

Assessment of Designated Use Support within Barnegat Bay



Division of Monitoring and Standards

NJDEP

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ASSESSMENT OF DESIGNATED USE SUPPORT WITHIN BARNEGAT BAY

1. Introduction

The 660-square-mile Barnegat Bay watershed encompasses most of the 33 municipalities in Ocean County and four municipalities in Monmouth County. Barnegat Bay has long been appreciated for its great aesthetic, economic and recreational value. It supports wetlands and aquatic vegetation, shellfish beds, finfish habitats, waterfowl nesting grounds and spectacular vistas. The land draining to the bay has a population of more than 550,000, which increases significantly during the summer season.

The entire watershed has undergone dramatic growth since 1950, resulting in land use shifting from primarily forest, wetlands and agricultural to various forms of suburban development. This change in land use has affected the quality and quantity of stormwater runoff and has modified habitats. There has also been increased human use in the form of swimming, boating, and harvesting of fish and shellfish. In addition, the Oyster Creek nuclear generating facility cooling water system, which commenced operation in 1969, affects bay resources through entrainment/impingement of aquatic organisms at the intake and as the result of thermal modification from the discharge of water used for cooling.

There has been growing concern about the health of Barnegat Bay based on observed loss of sea grasses such as eel grass and widgeon grass, collectively referred to as submerged aquatic vegetation (SAV), episodic blooms of macro algae and brown tides, decline of hard clams, and increasing numbers of invasive species such as sea nettles. The full suite of stressors and biological/chemical/physical processes responsible for these observations is not entirely known. Alteration of the shoreline, hydrologic modification, resource harvesting, boating, the effects of the Oyster Creek nuclear generating facility and declining water quality are all suspected causes.

On December 9, 2010, Governor Chris Christie announced a 10-point Action Plan to address the ecological health of the Barnegat Bay watershed. The Action Plan recognized that there were multiple stressors potentially responsible for the observed conditions in the bay, including water quality. Plan element 7 calls for "Adopting More Rigorous Standards." Water quality standards are the starting point to determining the current condition of the Bay and serve as targets for restoration efforts. This is because water quality standards are set at levels that are believed to support the designated uses of a waterbody, including support of aquatic life and recreational uses.

The Department has numeric water quality standards for some parameters in estuarine waters like Barnegat Bay and on December 21, 2010, the Department adopted narrative nutrient criteria for coastal waters. However, developing numeric translators for narrative nutrient criteria is a complex and challenging task and has not yet been completed. To develop the numeric translators for narrative criteria and to determine if the existing numeric criteria are in fact protective of designated uses in the unique setting of Barnegat Bay requires a better understanding of the complex chemical, physical and biological processes that define the water quality in the bay.

To advance this objective, the Department engaged multiple partners to carry out New Jersey's most comprehensive water monitoring project, through which over 5,000 water samples were collected over a 2 year period within Barnegat Bay Watershed. The study was designed to determine the locations and extent of water quality impairments and calibrate and validate modeling tools that define the relationship between pollutant loads and water quality. This information will then be used in combination with the findings of ecological research conducted under Barnegat Bay Action Plan element 9, "Fill in the Gaps on Research." The results from the set of 10 research projects developed under Plan element 9 are expected to provide information that will clarify water quality thresholds key to supporting the health of the various plant and animal communities that are the basis of a healthy ecology. Determining the thresholds will help in interpreting the narrative criteria, will inform the need to set or revise numeric water quality criteria appropriate for Barnegat Bay specific conditions, and will inform development of restoration measures using the water quality modeling tools developed under Plan element 7.

In addition, the data collected through this initiative will be used in the next Integrated Water Quality Monitoring and Assessment Report (Integrated Report). This report is the means by which New Jersey meets the federal Clean Water Act requirement to determine the status of its principal waters in terms of overall water quality and support of designated uses and identify strategies to maintain and improve water quality. This assessment is required to be performed every two years in even numbered years. The Barnegat Bay initiative timeline did not coincide with the timeline for development of the 2012 Integrated Report. Data solicitation for that assessment concluded on July 1, 2011 in order to allow time to process the data and produce the Integrated Report in 2012 while the Barnegat Bay comprehensive monitoring program commenced in June of 2011, Concurrent with development of the 2012 Integrated Report, biweekly or weekly samples were being collected throughout 2012 and the research projects under Plan element 9 had commenced. Because of the keen interest in a comprehensive assessment of Barnegat Bay, the Department made a commitment to complete an off-year assessment using the robust data set collected in 2012.

2. Description of Monitoring Program and Data Used in the Assessment:

On June 6, 2011, DEP and its partners launched a comprehensive ambient monitoring project that measured both water quality and water quantity in ways never done before in the Barnegat Bay watershed. The Department enlisted numerous partners, including local and county governments, State and Federal agencies, a national estuary program, a water utility, a local technical high school, and a university to assist the Department in sampling and sample analysis. Water quality was measured in the tributaries and in the bay; water flow was measured into the bay from tributaries, within the bay and at the three inlets from the Atlantic Ocean. Continuous water quality monitoring was conducted at select locations, and there were intensive summer season monitoring events. The continuous and intensive monitoring components complemented the discrete sampling to capture the full range of daily, tidal and seasonal variations. For a more complete description of the monitoring program, see <http://www.nj.gov/dep/barnegatbay/qapp.htm>.

Besides data collected through the Department’s ambient network, other data collected between 1/1/2008 and 12/31/2012 within the Barnegat Bay watershed were also used in this assessment, including data submitted by stakeholders and data collected under Plan 9 studies. Only that portion of the Plan 9 data that was made available to the Department by November 2013 was used in this assessment. Data used for the assessment process can be downloaded from Water Quality Portal at (<http://www.waterqualitydata.us/portal.jsp>).

3. Attainment Relative to Existing NJ Water Quality Standards

3.1 Applicable Standards:

New Jersey’s Surface Water Quality Standards (SWQS) at N.J.A.C. 7:9B establish the use designations, classifications, and criteria by which the quality and health of New Jersey’s waters are measured. The SWQS contain numeric criteria for conventional parameters, toxic substances and metals, as well as narrative criteria and policy statements. The numeric criteria for conventional parameters applicable within the Barnegat Bay tributaries and bay are contained in Table 1.

Table 1: Selected Surface Water Criteria Applicable to the Barnegat Bay Watershed *

Conventional Parameters	FW2 Trout Maintenance	FW2 Non Trout	Pinelands	Estuary Saline 1	S Jersey pH
Total Phosphorus (river/lake) (mg/l)	0.1/0.05	0.1/0.05	0.1/0.05		
Nitrate (mg/l)	10	10	2		
Temperature (Celsius)	25	31	31	29.4	
Temperature-7 day avg (Celsius)	23	28	28		
pH high	8.5	8.5	5.5	8.5	7.5
pH low	6.5	6.5	3.5	6.5	4.5
Dissolved Oxygen (mg/l)	5	4	85% DO Sat	4	
Dissolved Oxygen-24 avg (mg/l)	6	5		5	
Turbidity (mg/l)	50	50	20	30	
Turbidity-30 day avg (mg/l)	15	15		10	
TSS (mg/l)	25	40	40		
TDS (mg/l)	500	500	100		
Chloride (mg/l)	250	250	250		
Sulfate (mg/l)	250	250	250		
Enterococci high (#cells/100 ml)				104	
Enterococci geomean (#cells/100 ml)				35	
E. Coli high (#cells/100 ml)	235	235	235		
E. Coli geomean (#cells/100 ml)	126	126	126		

*Table represents a subset of SWQS that apply to fresh and saline waters; all applicable standards can be found at: http://www.nj.gov/dep/rules/rules/njac7_9b.pdf

In addition, the recently adopted narrative nutrient criteria at N.J.A.C. 7:9B-1.14(d) 4.i provide:

Except as due to natural conditions, nutrients shall not be allowed in concentrations that render the waters unsuitable for the existing or designated uses due to objectionable algal densities, nuisance aquatic vegetation, diurnal fluctuations in dissolved oxygen or pH indicative of excessive photosynthetic activity, detrimental changes to the composition of aquatic ecosystems, or other indicators of use impairment caused by nutrients.

As previously stated, the Department has not yet developed numeric translators for the narrative nutrient criteria. The Barnegat Bay Initiative is expected to advance this objective.

3.2 Assessment Method Applied:

The assessment methods were essentially those used in developing the 2012 assessment, as described in the 2012 Integrated Water Quality Monitoring and Assessment Methods Document (Methods Document), found at: http://www.state.nj.us/dep/wms/bwqsa/2012_final_methods_doc_with_response_to_comments.pdf.

The key exception is that the assessment unit spatial delineation in the waters of Barnegat Bay has been modified. Assessment units have been based on HUC 14 delineations. In open waters such as Barnegat Bay, HUC 14 delineations are straight line extensions of land-based HUC boundaries, in the absence of drainage features present on land. The new Barnegat Bay assessment units were developed after evaluating the hydrological, chemical and biological features of the Bay as they related to expressed water quality. This revised delineation of assessment units was made possible because of the robust monitoring program and modeling completed to date. The tributary assessment units continue to be based on HUC14 subwatersheds. Figure 1 depicts the assessment units and the monitoring locations or stations within each assessment unit.

3.3 Results of Barnegat Bay Water Quality Assessment

Assessment was performed following the 2012 Methods for all existing SWQS that apply to Barnegat Bay and its tributaries and are reported for each assessment unit. The options for findings are one of the following:

- Fully Supporting** - the data indicate the waterbody attains the designated use,
- Not Supporting** - the data indicate that the waterbody does not attain the designated use,
- Not Supporting with a TMDL already prepared** - the data indicate that the waterbody does not attain the designated use and a TMDL has been prepared for relevant parameter(s),
- Insufficient**- the data is insufficient to make an assessment decision, or
- N/A** - designated use is not applicable to the assessment unit.

The relevant designated uses are identified for each assessment unit and the finding for each assessment unit. Where a designated use is not supporting, the parameter(s) responsible for the

finding is identified as a “cause” if known. The 2012 Methods Document provides a description of the decision path used to determine that a parameter is the cause for a designated use being not supported. There are some designated uses that are not supported but there is no clear parameter that can be identified as the cause for the impairment. In this case the cause is listed as unknown.

The results of applying the assessment methods set forth in the 2012 Methods Document are provided in Appendix A. Table 2 below provides an overall summary of the assessment outcomes by type for the bay and the tributaries. Additionally details of the site specific station assessments are available for review as a separate document entitled “Station Assessments for 2013 Barnegat Bay Assessment” at <http://www.state.nj.us/dep/barnegatbay/docs/station-assessments-for-2013-barnegat-bay-assessment.xlsx>

Figure 1 Assessment Units

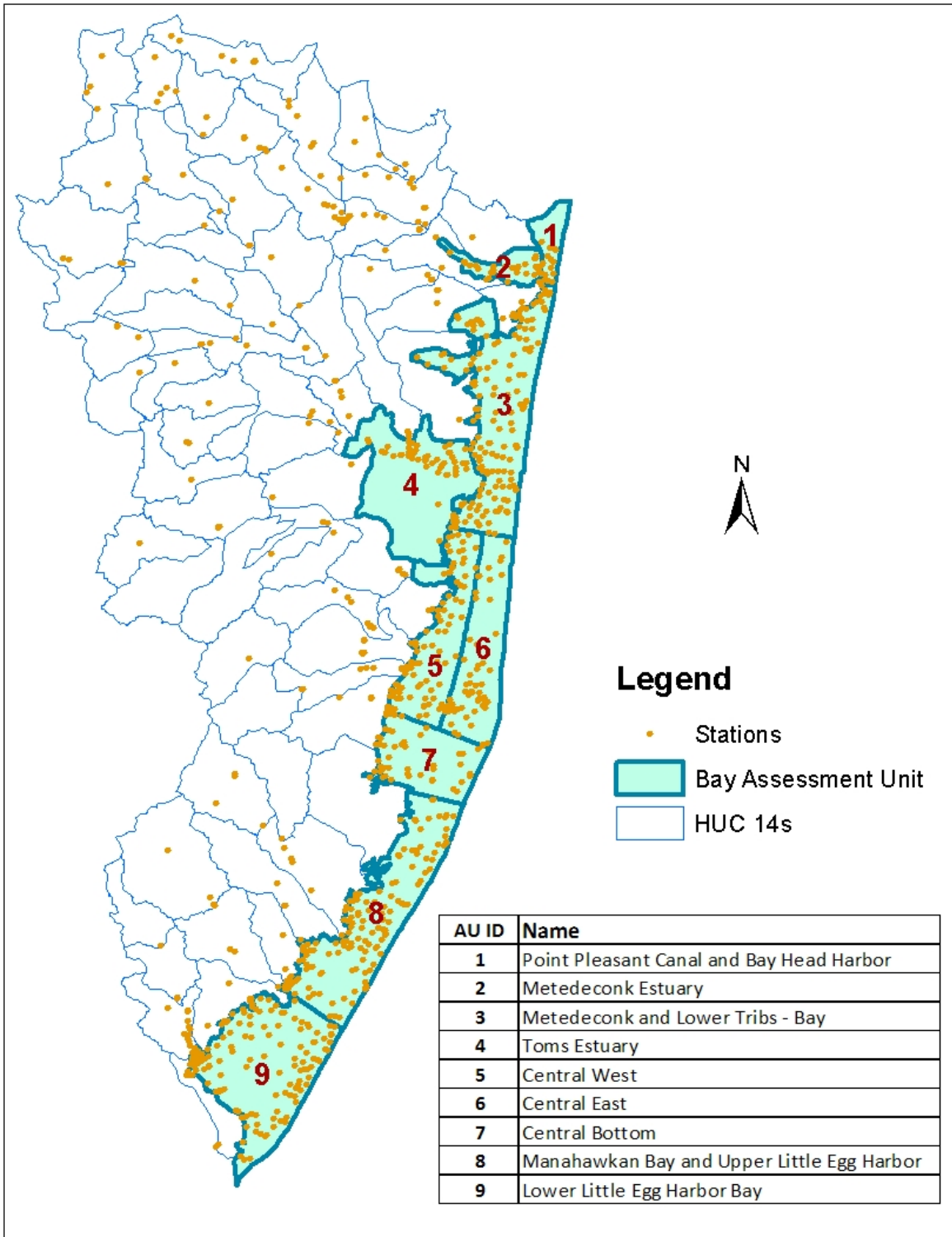
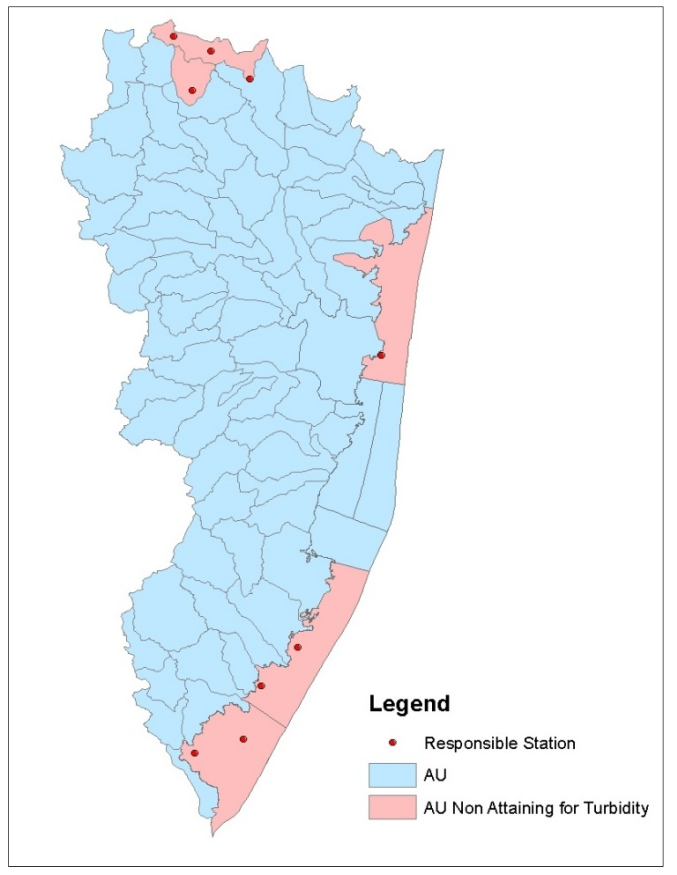
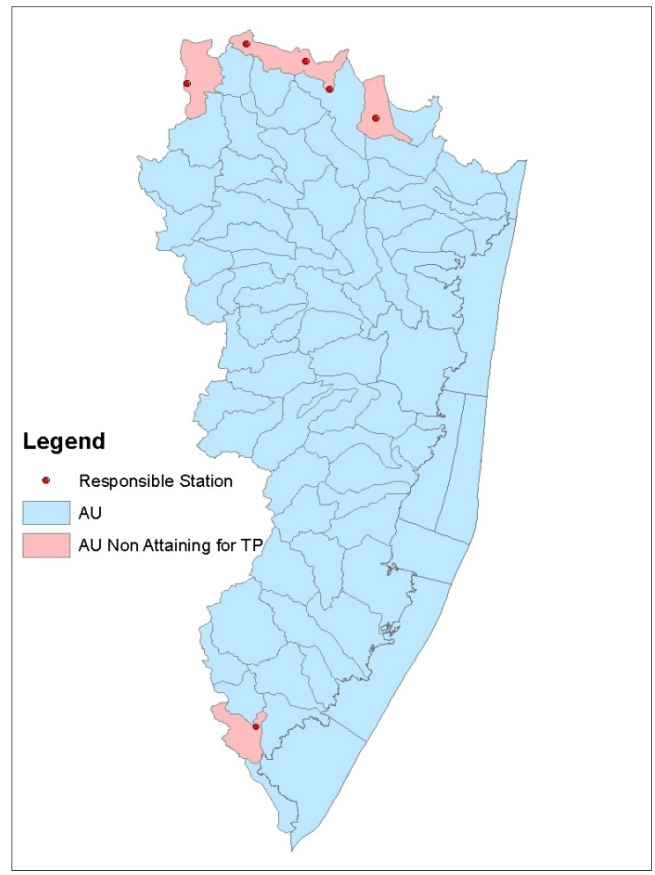
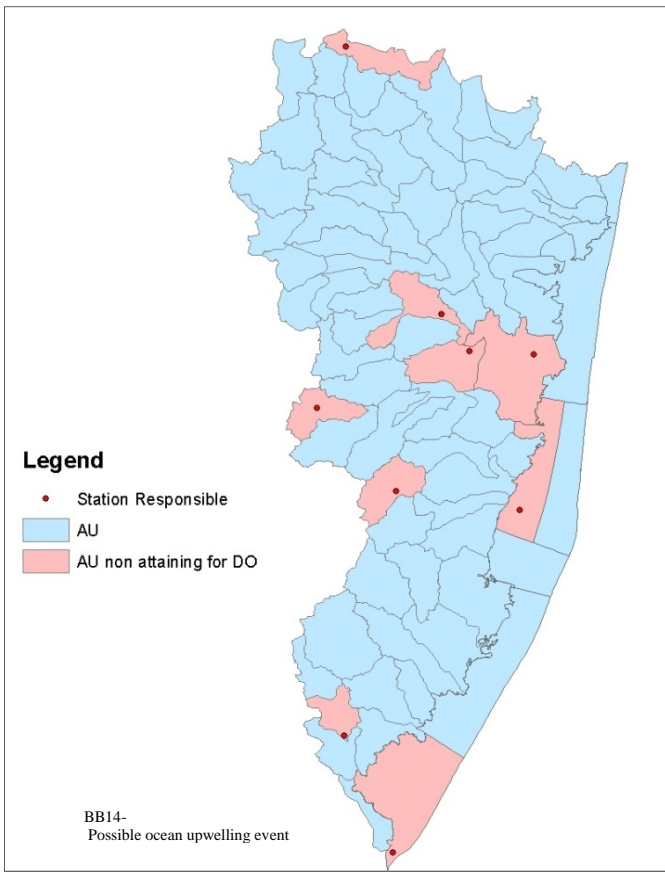


Table -2—Summary of 2013 Assessment Outcomes

Waterbody Type	Assessment Result	Drinking Water	Recreation	Aquatic Life	Shellfish	Trout	Fish Consumption
Bay	Fully Supporting	0	7	0	5	0	0
	Insufficient Data	0	0	4	0	0	8
	Not Supporting - TMDL	0	2	0	4	0	0
	Not Supporting	0	0	5	0	0	1
	NA	9	0	0	0	9	0
Tributary	Fully Supporting	25	19	28	5	3	0
	Insufficient Data	13	15	14	4	1	49
	Not Supporting - TMDL	0	20	1	9	0	9
	Not Supporting	16	13	24	0	5	9
	NA	13	0	0	49	58	0

Figures 2, 3 and 4 depict the location of the assessment units that do not attain the applicable numeric water quality criteria of dissolved oxygen (DO), total phosphorus (TP) and turbidity, respectively. These three parameters were selected to display because they are associated with aquatic life use support.

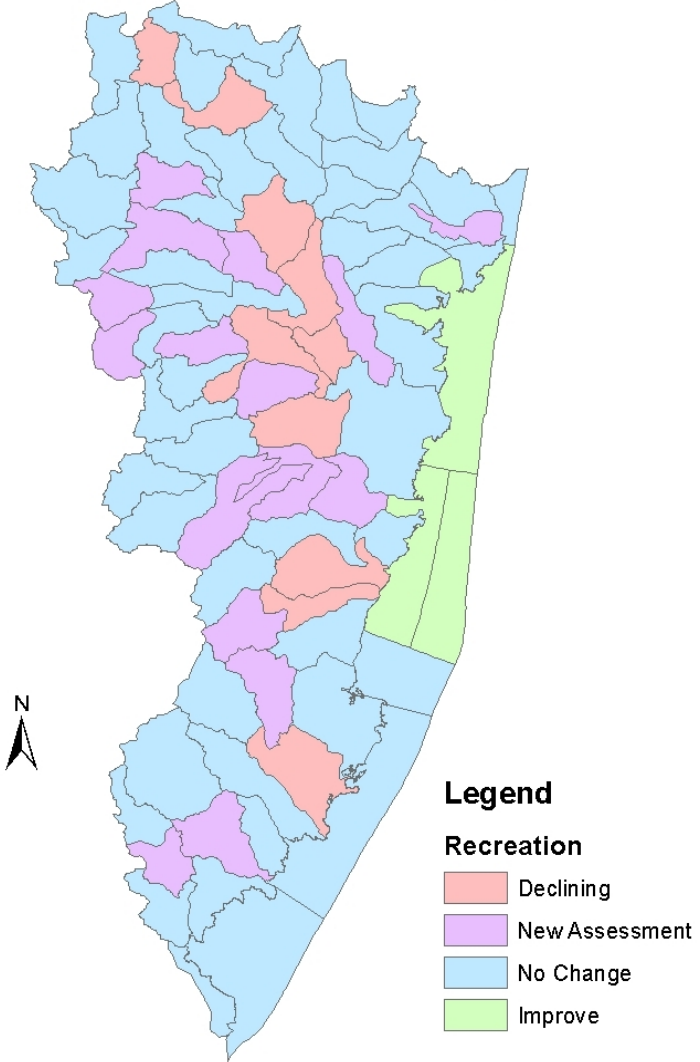
Figures 2, 3 and 4: 2013 Barnegat Bay Assessment - Assessment units not attaining applicable numeric criteria for selected parameters of interest



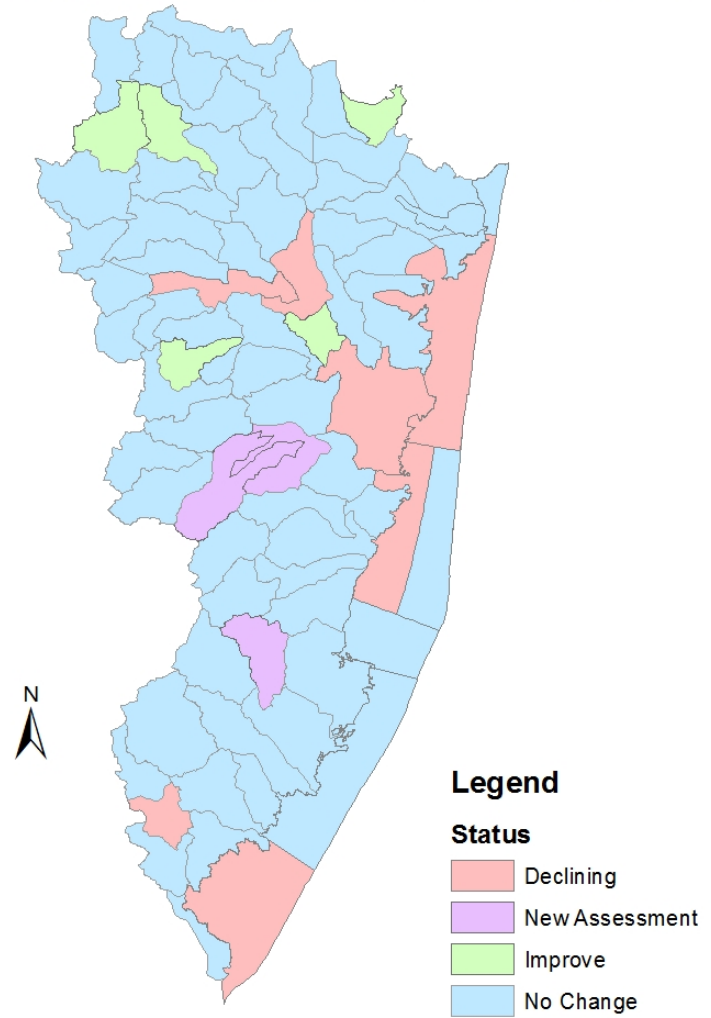
3.4 Comparison of Barnegat Bay 2012 vs. 2013 Assessment:

The current assessment was compared to the outcomes of the 2012 Integrated Report. The assessment unit status has changed in some cases, as a result of the additional data that were available for evaluation through the Barnegat Bay Initiative, primarily with respect to recreational and aquatic life uses. These uses were selected for a side by side comparison as depicted in Figures 5 & 6. As shown in these figures, assessment findings are now possible in several tributary assessment units where data was not available previously, primarily with respect to recreational use. For the recreation use, three Bay AUs were found to have improved to fully supporting status and ten tributaries AUs were found to decline from fully supporting to not supporting status. For aquatic life use, improvements to fully supporting status were found in five tributaries AUs and four Bay AUs declined to not supporting status because of the levels of DO and turbidity.

**Figure 5. Changes in Recreation Use Assessment
2012 Integrated Report vs 2013 Barnegat Bay Assessment**



**Figure 6. Changes in Aquatic Life Use Assessment
2012 Integrated Report vs 2013 Barnegat Bay Assessment**



4. Comparison to Water Quality Targets Identified by other Estuaries

As previously discussed, currently the Department has numeric water quality standards for some parameters and a narrative nutrient criterion for estuarine waters including Barnegat Bay. Developing numeric translators for narrative nutrient criteria is a complex and challenging task and has not yet been completed. To develop the numeric translator for narrative criteria and to determine if the existing numeric criteria are in fact protective of designated uses in the unique setting of Barnegat Bay requires a better understanding of the complex processes that define the water quality in the bay. Scientific study of other estuaries has sought to define and quantify water quality criteria that would equate to support of healthy ecosystems in those estuaries, similar to the work underway in Barnegat Bay.

Work in other estuaries in the Northeast United States was consulted to determine the approach used and the findings relative to setting water quality targets and/or numeric nutrient criteria. These estuaries include New Hampshire's Great Bay Estuary, Delaware Inland Bays, Chesapeake Bay and the Massachusetts Estuary project addressing 89 back bays and Long Island Sound. Work in these estuaries is summarized in a white paper entitled "Assessment Criteria for Nutrients in Selected Northeast Estuaries", which can be found at:
<http://www.state.nj.us/dep/barnegatbay/docs/assessment-criteria-for-nutrients-in-selected-northeast-estaries.pdf>

Estuarine water quality targets were established in those programs in terms of parameters that affect productivity or respond to productivity. There is variability in the metrics considered, how the metrics are measured and the value that would serve as the threshold for impairment. This serves to underscore the importance of completing the work underway under Plans 7 and 9 to determine the correct metrics to protect ecological health specifically in Barnegat Bay.

Tables 3 through 7 were prepared to depict how Barnegat Bay data in each assessment unit compares to the range of values considered adequate to support a healthy estuarine ecosystem elsewhere in the northeast. The Barnegat Bay results relative to the thresholds set by other studies are presented using the station with the best water quality and the worst water quality, relatively speaking, in each assessment unit. While it is not possible to draw definitive conclusions for Barnegat Bay based on this comparison, it is useful to get a general sense of the condition of Barnegat Bay relative to the range of targets identified for other estuaries. The parameters that are presented below are

- Dissolved Oxygen (DO)
- TSS and Clarity
- Chlorophyll a

Although NJ does have a numeric criterion for dissolved oxygen, this criterion may need to be revised to reflect a level that would be consistent with supporting a healthy ecosystem that would be indigenous to the Barnegat Bay. Therefore comparison with DO thresholds in other estuaries was included herein as well.

Table 3: Dissolved Oxygen as Instantaneous and Annual Average

Assessment Unit	# of stations with data	Target used by Others	BB Data Percent of Samples below the Target		Target used by Others	BB Data # of years below	
		DO	Best Station	Worst Station	DO	Best Station	Worst Station
Point Pleasant Canal and Bay Head Harbor	2	instantaneous > 5 mg/L	8%	12%	> 6 mg/L as annual average	0	2
Metedeconk Estuary	5		0%	8%		0	0
Metedeconk and lower tribs - Bay	20		0%	17%		0	1
Toms Estuary	16		0%	23%		0	0
Central West	15		0%	28%		0	1
Central East	9		0%	33%		0	2
Central Bottom	5		2%	20%		0	2
Manahawkin Bay and Upper Little Egg Harbor	18		0%	50%		0	1
Lower Little Egg Harbor Bay	15		0%	44%		0	1

Table 4: Dissolved Oxygen as % Saturation

Bay Assessment Unit	# of stations with data	Target used by others	BB data % below target at each station	
		DO Saturation	Best Station	Worst Station
Point Pleasant Canal and Bay Head Harbor	1	Daily Mean > 75%	11.1	11.1
Metedeconk Estuary	0		N/A	N/A
Metedeconk and lower tribs - Bay	4		7.1	25
Toms Estuary	1		27.6	27.6
Central West	3		7.1	25.9
Central East	2		2.4	7.3
Central Bottom	1		8.7	8.7
Manahawkin Bay and Upper Little Egg Harbor	3		2.2	22.2
Lower Little Egg Harbor Bay	3		8.9	20

Table 5: Dissolved Oxygen as 30 day average

Bay Assessment Unit	# of stations with data	Target used by others	BB data # of 30-day mean below the target	
		DO	Best Station	Worst Station
Point Pleasant Canal and Bay Head Harbor	2	> 5 mg/L as 30-day average	0	1
Metedeconk Estuary	5		0	1
Metedeconk and lower tribs - Bay	20		0	2
Toms Estuary	16		0	1
Central West	15		0	3
Central East	9		0	3
Central Bottom	5		0	2
Manahawkan Bay and Upper Little Egg Harbor	18		0	4
Lower Little Egg Harbor Bay	16		0	4

Table 6: TSS and Clarity

Assessment Units	TSS, mg/L				Percent of Light through Water, %			
	# of stations with data	Target used by other	BB 75th Percentile in Growing Season		# of stations with data	Target used by other	BB 25th Percentile	
		75th Percentile in growing season	Best Station	Worst Station		Percent light through, %	Best Station	Worst Station
Point Pleasant Canal and Bay Head Harbor	2	< 20 mg/L	16.3	27.6	0	> 22%	N/A	N/A
Metedeconk Estuary	2		7.0	16.0	0		N/A	N/A
Metedeconk and lower tribs - Bay	16		14.5	29.0	4		12.4	8.4
Toms Estuary	5		7.5	23.0	1		4.4	4.4
Central West	11		16.0	28.0	0		N/A	N/A
Central East	7		21.0	34.5	0		N/A	N/A
Central Bottom	3		28.0	34.8	1		28.2	28.2
Manahawkin Bay and Upper Little Egg Harbor	12		24.5	40.5	3		29.0	21.5
Lower Little Egg Harbor Bay	12		24.6	43.5	3		30.2	24.2

Table 7: Chlorophyll a

Assessment Unit	Chl a, ug/L							
	# of stations with data	Target used by Others			BB Mean		BB 90th Percentile	
		Mean	90th percentile (NH-Great Bay)	90th percentile (DE-Inland Bays)	Best Station	Worst Station	Best Station	Worst Station
Point Pleasant Canal and Bay Head Harbor	2	< 5 ug/L	< 10 ug/L	< 20 ug/L	4.2	7.7	7.7	15.9
Metedeconk Estuary	2				3.7	7.2	7.7	29.5
Metedeconk and lower tribs - Bay	16				4.6	12.1	9.5	20.2
Toms Estuary	5				1.9	17.1	4.4	29.0
Central West	11				3.5	7.9	7.2	14.2
Central East	7				3.6	7.9	6.2	15.2
Central Bottom	3				4.8	7.8	8.0	15.1
Manahawkin Bay and Upper Little Egg Harbor	12				3.2	14.7	5.9	20.3
Lower Little Egg Harbor Bay	12				2.9	7.3	5.9	17.9

Although the Plan 9 research projects have not yet been completed, the Department received the annual reports and is currently reviewing the preliminary results from the first year and second year data. Some highlights from these biological studies include: 1) within Barnegat Bay, four indices of habitat quality were evaluated using benthic macroinvertebrate data and these indices characterized the substantial majority of the 100 sites sampled in summer 2012 as not degraded, good or of high quality; 2) hard clam shell growth was comparable to other mid-Atlantic coastal ecosystems; 3) the distribution of juvenile fish populations in the bay does not appear to be affected by the degree of urbanization but populations do congregate at the intake to and outfall of the Oyster Creek generating facility, 4) wetlands function to sequester a significant amount of the nitrogen loading to the bay, and 5) the marine conservation zone appears to provide a refuge from fishing. When the ecological research is completed, it is expected to help to confirm or revise designated use assessments.

To date, the findings of the Plan 7 and 9 work confirm that the overall action plan is crafted to address some of the stressors in the near term as well as to foster completion of needed scientific studies that will inform the need for additional or modified restoration strategies.

5. Relationship to 2014 303(d) List

This assessment is intended as an off-year special assessment to consider information that was not available for inclusion in the 2012 Integrated Report to enhance the assessment of the Barnegat Bay watershed. Because work has already begun to compile the next Integrated Report, which is due in 2014, this assessment is for informational purposes. For the 2014 Integrated Report, the assessment that is contained in this document will be updated using 2013 data collected for Plans 7 and 9, in addition to the readily available data collected in the Barnegat Bay estuary watershed and submitted by stakeholders in response to the Department's solicitation of data to be used for the 2014 303(d) List of Water Quality Limited Waters. The overall 2014 Integrated Report, including the Barnegat Bay watershed, will be developed and made available for public comment and EPA approval in accordance with the procedures at N.J.A.C. 7:15-6.

APPENDIX A:
Assessment Results by Sub watershed

APPENDIX A: Table 8: Assessment Results by Sub watershed

The relevant designated uses are identified in the column headings, the assessment unit names per each row and the finding for each assessment unit in the relevant cell. Where a designated use is not supporting, the parameter(s) responsible for the finding is identified in the “causes” column, if known. The 2012 Methods Document provides a description of the decision path used to determine that a parameter is the cause for a designated use being not supporting. There are some designated uses that are not supporting but there is no clear parameter that can be identified as the cause for the impairment. In this case the cause is listed as unknown.

Type	Waterbody		Designated Use						Causes
	Assessment Unit ID	Name	Drinking Water	Recreation	Aquatic Life	Shellfish	Trout	Fish Consumption	
Bay	2	Metedeconk R Estuary	N/A	Not Supporting - TMDL	Insufficient	Not Supporting - TMDL	N/A	Insufficient	Enterococcus, Total Coliform
Bay	1	Point Pleasant Canal and Bay Head Harbor	N/A	Fully Supporting	Insufficient	Not Supporting - TMDL	N/A	Insufficient	Total Coliform
Bay	3	Metedeconk and Lower Tribs - Bay	N/A	Fully Supporting	Not Supporting	Not Supporting - TMDL	N/A	Insufficient	Turbidity, Total Coliform
Bay	4	Toms R Estuary	N/A	Not Supporting - TMDL	Not Supporting	Not Supporting - TMDL	N/A	Not Supporting	Enterococcus, Dissolved Oxygen, Total Coliform, Fish-Mercury, Fish-PCB, Fish-DDX
Bay	5	Barnegat Bay Central	N/A	Fully	Not	Fully	N/A	Insufficient	Dissolved Oxygen

Type	Waterbody		Designated Use						Causes
	Assessment Unit ID	Name	Drinking Water	Recreation	Aquatic Life	Shellfish	Trout	Fish Consumption	
		West		Supporting	Supporting	Supporting			
Bay	6	Barnegat Bay Central East	N/A	Fully Supporting	Insufficient	Fully Supporting	N/A	Insufficient	
Bay	7	Barnegat Bay Central Bottom	N/A	Fully Supporting	Insufficient	Fully Supporting	N/A	Insufficient	
Bay	8	Manahawkan Bay and Upper Little Egg Harbor	N/A	Fully Supporting	Not Supporting	Fully Supporting	N/A	Insufficient	Turbidity
Bay	9	Lower Little Egg Harbor Bay	N/A	Fully Supporting	Not Supporting	Fully Supporting	N/A	Insufficient	Dissolved Oxygen, Turbidity
Trib	02040301020010-01	Metedeconk R NB (above I-195)	Not Supporting	Not Supporting - TMDL	Not Supporting	N/A	N/A	Not Supporting	Lead-HH, Fecal Coliform, Dissolved Oxygen, Turbidity, Arsenic, TP, Fish-Mercury, Fish-Chlordane, Fish-PCB, Fish-DDX
Trib	02040301020020-01	Metedeconk R NB (Rt 9 to I-195)	Fully Supporting	Not Supporting - TMDL	Not Supporting	N/A	Not Supporting	Insufficient	Fecal Coliform, Cause Unknown ¹

Type	Waterbody		Designated Use						Causes
	Assessment Unit ID	Name	Drinking Water	Recreation	Aquatic Life	Shellfish	Trout	Fish Consumption	
Trib	02040301020030-01	Haystack Brook	Not Supporting	Not Supporting - TMDL	Not Supporting	N/A	N/A	Insufficient	Lead-HH, Fecal Coliform, Total Phosphorus
Trib	02040301020040-01	Muddy Ford Brook	Fully Supporting	Not Supporting - TMDL	Fully Supporting	N/A	Fully Supporting	Insufficient	Fecal Coliform
Trib	02040301020050-01	Metedeconk R NB (confluence to Rt 9)	Not Supporting	Not Supporting - TMDL	Not Supporting	N/A	Not Supporting	Insufficient	Arsenic, Lead-HH, Fecal Coliform, Cause Unknown ¹
Trib	02040301030010-01	Metedeconk R SB (above I-195 exit 21 rd)	Not Supporting	Not Supporting - TMDL	Fully Supporting	N/A	N/A	Insufficient	Arsenic, Lead-HH, E. Coli
Trib	02040301030020-01	Metedeconk R SB (74d19m15s to I-195 X21)	Not Supporting	Fully Supporting	Not Supporting	N/A	N/A	Insufficient	Arsenic, , Turbidity
Trib	02040301030030-01	Metedeconk R SB (BennettsPd to 74d19m15s)	Not Supporting	Not Supporting - TMDL	Fully Supporting	N/A	N/A	Not Supporting	Arsenic, Fecal Coliform, Fish-Mercury, Fish-Chlordane, Fish-PCB
Trib	02040301030040-01	Metedeconk R SB (Rt 9 to Bennetts Pond)	Not Supporting	Not Supporting	Fully Supporting	N/A	Insufficient	Not Supporting -	Arsenic, Fecal Coliform, Fish-

Type	Waterbody		Designated Use						Causes
	Assessment Unit ID	Name	Drinking Water	Recreation	Aquatic Life	Shellfish	Trout	Fish Consumption	
				- TMDL				TMDL	Mercury
Trib	02040301030050-01	Metedeconk R SB (confluence to Rt 9)	Not Supporting	Not Supporting - TMDL	Not Supporting	N/A	N/A	Insufficient	Arsenic, Lead-HH, Fecal Coliform, Cause Unknown ¹
Trib	02040301040010-01	Beaverdam Creek	Insufficient	Insufficient	Not Supporting	Not Supporting - TMDL	N/A	Insufficient	Cause Unknown ¹ , Total Coliform
Trib	02040301040020-01	Metedeconk R (Beaverdam Ck to confl)	Not Supporting	Not Supporting - TMDL	Not Supporting	Not Supporting - TMDL	N/A	Insufficient	Arsenic, E Coli. , pH, Total Coliform, Macroinvertebrate impairment
Trib	02040301050010-01	Kettle Creek (above Lake Riviera outlet)	Insufficient	Insufficient	Not Supporting	N/A	N/A	Insufficient	Cause Unknown ¹
Trib	02040301050020-01	Kettle Creek (below Lake Riviera outlet)	N/A	Fully Supporting	Insufficient	Not Supporting - TMDL	N/A	Insufficient	Total Coliform
Trib	02040301050030-01	Metedeconk Neck tribs (below Heron Is)	N/A	Insufficient	Insufficient	Insufficient	N/A	Insufficient	

Type	Waterbody		Designated Use						Causes
	Assessment Unit ID	Name	Drinking Water	Recreation	Aquatic Life	Shellfish	Trout	Fish Consumption	
Trib	02040301050040-01	Barnegat North tribs (Tide Ck to Rt 37)	N/A	Fully Supporting	Insufficient	Insufficient	N/A	Insufficient	
Trib	02040301060010-01	Toms River (above Francis Mills)	Insufficient	Not Supporting - TMDL	Not Supporting	N/A	N/A	Not Supporting	Fecal Coliform, Total Phosphorus, Fish-PCB, Macroinvertebrate Impairment
Trib	02040301060020-01	Toms River (74-22-30 rd to Francis Mills)	Not Supporting	Not Supporting - TMDL	Fully Supporting	N/A	N/A	Insufficient	Arsenic, E. coli,
Trib	02040301060030-01	Toms River (Bowman Rd to 74-22-30 road)	Not Supporting	Not Supporting - TMDL	Fully Supporting	N/A	insufficient	Insufficient	Arsenic, Fecal Coliform,
Trib	02040301060040-01	Maple Root Branch (Toms River)	Fully Supporting	Not Supporting	Fully Supporting	N/A	N/A	Insufficient	E. Coli
Trib	02040301060050-01	Dove Mill Branch (Toms River)	Insufficient	Not Supporting - TMDL	Not Supporting	N/A	N/A	Not Supporting - TMDL	Fecal Coliform, pH, Fish-Mercury, Macroinvertebrate impairment

Type	Waterbody		Designated Use						Causes
	Assessment Unit ID	Name	Drinking Water	Recreation	Aquatic Life	Shellfish	Trout	Fish Consumption	
Trib	02040301060060-01	Toms River (Hope Chapel Rd to Bowman Rd)	Fully Supporting	Not Supporting - TMDL	Fully Supporting	N/A	Fully Supporting	Not Supporting	Fecal Coliform, Fish-PCB
Trib	02040301060070-01	Toms River (Rt 70 to Hope Chapel Road)	Fully Supporting	Not Supporting - TMDL	Fully Supporting	N/A	Fully Supporting	Insufficient	E. Coli
Trib	02040301060080-01	Toms River (Oak Ridge Parkway to Rt 70)	Fully Supporting	Not Supporting - TMDL	Not Supporting	N/A	Not Supporting	Not Supporting	Fecal Coliform, Cause Unknown ¹ Fish-PCB
Trib	02040301070010-01	Shannae Brook	Fully Supporting	Fully Supporting	Not Supporting	N/A	N/A	Not Supporting - TMDL	pH, Fish-Mercury
Trib	02040301070020-01	Harris Branch / Bordens Mill Branch	Insufficient	Insufficient	Insufficient	N/A	N/A	Insufficient	
Trib	02040301070030-01	Ridgeway Br (Hope Chapel Rd to HarrisBr)	Fully Supporting	Fully Supporting	Fully Supporting	N/A	N/A	Not Supporting - TMDL	Fish-Mercury
Trib	02040301070040-01	Ridgeway Br (below Hope Chapel Rd)	Not Supporting	Not Supporting	Fully Supporting	N/A	N/A	Not Supporting - TMDL	Arsenic, E. Coli, Fish-Mercury

Type	Waterbody		Designated Use						Causes
	Assessment Unit ID	Name	Drinking Water	Recreation	Aquatic Life	Shellfish	Trout	Fish Consumption	
Trib	02040301070050-01	Blacks Branch (above 74d22m05s)	Fully Supporting	Not Supporting	Not Supporting	N/A	N/A	Insufficient	E. Coli, Cause Unknown
Trib	02040301070060-01	Old Hurricane Brook (above 74d22m30s)	Insufficient	Not Supporting	Not Supporting	N/A	N/A	Insufficient	E. Coli, Cause Unknown ¹
Trib	02040301070070-01	Old Hurricane Brook (below 74d22m30s)	Insufficient	Fully Supporting	Insufficient	N/A	N/A	Insufficient	
Trib	02040301070080-01	Manapaqua Brook	Not Supporting	Not Supporting - TMDL	Fully Supporting	N/A	N/A	Insufficient	Mercury-HH, E. coli
Trib	02040301070090-01	Union Branch (below Blacks Br 74d22m05s)	Not Supporting	Not Supporting - TMDL	Not Supporting	N/A	N/A	Not Supporting	Arsenic, E. Coli, Cause Unknown ¹ , Fish-Chlordane, Fish-PCB, Fish-DDX
Trib	02040301080010-01	Wrangel Brook (above Michaels Branch)	Insufficient	Fully Supporting	Fully Supporting	N/A	N/A	Insufficient	
Trib	02040301080020-01	Michaels Branch (Wrangel Brook)	Insufficient	Insufficient	Insufficient	N/A	N/A	Insufficient	
Trib	02040301080030-01	Davenport Branch (above Pinewald Road)	Insufficient	Insufficient	Insufficient	N/A	N/A	Not Supporting - TMDL	Fish-Mercury

Type	Waterbody		Designated Use						Causes
	Assessment Unit ID	Name	Drinking Water	Recreation	Aquatic Life	Shellfish	Trout	Fish Consumption	
Trib	02040301080040-01	Davenport Branch (below Pinewald Road)	Insufficient	Not Supporting	Fully Supporting	N/A	N/A	Insufficient	E. Coli
Trib	02040301080050-01	Wrangel Brook (below Michaels Branch)	Not Supporting	Not Supporting	Not Supporting	N/A	N/A	Insufficient	Arsenic, Mercury-HH, E. Coli, Dissolved Oxygen
Trib	02040301080060-01	Toms River Lwr (Rt 166 to Oak Ridge Pkwy)	Fully Supporting	Not Supporting - TMDL	Fully Supporting	N/A	N/A	Not Supporting	E. Coli, Fish-Mercury, Fish-Chlordane, Fish-PCB, Fish-DDX
Trib	02040301080070-01	Jakes Branch (Lower Toms River)	Fully Supporting	Not Supporting	Not Supporting	N/A	N/A	Insufficient	E. Coli, Dissolved Oxygen, Macroinvertebrate impairment
Trib	02040301080080-01	Long Swamp Creek	Insufficient	Fully Supporting	Insufficient	N/A	N/A	Insufficient	
Trib	02040301090010-01	Webbs Mill Branch	Fully Supporting	Fully Supporting	Not Supporting	N/A	N/A	Insufficient	Dissolved Oxygen, Macroinvertebrate impairment
Trib	02040301090020-01	Chamberlain Branch	Fully Supporting	Fully Supporting	Fully Supporting	N/A	N/A	Insufficient	

Type	Waterbody		Designated Use						Causes
	Assessment Unit ID	Name	Drinking Water	Recreation	Aquatic Life	Shellfish	Trout	Fish Consumption	
Trib	02040301090030-01	Cedar Creek (74-16-38 to Chamberlain Br)	Fully Supporting	Fully Supporting	Fully Supporting	N/A	N/A	Insufficient	
Trib	02040301090040-01	Factory Br / Newbolds Br / Daniels Br	Insufficient	Fully Supporting	Fully Supporting	N/A	N/A	Insufficient	
Trib	02040301090050-01	Cedar Creek (GS Parkway to 74d16m38s)	Insufficient	Fully Supporting	Fully Supporting	N/A	N/A	Not Supporting - TMDL	Fish-Mercury
Trib	02040301090060-01	Cedar Creek (below GS Parkway)	Fully Supporting	Fully Supporting	Fully Supporting	Not Supporting - TMDL	N/A	Insufficient	Total Coliform
Trib	02040301100020-01	Barnegat Cntrl tribs (CedarCk - Forked R)	N/A	Insufficient	Insufficient	Insufficient	N/A	Insufficient	
Trib	02040301110010-01	Forked River NB (above old RR grade)	Fully Supporting	Not Supporting - TMDL	Not Supporting	N/A	N/A	Insufficient	E. Coli, Dissolved Oxygen, Macroinvertebrate impairment
Trib	02040301110020-01	Forked River NB (below old RR grade)	Fully Supporting	Fully Supporting	Fully Supporting	N/A	N/A	Insufficient	

Type	Waterbody		Designated Use						Causes
	Assessment Unit ID	Name	Drinking Water	Recreation	Aquatic Life	Shellfish	Trout	Fish Consumption	
Trib	02040301110030-01	Forked River (below NB incl Mid/South Br)	N/A	Not Supporting	Fully Supporting	Not Supporting - TMDL	N/A	Insufficient	E. Coli, Total Coliform
Trib	02040301110040-01	Oyster Creek (above Rt 532)	Insufficient	Fully Supporting	Fully Supporting	N/A	N/A	Insufficient	
Trib	02040301110050-01	Oyster Creek (below Rt 532)	N/A	Not Supporting	Fully Supporting	Insufficient	N/A	Insufficient	E. Coli
Trib	02040301120010-01	Waretown Creek / Lochiel Creek	N/A	Insufficient	Insufficient	Fully Supporting	N/A	Insufficient	
Trib	02040301120020-01	Barnegat South tribs (below Lochiel Ck)	N/A	Fully Supporting	Insufficient	Fully Supporting	N/A	Insufficient	
Trib	02040301130010-01	Four Mile Branch (Mill Creek)	Insufficient	Fully Supporting	Not Supporting	N/A	N/A	Insufficient	Cause Unknown ¹
Trib	02040301130020-01	Mill Ck (above GS Parkway)	Fully Supporting	Insufficient	Not Supporting	N/A	N/A	Insufficient	pH
Trib	02040301130030-01	Mill Ck (below GS Parkway)/Manahawkin Ck	Fully Supporting	Not Supporting	Not Supporting	Fully Supporting	N/A	Not Supporting	E. Coli, Fish-Mercury, Fish-PCB, Fish-DDX, Cause unknown ¹

Type	Waterbody		Designated Use						Causes
	Assessment Unit ID	Name	Drinking Water	Recreation	Aquatic Life	Shellfish	Trout	Fish Consumption	
Trib	02040301130040-01	Cedar Run	Not Supporting	Insufficient	Fully Supporting	Not Supporting - TMDL	N/A	Insufficient	Arsenic, Total Coliform
Trib	02040301130050-01	Westecunk Creek (above GS Parkway)	Insufficient	Insufficient	Fully Supporting	N/A	N/A	Not Supporting - TMDL	Fish-Mercury
Trib	02040301130060-01	Westecunk Creek (below GS Parkway)	N/A	Not Supporting	Fully Supporting	Not Supporting - TMDL	N/A	Insufficient	E. Coli, Total Coliform
Trib	02040301130070-01	Dinner Point Creek & tribs	N/A	Insufficient	Insufficient	Not Supporting - TMDL	N/A	Insufficient	Total Coliform
Trib	02040301140010-01	Mill Branch (above GS Parkway)	Insufficient	Insufficient	Fully Supporting	N/A	N/A	Insufficient	
Trib	02040301140020-01	Mill Branch (below GS Parkway)	Fully Supporting	Not Supporting	Not Supporting	N/A	N/A	Not Supporting	E. Coli, Dissolved Oxygen, Fish-Mercury, Fish-PCB
Trib	02040301140030-01	Tuckerton Creek (below Mill Branch)	N/A	Insufficient	Not Supporting - TMDL	Not Supporting - TMDL	N/A	Not Supporting - TMDL	Total Phosphorus, Total Coliform, Fish-Mercury

Type	Waterbody		Designated Use						Causes
	Assessment Unit ID	Name	Drinking Water	Recreation	Aquatic Life	Shellfish	Trout	Fish Consumption	
Trib	02040301140040-01	LEH Bay tribs (Westecunk Ck-Tuckerton Ck)	N/A	Fully Supporting	Insufficient	Fully Supporting	N/A	Insufficient	
Trib	02040301140050-01	LEH Bay tribs (Willis Creek to LE Inlet)	N/A	Insufficient	Insufficient	Fully Supporting	N/A	Insufficient	

1. Per the method document, if chemical data are unavailable or show no violation of applicable criteria, but biological data (macroinvertebrate) indicate impairment, the cause of Aquatic Life Use non-support will be identified on the 303(d) List as “cause unknown”.