Chapter 1
White Oak Subbasin 03-05-01
Including: White Oak River, Queens Creek and Bear Creek

1.1 Subbasin Overview

Subbasin 03-05-01 at a Glance

Land and Water Area

Total area:	351 mi^2
Land area:	322 mi^2
Water area:	29 mi^2

Land Cover (percent)

Forest/Wetland:	76%
Water:	8%
Urban:	1%
Cultivated Crop:	11%
Pasture/Managed Herbaceous:	3 %

Counties
Carteret, Craven, Jones and Onslow

Municipalities
Cape Carteret, Cedar Point, Maysville, Peletier and Swansboro

Monitored Waterbody Statistics

Aquatic Life

Total:	1,815ac/48.7 mi
Total Supporting:	981ac/48.7 mi
Total Impaired:	792.6 ac
Total Not Rated:	41.6 ac

Recreation

Total:	4,405 ac
Total Supporting:	4,405 ac

Shellfish Harvesting

Total:	11,032 ac/3.8 mi
Total Supported:	4,114.3 ac
Total Impaired:	6,918ac/3.8 mi

This subbasin contains the White Oak River and its tributaries in Onslow, Jones, Craven and Carteret counties. Most of this area, including its two lakes (Catfish Lake and Great Lake), lies relatively undisturbed within the Croatan National Forest and Hoffman State Forest. A map of this subbasin including water quality sampling and NPDES locations are presented in Figure 3. Use support ratings for monitored waters are presented in Table 3.

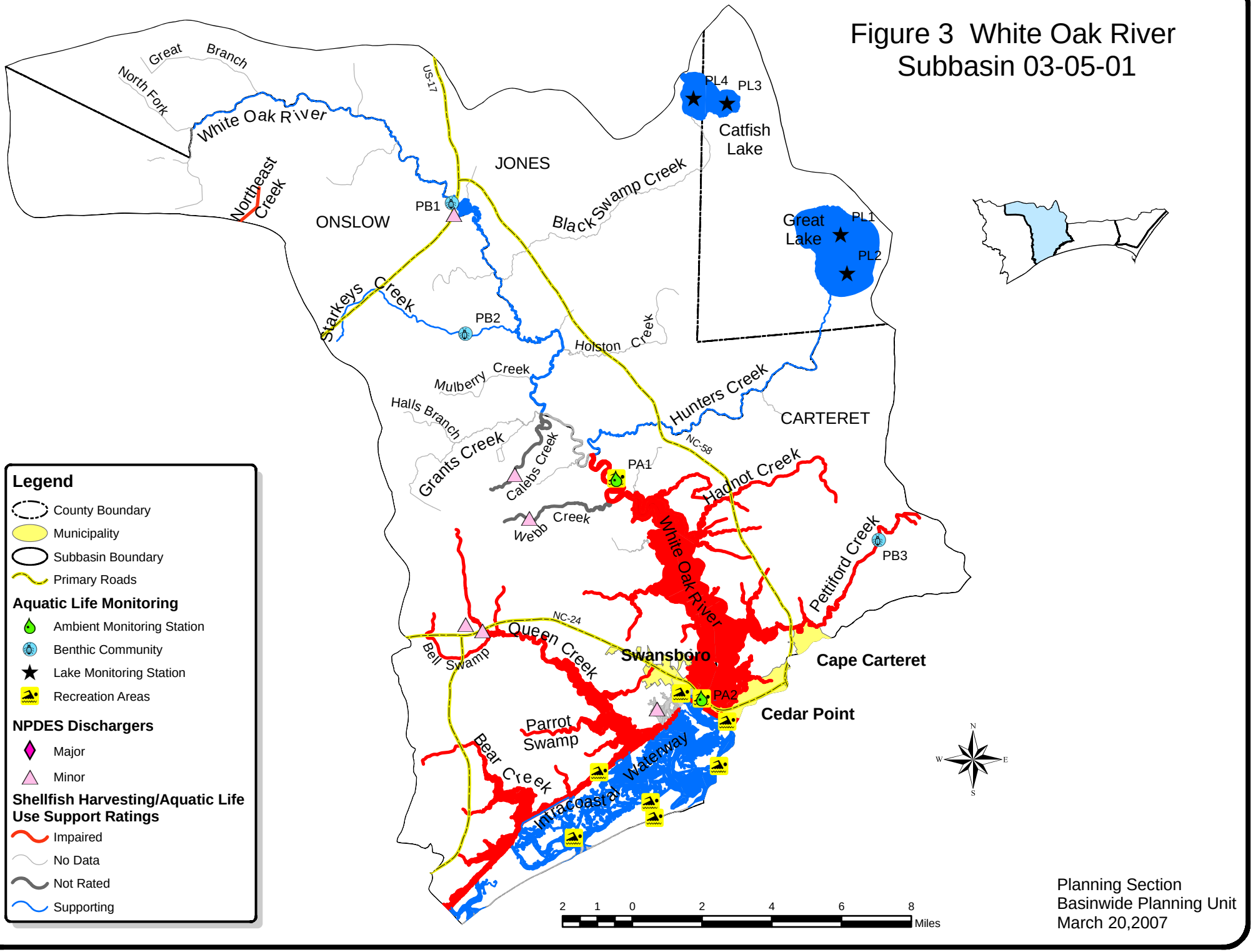
The White Oak River is a blackwater river, flowing 40 mi (64 km) to drain into the Atlantic Ocean at Bogue Sound. Headwaters rise in pocosins of northern Onslow County. It flows east, then SSE, along the border between Onslow and Carteret counties, and forming the western boundary of Croatan National Forest. A significant portion of waters in this subbasin are estuarine, including the waters around Hammocks Beach State Park, the Intracoastal Waterway (ICWW), Bogue Sound, much of the White Oak River, and most of Queens Creek and Bear Creek. There are 2,570 acres of Outstanding Resource Waters (ORW) in this subbasin, mostly around Bear Island. A portion of the White Oak River between Spring Branch and Hunters Creek is High Quality Waters (HQW) based on its designation as primary nursery area.

Agriculture and forestry are dominant land uses in the upper basin. Agricultural runoff drains into tributaries on both the Onslow County and Jones County side of the river. Developments occurring downstream of Stella are beginning to limit agriculture and forestry practices.

Communities at the mouth of the White Oak River have experienced at least 17 percent increase in population since 1990. Urban areas include, Cape Carteret, Cedar Point, Maysville, Peletier and Swansboro. Population has increased the most in the communities along the eastern shores of the White Oak River, with the population of Peletier having increased by 37.6 percent and Cedar Point by 32.4 percent between 1990 and 2000. Refer to Chapter 9 for more information about population growth and trends.

There are five individual NPDES wastewater discharge permits in this subbasin with a total permitted flow of 0.51 MGD. In 2005, three of these facilities were out of compliance with

Figure 3 White Oak River Subbasin 03-05-01



Legend

- County Boundary
- Municipality
- Subbasin Boundary
- Primary Roads

Aquatic Life Monitoring

- Ambient Monitoring Station
- Benthic Community
- Lake Monitoring Station
- Recreation Areas

NPDES Dischargers

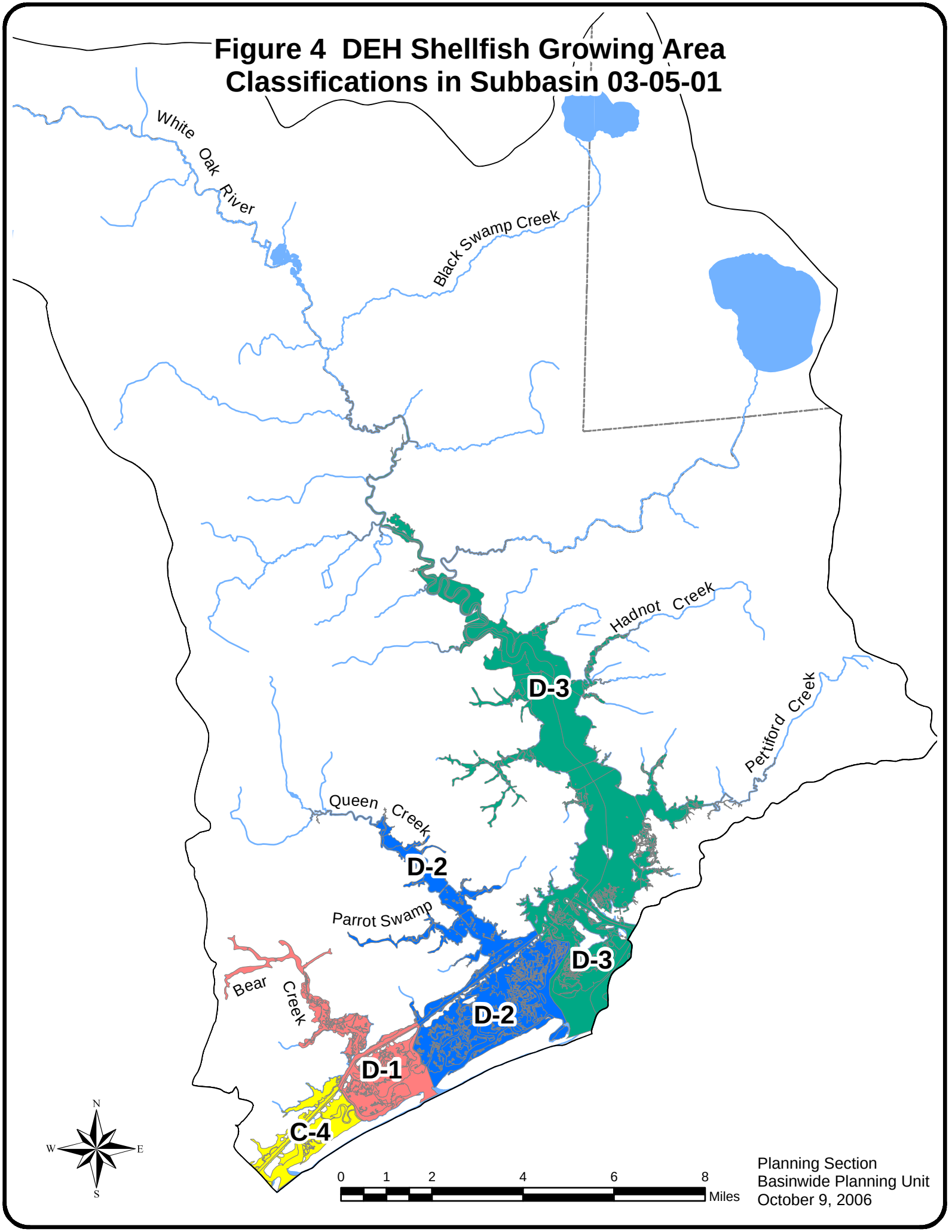
- Major
- Minor

Shellfish Harvesting/Aquatic Life Use Support Ratings

- Impaired
- No Data
- Not Rated
- Supporting

Planning Section
Basinwide Planning Unit
March 20,2007

Figure 4 DEH Shellfish Growing Area Classifications in Subbasin 03-05-01



Planning Section
Basinwide Planning Unit
October 9, 2006

Table 3

WHITE OAK Subbasin 03-05-01

AU Number / Description	Classification	Length/Area		Aquatic Life Assessment: AL Rating	Station	Result	Year/ Parameter	% Exc	Recreation Assessment: REC Rating	Station	Result	Shellfish Harvesting: SH Rating	GA	Stressors	Sources
Banks Channel															
19-41-6	SA HQW	62.2	S Acres	ND					ND			S	APP		
From Browns Inlet to Intracoastal Waterway													C-4		
Barnes Branch															
20-3-1	C	1.2	FW Miles	ND					ND						
From source to South Prong White Oak River															
Bear Creek															
19-41-10	SA HQW	49.3	S Acres	ND					ND			S	APP		
From Shacklefoot Channel to Intracoastal Waterway													D-1		
19-41-11a1	SA HQW	88.1	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From source to DEH closed area line													D-1		
19-41-11a2	SA HQW	8.2	S Acres	ND					ND			I	CAC	Fecal Coliform Bacteria	Stormwater Runoff
DEH CAC area along north shore of creek													D-1		
19-41-11a3	SA HQW	19.2	S Acres	ND					ND			I	CAO	Fecal Coliform Bacteria	Stormwater Runoff
DEH CAO area along south shore shore of creek													D-1		
19-41-11b1	SA HQW	12.1	S Acres	ND					ND			I	CAC	Fecal Coliform Bacteria	Stormwater Runoff
DEH CAC area along north shore of creek													D-1		
19-41-11b2	SA HQW	179.8	S Acres	ND					ND			I	CAO	Fecal Coliform Bacteria	Stormwater Runoff
DEH CAO area along south shore shore of creek													D-1		
Bear Inlet															
19-41-13	SA HQW	241.1	S Acres	ND					**S**	C23A	NCE	S	APP		
From Atlantic Ocean to Intracoastal Waterway													D-2		

Table 3

WHITE OAK Subbasin 03-05-01

AU Number / Description	Classification	Length/Area		Aquatic Life Assessment: AL Rating	Station	Result	Year/ Parameter	% Exc	Recreation Assessment: REC Rating	Station	Result	Shellfish Harvesting	GA	Stressors	Sources
Bear Island ORW Area															
19-41-18a	SA ORW	2,207.9	S Acres	ND					**S**	C25	NCE	S	APP		
All waters within an area north of Bear Island defined by a line from the western most point on Bear Island and running along the eastern shore of Sanders Creek to the northeast m													D-3		
19-41-18b1	SA ORW	24.0	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	WWTP NPDES
All waters within an area north of Bear Island defined by a line from the western most point on Bear Island and running along the eastern shore of Sanders Creek to the northeast m													D-3	Fecal Coliform Bacteria	Stormwater Runoff
19-41-18b2	SA ORW	18.0	S Acres	ND					ND			S	APP		
All waters within an area north of Bear Island defined by a line from the western most point on Bear Island and running along the eastern shore of Sanders Creek to the northeast m													D-3		
Bell Swamp															
19-41-16-1	SA HQW	1.0	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From source to Queen Creek													D-2		
Black Swamp Creek															
20-9	C	9.3	FW Miles	ND					ND						
From source to White Oak River															
Boathouse Creek															
20-31	SA HQW	15.8	S Acres	ND					ND			I	CAC	Fecal Coliform Bacteria	Stormwater Runoff
From source to White Oak River													D-3		
Bogue Inlet															
19-41-17	SA ORW	195.2	S Acres	ND					ND			S	APP		
From Atlantic Ocean to Intracoastal Waterway													D-3		
Brick Kiln Branch															
20-8	C	2.9	FW Miles	ND					ND						
From source to White Oak River															
Browns Creek															
19-41-8	SA HQW	52.8	S Acres	ND					ND			I	CAO	Fecal Coliform Bacteria	Stormwater Runoff
From source to Intracoastal Waterway													C-4		

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WHITE OAK Subbasin 03-05-01

AU Number / Description	Classification	Length/Area		Aquatic Life Assessment					Recreation Assessment			Shellfish Harvesting			
				AL Rating	Station	Result	Year/ Parameter	% Exc	REC Rating	Station	Result	SH Rating	GA	Stressors	Sources
Browns Inlet															
19-41-7	SA HQW	150.3	S Acres	ND					ND			S	APP		
From Atlantic Ocean to Intracoastal Waterway													C-4		
Caleb Branch (City Weeks Branch)															
20-23-3	SA HQW	1.2	S Miles	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From source to Hadnot Creek													D-3		
Calebs Creek															
20-15	C	3.2	FW Miles	**NR**					ND					Ammonia	WWTP NPDES
From source to White Oak River															
Cales Creek															
20-22	SA HQW	7.2	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From source to White Oak River													D-3		
Cartwheel Branch															
20-26-1	SA HQW	4.3	S Acres	ND					ND			I	CAC	Fecal Coliform Bacteria	Stormwater Runoff
From source to Holland Mill Creek													D-3		
Catfish Lake															
20-9-1	C	949.0	FW Acres	**S**	PL3	NCE			ND						
					PL4	NCE									
					PL1	NCE									
From source to Black Swamp Creek															
Chinkapin Branch															
20-3-2	C	0.8	FW Miles	ND					ND						
From source to South Prong White Oak River															
Cow Channel															
19-41-15	SA ORW	16.5	S Acres	ND					ND			S	APP		
From Bogue Inlet to Intracoastal Waterway													D-2		
Dennis Creek (Demkis Creek)															
20-34	SC	9.3	S Acres	ND					ND						
From source to White Oak River															

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AU Number / Description	Classification	Length/Area		Aquatic Life Assessment					Recreation Assessment			Shellfish Harvesting			
				AL Rating	Station	Result	Parameter	Year/ % Exc	REC Rating	Station	Result	SH Rating	GA	Stressors	Sources
Dicks Creek															
19-41-16-5	SA HQW	22.8	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From source to Queen Creek													D-2		
Dubling Creek															
20-30	SA HQW	53.3	S Acres	ND					ND			I	CAC	Fecal Coliform Bacteria	Stormwater Runoff
From source to White Oak River													D-3		
Foster Creek															
20-35	SC	37.2	S Acres	ND					ND						
From source to White Oak River															
Freemans Creek															
20-16	C	1.6	FW Miles	ND					ND						
From source to White Oak River															
Gibson Branch															
20-6.5	C	2.2	FW Miles	ND					ND						
From source to White Oak River															
Godfry Branch															
20-24	SA HQW	3.4	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From source to White Oak River													D-3		
Goose Creek															
19-41-14	SA HQW	2.6	S Acres	ND					ND			I	CAO	Fecal Coliform Bacteria	Stormwater Runoff
From source to Intracoastal Waterway													D-2		
Grants Creek															
20-14	C	1.7	FW Miles	ND					ND						
From source to White Oak River															
20-14-1	C	3.7	FW Miles	ND					ND						
From source to Spring Branch															
Gravelly Branch															
20-11	C	1.1	FW Miles	ND					ND						
From source to White Oak River															

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AU Number / Description	Classification	Length/Area		Aquatic Life Assessment					Recreation Assessment			Shellfish Harvesting			
				AL Rating	Station	Result	Year/ Parameter	% Exc	REC Rating	Station	Result	SH Rating	GA	Stressors	Sources
Great Branch (Grape Branch)															
20-4	C	3.6	FW Miles	ND					ND						
From source to White Oak River															
Hadnot Creek															
20-23	SA HQW	43.4	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From source to White Oak River													D-3		
Halls Branch (Cummins Creek)															
20-14-1-1	C	3.6	FW Miles	ND					ND						
From source to Grants Creek															
Halls Creek															
19-41-16-3	SA HQW	26.9	S Acres	ND					ND			I	CAC	Fecal Coliform Bacteria	Stormwater Runoff
From source to Queen Creek													D-2		
Hampton Bay															
20-27	SA HQW	82.1	S Acres	ND					ND			I	CAC	Fecal Coliform Bacteria	Stormwater Runoff
Entire Bay													D-3		
Hargetts Creek															
20-25	C	5.0	S Acres	ND					ND						
From source to White Oak River															
Holland Mill Creek															
20-26	SA HQW	29.1	S Acres	ND					ND			I	CAC	Fecal Coliform Bacteria	Stormwater Runoff
From source to White Oak River													D-3		
Holston Creek															
20-12	C	5.5	FW Miles	ND					ND						
From source to White Oak River															
Hunters Creek (Great Lake)															
20-17	C	20.5	FW Miles	**S**	PL2	NCE			ND						
From source to White Oak River															

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AU Number / Description	Classification	Length/Area	Aquatic Life Assessment: AL Rating	Station	Result	Year/ Parameter	% Exc	Recreation Assessment: REC Rating	Station	Result	Shellfish Harvesting: SH Rating	GA	Stressors	Sources
Intracoastal Waterway														
19-41-(0.5)d From subbasin boundary to southwest mouth of Bear Creek	SA HQW	276.9 S Acres	ND					ND			I	CAO D-1	Fecal Coliform Bacteria	Stormwater Runoff
19-41-(0.5)e From southwest mouth of Bear Creek to mouth of Goose Creek	SA HQW	57.0 S Acres	ND					ND			I	CAO D-2	Fecal Coliform Bacteria	Stormwater Runoff
19-41-(14.5)a From the northeast mouth of Goose Creek to the southwest mouth of Queen Creek	SA ORW	108.4 S Acres	ND					**S**	C22A	NCE	I	CAO D-2	Fecal Coliform Bacteria	Stormwater Runoff
19-41-(14.5)b Unnamed area south of ICWW between Bear Creek and Saunders Creek	SA HQW	172.7 S Acres	ND					ND			S	APP D-2		
19-41-(15.5)a From the southwest mouth of Queen Creek to the west side of the Whiteoak River Restricted Area	SA HQW	162.6 S Acres	ND					ND			I	CAO D-3	Fecal Coliform Bacteria	Stormwater Runoff
19-41-(15.5)b From the southwest mouth of Queen Creek to the west side of the Whiteoak River Restricted Area	SA HQW	63.9 S Acres	ND					ND			I	CAO D-3	Fecal Coliform Bacteria	Stormwater Runoff
Mill Creek														
19-41-11-1 From source to Bear Creek	SA HQW	14.6 S Acres	ND					ND			I	PRO D-1	Fecal Coliform Bacteria	Stormwater Runoff
Mill Creek (Pettiford Creek)														
20-29-1-1 From source to Pettiford Creek	SA HQW	0.8 S Miles	ND					ND			I	PRO D-3	Fecal Coliform Bacteria	Stormwater Runoff
Mirey Branch														
20-7 From source to White Oak River	C	1.0 FW Miles	ND					ND						
Mulberry Creek														
20-13 From source to White Oak River	C	3.1 FW Miles	ND					ND						
Mullet Gut														
20-29-2-1 From source to Starkey Creek	SA HQW	1.6 S Acres	ND					ND			I	PRO D-3	Fecal Coliform Bacteria	Stormwater Runoff

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AU Number / Description	Classification	Length/Area		Aquatic Life Assessment					Recreation Assessment			Shellfish Harvesting			
				AL Rating	Station	Result	Year/ Parameter	% Exc	REC Rating	Station	Result	SH Rating	GA	Stressors	Sources
Mundine Branch															
20-6	C	2.2	FW Miles	ND					ND						
From source to White Oak River															
North Fork White Oak River															
20-2	C	2.7	FW Miles	ND					ND						
From source to White Oak River															
Parrot Swamp															
19-41-16-4a	SA HQW	65.3	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From source to DEH closure line.													D-2		
19-41-16-4b	SA HQW	46.3	S Acres	ND					ND			I	CAO	Fecal Coliform Bacteria	Stormwater Runoff
From DEH closure line to Queen Creek													D-2		
Pasture Branch															
19-41-16-2	SA HQW	1.0	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From source to Queen Creek													D-2		
Pettiford Creek															
20-29-1	SA HQW	41.6	S Acres	**NR**					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From source to Pettiford Creek Bay					PB3	NR							D-3		
Pettiford Creek Bay															
20-29	SA HQW	239.3	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
Entire Bay													D-3		
Pitts Creek (Hargetts Creek)															
20-21	SA HQW	0.3	S Miles	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From source to White Oak River													D-3		

Table 3

WHITE OAK Subbasin 03-05-01

AU Number / Description	Classification	Length/Area		Aquatic Life Assessment: AL Rating	Station	Result	Year/ Parameter	% Exc	Recreation Assessment: REC Rating	Station	Result	Shellfish Harvesting: SH Rating	GA	Stressors	Sources
Queen Creek															
19-41-16a	SA HQW	283.7	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Forest Harvesting
DEH closed area from source to DEH Conditionally Approved closed line at Queens Creek Road Bridge.													D-2	Fecal Coliform Bacteria	Agriculture
														Fecal Coliform Bacteria	Stormwater Runoff
19-41-16b1	SA HQW	150.8	S Acres	ND					ND			I	CAC	Fecal Coliform Bacteria	Stormwater Runoff
From DEH Conditionally Approved closed line at Queens Creek Road Bridge to DEH Conditionally Approved Open line at northeast mouth of Parrot Swamp.													D-2		
19-41-16b2	SA HQW	11.6	S Acres	ND					ND			I	CAO	Fecal Coliform Bacteria	Stormwater Runoff
From DEH Conditionally Approved closed line at Queens Creek Road Bridge to DEH Conditionally Approved Open line at northeast mouth of Parrot Swamp.													D-2		
19-41-16c	SA HQW	283.8	S Acres	ND					ND			I	CAO	Fecal Coliform Bacteria	Stormwater Runoff
From DEH Conditionally Approved Open line at northeast mouth of Parrot Swamp to Intracoastal Waterway.													D-2		
19-41-16d	SA HQW	3.0	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Forest Harvesting
DEH closed area at mouth of Dicks Creek													D-2	Fecal Coliform Bacteria	Agriculture
														Fecal Coliform Bacteria	Stormwater Runoff
Saunders Creek															
19-41-12	SA HQW	163.9	S Acres	ND					ND			S	APP		
From Bear Creek to Intracoastal Waterway													D-2		
Schoolhouse Branch															
20-23-1	SA HQW	0.7	S Miles	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From source to Hadnot Creek													D-3		
Shacklefoot Channel															
19-41-9	SA HQW	81.7	S Acres	ND					ND			S	APP		
From Bear Creek to Intracoastal Waterway													D-1		
South Fork White Oak River															
20-3	C	1.0	FW Miles	ND					ND						
From source to White Oak River															

Table 3

WHITE OAK Subbasin 03-05-01

AU Number / Description	Classification	Length/Area		Aquatic Life Assessment					Recreation Assessment			Shellfish Harvesting			
				AL Rating	Station	Result	Year/ Parameter	% Exc	REC Rating	Station	Result	SH Rating	GA	Stressors	Sources
Starkey Creek															
20-29-2	SA HQW	31.4	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Agriculture
From source to Pettiford Creek Bay													D-3		
Starkeys Creek															
20-10	C	6.9	FW Miles	**S**					ND						
From source to White Oak River					PB2	M									
Steep Hill Branch															
20-23-2	SA HQW	0.8	S Miles	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From source to Hadnot Creek													D-3		
Stevens Creek															
20-28	SA HQW	6.9	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From source to White Oak River													D-3		
Taylor Creek															
20-20	C	2.0	FW Miles	ND					ND					Fecal Coliform Bacteria	Stormwater Runoff
From source to White Oak River															
Ward Creek															
20-33	SC	13.6	S Acres	ND					ND						
From source to White Oak River															
Webb Creek															
20-19	C	3.8	FW Miles	**NR**					**NR**					Fecal Coliform Bacteria	WWTP NPDES
From source to White Oak River														Low Dissolved Oxygen	WWTP NPDES

Table 3

WHITE OAK Subbasin 03-05-01

AU Number / Description	Classification	Length/Area		Aquatic Life Assessment: AL Rating	Station	Result	Year/ Parameter	% Exc	Recreation Assessment: REC Rating	Station	Result	Shellfish Harvesting: SH Rating	GA	Stressors	Sources
WHITE OAK RIVER															
20-(1)	C	21.2	FW Miles	**S**					ND						
From source to Spring Branch					PB1	GF									
20-(14.5)	C HQW	3.3	FW Miles	ND					ND						
From Spring Branch to Hunters Creek															
20-(18)a1	SA HQW	792.6	S Acres	**I**	PA1	CE	Low DO	28.1	**S**	PA1	NCE	I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
					PA1	CE	Low pH	35.1						Low pH	
DEH closed area from Hunters Creek to DEH closure line.													D-3	Low Dissolved Oxygen	
20-(18)a2	SA HQW	1,177.6	S Acres	ND					ND			I	CAC	Fecal Coliform Bacteria	Stormwater Runoff
DEH closed area from Hunters Creek to DEH closure line.													D-3		
20-(18)b	SA HQW	230.5	S Acres	ND					ND			I	CAC	Fecal Coliform Bacteria	Stormwater Runoff
From DEH closure line to DEH Conditionally Approved Closed line.													D-3		
20-(18)c1	SA HQW	183.0	S Acres	ND					ND			I	CAC	Fecal Coliform Bacteria	Stormwater Runoff
From DEH Conditionally Approved Closed line to the DEH Conditionally Approved Open line													D-3		
20-(18)c3	SA HQW	1,849.8	S Acres	ND					ND			I	CAO	Fecal Coliform Bacteria	Stormwater Runoff
From DEH Conditionally Approved Closed line to the DEH Conditionally Approved Open line													D-3		
20-(18)c4	SA HQW	26.0	S Acres	ND					ND			I	CAC	Fecal Coliform Bacteria	Stormwater Runoff
From DEH Conditionally Approved Closed line to the DEH Conditionally Approved Open line													D-3		
20-(18)c5	SA HQW	28.1	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From DEH Conditionally Approved Closed line to the DEH Conditionally Approved Open line													D-3		
20-(18)c6	SA HQW	31.3	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From DEH Conditionally Approved Closed line to the DEH Conditionally Approved Open line													D-3		
20-(18)c7	SA HQW	21.4	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From DEH Conditionally Approved Closed line to the DEH Conditionally Approved Open line. Prohibited Area at Hwy 24 Bridge													D-3		

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WHITE OAK Subbasin 03-05-01

AU Number	Classification	Length/Area		Aquatic Life Assessment					Recreation Assessment			Shellfish Harvesting			
Description				AL Rating	Station	Result	Year/ Parameter	% Exc	REC Rating	Station	Result	SH Rating	GA	Stressors	Sources
20-(18)c8	SA HQW	6.9	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From DEH Conditionally Approved Closed line to the DEH Conditionally Approved Open line. Prohibited area Dolphin Bay Estates and Canal													D-3		
20-(18)d	SA HQW	7.7	S Acres	ND					ND			I	CAO	Fecal Coliform Bacteria	Stormwater Runoff
DEH closed area adjacent to the east side of the White Oak River Restricted Area													D-3		
20-(18)e1	SA HQW	755.5	S Acres	ND					**S**	C30 C30A	NCE NCE	S	APP		
From the DEH Conditionally Approved Open line to the Atlantic Ocean excluding the ICWW													D-3		
20-(18)e2	SA HQW	31.9	S Acres	**S**	PA2	NCE			**S**	PA2	NCE	I	CAO	Fecal Coliform Bacteria	Stormwater Runoff
From the DEH Conditionally Approved Open line to the Atlantic Ocean excluding the ICWW													D-3		
20-(18)e3	SA HQW	5.5	S Acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Stormwater Runoff
From the DEH Conditionally Approved Open line to the Atlantic Ocean excluding the ICWW. Dudleys Marina and Boataminiums													D-3		
White Oak River Restricted Area															
20-32	SC	267.6	S Acres	ND					**S**	C27A	NCE			Fecal Coliform Bacteria	WWTP NPDES
That portion of White Oak River within an area bounded by a line running in an easterly direction from a point below Foster Creek to east end of Swansboro Bridge (N.C. Hwy. 24)															
Wolf Swamp															
20-17-1	C	1.1	FW Miles	ND					ND						
From source to Hunters Creek															

Table 3

WHITE OAK Subbasin 03-05-01

AU Number	Classification	Length/Area	Aquatic Life Assessment					Recreation Assessment			Shellfish Harvesting			
Description			AL Rating	Station	Result	Parameter	Year/ % Exc	REC Rating	Station	Result	SH Rating	GA	Stressors	Sources

Use Categories:
AL - Aquatic Life
REC - Recreation
SH - Shellfish Harvesting

Monitoring data type:
PF - Fish Community Survey
PB - Benthic Community Survey
PA - Ambient Monitoring Site
PL- Lake Monitoring
S, C- DEH RECMON

GA - DEH SS Classification and Growing Area
APP- Approved
CAO- Conditionally Approved-Open
CAC- Conditionally Approved-Closed
PRO- Prohibited

Results:
E - Excellent
G - Good
GF - Good-Fair
F - Fair
P - Poor
NI - Not Impaired
S- Severe Stress
M-Moderate Stress
N- Natural

Use Support Ratings 2006:
S - Supporting, I - Impaired
NR - Not Rated
NR*- Not Rated for Recreation (screening criteria exceeded)
ND-No Data Collected to make assessment

Results
CE-Criteria Exceeded > 10% and more than 10 samples
NCE-No Criteria Exceeded

Miles/Acres
FW- Fresh Water
S- Salt Water

Aquatic Life Rating Summary

S	m	31.9	S Acres
NR	m	41.6	S Acres
I	m	792.6	S Acres
S	m	48.7	FW Miles
S	m	949.0	FW Acres
NR	e	7.0	FW Miles
ND		3.8	S Miles
ND		10,498.7	S Acres
ND		53.6	FW Miles

Recreation Rating Summary

S	m	4,405.1	S Acres
NR	e	3.8	FW Miles
ND		3.8	S Miles
ND		6,959.8	S Acres
ND		105.5	FW Miles
ND		949.0	FW Acres

Fish Consumption Rating Summary

I	e	3.8	S Miles
I	e	11,364.9	S Acres
I	e	109.3	FW Miles
I	e	949.0	FW Acres

Shellfish Harvesting Rating Summary

I	m	3.8	S Miles
S	m	4,114.3	S Acres
I	m	6,917.8	S Acres

permit limits for a total of 19 violations resulting in issuing 6 Notices of Violation and the remaining proceeded to enforcement. The Town of Swansboro Wastewater Treatment Plant (WWTP) holds the largest capacity permit with a total permitted discharge of 0.3 MGD. As of 2004, there were two general stormwater permits. Refer to Appendix II for the listing of NPDES permit holders.

1.2 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. In subbasin 03-05-01, use support was assigned for (1) fish consumption, (2) aquatic life, (3) recreation, and (4) shellfish harvesting, as noted below. For more information about use support methodology, refer to Appendix IV.

(1) All waters are Impaired on an evaluated basis in the fish consumption category because of a fish consumption advise that applies to the entire state. More information on fish consumption use support can be found in Chapter 7.

(2) Waters were assessed for supporting aquatic life using three benthic macroinvertebrate samplings and two ambient monitoring stations. Two lakes (Catfish and Great Lakes) were also monitored during this assessment period as part of the Lakes Assessment Program. No criteria were exceeded and they are Supporting their designated uses. Refer to the ***2005 White Oak River Basinwide Assessment Report*** at http://www.esb.enr.state.nc.us/Basinwide/WOA2005.pdf and Appendix I for more information on monitoring.

(3) Waters were assessed for supporting recreation activities based on the DEH recreation monitoring program as detailed in Chapter 7.

(4) Criteria for making use support determinations for the shellfish harvesting category were based on Division of Environmental Health Sanitary Survey (DEH SS) growing area classifications. The problem parameter for all shellfish waters is the potential for exceeding fecal coliform standards. Differences in acreage estimates between basin cycles are not just related to changes in water quality. Changes in acreage are related to more refined methods of estimating acreages, changes in growing area classifications, extension of closure areas as a result of additional boat slips associated with marinas, and to changes in use support methodology. Refer to Figure 4 to identify growing area locations within this subbasin.

Waters in the following sections 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 is used to 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. Table 4 contains a summary of use support ratings by category in subbasin 03-05-01, detailed use support information about specific AU#s and shellfish growing areas follows.

Table 4 Summary of Use Support Ratings by Category in Subbasin 03-05-01

Use Support Rating	Aquatic Life		Recreation		Shellfish Harvesting	
	Freshwater	**Saltwater**	**Freshwater**	**Saltwater**	**Freshwater**	**Saltwater**
Monitored Waters						
Supporting	48.7 mi 949 ac	31.9 ac	0	4,405.1 ac	0	4,114.3 ac
Impaired*	0	792.6 ac (92%)	0	0	0	3.8 mi (100%) 6,917.8 ac (63%)
Not Rated	0	41.6 ac	0	0	0	0
Total	**48.7 mi 949 ac**	**866.1 ac**	**0**	**4,405.1 ac**	**0**	**3.8 mi 11,032.1 ac**
Unmonitored Waters						
Not Rated	7 mi	0	3.8 mi	0	0	0
No Data	53.6 mi	3.8 mi 10,498.7 ac	105.5 mi 949 ac	3.8 mi 6,959.8 ac	0	0
Total	**60.6 mi**	**3.8 mi 10,498.7 ac**	**109.3 mi 949 ac**	**3.8 mi 6,959.8 ac**	**0**	**0**
Totals						
All Waters	**109.3 mi 949 ac**	**3.8 mi 11,364.8 ac**	**109.3 mi 949 ac**	**3.8 mi 11,364.9 ac**	**0**	**3.8 mi 11,032.1 ac**

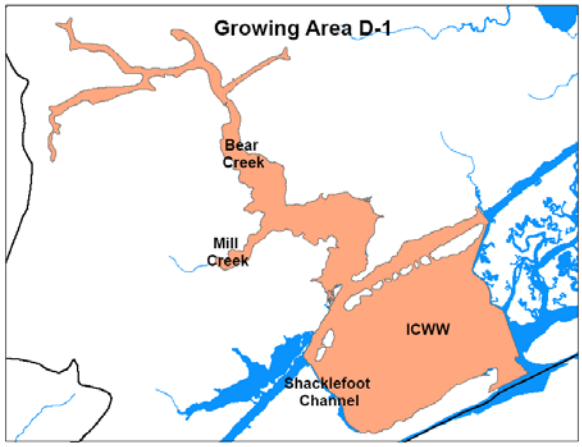
* The noted percent Impaired is the percent of monitored miles/acres only.

1.3 Status and Recommendations for Previously and Newly Impaired Waters

The following waters were either identified as Impaired in the previous basin plan (2001) 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 assessment unit number (AU#).

No freshwater was Impaired in subbasin 03-05-01, except for fish consumption. For Impaired Class SA waters presented below, refer to Chapter 7 for more information and recommendations on shellfish harvesting use support and DEH SS growing area classifications. Refer to Figure 3 for a map of subbasin 03-05-01 and Figure 4 to identify growing area locations within this subbasin. If the entire Class SA water is located within more than one growing area it is noted in the corresponding growing area Table.

1.3.1 Division of Environmental Health Growing Area D-1



The following DWQ Class SA waters and the Impaired assessment units associated with these waters are located within Growing Area D-1 as shown here and in Figure 4 & Table 5.

According to the ***Sanitary Survey of Bear Creek Area, Area D-1,*** *(DEH, Shellfish Sanitation & Recreational Water Quality Section, September 2002)* slight water quality improvements have occurred since the 2000 evaluation. However, these areas still do not meet approved area criteria. Bear Creek drains approximately 8,320 acres of watershed. Oysters and clams grow well in this area, with clam production being the most significant commercial species.

The most significant threat to the water quality in Bear Creek is stormwater runoff. The hilly terrain along with eight tributaries and intermittent streams provide routes for pollution to rapidly reach the creek. The major land uses in the area continue to be forestry and agriculture (corn, soybeans, tobacco and winter wheat). It was noted that farm animals from two farms have access to intermittent streams that drain into Bear Creek. Other pollution sources include approximately 30 chickens, two auto salvage yards and several dog pens. The boat ramp at Willis Landing drains over 1,200 feet of road and agricultural fields, contributing chemical pollutants and sediment and debris into Bear Creek. The survey noted one septic system violation and the system has since been repaired. DEH did not recommend any changes in growing area classification at the time of the survey.

Table 5 Summary of DEH Growing Area D-1 Classifications in Subbasin 03-05-01

Class SA Water	Assessment Unit #	Growing Area Classification	DEH Growing Area
Bear Creek	19-41-10 19-41-11a1 19-41-11a2, 19-41-11b1 19-41-11-a3, 19-41-11b2	APP PRO CAC CAO	D-1
Mill Creek	19-41-11-1	PRO	D-1
ICWW	19-41-(14.5)b 19-41-(0.5)d 19-41-(0.5)e 19-41-(14.5)a 19-41-(15.5)a 19-41-(15.5)b	APP CAO CAO CAO CAO CAO	D-1, D-2, D-3

APP=Approved, PRO=Prohibited, CAC=Conditionally Approved Closed, CAO=Conditionally Approved Open

Bear Creek [AU# 19-41-11a1, a2, a3, b1, and b2]

2001 Recommendations

Upper and Lower Bear Creek were reported as not supporting shellfish harvesting. Potential sources of pollution identified include forestry, agriculture and wildlife (DENR 1999). The NC

Cooperative Extension Service implemented BMPs in the Bear Creek watershed to help reduce fecal coliform bacteria transport to Bear Creek in an effort to restore shellfish harvesting.

Current Status
Bear Creek (307.4 acres) is Impaired for shellfish harvesting. Bear Creek is classified by DEH SS as prohibited, conditionally approved closed and conditionally approved open (see Table 5) in growing area D-1 due to potential fecal coliform bacteria levels. Bear Creek will remain on the state's 303(d) list of Impaired waters. An additional 49.3 acres are classified as approved and are Supporting shellfish harvesting.

Mill Creek [AU# 19-41-11-1]

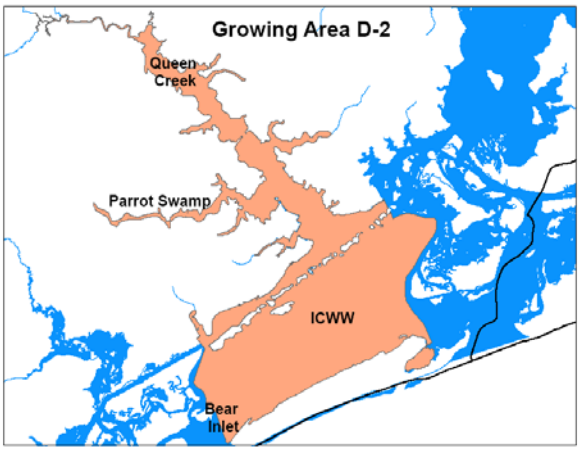
Mill Creek from source to Bear Creek (14.6 acres) is Impaired for shellfish harvesting. Mill Creek is classified by DEH SS as prohibited in growing area D-1 due to potential fecal coliform bacteria levels. Mill Creek will remain on the state's 303(d) list of Impaired waters.

Intracoastal Waterway ICWW [AU# 19-41-(0.5)d and e, 19-41-(14.5)a, 19-41-(15.5)a and b]

2001 Recommendations
The ICWW (excluding 19-41-(15.5)b) was not supporting shellfish harvesting. Potential sources of pollution identified include runoff from subdivision and agricultural land especially in the upper portions of the watershed (DENR, 2001).

Current Status
ICWW from subbasin boundary to the White Oak River Restricted area (668.8 acres) is Impaired for shellfish harvesting. ICWW is classified by DEH SS as conditionally approved open in growing areas D-1, D-2 and D-3 due to potential fecal coliform bacteria levels. An additional 172.7 acres are classified as approved and are considered Supporting shellfish harvesting in area D-2. Segment 19-41-(15.5)b (63.9 acres) of the ICWW will be added to the 303(d) list of Impaired waters. ICWW will remain on the state's 303(d) list of Impaired waters.

1.3.2 Division of Environmental Health Growing Area D-2



The following DWQ Class SA waters and the Impaired assessment units associated with these waters are located within Growing Area D-2 as shown here and in Figure 4 & Table 6.

According to the ***Sanitary Survey of Queen Creek Area, Area D-2*** *(DEH, Shellfish Sanitation & Recreational Water Quality Section, February 2002 and December 2006)* there has been some decline in water quality since the last survey in 2002. As a result of the DEH 2006 survey no changes in growing area classifications were recommended. Queens Creek receives drainage from approximately 50 square miles of watershed, with agriculture, forestry and residential uses. Both oysters and clams grow well throughout the area. The most significant threat to the water quality of this rapidly developing area in Queen Creek is

stormwater runoff. The topography of the area is hilly with peaks of 30 feet in some areas. Runoff, accelerated by the steep terrain, pipes and manicured lawns, reaches shellfish waters with little retention or treatment time. Runoff from impervious surfaces, subdivisions, and cleared land is the primary contributor to fecal coliform levels throughout the D-2 growing area. Sedimentation is also becoming a problem in this area, specifically evident upstream of the Queens Creek Road bridge.

The town of Hubert makes up much of Queen Creek's watershed and the permanent population surrounding this area is estimated to be 8,900, based on 2000 census data. There are 42 subdivisions in this area, of which 15 are new. Three of these new subdivisions plan to connect to Swansboro's WWTP system. Five septic system failures were located at residences as noted in the 2002 survey and two septic system failures were reported in the 2006 survey. Concerns with RV camper disposal of graywater and wastewater were reported to the local health department.

Several stormwater culverts discharge directly into the open waters of Queen Creek. There is a 24-inch storm drain near the end the Dix Creek Road, which receives drainage from a wide area including farmland and a low density residential area. Another large storm drain near Matthews Landing, combined with a boat ramp and a ten slip docking facility, also pose a significant potential source of pollution during heavy rain events. Shell Rock Landing receives runoff from a boat ramp, as well as fish cleaning sinks and a large yard frequented by waterfowl. NC Division of Coastal Management was notified of a potential violation of a permitted slip dockage at Great Neck Landing; a notice of violation has been issued pending an investigation into the permit.

Wildlife is prevalent throughout the area, along with domestic and livestock, however the only identified issue of possible water quality concern is related to a flock of domesticated Canada Geese residing on a lawn with direct runoff into conditionally approved open waters.
There were no temporary openings of the conditionally approved closed sections of the area.
DEH did not recommend any changes in growing area classification at the time of the survey.

Table 6 Summary of DEH Growing Area D-2 Classifications in Subbasin 03-05-01

Class SA Water	Assessment Unit #	Growing Area Classification	DEH Growing Area
Bell Swamp	19-41-16-1	PRO	D-2
Dicks Creek	19-41-16-5	PRO	D-2
Goose Creek	19-41-14	CAO	D-2
Halls Creek	19-41-16-3	CAC	D-2
Parrot Swamp	19-41-16-4a 19-41-16-4b	PRO CAO	D-2
Pasture Branch	19-41-16-2	PRO	D-2
Queen Creek	19-41-16a 19-41-16d 19-41-16b1 19-41-16b2 19-41-16c	PRO PRO CAC CAO CAO	D-2
ICWW	19-41-(14.5)b 19-41-(0.5)d 19-41-(0.5)e 19-41-(14.5)a 19-41-(15.5)a 19-41-(15.5)b	APP CAO CAO CAO CAO CAO	D-1, D-2, D-3

APP=Approved, PRO=Prohibited, CAC=Conditionally Approved Closed, CAO=Conditionally Approved Open

Bell Swamp, Dicks Creek, Goose Creek, Halls Creek, Parrot Swamp and Pasture Branch

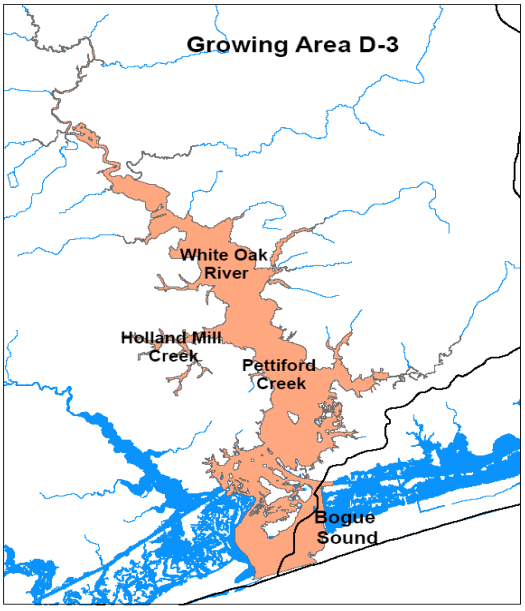
These water bodies are Impaired for shellfish harvesting. Each is classified by DEH SS in the Table above for growing area D-2 due to potential fecal coliform bacteria levels and will remain on the state's 303(d) list of Impaired waters.

Queen Creek [AU# 19-41-16a, b1, b2, c and d]

2001 Recommendations
Queen Creek was reported as not supporting shellfish harvesting. Potential sources of pollution included runoff from subdivisions and forest clearing. There were also noted problems with a septic system in the watershed (DENR 2001).

Current Status
Queen Creek from DEH closed area from source to DEH closed area at mouth of Dicks Creek (732.9 acres), is Impaired for shellfish harvesting. Queen Creek is classified by DEH SS as conditionally approved open, conditionally approved closed and prohibited (see Table 6) in growing area D-2 due to potential fecal coliform bacteria levels. Segment [19-41-16b1 and b2] of Queen Creek will be added to the 303(d) list of Impaired waters. Queen Creek will remain on the state's 303(d) list of Impaired waters.

1.3.3 Division of Environmental Health Growing Area D-3



The following DWQ Class SA waters and the Impaired assessment units associated with these waters are located within Growing Area D-3 as shown here and in Figure 4 & Table 7.

According to the ***Sanitary Survey of White Oak River Area, Area D-3,*** *(DEH, Shellfish Sanitation & Recreational Water Quality Section, December 2003 and November 2006)* Data review shows some water quality degradation in localized areas and a general decline in water quality since the 2003 survey. Oyster and clam production are good throughout the area. The watershed for this growing area is large; approximately 80 square miles. Steep slopes and grades characterize upland portions of the growing area.

There are 39 subdivisions, which are a visual measure of growth in this area contributing to the concentration of septic systems, pet waste, and stormwater. Four of these subdivisions on the west side of the White Oak River are connected to Swansboro's WWTP, while four subdivisions on the east side of the river depend on on-site septic systems. Three failing septic systems were noted in 2003 and two were noted in 2006 surveys; these were reported to the county health department for repairs. Stormwater runoff is likely the major cause of water quality degradation. Most subdivisions have direct stormwater runoff to nearby streams with no additional stormwater controls. The boat ramp and parking area at White Oak Crossing subdivision shows

evidence of significant sediment runoff to the White Oak River. There are 11 marinas or docking facilities; only Caspers Marina has a pump out station and is designated as a Clean Marina. One marina received a notice of violation for exceeding its permitted slip numbers and boat size.

Wildlife and domestic animals may contribute to water quality degradation as moderate horse and hobby farm activity occurs within the basin along with natural populations of wildlife in the upper reaches of the growing area. Agricultural activities are scattered throughout the area. The Highway 24 bridge spanning the White Oak River was widened from two-lane to four-lane in 2002. Other roads between and adjacent to the bridge were also widened. Increased impervious surfaces and loss of vegetated buffers are likely responsible for some decline in water quality noted over the past year in the eastern portion of the river upstream of the new bridge and highway construction and along the southern contours downstream of the bridge.

Data from two stations in this area will result in additional closures. Additional closures were recommended, moving the conditionally approved open and closed areas further downstream and closing an additional 217 acres. Waters along the eastern shore of the White Oak River at Dubling and Boathouse Creeks have shown declines and an additional 15 acres will be closed. Another 44 acres will be prohibited in a marshy slough east of the East Channel and directly north of the expanded Highway 24 bridge. Due to the expansion of boat slips near the Bogue Inlet Boataminiums Marina, an additional one acre will be closed. An expansion at Dudley's Marina between 1998 and 2003 of 17 slips and the changes in criteria for defining slips and linear dockage space, as well as neighboring private slips within close proximity will close an additional 2.5 acres. The total additional acreage closed to harvesting as a result of this 2003 survey is approximately 279 acres. As a result of the 2006 survey, approximately 84 acres will be managed as conditionally approved closed, with 21 acres reclassified as prohibited and 4 acres will be opened as a result of the 2006 D-3 Sanitary Survey Report because the marina is considered to be an "open flow system" marina instead of a "closed flow system" marina.

Table 7 Summary of DEH Growing Area D-3 Classifications in Subbasin 03-05-01

Class SA Water	Assessment Unit #	Growing Area Classification	DEH Growing Area
Bear Island	19-41-18a 19-41-18b2 19-41-18b1	APP APP PRO	D-3
Boathouse Creek	20-31	CAC	D-3
Caleb Branch (City Weeks Branch)	20-23-3	PRO	D-3
Cales Creek	20-22	PRO	D-3
Cartwheel Branch	20-26-1	CAC	D-3
Dubling Creek	20-30	CAC	D-3
Godfry Branch	20-24	PRO	D-3
Hadnot Creek	20-23	PRO	D-3
Hampton Bay	20-27	CAC	D-3
Holland Mill Creek	20-26	CAC	D-3
Mill Creek (Pettiford Creek)	20-29-1-1	PRO	D-3
Mullet Gut	20-29-2-1	PRO	D-3
Pettiford Creek	20-29-1	PRO	D-3
Pettiford Creek Bay	20-29	PRO	D-3
Pitts Creek (Hargetts Creek)	20-21	PRO	D-3
Schoolhouse Branch	20-23-1	PRO	D-3
Starkey Creek	20-29-2	PRO	D-3
Steep Hill Branch	20-23-2	PRO	D-3
Stevens Creek	20-28	PRO	D-3

White Oak River	20-(18)e1 20-(18)a1 20-(18)c5 20-(18)c6 20-(18)c7 20-(18)c8 20-(18)e3 20-(18)a2 20-(18)b 20-(18)c1 20-(18)c4 20-(18)c3 20-(18)d 20-(18)e2	APP PRO PRO PRO PRO PRO PRO CAC CAC CAC CAC CAO CAO CAO	D-3
ICWW	19-41-(14.5)b 19-41-(0.5)d 19-41-(0.5)e 19-41-(14.5)a 19-41-(15.5)a 19-41-(15.5)b	APP CAO CAO CAO CAO CAO	D-1, D-2, D-3

APP=Approved, PRO=Prohibited, CAC=Conditionally Approved Closed, CAO=Conditionally Approved Open

Bear Island [AU# 19-41-18b1]

Bear Island (24.0 acres) is Impaired for shellfish harvesting. Bear Island is classified by DEH SS as prohibited in growing area D-3 due to potential fecal coliform bacteria levels. An additional 2,225.9 acres are classified as approved and are considered Supporting shellfish harvesting. Bear Island receives runoff from the Town of Swansboro and effluent from the WWTP. Between 2003 and 2004, weekly averages were exceeded for fecal coliform bacteria at the WWTP for the Town of Swansboro. However, Swansboro is currently enlarging and improving their WWTP with installation of the low rate infiltration basins in Hubert and removing their point source discharge. Bear Island will remain on the state's 303(d) list of Impaired waters.

Boathouse Creek, Caleb Branch (City Weeks Branch), Cales Creek, Cartwheel Branch, Dubling Creek, Godfry Branch, Hadnot Creek, Hampton Bay, Holland Mill Creek, Mill Creek (Pettiford Creek), Mullet Gut, Pettiford Creek Bay, Pitts Creek (Hargetts Creek), Schoolhouse Branch, Starkey Creek, Steep Hill Branch and Stevens Creek

These water bodies are Impaired for shellfish harvesting. Each is classified by DEH SS in the table above for growing area D-3 due to potential fecal coliform bacteria levels, and will remain on the state's 303(d) list of Impaired waters.

Pettiford Creek [AU# 20-29-1]

Pettiford Creek from source to Pettiford Creek Bay (41.6 acres) is Impaired for shellfish harvesting. Pettiford Creek is classified by DEH SS as prohibited in growing area D-3 due to measured fecal coliform bacteria levels. Located in the Croatan Forest, benthos assessment site PB3 is a reference stream for Swamp Region P and is Not Rated for aquatic life. Pettiford Creek will remain on the state's 303(d) list of Impaired waters.

White Oak River [AU# 20-(18)a1, a2, b, c1, c3, c4, c5, c6, c7, c8, d, e2 and e3]

2001 Recommendations

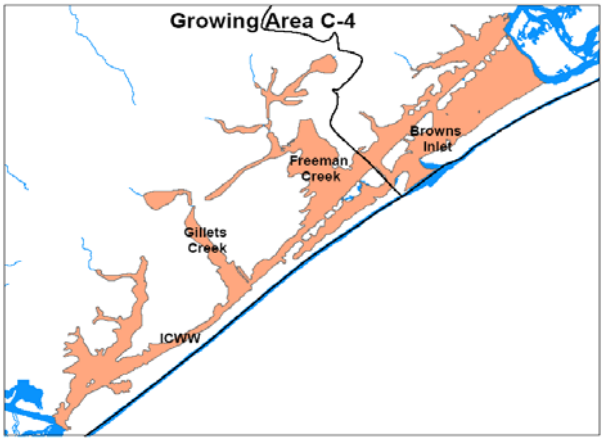
White Oak River was classified as prohibited/restricted and permanently closed to shellfish harvesting. The population of the watershed has grown substantially and will continue to experience rapid growth. Potential sources of pollution included runoff from subdivisions and agricultural land especially in the upper portions of the watershed. There were noted septic system problems near the NC Highway 24 causeway as well. There were also concerns that NC Highway 24 causeway reduces tidal flushing of the mouth of the White Oak River, which could result in slower dissipation of bacteria and lower salinity (DENR, 2001).

Current Status

White Oak River from Hunters Creek to the Atlantic ocean excluding the ICWW and 755.5 acres in AU# 20-(18)e1 is Impaired (4,392.3 acres) for shellfish harvesting. White Oak River is classified by DEH SS as conditionally approved closed, conditionally approved open and prohibited in growing area D-3 due to potential fecal coliform bacteria levels. Segment [20-(18)a1] is also Impaired (792.6 acres) in the aquatic life category due to low DO in 28 percent of samples and low pH in 35 percent of samples at site PA1. White Oak River will remain on the state's 303(d) list of Impaired waters. This assessment period results in an additional 331 acres to be added to the 2008 303(d) list.

A Section 319 project contract began in August 2006 as a partnership between NC Coastal Federation, NC DOT, NC DWQ and Cedar Point. The goal of the project is to develop TMDLs for Dubling Creek, Boathouse Creek, and an embayment South of Boathouse Creek. This project will document how tidal creeks that flow to the southeast White Oak River have become impaired by elevated levels of fecal coliform bacteria, and what needs to be done to restore the creeks' designated use of shellfish harvesting. These goals are to be accomplished by: 1) documenting sources and transport mechanisms that deliver fecal coliform to the impaired waters; 2) developing TMDLs for Dubling Creek, Boathouse Creek and an embayment south of Boathouse Creek; 3) devising Watershed Implementation Plans that adhere to EPA's 9 Key Elements for watershed management for each of the three TMDL waters and the White Oak River near the NC24 bridge (44 acres); 4) conducting landowner and citizen education and outreach about this project; and 5) identifying at least 24 sites for BMP installation. A second phase of this project will be needed to implement the recommended BMPs.

1.3.4 Division of Environmental Health Growing Area C-4



The following DWQ Class SA waters and the Impaired assessment units associated with these waters are located within Growing Area C-4 as shown here and in Figure 4 & Table 8.

According to the ***Sanitary Survey of Hurst Beach Area, Area C-4,*** *(DEH, Shellfish Sanitation & Recreational Water Quality Section, February 2003)* the watershed for this area is only 16 square miles and is located entirely within the U.S. Marine Corps Base at Camp Lejeune. With few permanent residents in the area, potential sources of pollution include runoff from forest clearing and wildlife.

Table 8 Summary of DEH Growing Area C-4 Classifications in Subbasin 03-05-01

Class SA Water	Assessment Unit #	Growing Area Classification	DEH Growing Area
Browns Creek	19-41-8	CAO	C-4

APP=Approved, PRO=Prohibited, CAC=Conditionally Approved Closed, CAO=Conditionally Approved Open

Browns Creek [AU# 19-41-8]

Browns Creek from source to Intracoastal Waterway (52.8 acres) is Impaired for shellfish harvesting. Browns Creek is classified by DEH SS as conditionally approved open in growing area C-4 due to potential fecal coliform bacteria levels. Browns Creek will remain on the state's 303(d) list of Impaired waters.

1.4 Status and Recommendations for Waters with Noted Impacts

Based on DWQ's most recent use support methodologies, the surface waters discussed in this section 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#. Refer to Section 1.1 for more information about AU#. Nonpoint source program agency contacts are listed in Appendix III.

1.4.1 White Oak River [AU# 20-(1)]

Current Status

White Oak River from source to Spring Branch (21.2 miles) is currently Supporting due to a Good-Fair bioclassification at site PB1. Snags and root mats provide good instream habitat and the substrate is a good mix of gravel, rubble and sand. Land use in the headwaters is primarily undisturbed. The site receives runoff from an adjacent campground near Maysville, and there is inadequate riparian vegetation along the streambanks.

Continued development, road building, wetland ditching and draining, and poor de-snagging practices have the potential to cause degradation of aquatic habitats and water quality in the White Oak River, as well as increase the potential for eutrophication problems in the estuary. Land use practices should implement appropriate best management practices to reduce water quality impacts.

Trash in the form of litter and larger items (washing machines, chairs, old coolers and farm implements) has been identified as a problem throughout the White Oak River watershed. Several local groups are participating in clean up and educational efforts to help prevent further aesthetic degradation of the river.

2007 Recommendations

DWQ will continue to monitor this section of the White Oak River and document any changes to water quality. DWQ will assist agency personnel in locating sources of water quality protection

funding for community education related to nonpoint source runoff and the importance of riparian zones.

1.4.2 Starkeys Creek [AU# 20-10]

Starkeys Creek from source to White Oak River (6.9 miles) is Supporting in the aquatic life category. The benthos assessment for Starkey Creek is located on the west side of the White Oak River in Swamp Region P, and has a drainage area of approximately 16 square miles. Though much of the watershed is agricultural, the stream at this site had good riparian and instream habitat. DWQ biologists gave this segment a moderate stress bioclassification and noted that taxa richness had declined since the last sampling, but abundance increased. Many taxonomic changes were noted, but no consistent patterns were documented between 1999 and 2004.

1.4.3 Calebs Creek [AU #20-15]

Calebs Creek is Not Rated on an evaluated basis in the aquatic life category. Silverdale Elementary School WWTP (NC0050849) had significant violations of ammonia permit limits during the last two years of the assessment period. The NPDES compliance process will be used to address the significant permit violations noted above.

1.4.4 Foster Creek [AU #20-32]

Foster Creek is Not Rated on an evaluated basis in the recreation category. Town of Swansboro WWTP (NC0036153) had significant violations of fecal coliform permit limits during the last two years of the assessment period. However, Swansboro is currently enlarging and improving their WWTP with installation of the low rate infiltration basins in Hubert and removing their point source discharge. The NPDES compliance process will be used to address the significant permit violations noted above.

1.4.5 Catfish and Great Lakes

Catfish and Great Lakes were sampled by DWQ in June, July, and August 2004. Both natural lakes, located within the Croatan National Forest in Carteret County, are dystrophic and naturally low in pH and have tannin-stained water.

Both lakes exhibited increases in total phosphorus and total Kjeldahl nitrogen concentrations in 2004 as compared with 1994. These increases in nutrient concentrations were likely due to rainfall shortly before each sampling event in 2004, which increased both runoff from the surrounding forested wetlands and suspension of organic material from the bottom of the lakes into the water column. Turbidity in Great Lake was greater than the state water quality standard of 25 NTU in 2004. Again, this was most likely the result of the suspension of particulate detritus from the lake bottom due to storm wind mixing. Neither lake exhibited elevated chlorophyll *a* values in 2004 in response to increases in nutrients. This lack of increase in chlorophyll *a* values is expected due to the natural light limitation associated with dystrophic lakes. Catfish and Great Lakes continue to support their designated use for aquatic life in 2004. For further background information on these lakes (including sampling data), refer to http://www.esb.enr.state.nc.us/.

1.4.6 Local Initiatives (for more information see Chapter 15)

Land and estuarine areas in subbasin 03-05-01 are considered a conservation target by Onslow Bight Conservation Forum (Chapter 15) and are considered a high priority area for the NC Oyster Plan (Chapter 10).

Land acquisition projects in this area through North Carolina Coastal Federation (NCCF) total 3,323 acres along the White Oak River to preserve habitat and protect water quality in the river. The NCCF will begin a joint effort with local citizen volunteers, DWQ, NCDOT and the town of Cedar Point to study four embayments along the southern portion of the White Oak River. Water quality samples will be taken in Dubling and Boathouse Creeks, an area north of the Swansboro causeway and a small bay in the middle of cedar point.

Hammocks Beach State Park is the site of several ongoing water quality improvement projects. Oyster habitat restoration efforts are underway at Hammocks Beach State Park, where clutch planting provide sub-tidal oyster habitat. A Living Shoreline Project is also underway providing shoreline stabilization while also restoring wetland habitat area and providing a stormwater buffer. Hammocks Beach State Park is the site of a stormwater project that will replace 40 percent of the impervious surface in a parking area with stormwater controls such as vegetated swales. This project will significantly reduce the flow of polluted stormwater into the sensitive shellfish water of the Intracoastal Waterway (ICW) and Bear Island ORW Area.

White Oak River Watershed Advisory Board activities include a bacterial source assessment, watershed assessment, and watershed monitoring project in the Pettiford Creek. Results indicated significant relationships between fecal coliform counts and slope/landform, ditch counts, and cats. Significant relationships were also found between e.coli counts and percent impervious surface, dogs, and wildlife. Catchments with a high likelihood for bacterial loading were identified and targeted for education, and a constructed stormwater wetland was built on the Mayor of Peletier's property within one of these catchments.

Six stormwater Best Management Practices (BMPs) were constructed in partnership with the Town of Swansboro and private landowners on public and other highly visible lands that drain to the White Oak River. Educational signage accompanies four of these BMPs. The BMPs were used as field examples in a Cooperative Extension class for designing and constructing BMPs (for coastal local government staff).