2014 Assessment Process – Public Comments and DWQ Responses

Comments from 12 organizations were received; those organizations are listed below with the abbreviation used to identify the commenter in parentheses:

1. Bill McLarney (McLarney)
2. Charlotte Mecklenburg Storm Water Services – Daryl Hammock (Charlotte)
3. City of Charlotte Stormwater Services – David Kroening (CM)
4. NC Farm Bureau (NCFB)
5. US EPA (EPA)
6. Duke Energy (Duke)
7. Waterkeepers Carolina (WKC)
8. NC League of Municipalities (NCLM)
9. NC Department of Transportation (DOT)
10. Michael A. Mallin, Research Professor, UNCW Center for Marine Sciences (Mallin)
11. Steve Tedder (Tedder)
12. NC Water Quality Association (WQA)

Comments were summarized and placed into the following categories:

1. Suggestion of alternative method
2. Additional methodology needed
3. Additional information requested (for an expanded document)
4. Other

Note: DWQ has prepared a new comprehensive document with the intention of clarifying its water quality assessment process. The document is referenced in many of the comments that requested clarification or further explanation of a process or method.

Comments are followed by DWQ responses in *italics*.

1. Suggestion of Alternative Method

(DOT) NCDOT supports the weight-of-evidence approach proposed for use to determine the aquatic life use support rating based on the action levels of copper and zinc. NCDOT encourages this type of approach for use with other action level parameters that are acknowledged to be generally not bioaccumulative and having variable toxicity to aquatic life.

(EPA, WKC) The EPA has determined that the State's ten percent exceedance methodology for toxics does not properly implement the WQS, as currently specified. DWQ is not required to use the EPA-recommended one-in-three method. However, DWQ has not provided a scientifically defensible rationale to support the ten percent methodology. Until DWQ provides this rationale, the EPA will continue to conduct an independent assessment and review water quality data to determine if additional toxics impairments should be added to the 303(d) list.

> *Response: We use a weight of evidence approach for copper and zinc because they are much more commonly found than other Action Level metals. Further, we don't monitor for some other Action Level metals. DWQ does not plan to address current Copper or Zinc category 5 assessments with TMDLs or other management strategies until new standards are adopted and impairment is confirmed with new data. After new standards are adopted DWQ will develop sampling protocols and assessment methods for these parameters. The methods will be out for public review in the summer of even numbered years.*

(DOT, NCFB, Duke, NCLM, WQA) The fish consumption methodology should be based on site-specific water quality data, not statewide DHHS consumption advisories.

> *Response: We will revise the methodology to address this comment. Category 5 assessments for fish consumption will be based on site-specific advisories that are based on site-specific fish tissue data collected by DWQ Environmental Sciences Section.*

(DOT, DOT, WKC) Recreation and Shellfish Harvesting - Waterbodies should only be included in a category 5 303(d) listing when a pollutant has been identified and its associated water quality standard has been violated and documented. WKC supports using shellfish closings, but also suggests adding methodology to reflect numeric standards.

> *Response: The pollutant identified for non-approved shellfish harvesting waters is fecal coliform bacteria. Shellfish growing area classifications are based on waterbody-specific information. Growing area classifications are developed by the National Shellfish Sanitation Program (NSSP) using water column and tissue data, and information from sanitary surveys of the contributing watershed, to protect public health. Any water having a NSSP classification of lower-than-Approved should be included in Category 5. The fecal coliform bacteria shellfish harvesting standard and DMF Shellfish Sanitation data are used for TMDLs.*

(NCLM) General - In the case of water bodies listed on the basis of data collected in a previous assessment period, the League suggests instituting additional monitoring plans for these stream segments. An existing nonsupport determination based on information from a past assessment period should not be used to continue that listing if there is any indication that conditions have changed due to efforts to correct the issue, or if data indicate that environmental conditions have changed. Second, other circumstances may warrant further monitoring before continuing a listing decision. These circumstances include data collected under extreme conditions such as drought or elevated temperatures. They may also include instances where parties have made specific efforts to address water quality problems since the last sampling period.

> *Response: DWQ carries over assessments from previous cycles until there is an indication of positive water quality change that is supported by monitoring data. Waters can be delisted if more recent data indicates standards are met. While DWQ could consider other information, more recent data would be the best "indication that conditions have changed due to efforts to correct the issue." We encourage parties who have "made specific efforts to address water quality problems since the last sampling period" to collect supporting data if possible, or to notify DWQ of the activity so that follow-up monitoring can be scheduled. Most assessed waters are part of an ongoing monitoring plan that includes regular sampling. We already exclude results from "extreme conditions" for biological assessments (see next comment). For other assessments, the 10% exceedance allowance helps to prevent 303(d) listing based on unusual events.*

(Charlotte, WQA) Ecological/Biological Integrity - A single biological sample should not be used to place a water body on the 303(d) list**.** It should be used to indicate the need for more intensive monitoring to determine if 1) there is indeed a water quality problem versus an isolated event resulting in poor sample timing and 2) if the biology is reacting to anthropogenic drivers. At the very least, communication with local authorities should be initiated to determine if there is any existing data that can augment the single biological sample.

(NCLM) Although it is acknowledged that biological sampling is intended to represent water quality conditions integrated over time, we believe that a single data point should not be used to concluded that a water body is impaired, thus triggering TMDL development. The inherent variability of natural systems is too broad and there are too many natural, climatic influences (for example drought conditions) that drive the biology of a stream.

> *Response: Macroinvertebrates and fish are useful biological monitors because they are found in all aquatic environments. Aquatic biota show responses to a wide array of potential pollutants, including those with synergistic or antagonistic effects. Benthic macroinvertebrate and fish communities are a cost-effective monitoring tool and the sedentary nature of the benthos, and limited home range of most stream fish, ensures that exposure to a pollutant or stress reliably denotes local conditions.*
>
> - *Biological monitoring integrates fluctuations in WQ between sampling periods.*
> - *Biological communities accurately reflect both long and short term conditions.*
> - *Most species have life cycles of a year or more.*
> - *Short-term aquatic life effects will generally be indicated in the community.*

North Carolina biological assessments (fish and invertebrates) employ species-level identifications to detect and characterize water quality problems. Assessments that only consider genus or family level identifications would not be as reliable for evaluating aquatic life support and identification of water quality stressors. Biological assessments, and specifically the species-level assessments employed by the North Carolina Division of Water Quality, produce reliable assessments of aquatic life use criteria.

Sound technical decision making by the field biologists can enhance the reliability of biological samples. Where natural conditions prohibit the collection of a representative biological sample (e.g., flooding, high turbidity, extreme low flows, etc.), samples will not be collected. When natural conditions might confound the reliability of a sample bioclassification, samples will not be used for 303(d) decisions.

DWQ recognizes the utility in collecting multiple samples and in sampling multiple locations along stream segments. Multiple samples can improve the ability to determine the possible source(s) and the geographic extent of impairment. DWQ biological monitoring programs will enhance the use of multiple samples to provide additional support for the identification of impaired waters.

(DOT) NCDOT recommends that waterbodies not be listed under category 5 based solely on benthic macroinvertebrate or fish community metrics (e.g. bioclassification), as these metrics do not identify a pollutant causing the biological impairment.

Response: Federal regulations require states to identify waters that do not meet <u>any</u> water quality standards applicable to their waters, including narrative criteria. DWQ attempts to identify a pollutant responsible for biological impairment. These biological assessments can be moved from Category 5 to Category 4 if an aquatic life-related pollutant is identified.

(Tedder) The use of confidence levels to ensure data validity for its intended use would strengthen the methodology. We need to build a 90-95% confidence level as we take listing actions on data. We need that level of confidence that the 10% or whatever % is used actually exceeds the standards.

Response: The 10% exceedance method allows for occasional exceedances of standards due to extreme conditions, unknown lab or equipment issues, and variability in the data. DWQ is proposing to use a nonparametric hypothesis testing approach based on the binomial distribution. This method will allow a quantifiable level of statistical confidence (90%) for listing decisions based on the 10% exceedance allowance. Data validity is ensured through consistent use of SOPs and rigorous QA/QC processes.

(NCLM) League members support allowances in the methodology for increased flexibility when making listing decisions. Such flexibility will allow for a more rigorous evaluation of impairment decisions while allowing DWQ to exercise good public policy judgment with these decisions. Especially when a decision can affect a large watershed, as is often the case with chlorophyll a listings, giving a water body the status of “further evaluation” before making a final listing decision seems judicious.

Response: There is already a great deal of flexibility in assessment of standard attainment, especially considering that numeric criteria, according to NC's state-adopted, EPA-approved standards, are written as "not to exceed." There is no evidence that delaying listing of waters for nutrients (chlorophyll a) results in different assessment conclusions. A delay in listing delays restoration, resulting in increased restoration costs.

DWQ will initiate a prioritization of waters for further action based on magnitude and frequency of exceedance of criteria.

(Tedder) The 10% criteria needs to be evaluated. Other states use values greater than to 10% and I think NC should also, especially for certain parameters (turbidity would be a good example).

Response: NC's numeric criteria are written as "not to exceed." DWQ is proposing a quantifiable level of statistical confidence (90%) for listing decisions based on the 10%. Previous assessment results do not support a higher exceedance allowance for turbidity. For the 2012 assessment, most (498) of the 611 monitoring locations met turbidity criteria (i.e., criteria were exceeded in less than 10% of samples from these locations). There were 207 locations with no turbidity exceedances at all.

(EPA, Charlotte, WKC) We recommend NC not automatically exclude data that is older than 5 years, particularly when its inclusion could be used to augment small sets of more current data. In order for the EPA to conclude that the State's process is consistent with federal requirements for consideration of all existing and readily available data and information, the State should revise its methodology to allow consideration of older data and data contained within smaller data sets for future section 303(d) lists.

Response: Older data are not automatically excluded. Combining older data with new data is not necessarily advisable, because newer data are more reflective of current conditions. The assessment occurs every two years, typically with a 5 year data set. Entities that believe more data are needed are invited to collect those data to include in the next assessment, in which case it would be combined with some of the data from the previous assessment.

(DOT, NCLM) Chlorophyll a - NCDOT recommends that the assessment methodology be amended to include a holistic, weight-of-evidence approach inclusive of biological response variables, chemical analytical water quality monitoring, and direct fish and benthic community metrics. This weight-of-evidence approach should be coupled with a strong documentation process which clearly records how the aquatic life use support decision was reached.

Response: Assessments are based on water quality standards. The Clean Water Act requires states to identify waters for which current pollution controls "are not stringent enough to implement <u>any</u> water quality standard applicable to such waters" (emphasis added). Standards are composed of uses and criteria to protect those uses; therefore, each criterion must be assessed individually.

(Duke) Mercury Assessment Criteria - The state's water quality criterion of 0.012 µg/L should not be included in the "Mercury Assessment Criteria" for determining impairment for fish consumption. EPA's 1984 criteria document titled "Ambient Water Quality Criteria for Mercury" suggest this water column value was only intended to trigger the need for further assessment of fish tissue and not as a determination of fish consumption impairment per se.

(Duke) Mercury Assessment Criteria - The UAM should be consistent with EPA's guidance for assessing mercury in fish tissue (Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion, EPA 823-R-10-001).

> *Response: The 0.012 µg/L is a current adopted, approved water quality standard; therefore, it must be applied where data are available. NC does not have a methylmercury criterion; however, aspects of the referenced EPA document can be applied to Category 4 waters. DWQ will work with stakeholders, including the commenter, to develop a process for recategorizing waters from Category 4 to Category 1 for mercury in fish tissue, consistent with the referenced EPA document.*

2. Additional Methodology Needed

(WKC) There are a large number of narrative and numeric standards applicable to Class C waters in 15A NCAC 02B .0211 and Class SC Waters in 15A NCAC 02B .0220 and numerous others for water supply watersheds that are not included in the Assessment Methodology, including solids and sludges, gases, oil, deleterious substances, phenolic substances, radioactive substances, and a large number of numerical criteria for toxics. The Proposed Assessment Methodology should include methods to assess all of the narrative and numeric criteria in 15A NCAC 02B .0208, as well as all of the numeric and narrative criteria for toxics in 15A NCAC 02B .0211 and 0220.

> *Response: DWQ's Random Ambient Monitoring System (RAMS) program has indicated that many of the standards above are not detected in surface waters at a frequency that would warrant regular monitoring and assessment of these parameters. If any substance is believed to be a stressor DWQ can initiate further monitoring to determine spatial and temporal extent and source identification, and to assess compliance with criteria.*

(WKC) there are no assessment methodologies proposed that relate in any way to evaluation of the water quality standards applicable to designating Nutrient Sensitive Waters or to the Nutrient Management Strategies for certain designated watersheds.

> *Response: The water quality standards that apply to NSW and waters with nutrient management strategies are the chlorophyll a criteria. DWQ continues to evaluate such waters using these criteria. We will clarify this in the document.*

(WKC) The Proposed Assessment Methodology only includes a method for assessment of fish and benthic communities to evaluate whether this standard is met and there is no apparent evaluation of short vs. long-term impairment.

Response: Many decades of peer reviewed data have clearly demonstrated that bioassessment methodologies (e.g., benthic macroinvertebrates and fish community) can reliably and accurately integrate the effects of both short and long-term sources of biological impairment. For example, benthic macroinvertebrate communities are composed of both short-lived taxa (e.g., chironomid larvae and some mayfly taxa) and long-lived taxa (e.g., stonefly and dragonfly nymphs). If a short-term pollution source was present in a waterbody, and the sample was taken after the introduction of this pollution source, the biological sample would reflect this in that most of the pollution sensitive short and long lived taxa would be absent while most of the pollution tolerant short and long-lived taxa would remain. Conversely, if the pollutant was chronic and long-term, not only would the short lived pollution sensitive taxa be absent, but there would also be a substantial reduction in many of the pollution tolerant short and long-lived taxa.

(WKC) Recreation - A methodology is only provided for the numeric criteria and a minimum sample number requirement is added to the 400 col./100 ml standard for fecal coliform contrary to the actual water quality standard in 15A NCAC 02B .0219, as well as the purpose of that standard which is to protect human health from unsafe, extremely high levels of bacteria in recreational waters. A separate standard exists to evaluate average conditions. No provision is made to list waters for extreme and recurrent exceedances of any of the bacteria standards though this type of water quality impairment in recreational waters is well-documented throughout North Carolina and presents a serious threat to human health. Additionally, no methodology is included to address the narrative standards in 15A NCAC 02B .0219 and 15A NCAC 02B .0222.

Response: We are interested in hearing specific recommendations for addressing the narrative criteria. The numeric criteria specify five samples in a 30-day period. The current assessment process is consistent with that.

(WKC) The Assessment Methodology does not appear to contain any protocol for evaluating whether a waterbody is threatened. The DWQ is required to evaluate and list waterbodies that are violating or expected to violate any applicable water quality standard and, in order to do so, it must develop and apply assessment methodologies that identify impairments and threats based on all narrative, numeric and antidegration standards.

Response: DWQ provides information to water quality programs (DENR and non-DENR) on waters that have occasional exceedances that do not result in category 4 or 5 assessments through its basinwide planning program. Permitting programs are designed to maintain water quality standards; therefore, it would be difficult to determine that a water body may not meet its water quality standards in the future.

(WKC) There is no mention in the UAM of the antidegradation requirements in 15A NCAC 02B .0201, 15A NCAC 02B .0224 and 15A NCAC 02B .0225, and there are no procedures for evaluating whether antidegradation standards are violated or likely to be violated.

Response: DWQ does not currently assess antidegradation. A methodology could be developed for future assessments with future EPA guidance and stakeholder input. In its 2012 303(d) guidance (3/21/11), EPA acknowledged that there is not currently a way for states to assess impairment of antidegradation standards: "EPA intends to work with States and other stakeholders to develop guidance on how best to assess and identify waters to determine whether State antidegradation requirements have been attained. This future guidance may be in the form of stand-alone Integrated Report guidance, or as part of future EPA biennial Integrated Report updates." EPA's guidance for 2014 has not yet been released.

(NCLM) Turbidity - This section of the methodology mentions that "natural background conditions" could affect turbidity, yet does not provide any description of how DWQ might evaluate these natural background conditions. Including such description will assist the public in better understanding listing decisions made on the basis of turbidity.

Response: The phrase "natural background conditions" is found in the standard, which is provided in this part of the methodology. In places with very little development, turbidity levels are generally well below the numeric criteria. There is not currently a way to evaluate natural background conditions for turbidity in NC, because turbidity measures can be affected by physical processes including geologic and hydrologic conditions, as well as activities historically conducted in the watershed. Much of the state has been disturbed over the last two centuries. Disturbed systems cannot provide accurate baseline conditions.

(DOT) Ecological/Biological Integrity - The .0202 and .0205 rules refer to 'reference conditions' and 'natural conditions' respectively, however the aquatic life assessment methodology does not provide actionable guidance on how reference and natural conditions are identified and how these two rules integrate into the methodology. NCDOT recommends that the assessment methodology be amended to include a site specific evaluation process for determining aquatic life use support in the face of natural variations in water quality normal for the area.

Response: The bioassessment methodologies that DWQ biologists current employ already includes a "site specific evaluation process for determining aquatic life use support in the face of natural variations in water quality normal for the area," through the use of reference conditions. For example, due to intrinsic physical-chemical differences between ecoregions, we would not rate a Piedmont stream with mountain criteria or vice versa. In addition, if DWQ biologists arrive at a stream that is obviously and significantly below base flow (either based on observed in situ conditions or USGS gauge discharge data), DWQ biologists will typically not obtain a sample and therefore no assessment decision is made. If a sample is obtained, and the interpretation of the data suggests abnormally low flow conditions (e.g., the lack or reduction of flow-indicating taxa) that sample is typically not assigned a bioclassification and therefore no assessment decision is made. In the rare event that a bioclassification is assigned (and an assessment decision is made) a follow up sample is taken during more typical flow conditions in an effort to either confirm or contradict the bioclassification decision.

3. Additional Information Requested

(NCLM) Despite the title of this section (Use Support Categories and Water Quality Standards), the methodology does not clearly define the state's use support categories. The League suggests filling out this section of the methodology with detail on the use support categories.

> *Response: An expanded explanation of assessment categories will be incorporated into the document. DWQ will make this information more visible and add clarifying language to make it more understandable to the general public.*

(NCLM) DWQ should strive to explain the reasoning behind selecting the 10% threshold.

> *Response: DWQ will better explain the 10% exceedance allowance in the document.*

(Duke) The Data Availability and Quality section should be modified to recognize that data collected by a biological laboratory that has been certified pursuant to 15A NCAC 02H.1100 and analyzed by a laboratory that has been certified pursuant to 15A NCAC 02H.0800 satisfies the data quality assurance requirements of the UAM. The Companies believe the requested modification to the Data Availability and Quality language would streamline the data submittal and acceptance process.

> *Response: The data submittal and acceptance process will be made clearer in the document. There are also other processes that meet quality assurance besides those listed above. DWQ prefers to have individual discussions with entities collecting data for submittal and use in NC water quality assessment so that all parties are in agreement on how the data can be or will be used in the assessment process.*

(NCLM) Swamp Water DO - This section of the methodology provides a mechanism to consider waters that are "swamp like," but provides no information on how DWQ would identify these waters. Such detail would strengthen the public's understanding of listing decisions.

> *Response: DWQ will add information in the document on how "swamp like" waters are identified.*

(NCLM) pH - This section of the methodology gives an allowance to agency decision-makers if waters have low pH levels as a "result of natural conditions." Implying that a listing decision may include some degree of best professional judgment, this section does not however describe how this discretion may be exercised. A more detailed explanation of the natural conditions creating low pH would again assist in the public's understanding of listing decisions in this area.

> *Response: DWQ has a robust methodology used to determine if Category 4 and 5 assessments for low DO or low pH are due to natural conditions. We will describe the process in the document, and provide links to examples. DWQ has used this process to recategorize such assessments to category 1. EPA has concurred with this process. DWQ has also identified waters exceeding DO and pH criteria in swamp or swamp like waters that may be from natural*

conditions. As resources allow DWQ will use this same process to recategorize these waters from category 3a to 1 or 5 as appropriate.

(NCLM) Shellfish Harvesting - This section of the methodology references data collected by the N.C. Division of Marine Fisheries (DMF). However, the methodology does not discuss how DMF classifies growing areas and does not reference DMF's own methodology. Because DWQ's assessment must be based on its own methodology, rather than a resource agency's determination of "prohibited" or "conditionally approved" growing areas, the League suggests including DMF's methodology in this section.

Response: DWQ will describe and include a link to this methodology. The growing area classification methodology is issued by the National Shellfish Sanitation Program and is used by all coastal states.

(NCFB, Duke, NCLM, WQA) The Use Assessment Methodology should include a new section describing the process by which a water may be delisted based on EPA's good cause factors.

Response: DWQ will provide this information in the document.

(WKC, NCLM) General - The Assessment Methodology does not adequately describe the decision-making process that DWQ will follow in making its listing decisions. For example, it does not describe how data will be collected or evaluated, how waterbodies will be prioritized, the standards by which waters will be determined to fall into which category, the required QA/QC process for data, how multiple data sets will be analyzed, the criteria for acceptance or rejection of data, standards for representativeness, or the rationale for minimum data requirements.

Response: DWQ will provide this information in the document, and make it more visible and understandable on the website.

(DOT) General - NCDOT recommends that the assessment methodology clarify the application of Rule 15A NCAC 02B .0211 (4) "For purposes other than consideration of NPDES permitting of point source discharges as described in this Subparagraph, the Action Levels in this Rule… … shall be considered as numerical ambient water quality standards."

Response: An explanation will be provided in the document. This language instructs DWQ to consider action level standards as water quality standards during the assessment process. DWQ is currently in the process of changing metals standards and will develop new sampling and assessment approaches when new standards are adopted. Any new assessment methods will be available for public review during even numbered years prior to the next assessment.

(Charlotte, NCLM) DWQ should be more explicit in their solicitation for data that can be used for use assessment and thus influence the 303(d) list. The standing solicitation should be made more apparent to the general public and local governments prior to developing the 303(d) list. A notice should go out including this link at a time suitable for accepting data for an upcoming list. This notice should coincide with notification of newly collected data by NCDWQ, so that water bodies lacking enough data to

support a conclusion can be augmented by locally collected data, if available. NCLM suggests this section should include detail to direct an interested party on how to develop an appropriate QAPP or data that can be used to supplement the current DWQ database.

Response: DWQ will make this process more visible on the website, and include the information in the document. DWQ will work with NCLM to help in encouraging data collecting entities to be timely with contacting DWQ so that data collected can be processed with all the other data sets prior to public review. DWQ will accept data at any time, and if it is suitable for use in assessment, we will use it.

(NCFB) If the Fish Consumption Assessment Methodology is retained, significant modifications are needed:

1. The data used to assess fish tissue concentrations that would potentially trigger the fish consumption advisory must be clearly identified
2. The statistical methods employed to interpret the data should be clearly described
3. The Use Assessment Methodology should be consistent with EPA's guidance for assessing mercury in fish tissue

Response: DWQ will provide links to DHHS procedures and methods in the document. The new methodology will use only site specific advisories based on fish tissue data. See also response in section 1.

(WQA) The assessment methodology should include procedures to ensure the 303(d) listings are based on accurate and representative data. In cases of a borderline impairment additional samples should be taken to increase the confidence in DWQs impairment/non-impairment determination. Extreme data outliers should be classified as outliers and should not provide the sole basis for a listing decision.

Response: The document will include a brief explanation of QA/QC procedures to ensure accuracy and representativeness, along with links to more information. Environmental data can be extremely variable. They are not expected to be homogeneous like replicates. They are influenced by many factors, such as precipitation, flow, and biological activity. Data are routinely screened for errors. If there are no errors, the data are used. Allowance for 10% of samples to exceed the standard eliminates the influence of a single extreme event. DWQ is proposing a quantifiable level of statistical confidence (90%) for listing decisions based on the 10%.

(NCLM) While water bodies are evaluated by discrete stream lengths called "assessment units," solutions to impairments "typically encompass entire watersheds." This overly broad statement belies DWQ's current approach to listing decisions, which favors the application of a minimum amount of data to the maximum number of streams that can be sampled. The broad statement also ignores situations in which a water body with (1) measured excursions from water quality standards and (2) impacted uses may benefit from controls on nearby sources rather than watershed-scale solutions. A more effective approach to addressing water body impairments should come through tailoring the necessary control measures to the specific identified impairment. In addition, to more effectively target the most problematic impairments, this section of the methodology should describe a priority-setting process for evaluating the state's streams.

Response: The public has always been invited to help delineate the length and area of impairments during the 303(d) list public review period. DWQ has made changes based on information offered by reviewers. As with other assessments, DWQ does limit the area represented for impairment to a minimum representative length where the benthos were collected. Implementation of TMDLs or other management strategies would encompass entire upstream drainage areas unless monitoring studies could rule out particular sub-drainages as contributing to the impairment.

The "broad statement" is intended to capture all possible sources that may be involved in restoration implementation efforts. Indicating that an entire drainage may be subject to restoration or protection measures helps to inform the public and potentially affected entities in advance. The mapped category 4 or 5 assessment is indicating only where the sample was collected.

(WQA) WQA requests clarification of the provisions in the assessment methodology for setting stream length. The WQA recommends that the assessment methodology set forth more objective guidelines. For example, we think biological impairment listings should be limited to the stream lengths actually surveyed.

Response: DWQ will provide examples of AU length/area determinations to help clarify this decision process. Stream lengths and other extents used to define Assessment Units are intended to describe the area to which the assessment applies. They are not intended to include the sources of any impairment. For impaired AU's, the source(s) of impairment are most likely upstream of the identified AU.

(WQA) DWQ should add a QAPP link to assessment methodology.

Response: DWQ will make the data submittal process and QAPP information more visible on our website and in the document.

4. Other

(WQA) We are unclear whether DWQ uses any data which are found to be below applicable quantitation levels. We believe that data below PQLs should be assigned values of "0". We would like to know what DWQ's procedure is in terms of the use of data which are below quantification levels.

Response: Non-detects are not counted as exceedances but are counted as samples. Except for bacteria, no summary statistics, such as means, are used for assessment; therefore, PQLs are typically not an issue.

(Charlotte, CM, WQA) We believe that the data used to list a water body should be readily available, including biological data and RAMS data. A schedule of RAMS sampling locations should also be available.

Response: Macroinvertebrate, fish community, and fish tissue data have been available on the Environmental Sciences website for well over two years here: http://portal.ncdenr.org/web/wq/ess/bau . In addition, in February, 2012 macroinvertebrate, fish community, and fish tissue data were uploaded to STORET. Links to STORET data, and how to access this data can be found here: http://portal.ncdenr.org/web/wq/storethome. To facilitate access to these data, select ***21NC03WQ NCDENR-DWQ (2008-Current)*** *from the appropriate drop-down menu for "Agency Code." Please note, although "2008-Current" is noted in the agency code, the actual data includes data to February, 2012.*

The DWQ provides the location of both current and historic Random Ambient Monitoring stations on the RAMS website: http://portal.ncdenr.org/web/wq/ess/eco/rams. Before each two year cycle of sampling begins, potential sites are checked to assure sites meet criteria such as safety and accessibility for sampling. Additionally, landowner permission is required for all sites located on private property. This process takes many months and usually is not fully completed until just before the initiation of the monitoring of new sites. The Division will provide upcoming RAMS sites location information on the website as soon as station locations are finalized for the next two-year cycle.

The Division's data from its Ambient Monitoring System and the Monitoring Coalition Program are currently available from STORET, except for recent data going through the data review process which may represent a period up to one-year. The status of recent data can be obtained by contacting the AMS or Monitoring Coalition coordinators. Data from the Random Ambient Monitoring System for the period 2007-2010 are currently being formatted for uploading into STORET. Monitoring data from these three programs are loaded into STORET under separate identifiers, thus making the sources distinguishable from one another. All data are reviewed for quality control which prevents uploading the data into STORET as soon as analysis results are available.

DWQ can (upon request) provide summary data for each AU assessed, beginning in July-August of odd numbered years, in both tabular and GIS formats.

(WQA) Underlying information about biological sampling also should be made available, including survey sheets, sampling dates, and any other relevant information (or at least indicate its availability upon request). Additionally, the requisite procedures for biological sampling should be clearly stated, and each survey used for 303(d) purposes should include a certification that the requirements were followed.

Response: Information regarding biological sampling will be provided upon request. Additional information can be found in biological assessment reports here: http://portal.ncdenr.org/web/wq/ess/reports

(Mallin) Chlorophyll a- Based on the cyanobacterial bloom formation frequency, extensive areal coverage, toxicity, and impacts to dissolved oxygen, I strongly urge the Division of Water Quality to modify assessment field methods to properly quantify Microcystis bloom samples by adding surface film sampling as a standard means to assess chlorophyll a biomass when such blooms are visible.

Response: The Division's sampling method for chlorophyll a is designed to obtain an estimate of algal biomass through a sample of chlorophyll a. Since phytoplankton can be present throughout the column of water in which light can penetrate, sampling only films of algae on the waters surface could bias the results. The Division is acutely aware of the Microcystis blooms along portions of the Cape Fear River and elsewhere in the state, and works closely with the Department of Health and Human Services, public water supplies, DENR regional offices and local entities.

DWQ will evaluate methods to assess these events that are consistent with standards, and will consider for the upcoming Nutrient Criteria Development Plan if there is a more appropriate indicator for rivers than depth-integrated chlorophyll a.

(NCLM) For copper and zinc the League suggests that the methodology direct a staff evaluation of how these factors were applied for the affected permittee's specific circumstance.

Response: There is no consideration of the presence or absence of permittees during assessment. For questions about permitting, please refer to NPDES permitting staff, SOPs, and individual permits.

(Duke) Mercury - The statistical methods employed to interpret the data should be clearly described. The NC Mercury TMDL states "to protect water bodies from impairment, the 90th percentile standardized-length largemouth bass fish tissue total mercury concentration is selected to meet the target level." This methodology is not mentioned in the UAM but clearly should be.

Response: DWQ used the statewide fish consumption advice for the statewide Category 5 mercury in fish tissue assessment. Upon development of the TMDL, a numeric TMDL target had to be identified. This quantitative value would attain the applicable water quality standard, including designated uses and narrative criteria, as necessary to calculate the load allocation and wasteload allocation (40 C.F.R. 130.2(i)). No numeric fish tissue criterion for mercury is established in North Carolina; a fish tissue mercury target was therefore needed for this TMDL. The assessment process description does not include a description of the TMDL development process.

(Charlotte) When two sources of data are collected on one waterbody and the results are in conflict, procedures should be outlined and some forum should be available to discuss the disagreement. The source of the conflict should be determined before classifying the waterbody as impaired.

Response: If the data are for the same pollutant, data sets may be combined. For comparable data collected by different entities at the same location, the datasets are combined before the criterion is assessed to prevent conflict. If they are the same type of biological data, the more recent results would typically be used. In general, all parameters are assessed independently of one another. There is no conflict if one parameter is assessed in category 5 and the other in category 1. Before restoration efforts are undertaken all data sets are considered when determining the most effective and efficient approach to implementation.

(Charlotte) The assessment methodology should be periodically reviewed by the Environmental Management Commission.

> *Response: The EMC has decided to review the entire water quality assessment process (not just the 303(d) listing methodology) in even-numbered years prior to the assessment in the following odd-numbered year. Public review will also be part of this process.*

(McLarney) In my opinion, most macroinvertebrate-based assessment methodologies are more sensitive to water quality issues than fish-based methodologies. However, fish-based IBI better reflects impacts to habitat quality.

> *Response: DWQ would generally agree with this opinion. For example, in instances where fish IBI bioclassifications differ from benthic macroinvertebrate bioclassifications by more than one bioclassification level (e.g., IBI rates a stream Fair, benthos rates the same stream Excellent) it has been consistently documented that the water chemistry parameters (i.e., dissolved oxygen, specific conductance, pH) indicate favorable physico-chemical conditions. However, habitat data can demonstrate localized riparian and in-stream habitat deficiencies. These situations typically occur in mountain valleys where, although the overall catchment is largely forested (on the hillsides and areas immediately adjacent to the hillsides), the immediate sampling locality is in the valley where agricultural and other anthropogenic activities are concentrated. In these scenarios, despite the fact that the overall watershed is mostly forested (and therefore the water quality is favorable) the immediate habitat of the sampling locality is poor.*

(McLarney) Ecological/Biological Integrity - If the goal of your program is to assess the health of our streams, then I suggest a comparison of your fish IBI metric criteria with TVA and other criteria, probably leading to adjustments to more accurately reflect impacts to habitat. But if designation of "impaired" waters is inextricably tied to water quality, then for that purpose emphasis should probably be on benthic biomonitoring, complemented by determination of ambient parameters.

> *Response: As the previous comment and response suggest, benthic macroinvertebrates may not track habitat deficiencies as well as fish. Since most fish require clean, unembedded gravel/cobble substrate for spawning it should be no surprise that fish communities would be depressed in areas of intense sedimentation. Therefore, at least as it pertains to 303d listings, fish bioclassifications are useful tools to evaluate sediment impacts.*
>
> *While sediment and other habitat problems are likely the proximal cause for the low bioclassifications there are no standards for sediment or scour. Restoration efforts in these situations are likely to require hydrologic, hydraulic restoration with structural stream restoration and BMPs.*

(McLarney) Ecological/Biological Integrity - To the degree that habitat quality is a concern, I would like to draw attention to ongoing U. Georgia/Coweeta work on refinement of the USDA Stream Visual Assessment Protocol (SVAP). To the degree that DWQ is able to apply or promote this sort of low-cost, simple habitat assessment, it can serve as a "flagging" mechanism to help in the selection of sites for

follow-up with biomonitoring, ambient monitoring and/or more sophisticated habitat assessment methodologies.

Response: Based on experience gained from over 10,000 biological samples (fish community and benthic macroinvertebrates) spanning more than 30 years, we believe that habitat is not a reliable indicator or predictor of water quality. DWQ's Biological Assessment Unit (BAU) collects habitat data concurrent with biological samples to better enable BAU to interpret biological data. For example, the pollution intolerant mayfly Neoephemera purprea favors rootmat habitat. If we collect a sample where N. purprea is absent but note (through habitat assessment) that the favored root mat habitat is also absent, this key fact helps biologists interpret the data within an ecological context. In this instance, the lack of this pollution intolerant taxon is not necessarily the result of water quality problems but rather its absence was more likely the result of a simple lack of a particular habitat type.

(McLarney) Ecological/Biological Integrity - For some years now, I have expressed ethical concerns with the DWQ's fish sampling methodology, in terms of the high fish mortality which often results. I suggest that it would be to everyone's benefit to sacrifice a measure of efficiency to avoid high fish mortality and bad P.R.

Response: Although we believe that measures are already employed by DWQ biologists to reduce incidental mortality during IBI collections, we will continue to investigate methods by which fish mortality can be further reduced.

(WQA) We object to EPA's recent assertion of an unpromulgated policy that waters should be listed if an applicable water quality standard is exceed more than once in a three year period. EPA lacks the authority to impose it as a binding legal requirement on the state.

Response: DWQ is not recommending adoption of this assessment method.

(WQA, NCLM) We urge the DWQ to prepare electronic listing fact sheets for each new listing. The fact sheet should include the following: 1) Summary of the waterbody 2) Idenfity the pollutant(s) of concern 3) Provide a link to the raw data and associated information (QA/QC, etc) 4) Explain how the data met the listing criteria 5) Other appropriate information. NCLM adds staff deliberations on listings should be included as well.

Response: When assessment decisions of any kind are made outside of the general methodology it is well documented. DWQ will provide this information to the public for all future assessments. Most of this information is currently provided on the published 303(d) list. DWQ will include more information for future assessments.