Use Support Methodology 2008

How and Why Water Quality Ratings are Determined

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. 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. 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, watershed information and landmarks on which to base descriptions. The segments where water quality concerns are found used as markers. Solutions to water quality concerns, including TMDLs, typically encompass entire watersheds.

Data Window

The data window for the 2008 Use Support Assessment (303d listings) includes data collected in calendar years 2002 through 2006. 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 DWQ collects most of the data used for water quality assessments. There are significant data sets collected by NC DEH for use in coastal water quality assessment. Local governments and environmental groups as well as industry, municipal and university coalitions also provide data. Submitted data sets must include an approved QAPP to assure that the data were collected in a manner consistent with agency data. A standing solicitation for data is maintained on the NC DWQ website.

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

Dissolved Oxygen

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 (or 10 daily averages) were 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.

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. 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.

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

A secondary 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. 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 Dissolved Oxygen (DO) Assessment (Secondary Class Sw)

A classified swamp (Sw) AU was not rated for aquatic life when greater than 10% of samples were below 4 mg/l (5 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 water bodies 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 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 making use support determinations on 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 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.

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 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 (Secondary Class Sw)

A 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

Temperature Standards

For freshwaters- Temperature: not to exceed 2.8 degrees C (5.04 degrees F) above the natural water temperature, and in no case to exceed 29 degrees C (84.2 degrees F) for mountain and upper piedmont waters and 32 degrees C (89.6 degrees F) for lower piedmont and coastal plain waters. The temperature for trout waters shall not be increased by more than 0.5 degrees C (0.9 degrees F) due to the discharge of heated liquids, but in no case to exceed 20 degrees C (68 degrees 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 degrees C (1.44 degrees F) during the months of June, July, and August nor more than 2.2 degrees C (3.96 degrees F) during other

months and in no cases to exceed 32 degrees C (89.6 degrees F) due to the discharge of heated liquids.

Temperature Assessment

A mountain or upper piedmont water 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 Tr Classified Waters

A trout water AU was not rated for aquatic life when greater than 10% of samples were greater than 20°C for classified trout waters (Tr). 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 mg/l in sounds, estuaries, and other waters subject to growths of macroscopic or microscopic vegetation. Other waters subject to growths are interpreted by NC 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 mg/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 sample 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 is a standards violation using the above methodology. This is a category 3a listing not requiring a TMDL.

Toxic Substances

Toxic Substances Numerical Standards

Refer to Water Quality "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)

Toxic Substances Assessment

An AU was assessed as Impaired for aquatic life when greater than 10% of samples were greater than the above 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.

Toxic Substances Action Level Standards

Refer to Water Quality "Redbook" for complete text of standards

Copper: 7 ug/l	Iron: 1.0 mg/l;	Silver: 0.06 ug/l;	Zinc: 50 ug/l;
Chlorides were assessed with other toxic substances when data were available			

Toxic Substances Action Level Assessment

Copper, Iron, Silver, and Zinc exceedances of the 10% criterion were not adequate indicators of impacts to ecological/ biological integrity in North Carolina waters due to high naturally occurring levels and were not used to assess waters as Impaired.

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 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 Standards

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

An AU was assessed as Impaired for aquatic life when a fish community or benthos 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.

Biological Assessment Methodology

Benthic macroinvertebrate (aquatic insects) and fish community samples are the best way to assess the biological integrity of most waterbodies. Unfortunately, these community measures cannot be applied to every stream size and are further limited by geographic region. These community measures are designed to detect current water quality and water quality changes that may be occurring in the watershed. However, they are only directly applied to the AU# where the sample was collected.

Where recent data for both benthic macroinvertebrates and fish communities are available, both are evaluated for use support assessments. Where both ambient monitoring data and biological data are available, biological data may be given greater weight; however, each data type is assessed independently.

Benthic Macroinvertebrate Criteria

Criteria have been developed to assign bioclassifications to most benthic macroinvertebrate samples based on the number of taxa present in the pollution intolerant aquatic insect groups of Ephemeroptera, Plecoptera and Trichoptera (EPT); and the Biotic Index (BI), which summarizes tolerance data for all taxa in each sample. Because these data represent water quality conditions with a high degree of confidence, use support ratings using these data are considered monitored. If a Fair macroinvertebrate bioclassification is obtained under conditions (such as drought or flood conditions, recent spills, etc.) that may not represent normal conditions or is borderline Fair (almost Good-Fair), a second sample should be taken within 12-24 months to validate the Fair bioclassification. Such sites will be Not Rated until the second sample is obtained. Use support ratings are assigned to AU# using benthic macroinvertebrate bioclassifications as follows.

Waterbody Sample Type or Criteria	Bioclassification	Use Support Rating
Mountain, piedmont, coastal A[3]	Excellent	Supporting
Mountain, piedmont, coastal A[3]	Good	Supporting
Swamp[1]	Natural	Supporting
Mountain, piedmont, coastal A	Good-Fair	Supporting
Smaller than criteria, but Good-Fair[2]	Not-Impaired	Supporting
Swamp[1]	Moderate Stress	Supporting
Mountain, piedmont, coastal A[3]	Fair	Impaired
Swamp[1]	Severe Stress	Impaired
Mountain, piedmont, coastal A[3]	Poor	Impaired
Criteria not appropriate to assign bioclassification	Not Rated	Not Rated

1. Swamp streams for benthos sampling are defined as streams in the coastal plain that have no visible flow for a part of the year, but do have flow during the February to early March benthic index period.
2. This designation may be used for flowing waters that are too small to be assigned a bioclassification (less than three square miles drainage area), but have a Good-Fair or higher bioclassification using the standard qualitative and EPT criteria.
3. Coastal A streams are those located in the coastal plain that have flow year round and are wadeable.

Fish Community Criteria

The North Carolina Index of Biotic Integrity (NCIBI) is a method for assessing a stream's biological integrity by examining the structure and health of its fish community. The NCIBI incorporates information about species richness and composition, indicator species, trophic function, abundance and condition, and reproductive function. Because these data represent water quality conditions with a high degree of confidence, use support ratings using these data are considered monitored. Use support ratings are assigned to AU# using the NCIBI bioclassifications as follows:

NCIBI	Use Support Rating
Excellent	Supporting
Good	Supporting
Good-Fair	Supporting
Fair	Impaired
Poor	Impaired

If a Fair fish bioclassification is obtained under conditions (such as drought or flood conditions, recent spills, etc.) that may not represent normal conditions or is borderline Fair (almost Good- Fair), a second sample should be taken within 12-24 months to validate the Fair bioclassification. Such sites will be Not Rated until the second sample is obtained. The NCIBI was recently revised (NCDENR, 2001), and the bioclassifications and criteria have also been recalibrated against regional reference site data (NCDENR, 2000a, 2000b and 2001a).

NCIBI criteria are applicable only to wadeable streams in the following river basins: Broad, Catawba, Savannah, Yadkin-Pee Dee, Cape Fear, Neuse, Roanoke, Tar-Pamlico, French Broad, Hiwassee, Little Tennessee, New and Watauga. Additionally, the NCIBI criteria are only applicable to streams in the piedmont portion of the Cape Fear, Neuse, Roanoke

and Tar-Pamlico River basins. The definition of "piedmont" for these four river basins is based upon a map of North Carolina watersheds (Fels, 1997). Specifically:

- In the Cape Fear River basin -- all waters except for those draining the Sandhills in Moore, Lee and Harnett counties, and the entire basin upstream of Lillington, NC.
- In the Neuse River basin -- the entire basin above Smithfield and Wilson, except for the south and southwest portions of Johnston County and eastern two-thirds of Wilson County.
- In the Roanoke River basin -- the entire basin in North Carolina upstream of Roanoke Rapids, NC and a small area between Roanoke Rapids and Halifax, NC.
- In the Tar-Pamlico River basin -- the entire basin above Rocky Mount, except for the lower southeastern one-half of Halifax County and the extreme eastern portion of Nash County.

NCIBI criteria have not been developed for:

- Streams in the Broad, Catawba, Yadkin-Pee Dee, Savannah, French Broad, Hiwassee, Little Tennessee, New and Watauga River basins which are characterized as wadeable first to third order streams with small watersheds, naturally low fish species diversity, coldwater temperatures, and high gradient plunge-pool flows. Such streams are typically thought of as "Southern Appalachian Trout Streams".
- Wadeable streams in the Sandhills ecoregion of the Cape Fear, Lumber and Yadkin-Pee Dee River basins.
- Wadeable streams and swamps in the coastal plain region of the Cape Fear, Chowan, Lumber, Neuse, Pasquotank, Roanoke, Tar-Pamlico and White Oak River basins.
- All nonwadeable and large streams and rivers throughout the state.

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 RECMON beach 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 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 fecal coliform bacteria data collected at DEH monitoring stations in Class SA waters. DEH growing area classifications were also used for use assessments. 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 percent 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

An AU was assessed as Impaired when the geometric mean was greater than 14 colonies/100ml or greater than 10% of the samples were higher than 43 colonies/100ml. This is a category 5 listing requiring a TMDL.

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 4cs listing not 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 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.

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 mg/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. Previous Category 5 listings for Mercury based on site specific advisories will remain.

Reporting Requirements of the Federal Clean Water Act

The North Carolina Water Quality Assessment and Impaired Waters List is an integrated report that includes both the 305(b) and 303(d) reports. The 305(b) Report is compiled to meet the federal Clean Water Act (CWA) Section 305(b) reporting requirements. The 305(b) portion of the integrated report presents how well waters support designated uses (e.g., swimming, aquatic life, water supply), as well as likely stressors (e.g., sediment, nutrients) and potential sources of impairment. The 303(d) List is a comprehensive account of impaired waters that require total maximum daily loads (TMDLs).

Section 303(d) of the CWA enacted in 1972 required States, Territories and authorized Tribes to 1) identify and establish a priority ranking for waters for which technology-based effluent limitations are not stringent enough to attain and maintain water quality standards, 2) establish TMDLs for the pollutants causing impairment in those waters, and 3) develop and submit the list of impaired waters and TMDLs to the U.S. Environmental Protection Agency (EPA). EPA is required to approve or disapprove the state-developed 303(d) list within 30 days. For each segment impaired by a pollutant and identified in the 303(d) list, a TMDL must be developed.

Introduction to TMDLs

A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant sources. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The calculation must include a margin of safety to ensure that the waterbody can still attain its designated uses. The calculation must also account for seasonal variation and critical conditions in water quality.

For more information on TMDLs and the 303(d) listing process, visit the NC TMDL website at http://h2o.enr.state.nc.us/tmdl/.

Contents of the Integrated Report

The Integrated Report includes descriptions of monitoring programs, the use support methodology, and the impaired waters list. Guidance from EPA encourages placement of all waterbody assessment units into one unique assessment category. Each category is described in detail below:

Category 1: Attaining the water quality standard and no use is threatened. This category consists of those waterbody assessment units where all applicable use support categories are rated “Supporting”. Data and information are available to support a determination that the water quality standards are attained and no use is threatened. Future monitoring data will be used to determine if the water quality standard continues to be attained. However, because of the statewide fish consumption advice for mercury, there are no Category 1 waters.

Category 2: Supporting or not Impaired for all monitored uses. This category consists of those waterbody assessment units where at least one of the applicable use support categories are rated “Supporting” and the other use support categories are rated “Not Rated” or “No Data”. Also included in this category are waters where at least one of the applicable use support categories, except Fish Consumption, are rated “Supporting”; the remaining applicable use support categories, except Fish Consumption, are rated “Not Rated”; and the Fish Consumption category is rated “Impaired-Evaluated”. Data and information are available to support a determination that some, but not all, uses are attained. Attainment status of the remaining uses is unknown because there are insufficient or no data or information. Future monitoring data will be used to determine if the uses previously found to be in attainment remain

in attainment, and to determine the attainment status of those uses for which data and information were previously insufficient to make a determination.

Category 3: No data or insufficient information to determine if any designated use is attained. This category consists of those waterbody assessment units where all applicable use support categories, except Fish Consumption, are rated "Not Rated", and the Fish Consumption category is rated "Impaired-Evaluated". Measured data or information to support an attainment determination for any use are not available. Supplementary data and information, or future monitoring, will be required to assess the attainment status. This category contains distinct sub-categories:

Category 3a- Instream/monitoring data are inconclusive
Category 3c- No Data available for assessment
Category 3t- No Data available for assessment – Assessment Unit is in a watershed with an approved TMDL

Category 4: Impaired or threatened for one or more designated uses but does not require the development of a TMDL. This category contains distinct sub-categories:

Category 4a: TMDL has been completed. This category consists of those waterbody assessment units for which EPA has approved or established a TMDL and water quality standards have not yet been achieved. Monitoring data will be considered before moving an assessment unit from Category 4a to Categories 1 or 2.

Category 4b: Other pollution control requirements are reasonably expected to result in the attainment of the water quality standard in the near future. This category consists of those waterbody assessment units for which TMDLs will not be attempted because other required regulatory controls (e.g., NPDES permit limits, Stormwater Program rules, implemented watershed plan, etc.) are expected to attain water quality standards within a reasonable amount of time. Future monitoring will be used to verify that the water quality standard is attained as expected.

Category 4c: Impaired- Loss of use because impairment is not caused by a pollutant. This category consists of assessment units that are impaired by pollution, not by a pollutant. EPA defines pollution as "The man-made or man-induced alteration of the chemical, physical, biological and radiological integrity of the water." EPAs staff have verbally stated that this category is intended to be used for impairments related to water control structures (e.g., dams). Future monitoring will be used to confirm that there continues to be an absence of pollutant-caused impairment and to support water quality management actions necessary to address the cause(s) of the impairment.

Category 4cr: Impaired- Loss of recreation use because swimming advisories were posted; however, no data is available for TMDL development.

Category 4cs: Impaired- Loss of shellfish harvesting use because the growing area is not approved for shellfish harvesting by the Department of Environmental Health and no data is available for TMDL development.

Category 4ct: Impaired- Assessment Unit is in a watershed that is part of a TMDL study area for the parameter of interest.

Category 4s: Impaired ecological/biological integrity with a concurrent category 5 aquatic life parameter of interest.

Category 5: Impaired for one or more designated uses by a pollutant(s) and requires a TMDL. This category consists of those waterbody assessment units that are impaired by a pollutant and the proper technical conditions exist to develop TMDLs. As defined by the EPA, the term pollutant means "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into the water". When more than one pollutant is associated with the impairment of a single waterbody assessment unit in this category, the assessment unit will remain in Category 5 until TMDLs for all listed pollutants have been completed and approved by the EPA.

Category 5s: Impaired ecological/biological integrity and stressor study does not indicate any aquatic life standard violations.

The draft 2008 North Carolina 303(d) list for the State of North Carolina only includes Category 5 waters. An impaired

waters list (Categories 4 & 5) and the complete use support summary of monitored waterbodies in the North Carolina (Integrated Report/305(b)) will be available for downloading on the DWQ website: http://h2o.enr.state.nc.us/tmdl/General_303d.htm.

How North Carolina Delists Waters

Waters appearing on the previously approved impaired waters list will be moved to Categories 1, 2, 3 or 4 under the following circumstances:

- Applicable water quality standards are being met (i.e., no longer impaired for a given pollutant).
- The basis for putting the water on the list is determined to be invalid (i.e., was mistakenly identified as impaired in accordance with 40 CFR 130.7(b)(6)(iv) and/or National Clarifying Guidance for State and Territory 1998 Section 303(d) Listing Decisions. Robert Wayland, III, Director. Office of Wetlands, Oceans and Watersheds. Aug 27, 1997).
- A water quality variance has been issued for a specific standard (e.g., chloride).
- Removal of fish consumption advisories or modification of fish eating advice.
- Typographic listing mistakes (e.g., the wrong water was identified).
- EPA has approved a TMDL.

Scheduling TMDLs

Category 5 waters, those for which TMDLs are required, are at many different stages on the path to an approved TMDL. Some require additional data. Some require more outreach to increase stakeholder involvement. Others need to have a technical strategy budgeted, funded and scheduled. Some are ready for EPA submittal.

According to EPA guidance (EPA 2004), prioritization of waterbody assessment units for TMDLs need not be reflected in a "high, medium or low" manner. Instead, prioritization can be reflected in the TMDL development schedule. Generally, North Carolina attempts to develop TMDLs within 8-13 years of the original pollutant listing. TMDLs under development are listed on the NC TMDL website at http://h2o.enr.state.nc.us/tmdl/.

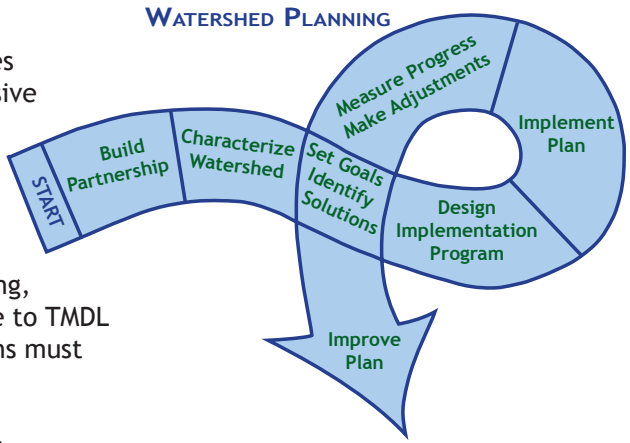
Revising TMDLs

Current federal regulations do not specify when TMDLs should be revised. However, there are several circumstances under which it would seem prudent to revisit existing TMDLs. The TMDL analysis of targets and allocations is based upon the existing water quality standards, hydrology, water quality data (chemical and biological), and existing, active NPDES wastewater discharges. Conditions related to any of these factors could be used to justify a TMDL revision. Specific conditions that the Division will consider prior to revising an existing, approved TMDL include the following:

- A TMDL has been fully implemented and the water quality standards continue to be violated. If a TMDL has been implemented and water quality data indicate no improvement or a decline in overall water quality, the basis for the TMDL reduction or the allocation may need to be revised;
- The addition or removal of hydraulic structures to a waterbody (e.g., dams). Substantial changes to waterbody hydrology and hydraulics have the potential to change many aspects of target setting, including the water quality standard upon which the TMDL was developed, the water quality data, and the water quality modeling;
- Incorrect assumptions were used to derive the TMDL allocations. This would include errors in calculations and omission of a NPDES permitted discharge.

Should a TMDL be revised due to needed changes in TMDL targets, the entire TMDL would be revised. This includes the TMDL target, source assessment, and load and wasteload allocations. However, the Division may elect to revise only specific portions of the TMDL. For example, changes may be justifiable to the load and wasteload allocation portions of a TMDL due to incorrect calculations or inequities. In these cases, revisions to the TMDL allocations would not necessarily include a revision of TMDL targets. Any TMDL revisions would include a public notice and comment period.

Alternatives to TMDLs



Watershed restoration efforts include many other activities besides TMDLs. Protection and prevention of impairment are least expensive and most efficient in the long term. Local direct action to correct water quality problems, before a TMDL is developed, is preferable in many cases. The division will consider postponing TMDL development at the request of local governments and/or organizations actively attempting to achieve water quality standards. Factors such as funding, ordinances, expertise, planning, and timetable will be evaluated. Another more formal alternative to TMDL development is a Category 4b demonstration. Such demonstrations must include the following six EPA required elements:

1) Identification of segment and statement of problem causing the impairment;
2) Description of pollution controls and how they will achieve water quality standards;
3) An estimate or projection of the time when WQS will be met;
4) Schedule for implementing pollution controls;
5) Monitoring plan to track effectiveness of pollution controls; and
6) Commitment to revise pollution controls, as necessary.

For more information about the Clean Water Act Sections 303(d), 305(b), and 314 integrated reporting and listing decisions see EPA's watershed website: ***http://www.epa.gov/owow/tmdl/2008_ir_memorandum.html***.
For more information on watershed planning see EPA's website: ***http://iaspub.epa.gov/watershedplan/watershedPlanning.do?pageId=48&navId=35***.