Reappraisal Report for Shellfish Growing Area A0Cent (Beach Haven Terrace to Bayhead)

February 2015

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(Beach Haven Terrace to Bayhead)

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2005 - 2010

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Cover Photo – Back Bay Erosion, Island Beach State Park, NJ

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EXECUTIVE SUMMARY

A0Cent is an ocean shellfish growing area that encompasses 31 miles of coastline from Beach Haven Terrace in the south to Bayhead in the north. This growing area then extends eastward from the coast out into the Atlantic Ocean for three miles. In total, A0Cent is currently comprised of 78,443 acres of shellfish growing waters.

The criteria used for shellfish growing water classification review in this three-year Reappraisal is based on *Approved* or *Prohibited* water classifications, as these are the only two classifications used for New Jersey's ocean shellfish growing waters. Currently, there are 73,965 acres of *Approved* waters in A0Cent and 4,478 acres are designated as *Prohibited*. The New Jersey Shellfish Growing Water Classification Charts, which can be found within the Water Monitoring and Standards' (WM&S'), Bureau of Marine Water Monitoring's (BMWM's) website, provide an excellent tool for viewing the location and classifications for A0Cent (see *www.state.nj.us/dep/wms/bmw*).

The Ocean County Utilities Authority (OCUA) – Southern, Central, and Northern Water Pollution Control Facilities (wastewater treatment facilities) discharge pipes and outfalls are present in this area. This requires the designation of three safety (*Prohibited*) zones for A0Cent. As such, the sampling strategy utilized is Adverse Pollution Condition (APC).

For this reappraisal, the results of water quality analyses for samples collected between May 2005 and April 2010 indicate most classifications in this shellfish growing area remain appropriately designated. A downgrade based on water quality is proposed in this report though, for a portion of the Atlantic Ocean east of Island Beach State Park. Specifically, 2,174.51 *Approved* acres are recommended for downgrade to *Prohibited* (see map to the right).

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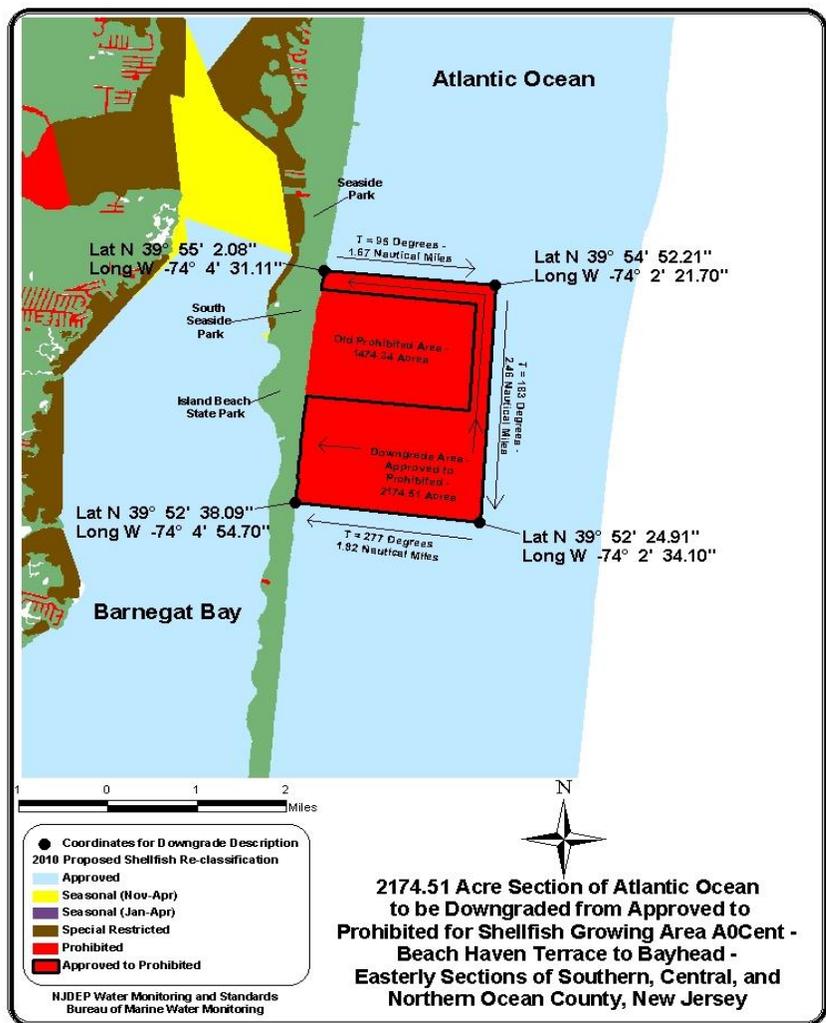
GROWING AREA PROFILE

LOCATION AND DESCRIPTION

A0Cent shellfish growing waters cover approximately 31 miles of coastline from Beach Haven Terrace in the south to Bayhead in the north, and offshore to the State's three (3) mile jurisdictional limit (Please Note: all references to "miles" in this report are in Nautical measure, whereby, one Nautical Mile equates to 6,086 feet).

The coastal towns adjoining the shellfish growing waters of A0Cent are urban, comprised in large part by residential homes, although there are clusters of commercial properties. These towns generally act as seashore towns with populations expanding during spring and summer and reducing greatly in the winter.

The southern half of coastal A0Cent is made up of the barrier island known as Long Beach Island or LBI. To the north of LBI, across Barnegat Inlet, is a substantial section of relatively undeveloped land belonging to Island Beach

Location of Shellfish Growing Area A0Cent - Beach Haven Terrace to Bayhead - Easterly Sections of Southern, Central, and Northern Ocean County, New Jersey

State Park. The remainder of the abutting coastal land mass for A0Cent is a composition of numerous shore towns beginning with South Seaside Park and extending north to Bayhead (see shellfish growing area location figure - above right).

As previously mentioned, the outfalls for OCUA's southern, central, and northern water pollution control facilities' wastewater treatment discharge pipes and outfalls are located in A0Cent. The outfall locations for these plants represent the only point sources of pollution that could potentially impact this locations water quality.

Closed safety zones, or *Prohibited* waters surround all of the OCUA outfalls. Although limited in their total acreage, the *Prohibited* areas are primarily maintained as buffers for effluent dilution.

Island Beach State Park is not interconnected with a sewage system with the exception of the gatehouse at the entrance of the park. The gatehouse is connected via a pump to the regional system. The other structures in the park are on a subsurface disposal system (septic system).

Rainfall runoff appears to have little impact on this area's water quality and shellfish growing water classifications as stormwater drainage is directed primarily toward the bayside. Any waters having been impacted by stormwater runoff on the bayside have been significantly diluted upon reaching the ocean waters of A0Cent.
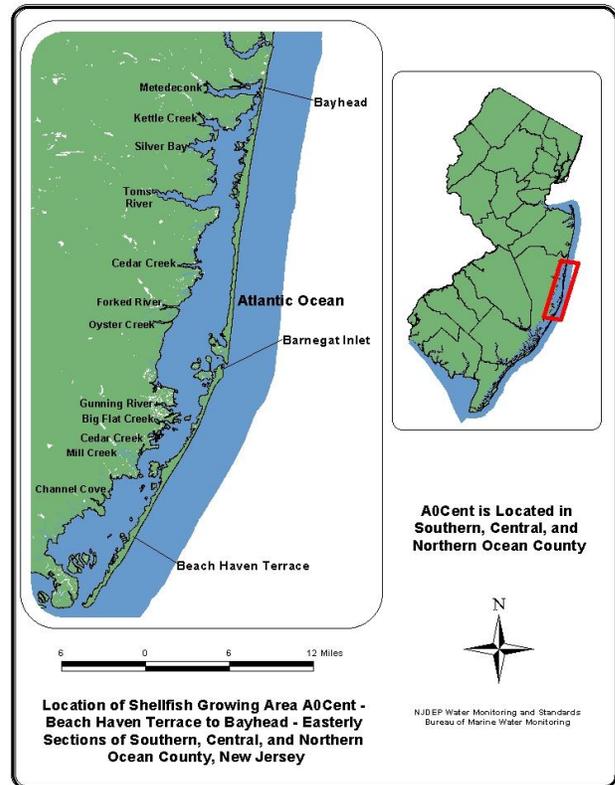
GROWING AREA CLASSIFICATION SUMMARY

The last Sanitary Survey for this shellfish growing area covered the years from 1996 – 2000. The results of the water quality analyses from that report indicated WM&S/BMWM had the ability to reduce what had been 6,370 *Prohibited* acres to the current 4,478 acres. With that, *Approved* acreage increased to 73,965 acres.

The reduction in *Prohibited* waters or upgrade noted above, took place around the outfall for the Northern Water Pollution Control Facility Discharge Pipe. This decrease in *Prohibited* acreage occurred because the water within the upgrade area met all criteria for classification as *Approved*. Further, a more practical delineation of the *Prohibited* area surrounding the outfall was established from enforcement, regulatory, and shellfish industry points of views, as the delineation was changed to plot coordinates rather than reference landmarks. Although *Prohibited* acreage was reduced with that upgrade, an adequate dilution area was left to surround the discharge pipe and outfall location for incidental discharge.

In the most recent shellfish growing area report, a Reappraisal written in 2007 for the years 2001 – 2006, there were no recommendations suggested for classification change in A0Cent. The information contained within this currently prepared Reappraisal (2005 – 2010) suggests a downgrade based on water quality is required in the waters off Island Beach State Park. The downgrade requires 2,174.51 acres of *Approved* waters be reclassified as *Prohibited*. *Approved* waters will decrease from 73,965 to 71,790 and *Prohibited* waters will increase from 4,478 to 6,653 Current and proposed classifications along with growing water acreage and percentages (current and proposed) are shown below and on the next page. As noted in the Executive Summary, A0Cent classifications can also be reviewed in the State of New Jersey Shellfish Growing Water Classification Charts section of the WM&S/BMWM website (see *www.state.nj.us/dep/wms/bmw*).

Current Classification for Shellfish Growing Area A0Cent - Beach Haven Terrace to Bayhead - Easterly Sections of Southern, Central, and Northern Ocean County, New Jersey

Shellfish Growing Water Classifications by Percentage and Acreage - Shellfish Growing Area A0Cent
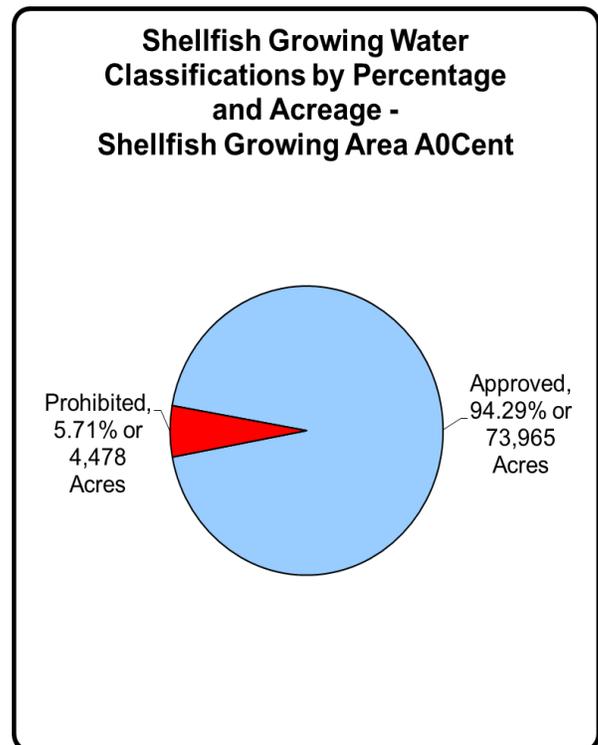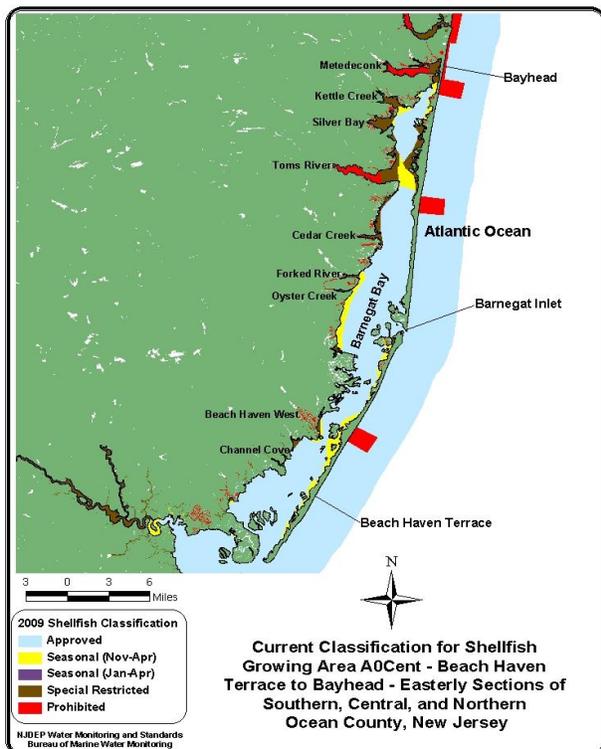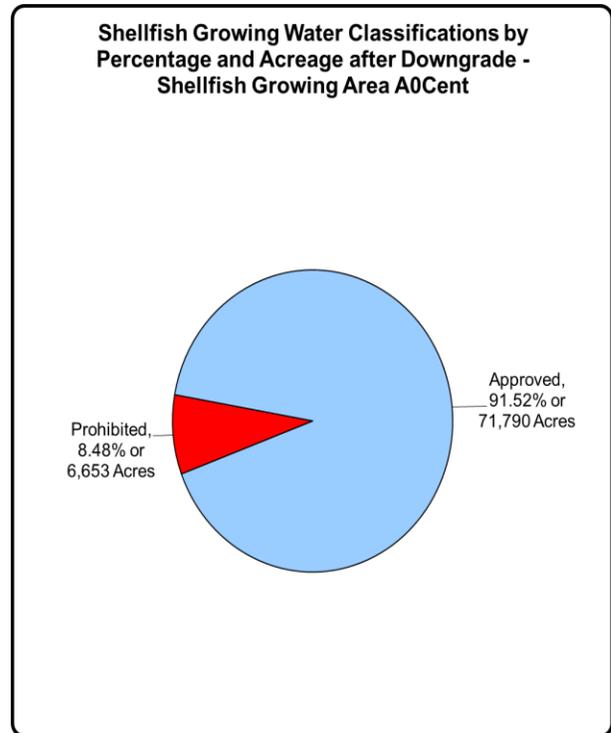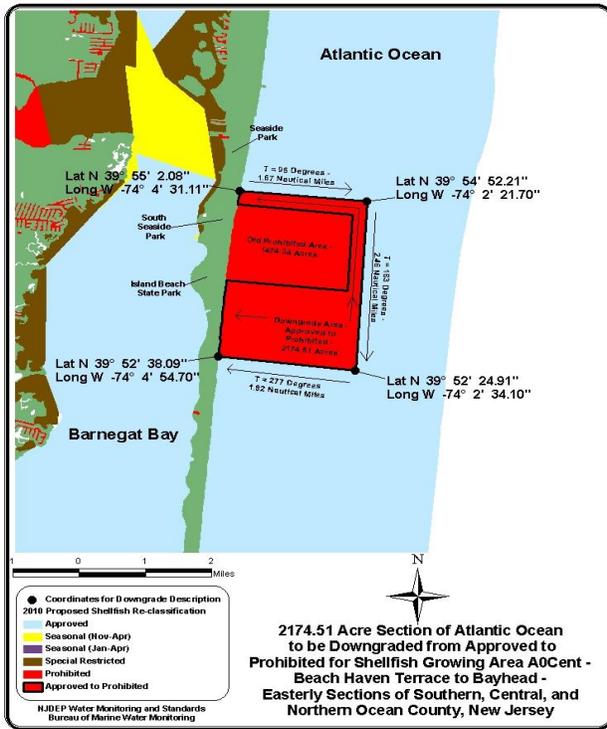
EVALUATION OF BIOLOGICAL RESOURCES

Historically, *Approved* ocean waters have been used for harvesting surf clams (Spisula solidissima) and blue mussels (Mytilus edulis) by dredge boats licensed by the Division of Fish and Wildlife. Surf clams (for bait purposes only - non-human consumption) can also be harvested from *Prohibited* areas under a special program administered by WM&S/BMWM and enforced by the Division of Fish and Wildlife.

In addition to being the State's largest molluscan fishery, New Jersey's surf clam fishery historically leads all other surf clamming states in total landings and continued to do so in 2010, according to the most recently released statistics from NOAA's National Marine Fisheries Service.

Since New Jersey's surf clam industry is at the national forefront in total landings, monitoring, management, and conservation of this resource is very important to the State. In this regard, the New Jersey Surf Clam Advisory Committee, comprised of industry and government representatives, in conjunction with the Commissioner for the New Jersey Department of Environmental Protection, set the quotas for harvest, which takes place from October 1 – May 31st. The tables on the next page denote commercial landings in pounds of meat and ex-vessel value for New Jersey surf clams from 1993 through the 2010 harvest year; a brief history of surf clam quotas, and the ocean bi-valves with the largest landings for the State are shown as well.

Commercial Data for Surf Clams Showing Pounds of Meat and Ex-vessel Value for New Jersey Landings. Source: NOAA - National Marine Fisheries Service – February 27, 2013		
Year	Lbs. of Surf Clams Landed	Ex-vessel Value
1993	47,978,097	$ 21,802,735
1994	48,572,236	$ 26,840,477
1995	46,329,437	$ 27,443,281
1996	48,740,881	$ 28,983,170
1997	45,603,401	$ 27,168,453
1998	44,751,327	$ 23,060,750
1999	49,299,900	$ 25,371,922
2000	58,047,629	$ 31,371,354
2001	52,872,341	$ 29,326,676
2002	53,590,740	$ 29,172,373
2003	51,336,955	$ 27,431,645
2004	43,521,704	$ 22,284,335
2005	38,967,993	$ 20,028,662
2006	43,643,726	$ 25,106,785
2007	44,791,212	$ 26,546,602
2008	39,346,425	$ 24,349,551
2009	32,893,521	$ 20,568,576
2010	25,089,484	$ 16,010,934

New Jersey Surf Clam Quotas in Industry Bushels by Year (1996 – 2010). Source: New Jersey Department of Environmental Protection, Bureau of Shellfisheries	
Surf Clam Harvest Year	Surf Clam Quotas in Industry Bushels
1996 - 1997	600,000
1997 - 1998	600,000
1998 - 1999	700,000
1999 - 2000	700,000
2000 - 2001	700,000
2001 - 2002	600,000
2002 - 2003	600,000
2003 - 2004	275,000
2004 - 2005	350,000
2005 - 2006	237,000
2006 - 2007	240,000
2007 - 2008	198,000
2008 - 2009	58,368
2009 - 2010	55,296

Ocean Bi-Valves w/ Largest Landings Reported for New Jersey (0 - 3 Miles Distance from Shore highlighted in yellow)									
	DISTANCE FROM N. J. SHORE								
	0 - 3 MILES		3 - 200 MILES		HIGH SEAS		COMBINED TOTALS		
COMMON BI-VALVE NAME	Pounds of Meat (000)	Dollars (000)	Pounds of Meat (000)	Dollars (000)	Pounds of Meat (000)	Dollars (000)	Total Pounds of Meat (000)	Total Dollars (000)	Price/ Pound of Meat
Surf Clam	7,959	4,641	17,130	11,370	-	-	25,089	16,011	$.64
Sea Scallops	56	497	14,098	108,492	-	-	14,155	108,990	$7.70
Ocean Quahog	2,141	1,104	11,307	6,775	-	-	13,448	7,878	$.59
-- TOTALS --	10,156	6,242	42,535	126,637	-	-	52,692	132,879	

Adapted from: Landings by Distance from U.S. Shores, 2010, State of New Jersey, National Marine Fisheries Service - Fisheries Statistics and Economics Division - Report printed on: 02/27/13
* No Data Available

SHORELINE SURVEY: EVALUATION OF POTENTIAL POLLUTION SOURCES

Shoreline surveys or site specific tours of areas nearby or abutting shellfish growing waters can provide insight as to the location and nature of land use, surface water discharges, marinas, unpermitted discharges, and stormwater inputs. Shoreline surveys of A0Cent were conducted on July 9, 2010 and August 17, 2010. The following sections detail information derived collectively from those surveys, and those that preceded them.

LAND USE

Areas for new development are generally limited within the municipalities or boroughs abutting A0Cent as much of the land that could be used for such projects has already been developed. Under normal circumstances there would be some new construction projects taking place in areas where homes had been torn down. And, there might be some new home projects taking place on previously vacant land. In addition, many of the homes and businesses within coastal A0Cent do undergo reconstruction and refurbishment from time to time.

Impact from construction is lessoned or unlikely though due to the nature of the land and water abutting and surrounding this shellfish growing area. Construction projects bordering on eco-sensitive areas such as those in A0Cent are required by local, state, and federal regulations to utilize specific setbacks and buffers as a means of protecting flora and fauna specific to wetland, riparian, or estuarine locations. The use of these buffers can never be understated as their utilization suggests construction is unlikely to severely impact surrounding natural ecosystems.

Aside from contributing to productivity, wetland and estuarine zones provide valuable habitat for many marine species during some point of their life cycle. In addition, some plant species within these zones take up contaminants from the ecosystem.

There are some areas of wetlands in close proximity to urban development in A0Cent as shown in the maps below. Larger areas of wetlands are situated on the western side of Ship Bottom, the High Bar Harbor sector near Barnegat Light, and Island Beach State Park.

Coastal Land Use Patterns for Shellfish Growing Area A0Cent - Beach Haven Terrace to Bayhead - Easterly Sections of Southern, Central, and Northern Ocean County, New Jersey

NJDEP Water Monitoring and Standards Bureau of Marine Water Monitoring

Structures, Shore, and Vegetation for Shellfish Growing Area A0Cent - Beach Haven Terrace to Bayhead - Easterly Sections of Southern, Central, and Northern Ocean County, New Jersey

NJDEP Water Monitoring and Standards Bureau of Marine Water Monitoring

The lands adjacent to Shellfish Growing Area A0Cent can geophysically be described as barrier islands. The predominant land use on these barrier islands is urban.

There are numerous mainland communities situated just to the west of A0Cent (see figure – to the right).

Sewage from areas abutting A0Cent and many adjacent communities is carried to wastewater treatment facilities by sanitary sewers. It is then treated by either the southern, central, or northern wastewater treatment facilities of the OCUA.

There are pockets of homes within the nearby Pinelands that utilize septic systems. Septic is primarily utilized in areas of lower population density. Generally, the availability for access to city sewage infrastructure is less likely in these areas.

Coastal Municipalities for Shellfish Growing Area A0Cent - Beach Haven Terrace to Bayhead - Easterly Sections of Southern, Central, and Northern Ocean County, New Jersey

NJDEP Water Monitoring and Standards Bureau of Marine Water Monitoring
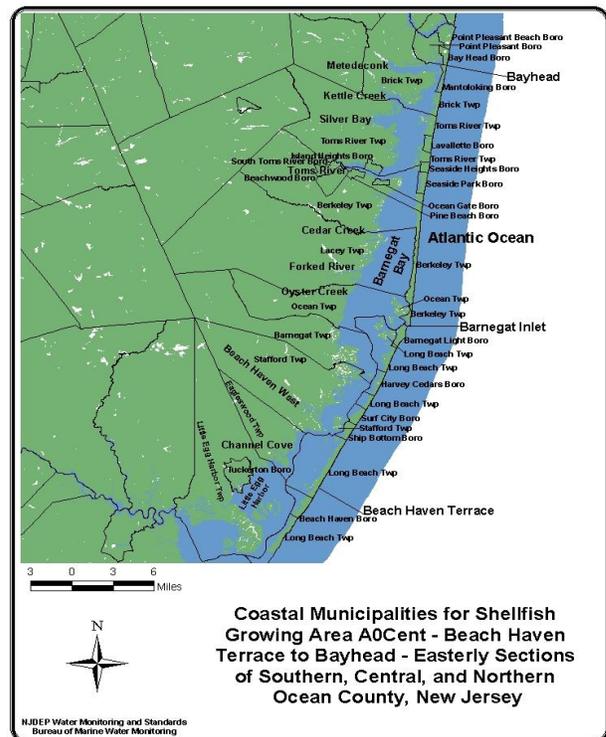
There are always concerns regarding nutrient loading and elevated coliform levels within watersheds near communities utilizing septic. However, the distance from these communities to this growing area provides a safety zone for dilution.

Some communities that were utilizing septic systems have converted to city sewerage as they have grown in size. For example, Ocean Acres in Manahawkin (southern sector of A0Cent – Ocean County) has primarily moved in this direction. Population growth and enhanced development within Ocean County appear to have been a determining factor in the change from septic to sewerage infrastructure in Ocean Acres and other similar communities.

SURFACE WATER DISCHARGES – TREATMENT FACILITY WASTEWATER EFFLUENTS

Evaluation and compliance of shellfish growing areas is ascertained using NSSP criteria as contained in the *Guide for the Control of Molluscan Shellfish*, 2013. Interaction between the State and treatment plants is important in determining plant efficiency, which integrally relates to the eventual effluent quality discharged into ocean waters off the coast of New Jersey. State effluent standards for direct discharge are presented in the table on this page. And, the wastewater treatment facilities, discussed in this section do maintain the standards shown in that table.

From south to north, the three facilities with potential point sources of contamination in the A0Cent Shellfish Growing Area are the Ocean County Utilities Authority – Southern Water Pollution Control Facility (OCUA – SWPCF), Ocean County Utilities Authority – Central Water Pollution Control Facility (OCUA – CWPCF), and the Ocean County Utilities Authority – Northern Water Pollution Control Facility (OCUA – NWPCF).

OCUA acts as a regional reclamation authority for wastewater treatment with the central plant serving as the location for their administrative offices. OCUA's three treatment facilities are capable of treating eighty-four million gallons of wastewater per day with forty pumping stations, two hundred miles of force main and gravity lines, and three ocean outfall lines that service 31 municipalities in Ocean County and five Monmouth County municipalities.

Effluent Standards for Direct Discharge to Surface Water from Publicly/Privately Owned Wastewater Treatment Facilities – NJPDES Permit Regulations (7:14A – 12.2 – 12.5)	
Avg. BOD$_5$ Level/Wk.	≤ 45 mg/L
Avg. BOD$_5$ Level/Mo.	≤ 30 mg/L
Avg. BOD5 % Removal/ Mo.	≥ 85%
or Avg. CBOD5 Level/Wk.	≤ 40 mg/L
or Avg. CBOD5 Level/Mo.	≤ 25 mg/L
or Avg. CBOD5 % Removal/ Mo.	≥ 85%
Avg. TSS Level/Wk.	≤ 45 mg/L
Avg. TSS Level/Mo.	≤ 30 mg/L
Avg. TSS % Removal/ Mo.	≥ 85%
Geo. Mean FC/Wk.	≤ 400 MPN/100 mL
Geo. Mean FC/Mo.	≤ 200 MPN/100 mL

All of the wastewater treatment plant outfalls mentioned in this report are located in the Atlantic Ocean, east of Ocean County. The plants utilize secondary forms of sewage treatment, eventually releasing treated effluents through their ocean outfalls, allowing for additional mixing and dilution.

As mentioned previously, significant buffers (*Prohibited* areas) have been established around all ocean outfalls for safety zones.

To allow for additional mixing and dilution, these ocean outfalls are located at some distance offshore. In nautical miles, the approximate distances are as follows: OCUA - SWPCF (.80 n mi.), OCUA - CWPCF (.83 n mi.), and OCUA - NWPCF (.77 n mi.).

The Ocean County Utilities Authority wastewater treatment plant outfalls are located east of 5th street in Ship Bottom (southern outfall), 23rd avenue, south Seaside Park (central outfall), and off Princeton Avenue in Mantoloking (northern outfall).

The figure to the right shows the outfall locations and the table below shows the waste type, design flow, and discharge characteristics of each plant. Updated summaries of OCUA's southern, central, and northern treatment facilities are presented in the following sections.
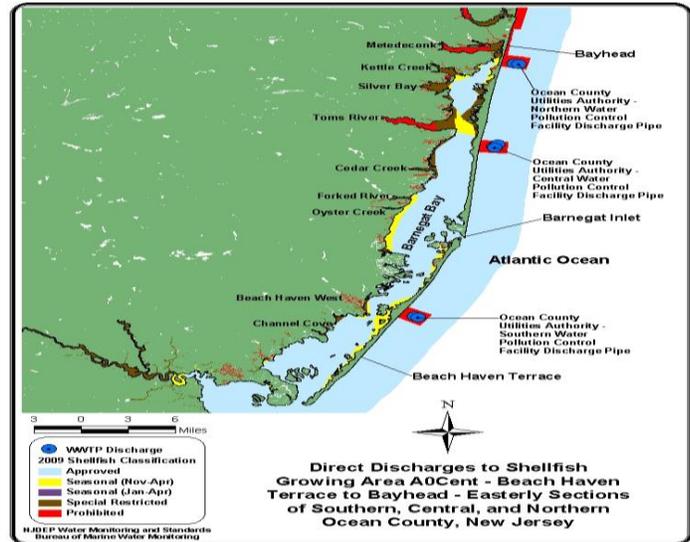
Map Key(s) - Direct Discharge(s) to Waters of Shellfish Growing Area A0Cent			
Facility Name	**Waste Type**	**Waste Quantity (Design Flow - MGD)**	**Discharge**
Ocean County Utilities Authority <u>Southern</u> Water Pollution Control Facility	Residential Wastewater Influent w/ Light Industrial Input	20	Secondary Treated Effluent
Ocean County Utilities Authority <u>Central</u> Water Pollution Control Facility	Residential Wastewater Influent w/ Light Industrial Input	32	Secondary Treated Effluent
Ocean County Utilities Authority <u>Northern</u> Water Pollution Control Facility	Residential Wastewater Influent w/ Light Industrial Input	32	Secondary Treated Effluent

Ocean County Utilities Authority – Southern Water Pollution Control Facility

The Southern Water Pollution Control Facility for the Ocean County Utilities Authority is located at 150 Cedar Run Dock Rd., West Creek, NJ. This facility serves Long Beach Island, Tuckerton, and the Townships of Eagleswood, Stafford; Little Egg Harbor, and has been online since 1977.

The OCUA - SWPCF has a design flow of 20 MGD and utilizes a conventional activated sludge processing system that produces secondary treated effluent. Influent primarily consists of residential sanitary wastewater although there is light industrial input entering this facility.

Bio-solids, a by-product of the OCUA – SWPCF treatment process are anaerobically digested, thickened, dried, and pelletized. This is a cooperative process that takes place between OCUA's treatment facilities and the OCUA - CWPCF Fertilizer Manufacturing Facility.

The OCUA-SWPCF has 13 pump stations. These stations are located in the municipalities of Little Egg Harbor, Tuckerton, Eagleswood Twp., Stafford Twp., Long Beach Twp. (6), Harvey Cedars, Surf City, and Beach Haven.

The facility is staffed 24 hours a day and is equipped with a complete alarm system should a malfunction or breakdown occur. Plant personnel also have manuals describing all possible malfunctions and equipment failures that might occur within the system. These give step by step instructions to remedy specific problems. Also, all essential equipment has backup units available in the event of equipment breakdown or required scheduled maintenance.

Disinfection takes place with the aid of sodium hypochlorite. For this procedure, the concentration of chlorine in sodium hypochlorite is 15%. Disinfection is best described as manually adjusted to a desired feed rate in order to destroy pathogenic bacteria. There are automatic alarms for low and high end chlorine residuals. The southern plant takes six grab samples a day to test for chlorine concentration and bacterial testing for fecal coliform is done once a day on a year round basis.

Ocean County Utilities Authority – Central Water Pollution Control Facility

The Ocean County Utilities Authority - Central Water Pollution Control Facility is situated at 501 Hickory Lane, Bayville NJ. It began its operation in November of 1979.

The design flow rating for the OCUA central plant is 32 MGD and it services the towns of Brick, Lavallette, Ortley Beach, Seaside Heights, Seaside Park, Island Heights, Toms River, South Toms River, Forked River, Waretown, Bayville, and Normandy Beach. It utilizes a conventional activated sludge with secondary treatment system and has minimal input from light industry.

Sludge, a by-product of the OCUA – CWPCF treatment process is thickened, anaerobically digested, dried, and pelletized. This is a cooperative process that takes place between OCUA's treatment facilities and the OCUA - CWPCF Fertilizer Manufacturing Facility.

OCUA's central wastewater treatment facility operates with 19 pump stations. Those stations are located in the municipalities of Brick, Lavallette, Seaside Heights, Seaside Park, Island Heights, South Toms River; four are situated in Dover, five are located in Berkeley, two are in Lacey, and Barnegat and Ocean Townships each have one pump station.

The increase of inflow by infiltration during storm events does not create significant issues for the central plant. The plant is equipped with automatic alarms for instances of greater influent intake (during storm events), power failure, and breakdowns. If a problem occurs, central operations at the facility are notified, as well as the NJDEP hotline. The facility is staffed 24 hrs. /day and the hotline is always on line to receive notification in emergency situations.

The plant does not have alarms for low chlorine residual but they do operate with a computerized monitoring system that constantly records all processes of disinfection. In the case of emergency, the sodium hypochlorite disinfection system picks up power from emergency generators.

The central OCUA plant utilizes one 5,000 gallon tank for dispensing sodium hypochlorite. It has a feed rate in the winter of 440 gal/day and 633 gal/day in the summer. The chlorine container is checked three times per day at a minimum. Plant engineers monitor chlorine content with six grab samples per day, as required by permit, and effluent bacterial testing is done once per day.

Ocean County Utilities Authority - Northern Water Pollution Control Facility

The OCUA northern facility is located at 255 Mantoloking Rd., Brick, NJ. Plant operations began in 1976.

The OCUA - NWPCF utilizes an activated sludge system to provide secondary treatment for wastewater. Aside from residential wastewater, influent for the northern facility is also composed of approximately six percent input from light industry.

Sludge, a by-product of the plants treatment process is thickened, anaerobically digested, dried, and pelletized. This is a cooperative process that takes place between OCUA's treatment facilities and the OCUA - CWPCF Fertilizer Manufacturing Facility.

OCUA – NWPCF has a design flow rating of 32 MGD and serves the communities of Bayhead, Point Pleasant Beach, Point Pleasant Boro, Bricktown, Lakewood, Jackson, and Mantoloking. This facility also receives sewage from the Manasquan River Regional Sewerage Authority, which serves Farmingdale, Howell, Freehold Boro, and Freehold Township.

It has been estimated that inflow and infiltration from sewer lines will increase flow to this facility by 10 percent at most. Actions to address inflow and infiltration are primarily initiated by the local municipalities whose lines feed into the facility.

There are eight pump stations connected to this treatment facility. They are located in Bayhead, Point Pleasant, Point Pleasant Beach, two in Jackson, and three in Brick. All pump stations have dual pumps and automatic alarms for high water, power failure, and breakdown.

Alarms go to the operator's panel in the treatment facility, which is manned 24 hours per day. The treatment facility also has its own automatic alarm systems for high water, power failure, and breakdown that route in similar fashion for appropriate action if an emergency were to arise. The plant also has two treatment formats to allow for uninterrupted processing during maintenance or repair of machinery at the facility.

Disinfection is achieved through a continuous manual feed of sodium hypochlorite. Two 6000 gallon tanks feed sodium hypochlorite. They average a daily feed rate of 500 gallons of sodium hypochlorite in the summer and winter. There are automatic alarms for low effluent chlorine residual, malfunction of the Chlorinator, or recorder, and plant personnel also play an integral role in monitoring and inspecting these, and all plant processes. For example, the chlorine container is

checked for depletion daily by the operator; chlorine residual is monitored with six grab samples per day and effluent bacterial testing is performed year round with one sample per day.

SPILLS, UNPERMITTED DISCHARGES, AND CLOSURES

The figure to the right shows the location of spills or unpermitted discharges that occurred in areas that have relative proximity to the A0Cent coastal boundary. These discharges occurred or were reported to have occurred within the time frame that this report was written. None of these indirect discharges resulted in a closure for the waters of A0Cent. And, there were no large indirect discharges or spills that were immediately related to the ocean waters of A0Cent during the time period covered by this report.

The contents discharged at the locations shown in the map, whether validated or proposed, were reported as a number of different substances such as sewage, oil, diesel, fire extinguisher foam, and pool water. Total discharge in all cases was suggested to be minimal and the result of a variety of circumstances such as back up, spill, vehicular accidents, damaged or sinking boats, fire, and improper discharge by residents.

Location of Spills Near Shellfish Growing Area
A0Cent - Beach Haven Terrace to Bayhead - Easterly Sections of Southern, Central, and Northern Ocean County, New Jersey
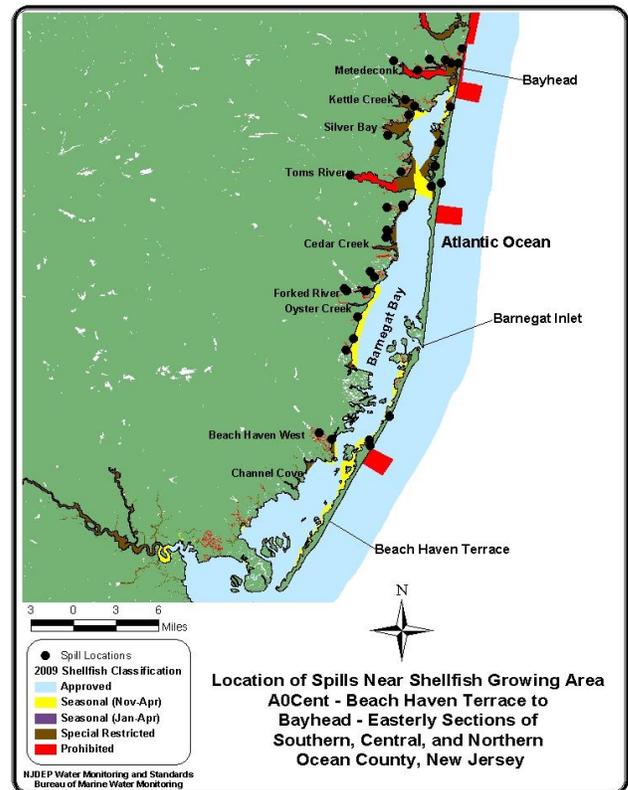
The spill locations were unlikely to have had significant impact on the chemical or bacteriological water quality of A0Cent. In all cases, the spills and discharges were too small, and their distance to these shellfish growing waters was such that impact would have been reduced from dilution, percolation, and absorption. Bureau monitoring locations and subsequently related data showed no specific impact, as well.

STORMWATER DISCHARGES

Environmental pressures on shellfish beds in New Jersey can originate in materials that enter growing waters via stormwater. These materials include bacteria, as well as other waste that enters the stormwater collection system. Management of stormwater runoff along this section of coastline (adjacent to A0Cent) consists of directing flow into creeks, rivers, and back bays (away from the ocean). The stormwater outfalls that disperse their input into the back bay waters of this area can be seen in the map on the next page.

Past and present surveys for A0Cent support the idea that stormwater runoff is extremely limited in its potential to impact the area, as no stormwater outfalls empty toward the ocean in this shellfish growing area. It is likely that a small amount of storm runoff enters the ocean waters from non-channeled runoff but most stormwater inputs pass through storm drain infrastructure that empties into back bay waters.

Barnegat Bay receives stormwater inputs prior to their flowing into Shellfish Growing Area A0Cent. A great deal of Barnegat Bay waters then flow into A0Cent through Barnegat Inlet. Little Egg Harbor may additionally provide some contribution to Beach Haven Inlet which is located just south of these shellfish growing waters.

Vast portions of Barnegat Bay and Little Egg Harbor waters are *Approved.* Although these embayment's do receive many of the stormwater inputs that might otherwise be directed into the ocean waters of A0Cent, substantial dilution appears to be occurring within these systems, when considering the total area of *Approved* acreage these bays comprise. As these embayment's eventually feed into the ocean shellfish growing waters of A0Cent, it is important to understand that their water quality in terms of bacteriological monitoring and related data is generally good, despite the stormwater inputs they receive from runoff, creeks, and rivers. This lends support to the suggestion that impacts from stormwater inputs are fairly limited for this shellfish growing area.
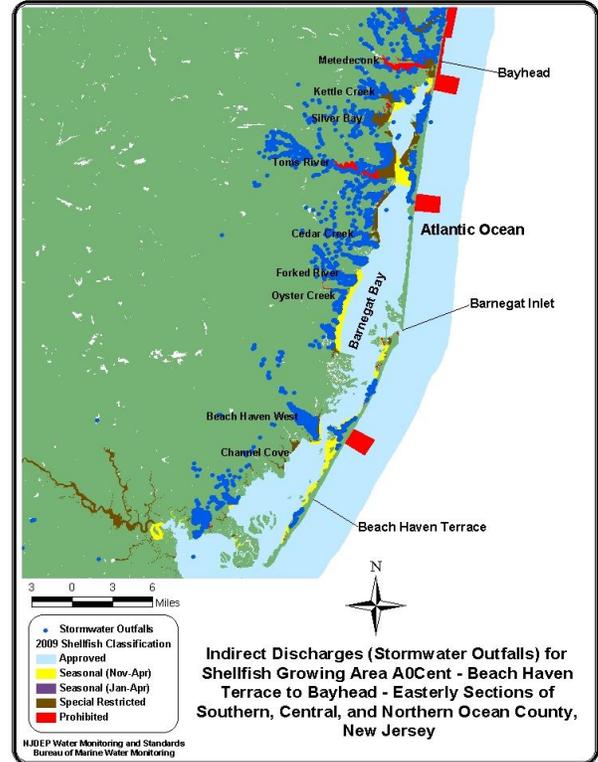
WATER QUALITIES STUDIES

SAMPLING STRATEGY

Shellfish growing area A0Cent was sampled using the Adverse Pollution Condition (APC) sampling strategy. The APC sampling strategy requires a minimum 15 sample composite of data, collectively supported by a minimum requirement of five samples per year.

Each shellfish producing state is directed to adopt either the total coliform or fecal coliform criterion to classify its waters. The criteria were developed to ensure that shellfish harvested from designated waters would be free of pathogenic (disease-producing) bacteria. Combinations of these criterion may also be used.

This report was written in 2010, and at that time, FC analysis was accomplished using direct 3 tube, A-1. While New Jersey had been using fecal coliform analysis (direct 3 tube, A-1) and criteria for its ocean waters and total coliform analysis (3 tube, three dilution) and criteria for its back bay areas, BMWM/WM&S switched all State shellfish growing areas over to the criteria for fecal coliform in February, 2012, and the method for analysis changed as well.

BMWM/WM&S now use mTEC agar plating to facilitate the fecal coliform bacteriological analysis for samples taken within New Jersey shellfish growing areas, and had been acquiring adjunct mTEC data for its growing areas for some time in order to statistically facilitate the transition to mTEC. Statistical facilitation, in the case of Shellfish growing area A0Cent refers to the combination of past, 3 tube, A-1 data with current mTEC data in order to obtain statistically valid measurements during the transition.

Each classification criterion is composed of a measure of the statistical "central tendency" (geometric mean) and the relative variability of the data set. For the Adverse Pollution Condition sampling strategy, variability is expressed utilizing the 90th percentile. Although the State has only *Approved* and *Prohibited* classifications in its ocean waters, an area to be *Approved* under the *Seasonal* classification using APC would have to be sampled and meet the criterion during the time of year that it is *Approved* for the harvest of shellfish. The table below shows the statistical criteria for the APC strategy. The area on the chart highlighted in yellow represents the criteria used when analyzing with direct 3 tube, A-1, which was utilized in the preparation of this report.

Statistical Criteria for Adverse Pollution Condition Sampling Strategy					
	Total Coliform Criteria		Fecal Coliform Criteria		
	Geometric mean (MPN/100 mL)	No more than 10% of samples can exceed (MPN/100 mL)	Geometric mean (MPN/100 mL)	No more than 10% of samples can exceed (MPN/100 mL)	
Approved Water Classification	70	330	14	49 w/ direct 3-tube, A1	31 w/ mTEC Agar
Special Restricted Water Classification	700	3300	88	300 w/direct 3-tube, A1	163 w/ mTEC Agar

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: ARCMAP).

Water sampling was performed in accordance with the Field Procedures Manual (NJDEP, 2005). Water quality sampling, analysis, and shoreline/watershed surveys were conducted in accordance with the NSSP *Guide for the Control of Molluscan Shellfish,* 2013.

The results were compiled from the 50 surface and 30 bottom stations that comprise Assignments 481, 491, and 501. A review of the records suggests that 1,638 water samples were collected for fecal coliform bacterial analysis during the 2005 and 2010 time frame that

Current Surface and Bottom Sampling Stations for Shellfish Growing Area A0Cent - Beach Haven Terrace to Bayhead - Easterly Sections of Southern, Central, and Northern Ocean County, New Jersey
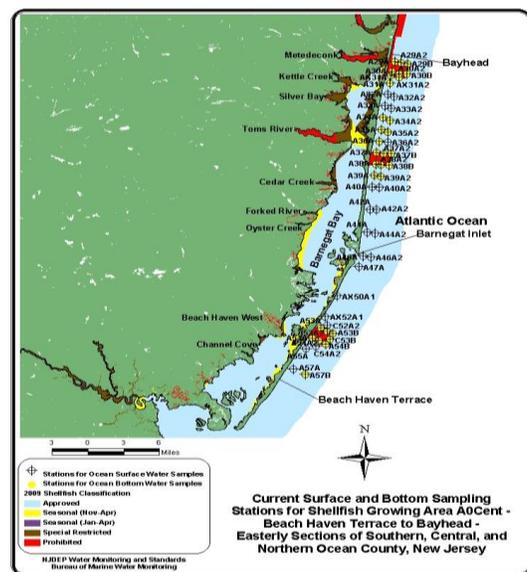
comprises this Reappraisal. Additional information on lab methodology and sampling strategy can be found in the Shellfish Growing Area Report Guidance Document.

The Shellfish Growing Water Monitoring Stations for Beach Haven Terrace to Bayhead (A0Cent) are presented in the map on the previous page. They were analyzed by WM&S/BMWM at Leeds Point. Classification of these shellfish growing waters has been based on these data

BACTERIOLOGICAL QUALITY

### Compliance with NSSP APC Approved Criteria

For this reappraisal, final analyses in conjunction with NSSP requirements for *Approved* waters suggest shellfish growing area A0Cent requires a downgrade for a portion of *Approved* waters. The downgrade area will become *Prohibited* in classification due to water quality. Final analysis was based on NSSP criteria, APC strategy, and requirements for *Approved* shellfish growing water classification in relation to fecal coliform direct 3 tube A-1 analysis.

When analyzing a minimum of the most recent fifteen samples collected per station, there was one station that exceeded NSSP *Approved* year round criteria. That same station was one of five stations that exceeded NSSP criteria for *Approved* waters during the summer.

Two of the stations exceeding *Approved* criteria were in *Approved* waters and three were in *Prohibited* waters (see maps to the right). All stations exceeded *Approved* criteria with regard to their 90th percentile scores.

The appropriate data analysis for this shellfish growing area with regard to the lab methodology used, suggests the geometric mean shall not exceed 14 MPN/100 mL and no more than 10% of the samples can exceed 49 MPN/100 mL.

The data presented in this report was compiled during May 2005 through April 2010. During that time frame, *Approved* bottom station A39A2 exceeded APC *Approved* yr. rnd. criteria with 22 samples when reviewing the Statistical Summary and the Shellfish Growing Water Data Listings. A39A2 is a bottom station in *Approved* waters. That station had a year round geo-mean of 6.9 MPN/100 mL, which was acceptable for yr. rnd. *Approved*. However, bottom station A39A2 exceeded the 90th percentile with 13.6% > 49
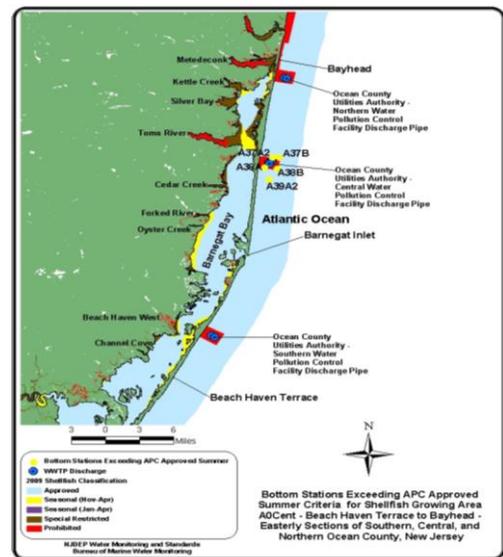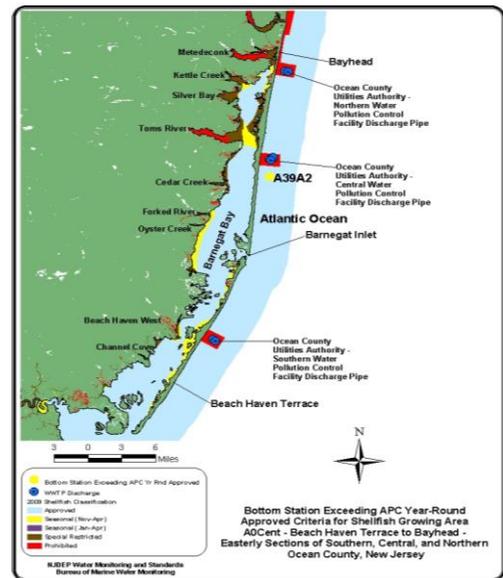
MPN/100 mL.

The data review for this shellfish growing area requires the geometric mean not exceed 14 MPN/100 mL and no more than 10% of the samples should exceed 49 MPN/100 mL with 15 or more samples. As a result, the data set does not support the current classification for this area with regard to year round NSSP requirements for APC, and fecal coliform review for *Approved* waters. *Approved* bottom station A39A2 exceeded the 90th percentile.

Bottom stations A37A2, A37B, A38A, A38B and A39A2 exceeded APC *Approved* criteria for the summer with 21 to 22 samples when reviewing the Statistical Summary and the Shellfish Growing Water Data Listings. Utilizing fecal coliform direct 3 tube A-1 analysis, these bottom stations had summer geo-means that were no higher than 6.3 MPN/100 mL, which was acceptable for *Approved* criteria. All stations except A39A2 exceeded the 90th percentile with 11.8 % > 49 MPN/100 mL during the summer. Station A39A2 had a 90th percentile during the summer of 17.6 % > 49 MPN/100 mL.

Bottom stations A37B and A39A2 are both in *Approved* waters while all others that exceeded *Approved* criteria for the summer are in *Prohibited* waters. As a result, this data set does not support the current classification for this area with regard to NSSP requirements for APC and fecal coliform review for *Approved* bottom stations A37B and A39A2, as both stations exceeded the 90th percentile.

With the exception of the stations relating to the downgrade presented in this report, the bacterial data for the remaining stations in this shellfish growing area is acceptable for *Approved* classification. However, *Prohibited* classifications must remain in those areas surrounding outfalls because this is required as a precaution for public health and safety.

Rainfall Effects

Precipitation patterns in the coastal areas of New Jersey are typical of the Mid-Atlantic coastal region. Summer storms are localized and often associated with thunder and lightning activity. Winter storms are frequently associated with northeasters. Hurricanes can occur during the summer and early fall. Additional information on annual storm averages, duration, intensity, and event volume is provided in the Shellfish Growing Area Report Guidance Document.

The precipitation data for this area was provided by the National Oceanic and Atmospheric Administration (NOAA), and stations RA012, RA014 and RA021.

Based on Wet/Dry statistics, there were 15 surface sampling stations and five bottom stations that showed rainfall components in relation to water quality for this shellfish growing area (see map on next page). Fourteen stations were in *Approved* waters and six were in *Prohibited* waters.

Rainfall components must register a t-statistical probability less than 0.05. The Wet/Dry Statistics were calculated based on an impact time of 72 hours prior to the day of sampling and a wet/dry cutoff of 0.75 inches of rain, as these criteria produced the most results for impact.

Rain component stations were generally located throughout the waters of this shellfish growing area although more were positioned in the north through the central portion.

Rain component stations showed a higher geometric mean during wet conditions as opposed to dry. The highest geo-mean for wet conditions in the wet/dry data sheets was 15.1 MPN/100 mL for the *Prohibited* bottom station A37A2 with 4 wet counts. No *Approved* stations with rain components were higher than 10.0 MPN/100 mL in the wet/dry data sheets.

In the Statistical Summary, the highest year round geometric mean recorded for any rain component station was 5.0 MPN/100mL, and most of these stations showed 0 % > 49 MPN/100 mL with the following exceptions: *Approved* bottom station A35A had a 90th percentile of 5% > 49 and *Prohibited* bottom stations A30A2 and A37A2 respectively showed 90th percentiles of 5.0 % and 9.5% > 49 MPN/100 mL.

The bacteriological water quality analysis for precipitation in this shellfish growing area report suggests minimal impact from rainfall, as stations with rainfall components had relatively low geo-means and 90th percentiles.

Large storms, or severe winter, cyclonic events ("nor'easters"), although present, have not been catastrophic during this review period, and impact from hurricanes has been limited. In addition, there appears to be no specific relationship between rainfall and the shellfish classification change proposed in this Reappraisal. None the less, WM&S/BMWM decided to place rainfall priorities for sampling on assignments 491 and 501 with regard to the number of stations in the assignments that had wet/dry components. This sampling priority can be reviewed in the Recommended Changes in Monitoring Schedule section of this report.

Seasonal Effects

Surface station A53A2 showed a seasonal effect or component with the t-probability being less than 0.05. A53A2 is located in *Approved* waters and is situated in the southern portion of the growing area as shown in the map to the right.

Surface station A53A2 was within the criteria for *Approved* water classification regardless of its having a seasonal component. The t-statistic probability was noted at 0.022 in the seasonal stats, and it had a higher geo-mean
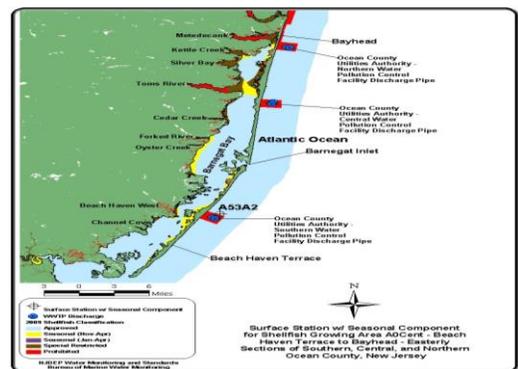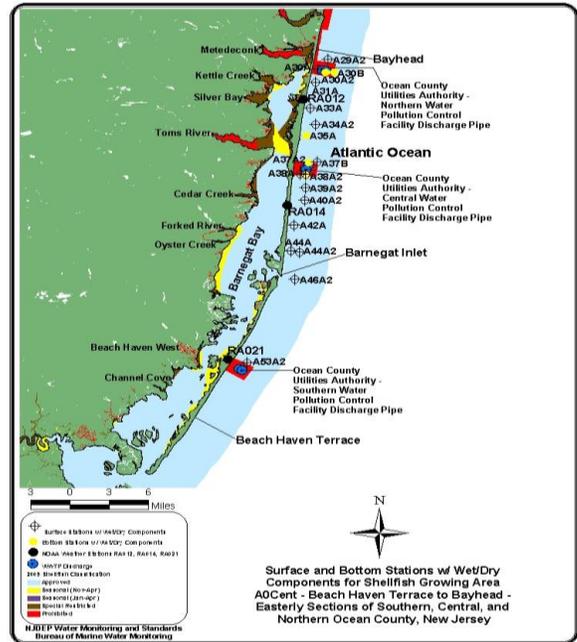
in winter that registered 3.2 MPN/100 mL.

From the Statistical Summary, A53A2 had a year round geo-mean of 3.1 MPN/100 mL, and its 90th percentile was 0 % > 49 MPN/100 mL with 20 samples.

Minimal impact was noted from seasonality. No change is required in shellfish classifications due to seasonality.

RELATED STUDIES

Nutrients

WM&S/BMWM perform additional water quality studies related to the bacteriological monitoring program. Nutrient monitoring and the collection of nutrient data is an example of one of those studies, and is part of WM&S'/BMWM's Ambient Marine Water Monitoring Program.

Stations for the Ambient Marine Water Monitoring Program are derived from an area weighted probabilistic sampling design. This provides a broader assessment, based on acreage of estuarine waters. Ocean waters are also sampled although in lessor frequency than State back bay waters.

Currently, there are 40 + nutrient sampling stations within the estuarine waters of New Jersey. At the time this shellfish growing area report was written, ocean nutrient sampling for this growing area involved stations JC41E, A30B, A34A, JC53E, A38A2, A40C, JC61E, A47A, AX50A1, and A54B, as shown in the map on the bottom right.

Chlorophyll data are also contained within the nutrient data. As such, WM&S'/BMWM is able to maintain an ongoing picture of algal activity within State waters. This chlorophyll data also proves to be useful as adjunct information for the Bureau's phytoplankton monitoring program.

Increased chlorophyll levels are also identified by WM&S/BMWM with the aid of a remote chlorophyll flight sensor. WM&S'/BMWM's remote aircraft sensing began in 2007, and involves partnerships with New Jersey's Forest Fire Service (plane services), Rutgers (data storage); USEPA Region 2 (funding). With this program, flights take place six days a week, weather permitting, during spring and summer. These flights provide estimates of State coastal chlorophyll levels and a perspective on bloom conditions/trends.

If chlorophyll sensing suggests an area of the State is experiencing a bloom, WM&S/BMWM target sample from shore or by boat. Subsequently, such samples are analyzed at the Leeds Point Lab so species type and concentration levels are known.

Further information on nutrients within State waters is available at *www.state.nj.us/dep/wms/bmw* in report sections such as those referring to Estuarine and Coastal Water Quality. Ambient results and nutrient data additionally serve other reports such as the States' Integrated Assessment Report.

Phytoplankton Monitoring

The WM&S/BMWM phytoplankton monitoring program involves the collection of water column samples in order to evaluate and determine the presence of marine biotoxins associated with certain algal species, as NSSP requires shellfish harvesting states to have a Biotoxin Contingency Plan. Were there to be a toxic algal bloom for some duration, shellfish tissue samples would also be analyzed, and if found to contain toxins, the State would be required to close impacted shellfish growing waters.

Although New Jersey's marine waters are generally not associated with toxic algal species or blooms of this type, the Biotoxin Contingency Plan is required for public health and safety, as ingestion of shellfish that have fed on toxic algal species, can cause an array of human health issues. Currently, the WM&S/BMWM Phytoplankton Monitoring Program consists of 48 marine water stations (see map, bottom right), located in both estuarine and front ocean waters. The data and information gathered in this sampling is used as adjunct information, if necessary (bloom and species dependent), in State Annual, Reappraisal, and Sanitary Survey reports for shellfish growing areas. Additionally, reports denoted as Summary of Phytoplankton Blooms have been compiled and are available electronically at *www.state.nj.us/dep/wms/bmw*.

At present, stations A32A, A38A, and AX52A1 have been allocated as the phytoplankton stations within the A0Cent shellfish growing area. Limited results exist for these stations thus far but a review of WM&S'/BMWM's Annual Summary of Phytoplankton Blooms and Related Conditions in New Jersey Coastal Waters suggests populations of phytoplankton are generally sparse within this shellfish growing area, when reviewing monitoring data for phytoplankton monitoring station A54B, which was utilized previously in A0Cent. And toxic species, of any size and duration, have not been associated with the area where that station is located (again see *www.state.nj.us/dep/wms/bmw*).

There are occasional occurrences of algal blooms in all ocean waters in New Jersey, and these can occur throughout the year. The warmer months of spring and summer provide a very common period for algal growth, though.

WM&S/BMWM Stations for Phytoplankton Monitoring Program

It is more frequently the discoloration of the water from algal blooms that causes issues along New Jersey's coastal waters rather than the toxicity of the phytoplankton. For example, brown tides resulting from one of New Jersey's more frequent algal blooms can be spotted in back bay waters, inlets, and occasionally the ocean, near inlet passageways. This generally occurs during May and June. However, aside from the bloom causing discoloration of the water, there are no known threats to human health from brown tides. For this reason, they are not considered in classifying waters for shellfish harvest.

Cooperative Coastal Monitoring

WM&S/BMWM also oversee the Cooperative Coastal Monitoring Program (CCMP). CCMP involves coastal water quality assessments and pollutant source investigation. There are two components to this program. These are recreational water quality monitoring at New Jersey bathing beaches and aerial surveillance of State coastal waters.

Water quality monitoring for the bathing beach component is administered by NJDEP, the Department of Health, and local environmental health agencies interacting within their regions of coastal New Jersey. These agencies collect water samples each week at 180 ocean and 35 bay monitoring stations from mid-May through mid-September. Samples are taken on Monday and continued sampling through the week is performed as required. Samples from these monitored stations are analyzed for enterococci bacteria concentrations.

Enterococci are used as a fecal coliform indicator in marine recreational waters (US EPA, 1986). The acceptable rate for the "steady state geometric mean indicator density" for enterococci in the waters of marine bathing beaches is 35 CFU/100 mL or less, and 104 CFU/100 mL is also considered acceptable as a one time exposure (Cabelli, 1983).

At the time this report was written, A0Cent had thirty-nine bathing beach stations as shown in the map to the right. Data for Cooperative Coastal Monitoring or bathing beach stations is available at http://www.njbeaches.org.

The other component of the CCMP program, aerial surveillance, is conducted six days a week, weather permitting. Having this component provides an evaluative tool to aerially observe coastal water quality and potential pollution reports.

Cooperative Coastal Monitoring Stations for Shellfish Growing Area A0Cent - Beach Haven Terrace to Bayhead - Easterly Sections of Southern, Central, and Northern Ocean County, New Jersey
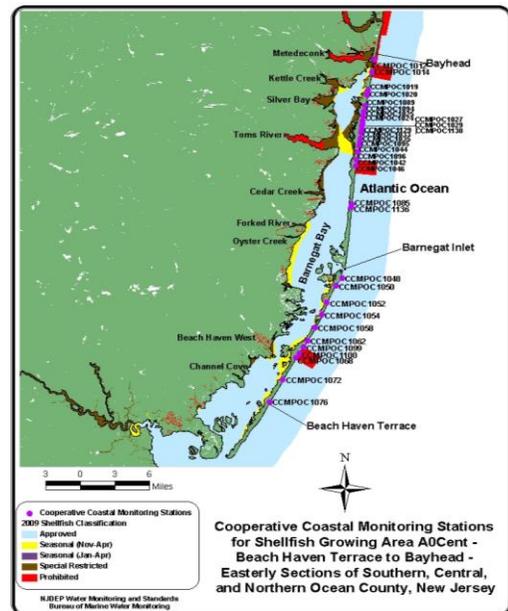
Flight paths are coordinated to observe the eastern coastal and inter-coastal waters of the State during the week. The aerial component of the CCMP program works in conjunction with the United States Army Corps of Engineers. It is part of the NY/NJ Harbor Estuary Program Floatables Action Plan. If floating solid waste and debris are spotted by aerial surveillance, the Army Corps attempts to respond with water-skimming vessels.

CONCLUSIONS

The following was concluded based on the water quality data from May 01, 2005 through April 13, 2010. The shellfish growing waters within this 31-mile stretch known as A0Cent, generally meet NSSP criteria for classification as *Approved*. A downgrade for a portion of *Approved* acreage off Island Beach State Park is necessary due water quality, though. The waters being downgraded will become *Prohibited* in classification. All other waters met the criteria for classification as *Approved*.

Fecal Coliform monitoring in A0Cent was accomplished using direct 3 tube A-1 analysis, and APC sampling strategy. Stations were reviewed for both their geometric means and 90th percentiles, as a station should meet the criteria for both statistical measurements. Again, as mentioned previously in this report, this criteria states that the geometric mean shall not exceed 14 MPN/100 mL and no more than 10% of the samples can exceed 49 MPN/100 mL when reviewing a minimum of 15 samples.

Year round and summer data presented the greatest concern when analyzing the data. For either year round or summer geo-means, no station was higher than 8.2 MPN/100 mL. This was acceptable for NSSP *Approved* year round criteria. When considering 90th percentiles for stations in this shellfish growing area, *Approved* bottom station A39A2 exceeded NSSP Approved year round criteria with 13.6 MPN/100 mL (22 samples analyzed). This same station exceeded the summer *Approved* criteria with 17.6 MPN/100 mL (17 samples analyzed). *Approved* bottom station A39A2 presented two of three reasons for the downgrade in this report with regard to its 90th percentile failures throughout the year and during the summer.

Bottom stations A37A2, A37B, A38A and A38B also exceeded the summer criteria, as each of the stations had 90th percentiles of 11.8 MPN/100 mL (with 17 samples analyzed). Three of the four stations were in *Prohibited* waters, which presents no reason for downgrade. *Approved* bottom station A37B provides the third reason for downgrade, as it exceeded NSSP *Approved* criteria during the summer.

Components or variability for precipitation and season were present. Although these components were observed in the data, their impact was generally limited, as noted in the Rainfall and Seasonal Effects sections of this report. However, sampling with regard to rainfall priority has been placed on assignments 491 and 501 due to the number of stations in the assignments that had precipitation components. These rainfall priorities have subsequently been requested for these assignments within 48/72 hours after precipitation. This will allow WM&S/BMWM to specifically sample those assignments following time frames when variability has been observed in the data.

In addition, the waters of A0Cent, which are currently, classified *Prohibited* will remain classified as *Prohibited*. This must be done regardless of water quality in order to fulfill requirements for buffers, dilution, and public health and safety in relation to the direct outfalls present in these shellfish growing waters.

RECOMMENDATIONS

Recommended Classification Change

A portion of *Approved* waters east of the Borough of Seaside Park, and more specifically originating from a point east of 8th and Ocean Avenues in Island Beach State Park are recommended for reclassification to *Prohibited*. This reclassification represents a downgrade based on water quality. There was an exceedance of NSSP fecal coliform criteria for *Approved* waters.

The specific recommendations for this down grade follow:

2,174.51 acres are recommended for reclassification from *Approved* to *Prohibited*. *Prohibited* acreage for A0Cent should increase to 6653 from the previous amount of 4478 acres, and *Approved*
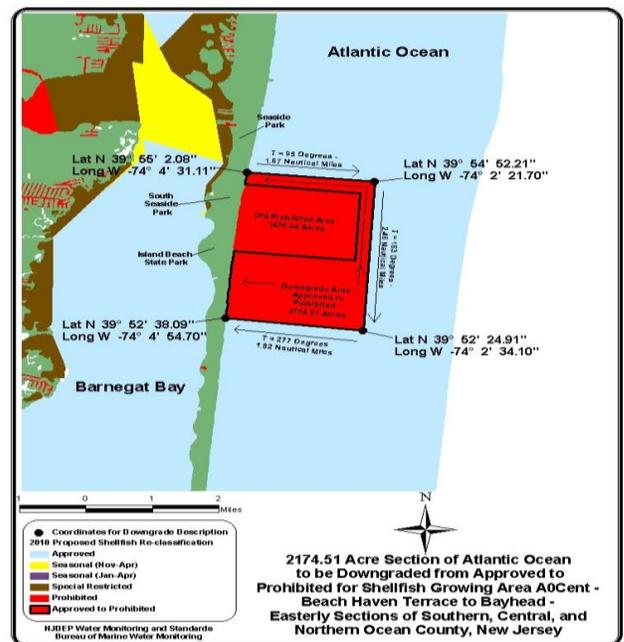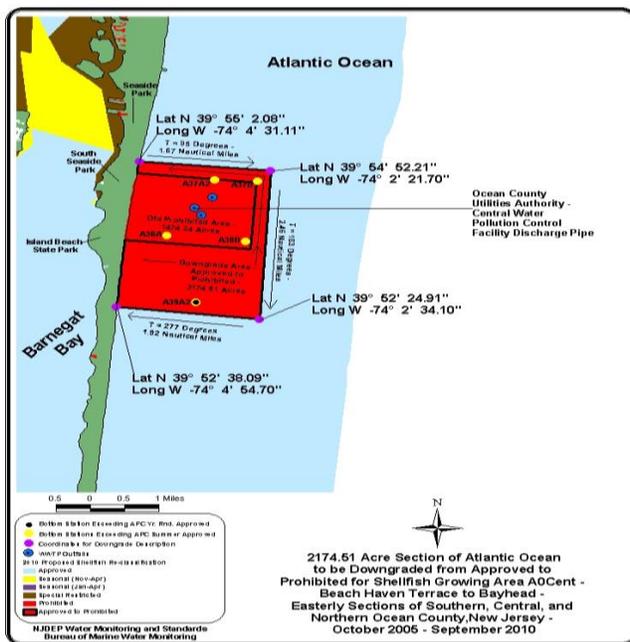
waters for A0Cent will then become 71,790, as opposed to the former 73,965. The growing water section recommended for classification change can be seen in the maps above.

For this downgrade, one section of The New Jersey Administrative Code relating to shellfish growing water classification was rewritten. That section pertained to the *Prohibited* waters of the Atlantic Ocean (7:12-2.1 (a)–20-iii.).

The amendment for *Prohibited* waters is presented in the Legal Description for Recommended Change section that follows.

Legal Description for Recommended Change

§ 7:12-2.1   Shellfish growing water classification—Prohibited

(a) The following shellfish growing waters are classified Prohibited:

20. Atlantic Ocean:

iii. [All of the Ocean waters inshore of a line beginning at the water tank located on the corner of Barnegat Avenue and 12th Avenue, Borough of Seaside Park, with coordinates of latitude 39 degrees 54 minutes 52.4 seconds N., longitude 74 degrees 4.0 minutes 57.7 seconds W., and bearing approximately 096 degrees T to a point approximately 1.5 nautical miles from the shoreline with coordinates of latitude 39 degrees 54 minutes 40.0 seconds N., longitude 74 degrees 02 minutes 36.4 seconds West. The line continues from this point parallel to the shoreline in a southerly direction 1.5 nautical miles offshore for approximately 1.1 nautical miles to a point with coordinates of latitude 39 degrees 53 minutes 35.1 seconds N., longitude 74 degrees 02 minutes 42.2 seconds W., then bearing approximately 276 degrees T (reciprocal 096 degrees T) for approximately 1.6 nautical miles to the cupola located on top of Island Beach State Park's Maintenance Center (the old Coast Guard Station 110), with coordinates of latitude 39 degrees 53 minutes 44.6 seconds N., longitude 74 degrees 04 minutes 54.1 seconds W., and terminating;]

All ocean waters contained within an area originating from a point with coordinates of latitude 39 degrees 55 minutes 2.08 seconds N., longitude 74 degrees 4 minutes 31.11 seconds W; located East of the intersection of 8th and Ocean Avenues, Borough of Seaside Park. Then, bearing 095 degrees T to a point 1.67 nautical miles from the shoreline with coordinates of latitude 39 degrees 54 minutes 52.21 seconds N., longitude 74 degrees 2 minutes 21.70 seconds West; then continues South at 183 degrees T, and parallel to the shoreline for 2.46 nautical miles to a point with coordinates of latitude 39 degrees 52 minutes 24.91 seconds N., longitude 74 degrees 2 minutes 34.10 seconds W.; then bears West at 277 degrees T for 1.82 nautical miles to a point with coordinates of latitude 39 degrees 52 minutes 38.09 seconds N., longitude 74 degrees 4 minutes 54.70 seconds W. where it terminates;

iv. – xiv. (No change)

Recommended Changes in Monitoring Schedule

The APC sampling strategy for A0Cent will remain in place. Due to the downgrade proposed in this report, it was evident that additional stations should be added in order to weigh statistics for various locations inside and outside the boundaries of the newly downgraded area (see map that follows this section). This will give WM&S/BMWM the opportunity to further research the reasons for water quality degradation, and test the borders of the downgrade area proposed in this reappraisal. In addition, sampling with regard to rainfall priority has been placed on two of three growing area assignments. Rainfall priority was placed on the two assignments with regard to the number of stations in the assignments that had wet/dry components. Concerning these considerations, monitoring with regard to current sampling schedules should proceed as presented in the BMWM's 2010' – 2011' Marine Water Sampling Assignments guide with the exception of the following changes:

1)   Assignments 491 and 501 are to be sampled under rainfall priority with 48/72 hrs. following a precipitation event as the preferred sampling time frame.

2)   Surface station A40A2 (currently bottle 7) and surface station A40A (currently bottle 25) which are both in Assignment 491 are to become surface/bottom sampling stations, as opposed to surface only.

3) Surface station A36A2 (currently bottle 17) which is in Assignment 501 is to become a surface/bottom sampling stations, as opposed to surface only.

4) Reactivate surface station A39B and make it a surface/bottom sampling station, as opposed to surface only. It will be a *Prohibited* station in Assignment 491 and assigned to NOAA rain station RA014.

5) Reactivate surface station A40B and make it a surface/bottom sampling station, as opposed to surface only. It will be an *Approved* station in Assignment 491 and assigned to NOAA rain station RA014.

6) Reactivate surface station A36B and make it a surface/bottom sampling station, as opposed to surface only. It will be an *Approved* station in Assignment 501 and assigned to NOAA rain station RA012.

7) Create new station A39D as a surface/bottom sampling station in Assignment 491and relegated to NOAA rain station RA014. This station will be in *Approved* waters with Lat. N 39 deg 52' 17.47" and Long. W -74 deg 3' 55.93".

8) Create new station A39E as a surface/bottom sampling station in Assignment 491and relegated to NOAA rain station RA014. This station will be in *Approved* waters with Lat. N 39 deg 52' 12.10" and Long. W -74 2' 58.07".

9) Create new station A39F as a surface/bottom sampling station in Assignment 491and relegated to NOAA rain station RA014. This station will be in *Prohibited* waters with Lat. N 39 deg 53' 15.86" and Long. W -74 deg 4' 8.37".

10) Create new station A39G as a surface/bottom sampling station in Assignment 491and relegated to NOAA rain station RA014. This station will be in *Prohibited* waters with Lat. N 39 deg 53' 10.84" and Long. W -74 2' 50.44".

11) Create new station A39H as a surface/bottom sampling station in Assignment 491and relegated to NOAA rain station RA014. This station will be in *Approved* waters with Lat. N 39 deg 52' 38.95" and Long. W -74 2' 13.35".

12) Create new station A38D as a surface/bottom sampling station in Assignment 491 and relegated to NOAA rain station RA014. This station will be in *Approved* waters with Lat. N 39 deg 53' 40.70" and Long. W -74 2' 7.37".

13) Create new station A37D as a surface/bottom sampling station in Assignment 491and relegated to NOAA rain station RA014. This station will be in *Approved* waters with Lat. N 39 deg 54' 40.74" and Long. W -74 2' 3.06".

14) Create new station A37E as a surface/bottom sampling station in Assignment 491and relegated to NOAA rain station RA014. This station will be in *Approved* waters with Lat. N 39 deg 55' 9.16"and Long. W -74 2' 31.84".

15) Create new station A37F as a surface/bottom sampling station in Assignment 491and relegated to NOAA rain station RA014. This station will be in *Approved* waters with Lat. N 39 deg 55' 12.81" and Long. W -74 3' 26.41".

Atlantic Ocean

Seaside Park

Current Surface Station A36 A2 –
Make It Surface and Bottom Station

Re-activate Surface Station A36 B –
Make It Surface and Bottom Station

New Station A37 F, S/B, RA014, Approved
Lat N 39 deg 55' 12.81"
Long W -74 3' 26.41"

New Station A37 E, S/B, RA014, Approved
Lat N 39 deg 55' 9.16"
Long W -74 2' 31.84"

South Seaside Park

New Station A37 D, S/B, RA014, Approved
Lat N 39 deg 54' 40.74"
Long W -74 2' 3.06"

A37A2   A37B

Barnegat Bay

Old Prohibited
Area –
1474.34 Acres

Ocean County
Utilities Authority –
Central Water
Pollution Control
Facility Discharge Pipe

A38A   A38B

Island Beach
State Park

New Station A38 D, S/B, RA014, Approved
Lat N 39 deg 53' 40.70"
Long W -74 2' 7.37"

Downgrade Area –
Approved to
Prohibited –
2174.51 Acres

New Station A39 F, S/B, RA014, Prohibited
Lat N 39 deg 53' 15.6"
Long W -74 deg 4' 37"

New Station A39 G, S/B, RA014, Prohibited
Lat N 39 deg 53' 10.84"
Long W -74 2' 50.44"

Re-activate Surface Station A39 B –
Make It Surface and Bottom Station

A39A2

New Station A39 H, S/B, RA014, Approved
Lat N 39 deg 52' 38.95"
Long W -74 2' 13.35"

New Station A39 D, S/B, RA014, Approved
Lat N 39 deg 52' 17.47"
Long W -74 deg 3' 55.93"

New Station A39 E, S/B, RA014, Approved
Lat N 39 deg 52' 12.10"
Long W -74 2' 58.07"

Current Surface Station A40 A –
Make It Surface and Bottom Station

Current Surface Station A40 A2 –
Make It Surface and Bottom Station

Re-activate Surface Station A40 B –
Make It Surface and Bottom Station

N

0.5   0   0.5   1 Miles

Re-activated Surface Stations to Become S/B
Current Surface Stations to Become S/B
New Surface Stations
New Bottom Stations
Bottom Station Exceeding APC Yr. Rnd. Approved
Bottom Stations Exceeding APC Summer Approved
WWTP Outfalls
2010 Proposed Shellfish Reclassification
Approved
Seasonal (Nov-Apr)
Seasonal (Jan-Apr)
Special Restricted
Prohibited
Approved to Prohibited

NJDEP Water Monitoring and Standards
Bureau of Marine Water Monitoring

Additional Monitoring Stations to be Added Near the
2174.51 Acre Section of Atlantic Ocean
to be Downgraded from Approved to
Prohibited for Shellfish Growing Area A0Cent -
Beach Haven Terrace to Bayhead -
Easterly Sections of Southern, Central, and
Northern Ocean County, New Jersey -
October 2005 - September 2010

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LITERATURE CITED

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SUPPORTING DOCUMENTATION

Data sheets – Reappraisal Report for Shellfish Growing Area A0Cent (Beach Haven Terrace to Bayhead), February 2015 (see the Shellfish Growing Area Reports section at *www.state.nj.us/dep/wms/bmw*).

Shoreline survey field notes and pictures – Reappraisal Report for Shellfish Growing Area A0Cent (Beach Haven Terrace to Bayhead), February 2015 (see the Shellfish Growing Area Reports section at *www.state.nj.us/dep/wms/bmw*).