CHAPTER 8

2010 Use Support & Methodology

In the New River Basin

2010 IR Category	Integrated Reporting Categories for individual Assessment Unit/Use Support Category/ Parameter Assessments. A single AU can have multiple assessments depending on data available and classified uses.
1	All designated uses are monitored and supporting
1b	Designated use was impaired, other management strategy in place and no standards violations for the parameter of interest (POI)
1nc	DWQ have made field determination that parameter in exceedance is due to natural conditions
1r	Assessed as supporting watershed is in restoration effort status
1t	No criteria exceeded but approved TMDL for parameter of interest
2	Some designated uses are monitored and supporting none are impaired Overall only
2b	Designated use was impaired other management strategy in place and no standards violations Overall only
2r	Assessed as supporting watershed is in restoration effort status overall only
2t	No criteria exceeded but approved TMDL for POI Overall only
3a	Instream/monitoring data are inconclusive (DI)
3b	No Data available for assessment
3c	No data or information to make assessment
3n1	Chlorophyll a exceeds TL value and SAC is met-draft
3n2	Chlorophyll a exceeds EL value and SAC is not met first priority for further monitoring-draft
3n3	Chlorophyll a exceeds threshold value and SAC is not met first second priority for further monitoring-draft
3n4	Chlorophyll a not available determine need to collect-draft
3t	No Data available for assessment –AU is in a watershed with an approved TMDL
4b	Designated use impaired other management strategy expected to address impairment
4c	Designated use impaired by something other than pollutant
4cr	Recreation use impaired no instream monitoring data or screening criteria exceeded
4cs	Shellfish harvesting impaired no instream monitoring data-no longer used
4ct	Designated use impaired but water is subject to approved TMDL or under TMDL development
4s	Impaired Aquatic Life with approved TMDL for Aquatic Life POI or category 5 listing
4t	Designated use impaired approved TMDL
5	Designated use impaired because of biological or ambient water quality standards violations and needing a TMDL
5r	Assessed as impaired watershed is in restoration effort status

NC 2010 Integrated Report

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AU_Number	AU_Name	AU_Description	LengthArea	AU_Units	Classification
Category	Parameter	Reason for Rating	Use Category	Collection Year	303(d)year

New River Basin — **North Fork New River Watershed** **0505000101**

New River Basin — Upper New River Subbasin — 05050001

New River Basin — **North Fork New River Watershed** **0505000101**

10-2-21-(4.5)	**Big Horse Creek**	From SR#1362 to SR#1353 (Tuckerdale)		**5.5 FW Miles**	C;Tr:+	
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		
10-2-21-(7)	**Big Horse Creek (Horse Creek)**	From SR#1353 (Tuckerdale) to North Fork New R		**6.5 FW Miles**	C:+	
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		
1	**Ecological/biological Integrity FishCom**	Good Bioclassification	Aquatic Life	2008		
10-2-14	**Big Laurel Creek**	From source to North Fork New River		**17.5 FW Miles**	C;Tr:+	
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		
1	**Ecological/biological Integrity FishCom**	Good Bioclassification	Aquatic Life	2008		
10-2-8	**Brush Fork**	From source to North Fork New River		**5.1 FW Miles**	C;Tr:+	
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		
10-2-20	**Buffalo Creek**	From source to North Fork New River		**9.7 FW Miles**	C;Tr:+	
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		
3a	**Ecological/biological Integrity FishCom**	Not Rated Bioclassification	Aquatic Life	2008		
10-2-27	**Helton Creek**	From NC-VA State Line to North Fork New River		**19.0 FW Miles**	C;Tr:+	
1	**Ecological/biological Integrity Benthos**	Good Bioclassification	Aquatic Life	2008		
3a	**Ecological/biological Integrity FishCom**	Not Rated Bioclassification	Aquatic Life	2008		
10-2-7	**Hoskin Fork**	From source to North Fork New River		**5.2 FW Miles**	C;Tr:+	
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		
10-2-20-1	**Little Buffalo Creek**	From source to Buffalo Creek		**4.4 FW Miles**	C;Tr:+	
5	**Ecological/biological Integrity Benthos**	Fair Bioclassification	Aquatic Life	2008	2000	
10-2-21-8	**Little Horse Creek**	From source to Big Horse Creek		**10.9 FW Miles**	C;Tr:+	
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		
10-2-23	**Little Phoenix Creek**	From source to North Fork New River		**4.6 FW Miles**	C;Tr:+	
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		
10-2-25	**Long Shoals Creek**	From source to North Fork New River		**2.7 FW Miles**	C;Tr:+	
1	**Ecological/biological Integrity Benthos**	Not Impaired Bioclassification	Aquatic Life	2008		

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Category	Parameter	Reason for Rating	Use Category	Collection Year	303(d)year

New River Basin — **North Fork New River Watershed 0505000101**

10-2-21-8-1	**Middle Fork Little Horse Creek**	From source to Little Horse Creek	**4.5 FW Miles**		C;Tr:+
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008	
10-2-28	**Millpond Branch**	From source to North Fork New River	**2.0 FW Miles**		C:+
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2003	
10-2-(1)	**North Fork New River**	From source to Three Top Creek	**14.1 FW Miles**		C;Tr:+
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008	
1	**Ecological/biological Integrity FishCom**	Good Bioclassification	Aquatic Life	2008	
10-2-(12)	**North Fork New River**	From Three Top Creek to New River	**36.5 FW Miles**		C:+
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008	
1	**Fecal Coliform (recreation)**	No Criteria Exceeded	Recreation	2008	
1	**Water Quality Standards Aquatic Life**	No Criteria Exceeded	Aquatic Life	2008	
10-2-15	**Rich Hill Creek**	From source to North Fork New River	**4.9 FW Miles**		C;Tr:+
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008	
10-2-10	**Roundabout Creek**	From source to North Fork New River	**4.0 FW Miles**		C;Tr:+
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008	
10-2-13	**Three Top Creek**	From source to North Fork New River	**13.2 FW Miles**		C;Tr:+
1	**Ecological/biological Integrity Benthos**	Good Bioclassification	Aquatic Life	2008	
3a	**Ecological/biological Integrity FishCom**	Not Rated Bioclassification	Aquatic Life	2008	

New River Basin — **South Fork New River Watershed 0505000102**

10-1-37	**Cranberry Creek (Mulberry Creek)**	From source to South Fork New River	**18.9 FW Miles**		B;Tr:+
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008	
1	**Ecological/biological Integrity FishCom**	Good Bioclassification	Aquatic Life	2008	
10-1-3-(1)	**East Fork South Fork New River**	From source to Watauga County SR 1524	**2.3 FW Miles**		WS-IV;Tr:+
5	**Ecological/biological Integrity Benthos**	Fair Bioclassification	Aquatic Life	2003	2008
10-1-3-(8)	**East Fork South Fork New River**	From .8 mile downstream of Watauga Co SR 1524 to S Fk New River	**0.5 FW Miles**		WS-IV;CA:+
1	**Ecological/biological Integrity Benthos**	Good Bioclassification	Aquatic Life	2008	

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Category	Parameter	Reason for Rating	Use Category	Collection Year	303(d)year

New River Basin — **South Fork New River Watershed** — **0505000102**

⊙	**10-1-9-(6)**	**Howard Creek**	From the Appalachian State University Raw Water Supply Intake Dam to South Fork New River	**3.6**	**FW Miles**	C;Tr,HQW
1	**Ecological/biological Integrity Benthos**	Good Bioclassification	Aquatic Life	2008		
3a	**Ecological/biological Integrity FishCom**	Not Rated Bioclassification	Aquatic Life	2008		
⊙	**10-1-35-4**	**Little Peak Creek**	From source to Peak Creek	**2.8**	**FW Miles**	B;Tr:+
4s	**Ecological/biological Integrity Benthos**	Poor Bioclassification	Aquatic Life	2008	2000	
⊙	**10-1-10**	**Meat Camp Creek**	From source to South Fork New River	**10.4**	**FW Miles**	C;Tr:+
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		
3a	**Ecological/biological Integrity FishCom**	Not Rated Bioclassification	Aquatic Life	2008		
⊙	**10-1-2-(15)**	**Middle Fork South Fork New River**	From 0.4 mile downstr of US Hwy 221 & 321 to South Fk New River	**0.5**	**FW Miles**	WS-IV;CA:+
1	**Ecological/biological Integrity Benthos**	Good-Fair Bioclassification	Aquatic Life	2008		
3a	**Ecological/biological Integrity FishCom**	Not Rated Bioclassification	Aquatic Life	2008		
⊙	**10-1-2-(6)**	**Middle Fork South Fork New River**	From Brown Branch to Boone Dam	**3.5**	**FW Miles**	WS-IV;Tr:+
1	**Ecological/biological Integrity Benthos**	Good-Fair Bioclassification	Aquatic Life	2003		
⊙	**10-1-32b**	**Naked Creek**	From 0.4 miles above Jefferson WWTP to South Fork New River	**2.5**	**FW Miles**	C:+
1	**Ecological/biological Integrity Benthos**	Good-Fair Bioclassification	Aquatic Life	2008		
5	**Ecological/biological Integrity FishCom**	Fair Bioclassification	Aquatic Life	2008	2010	
⊙	**10-1-10-2**	**Norris Fork**	From source to Meat Camp Creek	**4.3**	**FW Miles**	C;Tr:+
1	**Ecological/biological Integrity Benthos**	Good Bioclassification	Aquatic Life	2008		
⊙	**10-1-27-(2)**	**Obids Creek**	From a point 0.9 mile downstream of NC Hwy 163 to South Fork New River	**2.8**	**FW Miles**	WS-IV;Tr:+
1	**Ecological/biological Integrity Benthos**	Good Bioclassification	Aquatic Life	2008		
1	**Ecological/biological Integrity FishCom**	Good Bioclassification	Aquatic Life	2008		
⊙	**10-1-35-3**	**Ore Knob Branch**	From source to Peak Creek	**0.9**	**FW Miles**	B;Tr:+
4s	**Ecological/biological Integrity Benthos**	Poor Bioclassification	Aquatic Life	2003	2000	
⊙	**10-1-35-(2)a**	**Peak Creek**	From Water Supply Dam at Appalachian Sulphides, Inc to Ore Knob Branch	**2.1**	**FW Miles**	B;Tr:+
1	**Ecological/biological Integrity Benthos**	Good Bioclassification	Aquatic Life	2008		

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Category	Parameter	Reason for Rating	Use Category	Collection Year	303(d)year

New River Basin — **South Fork New River Watershed 0505000102**

10-1-35-(2)b	**Peak Creek**	From Ore Knob Branch to South Fork New River		**2.9 FW Miles**		B;Tr:+
4s	**Ecological/biological Integrity Benthos**	Poor Bioclassification	Aquatic Life	2008	2006	
10-1-15-1	**Pine Orchard Creek**	From source to Elk Creek		**3.5 FW Miles**		C;Tr:+
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		
10-1-24	**Pine Swamp Creek (Pine Swamp)**	From source to South Fork New River		**5.5 FW Miles**		C:+
1	**Ecological/biological Integrity Benthos**	Good Bioclassification	Aquatic Life	2008		
10-1-38	**Prathers Creek**	From source to South Fork New River		**11.1 FW Miles**		B;Tr:+
1	**Ecological/biological Integrity FishCom**	Good-Fair Bioclassification	Aquatic Life	2008		
10-1-31-(2)	**Roan Creek**	From 0.5 mile upstream of mouth to South Fork New River		**0.4 FW Miles**		WS-IV;Tr,CA:+
1	**Ecological/biological Integrity Benthos**	Good Bioclassification	Aquatic Life	2008		
1	**Ecological/biological Integrity FishCom**	Good Bioclassification	Aquatic Life	2008		
10-1-25-2a	**South Beaver Creek(Lake Ashe)**	From source to Lake Ashe		**5.1 FW Miles**		C;Tr:+
1	**Ecological/biological Integrity Benthos**	Good Bioclassification	Aquatic Life	2008		
10-1-(20.5)	**South Fork New River**	From a point 0.4 mile upstream of Couches Creek to a point 2.8 mile upstream of Obids Creek		**21.8 FW Miles**		WS-V;HQW
1	**Ecological/biological Integrity Benthos**	Good Bioclassification	Aquatic Life	2008		
10-1-(26)b	**South Fork New River**	From Obids Creek to a point 0.6 miles upstream of Roan Creek		**6.6 FW Miles**		WS-IV;HQW
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		
1	**Fecal Coliform (recreation)**	No Criteria Exceeded	Recreation	2008		
1	**Water Quality Standards Aquatic Life**	No Criteria Exceeded	Aquatic Life	2008		
1	**Water Quality Standards Water Supply**	No Criteria Exceeded	Water Supply	2008		
10-1-(3.5)a	**South Fork New River**	From Winkler Creek to 0.1 miles downstream of Hunting Lane		**0.3 FW Miles**		C:+
5	**Ecological/biological Integrity Benthos**	Fair Bioclassification	Aquatic Life	2003	2008	
1	**Ecological/biological Integrity FishCom**	Good Bioclassification	Aquatic Life	2008		
1	**Fecal Coliform (recreation)**	No Criteria Exceeded	Recreation	2008		
1	**Water Quality Standards Aquatic Life**	No Criteria Exceeded	Aquatic Life	2008		

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Category	Parameter	Reason for Rating	Use Category	Collection Year	303(d)year

New River Basin — **South Fork New River Watershed 0505000102**

⊙	**10-1-(3.5)b**	**South Fork New River**	From 0.1 mile downstream Hunting Lane to US Hwy.221/421	**5.1 FW Miles**		C:+
5	**Ecological/biological Integrity Benthos**	Fair Bioclassification	Aquatic Life	2008	2008	
1	**Ecological/biological Integrity FishCom**	Good Bioclassification	Aquatic Life	2008		
1	**Fecal Coliform (recreation)**	No Criteria Exceeded	Recreation	2008		
1	**Water Quality Standards Aquatic Life**	No Criteria Exceeded	Aquatic Life	2008		
⊙	**10-1-(33.5)**	**South Fork New River**	From Dog Creek to New River	**22.5 FW Miles**		B;ORW
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		
1	**Fecal Coliform (recreation)**	No Criteria Exceeded	Recreation	2008		
1	**Water Quality Standards Aquatic Life**	No Criteria Exceeded	Aquatic Life	2008		
⊙	**10-1-18ut4**	**UT MILL CR**	Source to MILL CR	**1.3 FW Miles**		
1	**Ecological/biological Integrity Benthos**	Not Impaired Bioclassification	Aquatic Life	2007		
⊙	**10-1-(14.5)ut4**	**UT S FK NEW R**	Source to S FK NEW R	**1.0 FW Miles**		
3a	**Ecological/biological Integrity Benthos**	Data Inconclusive	Aquatic Life	2007		
⊙	**10-1-4-(3.5)b**	**Winkler Creek**	From Winkler Creek Road (SR #1549) to South Fork New River	**1.7 FW Miles**		C;Tr:+
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		

New River Basin — **Fox Creek-New River Watershed 0505000103**

⊙	**10-3**	**Grassy Creek**	From North Carolina-Virginia State	**4.1 FW Miles**		C;Tr:+
1	**Ecological/biological Integrity Benthos**	Good Bioclassification	Aquatic Life	2008		
1	**Ecological/biological Integrity FishCom**	Good-Fair Bioclassification	Aquatic Life	2008		
⊙	**10b**	**New River (North Carolina Portion)**	From first point of crossing state line to last point of crossing state line	**6.4 FW Miles**		C;ORW
3a	**Copper**	Standard Violation	Aquatic Life	2006		
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		
3a	**Zinc**	Standard Violation	Aquatic Life	2006		

New River Basin — **Little River-New River Watershed 0505000104**

⊙	**10-9-7**	**Bledsoe Creek**	From source to Little River	**5.9 FW Miles**		C;Tr
1	**Ecological/biological Integrity Benthos**	Good-Fair Bioclassification	Aquatic Life	2008		
⊙	**10-9-10**	**Brush Creek**	From source to Little River	**27.8 FW Miles**		C;Tr
1	**Ecological/biological Integrity Benthos**	Good Bioclassification	Aquatic Life	2007		
1	**Ecological/biological Integrity FishCom**	Good Bioclassification	Aquatic Life	2008		

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Category	Parameter	Reason for Rating	Use Category	Collection Year	303(d)year

New River Basin — **Little River-New River Watershed 0505000104**

10-9-12	**Crab Creek**	From source to Little River		**7.8 FW Miles**	C;Tr	
1	**Ecological/biological Integrity Benthos**	Good-Fair Bioclassification	Aquatic Life	2007		
5	**Ecological/biological Integrity FishCom**	Fair Bioclassification	Aquatic Life	2008	2010	
10-6-(2)	**Elk Creek (North Carolina Portion)**	From U.S. Hwy. 221 to New River		**7.4 FW Miles**	C:+	
1	**Ecological/biological Integrity Benthos**	Good Bioclassification	Aquatic Life	2008		
1	**Ecological/biological Integrity FishCom**	Good Bioclassification	Aquatic Life	2008		
10-9-9	**Glade Creek**	From source to Little River		**8.3 FW Miles**	C;Tr	
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		
1	**Ecological/biological Integrity FishCom**	Good Bioclassification	Aquatic Life	2008		
10-9-10-2	**Laurel Branch (Laurel Creek)**	From source to Brush Creek		**5.2 FW Miles**	C;Tr	
1	**Ecological/biological Integrity Benthos**	Not Impaired Bioclassification	Aquatic Life	2008		
10-9-(6)	**Little River**	From dam at Sparta Lake to NC 18 (Blevins Crossroads)		**17.5 FW Miles**	C	
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		
1	**Fecal Coliform (recreation)**	No Criteria Exceeded	Recreation	2008		
1	**Water Quality Standards Aquatic Life**	No Criteria Exceeded	Aquatic Life	2008		
10-9-(11.5)	**Little River (North Carolina Portion)**	From NC 18 (Blevins Crossroads) to New River (state line)		**3.6 FW Miles**	C;HQW	
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2003		
10-9-(1)a	**Little River (Sparta Lake)**	From source to Sparta Lake at Pine Swamp Creek		**11.6 FW Miles**	C;Tr	
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2008		
1	**Ecological/biological Integrity FishCom**	Good Bioclassification	Aquatic Life	2008		
10-9-11	**Moccasin Creek**	From source to Little River		**4.4 FW Miles**	C	
1	**Ecological/biological Integrity Benthos**	Good Bioclassification	Aquatic Life	2006		
10-9-5	**Pine Swamp Creek**	From source to Little River		**5.2 FW Miles**	C;Tr	
1	**Ecological/biological Integrity Benthos**	Good Bioclassification	Aquatic Life	2008		
1	**Ecological/biological Integrity FishCom**	Good Bioclassification	Aquatic Life	2008		
10-9-12ut8ut4	**UT CRAB CR**	Source to CRAB CR		**0.7 FW Miles**		
1	**Ecological/biological Integrity Benthos**	Not Impaired Bioclassification	Aquatic Life	2008		

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Category	Parameter	Reason for Rating	Use Category	Collection Year	303(d)year
New River Basin			**Little River-New River Watershed**		**0505000104**
10-9-12ut8	**UT UT CRAB CR**	Source to UT CRAB CR	**4.5**	**FW Miles**	
1	**Ecological/biological Integrity Benthos**	Not Impaired Bioclassification	Aquatic Life	2007	
10-9-4	**Waterfalls Creek**	From source to Little River	**4.3**	**FW Miles**	C;Tr
1	**Ecological/biological Integrity Benthos**	Excellent Bioclassification	Aquatic Life	2006	
10-9-9-1	**Wolf Branch**	From source to Glade Creek	**2.8**	**FW Miles**	C;Tr
1	**Ecological/biological Integrity Benthos**	Not Impaired Bioclassification	Aquatic Life	2006	

North Carolina Division of Water Quality

2010
Use Assessment Methodology

EPA Approved August 31, 2010

Table of Contents

Purpose

Section 303(d) of the federal Clean Water Act (CWA) which Congress enacted in 1972 requires States, Territories and authorized Tribes to identify and establish a priority ranking for waterbodies for which technology-based effluent limitations required by section 301 are not stringent enough to attain and maintain applicable water quality standards, establish total maximum daily loads (TMDLs) for the pollutants causing impairment in those waterbodies, and submit, from time to time, the list of impaired waterbodies and TMDLs to the U.S. Environmental Protection Agency (EPA). Current federal rules require states to submit 303(d) lists biennially, by April 1st of every even numbered year. The "303(d) list" is technically considered the impaired waters listed as Category 5, requiring a TMDL. EPA is required to approve or disapprove the state-developed §303(d) list within 30 days. For each water quality limited segment impaired by a pollutant and identified in the §303(d) list, a Total Maximum Daily Load (TMDL) must be developed.

Assessment Units and Water Quality Classifications

Water quality assessments are based on water quality classifications as well as data availability. Water quality classifications are associated with a stream reach or area that is described in the schedule of classifications. Reaches vary in length or area and are sometimes split into smaller units to represent application of water quality data. Classifications are represented by a series of numbers called index numbers, 27-33-43-(1), as an example. Water quality assessments are applied to assessment units or AUs. AUs are, for the most part, the same as index numbers. When an AU is subdivided because of data applicability a letter is added to indicate this smaller unit. For example, if Index number 27-33-43-(1) (12 miles in length) is divided into three different segments because of three different available data types the new segments would be 27-33-43-(1)a, 27-33-43-(1)b and 27-33-43-(1)c. The combined mileage of the AUs would be 12 miles.

Decisions on the length or area to apply data to are based on the data type, waterbody characteristics, stations indicating similar water quality, watershed information and landmarks on which to base descriptions. The AUs where water quality concerns are evident are used as markers. Solutions to water quality concerns, including TMDLs, typically encompass entire watersheds.

Data Window/Assessment Period

The data window for the 2010 Water Quality Use Assessment (305(b) and 303(d) Integrated Reporting) includes data collected in calendar years 2004 through 2008 (five years). Some AUs may have biological data collected earlier for waters that have not been resampled during this data window or where the current impairment is based on that sample. The data collection year is noted for each AU.

Data Availability and Quality

Data are collected by various state and federal agencies. NC Department of Environment and Natural Resources (NCDENR) Division of Water Quality (DWQ) collects most of the data used for water quality assessments. There are significant data sets collected by NCDENR Division of Environmental Health (DEH) for use in coastal water quality assessment. The United States Geological Survey (USGS) also provides data in several AUs. Local governments and environmental groups as well as industry, municipal and university coalitions also provide data. Submitted data sets must include an approved Quality Assurance Project Plan (QAPP) or other documentation to assure that the data were collected in a manner consistent with agency data. A standing solicitation for data is maintained on the DWQ website. DWQ evaluates all data and information submitted.

Use Support Categories and Water Quality Standards

There are numerical and narrative water quality standards that are in place to protect the various best uses of North Carolina waters. Best uses include aquatic life or biological integrity, recreation or swimming, fish consumption, shellfish harvesting and water supply. Water quality assessments are based on the standards and data availability for the applicable use support category- aquatic life, recreation etc. Dissolved oxygen standards are used to assess aquatic life and pathogen indicators are used to assess recreation for example. Standards assessment criteria have been developed for each parameter assessed. The standards assessment criteria are used to make water quality assessments- not the standards themselves. While the standards assessment criteria are based on the standards they are different in that a frequency term is included. The details of how each standard is assessed are discussed in the following sections.

Aquatic Life Assessment Methodology

Numerical Water Quality Standards

The aquatic life numerical water quality standards are assessed using a 10% exceedance of the standard criterion. These assessments use ambient monitoring data from the five year assessment period (2004-2008). If no aquatic life numerical water quality standards exceed the 10% criterion then the AU is Supporting aquatic life water quality standards. This AU/multiple-parameters assessment is a Category 1 listing not requiring a TMDL. If greater than 10% of the

samples exceed the numerical standard and there are at least 10 samples, then the AU is Impaired for that parameter. The AU/parameter assessment is listed in Category 5, requiring a TMDL. If the 10% criterion was exceeded and fewer than 10 samples were collected the AU was Not Rated and targeted for further sampling. This is a Category 3a listing not requiring a TMDL. The NC DWQ "Redbook" contains the complete descriptions of water quality standards and surface water classifications [15a NCAC 02B .0200 - .0300]

Dissolved Oxygen (DO) Standards

Freshwater dissolved oxygen: not less than 6.0 mg/l for trout waters; for non-trout waters, not less than a daily average of 5.0 mg/l with a minimum instantaneous value of not less than 4.0 mg/l; swamp waters, lake coves or backwaters, and lake bottom waters may have lower values if caused by natural conditions.

Salt water dissolved oxygen: not less than 5.0 mg/l, except that swamp waters, poorly flushed tidally influenced streams or embayments, or estuarine bottom waters may have lower values if caused by natural conditions.

Freshwater Dissolved Oxygen (DO) Assessment (Class C, B, WS)

A fresh non-swamp water AU was assessed as Impaired for aquatic life when greater than 10% of samples were below 4 mg/l for instantaneous samples (monthly) or when greater than 10% of samples are below a daily average of 5mg/l. A minimum of 10 samples was needed to rate the water as Impaired.

Saltwater Dissolved Oxygen (DO) Assessment (Class SC, SB, SA)

A saline/estuarine non-swamp water AU was assessed as Impaired for aquatic life when greater than 10% of samples were below 5 mg/l. A minimum of 10 samples was needed to rate the water as Impaired.

Trout Water Dissolved Oxygen (DO) Assessment (Supplemental Class Tr)

A supplemental classified Trout water AU was assessed as Impaired for aquatic life when greater than 10% of samples were below 6 mg/l. A minimum of 10 samples was needed to rate the water as Impaired.

Swamp Water Dissolved Oxygen (DO) Assessment (Supplemental Class Sw)

A supplemental classified swamp (Sw) AU was Not Rated for aquatic life when greater than 10% of samples were below 4 mg/l (5 mg/l for salt) for instantaneous samples (monthly) or when greater than 10% of samples were below a daily average of 5 mg/l (freshwater only). There is not a numerical standard for these waterbodies and natural background conditions cannot be determined. This is a category 3a listing not requiring a TMDL.

A swamp like AU (not classified Sw) was Not Rated for aquatic life when greater than 10% of samples were below 4 mg/l (5 mg/l for salt) for instantaneous samples

(monthly) or when greater than 10% of samples were below a daily average of 5mg/l (freshwater only) and when greater than 10% of samples were below a pH of 6.0 (SU) for freshwater or 6.8 (SU) for saltwater. Geographic location, biological data, tributary classifications, discharges and land use were considered when assigning use support ratings to waters considered to be swamp like or receiving significant swamp water input.

pH

pH Standards

Freshwater pH: shall be normal for the waters in the area, which generally shall range between 6.0 and 9.0 except that swamp waters may have a pH as low as 4.3 if it is the result of natural conditions;

Saltwater pH: shall be normal for the waters in the area, which generally shall range between 6.8 and 8.5 except that swamp waters may have a pH as low as 4.3 if it is the result of natural conditions;

Low pH Assessment (Class C, SC, B, SB, SA, WS)

A non-swamp water AU was assessed as Impaired for aquatic life when greater than 10% of samples were below a pH of 6.0 (SU) for freshwater or 6.8 (SU) for saltwater.

A swamp like AU (not classified Sw) was Not Rated for aquatic life when greater than 10% of samples were below a pH of 6.0 (SU) for freshwater or 6.8 (SU) for saltwater or when greater than 10% of samples were below a dissolved oxygen of 4 mg/l (5 mg/l for salt) for instantaneous samples (monthly) or when greater than 10% of samples were below a daily average of 5mg/l (freshwater only) Geographic location, biological data, tributary classifications, discharges and land use were considered when making use support determinations on waters considered to be swamp like or receiving significant swamp water input.

High pH Assessment (Class C, SC, B, SB, SA, WS)

An AU was assessed as Impaired for aquatic life when greater than 10% of samples were greater than a pH of 9 (SU) for freshwater or 8.5 (SU) for saltwater. A minimum of 10 samples was needed to rate the water as Impaired. This is a Category 5 listing requiring a TMDL.

If the 10% criterion was exceeded and fewer than 10 samples were collected the AU was Not Rated and targeted for further sampling. This is a Category 3a listing not requiring a TMDL.

Swamp Water Low pH Assessment (Supplemental Class Sw)

A supplemental classified swamp (Sw) AU was assessed as Impaired when greater than 10% of samples were below 4.3 (SU). A minimum of 10 samples was needed to rate the water as Impaired. This is a Category 5 listing requiring a TMDL.

If the 10% criterion was exceeded and fewer than 10 samples were collected the AU was Not Rated and targeted for further sampling. This is a Category 3a listing not requiring a TMDL.

Temperature Use Assessment

Temperature Standards

For freshwaters- Temperature: not to exceed 2.8°C (5.04°F) above the natural water temperature, and in no case to exceed 29°C (84.2°F) for mountain and upper piedmont waters and 32°C (89.6°F) for lower piedmont and coastal plain waters. The temperature for trout waters shall not be increased by more than 0.5°C (0.9°F) due to the discharge of heated liquids, but in no case to exceed 20°C (68°F).

Lower piedmont and coastal plain waters mean those waters of the Catawba River Basin below Lookout Shoals Dam; the Yadkin River Basin below the junction of the Forsyth, Yadkin, and Davie County lines; and all of the waters of Cape Fear, Lumber, Roanoke, Neuse, Tar-Pamlico, Chowan, Pasquotank, and White Oak River Basins; except tidal salt waters which are assigned S classifications.

Mountain and upper piedmont waters mean all of the waters of the Hiwassee; Little Tennessee, including the Savannah River drainage area; French Broad; Broad; New; and Watauga River Basins; and those portions of the Catawba River Basin above Lookout Shoals Dam and the Yadkin River Basin above the junction of the Forsyth, Yadkin, and Davie County lines.

For saltwaters- Temperature: shall not be increased above the natural water temperature by more than 0.8°C (1.44°F) during the months of June, July, and August nor more than 2.2°C (3.96°F) during other months and in no cases to exceed 32°C (89.6°F) due to the discharge of heated liquids.

Temperature Assessment

A mountain or upper piedmont AU was assessed as Impaired for aquatic life when greater than 10% of samples were greater than 29°C. A minimum of 10 samples was needed to rate the water as Impaired.

A lower piedmont or coastal plain stream AU was assessed as Impaired for aquatic life when greater than 10% of samples were greater than 32°C. A minimum of 10 samples was needed to rate the water as Impaired.

If the 10% criterion was exceeded and fewer than 10 samples were collected the water was Not Rated and targeted for further sampling. This is a Category 3a listing not requiring a TMDL.

Temperature Screening Criteria for Trout Waters (Supplemental Class Tr)

A supplemental classified trout water (Tr) AU was Not Rated for aquatic life when greater than 10% of samples were greater than 20°C. The presence of heated discharges was not determined. This is a Category 3a listing not requiring a TMDL.

Assessment of Extreme Temperature Conditions

A waterbody that exceeds the above criteria may be Not Rated for aquatic life because of meteorological conditions that occur on a regular basis. These conditions must be documented and reassessment will occur after more normal conditions return. This is a Category 3a listing not requiring a TMDL. Examples of extreme conditions may include extreme drought, reservoir drawdown, hurricane impacts and flooding, dam failure, and saltwater encroachment. Other extreme conditions may be documented as needed for future assessments

Chlorophyll *a*

Chlorophyll *a* Standard

Chlorophyll *a* (corrected): not greater than 40 μg/l in sounds, estuaries, and other waters subject to growths of macroscopic or microscopic vegetation.

Other waters subject to growths are interpreted by DWQ to include dam backwaters, lakes and reservoirs.

Chlorophyll *a* Standards Assessment

An AU was assessed as Impaired for aquatic life when greater than 10% of samples were greater than 40 μg/l. A minimum of 10 samples was needed to rate the water as Impaired. This is a Category 5 listing requiring a TMDL.

If the 10% criterion was exceeded and fewer than 10 samples were collected the AU was Not Rated and targeted for further sampling. Some reservoirs in North Carolina are sampled fewer than 10 times during the assessment period. These data are used to document eutrophication issues. Reservoirs are targeted for increased monitoring to determine if there are standards violations using the above methodology. This is a Category 3a listing not requiring a TMDL.

Toxic Substances and Action Levels Metals

Toxic Substances Numerical Standards

Refer to the NC DWQ "Redbook" for complete text of standards
Arsenic: 50 ug/l
Beryllium: 6.5 ug/l;
Cadmium: 0.4 ug/l for trout waters and 2.0 ug/l for non-trout waters;
Chlorine, total residual: 17 ug/l;
Chromium, total recoverable: 50 ug/l;
Cyanide: 5.0 ug/l
Fluorides: 1.8 mg/l;
Lead, total recoverable: 25 ug/l;
Mercury (assessed in fish consumption category)
Nickel: 88 ug/l; 8.3 ug/l
Chlorides: 230mg/l; (note this is an action level standard)

Metals Action Level Standards

Action Level Copper: 7 ug/l FW or 3 ug/l SW
Action Level Silver: 0.06 ug/l;
Action Level Zinc: 50 ug/l;

Toxic Substances and Action Level Metals Assessment

An AU was assessed as Impaired for aquatic life when greater than 10% of samples were greater than the above standards or action level standards. A minimum of 10 samples was needed to rate the water as Impaired. These are Category 5 listings requiring a TMDL.

If the 10% criterion was exceeded and fewer than 10 samples were collected the AU was Not Rated and targeted for further sampling. This is a Category 3a listing not requiring a TMDL.

The action level standard for Iron was not assessed during this assessment period because the standard is being reevaluated and the Iron exceedances of the Action Level have been shown to be a natural condition.

Action levels are used for permitting purposes and are not used as the only information to assess aquatic life uses. Copper and Zinc may be indicators of potential impacts to aquatic life. DWQ will review Copper and Zinc assessments that result in Category 5 listings. The review will be used to determine if the Category 5 listing is appropriate. The following criteria will be used to determine if a review is warranted.

1. A collocated Good, Excellent, Natural or Not Impaired biological rating or

2. A collocated Good-Fair, Moderate or Not Rated biological rating and less than 25% of Copper or Zinc samples exceed the evaluation level.
3. There are no biological data available and less than 25% of Copper or Zinc samples exceed the evaluation level.

The Water Quality Assessment Team will evaluate and integrate the following lines of watershed information to determine if a Category 5 listing for Copper and/or Zinc is warranted.

1- Analysis of duration, frequency and magnitude of exceedances.
2- Historical data and trends for the parameter of interest.
3- Detailed assessment of all available biological data.
4- Qualitative aquatic habitat information.
5- Natural or background conditions assessment including current imagery.
6- Sample quality (note that Zinc samples can be easily contaminated)
7- Waterbody classifications and other designated uses.
8- Exceedances of other likely associated metals.
9- Biological data in nearby Assessment Units.
10- Potential Sources of metals
11- Site specific hardness

After review the Assessment team will determine if the AU/parameter assessment is more appropriately listed in a Category other than 5. Each reviewed assessment will require documented justification for a final Integrate Report category other than Category 5.

Turbidity

Turbidity Standards

Turbidity: the turbidity in the receiving water shall not exceed 50 Nephelometric Turbidity Units (NTU) in streams not designated as trout waters and 10 NTU in streams, lakes or reservoirs designated as trout waters; for lakes and reservoirs not designated as trout waters, the turbidity shall not exceed 25 NTU; if turbidity exceeds these levels due to natural background conditions, the existing turbidity level cannot be increased.

Turbidity Assessment

An AU was assessed as Impaired for aquatic life when greater than 10% of samples were greater than 50 NTU or 10 NTU for Tr waters or 25 NTU for lakes, reservoirs and estuarine waters. A minimum of 10 samples was needed to rate the water as Impaired. This is a Category 5 listing requiring a TMDL.

If the 10% criterion was exceeded and fewer than 10 samples were collected the AU was Not Rated and targeted for further sampling. This is a Category 3a listing not requiring a TMDL.

Ecological/Biological Integrity

Aquatic Life Narrative Standards

The aquatic life narrative water quality standard is assessed using a biological integrity index criterion (or bioclassification). Biological integrity means the ability of an aquatic ecosystem to support and maintain a balanced and indigenous community of organisms having species composition, diversity, population densities and functional organization similar to that of reference conditions. Waters shall be suitable for aquatic life propagation and maintenance of biological integrity, wildlife, secondary recreation, and agriculture. Sources of water pollution which preclude any of these uses on either a short-term or long-term basis shall be considered to be violating a water quality standard.

Aquatic Life Assessment

An AU was assessed as Impaired for aquatic life when a fish or benthic macroinvertebrate community sample received a bioclassification of Severe, Poor or Fair and there were no other Aquatic Life standards violations. This is a Category 5 listing requiring a TMDL.

An AU was assessed as Impaired for aquatic life when a fish or benthic macroinvertebrate community sample received a bioclassification of Severe, Poor or Fair and there were other Aquatic Life numeric standards violations. This is a Category 4s listing requiring a TMDL for the identified aquatic life numerical standards violation (Category 5 or 4t listing) impairing the ecological/biological integrity of the waterbody.

An AU was assessed as Impaired for aquatic life when a fish or benthic macroinvertebrate community sample received a bioclassification of Severe, Poor or Fair and an approved TMDL for an aquatic life numerical water quality standard has been completely implemented. This is a Category 5s listing requiring a TMDL.

Recreation Assessment Methodology

Recreation standards were assessed using fecal coliform bacteria data collected at DWQ ambient stations and special study sites and enterrococci data collected at DEH Recreational Monitoring sites in coastal waters. Screening criteria were used to assess areas for potential standards violations. DEH advisory postings were also used for recreation assessments as well. The following criteria were used to assess waters for recreation.

Pathogen Indicator Standards

Organisms of coliform group: fecal coliforms not to exceed geometric mean of 200/100 ml (MF count) based on at least five consecutive samples examined during any 30-day period and not to exceed 400/100 ml in more than 20 percent of the samples examined during such period.

Enterococcus, including *Enterococcus faecalis, Enterococcus faecium, Enterococcus avium* and *Enterococcus gallinarium*: not to exceed a geometric mean of 35 enterococci per 100 ml based upon a minimum of five samples within any consecutive 30 days.

Fecal Coliform Bacteria Assessment Criteria

An AU was assessed as Impaired when the geometric mean was greater than 200 colonies/100ml or greater than 20% of the samples were higher than 400 colonies/100ml. At least 5 samples must have been collected within the same 30-day period. This is a Category 5 listing requiring a TMDL.

Fecal Coliform Bacteria Screening Assessment

An AU was Not Rated when the geometric mean was greater than 200 colonies/100ml or greater than 20% of the samples were higher than 400 colonies/100ml. Samples were not collected in the same 30-day period. This is a Category 3a listing not requiring a TMDL. These AUs are prioritized for resampling 5 times in 30 days based on classification and available resources. Data are reviewed yearly for prioritization.

Enterrococci Assessment Criteria

An AU was assessed as Impaired when the geometric mean was greater than 35 colonies/100ml. At least 5 samples must have been collected within the same 30-day period. This is a Category 5 listing requiring a TMDL.

Enterrococcus Screening Assessment

An AU was Not Rated when the geometric mean was greater than 35 colonies/100ml. Samples were not collected in the same 30-day period. This is a Category 3a listing not requiring a TMDL.

Advisory Posting Assessment

An AU was assessed as Impaired when a swimming advisory was posted for greater than 61 days in any 5 year period (includes permanent postings). This is a Category 4cr listing not requiring a TMDL.

Shellfish Harvesting Assessment Methodology

Shellfish Harvesting standards were assessed using DEH growing area classifications. The following criteria were used to assess waters for shellfish harvesting.

Shellfish Harvesting Standards

Organisms of coliform group: fecal coliform group not to exceed a median MF of 14/100 ml and not more than 10% of the samples shall exceed an MF count of 43/100 ml in those areas most probably exposed to fecal contamination during the most unfavorable hydrographic and pollution conditions.

Fecal Coliform Bacteria Assessment Criteria

DEH fecal coliform data were not assessed to determine standards violations. Category 5 impairments were based on Growing Area Classifications alone.

DEH Shellfish Sanitation Growing Area Classification Assessment

An AU was assessed as Impaired when the DEH growing area classification was Prohibited or conditionally approved. This is a Category 5 listing requiring a TMDL.

Water Supply Assessment Methodology

Water Supply standards were assessed using data collected at DWQ ambient stations located in Class WSI-WSV waters. The following criteria were used to Impair waters for water supply. Category 5 listings were only made when Standards Assessment Criteria (SAC) were exceeded.

Water Supply Standards

Refer to Water Quality "Redbook" for complete text of standards
Barium: 1.0 mg/l;
Chloride: 250 mg/l;
Manganese: 200 ug/l; (not human health or aquatic life- not assessed)
Nickel: 25 ug/l;
Nitrate nitrogen: 10.0 mg/l;
2,4-D: 100 ug/l;
2,4,5-TP (Silvex): 10 ug/l;
Sulfates: 250 mg/l;

Water Supply Assessment

An AU was assessed as Impaired for water supply when greater than 10% of samples were greater than the above standards except for manganese. A minimum of 10 samples was needed to rate the water as Impaired. This is a Category 5 listing requiring a TMDL.

If the 10% criterion was exceeded and fewer than 10 samples were collected the AU was Not Rated and targeted for further sampling. This is a Category 3a listing not requiring a TMDL.

Fish Consumption Assessment Methodology

Fish Consumption was assessed based on site-specific fish consumption advisories. The advisories were based on the NC Department of Health and Human Services (DHHS) consumption advisories developed using fish tissue data that exceed standards. The following criteria were used to Impair waters for fish consumption. Because of the statewide Mercury advice there were no use cases for Supporting fish consumption and therefore no overall Category 1 waters.

Polychlorinated biphenyls (PCBs) Assessment Criteria

An AU was assessed as Impaired when a site-specific advisory was posted for PCBs. This is a Category 5 listing requiring a TMDL.

Dioxin Assessment Criteria

An AU was assessed as Impaired when a site-specific advisory was posted for dioxins. This is a Category 5 listing requiring a TMDL.

Mercury Assessment Criteria

An AU was assessed as Impaired for fish consumption when greater than 10% of samples were greater than 0.012 μg/l. A minimum of 10 samples was needed to rate the water as Impaired. This is a Category 5 listing requiring a TMDL.

If the 10% criterion was exceeded and fewer than 10 samples were collected the AU was Not Rated and targeted for further sampling. This is a Category 3a listing not requiring a TMDL.

Statewide advice for Mercury in fish tissue was not assessed because it was not associated with a specific AU but was applied to all waters of the state. All AUs are considered Impaired and in Category 5 for the statewide Mercury fish consumption advice. Previous site specific listings for Mercury will no longer be listed in Category 5. DWQ continues to monitor mercury in fish tissue, and has identified specific locations where Mercury levels exceed 0.4mg/kg of fish tissue.