

Section B - Chapter 7

Tar-Pamlico River Subbasin 03-03-07

Pamlico River, Pungo River and Pantego Creek

7.1 Subbasin Overview

Subbasin 03-03-07 at a Glance

Land and Water Area

Total area:	1,190.0 mi ²
Land area:	997.4 mi ²
Water area:	192.6 mi ²

Population Statistics

2000 Est. Pop.:	44,232 people
Pop. Density:	44 persons/mi ²

Land Cover (percent)

Forest/Wetland:	55.5
Surface Water:	17.5
Urban:	0.5
Cultivated Crop:	25.5
Pasture/ Managed Herbaceous:	1.0

Counties

Beaufort, Craven, Hyde, Pamlico, Tyrrell and Washington

Municipalities

Washington, Belhaven, Bath and Aurora

There has been little population growth in this subbasin, although there has been growth along the north shore of the Pamlico River. Washington is the largest town in the subbasin. The predominant land cover is forest and wetland with extensive cultivated cropland as well.

There are 20 individual NPDES wastewater discharge permits in this subbasin with a total permitted flow of 7.5 MGD (Figure B-7). The largest is Washington WWTP (3.2 MGD). There are also 11 general NPDES wastewater permits, one individual NPDES stormwater permit, and 20 general NPDES stormwater permits in the subbasin. Refer to Appendix I for identification and more information on individual NPDES permit holders.

Washington will have to submit a model stormwater ordinance as required by the Tar-Pamlico NSW strategy (page 75) stormwater rules. Significant issues related to compliance with NPDES permit conditions are discussed below. There are also 18 registered animal operations in this subbasin.

There were two benthic macroinvertebrate community samples and two fish community samples (Figure B-7 and Table B-13) collected in 2002 as part of basinwide

monitoring. Two sites remained the same and two sites were monitored for the first time during the assessment period. Data were collected from 30 ambient monitoring stations as well. DEH samples at 13 swimming areas and six shellfish growing areas.

Refer to *2003 Tar-Pamlico River Basinwide Assessment Report* at <http://www.esb.enr.state.nc.us/bar.html> and Section A, Chapter 3 for more information on monitoring.

Figure B-7 Tar-Pamlico River Subbasin 03-03-07

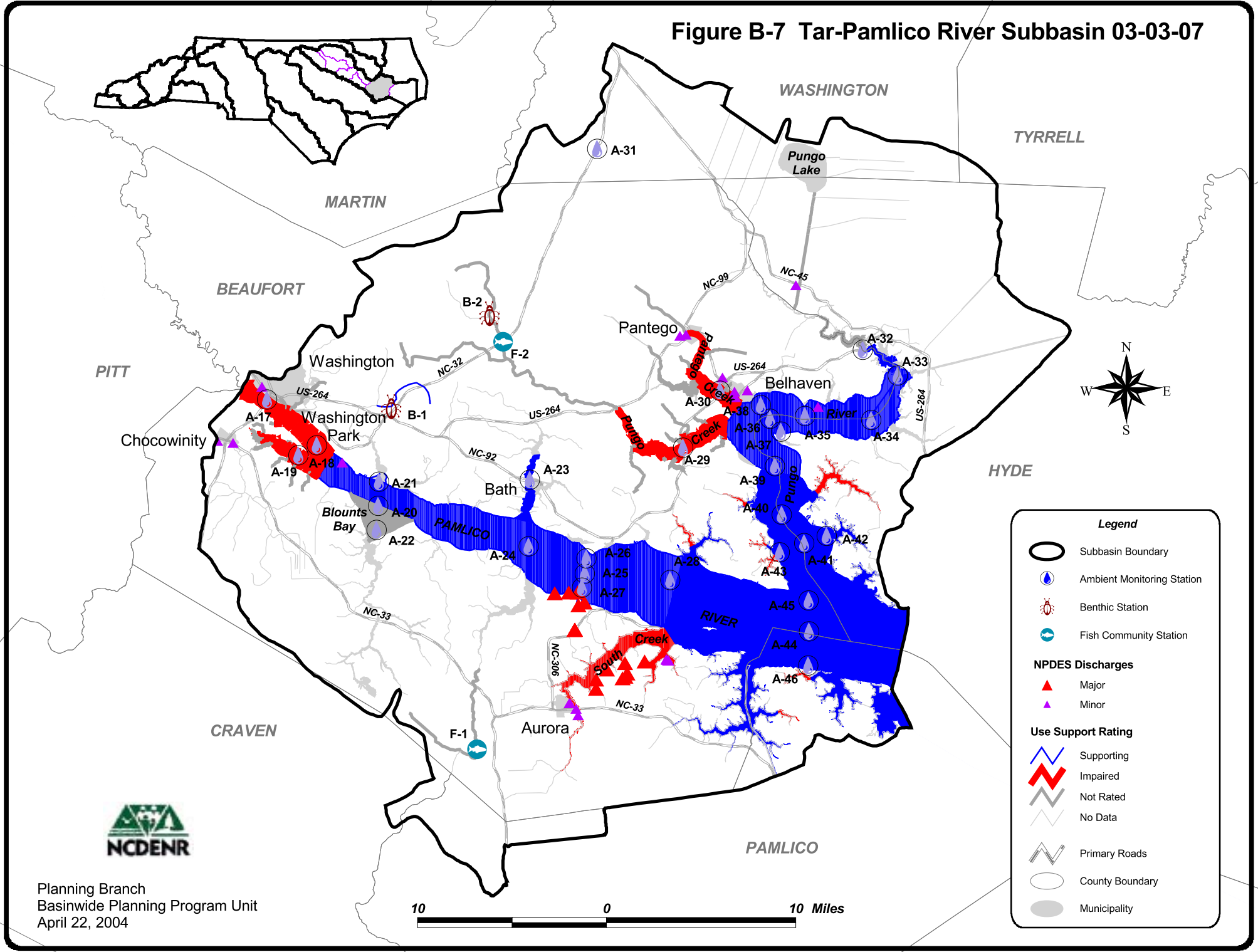


Table B-13 DWQ Assessment and Use Support Ratings Summary for Monitored Waters in Subbasin 03-03-07

Waterbody	Assessment Unit Number	DWQ Classification	Length/ Area	Category	Data Type with Map Number and Data Results			Use Support Rating	
					Biological	Ambient	Other	2004	1998
Kennedy Creek	28-104	C NSW	32.0 ac	AL		A-17 ce	P-1	I	PS
PAMLICO RIVER	29-(1)	SC NSW	739.5 ac	AL		A-17 ce	P-1	I	PS
Rodman Creek	29-4-(2)	SC NSW	19.1 ac	AL		A-17 ce	P-1	I	PS
PAMLICO RIVER	29-(5)a	SB NSW	1,765.6 ac	AL		A-18 ce		I	PS
PAMLICO RIVER	29-(5)b	SB NSW	28,452.2 ac	AL		A-21 nce A-24 to A-28 nce	P-3 P-4	S	ST
Chocowinity Bay	29-6-(1)	SC NSW	389.6 ac	AL		A-19 nce		I	PS
Chocowinity Bay	29-6-(5)	SB NSW	503.2 ac	AL		A-19 nce		I	PS
Blounts Bay (inside a line from Hill Point to Mauls Point)	29-9	SB NSW	2,101.2 ac	AL		A-20 nce A-22 nce	P-2	NR	ST
Beaverdam Swamp	29-10-2	C NSW	4.3 mi.	AL	B-1 MS--02			S	ST
Bath Creek	29-19-(5.5)	SB NSW	861.2 ac	AL		A-23 nce		S	ST
Durham Creek	29-21-(1)	C NSW	9.9 mi.	AL	F-1 NR--02			NR	NR
PAMLICO RIVER	29-(27)	SA NSW	33,766.4 ac	AL		A-44 to A-46 nce		S	ST
Pungo River	29-34-(5)	SC NSW	253.1 ac	AL		A-32 nce		NR	ST
Pungo River	29-34-(12)a	SB NSW	15,409.8 ac	AL		A-33 to A-39 nce		S	ST
Pungo River	29-34-(12)b	SB NSW	2.8 ac	AL		A-38 nce		S	ST
Pantego Creek	29-34-34-(2)	SC NSW	952.4 ac	AL		A-30 nce		I	ST
Pungo Creek	29-34-35	SC NSW	1,701.6 ac	AL		A-29 nce		I	ST
Acre Swamp	29-34-35-1-1	C Sw NSW	7.5 mi.	AL	B-2 NR--02 F-2 NR--02			NR	ST
Pungo River	29-34-(38)	SA NSW	10,367.8 ac	AL		A-40 to A-43 nce		S	ST
PAMLICO RIVER	29-(5)a	SB NSW	1,765.6 ac	REC		A-18 nce	DEH nce	S	N/A
PAMLICO RIVER	29-(5)b	SB NSW	28,452.2 ac	REC		A-21 nce A-24 to A-28 nce	DEH nce	S	N/A

Table B-13 DWQ Assessment and Use Support Ratings Summary for Monitored Waters in Subbasin 03-03-07 (continued)

Waterbody	Assessment Unit Number	DWQ Classification	Length/ Area	Category	Data Type with Map Number and Data Results			Use Support Rating	
					Biological	Ambient	Other	2004	1998
Chocowinity Bay	29-6-(5)	SB NSW	503.2 ac	REC		A-19 nce		S	N/A
Blounts Bay (inside a line from Hill Point to Mauls Point)	29-9	SB NSW	2,101.2 ac	REC		A-20 nce A-22 nce	DEH nce	S	N/A
Broad Creek	29-10-(3)	SB NSW	368.1 ac	REC			DEH nce	S	N/A
Little Goose Creek	29-11-(2)	SC NSW	141.2 ac	REC			DEH nce	S	N/A
Bath Creek	29-19-(5.5)	SB NSW	861.2 ac	REC		A-23 nce	DEH nce	S	N/A
PAMLICO RIVER	29-(27)	SA NSW	33,766.4 ac	REC		A-44 to A-46 nce		S	N/A
Pungo River	29-34-(12)a	SB NSW	15,409.8 ac	REC		A-33 to A-39 nce		S	N/A
Pungo River	29-34-(12)b	SB NSW	2.8 ac	REC			DEH ce	I	N/A
Pantego Creek	29-34-34-(2)	SC NSW	952.4 ac	REC		A-30 nce		S	N/A
Pungo Creek	29-34-35	SC NSW	1,701.6 ac	REC		A-29 nce		S	N/A
Pungo River	29-34-(38)	SA NSW	10,367.8 ac	REC		A-40 to A-43 nce		S	N/A
See Appendix III	122 segments	SA NSW	51,801.2 ac	SH			DEH nce	S	N/A
See Appendix III	41 segments	SA NSW	5,111.3 ac	SH			DEH ce	I	N/A

Assessment Unit Number - Portion of DWQ Classified Index where monitoring is applied to assign a use support rating.

Use Categories: AL - Aquatic Life REC - Recreation FC - Fish Consumption	Monitoring data type: F - Fish Community Survey B - Benthic Community Survey SF - Special Fish Community Study SB - Special Benthic Community Study A - Ambient Monitoring Site FT - Fish Tissue Site P - Phytoplankton Monitoring Site	Bioclassifications: E - Excellent N - Natural G - Good MS - Moderate Stress GF - Good-Fair SS - Severe Stress F - Fair P - Poor	Use Support Ratings 2004: S - Supporting, I - Impaired, NR - Not Rated Use Support Ratings 1998: FS - fully supporting, ST - supporting but threatened, PS - partially supporting, NS - not supporting, NR - not rated, N/A - not applicable
		Ambient Data nce - no criteria exceeded ce - criteria exceeded	

Use support ratings for all waters in subbasin 03-03-07 are summarized in Part 7.2 below. Recommendations, current status and future recommendations for waters that were Impaired in 1999 are discussed in Part 7.3 below. Current status and future recommendations for newly Impaired waters are discussed in Part 7.4 below. Waters with noted water quality impacts are discussed in Part 7.5 below. Water quality issues related to the entire subbasin are discussed in Part 7.6. Refer to Appendix III for a complete list of monitored waters and more information on Supporting monitored waters.

7.2 Use Support Assessment Summary

Use support ratings were assigned for waters in subbasin 03-03-07 in the aquatic life, recreation, fish consumption and shellfish harvesting categories. All waters are Impaired on an evaluated basis in the fish consumption category because of statewide fish consumption advice for mercury that is applied in this use category to basins east and south of I-85 (page 90).

There were 21.7 stream miles (7 percent), 369.9 freshwater acres (13 percent), and 97,285.4 estuarine acres (84 percent) monitored during this assessment period in the aquatic life category. There were 369.9 freshwater acres and 6,070.9 estuarine acres Impaired in this category. There were also 2.8 estuarine acres Impaired in the recreation category and 5,111.3 estuarine acres Impaired in the shellfish harvesting category. Refer to Table B-14 for a summary of use support ratings for waters in subbasin 03-03-07.

Table B-14 Summary of Use Support Ratings by Use Category in Subbasin 03-03-07

Use Support Rating	Aquatic Life	Fish Consumption	Recreation	Shellfish Harvesting
Monitored Waters				
Supporting	4.3 mi 88,860.2 Est ac	0	97,130.2 Est ac	51,801.2 Est ac
Impaired	369.9 fw ac 6,070.9 Est ac	0	2.8 Est ac	5,111.3 Est ac
Not Rated	17.4 mi 2,354.2 Est ac	0	0	0
Total	21.7 mi 369.9 fw ac 97,285.4 Est ac	0	97,133.0 Est ac	56,912.5 Est ac
Unmonitored Waters				
Supporting	0	0	0	0
Impaired	0	327.8 mi 3,155.5 fw ac 114,805.0 Est ac	0	0
Not Rated	35.4 mi 690.4 Est ac	0	0	0
No Data	270.7 mi 2,785.6 fw ac 16,829.2 Est ac	0	327.8 mi 3,155.5 fw ac 17,672.0 Est ac	0
Total	306.2 mi 2,785.6 fw ac 17,519.6 Est ac	327.8 mi 3,155.5 fw ac 114,805.0 Est ac	327.8 mi 3,155.5 fw ac 17,672.0 Est ac	0
Totals				
All Waters	327.8 mi 3,155.5 fw ac 114,805.0 Est ac	327.8 mi 3,155.5 fw ac 114,805.0 Est ac	327.8 mi 3,155.5 fw ac 114,805.0 Est ac	56,912.5 Est ac

fw = freshwater Est ac = estuarine acres

7.3 Status and Recommendations of Previously Impaired Waters

Waters in the following section are identified by assessment unit number (AU#). This number is used to track defined segments in the water quality assessment database, 303(d) Impaired waters list, and the various tables in this basin plan. The assessment unit number 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 assessment unit and the DWQ index segment are the same.

7.3.1 Tar River [AU# 28-(102.5)]
Pamlico River [AU# 29-(1) and (5)a]
Chocowinity Bay [AU# 29-6-(1) and (5)]
Kennedy Creek [AU# 28-104]
Rodman Creek [AU# 29-4-(2)]

1999 Recommendations

It was recommended that efforts continue to reduce nitrogen loads to this portion of the estuary from both point and nonpoint sources of pollution.

Current Status

Tar River (338 acres), Pamlico River (2,505.1 acres), Chocowinity Bay (891.8 acres), Kennedy Creek (32 acres) and Rodman Creek (19.1 acres) are currently Impaired because the chlorophyll *a* criterion was exceeded in 17 percent of samples collected at site A-19 during the assessment period. ECU research also indicated high levels of chlorophyll *a* in the Pamlico River near Washington.

Algae were also monitored during February, June through September, and November 1998-2002. Algal blooms and fish kills were also investigated along the river throughout each year. Effects from hurricanes and droughts were apparent as algal concentrations fluctuated over time and were most noticeable at site A-20. Post-hurricane flushing events during summer 1998 and from September 1999 through spring 2000 prevented algae from remaining in the river for long periods of time, so algal concentrations decreased. This trend was especially noticeable after Hurricane Floyd when algal concentrations were much lower than usual from late 1999 to early 2000. When the region began to experience droughts during 2000-2002, low rainfall reduced flow rates which allowed algae to remain in the river and absorb nutrients.

During 2001, algal concentrations increased. However, the prolonged lack of rainfall by 2002 likely suppressed new nutrients from entering the river because algal concentrations decreased during 2002. Species community composition was similar among the four sites and dinoflagellates (unicellular flagellates) and diatoms (unicellular or chain-forming species encased in silica) were often prevalent. The most upstream station, site A-17, usually had the lowest algal concentrations in comparison to the other sites, but was the only site to experience an algal bloom mid-way through the 2001-2002 drought. Site A-20 had the highest number of recorded blooms along the river. This may have been due to its location near a bay, which possibly had longer retention times than the downstream mid-channel sites. Algal concentrations decreased downstream at sites A-24 and A-28.

A TMDL for this segment has been approved by EPA to help address nutrient overloading into these waters (page 61). The Tar-Pamlico River basin NSW strategy (page 61) has also been developed to address these water quality problems.

2004 Recommendations

DWQ will continue to monitor nutrient loading into this portion of the Tar-Pamlico estuary to assess the success of implementation of the Tar-Pamlico River basin NSW strategy. Because of the complex nature of the estuarine waters, longer periods of data collection and monitoring of

management strategies will be needed before water quality goals are met. Algal monitoring in and around the Pamlico River will also continue during the next five years.

7.3.2 Impaired Class SA Waters

Portions of Class SA waters were partially supporting in the 1999 basin plan because they were classified as prohibited to shellfish harvesting by DEH SS. No specific recommendations were made to address bacterial contamination in these waters in the 1999 basin plan. Because of changes in use support methodology, there are changes in the acreages and areas that are Impaired in the shellfish harvesting category. These waters are discussed below in Part 7.4.4.

7.4 Status and Recommendations of Newly Impaired Waters

Waters in the following section are identified by assessment unit number (AU#). This number is used to track defined segments in the water quality assessment database, 303(d) Impaired waters list, and the various tables in this basin plan. The assessment unit number 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 assessment unit and the DWQ index segment are the same.

7.4.1 Pungo River [AU# 29-34-(12)b]

Current Status

Pungo River (2.8 acres) is currently Impaired in the recreation category because DEH Recreational Water Quality Monitoring had posted swimming advisories for greater than 61 days of the assessment period. The Town of Belhaven has experienced sanitary sewer overflows (SSOs) during the assessment period as well as exceeding fecal coliform bacteria permit limits at the WWTP. Although swimming advisories were posted in only one area near Belhaven, other areas may also have periodically high bacteria levels.

2004 Recommendations

DEH will continue to monitor this area and post advisories when needed. DWQ and DEH are continuing to work to develop better methods of identifying the extent of water quality problems near swimming areas to assure that these areas are monitored and to identify possible sources of contamination. DWQ will also work with Belhaven to reduce SSO frequency and improve reporting of SSOs. Belhaven has been assessed for fecal coliform violations at the outfall.

7.4.2 Pungo Creek [AU# 29-34-35]

Current Status

Pungo Creek (1,701.6 acres) is currently Impaired because the chlorophyll *a* criterion was exceeded in 17.6 percent of samples collected at site A-29 during the assessment period. There were also indications of swamp waters influence, as the pH was lower at this site. The Pungo Creek watershed has an extensive ditch network that drains large agricultural areas.

2004 Recommendations

DWQ will continue to implement the Tar-Pamlico River basin NSW strategy to reduce nutrient loading into Pungo Creek that may be causing algal blooms that result in exceedances of the chlorophyll *a* standard.

7.4.3 Pantego Creek [AU# 29-34-34-(2)]

Current Status

Pantego Creek (952.4 acres) is currently Impaired because the chlorophyll *a* criterion was exceeded in 23.5 percent of samples collected at site A-30 during the assessment period. There were also indications of swamp waters influence, as the pH was lower at this site. The Pantego Creek watershed has an extensive ditch network that drains large agricultural areas. Pantego Creek also receives wastewater from a few small discharges in the watershed.

2004 Recommendations

DWQ will continue to implement the Tar-Pamlico River basin NSW strategy to reduce nutrient loading into Pantego Creek that may be causing algal blooms that exceed the chlorophyll *a* criterion.

7.4.4 Impaired Shellfish Harvesting Waters (Class SA)

Current Status

The following groups of waters are Impaired in the shellfish harvesting category. The current status is discussed briefly for each below. Recommendations are presented at the end of this section for all the Impaired waters. Refer to Appendix III for descriptions of the specific assessment units areas.

South Creek and Tributaries [AU# 29-28]

South Creek and tributaries (3,674 acres) were Not Rated in 1999, but are currently Impaired because these areas are prohibited or permanently closed to shellfish harvesting by DEH SS (page 51). South Creek and tributaries are part of DEH shellfish growing area G-12.

North Creek and Garrett Gut [AU# 29-29]

North Creek (162 acres) and Garrett Gut (7.9 acres) are currently Impaired because these areas are prohibited or permanently closed to shellfish harvesting by DEH SS (page 51). North Creek is on the north shore of the Pamlico River (DEH area G-1). DEH sanitary surveys indicate good clam production in G-1, with no oyster production.

Eastham Creek and Tributaries [AU# 29-33-3]

Eastham Creek and tributaries (65.3 acres) are currently Impaired because these areas are prohibited or permanently closed to shellfish harvesting by DEH SS (page 51). Eastham Creek and tributaries are part of DEH shellfish growing area G-1. Eastham Creek is a tributary to Goose Creek in the southern portion of DEH area G-1. DEH sanitary surveys indicate good clam production in G-1, with no oyster production.

Slade Creek and Tributaries [AU# 29-34-40]

Slade Creek and tributaries (759.3 acres) are currently Impaired because these areas are prohibited or permanently closed to shellfish harvesting by DEH SS (page 51). Slade Creek and tributaries are part of DEH shellfish growing area G-8. DEH sanitary surveys indicate good clam production in G-8, with poor oyster production.

Jordan Creek [AU# 29-34-41a]

Jordan Creek (90 acres) is currently Impaired because this area is prohibited or permanently closed to shellfish harvesting by DEH SS (page 51). Jordan Creek is part of DEH shellfish growing area G-8. DEH sanitary surveys indicate good clam production in G-8, with poor oyster production.

Oyster Creek and Tributaries [AU# 29-35]

Oyster Creek and tributaries (133.8 acres) are currently Impaired because these areas are prohibited or permanently closed to shellfish harvesting by DEH SS (page 51). Oyster Creek and tributaries are part of DEH shellfish growing area G-2. DEH sanitary surveys indicate good clam production in G-2, with no oyster production.

2004 Recommendations

DEH SS will continue to monitor bacterial water quality. DWQ, DEH and DCM are currently developing tools to better track water quality changes, make use support assessments, and support research in shellfish harvesting waters of North Carolina. The North Carolina Coastal Nonpoint Source Program (page 176) is developing a series of programs to help local governments address bacterial contamination in coastal waters. DWQ is also cooperating with DCM to assure that water quality problems identified in basinwide water quality plans are considered in development local land use plans in coastal counties.

7.5 Status and Recommendations for Waters with Noted Impacts

The surface waters discussed in this section are not Impaired. However, notable water quality problems and concerns have been documented for these waters based on this assessment. While these waters are not Impaired, attention and resources should be focused on these waters to prevent additional degradation or facilitate water quality improvement.

Waters in the following section are identified by assessment unit number (AU#). This number is used to track defined segments in the water quality assessment database, 303(d) Impaired waters list, and the various tables in this basin plan. The assessment unit number 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 assessment unit and the DWQ index segment are the same.

7.5.1 Acre Swamp [AU# 29-34-35-1-1]

Current Status and 2002 Recommendations

Acre Swamp (7.5 miles) is currently Not Rated because sites F-2 and B-2 could not be assigned bioclassifications. Criteria for assigning bioclassifications to fish community samples have not been developed for coastal plain streams (page 73). The very low pH at site B-2 precluded

assigning a bioclassification to the benthic community. The stream is heavily channelized, has eroding streambanks, no riparian zone and little instream habitat.

DWQ will continue to monitor Acre Swamp to assess changes in the biological community that might be related to land disturbance activities. Water quality should be considered during land-disturbing activities, and BMPs should be implemented to minimize or prevent future impacts to water quality in the Acre Swamp watershed. DWQ will continue to develop criteria to assign bioclassifications for coastal plain fish communities.

7.5.2 Beaver Dam Swamp [AU# 29-10-2]

Current Status and 2004 Recommendations

Beaver Dam Swamp (4.3 miles) is currently Supporting because of a Moderate Stress bioclassification at site B-1 in 2002. The stream was channelized and habitat conditions are not ideal, although the stream appears to be recovering.

DWQ will continue to monitor water quality in Beaver Dam Swamp. Land-disturbing activities should implement BMPs to minimize or prevent future impacts to water quality in Beaver Dam Swamp watershed.

7.5.3 Blounts Bay [AU# 29-9]

Current Status and 2004 Recommendations

Blounts Bay (2,101.2 acres) is currently Not Rated in the aquatic life category because chlorophyll *a* data at sites A-20 and A-22 were not conclusive. Chlorophyll *a* was above 40 µg/l in 8 percent of samples at site A-20 and 25 percent of samples at site A-22. Only four samples were collected at site A-22, which did not meet the minimum of ten needed to assign a use support rating. Six fish kills lasting between one and three days have been investigated in Blounts Bay since 1999. The largest was over 86,000 fish in 1999 near Core Point. In two fish kills, the suspected cause was low dissolved oxygen levels.

DEH monitors one swimming area in Blounts Bay, and no swimming advisories were posted during the assessment period. Therefore, Blounts Bay is Supporting in the recreation category.

DWQ and DEH will continue to monitor water quality in Blounts Bay. DWQ will continue implementation of the Tar-Pamlico NSW strategy (page 61) to address nutrient overloading that may be stimulating algal blooms that exceed the chlorophyll *a* criterion.

7.6 Additional Water Quality Issues within Subbasin 03-03-07

This 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.

7.6.1 Impacts of Post-Hurricane De-Snagging on Instream Habitats

Many streams in the subbasin have noted impacts from the recent hurricanes. The biological community in the streams can recover rapidly if instream habitat is maintained. De-snagging operations should carefully remove debris from stream channels to restore natural flow and leave enough instream habitats so the biological community can recover. For more information on this issue, refer to page 81.