NJ Department of Environmental Protection
Water Monitoring and Standards

Sanitary Survey Report for Shellfish Growing Area BB3 (Westecunk Creek to Sunrise Beach)

February 2012

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

NJ Department of Environmental Protection
Bob Martin, Commissioner

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February 2012

2007 - 2011

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Acknowledgements:

This report was written under the direction of Jill Lipoti, Ph.D., Director and Bruce Friedman, Bureau Chief. Mike Kusmiesz assisted in the collection and storage of statistical and GIS data used in analysis. Special acknowledgment is given to Captain Murphy for perseverance in collecting shellfish water quality samples (for BB3 – a Barnegat Bay estuarine shellfish growing area) during the time frame discussed in this report. This study would not have been completed without the analytical capabilities of our microbiology laboratory staff including Bruce Hovendon, Supervising Environmental Specialist, Lisa DiElmo, Elena Heller, Carrie Lloyd and Bob Seabrook along with our chemistry laboratory staff including Eric Ernst, Bill Heddendorf, and Dawn Thompson, with supervision by Bob Schuster, Acting Section Chief.

Cover Photo – Cedar Bonnet Island view of Dorland J. Henderson Memorial Bridge, Rt. 72 and Barnegat Bay

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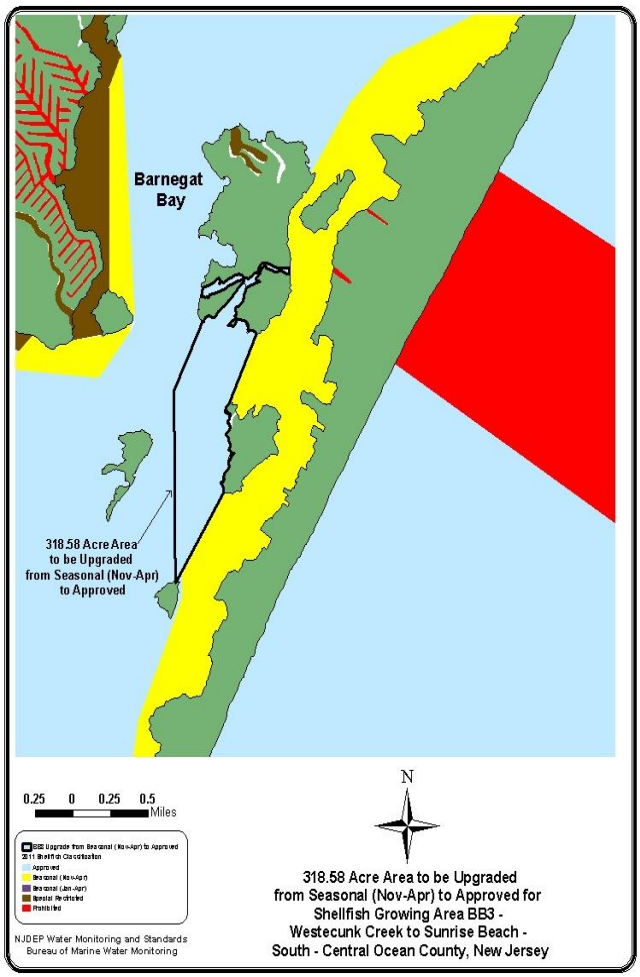
EXECUTIVE SUMMARY

Shellfish Growing Area BB3 consists of all the back bay waters that extend 16 miles from Westecunk or West Creek in the northern sector of Little Egg Harbor to Sunrise Beach in south-central sector of Barnegat Bay. In total, there are 40,062 shellfish growing water acres in BB3. The current acreage by classification equates to 34,870 *Approved*, 3,696 *Seasonal* (Nov – Apr), 988 *Special Restricted* and 508 *Prohibited*. Shellfish growing water classifications for BB3 can be viewed throughout this report, and in the State of New Jersey 2011 Shellfish Growing Water Classification Charts (i.e., 7 - 10) section of Water Monitoring and Standards' (WM&S'), Bureau of Marine Water Monitoring's (BMWM's) website (see *www.state.nj.us/dep/wms/bmw*).

For this Sanitary Survey, the results of water quality analyses for samples collected between May 2007 and October 2011 suggest an upgrade from *Seasonal* (Nov-Apr) to *Approved* is warranted due to continuously good water quality. This upgrade is proposed for the 318.58 acre area shown within the black outlined area designated in the map to the right. All remaining classifications in this shellfish growing area are appropriately designated [as per current analysis and NSSP classification practices for total coliform (TC) – using 3 tube multiple dilution in combination w/ 3 tube, four dilution analysis].



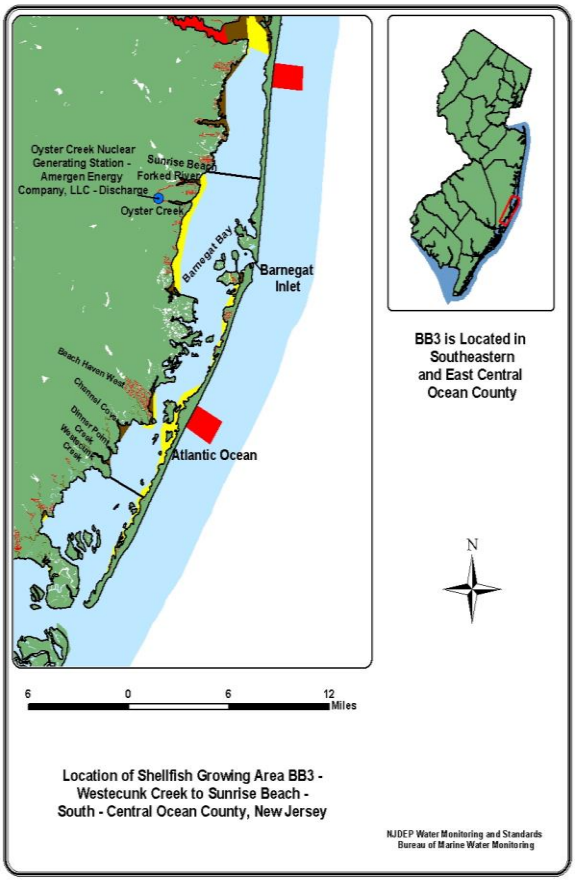
The Oyster Creek (nuclear) Generating Station provides the one potential direct source of input to the waters in Shellfish Growing Area BB3. Aside from change in ambient temperature, there has been no apparent direct and or long-term impact to BB3 shellfish growing water classifications from discharge, plant error, or operation. As this generating facility does not presently provide a continuing influence on shellfish growing water quality, BB3 is sampled utilizing the Systematic Random Sampling (SRS) strategy.

There is potential for non-point inputs such as those that might emanate from streams, creeks, rivers, lagoon/bayfront properties, marina's or storm water outfalls located within the waters of BB3. The waters surrounding potential input areas are appropriately designated with buffers or protective classifications. Although impact from these locations has been limited for this reporting period, such classifications are deemed a necessity to protect public health. With the exception of the upgrade noted above, all other classifications in BB3 remain unchanged for this reporting period.

GROWING AREA PROFILE

LOCATION AND DESCRIPTION

This Reappraisal covers shellfish growing waters from northern Little Egg Harbor to south-central Barnegat Bay (BB3). BB3 consists of 16 miles of back bay waters. It extends from the mouth of Westecunk Creek in a southeasterly direction toward Beach Haven Terrace on Long Beach Island, northward to Island Beach State Park and west to Sunrise Beach (Please Note: references to "miles" in this report are in Nautical Measure, whereby, one Nautical Mile equates to 6,086 feet).



There is a mixture of year round and seasonal communities that surround this shellfish growing area. With seasonal expansions in population, this area experiences greater population density during the late spring, summer, and early fall. Although much of the area surrounding BB3 is not heavily populated, residential development and redevelopment can be witnessed within the towns that comprise the eastern and western shorelines. Commercial development within this growing area is limited, although it has some presence within areas of Route 72 in Stafford Township and north on Route 9 toward Lacey Township.

The majority of the shellfish growing waters present in this area are classified as *Approved*, with several small sections of *Seasonally Approved*, *Special Restricted* and *Prohibited* waters, which act as buffers for the developed sections of shoreline along the bay which include marinas along with lagoon and bayfront communities.

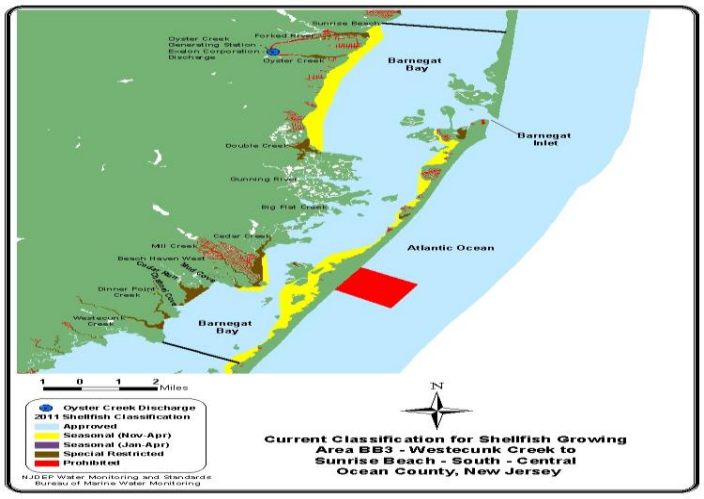
There are a number of water sources such as Westecunk Creek, Dinner Point Creek, Mill Creek, Double Creek, Oyster Creek, and Forked River that feed into the general body of water (Barnegat Bay) that comprises this shellfish growing area. These rivers and creeks are classified as *Prohibited* or *Special Restricted* depending on water quality, or the presence of nearby infrastructure such as a marina that has the potential to provide adverse inputs to the waterway. *Special Restricted* or *Seasonally Approved* classifications are often designated (when necessary) at the mouths of these waterways, in order to buffer an area that enters into *Approved* waters.

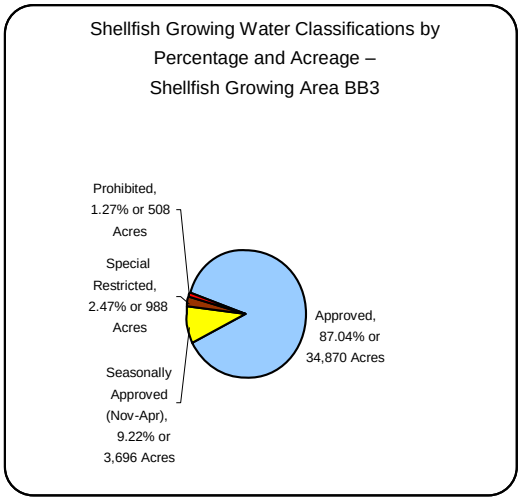
A portion of the combined water sources that make up shellfish growing area BB3 will enter the Atlantic Ocean by way of Barnegat Inlet in the north-central sector. Other water's of BB3 will exit the growing area to the south (beyond the confines of this growing area) by way of Little Egg Inlet.

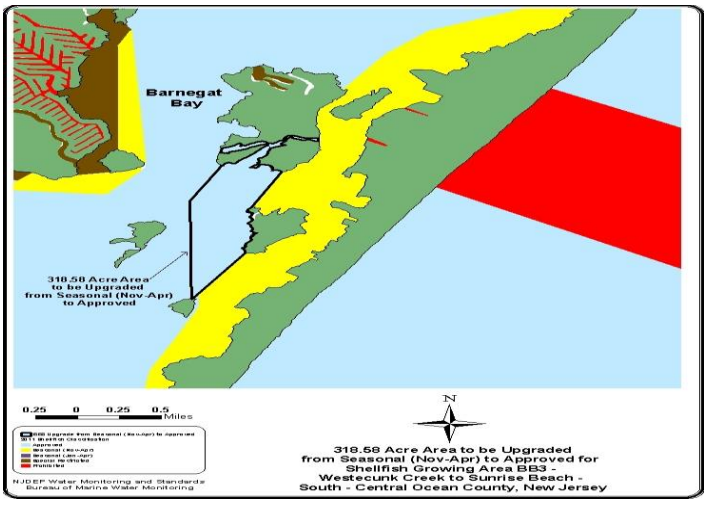
GROWING AREA CLASSIFICATION SUMMARY

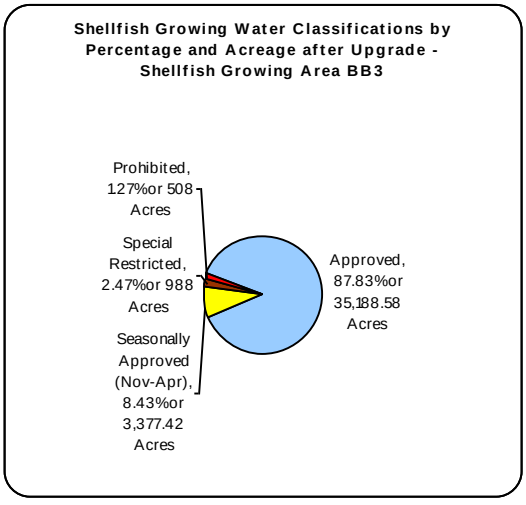
The last Sanitary Survey covering this area was performed in 2000. The last Reappraisal was written in 2008. The data analyzed in the 2008 Reappraisal supports current classifications for BB3. The data in this current Sanitary Survey supports the previous classifications but highlights an area on Cedar Bonnet Island and southward that warrants an upgrade of 318.58 acres from *Seasonal* (Nov-Apr) waters to *Approved*.

BB3 has an area of 40,062 acres. Current acreage by growing water classification follows: *Approved* - 34,870, *Seasonal* (Nov-Apr) - 3696, *Special Restricted* – 988, and *Prohibited* - 508. Following the upgrade proposed in this Sanitary Survey, BB3 classification acreage will change to: *Approved* - 35,188.58, *Seasonal* (Nov-Apr) – 3,377.42, *Special Restricted* – 988, and *Prohibited* - 508. Current and proposed classifications along with growing water acreage and percentages are shown below. As noted in the Executive Summary, BB3 classifications can also be reviewed in the State of New Jersey 2011 Shellfish Growing Water Classification Charts (i.e., 7 - 10) section of the WM&S/BMWM website (see www.state.nj.us/dep/wms/bmw).









EVALUATION OF BIOLOGICAL RESOURCES

Historically, baymen working the *Approved* and *Seasonally Approved* sections of this shellfish growing area have harvested hard clams (*Mercenaria mercenaria*) and soft shelled clams (*Mya arenaria*). However, the dominant molluscan shellfish species in this area is the hard clam, as minimal numbers of soft shelled clams are present today.

Hard clams yielded 1,529,231 pounds of meat and an ex- vessel value of $6,306,220 dollars in 2008. Figures such as these represent what was actually reported to the National Marine Fisheries Service (NMFS). Michael Celestino (2002) of the NJDEP Bureau of Shellfisheries commented on hard clam landings in the past by stating, "there are no explicit reporting requirements," and further suggested that actual numbers are probably higher than those reported.

At the time information was gathered for this current reappraisal, commercial landings figures for comparison by state had not been verified and posted for 2009 - 2011. However, as a means of comparison, the table below denotes commercial landings in pounds of meat and ex-vessel value for New Jersey hard clams from 1993 through the 2008 harvest year.

Employee resources for NMFS have "become limited" in recent years (Celestino, 2011). This may explain why numbers are lacking for subsequent years following 2008, as there have been cutbacks in federal personnel formerly involved in state surveys. While attempting to gather more data on State specific landings for hard clams and oysters at the time this report was written, it was evident that limited information existed or as yet, had not been generally compiled, on landings past 2008.

Commercial Data for Hard Clams Showing Pounds of Meat and Ex-vessel Value for New Jersey Landings. Source: NOAA Fisheries

Year	Lbs. of Hard Clams Landed	Ex-vessel Value
1993	1,511,890	$ 4,902,057
1994	1,282,670	$ 4,509,056
1995	1,425,723	$ 4,948,627
1996	1,926,598	$ 7,315,663
1997	1,695,718	$ 6,701,036
1998	2,193,358	$ 8,712,300
1999	1,880,327	$ 7,363,453
2000	1,622,221	$ 6,757,227
2001	1,357,128	$ 5,636,397
2002	1,542,445	$ 6,402,616
2003	1,259,832	$ 5,228,319
2004	1,795,538	$ 7,409,304
2005	1,852,108	$ 7,555,885
2006	1,843,991	$ 7,614,520
2007	239,733	968,308
2008	1,529,231	6,306,220
2009	*	*
2010	*	*
2011	*	*

* No Data Available

Approximately 96 % of BB3 shellfish growing waters are currently classified as *Approved or Seasonally Approved* for the harvest of shellfish. There are no quotas set for the harvest of shellfish in *Approved* and *Seasonally Approved* waters. Areas designated as *Seasonally Approved* can only

be harvested during winter months. The specific months during which a *Seasonally Approved* area can be harvested are November through April (six months) or January through April (four months) depending on the variation of water quality within these time frames. At present, there are no waters in BB3 that are classified as *Seasonal* (Jan – Apr).

With 96 % of the water's contained in BB3 classified as *Approved* or Seasonally *Approved*, there are a substantial amount of waters currently available for the harvesting of shellfish. For this and many other reasons, the Barnegat Bay Estuary which contains the waters of BB3 is considered a very valuable ecological, biological, recreational, and commercial resource. Due to its natural and economic value, the Barnegat Bay was made a part of the National Estuary Program in July of 1995 by the USEPA.

There are a large number of plants and animals that comprise the Barnegat Bay Estuary. They provide us with a unique estuarine community. As a result, there is a conservative balance between the species (plant, animal, and human) that live and interact within and about the system.

State waters contain a number of bi-valve species, as shown in the table below. For the regional area known as Barnegat Bay, the blue crab (Callinectes sapidus) and the hard clam (Mercenaria mercenaria) represent today's most important shellfish species from a recreational and commercial standpoint. For the purpose of this report, the focus is predominately placed on the hard clam bi-valve, although as previously noted, NMFS survey statistics for the hard clam were absent in their most current update.

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
Ocean Quahog	2,141	1,104	11,307	6,775	-	-	13,448	7,878	$.59
Hard Clam	*	*	-	-	-	-	*	*	*
Eastern (Atlantic) Oyster	*	*	-	-	-	-	*	*	*
-- TOTALS --	10,100	5,745	28,437	18,145	-	-	38,537	23,889	

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: 02/01/12
*** No Data Available**

SHORELINE SURVEY: EVALUATION OF POTENTIAL POLLUTION SOURCES

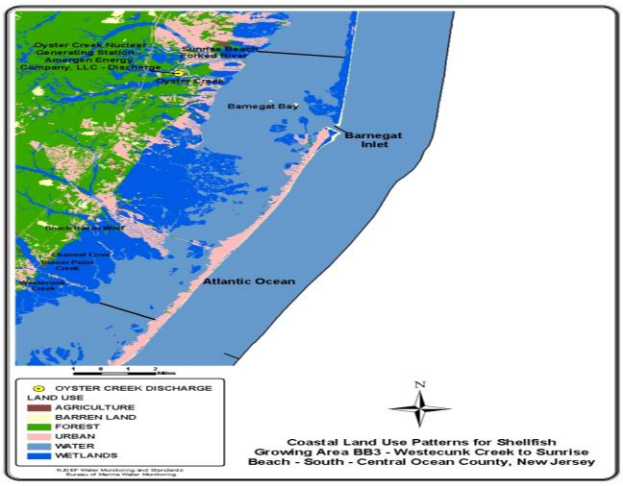
Shoreline surveys or site specific tours of areas nearby or abutting shellfish growing waters can provide insight as to the location and nature of land use, surface water discharges, marinas,

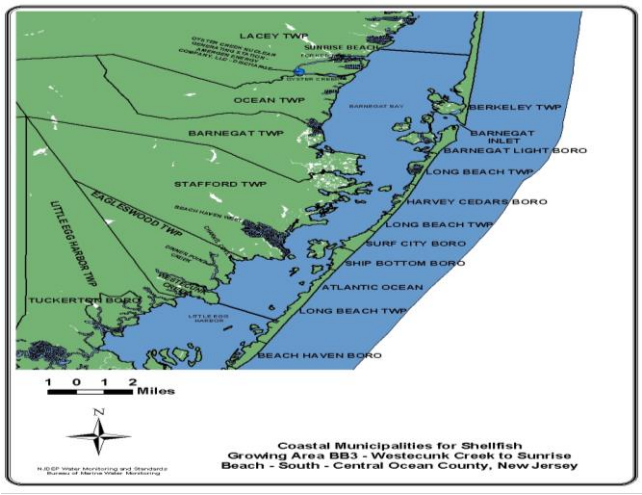
unpermitted discharges, and stormwater inputs. A shoreline survey of BB3 was conducted on August 11, 2011, and the following sections detail information derived collectively from that survey, and those that preceded it.

LAND USE

Urban environments, comprised of numerous municipalities are interspersed and make up the primary development in the area. The communities along the shore and those immediately to the west are primarily using city water and sewer, although there are communities further inland utilizing septic.

There is little agriculture connected with the lands abutting BB3. The vegetative communities comprising the ecosystems of BB3 are generally composed of either wetland or pineland forest species. The figures below show the land use, vegetation, and municipalities that surround this shellfish growing area.





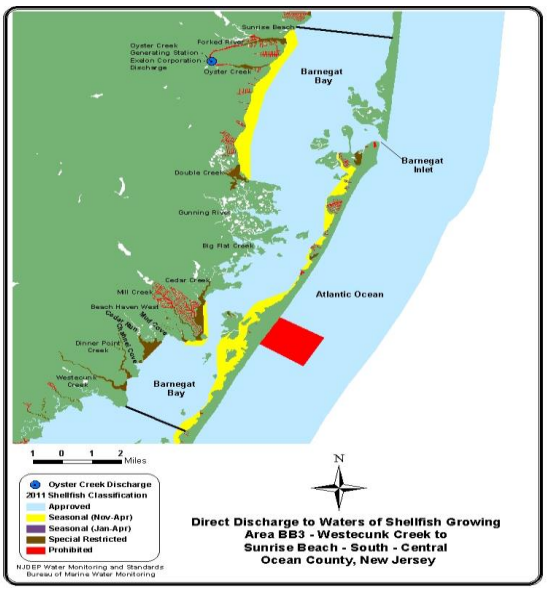
The mainland side of the bay has large areas of wetlands, which become forested lands further inland. Portions of a number of BB3's wetlands comprise the protected lands for the Edwin B, Forsythe National Wildlife Refuge. Further, there are wetlands to the northeast, which make up another protected area across Barnegat Inlet, known as Island Beach State Park. Generally, the barrier islands that make up the eastern side of BB3 have sporadic areas of wetlands located in or alongside the bay.

Projects bordering on eco-sensitive areas (e.g., salt marshes) are required by local, state, and federal regulations to utilize specific set backs and buffers as a means of protecting flora and fauna specific to wetland, riparian, or estuarine locations.

The majority of urban developed areas along the bay contain bayfront or lagoonfront communities. Lagoonfront communities consist of dredged canals/lagoons running through residential communities. Lagoon and bayfront communities are frequently the choice for recreational boaters, as these types of developments provide access to the bay for boat traffic.

SURFACE WATER DISCHARGES – NUCLEAR GENERATING FACILITY EFFLUENTS

The Oyster Creek Generating Station (a nuclear facility) is a direct effluent source for this area. The primary discharge from this facility is non-contact cooling water. This primarily involves the discharging of thermally elevated waters into Oyster Creek.



The discharge location in Oyster Creek (shown to the right) is approximately 2.33 Nautical Miles from Barnegat Bay allowing for additional mixing and dilution. Safety zones (*Prohibited* area classifications) have been established around the Oyster Creek canal/receiving area for thermally impacted water, or areas near the discharge location. *Restricted* buffers are located further out from the discharge location and abutting bayfront areas have been blanketed with *Seasonal* classifications, providing an additional buffer.

Should the Oyster Creek Generating Station malfunction, this Bureau has sufficient time to cease shellfishing in harvestable waters outside the plant's immediate location. Shellfish harvesting from contaminated waters and subsequent human ingestion is unlikely with the aid of safety zones, and warning systems.

Monitoring reports and review of State and Federal inspection summaries provide important information as this plant represents the only potential point source of contamination in the BB3 shellfish growing area. An updated summary of the Oyster Creek Generating Station follows.

Oyster Creek Generating Station

Exelon's Oyster Creek (nuclear) Generating Station is located in Lacey Twp. on Route 9 South, PO Box 388, Forked River, New Jersey 08731. Operations began in December 1969 and continued operation is expected until its retirement date of 2019.

The Oyster Creek nuclear facility utilizes a single boiling water reactor. It produces 645 net megawatts of electricity and is rated for 670 megawatt production. The plant serves nearly 600,000 homes.

Facility Name	***Waste Type***	**Avg. Waste Quantity (MGD)**	**Discharge**
Oyster Creek Nuclear Generating Station	Non-Contact Cooling Water and Stormwater	1326	Thermally Impacted Cooling Water and Stormwater Effluent

Intake water for the plant is primarily provided by Forked River. Intake water is used for two purposes. The first entails the circulating and service water systems. That operation utilizes as much as 662.4 MGD to cool the main condenser. Four intake pumps with a capacity of 115,000 gallons per minute service the circulating and service water systems.

Intake water is also used for the dilution water system. For this second operation, an average of 708 MGD is used to counter the thermal effects in the discharge canal. However, dilution water can reach as much as 1123.2 MGD. Three low speed pumps that individually have a capacity of up to 260,000 gallons per minute provide water for the dilution water system.

The facility has a New Jersey Pollution Discharge Elimination System (NJPDES) Permit (# NJ0005550) that allows them to discharge the following: non-contact cooling water from the operation of the plant, and storm water runoff. The daily discharge into Oyster Creek is 1,326 MGD. This is comprised of 592 MGD non-contact cooling water from the circulating water and service water systems, and 732 MGD of dilution water along with 2.4 MGD of intake screen wash water.

The regulatory standards for thermal surface water quality for the plant in relation to its utilization of Forked River, Oyster Creek, and Barnegat Bay follow: Ambient temperatures in the receiving waters shall not increase more than 4 degrees F from September through May. During June through August, ambient temperatures can not move higher than 1.5 degrees F, and water temperatures shall not exceed 85 degrees F except in areas designated for heat reduction.

Fish kills have been associated with the Oyster Creek Nuclear Generating Facility. Rapid ambient temperature increases resulting from warm water effluents have been the cause in such instances. Generally, fish kill events have been occasional circumstances.

Oyster Creek has also been involved in diluting a tritium plume that had been identified in 2009. This plume was discovered to have built up in ground water following the discovery of a leak in plant infrastructure. At this time, the plant suggests that tritium plume size has been greatly reduced, and tritium levels through dilution processes are negligible. Tritium pumped up from ground water sources, has been diluted by the plant and with NJDEP approval, has been subsequently released into their discharge canal. Inquiries on the plant can be researched at http://datamine2.state.nj.us/dep/DEP_OPRA/ when using Water Quality as your Program and the Program Interest ID of 46400. Additional nuclear regulatory information research can be gathered from the Nuclear Regulatory Commissions' web site, www.nrc.gov/ and the Bureau of Environmental Radiation (NJDEP) site at www.state.nj.us/dep/rpp/ber/.

The Oyster Creek plant is required by permit to monitor for radio nucleotide emissions on a quarterly basis. All monitoring reports must be sent to the New Jersey Department of Environmental Protection, Bureau of Environmental Radiation for review.

The facility is also required to test the local environment for impacts from radiation. This provides information for an annual report that must be compiled and submitted to the NRC. Testing includes air particulates, soil, stream, and bay sediments, along with shellfish, crustacean, and finfish flesh.

Two primary isotopes examined for the plants annual report include Cobalt - 60 and Cesium - 137. Comparison or background samples are taken from Great Bay.

Aside from circumstances related to sudden increases in ambient water temperature, and the ongoing dilution of tritium from groundwater beneath the plant, this generating facility's operation and operational standards appear to be in order at this time. As there appears to be a lack of impact related circumstances connected to the direct discharges of Oyster Creek and BB3 shellfish growing waters, no dimensional adjustments requiring an increase in the size of *Prohibited* or *Special Restricted* areas surrounding the facility are required at this time.

Direct inputs discharged from facilities can require the use of Adverse Pollution Condition Strategy for monitoring under conditions that have historically resulted in elevated levels of coliform for a particular growing area. The Oyster Creek facility discharges thermally impacted water in an area at some distance from the primary growing waters of BB3. Impact from a bacteriological standpoint for this plant has not been an issue from Bureau monitoring and available data. As a result, the direct discharge of this plant has not been connected with the need to use the APC Strategy and the SRS strategy is used instead.

MARINAS

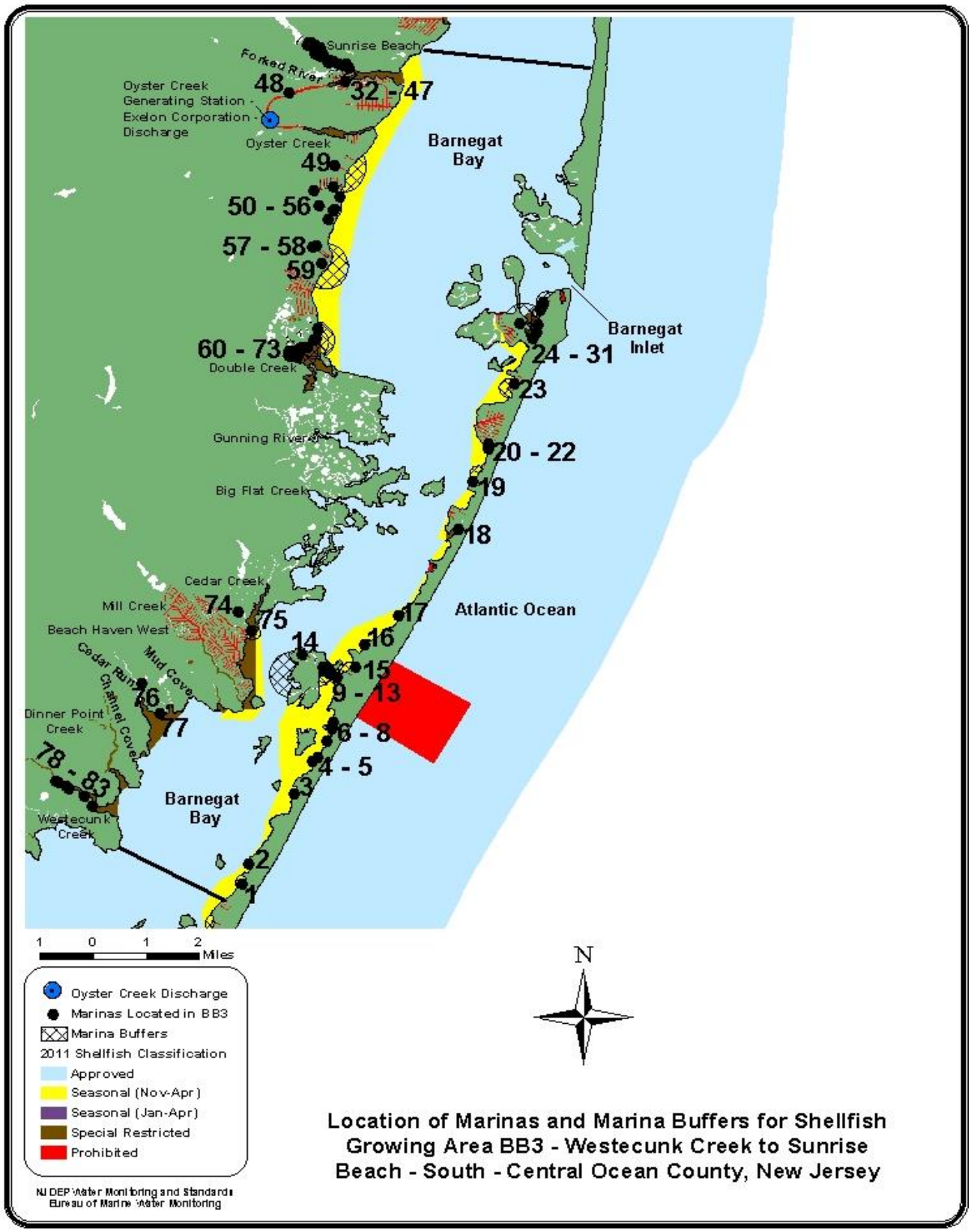
Marina facilities have the potential to affect the suitability of shellfish growing areas for the harvest of shellfish. This potential evolves from the concern over public health and safety in relation to the biological and chemical contamination that may be associated with marina facilities.

There are 83 marinas in Shellfish Growing Area BB3, as shown in the map and table that follow. Generally, these marinas are spread throughout the back bay shorelines of BB3 (both western and eastern shores). The majority of the marinas are located in or near developed urban areas. Frequently, marinas are located outside lagoon and bayfront communities, cove areas, creeks, or rivers.

The largest clusters of marinas in BB3 are located in Forked River, Double Creek, Barnegat Light, and Ship Bottom. There are no marinas on the more northeast section of BB3, as that section is part of Island Beach State Park.

The waters enclosed by marinas are classified as *Prohibited*. Depending on the size of the marina and water quality, the 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 active).

Marina buffer zones for State waters were calculated using the NJ Marina Buffer Equation or the Virginia Model (i.e., computer model developed by the State of Virginia). Both equations are approved by the US Food and Drug Administration. For more information on marinas and marina buffers, see the 2012 Shellfish Growing Area Report Guidance Document.


Sunrise Beach
Forked River
Oyster Creek Generating Station - Exelon Corporation - Discharge
Oyster Creek
48
32 - 47
49
50 - 56
57 - 58
59
60 - 73
Double Creek
Barnegat Bay
Barnegat Inlet
24 - 31
23
20 - 22
19
18
17
16
15
14
9 - 13
6 - 8
4 - 5
3
2
1
Gunning River
Big Flat Creek
Cedar Creek
Mill Creek
74
75
Beach Haven West
Cedar Run
Mud Cove
Channel Cove
76
77
Dinner Point Creek
78 - 83
Westecunk Creek
Barnegat Bay
Atlantic Ocean
1 0 1 2 Miles
N
Oyster Creek Discharge
Marinas Located in BB3
Marina Buffers
2011 Shellfish Classification
Approved
Seasonal (Nov-Apr)
Seasonal (Jan-Apr)
Special Restricted
Prohibited
NJ DEP Water Monitoring and Standards
Bureau of Marine Water Monitoring
Location of Marinas and Marina Buffers for Shellfish Growing Area BB3 - Westecunk Creek to Sunrise Beach - South - Central Ocean County, New Jersey

Marina Map Key									
Map ID	**Name**	**Location**	**# of Slips**	**Slips > 24 ft**	**slips < 24 ft**	**Depth (ft)**	**Buffer (radius, ft)**	**VA Model**	**Onsite Pumpout**
1	Haven Beach Club	Little Egg Harbor	50	30	20	3	971.00	-	-
2	Beach Haven Park Yacht Club	Little Egg Harbor	20	20	0	3	15.00	Yes	-
3	Brant Beach Yacht Club	Little Egg Harbor	65	65	0	3	1319.0	-	-
4	Marine Max Brant Beach	Little Egg Harbor	40	15	25	4	657.00	-	-
5	Haglers Marina	Little Egg Harbor	50	50	0	3	1157.0	-	-
6	Sunset Marina	Little Egg Harbor	105	84	21	3	1547.0	-	Yes
7	Ship Bottom Maine Center LLC	Manahawkin Bay	16	3	13	3	413.00	-	-
8	BB3 Unknown1	Manahawkin Bay	30	20	10	5	602.00	-	-
9	Hochstrassers Marina	Manahawkin Bay	70	70	0	9	790.00	-	-
10	BB3 Unknown10	Manahawkin Bay	50	50	0	9	668.00	-	-
11	BB3 Unknown 3	Manahawkin Bay	20	20	0	3	732.00	-	-
12	Dukes Bayside Dock	Manahawkin Bay	20	20	0	3	732.00	-	-
13	Ducks Inn Marina	Manahawkin Bay	50	50	0	3	1157.0	-	-
14	Causeway Marine	Manahawkin Bay	200	200	0	3	22.00	Yes	-
15	Surf City Marina	Manahawkin Bay	71	71	0	10	755.00	-	-
16	Surf City Yacht Club	Manahawkin Bay	70	70	0	3	1369.0	-	-
17	BB3 Private Property 2	Manahawkin Bay	5	5	0	5	283.00	-	-
18	Harvey Cedar Marina	Barnegat Bay	10	10	0	3	517.00	-	-
19	Boat Yard	Barnegat Bay	5	5	0	3	366.00	-	-
20	BB3 Unknown 4	Barnegat Bay	10	0	10	5	204.00	-	-
21	BB3 Unknown 5	Barnegat Bay	18	10	8	5	440.00	-	-
22	BB3 Private Property1	Barnegat Bay	5	2	3	5	211.00	-	-
23	Loveladies Marina Inc.	Barnegat Bay	50	50	0	5	896.00	-	Yes
24	Barnegat Light Yacht Basin	Barnegat Bay	52	52	0	3	1180.0	-	-
25	Marina At Barnegat Light	Barnegat Bay	40	40	0	3	1035.0	-	-
26	Bayview Marina	Barnegat Bay	50	50	0	3	1157.0	-	Yes
27	High Bar Harbour Marina	Barnegat Bay	170	170	0	3	71.00	Yes	Yes
28	Erics Boat	Barnegat Bay	35	35	0	3	968.00	-	-
29	Kellys Boat Rental	Barnegat Bay	10	10	0	3	517.00	-	-
30	Bobbies Boat	Barnegat Bay	6	6	0	3	401.00	-	-
31	Lighthouse Marina	Barnegat Bay	80	80	0	3	671.00	Yes	-
32	Southwinds Harbour Marina	Forked River	150	150	0	6	1417.0	-	-
33	BB3 Condo1	Forked River	50	50	0	5	896.00	-	-
34	Captains Inn	Forked River	40	40	0	5	801.00	-	-
35	Rivers Edge Marina	Forked River	25	25	0	5	634.00	-	-
36	Tides End Marina	Forked River	90	90	0	5	1202.0	-	-
37	Townsend's Marina	Forked River	70	70	0	5	1060.0	-	-
38	Ricks Marina	Forked River	30	30	0	5	694.00	-	-
39	Ted & Sons Forked River Marina	Forked River	50	50	0	5	896.00	-	-
40	Grant Boat Works	Forked River	27	27	0	5	658.00	-	-
41	Forked River Yacht Sales	Forked River	100	100	0	5	1267.0	-	-
42	Bara Marine	Forked River	17	17	0	5	522.00	-	-
43	River Lights Marina	Forked River	30	30	0	5	694.00	-	-
44	Silver Cloud Harbor Marina	Forked River	40	40	0	5	801.00	-	-
45	Wilberts Marina	Forked River	20	20	0	5	567.00	-	-
46	Forked River State Marina	Forked River	125	115	10	5	1374.0	-	-
47	Elks Point Club	Forked River	100	50	50	8	795.00	-	-
48	BB3 Unknown	Forked River	57	57	0	14	582.00	-	-
49	Holiday Harbor Marina	Barnegat Bay	200	200	0	3	2314.0	-	-
50	BB3 Unknown 2	Waretown Creek	40	40	0	3	1035.0	-	-
51	Long Key Yacht Club	Waretown Creek	130	40	90	3	1303.0	-	-
52	Boathouse Grill	Barnegat Bay	18	18	0	3	694.00	-	-
53	South Harbor Marine	South Harbor	32	32	0	3	925.00	-	-
54	Sanborn Marine Center	South Harbor	42	30	12	3	942.00	-	-
55	Stans Marine Center	South Harbor	130	130	0	3	1865.0	-	Yes
56	BB3 Condo 2	Liberty Harbor	80	80	0	3	1463.0	-	-
57	Lagoon View Yacht Club	Barnegat Bay	30	30	0	3	896.00	-	-
58	Leamings Marina	Barnegat Bay	76	31	45	3	1069.0	-	-
59	Cape Island Marina	Barnegat Bay	265	187	78	3	2355.0	-	-
60	Mystic Sailing Port	Barnegat Bay	8	8	0	3	463.00	-	-
61	BB3 Condo 3	Barnegat Bay	60	60	0	3	1267.0	-	-
62	BB3 Unknown 9	Barnegat Bay	15	15	0	3	634.00	-	-
63	BB3 Condo 4	Barnegat Bay	40	40	0	3	1035.0	-	-
64	Sun Harbor Marina	Barnegat Bay	60	60	0	3	1267.0	-	Yes
65	Bobs Bay Marina	Barnegat Bay	90	90	0	3	1552.0	-	Yes
66	Mariners Marina	Barnegat Bay	150	150	0	3	2004.0	-	Yes
67	Dirb Boat	Double Creek	20	20	0	3	732.00	-	-
68	BB3 Unknown 8	Double Creek	14	14	0	3	612.00	-	-

Marina Map Key									
Map ID	**Name**	**Location**	**# of Slips**	**Slips > 24 ft**	**slips < 24 ft**	**Depth (ft)**	**Buffer (radius, ft)**	**VA Model**	**Onsite Pumpout**
69	Captain Brownies Seafood	Double Creek	15	15	0	3	634.00	-	-
70	Bobs Dockage	Double Creek	9	9	0	3	491.00	-	-
71	Barnegat Boat Basin	Double Creek	13	13	0	3	590.00	-	-
72	East Bay Marina	Double Creek	29	29	0	3	881.00	-	-
73	Sherers Boat Basin	Double Creek	60	60	0	3	1267.0	-	-
74	Hance & Smythe	Manahawkin Creek	18	18	0	3	694.00	-	-
75	Margos Inn Marina	Manahawkin Bay	40	40	0	3	9.00	Yes	-
76	Marina Russos	Cedar Run	15	15	0	3	634.00	-	-
77	BB3 Unknown 7	Little Egg Harbor	8	8	0	5	358.00	-	-
78	West Creek Marina	Westecunk Creek	50	50	0	5	896.00	-	-
79	Nottes Landing	Westecunk Creek	18	18	0	5	538.00	-	-
80	Ernies Marina	Westecunk Creek	10	10	0	5	401.00	-	-
81	Toms Marine	Westecunk Creek	10	10	0	5	401.00	-	-
82	Nolans Marina	Westecunk Creek	10	10	0	5	401.00	-	-
83	BB3 Unknown 6	Westecunk Creek	15	15	0	5	491.00	-	-

SPILLS, UNPERMITTED DISCHARGES, AND CLOSURES

With the exception of Hurricane Irene, which brought about the closure of all State shellfish growing waters as a precaution for public health and safety, there have been no spills or unpermitted discharges that resulted in the closure of waters in shellfish growing area BB3.

Leaks or spills that do take place within New Jersey's shellfish growing waters are often the result of a variety of circumstances such as boats sinking, issues with sewage treatment plants such as pump station failure, broken sewer lines, sewer line back up, manhole overflow, broken pipes in commercial or residential locations, improper run off from commercial or residential locations, construction, and road runoff.

Often, the spills or unpermitted discharges noted above have limited impact on the chemical or bacteriological water quality in a shellfish growing area like BB3. Generally, the spills and discharges are rather small, and their distance to these shellfish growing waters is such that impact is reduced from dilution, percolation, and absorption. From the perspective of this report, which is generally founded on bactee results for total coliform, Bureau monitoring locations for BB3 continue to show relatively good water quality. Again, no specific spill or discharge brought about the closure of shellfish growing waters for BB3 during this reporting period.

STORM WATER 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.

Deriving information on the location and nature of stormwater inputs is partially accomplished by conducting shoreline surveys of shellfish growing area waterways, contributing waterways (e.g., rivers, creeks, etc.), and nearby communities. Shoreline surveys have provided evidence of two ways that storm runoff enters the estuarine waters of BB3. Stormwater delivered to these shellfish growing waters can be derived from non-directed runoff/input. Stormwaters also arrive by more specific means of drainage such as outfalls.

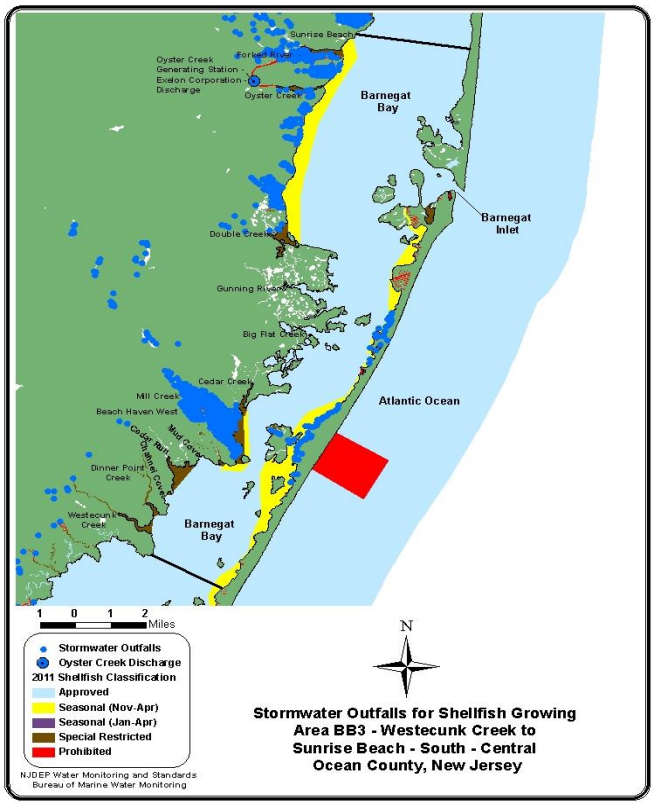
For BB3, non-directed runoff/input flows over land into streams, creeks, rivers, marina basins, and lagoon/bayfront community areas. Non-directed runoff then can occur in both developed community locations and more natural environs.

Stormwater outfalls are generally found near more developed areas. Examples of such locations would include lagoon/bayfront communities or marina basins that surround Shellfish Growing Area BB3.

Stormwater can especially impact lagoon communities and marina basins where pollutants can be concentrated for some time depending on rain, wind, and tide. Numerous stormwater outfalls can generally be found in lagoonfront communities. The pollutants that gather in lagoon communities and the basins of marinas are often more prevalent during summer when populations and utilization increase.

Lagoons, like marina basins are always classified as *Prohibited* waters. Further, the water's outside most lagoons have been classified as *Seasonally Approved* or *Special Restricted*, which provide additional buffers.

The eventual conveyance of pollutants from stormwater drains can be concentrated too. Pollutants within these systems have often been held for some time before receiving enough water to flush or purge the infrastructure.



Inputs found in stormwater such as petrochemicals, cleaning materials, paints, wood preservatives, animal waste or remains, and fertilizers come from a variety of sources. These sources again include lagoon/bayfront communities, marinas, creeks, streams, and rivers. Sources can also include boats, cars, birds, and domesticated/non-domesticated animals. The locations of stormwater outfalls for Shellfish Growing Area BB3 are shown in the figure on this page.

WATER QUALITIES STUDIES

SAMPLING STRATEGY

Shellfish growing area BB3 was sampled using the Systematic Random Sampling (SRS) strategy. Utilization of the SRS strategy required using a minimum of the most recent thirty samples collected for sampling stations in Assignments 107, 114, 117, 121 and 122, which brought about an analysis of data from May 2007 to Oct 2011.

With the SRS strategy, the 30 sample composite of data is supported by a minimum requirement of six samples per year. The SRS strategy is frequently used in areas where precipitation, seasonality, or tide play important roles. New Jersey commonly uses SRS strategy for back bay waters.

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. With the exception of ocean water analysis where fecal coliform criterion is used, New Jersey has determined its remaining shellfish growing water classifications with total coliform analysis.

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 Systematic Random Sampling (SRS) strategy, variability is expressed as the estimated 90th percentile. An area to be approved under the *Seasonal* classification must 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 SRS strategy.

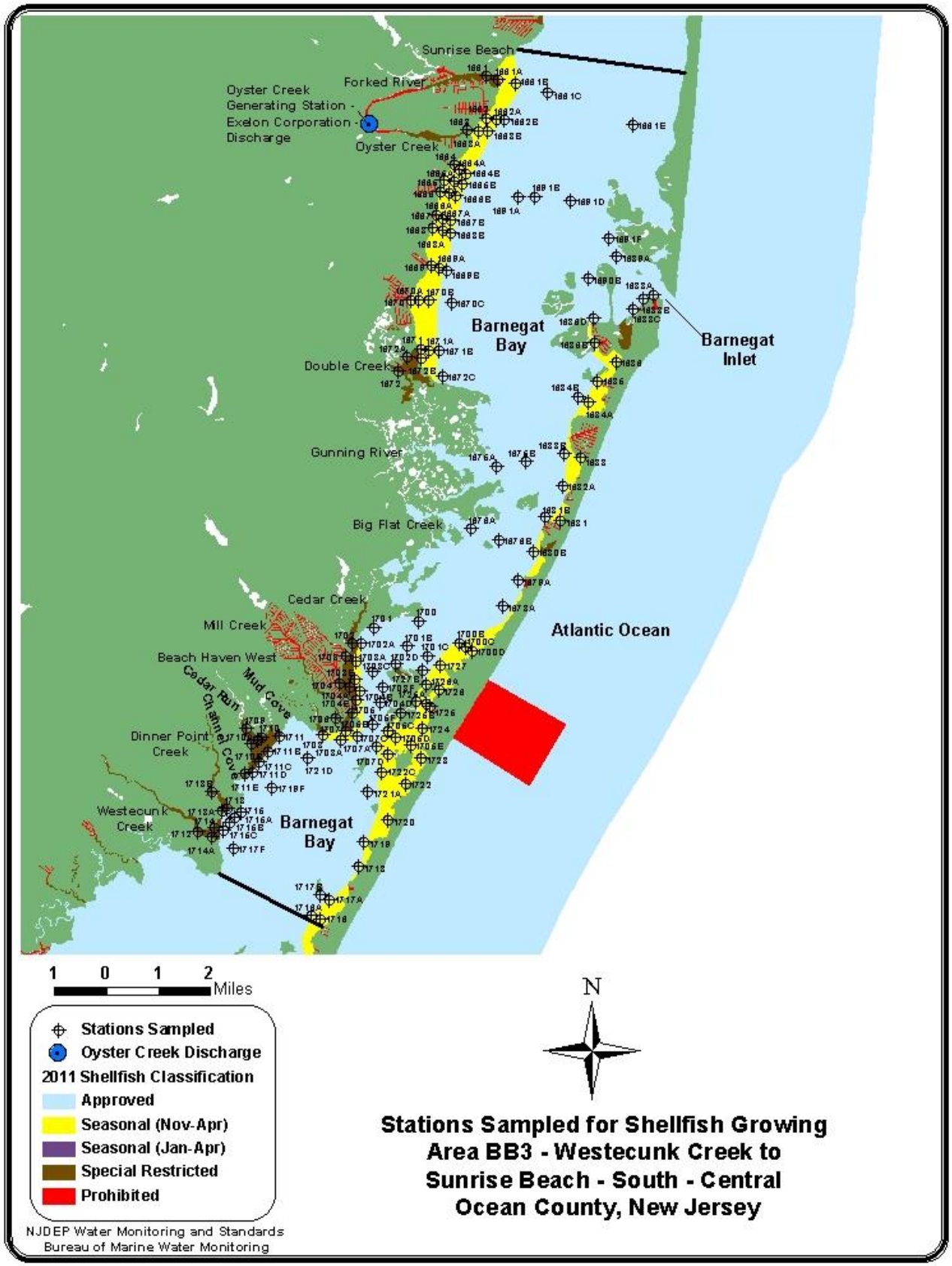
Statistical Criteria for SRS Strategy				
	Total Coliform Criteria		**Fecal Coliform Criteria**	
	Geometric mean (MPN/100 mL)	**Maximum 90th percentile** (MPN/100 mL)	**Geometric mean** (MPN/100 mL)	**Maximum 90th percentile** (MPN/100 mL)
Approved Water Classification	70	330	14	49
Special Restricted Water Classification	700	3300	88	300

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, 1992). Water quality sampling, shoreline and watershed surveys were conducted in accordance with the NSSP *Guide for the Control of Molluscan Shellfish,* 2009.

The results were compiled from Assignments 107, 114, 117, 121 and 122. A review of the records suggests that 4556 water samples were collected for total coliform bacteria between 2007 and 2011 and analyzed by the three tube MPN method (or three tube decimal dilution method) along with three-tube, four dilution analysis according to APHA (1970). Additional information on lab methodology and sampling strategy can be found in the 2012 Shellfish Growing Area Report Guidance Document.

From the five assignments that pertain to this shellfish growing area, 141 surface stations were monitored during each year and specifically analyzed for the 2007 – 2011 time frame that comprises this Sanitary Survey. The Shellfish Growing Water Monitoring Stations for Westecunk Creek to Sunrise Beach (BB3) are presented on the next page.


Sunrise Beach
Forked River
Oyster Creek Generating Station - Exelon Corporation - Discharge
Oyster Creek
Barnegat Bay
Barnegat Inlet
Double Creek
Gunning River
Big Flat Creek
Cedar Creek
Mill Creek
Atlantic Ocean
Beach Haven West
Mud Cove
Cedar Run
Channel Cove
Dinner Point Creek
Westecunk Creek
Barnegat Bay
1 0 1 2 Miles
Stations Sampled
Oyster Creek Discharge
2011 Shellfish Classification
Approved
Seasonal (Nov-Apr)
Seasonal (Jan-Apr)
Special Restricted
Prohibited
N
Stations Sampled for Shellfish Growing Area BB3 - Westecunk Creek to Sunrise Beach - South - Central Ocean County, New Jersey
NJDEP Water Monitoring and Standards
Bureau of Marine Water Monitoring

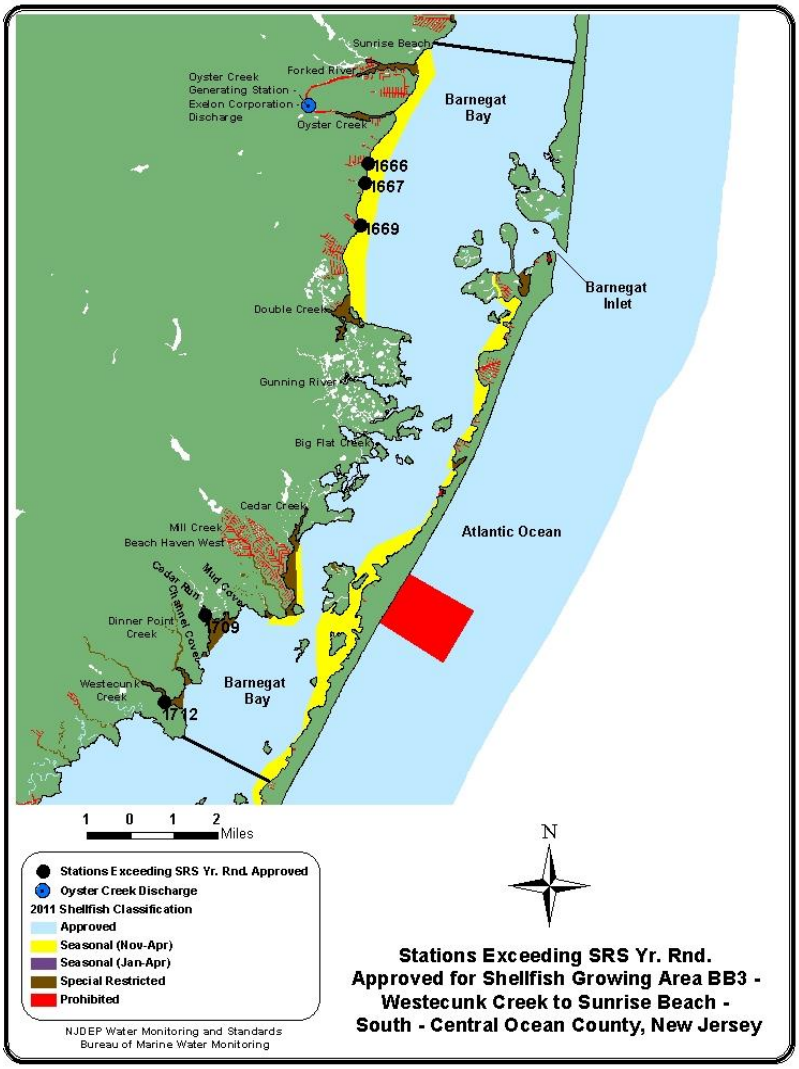
BACTERIOLOGICAL QUALITY

Compliance with NSSP SRS Approved Criteria

The National Shellfish Sanitation Program (NSSP) provides that *Approved* criteria for total coliform (using SRS strategy) shall be acceptable if total coliform (TC) bacteriological counts do not exceed a geometric mean of 70 MPN/100 mL, and, the estimated 90th percentile can be no higher than 330 MPN/100 mL with 30 or more samples. This criteria would also apply for a station located in *Seasonal* waters during the Nov-Apr time frame in which harvesting is allowed for that classification.

The data for this Sanitary Survey's compliance section also requires a description of the NSSP criteria for SRS *Special Restricted* waters, which suggests that the geo-mean not exceed 700 MPN/100 mL and the est. 90th percentile be no greater than 3300 MPN/100 mL. Additional information on NSSP criteria or NSSP's purpose, importance, and history is provided in the 2012 Shellfish Growing Area Report Guidance Document.

For this reporting period, five stations (1666 – SNA, 1667 – SNA, 1669 – SNA, 1709 – SR and 1712 – SR) did not meet SRS year round criteria for *Approved* water, total coliform (TC) with 30 or more samples. The map to the right shows those stations. Although these stations exceeded SRS yr. rnd. *Approved* criteria, they did not statistically exceed the criteria for their location within *Seasonal* (Nov-Apr) and *Special Restricted* waters.



Three of these stations (1666 – SNA, 1667 – SNA, 1669 – SNA) are located in *Seasonal* (SNA) waters. Two stations (1709 – SR and 1712 – SR) were located in *Special Restricted* (SR) waters. These stations are located along the northwestern and southwestern shorelines.

The year round geometric means (TC) for all of these stations were no higher than 38.9 MPN/100 mL. *Special Restricted* stations 1709 and 1712 had yr. rnd. est. 90th percentiles that were no higher than 658.1 MPN/100 mL. So stations 1709 – SR and 1712 – SR did not exceed the criteria for their *Special Restricted* classification with their geo-means and est. 90th percentiles.

With 33 year round samples, stations 1666 - SNA, 1667 – SNA and 1669 - SNA had yr. rnd. estimated 90th percentiles of 339.0, 368.0 and 331.1 MPN/100 mL, respectively. These numbers exceed NSSP-SRS year round *Approved* criteria regarding estimated 90th percentiles (all three stations).

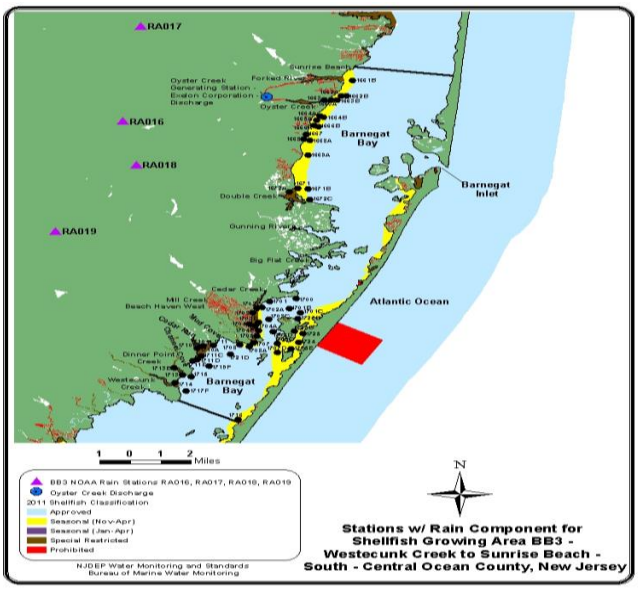
Statistically, with 16 summer samples contained within the 33 year round samples, stations 1666 - SNA, 1667 – SNA and 1669 - SNA were worse during the summer with estimated 90th percentiles of 825.1, 682.1 and 1017.7 MPN/100 mL, respectively. With an extended data pull of 35 samples during the summer, stations 1666 - SNA, 1667 – SNA and 1669 - SNA showed the following: geo-means were no higher than 59.3 MPN/100 mL and summer estimated 90th percentiles were 590.8, 766.3 and 590.4 MPN/100 mL, respectively. The summer estimated 90th percentiles exceeded NSSP criteria for *Approved* waters but stations 1666 - SNA, 1667 – SNA and 1669 - SNA are located in waters classified as *Seasonal* (Nov-Apr).

Stations 1666 - SNA, 1667 – SNA and 1669 SNA extended winter geo-means (34 winter only samples) were no higher than 14.7 MPN/100 mL, and their est. 90th percentiles were no higher than 104.2 MPN/100 mL. Statistically, their data remains acceptable for their *Seasonal* (Nov-Apr) classification.

On summary evaluation using SRS criteria for TC, the stations of this shellfish growing area produced acceptable water quality statistics with regard to their location and the associated classification of waters in which they were located.

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 lightening 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 2012 Shellfish Growing Area Report Guidance Document.



With the exception of Hurricane Irene, which occurred in August 2011, precipitation, accumulation, and the nature of storm events have not changed drastically for this reporting

period. Precipitation data for BB3 was provided by the National Oceanic and Atmospheric Administration (NOAA) with WM&S'/BMWM's use of stations RA016, RA017, RA018 and RA019 for shellfish growing area BB3.

Based on Wet/Dry statistics, there were 58 stations that showed a rainfall component in relation to water quality for this shellfish growing area, as can be seen in the map on previous page. Eighteen of those stations were in *Approved* waters, 25 were in *Seasonal* waters and 15 were in *Special Restricted* 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 24 hours prior to the day of sampling and a wet/dry cutoff of 0.25 inches of rain, as these criteria produced the most results for impact.

Rain component stations were found throughout this shellfish growing area with the exception of the western shorelines for the northern half of Long Beach Island and Island Beach State Park. Stations with rain components showed a higher geometric mean during wet conditions as opposed to dry.

The highest geo-means (those above 70 MPN/100 mL) for wet conditions in the wet/dry data sheets were found for 15 stations (1663 – SR, 1667 - SNA, 1702 – SR, 1703 - SR, 1703C – A, 1704 - SR, 1710 – SR, 1710A – SR, 1710B – SR, 1711 – SR, 1711D – A, 1713 – SR, 1713B – SR, 1714 – SR and 1715 – A). The higher geo-means noted for these stations occurred with just three to six wet counts. Four of those stations were in *Approved* waters, one was in waters classified as *Seasonal* (SNA), and 10 were in *Special Restricted* (SR) waters.

The wet/dry geo-means for those stations were found between 72.4 – 615.1 MPN/100 mL (again with wet counts between three and six). In the Statistical Summary, the highest year round geometric mean recorded for any rain component station was 33.7 MPN/100mL (station 1667 - SNA), and the highest estimated 90th percentile was 368.0 MPN/100 mL (again, station 1667). All other rain component stations had est. 90th percentiles that were no greater than 204.5 MPN/100 mL. Station 1667 – SNA had worse statistics during the summer with 16 samples.

When extending the data pull to show at least 30 samples for winter or summer, station 1667 still exceeded its est. 90th percentile w/ 766.3 MPN/100 mL during the summer but showed acceptable statistics during the winter season w/ a 14.7 MPN/100 mL geo-mean and its est. 90th percentile came in at 104.2 MPN/100 mL. This data remains acceptable for station 1667, as it has a *Seasonal* (Nov-Apr) classification. With this, the water quality in this shellfish growing area report suggests that impact occurred from rainfall but this impact did not affect shellfish classifications.

Seasonal Effects

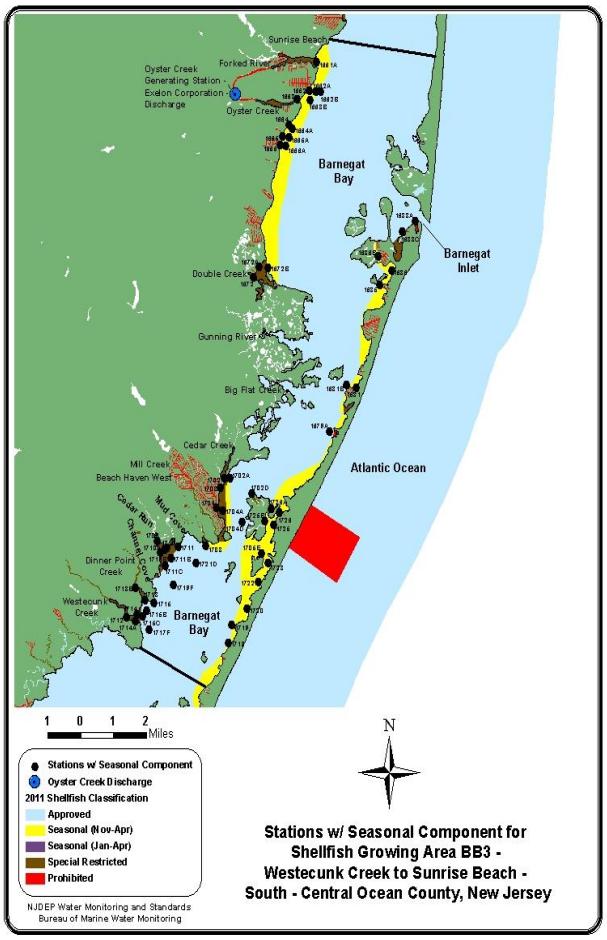
Many urban developed lands in this area experience significant seasonal fluctuations in population. During the summer months, increased population can result in increased impacts to the waters of BB3. However, impacts to back bay waters are not necessarily isolated as warmer month occurrences. Various circumstances such as storm activity can create impact during the winter. When impacts are observed as seasonally specific, monitoring programs are arranged to provide the best seasonally designed monitoring. For the five assignments (107, 114, 117, 121 and 122), 114, 117 and 121 are sampled with *Seasonal* priorities by design.

Fifty-nine stations showed a seasonal component. Those stations are shown in the map that follows. Nineteen of those stations were in *Approved* (A) waters, 23 stations were in waters classified as *Seasonal* (Nov-Apr) (SNA), and 17 were in water's classified as *Special Restricted* (SR).

Seasonal components must register a t-statistical probability less than 0.05. There are clusters of stations with seasonal components located outside Beach Haven West, Cedar Run, Dinner Point Creek, Westecunk Creek, Ship Bottom, Harvey Cedars, Barnegat Light, Double Creek and Forked River Beach.

Seasonal components were more apparent on the western side of the growing area. There were lagoon sections, marinas, and public docks within the areas where many of the seasonal components were observed. This could account for variation in the seasonal data for summer as these areas are more heavily used during that time frame. All stations showed higher statistical geometric means during the summer months.

For the stations with seasonal components, the highest geometric mean in the seasonal data sheets (above 70 MPN/100 mL w/ 14 - 22 samples) was 104.6 MPN/100 mL (station 1712 – SR). This did not exceed *Special Restricted* criteria. All other stations in the seasonal data sheets had geo-means that were ≤ 69.3 MPN/100 mL.



When comparing the year round data in the statistical summary for all stations with seasonal components, the station with the highest geo-mean was station 1712 – SR at 38.9 MPN/100 mL. This did not exceed *Special Restricted* criteria. Seasonal component stations with the highest est. 90th percentiles (those exceeding 330 MPN/100 mL) in the statistical summary were 1666 – SNA, 1709 – SR and 1712 - SR (w/ 33 - 34 samples) at 339.0, 617.9 and 658.1 MPN/100 mL, respectively. All other seasonal component stations had est. 90th percentiles ≤ 240.9 MPN/100 mL. Stations 1709 - SR and 1712 – SR had est. 90th percentiles that were within the criteria for their *Special Restricted* classification.

Extending the data pull, in order to get at least 30 samples for station 1666 – SNA during both the summer and winter seasons showed that it had an estimated 90th percentile of 590.8 MPN/100 mL during the summer. Although the summer season showed a high est. 90th percentile, 1666 – SNA is a *Seasonal* station with no harvest allowed during the summer. During the harvest season of Nov-Apr, station 1666 – SNA had a geo-mean of 8.6 MPN/100 mL, and its est. 90th percentile was 47.9 MPN/100 mL with 33 samples for that time frame. With that, no station with seasonal components

exceeded their classification criteria for geometric mean or est. 90th percentile. Seasonality did have impact on this growing area with special emphasis placed on the summer months. Impact did not cause any change in classifications though from a bacteriological standpoint.

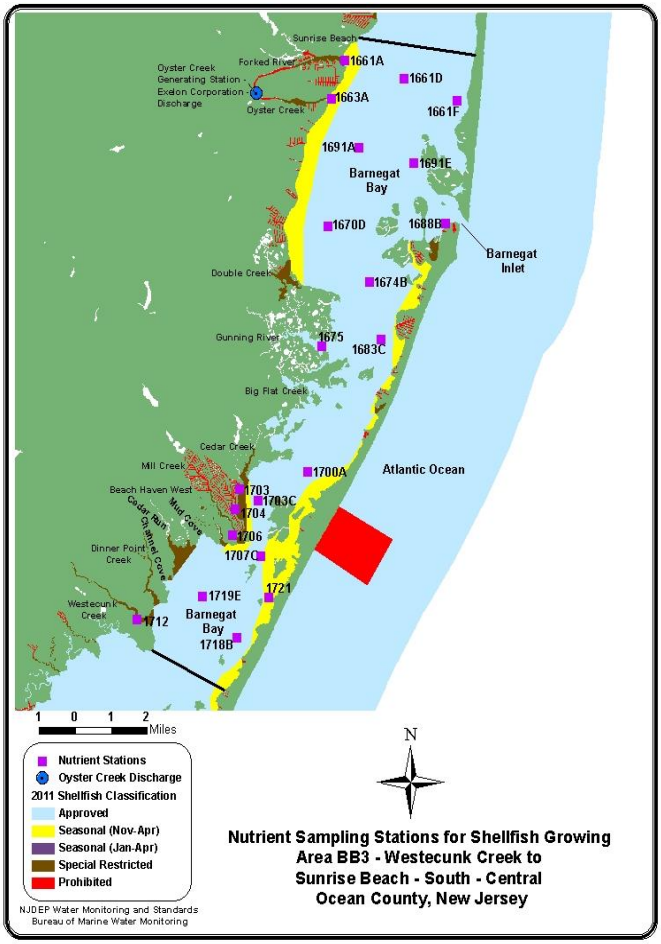
RELATED STUDIES

Nutrients

WM&S/BMWM perform additional water quality studies related to the bacteriological monitoring program. Nutrient monitoring and the collection of nutrient data as part of the NJ Coastal Monitoring Network is an example of one of those studies.

Nutrient stations are sampled on a quarterly basis. There are approximately 250 nutrient sampling stations within the coastal and inner coastal waters of New Jersey. Twenty-four of those stations are located within the ocean waters off the New Jersey coast. The 226 remaining nutrient stations are spread throughout the States back bay waters. The Bureau compiles the results of nutrient levels from such stations and then prepares a separate report.

Shellfish growing area BB3 has the following nutrient sampling stations: 1661A, 1661D, 1661F, 1663A, 1670D, 1670F, 1674B, 1675, 1683C, 1688B, 1691A, 1691E, 1700A, 1703C, 1704, 1706, 1707C, 1712, 1718B, 1719E and 1721. The locations for these 21 stations are shown to the right.



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

Nutrient and phytoplankton stations are generally arranged so samples for both are taken from matching locations. In this regard, data can be uniformly compared and analyzed where those stations occur and overlap. Further information on Nutrients within State waters is available at *www.state.nj.us/dep/wms/bmw* in sections such as those referring to Estuarine and Coastal Water Quality.

Phytoplankton Monitoring

In the WM&S/BMWM phytoplankton monitoring program, data are collected from samples which are gathered bi-weekly from May through August (Memorial Day through Labor Day). The data are evaluated by the Bureau of Marine Water Monitoring in order to determine the presence of marine biotoxins in accordance with NSSP requirements. Reports denoted as Summary of Phytoplankton blooms have been compiled and are available electronically at *www.state.nj.us/dep/wms/bmw*.

There are 16 phytoplankton stations within the waters of New Jersey. Of those 16, four are located off the coast from the southerly portion of Sandy Hook down to Cape May. The other 12 phytoplankton stations are situated within New Jersey's back bay waters.

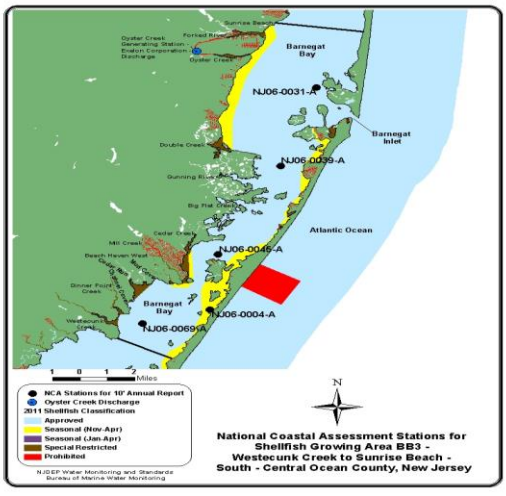
Stations 1670D and 1703C are phytoplankton stations in shellfish growing area BB3. Their locations can be observed in the nutrient map shown on the previous page. Current research (again see *www.state.nj.us/dep/wms/bmw*) suggests that populations of phytoplankton are generally found in low concentrations in these waters. No occurrences of large algal blooms connected with the presence of biotoxins have been recorded for the time period covered by this report.

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

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.

National Coastal Assessment

WM&S'/BMWM participates in projects such as the National Coastal Assessment (NCA) program in order to obtain data relating to toxins and metals within the sediments of New Jersey's back bays. The most recent review of five National Coastal Assessment stations shown to the right and monitored by WM&S/BMWM in the BB3 Shellfish Growing Area, showed a good rating as explained in table on next page.



(Long et al., 1995) suggested sediment contaminant criteria can be established when an Effects Range Median (ERM) is determined for each chemical as the 50th percentile (median) in a database of ascending

concentrations associated with adverse biological effects, and the Effects Range Low (ERL) is established for each chemical as the 10th percentile in a database of ascending concentrations associated with adverse biological effects.

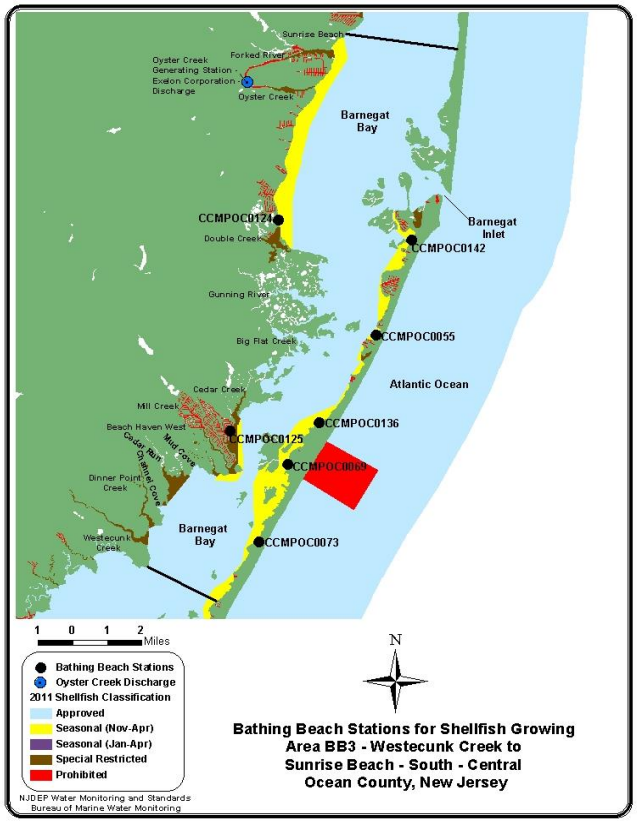
Most states tend to use the ERM/ERL criteria, as standards for sediment contaminants have not been fully developed. With the above monitoring stations, there were no ERM's exceeded, and only one station (NJ06-0069-A) had an ERL, which came in at 0.022 ug/g for the pesticide HEXACHLOROBENZENE. This was slightly higher than the maximum ERL provided for that pesticide at 0.020 ug/g. For additional NCA data or program information, visit http://water.epa.gov/type/oceb/assessmonitor/nccr/index.cfm.

Criteria for Assessing Sediment Contaminants by Site	
Rating	**Criteria**
Good	**No ERM concentrations are exceeded, and less than five ERL concentrations are exceeded.**
Fair	**No ERM concentrations are exceeded, and five or more ERL concentrations are exceeded.**
Poor	**An ERM concentration is exceeded for one or more contaminants.**
From: USEPA, National Coastal Condition Report III, December 2008, Table 1-12, Page 18	

Cooperative Coastal Monitoring

This Bureau also oversees 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 Senior Services and local environmental health agencies interacting within their regions of coastal New Jersey. These agencies collect water samples each week at 175 ocean and 43 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 are analyzed for enterococci bacteria concentrations at these monitored stations.



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 MPN/100 mL or less, and 104 enterococci/100 mL is also considered acceptable as a one time exposure (Cabelli, 1983).

BB3 has seven bathing beach stations (CCMPOC0055, CCMPOC0069, CCMPOC0073, CCMPOC0124, CCMPOC0125, CCMPOOC0136 and CCMPOC0142) as shown within the map on the previous page. Data for these 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.

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 results of the water quality data collected from sampling in this shellfish growing area indicated all stations were within NSSP, SRS criteria (total coliform) for the classification of waters in which they were located. One area with continually good water quality, discussed in the Executive Summary and Growing Area Classifications Summary is recommended for an upgrade. That upgrade will be discussed in detail in the Recommendations section that follows.

Impacts represented by statistical variation, also referred to as components from rainfall/precipitation and season were present. However, the data did not exceed NSSP criteria with regard to rain or season. Such impacts are generally minimized within shellfish growing area BB3 due to the dilution and mixing processes mentioned earlier in this report. As such, there is no reason to suggest that the sampling strategy or parameters for classification be altered for this growing area as per precipitation or seasonal influence.

Statistical components or variation in the data can provide useful information that presents a guideline for the classification of waters. As mentioned earlier in this report, the Bureau of Marine Water Monitoring utilizes seasonal priorities for sampling in three of the five assignments related to the shellfish growing waters of BB3.

These priorities are aligned with the *Seasonally Approved* (Nov - Apr) time frame and classifications that comprise BB3. The significant portion of waters in BB3 classified as *Seasonally Approved*, dictates prioritized WM&S/BMWM sampling during that period, as it coincides with the period when shellfishing is allowed in such waters.

For the purpose of public health and safety, the sampling strategy and classification for most back bay waters is also based on the location of stormwater outfalls, marinas, and lagoon sections that

exist within New Jersey's intercoastal waters. With BB3, the existence of potential contributors to coliform bacteria such as marinas, lagoons, and stormwater outfalls provides the primary reason for utilization of SRS Sampling Strategy. These influences also dictate the degree to which portions of the growing area are classified. Buffers of *Seasonal*, *Special Restricted*, or *Prohibited* waters are then most useful as protective zones in areas with the above influences. Buffers are most frequent in more densely populated areas where the occurrence of marinas, lagoons, and stormwater outfalls (water quality influences) are more common.

RECOMMENDATIONS

Recommended Classification Change

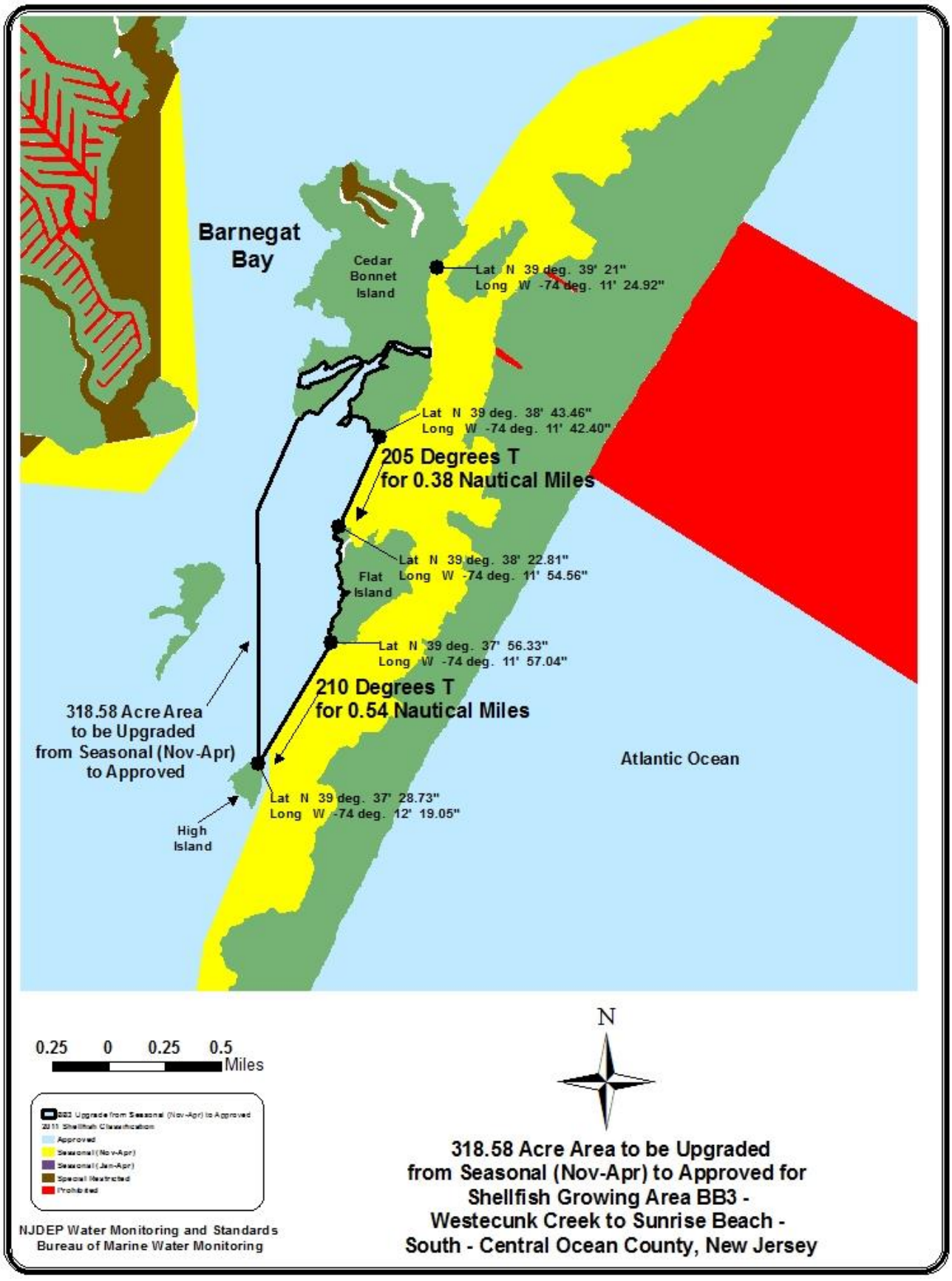
For this Sanitary Survey, an upgrade from *Seasonal* (Nov-Apr) to *Approved* is recommended for an area in BB3 located within the southern sector of an area commonly referred to as Cedar Bonnet Island, and a portion of waters to the south of that island. This upgrade is warranted due to continuously good water quality, represented by years of data acquired from monitoring stations within the upgrade perimeter. All stations within this proposed upgrade area have continued to meet NSSP *Approved* water quality criteria with regard to years of data reviews.

Aside from this upgrade, there are no recommendations for change in sampling strategy (i.e., SRS), and monitoring with regard to the current sampling schedules should proceed as presented in WM&S'/BMWM's current Marine Water Sampling Assignments 2011-2012 guide.

The specific recommendations for this upgrade follow:

318.58 acres are recommended for reclassification from *Seasonal* (Nov-Apr) to *Approved*. *Approved* acreage for BB3 should increase to 35,188.58 from the previous amount of 34,870 acres, and *Seasonal* (Nov-Apr) acreage for BB3 will then become 3,377.42, as opposed to the former 3,696. The growing water section recommended for classification change can be seen in the figure on the following page.

One section of The New Jersey Administrative Code relating to shellfish growing water classification was rewritten for this upgrade. That section was the *Seasonal* (Nov-Apr) waters of Southern Long Beach Island [7:12-4.1 (a)–4-ii-(1).]. The amendment for the *Seasonal* section rewrite is presented in the next section.


Barnegat Bay
Cedar Bonnet Island
Lat N 39 deg. 39' 21"
Long W -74 deg. 11' 24.92"
Lat N 39 deg. 38' 43.46"
Long W -74 deg. 11' 42.40"
205 Degrees T
for 0.38 Nautical Miles
Lat N 39 deg. 38' 22.81"
Long W -74 deg. 11' 54.56"
Flat Island
Lat N 39 deg. 37' 56.33"
Long W -74 deg. 11' 57.04"
210 Degrees T
for 0.54 Nautical Miles
318.58 Acre Area
to be Upgraded
from Seasonal (Nov-Apr)
to Approved
Atlantic Ocean
Lat N 39 deg. 37' 28.73"
Long W -74 deg. 12' 19.05"
High Island
0.25 0 0.25 0.5
Miles
N
2011 Shellfish Classification
Approved
Seasonal (Nov-Apr)
Seasonal (Jan-Apr)
Special Restricted
Prohibited
NJDEP Water Monitoring and Standards
Bureau of Marine Water Monitoring
318.58 Acre Area to be Upgraded
from Seasonal (Nov-Apr) to Approved for
Shellfish Growing Area BB3 -
Westecunk Creek to Sunrise Beach -
South - Central Ocean County, New Jersey

Legal Description for Recommended Change

§ 7:12-4.1 Seasonally Approved growing waters (Approved November 1 through April 30 yearly, Special Restricted May 1 through October 31, yearly)

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

4. Barnegat Bay to Little Egg Harbor Bay-Long Beach Island area:

ii. Southern Long Beach Island: Seasonal—Special Restricted May 1 through October 31 yearly, Approved November 1 through April 30 yearly:

(1) All those waters lying east of a line beginning at the point where Route 72 (Manahawkin Causeway) intersects with Long Beach Island (in Ship Bottom) and proceeding in a westerly direction as it follows the southern edge of Route 72 [(this line coincides with that described in (a)2i(1) above to where the highway intersects with the westernmost shoreline of Cedar Bonnet Island, and then following that shoreline in a generally southerly direction, but following all changes in direction of the shoreline until reaching the southernmost point of Cedar Bonnet Island, and then bearing approximately 190 degrees T to the unnamed island immediately south (this island is generally considered part of the Cedar Bonnet group) and then following that shoreline in a southerly direction to that island's southernmost point where it intersects a line beginning at the range markers (Department maintained) located on the above unnamed island and following that line bearing 203 degrees T to Flashing Red light 8ft. "74" (Fl R 4s "74") marking the intracoastal waterway, then bearing approximately 177 degrees T to the most northerly point of land on High Island] to where the highway intersects with the easternmost shoreline of Cedar Bonnet Island at a point with coordinates of latitude 39degrees 39 minutes 21 seconds N., longitude 74 degrees 11 minutes 24.92 seconds W., then following that shoreline in a southerly direction, crossing the mouths of all waterways until reaching the southeastern most point of Cedar Bonnet Island, then crossing the mouth of a larger waterway and continuing south along the eastern shoreline of the unnamed island immediately south of Cedar Bonnet (this island is generally considered part of the Cedar Bonnet group), and then following that island's eastern shoreline in a southerly direction to its southeastern most point with coordinates of latitude 39 degrees 38 minutes 43.46 seconds N., longitude 74 degrees 11 minutes 42.40 seconds W., then bearing 205 degrees T for 0.38 nautical miles to a point with coordinates of latitude 39 degrees 38 minutes 22.81 seconds N., longitude 74 degrees 11 minutes 54.56 seconds W., located on the northwestern side of the most northwestern of two smaller islands just northwest of Flat Island, then following the combined western shorelines of the two smaller islands in a southerly direction across the mouths of any waterways until reaching the southern tip of the most southerly of the two smaller islands, then continuing in a southerly direction across the mouth of a larger waterway until reaching the northwestern side of Flat Island, and continuing in a southerly direction along Flat Island's western shoreline across the mouths of any waterways until reaching Flat Island's southern tip at a point with coordinates of latitude 39 degrees 37 minutes 56.33 seconds N., 74 degrees 11 minutes 57.04 seconds W., then bearing 210 degrees T for 0.54 nautical miles to the most northerly point of land on High Island with coordinates of latitude 39 degrees 37 minutes 28.73 seconds N., 74 degrees 12 minutes 19.05

seconds W., and then following this island's eastern shoreline to its southernmost point, then bearing approximately 197 degrees T to Red "80" R "80", then bearing approximately 206 degrees T to Flashing Red light "81" (Fl G 2.5s "81"), then following the west side of the intracoastal waterway bearing approximately 187 degrees T to Red "84" (R "84"), then bearing approximately 218 degrees T to Flashing Red light "86" (Fl R 4s "86"), then bearing approximately 221 degrees T to Flashing Red light "88" (Fl R 2.5 s "88"), then bearing approximately 240 degrees T to Flashing Red light "92" (Fl R 4s "92"), then bearing approximately 209 degrees T to Quick Green light "95" (QG "95"), then bearing approximately 172 degrees T to the northernmost point of the easternmost Marshelder Island and then following the eastern shoreline of this island in a southerly direction to this island's southernmost point, and then bearing approximately 201 degrees T to Flashing Red light 104 (Fl R 2.5s "104"), then bearing approximately 229 degrees T to the northernmost point on Mordecai Island, then following the western shore of that island to its westernmost point, then bearing approximately 244 degrees T to Flashing Green light 109 (Fl G 4s "109") then bearing approximately 199 degrees T to a point on shore and terminating.

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SUPPORTING DOCUMENTATION

Data Sheets - Sanitary Survey Report for Shellfish Growing Area BB3 (Westecunk Creek to Sunrise Beach), February 2012 (see the Shellfish Growing Area Reports section at *www.state.nj.us/dep/wms/bmw*).

Shoreline survey field notes and pictures - Sanitary Survey Report for Shellfish Growing Area BB3 (Westecunk Creek to Sunrise Beach), February 2012 (see the Shellfish Growing Area Reports section at *www.state.nj.us/dep/wms/bmw*).