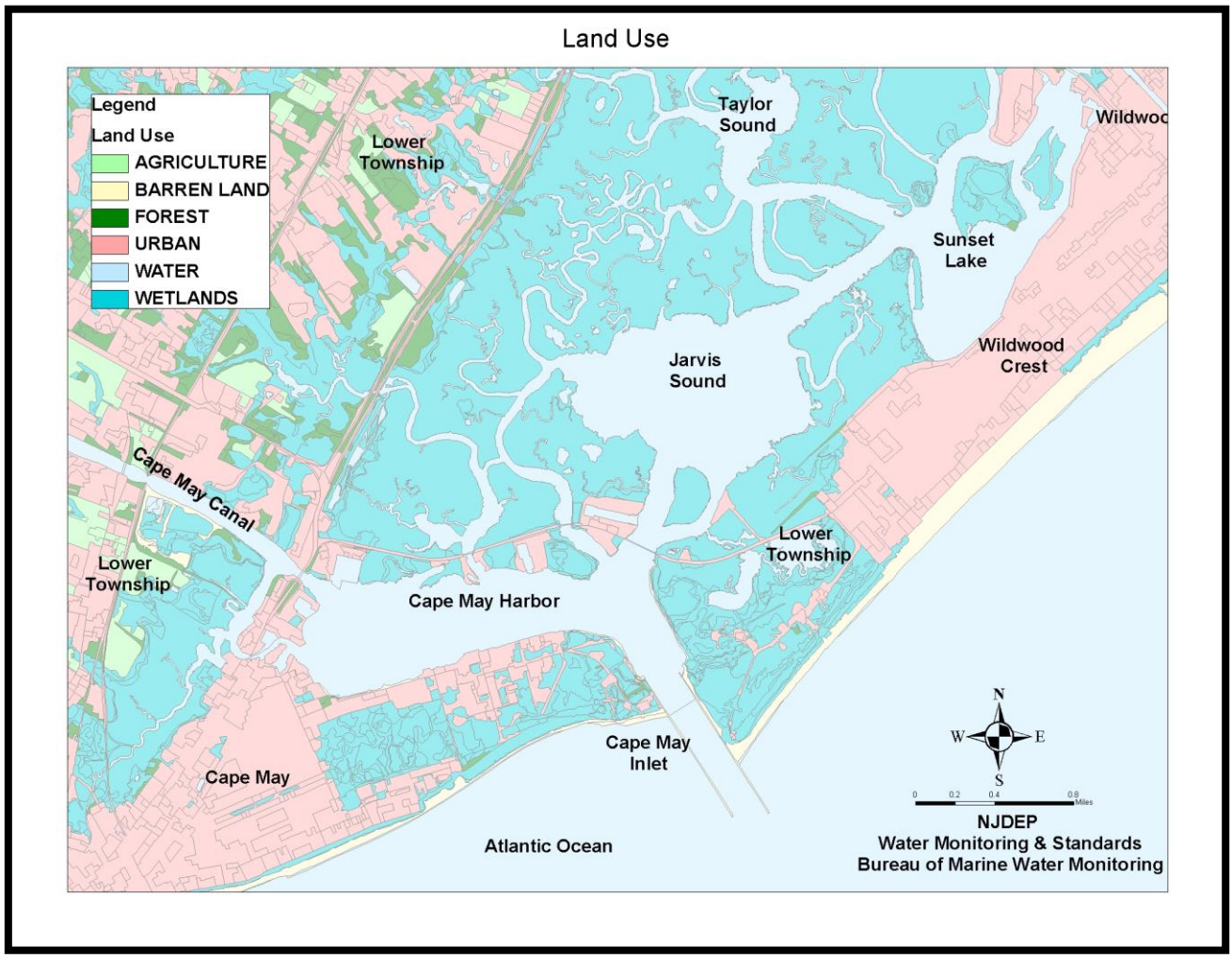
Shoreline Survey

The shoreline survey that was performed for this area on April 1, 2014 determined that there have been minor changes made to the area since the last reappraisal of this area.

There were photographs taken during the shoreline survey of this shellfish growing area on April 1, 2014. The photograph on the front cover shows the location of the bridge along Route 47, north of Sunset Lake and west of Wildwood. 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

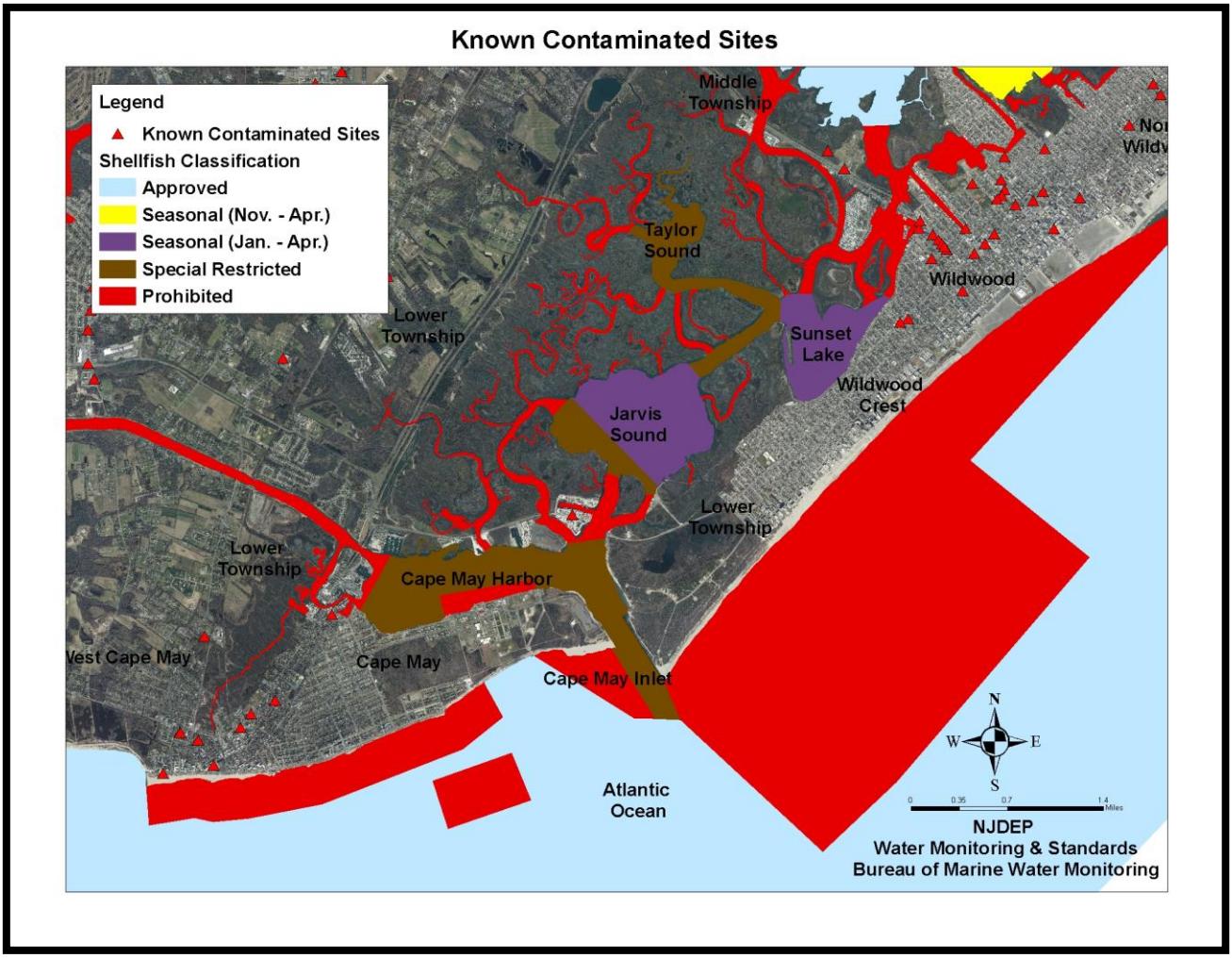
An extensively urbanized area to the east and south and tidal wetlands to the north and west border much of this area. The urban areas to the east and south are resort areas (Wildwood, Wildwood Crest, and Cape May) with significant boating and marine activities during the summer months. There are currently 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, Mill Creek, and Warren 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.



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).

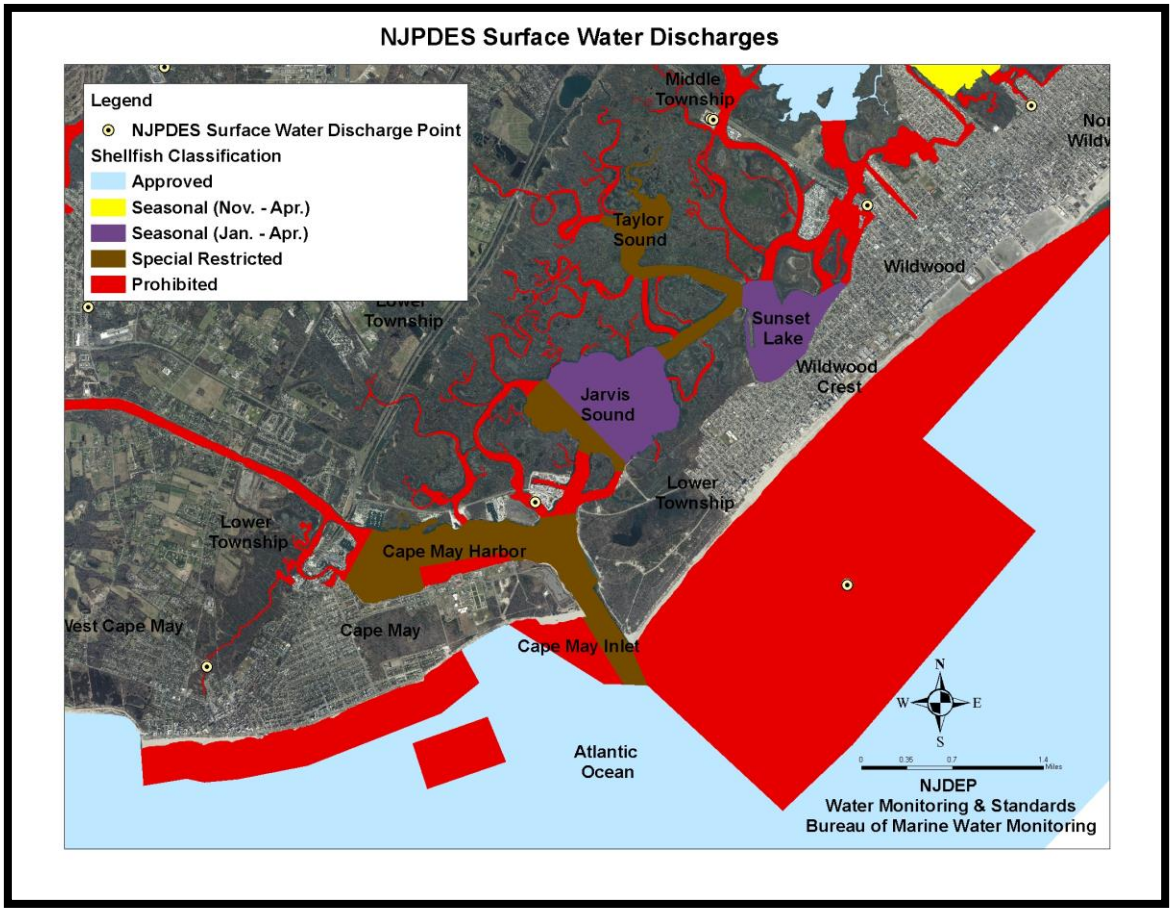
This shellfish growing area, which extends from Sunset Lake to Cape May Harbor, has several known contaminated sites located in the adjacent areas (see figure on next page). The major concentrations of these known contaminated sites are located to the east in Wildwood and Wildwood Crest, to the northwest in Middle Township, and to the west in Lower Township. There are also a few known contaminated sites located to the south in 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).

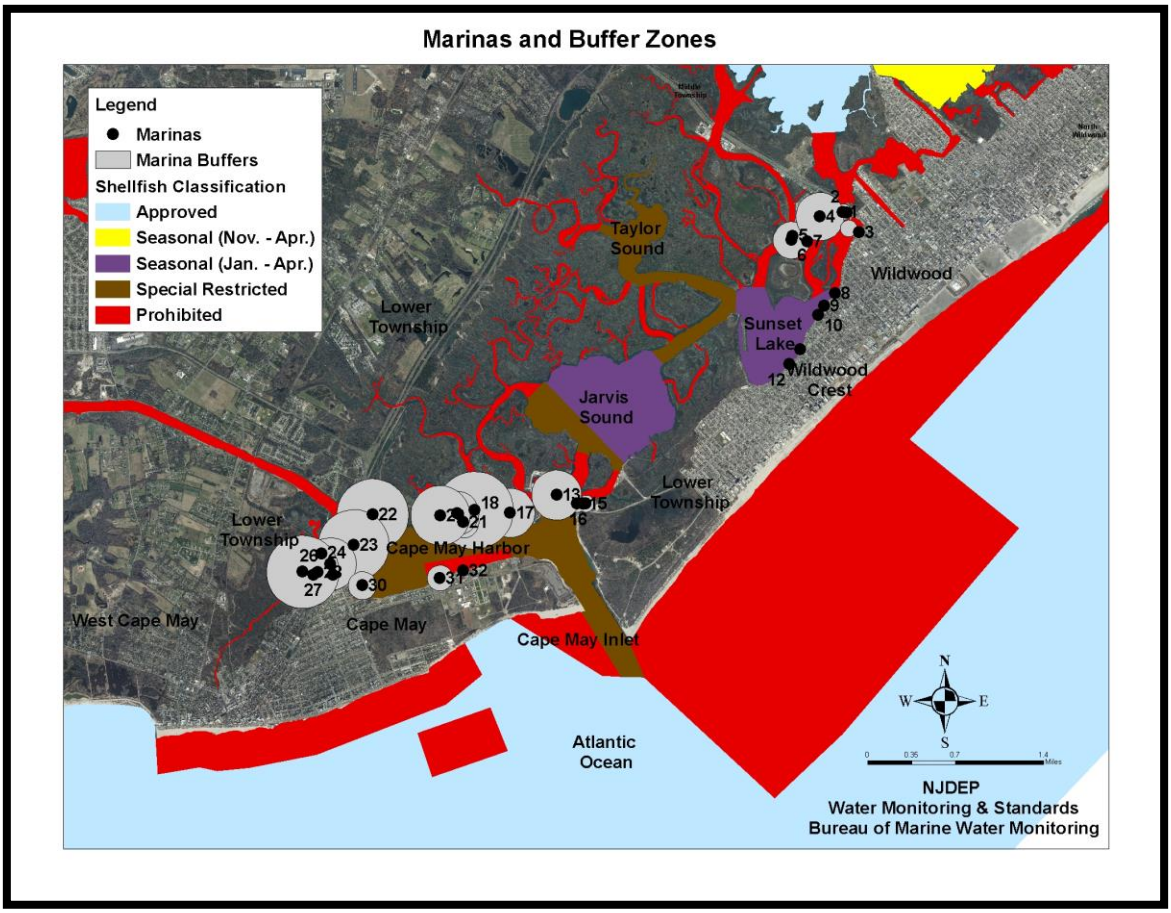
A surface water discharge involves the release of treated effluent from various municipal and industrial facilities directly into a river, stream, or the ocean. According to the NJPDES program, there was no surface discharger found in this shellfish growing area.



Marinas

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. Chemical compounds, such as oil and gasoline resulting from spills, leaks, and pressure washing 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. (NOAA) For this reason, waters within the marina basin are restricted to shellfish harvesting. 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*, *Special Restricted*, or *Seasonally Approved* (no harvest during summer months when the marina is normally active). There are 32 marinas situated within and adjacent to this shellfish growing area

To protect waters from the pollution generated by marina related activities, NJDEP implemented the New Jersey Clean Marina Program. This is a volunteer based program for marinas. The program provides assistance and guidance to marinas 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 do participate in this program. The lists of marinas that are certified and/or pledged under this program are on http://www.njcleanmarina.org/.

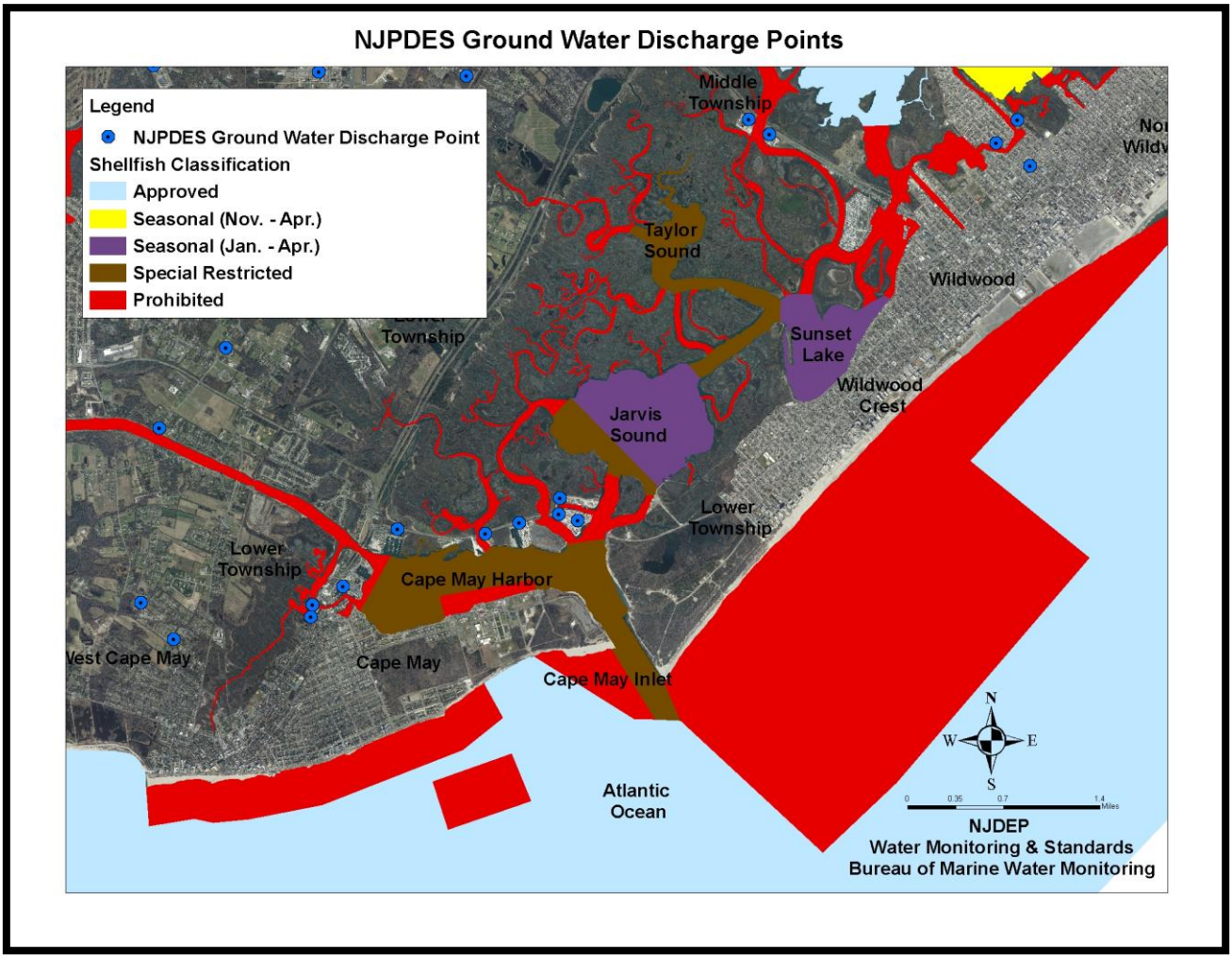


Map Key	Marina Name	Location	# of Wet Slips Total/Boats > 24ft.	*Size of Buffer Area* (radius; feet)	*Average Water Depth (ft)*	*Pumpout Facility*
1	Mocean Water Sports	Wildwood	12/12	347	8	No
2	Sea Raider Charter	Wildwood	7/7	265	8	No
3	Schooner Island Marina	Wildwood	310/310	2231	5	Yes
4	Lighthouse 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

Breezee Lee Yacht Club, north of Cape May Harbor

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), and septic areas are shown in the map below.


NJPDES Ground Water Discharge Points
Legend
NJPDES Ground Water Discharge Point
Shellfish Classification
Approved
Seasonal (Nov. - Apr.)
Seasonal (Jan. - Apr.)
Special Restricted
Prohibited
Middle Township
Taylor Sound
Wildwood
Sunset Lake
Wildwood Crest
Jarvis Sound
Lower Township
Cape May Harbor
Lower Township
Cape May
Cape May Inlet
Atlantic Ocean
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Water Monitoring & Standards
Bureau of Marine Water Monitoring

Spills, Unpermitted Discharges, and Closures

Spills

On November 16, 2007, a diesel fuel spill was reported for the area of 1600 Delaware Avenue near the Cape May Harbor in Cape May. According to the report sent to WM&S' Bureau of Marine Water Monitoring on this date at 10:00 A.M., an unknown amount of diesel oil spilled into the Cape May Harbor at this location from a sailboat that sank in these waters the night before. The shellfish classification of the Cape May Harbor in this area is *Special Restricted* to shellfish harvesting. This diesel oil spill was reported as terminated on this date at 11:03 A.M. and the cleanup of the area was completed at the time this report was received.

There were no emergency closures of shellfish waters in area SE7 due to spills or unpermitted discharges for the time period from January 2009 to August 2013.

Dredging

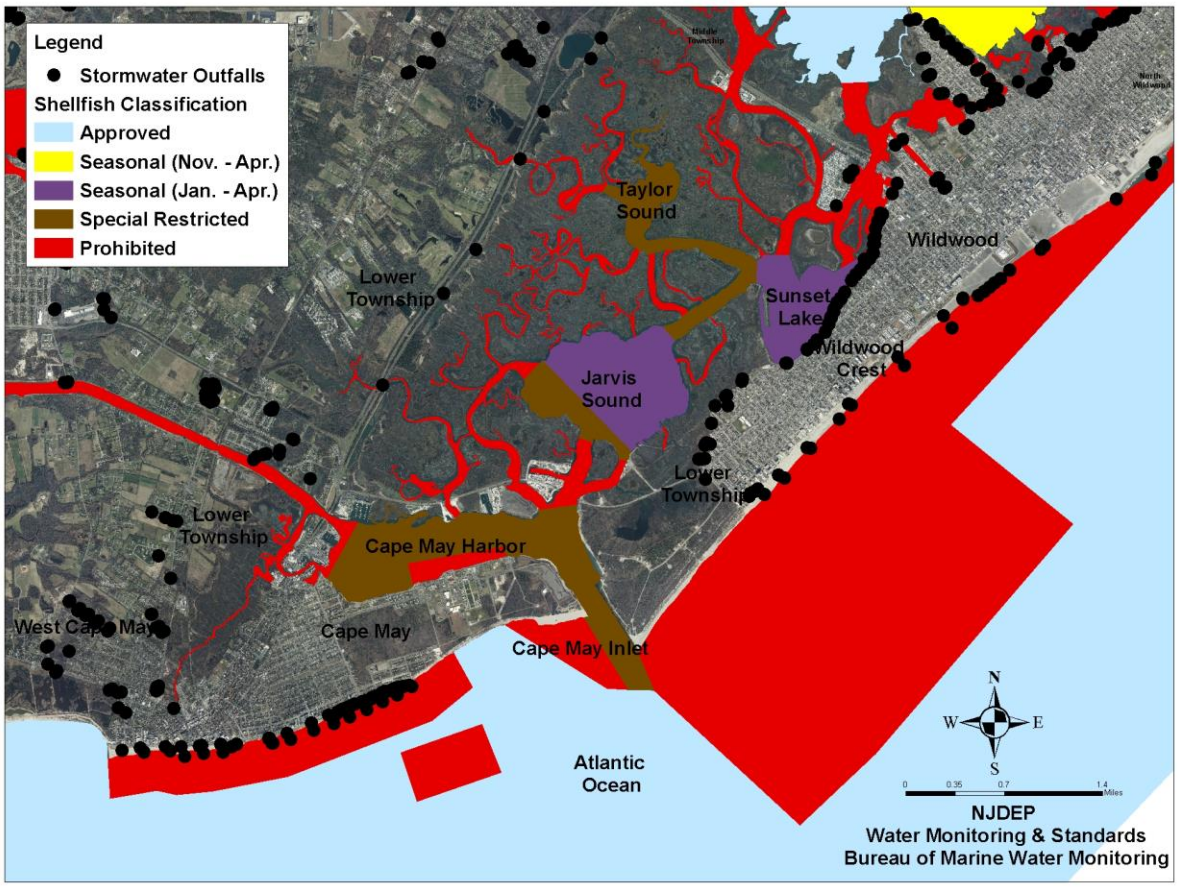
The process of dredging can impair water quality and contaminate shellfish beds that are living near dredging and disposal sites. WM&S/BMWM is given the opportunity to review such projects through CAFRA submission and will deny a project if the proposed dredging or disposal site can potentially contaminate 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. There were two dredging projects submitted to DLUR between 2009 and 2013 for this area. Dredging projects were submitted and approved by WM&S/BMWM for BreeZee Lee Marina and Mill Creek because contamination to shellfish beds was determined to be negligible.

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 67 outfalls in this area have the potential to impact water quality. The bulk of these outfalls are in Lower Township, Wildwood, Wildwood Crest, and West Wildwood.

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

Stormwater Discharges



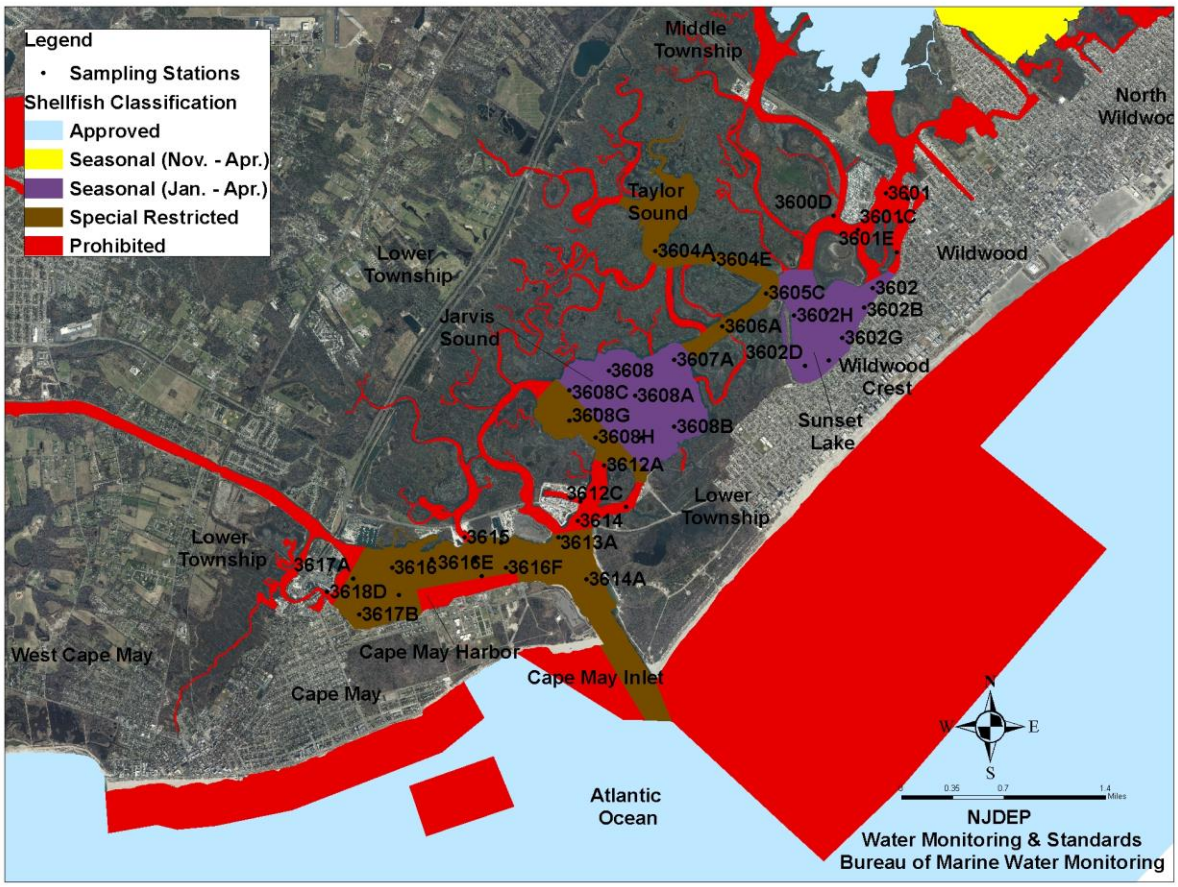
WATER QUALITIES STUDIES

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, 2011*. This shellfish growing area is not impacted by discharges from sewage treatment facilities or combined sewer overflows; therefore, it was sampled under the Systematic Random Sampling Strategy (SRS).

Water sampling was performed in accordance with the Field Procedures Manual (NJDEP, 2005). From 2009 through 2013, approximately 1,604 water samples were collected for fecal coliform bacteria from 44 monitoring stations. The locations of these stations are shown in the figure on the next page. 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 2011. 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).

Location of Sampling Stations



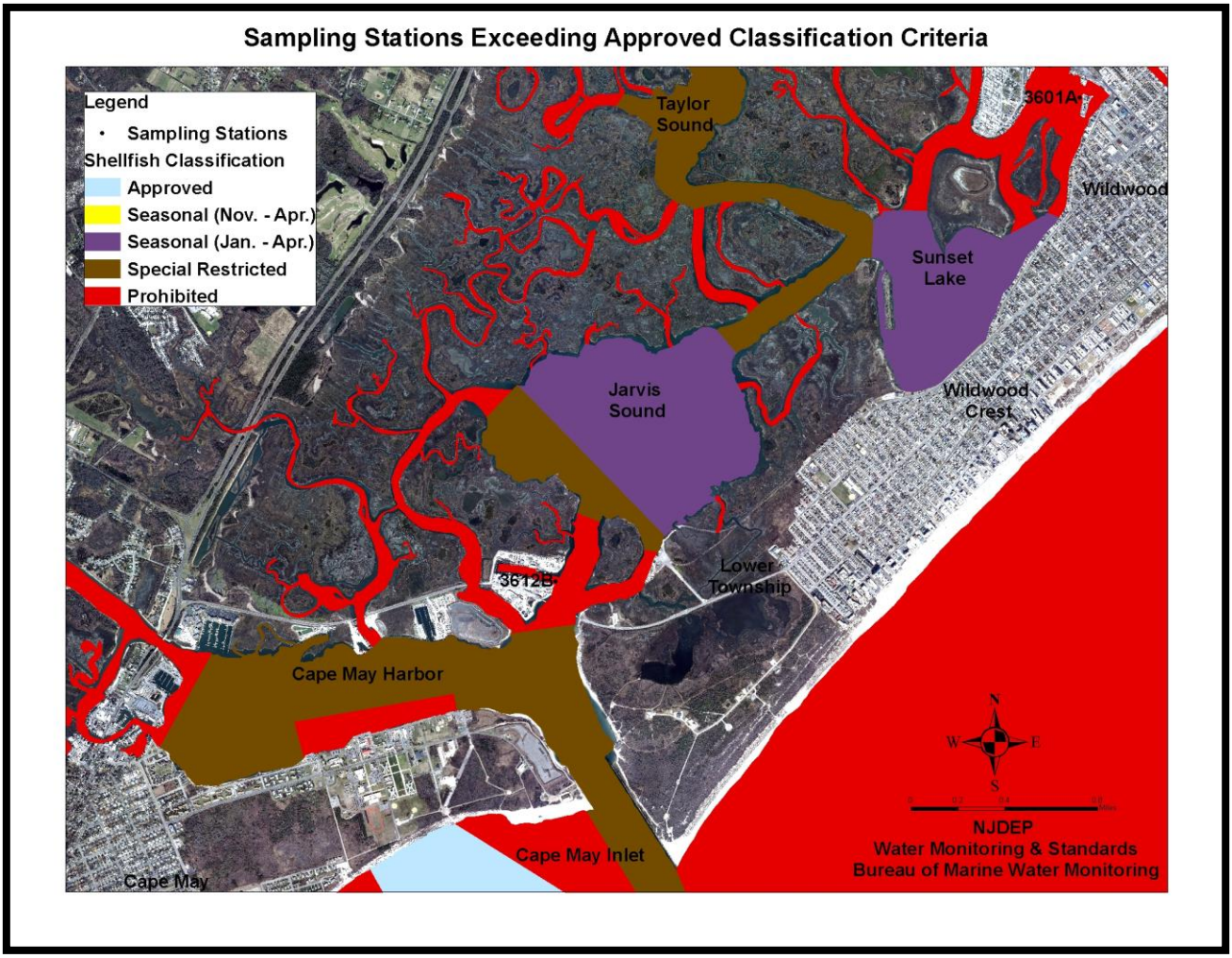
Bacteriological Quality

This report includes data analyzed from January 2009 to August 2013. 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 preceding figure shows all of the sampling stations for this area. The raw data listings for each sampling station, in accordance with the National Shellfish Sanitation Program (NSSP), are at the end of this report in the Appendix.

Compliance with NSSP SRS Criteria

Two of the sampling stations in this shellfish growing area (Sampling Stations **3601A** and **3612B**) exceeded the *Approved* shellfish classification criteria, year-round, in the summer, and in the winter. Sampling Station **3612B** is located in Middle Thorofare in *Prohibited* shellfish waters and **3601A** is located in Grassy Sound Channel in *Prohibited* shellfish waters. Both of these sampling stations meet the *Special Restricted* shellfish classification criteria. However, these sampling stations are located near Hinch's Marina, Two Mile Landing Marina, Cape Harbor Yacht Club, Schooner Island, Lighthouse Point, Mocean Water Sport, and Sea Raider Charter and the *Prohibited* shellfish classification of these shellfish waters is based on the possible impact by potential sources of pollution from activities in and around these marinas. Therefore, all of the sampling stations in this area were in compliance with their existing shellfish classification criteria. Some of the other sampling stations in this growing area are also located in shellfish waters which could possibly be impacted by potential sources of pollution, such as the activities in and around the marinas, and the stormwater released from the stormwater outfall pipes into the waters of this area and these shellfish waters are classified accordingly. There were no stations that exceeded the NSSP shellfish classification criteria for water quality in the *Seasonally Approved (January-April), Special Restricted,* and *Prohibited* waters of this shellfish growing area.

Bacteria levels at Sampling Stations **3605C** and **3606A**, located in the *Special Restricted* waters of the ICW between Jarvis Sound and Sunset Lake, showed an improvement in water quality and met the *Seasonally Approved (January to April)* shellfish classification criteria. Therefore, approximately 54.9 acres of shellfish waters between Jarvis Sound and Sunset Lake have been recommended for an upgrade from *Special Restricted* to *Seasonally Approved (January to April).*

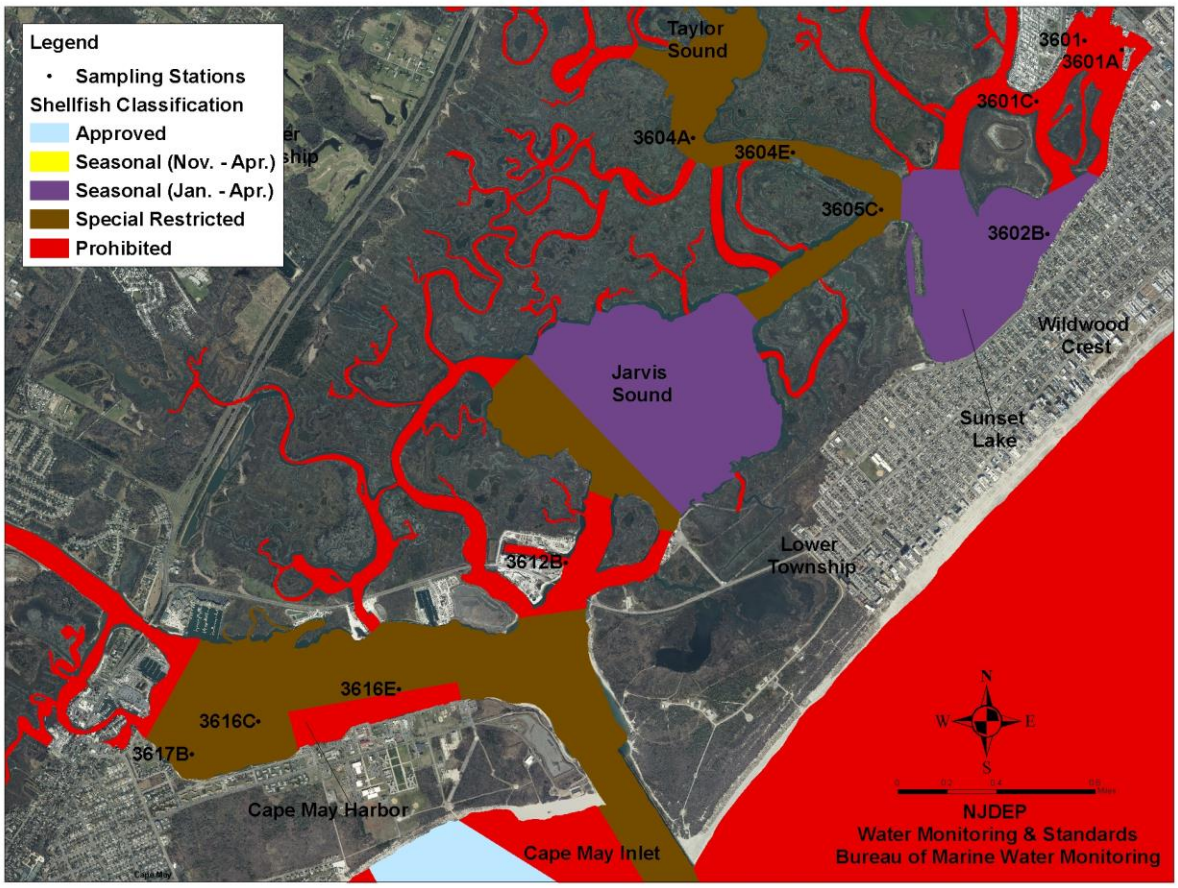


Seasonal Effects

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, 11 monitoring stations had a t-statistical probability of less than 0.05. All of these monitoring stations show a higher geometric mean during the summer than during the winter. This shellfish growing area was sampled with no seasonal preference.

Seasonal Sampling Stations



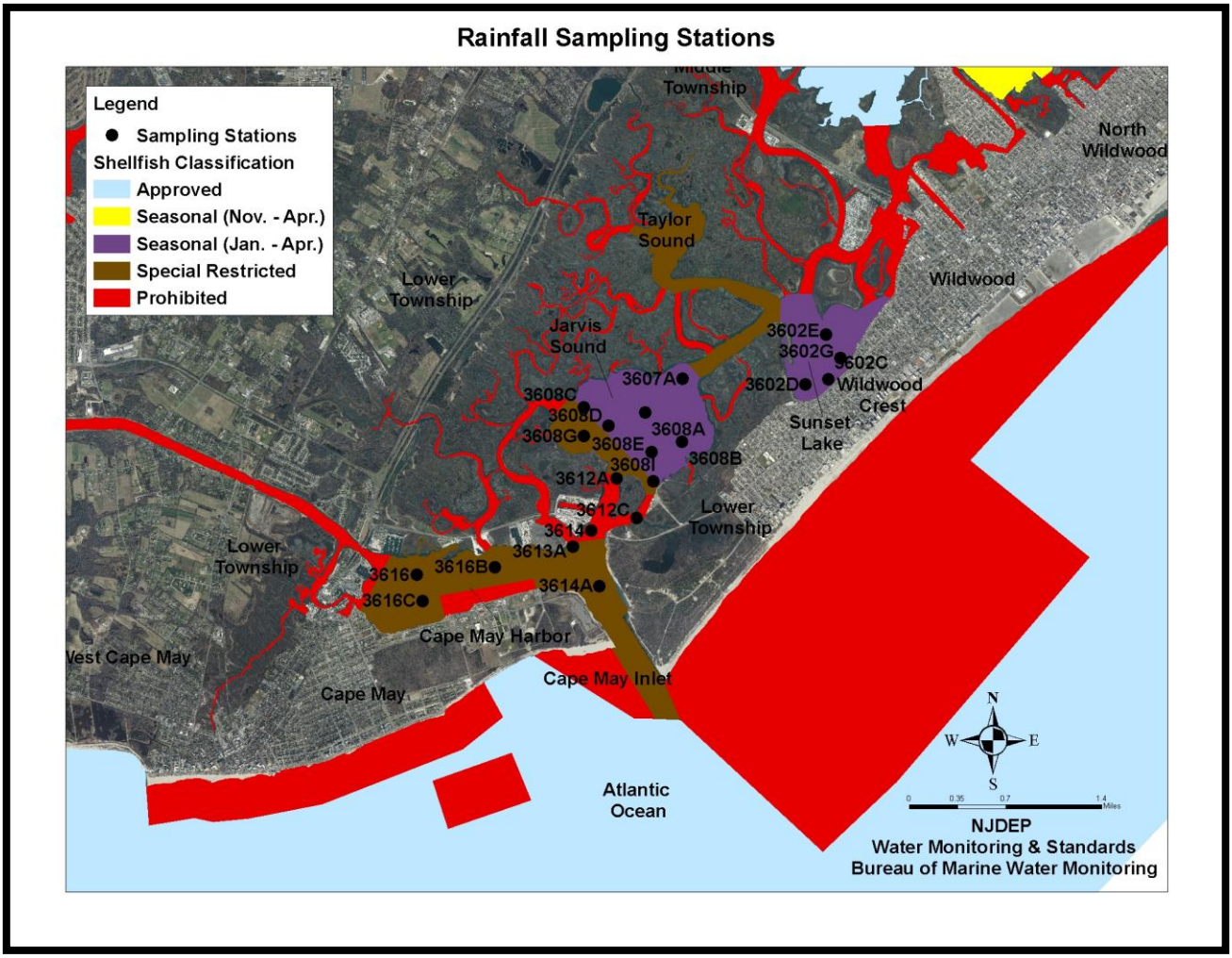
Rainfall Effects

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 1/1/2009 to 8/30/2013. The Wet/Dry Statistics were calculated based on a post impact time of 24 hours prior to the day of sampling and a wet/dry cutoff of 0.3 inches of rain. Any rainfall amounts above 0.3 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.

Based on a significant correlation between fecal coliform MPN values from wet/dry data for 1/1/2009 to 8/30/2013, an impact from rainfall was found to occur at twenty sampling stations in this shellfish growing area. These twenty SRS sampling stations are located throughout this shellfish growing area, in *Seasonally Approved (January to April), Special 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.

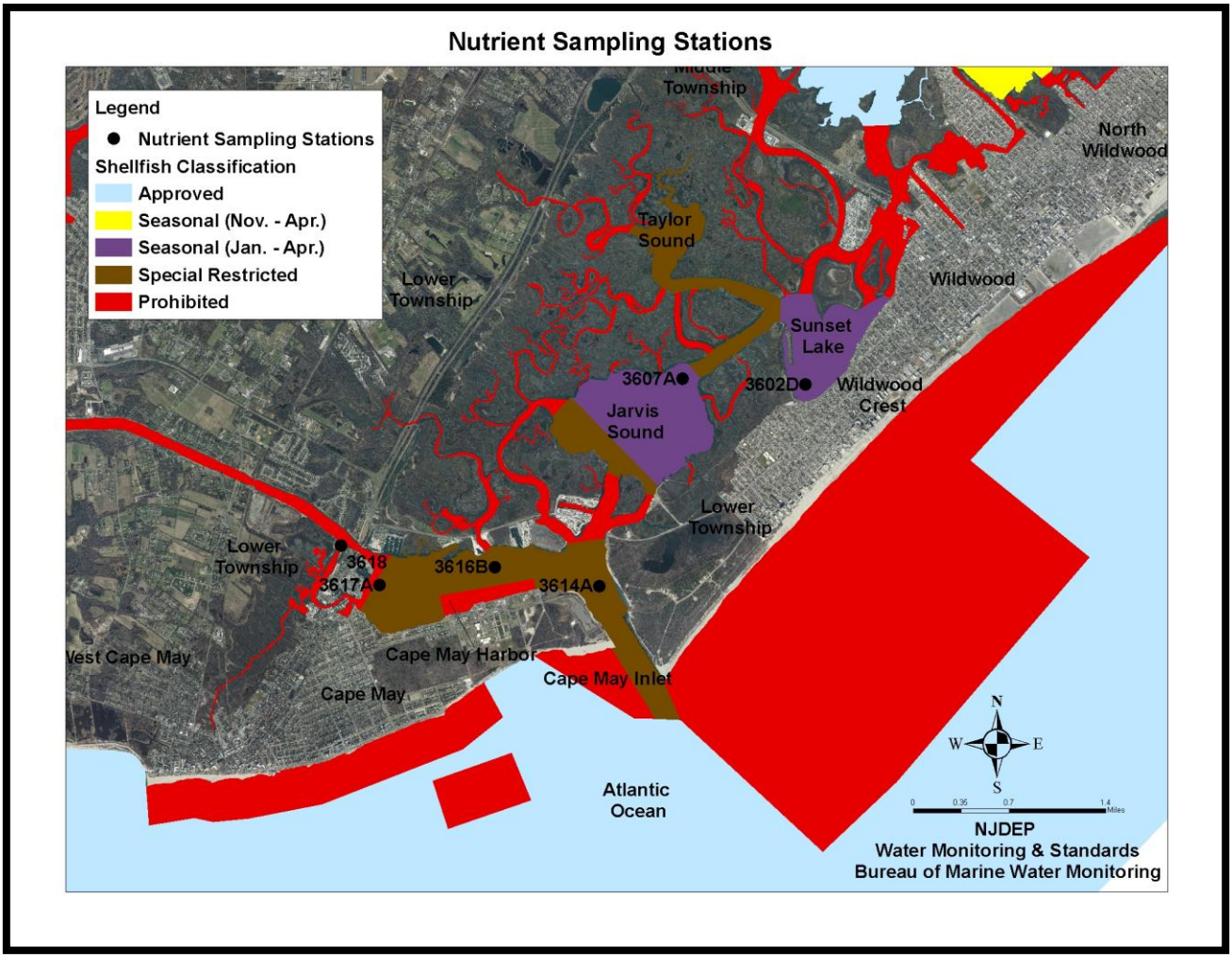
The Bureau of Marine Water Monitoring has begun to identify particular stormwater outfalls that discharge excessive bacteriological loads during storm events. In some cases, specific discharge points can be identified. When specific outfalls are identified as significant sources, the Department works with the county and municipality to further refine the source(s) of the contamination and implement remediation activities.



RELATED STUDIES

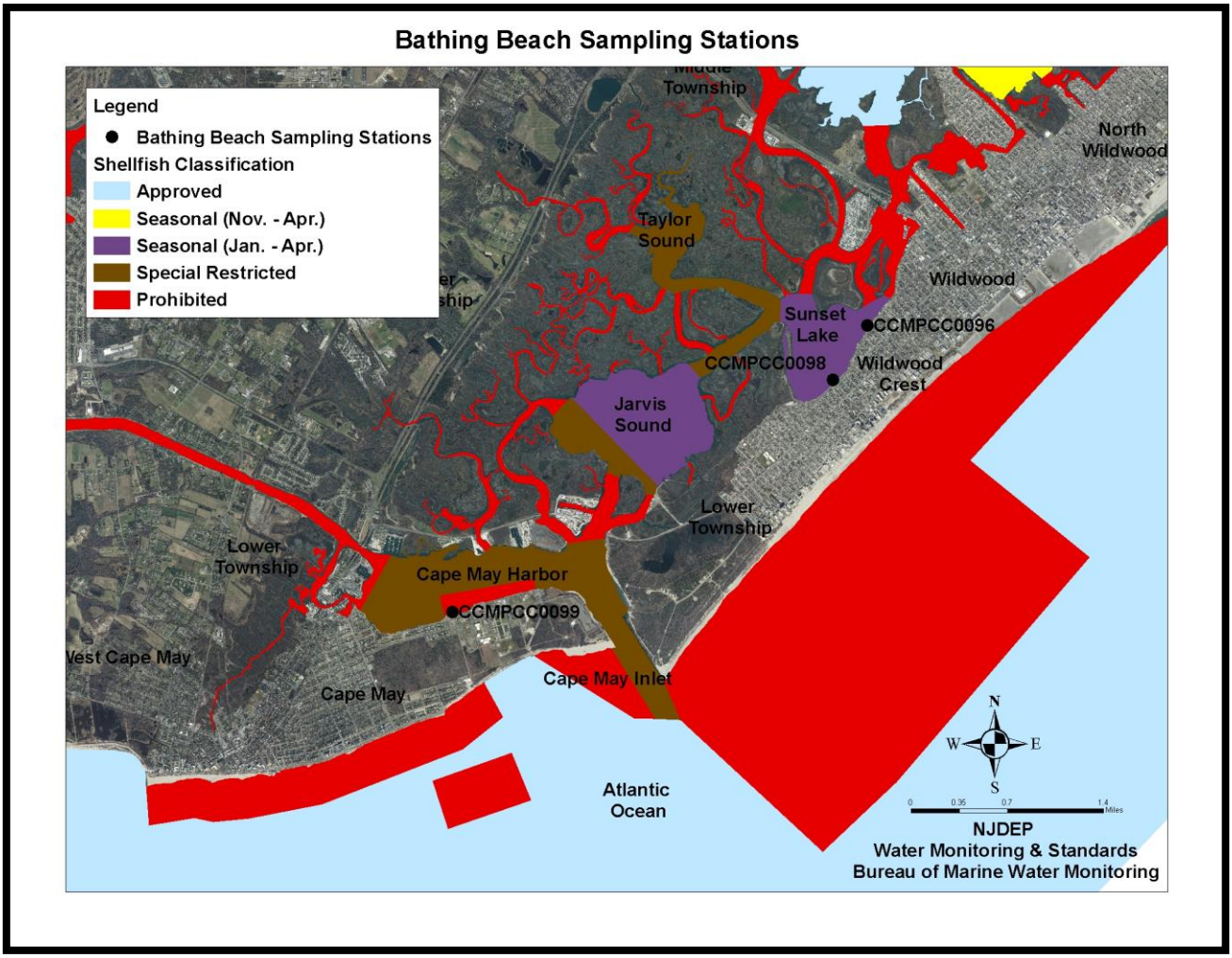
Nutrients

In this growing area, six nutrient monitoring sites were sampled under the estuarine monitoring program. At these nutrient monitoring sites, 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. For full nutrient assessment, see the Estuarine Monitoring Reports, available electronically at: http://www.state.nj.us/dep/bmw/



Bathing Beach

A review of the bathing beach data for 2009 to 2013 showed that there are three bathing beach sampling stations in this shellfish growing area. Two bathing beach sampling stations are located east of Sunset Lake near the marinas and stormwater outfalls west of Wildwood Crest and one bathing beach sampling station is located south of the Cape May Harbor near the docks for the U.S. Coast Guard Receiving Center. A review of the bathing beach data for these sampling stations showed that the geometric mean levels for these stations generally met the enterococcus criteria. For bathing beach water quality results, go to: www.njbeaches.org/monitoring_results.htm.



CONCLUSIONS

Based on the bacteriological data assessed, all of the sampling stations within this growing area meet their current shellfish classifications. The overall water quality for this growing area is good. Bacteria levels at Sampling Stations **3605C** and **3606A** in the *Special Restricted* waters of the ICW between Jarvis Sound and Sunset Lake showed an improvement in water quality and met the *Seasonally Approved (January to April)* shellfish classification criteria. Therefore, approximately 54.9 acres of shellfish waters between Jarvis Sound and Sunset Lake have been recommended for an upgrade in the shellfish classification from *Special Restricted* to *Seasonally Approved (January to April)*. 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.

RECOMMENDATIONS

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

SHELLFISH WATER CLASSIFICATION

RECOMMENDED CLASSIFICATION CHANGES

It is recommended that approximately 54.9 acres of *Special Restricted* shellfish waters around sampling stations **3605C** and **3606A** in the ICW between Sunset Lake and Jarvis Sound will be upgraded to the *Seasonally Approved (January to April)* shellfish classification. The area to be reclassified is shown in the figure on page 32.

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.

LEGAL DESCRIPTION FOR RECOMMENDED CHANGES:

In New Jersey Administrative Code 7:12-3.2 Shellfish growing waters that are classified as Special Restricted

The following shellfish growing waters are classified as Special Restricted:

30. The Wildwoods area:

i. (No Change.)

ii. All of Swain Channel, and Taylor Sound [and the Intracoastal Waterway] within a line from the mouth of Swain Channel at coordinates of latitude 38 degrees 58 minutes 49.7 seconds N., longitude 74 degrees 50 minutes 57.0 seconds W., then continuing along the shoreline in a northwesterly direction to Terrapin Thorofare and including Terrapin Thorofare, then continuing along the shoreline to a Department maintained marker at the north side of the mouth of Taylor Creek bearing approximately 213 degrees T to a Department maintained marker on the south side of the mouth of Jones Creek, then continuing along the shoreline in an easterly direction to a Department maintained marker on the west side of the mouth of Reubens Thorofare, then bearing 123 degrees T across the mouth of Reubens Thorofare to a Department maintained marker on the other side of Reubens Thorofare, then continuing easterly along the shoreline of Swain Channel to Jarvis Sound Thorofare and including Jarvis Sound Thorofare and continuing east to Old Turtle Creek and including Old Turtle Creek, then continuing in an easterly direction along the shoreline of Swain Channel to an unnamed body of water known as the intracoastal waterway (ICW) [then turning in a southerly direction at the junction with the ICW and continuing along the shoreline of the ICW to Jarvis Sound at a point at latitude 38 degrees 58 minutes 24.9 seconds N., longitude 74 degrees 51 minutes 41.7 seconds W., then bearing approximately 137 degrees T to a point at latitude 38 degrees 58 minutes 19.9 seconds N., longitude 74 degrees 51 minutes 35.6 seconds W., then turning in an easterly direction to a point at latitude 38 degrees 58 minutes 41.3 seconds N., longitude 74 degrees 50 minutes 57.4 seconds W., at the junction of the ICW and Sunset Lake then bearing approximately 2.5 degrees T to the point of origin] and terminating.

In New Jersey Administrative Code 7:12-4.2 Seasonally Approved growing waters (Approved January 1 through April 30 yearly,

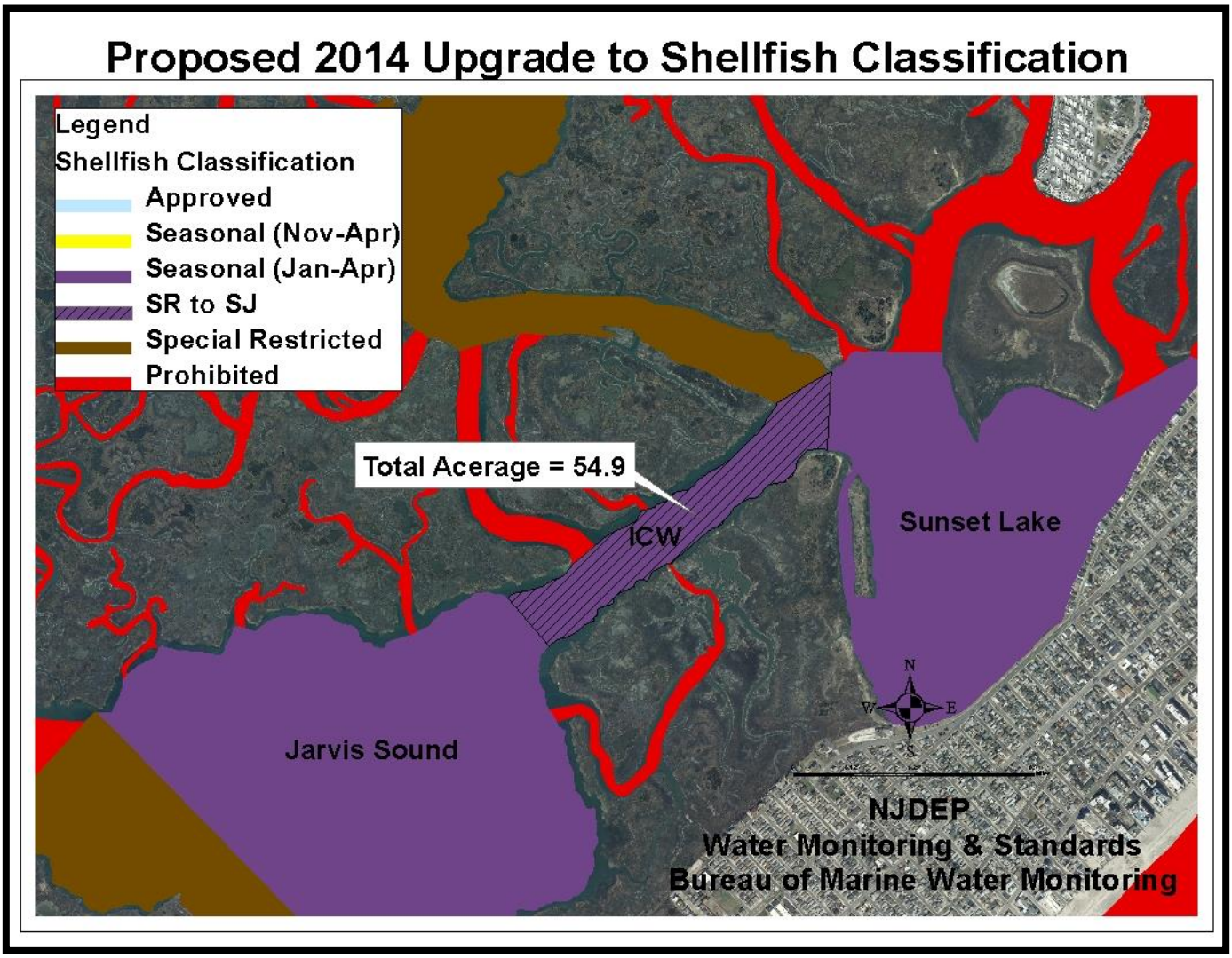
Special Restricted May 1 through December 31 yearly)

(a) The following shellfish waters designated on the charts referred to in N.J.A.C. 7:12-1.1 shall be Special Restricted for harvest of shellfish from May 1 through December 31 yearly and Approved for the harvest of shellfish from January 1 through April 30 yearly:

10. The Wildwoods area:

i. All of [Swain Channel, Taylor Sound and] the Intracoastal Waterway [within a line] from a point at the mouth of Swain Channel at coordinates of latitude 38 degrees 58 minutes 49.7 seconds N., longitude 74 degrees 50 minutes 57.0 seconds W., then turning in a southerly direction at the junction with the ICW and Swain Channel and continuing along the shoreline of the ICW to Jarvis Sound at a point at latitude 38 degrees 58 minutes 24.9 seconds N., longitude 74 degrees 51 minutes 41.7 seconds W., then bearing approximately 137 degrees T to a point at latitude 38 degrees 58 minutes 19.9 seconds N., longitude 74 degrees 51 minutes 35.6 seconds W., then turning in an easterly direction to a point at latitude 38 degrees 58 minutes 41.3 seconds N., longitude 74 degrees 50 minutes 57.4 seconds W., at the junction of the ICW and Sunset Lake then bearing approximately 2.5 degrees T to the point of origin and terminating.

ii[i.] All of the portion of Jarvis Sound beginning at a point at latitude 38 degrees 58 minutes 25.0 seconds N, longitude 74 degrees 51 minutes 41.8 seconds W, then continuing along the shoreline in a southerly direction to a Department maintained marker on the north side of the mouth of Meadow Creek then bearing approximately 239 degrees T to a Department maintained marker on the south side of Meadow Creek then continuing in a southerly direction to a Department maintained marker on the north side of the mouth of Punyard Creek and bearing approximately 222 degrees T across to a Department maintained marker north of the mouth of Upper Thorofare at latitude 38 degrees 58 minutes 12.5 seconds N, longitude 74 degrees 52 minutes 39.1 seconds W, then bearing approximately 136 degrees T to a Department maintained marker at latitude 38 degrees 57 minutes 54.7 seconds N, longitude 74 degrees 52 minutes 16.6 seconds W, then bearing approximately 136 degrees T to a Department maintained marker at latitude 38 degrees 57 minutes 38.4 seconds N, longitude 74 degrees 51 minutes 56.6 seconds W, then continuing along the shoreline in a northerly direction to a Department maintained marker at the south side of the mouth of Shell Thorofare and bearing approximately 330 degrees T across the mouth of Shell Thorofare to the other side then continuing along the shoreline of the ICW in a northerly direction to a point at latitude 38 degrees 58 minutes 20.0 seconds N, longitude 74 degrees 51 minutes 35.7 seconds W, and bearing approximately 317 degrees T back to the point of origin and terminating.



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