

# Chapter 13

## Neuse River Subbasin 03-04-13

Including the: Bay River and Pamlico Sound

### 13.1 Subbasin Overview

*Subbasin 03-04-13 at a Glance*

**Land Cover (percent)**

|                                 |      |
|---------------------------------|------|
| Forest/Wetland:                 | 33.6 |
| Surface Water:                  | 49.8 |
| Urban:                          | 4.0  |
| Cultivated Crop:                | 12.2 |
| Pasture/<br>Managed Herbaceous: | 0.4  |

**Counties**

Carteret and Pamlico

**Municipalities**

Alliance, Stonewall and Vandemere

**Stream Statistics**

|                   |                    |
|-------------------|--------------------|
| Total Streams:    | 3.5 mi/83,445.9 ac |
| Total Supporting: | 1.4 mi/80,429.8 ac |
| Total Impaired:   | 0.0 mi/1,214.7 ac  |
| Total Not Rated:  | 0.0 mi/0.0ac       |
| Total No Data:    | 2.1mi/1,801.4 ac   |

Population growth in the subbasin is minimal. Bayboro and Vandemere are the largest towns. The greatest residential concentration is the area on the south side of Bay River. Land use in the subbasin is mostly agricultural.

There is 1 minor NPDES wastewater discharge permit in this subbasin. The Bay River Metropolitan Sewer District (BRMSD) stopped discharging into the Bay River in 2000 and now all treated effluent is land applied on pine fields near the town of Arapahoe. The BRMSD reported no major problems aside from hurricanes. Refer to Appendix III for identification and more information on individual NPDES permit holders. There is also 1 permitted animal operation in this subbasin.

The North Carolina State Division of Environmental Health (DEH) is responsible for classifying coastal waters as to their suitability for shellfish harvesting, monitoring and issuing advisories for coastal recreational swimming areas. DEH

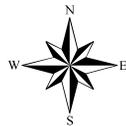
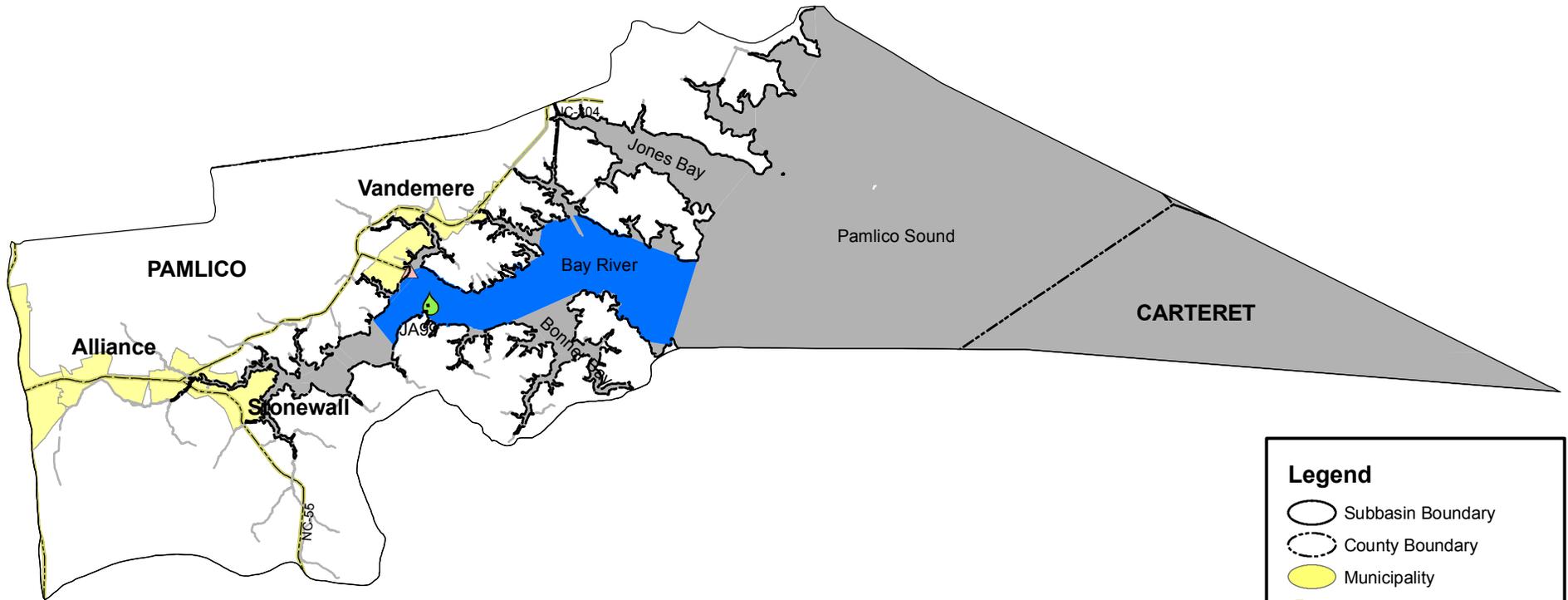
assess the level of enterococcus or fecal coliform bacteria in the water column. These bacteria are found in the intestines of warm-blooded animals. While they do not cause illness themselves, scientific studies indicate that enterococci and fecal coliform bacteria may indicate the presence of other disease-causing organisms. DEH will post swimming advisories and close shellfish waters to harvesting in order to protect human health.

Marinas, domestic pets, migratory waterfowl and other wild animals contribute to the bacterial loading throughout much of this area. As result of these contributions, the shellfish area closure line in the Bay River and Ball Creek were shifted further downstream. An additional closure was added to Jones Bay, with the closure of the Intracoastal Waterway just north of the highway 33 bridge, as well as to just south of the intersection with Jones Bay and extends out into Jones Bay.

The Camp Vandemere public beach area (DEH station # C114) on the north side of the Bay River is also classified as impaired due to the excessive number of days that swimming advisories were posted by DEH.

A map including the locations of the NPDES facilities and water quality monitoring stations is presented in Figure 35. Table 40 contains a list of assessment unit numbers (AU#) and length, streams monitored, monitoring data types, locations and use support ratings for waters in the

# Figure 35 Neuse River Subbasin 03-04-13



**Legend**

- Subbasin Boundary
- County Boundary
- Municipality
- Primary Roads

**Monitoring Stations**

- Ambient Monitoring Station
- Benthic Community
- Fish Community
- Lake Monitoring Station

**NPDES Dischargers**

- Major
- Minor

**Aquatic Life Rating**

- Impaired
- No Data
- Not Rated
- Supporting

**Table 40 Neuse River Basin**

**Subbasin (WBD-8 Number) 03020105**

**DWQ Subbasin**

**03-04-13**

| Assessment Unit Number   | Name                         | Overall Category | Potential Stressors | Use Support Category                                | Use Support Rating   | Reason for Rating | Parameter of Interest | Collection Year                      | Listing Year | IR Category |     |
|--|------------------------------|------------------|---------------------|---|----------------------|-------------------|-----------------------|--------------------------------------|--------------|-------------|-----|
| Description  | DWQ Subbasin                 | Miles/Acres      | Potential Sources   |   |                      |                   |                       |                                      |              |             |     |
| <b>Watershed (WBD-10 Number) 0302010502</b>  |                              |                  |                     | <b>Pamlico Sound-Ocracoke Inlet</b>                 |                      |                   |                       |                                      |              |             |     |
| <b>Subwatershed (WBD-12 Number) 030201050201</b>   |                              |                  |                     | <b>Deep Cove-Middle Ground</b>                      |                      |                   |                       |                                      |              |             |     |
| <b>27-147.5a</b>   | <b>PAMLICO SOUND</b>         |                  | <b>2</b>            |   | Shellfish Harvesting | Supporting        | No Criteria Exceeded  | Approved Growing Area                | 2006         | 1           |     |
| Northern portion Pamlico within Neuse River Basin subbasin 030413  |                              |                  |                     |   |                      |                   |                       |                                      |              |             |     |
| SA;HQW,NSW   | 03-04-13                     | 64,244.0         | S Acres             |   |                      |                   |                       |                                      |              |             |     |
| <b>27-157</b>  | <b>Little Porpoise Bay</b>   |                  | <b>2</b>            |   | Shellfish Harvesting | Supporting        | No Criteria Exceeded  | Approved Growing Area                | 2006         | 1           |     |
| From source to Pamlico Sound   |                              |                  |                     |   |                      |                   |                       |                                      |              |             |     |
| SA;HQW,NSW   | 03-04-13                     | 176.1            | S Acres             |   |                      |                   |                       |                                      |              |             |     |
| <b>Watershed (WBD-10 Number) 0302020408</b>  |                              |                  |                     | <b>Jones Bay-Bay River</b>                          |                      |                   |                       |                                      |              |             |     |
| <b>Subwatershed (WBD-12 Number) 030202040801</b>   |                              |                  |                     | <b>Upper Bay River</b>                              |                      |                   |                       |                                      |              |             |     |
| <b>27-150-3</b>  | <b>South Prong Bay River</b> |                  | <b>5</b>            | <b>Fecal Coliform Bacteria</b>                      | Shellfish Harvesting | Impaired          | Loss of Use           | Prohibited Growing Area              | 2006         | 2004        | 4cs |
| From source to Bay River   |                              |                  |                     |   |                      |                   |                       |                                      |              |             |     |
| SC;Sw,NSW  | 03-04-13                     | 27.4             | S Acres             |   | Shellfish Harvesting | Impaired          | Standard Violation    | Fecal Coliform (shellfish)           | 2006         | 2008        | 5   |
| <b>27-150-3-1</b>  | <b>Neal Creek</b>            |                  | <b>4cs</b>          | <b>Fecal Coliform Bacteria</b>                      | Shellfish Harvesting | Impaired          | Loss of Use           | Prohibited Growing Area              | 2006         | 2004        | 4cs |
| From source to South Prong Bay River   |                              |                  |                     |   |                      |                   |                       |                                      |              |             |     |
| SC;Sw,NSW  | 03-04-13                     | 1.3              | S Acres             |   |                      |                   |                       |                                      |              |             |     |
| <b>Subwatershed (WBD-12 Number) 030202040802</b>   |                              |                  |                     | <b>Middle Bay River</b>                             |                      |                   |                       |                                      |              |             |     |
| <b>27-150-(9.5)a1</b>  | <b>Bay River</b>             |                  | <b>5</b>            | <b>Fecal Coliform Bacteria</b><br>Stormwater Runoff | Shellfish Harvesting | Impaired          | Standard Violation    | Fecal Coliform (shellfish)           | 2006         | 2008        | 5   |
| From 27-150-(9.5)b to a line crossing the Bay River from Newton Creek to a point 0.3 miles upstream of Moore Creek |                              |                  |                     |   |                      |                   |                       |                                      |              |             |     |
| SA;HQW,NSW   | 03-04-13                     | 672.0            | S Acres             |   | Shellfish Harvesting | Impaired          | Loss of Use           | Prohibited Growing Area              | 2006         | 2004        | 4cs |
| <b>27-150-(9.5)a2</b>  | <b>Bay River</b>             |                  | <b>2</b>            |   | Aquatic Life         | Supporting        | No Criteria Exceeded  | Water Quality Standards 1n3          | 2006         |             | 1   |
| From a line crossing the Bay River from Newton Creek to a point 0.3 miles upstream of Moore Creek to Pamlico Sound |                              |                  |                     |   |                      |                   |                       |                                      |              |             |     |
| SA;HQW,NSW   | 03-04-13                     | 8,304.9          | S Acres             |   | Aquatic Life         | Supporting        | No Criteria Exceeded  | Water Quality Standards Aquatic Life | 2006         |             | 1   |
|  |                              |                  |                     |   | Recreation           | Supporting        | No Criteria Exceeded  | Fecal Coliform (recreation)          | 2006         |             | 1   |
|  |                              |                  |                     |   | Shellfish Harvesting | Supporting        | No Criteria Exceeded  | Approved Growing Area                | 2006         |             | 1   |
| <b>27-150-(9.5)b1</b>  | <b>Bay River</b>             |                  | <b>4cs</b>          | <b>Fecal Coliform Bacteria</b><br>Stormwater Runoff | Shellfish Harvesting | Impaired          | Loss of Use           | Prohibited Growing Area              | 2006         | 2004        | 4cs |
| DEH closed extending 366 meters east of SC SA line   |                              |                  |                     |   |                      |                   |                       |                                      |              |             |     |
| SA;HQW,NSW   | 03-04-13                     | 100.0            | S Acres             |   |                      |                   |                       |                                      |              |             |     |











**Table 40 Neuse River Basin**

**Subbasin (WBD-8 Number) 03020204**

**DWQ Subbasin**

**03-04-13**

| Assessment Unit Number   |                              | Name         |              | Overall Category | Potential Stressors<br>Potential Sources             | Use Support Category | Use Support Rating | Reason for Rating    | Parameter of Interest      | Collection Year | Listing Year | IR Category |
|--|------------------------------|--------------|--------------|------------------|--|----------------------|--------------------|----------------------|----------------------------|-----------------|--------------|-------------|
| Description  | Classification               | DWQ Subbasin | Miles/Acres  |                  |  |                      |                    |                      |                            |                 |              |             |
| <b>27-150-29</b>   | <b>Chadwick Creek</b>        |              |              | <b>2</b>         |  | Shellfish Harvesting | Supporting         | No Criteria Exceeded | Approved Growing Area      | 2006            |              | 1           |
| From source to Bay River   |                              |              |              |                  |  |                      |                    |                      |                            |                 |              |             |
| SA;HQW,NSW   |                              | 03-04-13     | 54.4 S Acres |                  |  |                      |                    |                      |                            |                 |              |             |
| <b>27-150-30</b>   | <b>No Jacket</b>             |              |              | <b>2</b>         |  | Shellfish Harvesting | Supporting         | No Criteria Exceeded | Approved Growing Area      | 2006            |              | 1           |
| From source to Bay River   |                              |              |              |                  |  |                      |                    |                      |                            |                 |              |             |
| SA;HQW,NSW   |                              | 03-04-13     | 13.3 S Acres |                  |  |                      |                    |                      |                            |                 |              |             |
| <b>27-150-31-1-1</b>   | <b>Jumpover Creek</b>        |              |              | <b>2</b>         |  | Shellfish Harvesting | Supporting         | No Criteria Exceeded | Approved Growing Area      | 2006            |              | 1           |
| From source to Intracoastal Waterway   |                              |              |              |                  |  |                      |                    |                      |                            |                 |              |             |
| SA;HQW,NSW   |                              | 03-04-13     | 7.7 S Acres  |                  |  |                      |                    |                      |                            |                 |              |             |
| <b>27-150-31-1b</b>  | <b>Intracoastal Waterway</b> |              |              | <b>2</b>         |  | Shellfish Harvesting | Supporting         | No Criteria Exceeded | Approved Growing Area      | 2006            |              | 1           |
| From Jones Bay to Gale Creek except for prohibited area at head of Jones Bay |                              |              |              |                  |  |                      |                    |                      |                            |                 |              |             |
| SA;HQW,NSW   |                              | 03-04-13     | 81.8 S Acres |                  |  |                      |                    |                      |                            |                 |              |             |
| <b>27-150-31-2</b>   | <b>Raccoon Creek</b>         |              |              | <b>2</b>         |  | Shellfish Harvesting | Supporting         | No Criteria Exceeded | Approved Growing Area      | 2006            |              | 1           |
| From source to Gale Creek  |                              |              |              |                  |  |                      |                    |                      |                            |                 |              |             |
| SA;HQW,NSW   |                              | 03-04-13     | 8.1 S Acres  |                  |  |                      |                    |                      |                            |                 |              |             |
| <b>27-150-31-3</b>   | <b>Whealton Creek</b>        |              |              | <b>2</b>         |  | Shellfish Harvesting | Not Rated          | Data Inconclusive    | Fecal Coliform (shellfish) | 2006            |              | 3a          |
| From source to Gale Creek  |                              |              |              |                  |  |                      |                    |                      |                            |                 |              |             |
| SA;HQW,NSW   |                              | 03-04-13     | 7.6 S Acres  |                  |  | Shellfish Harvesting | Supporting         | No Criteria Exceeded | Approved Growing Area      | 2006            |              | 1           |
| <b>27-150-31-4</b>   | <b>Tar Creek</b>             |              |              | <b>2</b>         |  | Shellfish Harvesting | Supporting         | No Criteria Exceeded | Approved Growing Area      | 2006            |              | 1           |
| From source to Gale Creek  |                              |              |              |                  |  |                      |                    |                      |                            |                 |              |             |
| SA;HQW,NSW   |                              | 03-04-13     | 3.8 S Acres  |                  |  |                      |                    |                      |                            |                 |              |             |
| <b>27-150-31-5</b>   | <b>Ditch Creek</b>           |              |              | <b>2</b>         |  | Shellfish Harvesting | Supporting         | No Criteria Exceeded | Approved Growing Area      | 2006            |              | 1           |
| From source to Gale Creek  |                              |              |              |                  |  |                      |                    |                      |                            |                 |              |             |
| SA;HQW,NSW   |                              | 03-04-13     | 19.0 S Acres |                  |  |                      |                    |                      |                            |                 |              |             |
| <b>27-150-31-5-1</b>   | <b>Ditch Creek Canal</b>     |              |              | <b>2</b>         |  | Shellfish Harvesting | Supporting         | No Criteria Exceeded | Approved Growing Area      | 2006            |              | 1           |
| From Ditch Creek (Jones Bay) to Ditch Creek (Gale Creek)                     |                              |              |              |                  |  |                      |                    |                      |                            |                 |              |             |
| SA;HQW,NSW   |                              | 03-04-13     | 0.5 S Miles  |                  |  |                      |                    |                      |                            |                 |              |             |
| <b>27-150-31a</b>  | <b>Gale Creek</b>            |              |              | <b>5</b>         | <b>Fecal Coliform Bacteria<br/>Stormwater Runoff</b> | Shellfish Harvesting | Impaired           | Standard Violation   | Fecal Coliform (shellfish) | 2006            | 2004         | 5           |
| From source to DEH prohibited area line on west side of ICWW                 |                              |              |              |                  |  |                      |                    |                      |                            |                 |              |             |
| SA;HQW,NSW   |                              | 03-04-13     | 29.4 S Acres |                  |  | Shellfish Harvesting | Impaired           | Loss of Use          | Prohibited Growing Area    | 2006            | 2004         | 4cs         |







**Table 40 Neuse River Basin**

**Subbasin (WBD-8 Number) 03020204**

**DWQ Subbasin**

**03-04-13**

| Assessment Unit Number          |                            | Name        |         | Overall Category | Potential Stressors<br>Potential Sources | Use Support Category | Use Support Rating | Reason for Rating    | Parameter of Interest | Collection Year | Listing Year | IR Category |
|---------------------------------|----------------------------|-------------|---------|------------------|--|----------------------|--------------------|----------------------|-----------------------|-----------------|--------------|-------------|
| Description<br>Classification   | DWQ Subbasin               | Miles/Acres |         |                  |  |                      |                    |                      |                       |                 |              |             |
| <b>27-154-2</b>                 | <b>Preston Bay</b>         |             |         | <b>2</b>         |  | Shellfish Harvesting | Supporting         | No Criteria Exceeded | Approved Growing Area | 2006            |              | 1           |
| From source to Middle Bay       |                            |             |         |                  |  |                      |                    |                      |                       |                 |              |             |
| SA;HQW,NSW                      | 03-04-13                   | 9.0         | S Acres |                  |  |                      |                    |                      |                       |                 |              |             |
| <b>27-154-3</b>                 | <b>Flower Bay</b>          |             |         | <b>2</b>         |  | Shellfish Harvesting | Supporting         | No Criteria Exceeded | Approved Growing Area | 2006            |              | 1           |
| From source to Middle Bay       |                            |             |         |                  |  |                      |                    |                      |                       |                 |              |             |
| SA;HQW,NSW                      | 03-04-13                   | 21.6        | S Acres |                  |  |                      |                    |                      |                       |                 |              |             |
| <b>27-154-4</b>                 | <b>Roundabout Bay</b>      |             |         | <b>2</b>         |  | Shellfish Harvesting | Supporting         | No Criteria Exceeded | Approved Growing Area | 2006            |              | 1           |
| From source to Middle Bay       |                            |             |         |                  |  |                      |                    |                      |                       |                 |              |             |
| SA;HQW,NSW                      | 03-04-13                   | 33.6        | S Acres |                  |  |                      |                    |                      |                       |                 |              |             |
| <b>27-154-5</b>                 | <b>Little Oyster Creek</b> |             |         | <b>2</b>         |  | Shellfish Harvesting | Supporting         | No Criteria Exceeded | Approved Growing Area | 2006            |              | 1           |
| From source to Middle Bay       |                            |             |         |                  |  |                      |                    |                      |                       |                 |              |             |
| SA;HQW,NSW                      | 03-04-13                   | 62.4        | S Acres |                  |  |                      |                    |                      |                       |                 |              |             |
| <b>27-155</b>                   | <b>Big Oyster Creek</b>    |             |         | <b>2</b>         |  | Shellfish Harvesting | Supporting         | No Criteria Exceeded | Approved Growing Area | 2006            |              | 1           |
| From source to Pamlico Sound    |                            |             |         |                  |  |                      |                    |                      |                       |                 |              |             |
| SA;HQW,NSW                      | 03-04-13                   | 55.5        | S Acres |                  |  |                      |                    |                      |                       |                 |              |             |
| <b>27-156</b>                   | <b>Big Porpoise Bay</b>    |             |         | <b>2</b>         |  | Shellfish Harvesting | Supporting         | No Criteria Exceeded | Approved Growing Area | 2006            |              | 1           |
| From source to Pamlico Sound    |                            |             |         |                  |  |                      |                    |                      |                       |                 |              |             |
| SA;HQW,NSW                      | 03-04-13                   | 661.7       | S Acres |                  |  |                      |                    |                      |                       |                 |              |             |
| <b>27-156-1</b>                 | <b>Porpoise Creek</b>      |             |         | <b>2</b>         |  | Shellfish Harvesting | Supporting         | No Criteria Exceeded | Approved Growing Area | 2006            |              | 1           |
| From source to Big Porpoise Bay |                            |             |         |                  |  |                      |                    |                      |                       |                 |              |             |
| SA;HQW,NSW                      | 03-04-13                   | 24.2        | S Acres |                  |  |                      |                    |                      |                       |                 |              |             |

Note:

See Section 23.3 for Overall and IR Category explanation.

Supporting waters are listed in Categories 1-3.

Impaired waters are listed in Categories 4 or 5.

subbasin. Refer to [http://h2o.enr.state.nc.us/tmdl/General\\_303d.htm](http://h2o.enr.state.nc.us/tmdl/General_303d.htm) for more information about use support methodology.

Waters in the following sections and in Table 40 are identified by an assessment unit number (AU#). This number is used to track defined segments in the water quality assessment database, list 303(d) Impaired waters and identify waters throughout the basin plan. The AU# is a subset of the DWQ index number (classification identification number). A letter attached to the end of the AU# indicates that the assessment is smaller than the DWQ index segment. No letter indicates that the AU# and the DWQ index segment are the same.

### 13.2 Use Support Assessment Summary

All surface waters in the state are assigned a classification appropriate to the best-intended use of that water. Waters are regularly assessed by DWQ to determine how well they are meeting their best-intended use. For more information about the use support assessment, refer to [http://h2o.enr.state.nc.us/tmdl/General\\_303d.htm](http://h2o.enr.state.nc.us/tmdl/General_303d.htm). Appendix X provides definitions of the terms used throughout this basin plan.

Refer to Table 41 for a summary of use support for waters in subbasin 03-04-13 (see Chapter 23, Section 23.3 for description of the IR category (for each parameter of interest) and Overall (river segment) category).

### 13.3 Status and Recommendations of Previously and Newly Impaired Waters

The following waters were either identified as Impaired in the previous basin plan (2002) or are newly Impaired based on recent data. If previously identified as Impaired, the water will either remain on the state’s 303(d) list or will be delisted based on recent data showing water quality improvements. If the water is newly Impaired, it will likely be placed on the 2008 303(d) list. The current status and recommendations for addressing these waters are presented below, and each is identified by an AU#. Information regarding 303(d) listing and reporting methodology can be found at [http://h2o.enr.state.nc.us/tmdl/General\\_303d.htm](http://h2o.enr.state.nc.us/tmdl/General_303d.htm).

Table 41 Summary of Use Support Ratings in Subbasin 03-04-13

| Units           | Total Monitored Waters | Total Impaired Waters |     | Total Supporting Waters |    | Total Not Rated Waters | Total No Data   | Total           |
|-----------------|------------------------|-----------------------|-----|-------------------------|----|------------------------|-----------------|-----------------|
|                 | Miles/<br>Acres        | Miles/<br>Acres       | %   | Miles/<br>Acres         | %  | Miles/<br>Acres        | Miles/<br>Acres | Miles/<br>Acres |
| Estuarine miles | 1                      | 0                     | 0.0 | 1                       | 39 | 0                      | 2               | 4               |
| Estuarine acres | 81,645                 | 1,215                 | 2   | 80,430                  | 96 | 0                      | 1,801           | 83,446          |

% - Percent of total miles/acres.

#### 13.3.1 Bay River [AU# 27-150-(9.5)a2]

##### Current Status

Bay River [AU# 27-150-(9.5)a2; SA; HQW; NSW] from a line crossing Bay River from Newton Creek to a point 0.3 miles upstream of Moore Creek to Pamlico Sound (8,304.9 saltwater acres) is Supporting aquatic life and recreational uses due to No Criteria Exceeded at ambient monitoring station JA99. Water quality was generally good in this segment with only 2 percent of the samples exceeding the chlorophyll *a* standard of 40µg/l. None of the fecal coliform bacteria samples taken exceeded to state standard of 400 CFU/100ml. The geometric mean was 4 CFU/100ml.

This segment of Bay River is Impaired for shellfish harvesting due to fecal coliform bacteria levels above the state standard of 43 CFU/100ml in more than 10 percent of the samples collected in SA waters. There are 8 DEH SS stations within this segment and 4 of the 8 had exceedances of 10 percent or more during this assessment period. This impairment is based on actual fecal coliform bacteria data and not on DEH SS growing area classifications.

This section of the Bay River will be added to the 2008 303(d) list of impaired waters for shellfish harvesting closures: fecal coliform bacteria standard violation.

#### Recommendations

DWQ recommends the use of BMPs throughout this watershed to reduce stormwater runoff which carries bacteria which leads to shellfish harvesting and beach closures.

### **13.3.2 Bay River [AU# 27-150-(9.5)b2]**

#### Current Status

Bay River [AU# 27-150-(9.5)b2; SA; HQW; NSW] from the DEH prohibited area along shore of Log Pond Creek area (16.5 saltwater acres) in Impaired for recreational purpose due to DEH posting a swimming advisory for more than 61 days over the 5 year assessment period and a geometric mean of greater than 35 enterococci/100 ml (based on 5 samples collected in a 30 day period).

The Camp Vandemere public beach area (DEH station # C114) on the north side of the Bay River had 64 days of swimming advisories posted by DEH. This same location had a geometric mean of greater than 35 enterococci/100 ml on more that one occasion. This is a Tier 2 site so it is monitored twice a month between April and October and once per month November through March. These beaches are monitored weekly after an advisory is issued until levels fall below the standard. The coastal recreational beach monitoring program uses enterococcus bacteria as the indicator species. The criteria for Tier 2 is a single sample maximum of 276 enterococci/100 ml water. Tier 2 beaches constitute areas such as those in the Intracoastal Waterway, tidal creeks and exposed shoals. People frequent Tier 2 beaches mostly on weekends and these sites are usually accessed by watercraft.

DEH recreational closings and data can be found at [http://www.deh.enr.state.nc.us/shellfish/Water\\_Monitoring/RWQweb/aboutus.htm](http://www.deh.enr.state.nc.us/shellfish/Water_Monitoring/RWQweb/aboutus.htm). The state Division of Environmental Health tests water quality at ocean and sound beaches in accordance with federal and state law. Enterococcus and fecal coliform, the bacteria group used for testing, is found in the intestines of warm-blooded animals. While they do not cause illness themselves, scientific studies indicate that enterococci and fecal coliform bacteria may indicate the presence of other disease-causing organisms. People swimming or playing in waters with bacteria levels higher than the action level have an increased risk of developing gastrointestinal illness or skin

infections. This is a swimming advisory, not a beach closing. The sign posted reads as follows: ATTENTION - SWIMMING IN THIS AREA NOT RECOMMENDED. BACTERIA TESTING INDICATES LEVELS OF CONTAMINATION THAT MAY BE HAZARDOUS TO YOUR HEALTH. THIS ADVISORY AFFECTS WATERS WITHIN 200' OF THIS SIGN. OFFICE OF THE STATE HEALTH DIRECTOR.

### 13.3.3 Division of Environmental Health Growing Area F-6

Table 42 Shellfish Growing Area F-6 Classifications

| Class SA Water       | Assessment Unit # | AU Length | Growing Area Classification <sup>1</sup> | DWQ Shellfish Rating <sup>2</sup> | DEH Growing Area |
|----------------------|-------------------|-----------|--|-----------------------------------|------------------|
| PAMLICO SOUND        | 27-147.5a         | 64244.00  | APP                                      | S                                 | F-3, F-6         |
| Bay River            | 27-150-(9.5)a     | 672.02    | PRO                                      | I                                 | F-6              |
| Bay River            | 27-150-(9.5)a     | 8304.92   | APP                                      | S                                 | F-6              |
| Bay River            | 27-150-(9.5)b     | 100.00    | PRO                                      | I                                 | F-6              |
| Bay River            | 27-150-(9.5)b     | 16.50     | PRO                                      | I                                 | F-6              |
| Harper Creek         | 27-150-10         | 32.51     | PRO                                      | I                                 | F-6              |
| Tempe Gut            | 27-150-11         | 0.90      | PRO                                      | I                                 | F-6              |
| Moore Creek          | 27-150-12         | 28.35     | PRO                                      | I                                 | F-6              |
| Chappel Creek        | 27-150-12-1       | 1.48      | PRO                                      | I                                 | F-6              |
| Newton Creek         | 27-150-13         | 3.78      | PRO                                      | I                                 | F-6              |
| Little Pasture Creek | 27-150-17         | 6.04      | APP                                      | S                                 | F-6              |
| Rice Creek           | 27-150-18         | 12.84     | APP                                      | S                                 | F-6              |
| Mesic Creek          | 27-150-19         | 4.26      | APP                                      | S                                 | F-6              |
| Simpson Creek        | 27-150-20-1       | 8.60      | PRO                                      | I                                 | F-6              |
| Pasture Creek        | 27-150-20-2       | 9.32      | APP                                      | S                                 | F-6              |
| Cabin Creek          | 27-150-20-3       | 30.49     | APP                                      | S                                 | F-6              |
| Ball Creek           | 27-150-20         | 32.42     | PRO                                      | I                                 | F-6              |
| Ball Creek           | 27-150-20         | 79.97     | APP                                      | S                                 | F-6              |
| Harris Creek         | 27-150-21         | 2.81      | APP                                      | S                                 | F-6              |
| Gascon Creek         | 27-150-22         | 3.24      | APP                                      | S                                 | F-6              |
| Barnes Creek         | 27-150-23         | 1.51      | APP                                      | S                                 | F-6              |
| Potter Creek         | 27-150-24         | 13.71     | APP                                      | S                                 | F-6              |
| Oyster Creek         | 27-150-25         | 19.56     | APP                                      | S                                 | F-6              |
| Bonner Bay           | 27-150-26         | 865.27    | APP                                      | S                                 | F-6              |
| Spring Creek         | 27-150-26-1       | 279.02    | APP                                      | S                                 | F-6              |
| Richardson Creek     | 27-150-26-1-1     | 8.88      | APP                                      | S                                 | F-6              |
| Maul Run             | 27-150-26-1-2     | 1.15      | APP                                      | S                                 | F-6              |
| Horton Creek         | 27-150-26-1-3     | 4.59      | APP                                      | S                                 | F-6              |
| Bryan Creek          | 27-150-26-1-4     | 13.17     | APP                                      | S                                 | F-6              |
| Ives Creek           | 27-150-26-1-4-1   | 8.55      | APP                                      | S                                 | F-6              |
| Long Creek           | 27-150-26-2       | 356.80    | APP                                      | S                                 | F-6              |
| Deep Oak Gut         | 27-150-26-2-1     | 2.22      | APP                                      | S                                 | F-6              |
| Cow Gallus Creek     | 27-150-26-2-2     | 11.41     | APP                                      | S                                 | F-6              |
| Dipping Vat Creek    | 27-150-26-2-3     | 26.90     | APP                                      | S                                 | F-6              |
| Riggs Creek          | 27-150-26-3       | 115.19    | APP                                      | S                                 | F-6              |
| Savannah Creek       | 27-150-26-3-1     | 11.03     | APP                                      | S                                 | F-6              |
| Morris Creek         | 27-150-26-3-2     | 5.39      | APP                                      | S                                 | F-6              |
| Raff Creek           | 27-150-26-3-3     | 10.86     | APP                                      | S                                 | F-6              |
| Sheephead Creek      | 27-150-26-4       | 18.65     | APP                                      | S                                 | F-6              |
| Little Bear Creek    | 27-150-27         | 55.33     | APP                                      | S                                 | F-6              |
| Blossum Pond Creek   | 27-150-27-1       | 15.09     | APP                                      | S                                 | F-6              |
| Bennett Creek        | 27-150-28-1       | 15.66     | PRO                                      | I                                 | F-6              |

| Class SA Water        | Assessment Unit # | AU Length | Growing Area Classification <sup>1</sup> | DWQ Shellfish Rating <sup>2</sup> | DEH Growing Area |
|-----------------------|-------------------|-----------|--|-----------------------------------|------------------|
| Win Creek             | 27-150-28-2       | 1.16      | PRO                                      | I                                 | F-6              |
| Plum Creek            | 27-150-28-3       | 8.13      | APP                                      | S                                 | F-6              |
| Riggs Creek           | 27-150-28-4       | 23.18     | APP                                      | S                                 | F-6              |
| Cox Creek             | 27-150-28-5       | 3.40      | APP                                      | S                                 | F-6              |
| Garden Creek          | 27-150-28-6       | 6.42      | APP                                      | S                                 | F-6              |
| Harper Creek          | 27-150-28-7       | 4.05      | APP                                      | S                                 | F-6              |
| Catchall Creek        | 27-150-28-8       | 4.59      | APP                                      | S                                 | F-6              |
| Bear Creek            | 27-150-28a        | 199.91    | PRO                                      | I                                 | F-6              |
| Bear Creek            | 27-150-28b        | 18.19     | PRO                                      | I                                 | F-6              |
| Bear Creek            | 27-150-28b        | 168.51    | APP                                      | S                                 | F-6              |
| Chadwick Creek        | 27-150-29         | 54.42     | APP                                      | S                                 | F-6              |
| No Jacket             | 27-150-30         | 13.32     | APP                                      | S                                 | F-6              |
| Jumpover Creek        | 27-150-31-1-1     | 7.71      | APP                                      | S                                 | F-6              |
| Intracoastal Waterway | 27-150-31-1       | 2.04      | PRO                                      | I                                 | F-6              |
| Intracoastal Waterway | 27-150-31-1       | 81.84     | APP                                      | S                                 | F-6              |
| Raccoon Creek         | 27-150-31-2       | 8.09      | APP                                      | S                                 | F-6              |
| Whealton Creek        | 27-150-31-3       | 7.57      | APP                                      | S                                 | F-6              |
| Tar Creek             | 27-150-31-4       | 3.85      | APP                                      | S                                 | F-6              |
| Ditch Creek           | 27-150-31-5       | 19.03     | APP                                      | S                                 | F-6              |
| Gale Creek            | 27-150-31a        | 29.40     | PRO                                      | I                                 | F-6              |
| Gale Creek            | 27-150-31b        | 16.65     | PRO                                      | I                                 | F-6              |
| Gale Creek            | 27-150-31b        | 172.01    | APP                                      | S                                 | F-6              |
| Sheeppen Creek        | 27-150-32         | 9.72      | APP                                      | S                                 | F-6              |
| Hogpen Creek          | 27-150-33         | 3.86      | APP                                      | S                                 | F-6              |
| Yaupon Creek          | 27-150-34         | 18.65     | APP                                      | S                                 | F-6              |
| Dump Creek            | 27-150-35         | 84.15     | APP                                      | S                                 | F-6              |
| Rockhole Bay          | 27-150-36         | 230.14    | APP                                      | S                                 | F-6              |
| Sound Bay             | 27-151            | 53.60     | APP                                      | S                                 | F-6              |
| Intracoastal Waterway | 27-152-1          | 6.97      | PRO                                      | I                                 | F-6              |
| Coot Creek            | 27-152-10         | 0.31      | APP                                      | S                                 | F-6              |
| Henry Creek           | 27-152-2          | 1.49      | PRO                                      | I                                 | F-6              |
| Bills Creek           | 27-152-3          | 8.09      | PRO                                      | I                                 | F-6              |
| Doll Creek            | 27-152-4          | 11.17     | APP                                      | S                                 | F-6              |
| Lambert Creek         | 27-152-5          | 7.36      | APP                                      | S                                 | F-6              |
| Ditch Creek           | 27-152-6          | 171.21    | APP                                      | S                                 | F-6              |
| Sheepneck Creek       | 27-152-6-1        | 15.60     | APP                                      | S                                 | F-6              |
| Dowdy Creek           | 27-152-6-2        | 7.54      | APP                                      | S                                 | F-6              |
| Drum Creek            | 27-152-7          | 58.98     | APP                                      | S                                 | F-6              |
| Little Eve Creek      | 27-152-8          | 24.90     | APP                                      | S                                 | F-6              |
| Little Drum Creek     | 27-152-9          | 20.60     | APP                                      | S                                 | F-6              |
| Jones Bay             | 27-152            | 17.31     | PRO                                      | I                                 | F-6              |
| Jones Bay             | 27-152            | 2865.66   | APP                                      | S                                 | F-6              |

**1 - Growing Area Classifications:** APP – Approved; CAO – Conditionally Approved-Open; CAC – Conditionally Approved-Closed; RES – Restricted; PRO- Prohibited.

**2 - DWQ Shellfish Rating:** S – Supporting; I - Impaired

The following DWQ Class SA waters and the Impaired assessment units associated with these waters are located within Growing Area F-6. If the entire Class SA water is located within more than one growing area it is noted in Table 42 above. See shellfish harvesting use support and growing area map in Chapter 10 section 10.3.4 (Figures 17 and 18).

According to the *Sanitary Survey of Neuse River Area, Area F-6, (DEH. Shellfish Sanitation Unit, January 2006)*, there have been little water quality changes since the last survey. This area

is located entirely in Pamlico County and includes waters of the Bay River, Jones Bay, Vandemere Creek, Ball Creek, Bonner Bay, Fisherman Bay, and Bear Creek, as well as a series of smaller creeks and tributaries. The watershed is approximately 60 square miles, and is dominated by agricultural and silviculture operations. Oyster production is fair but localized, and much of the commercial catch comes from the lower portion of the area.

Population in the region continues to grow at a slow rate. Bayboro and Vandemere are the largest towns and the greatest residential concentration is the area found on the south side of Bay River. With the exception of Hobucken, the area surrounding Jones Bay is predominantly rural, with most development concentrated along the main roads.

No new subdivisions have been built since the 2001 survey. A total of 14 new homes have been constructed within the growing area. Approximately 500 homes were destroyed in 2003 due to Hurricane Isabel. This is very low-lying area and most subdivisions have minimal stormwater control consisting of grassy swales and riprap retention. The initial impacts from lot clearing and road construction probably have the greatest impact on water quality in this region.

The Bay River Metropolitan Sewer District (BRMSD) continues to provide service for the towns of Bayboro and Vandemere, as well as along the main roads surrounding Bay River. The BRMSD stopped discharging into the Bay River and now all treated effluent is land applied on pine fields near the town of Arapahoe. The BRMSD reported no major problems aside from hurricanes. No failing on-site wastewater systems were found in throughout this growing area as well. Three stations were added in 2001 to monitor water quality after the removal of the WWTP discharge. Sampling was dropped in 2005 after sampling indicated no improvement in water quality.

A hobby farm located near Harper Point housed numerous birds and goats. This land is located adjacent to open shellfish waters, and there is a ditch draining the area around the animal pens. During the survey, this ditch appeared highly eutrophic. A herd of approximately 20 goats located on land near to marsh off of Old Hobucken Road is close to the Bear Creek closed shellfish area. Both of these farms are likely impacting water quality in there area.

There are numerous private docks and five larger marinas associated with commercial fishing operations, including Bayboro Harbor, Pamlico Packing, Pate Boatyard, Hobucken Marina, and R.E. Mayo Co.

Seasonally, a significant number of migratory waterfowl utilize the marshes, creeks, and impoundments of the region as temporary stopovers. Domestic pets and wild animals both contribute to fecal loading throughout much of this area.

Rainfall normally has little effect on the approved waters of this area except during extremely heavy rainfall evens (hurricanes or other severe coastal storm events) which cause temporary closures.

Water quality in the creeks and along the shore in area F-6 continues to decline and results from stations added recently indicate the need for further closures.

As result of the shellfish report, the closure line in the Bay River and Ball Creek were shifted further downstream. An additional closure was added to Jones Bay, with the closure of the

Intracoastal Waterway just north of the Highway 33 bridge, as well as to just south of the intersection with Jones Bay and will extend out into Jones Bay.

### 13.3.4 Division of Environmental Health Growing Area F-7

Table 43 Shellfish Growing Area F-7 Classifications

| Class SA Water      | Assessment Unit # | AU Length | Growing Area Classification <sup>1</sup> | DWQ Shellfish Rating <sup>2</sup> | DEH Growing Area |
|---------------------|-------------------|-----------|--|-----------------------------------|------------------|
| Fishing Bay         | 27-153            | 63.01     | APP                                      | S                                 | F-7              |
| Middle Bay          | 27-154            | 535.46    | APP                                      | S                                 | F-7              |
| Capp Creek          | 27-154-1          | 10.97     | APP                                      | S                                 | F-7              |
| Preston Bay         | 27-154-2          | 8.99      | APP                                      | S                                 | F-7              |
| Flower Bay          | 27-154-3          | 21.60     | APP                                      | S                                 | F-7              |
| Roundabout Bay      | 27-154-4          | 33.56     | APP                                      | S                                 | F-7              |
| Little Oyster Creek | 27-154-5          | 62.39     | APP                                      | S                                 | F-7              |
| Big Oyster Creek    | 27-155            | 55.48     | APP                                      | S                                 | F-7              |
| Big Porpoise Bay    | 27-156            | 661.75    | APP                                      | S                                 | F-7              |
| Porpoise Creek      | 27-156-1          | 24.16     | APP                                      | S                                 | F-7              |
| Little Porpoise Bay | 27-157            | 176.14    | APP                                      | S                                 | F-7              |
| West Bay            | 27-148            | 16359.32  | APP                                      | S                                 | F-7              |

**1 - Growing Area Classifications:** APP – Approved; CAO – Conditionally Approved-Open; CAC – Conditionally Approved-Closed; RES – Restricted; PRO- Prohibited.

**2 - DWQ Shellfish Rating:** S – Supporting; I - Impaired

The following DWQ Class SA waters and the Impaired assessment units associated with these waters are located within Growing Area F-7. If the entire Class SA water is located within more than one growing area it is noted in Table 43 above. See shellfish harvesting use support and growing area map in Chapter 10 section 10.3.4 (Figures 17 and 18).

There is no shoreline is shellfish growing Area F-7. DEH uses results from the surrounding growing areas to make decisions on Area 7. None of the recent 2006 sanitary surveys of Neuse River shellfish areas reported any changes made within the shellfish Area F-7

## 13.4 Status and Recommendations for Waters with Noted Impacts

The surface waters discussed below are not Impaired. However, notable water quality problems and concerns were documented for these waters during this assessment. Attention and resources should be focused on these waters to prevent additional degradation and facilitate water quality improvements. DWQ will notify local agencies of these water quality concerns and work with them to conduct further assessments and to locate sources of water quality protection funding. Additionally, education on local water quality issues and voluntary actions are useful tools to prevent water quality problems and to promote restoration efforts. The current status and recommendations for addressing these waters are presented below, and each is identified by an AU#. Nonpoint source program agency contacts are listed in Appendix IV.

There was only a single ambient monitoring station assessed by DWQ during this assessment period. DEH collect data for the assessment of the recreational and shellfish harvesting. These are reported above. All the waters within this subbasin are classified as SA or shellfish harvesting waters. These waters are affected by all potential bacterial contamination sources.

### Recommendation

DWQ recommends the use of BMPs throughout this watershed to reduce stormwater runoff which carries bacteria which leads to shellfish harvesting and beach closures.

## **13.5 Additional Water Quality Issues within Subbasin 03-04-13**

The previous sections discussed water quality concerns for specific stream segments. The following section discusses issues that may threaten water quality in the subbasin that are not specific to particular streams, lakes, or reservoirs. The issues discussed may be related to waters near certain land use activities or within proximity to different pollution sources.

### **13.5.1 Mercury Contamination – Fish Tissue Assessment**

The Division conducted fish tissue surveys at four stations within the Neuse River Basin from 1999 to 2004. These surveys were conducted as part of the mercury contaminant assessments in the eastern part of the state and during statewide pesticide assessments.

Tissue samples collected from the Neuse River at Goldsboro contained organic contaminants at undetectable levels or at levels less than the US EPA, US FDA, and State of North Carolina criteria. The Goldsboro samples consisted of composites of largemouth bass.

Elevated mercury concentrations (greater than the EPA and NC level of 0.4 ppm) were detected in fish samples collected from all four stations within the Neuse Basin. These included the Eno River near Durham, Neuse River at Goldsboro, Neuse River at Kinston, and Contentnea Creek at Snow Hill. Elevated levels were most often detected in largemouth bass, a species at the top of the food chain and most often associated with mercury bioaccumulation in North Carolina. Presently, there are no site-specific fish consumption advisories for mercury in the Neuse River basin; however, an advisory for the consumption of bowfin, and chain pickerel east of Interstate 85 was issued by NCDHHS in 2002 and a statewide advisory for the consumption of largemouth bass in 2006.

Because fish spend their entire lives in the aquatic environment, they incorporate chemicals from this environment into their body tissues. Contamination of aquatic resources has been documented for heavy metals, pesticides, and other complex organic compounds. Once these contaminants reach surface waters, they may be available for bioaccumulation, either directly or through aquatic food webs, and may accumulate in fish and shellfish tissues. Results from fish tissue monitoring can serve as an important indicator of further contamination of sediments and surface water.