

## **New Hampshire Department of Environmental Services**

### **RESPONSE TO PUBLIC COMMENT ON THE DRAFT 2006 CONSOLIDATED ASSESSMENT AND LISTING METHODOLOGY (CALM)**

2/23/06

On March 24, 2005, the New Hampshire Department of Environmental Services (DES) requested comments on the 2004 Consolidated Assessment and Listing Methodology (CALM) which served as a draft of the CALM for the 2006 Section 305(b) and 303(d) Surface Water Quality Report (i.e., the 2006 CALM). The request for comments was accompanied by a list and description of possible revisions being considered by DES at the time. Downloadable copies of the 2004 CALM and list of possible revisions were made available on the DES website for review ([www.des.state.nh.us/wmb/swqa/](http://www.des.state.nh.us/wmb/swqa/)). In addition, the following organizations/agencies were notified by email:

- Appalachian Mountain Club
- Audubon Society
- Connecticut River Joint Commissions
- Conservation Law Foundation
- County Conservation Districts
- Lake and River Local Management Advisory Committees
- Maine Department of Environmental Protection
- Manchester Conservation Commission
- Massachusetts Department of Environmental Protection
- Merrimack River Watershed Council
- National Park Service
- New England Interstate Water Pollution Control Commission
- NH Department of Health and Human Services
- NH Coastal Program
- NH Rivers Council
- North Country Council
- Regional Planning Commissions
- Society for the Protection of National Forests
- Natural Resources Conservation Service
- The Nature Conservancy
- Upper Merrimack River Local Advisory Committee
- US Environmental Protection Agency
- US Geological Survey
- US Fish and Wildlife Service
- US Forest Service
- University of New Hampshire
- Vermont Department of Environmental Conservation
- Volunteer Lakes Assessment Program
- Volunteer Rivers Assessment Program
- Water Quality Standards Advisory Committee

The public comment period ended on April 30, 2005. The following represents the Department's response to public comments received during this period. Each comment is numbered and

preceded by a general description of the subject matter. The Department's response immediately follows each comment (in bold font).

## A. RESPONSE TO PUBLIC COMMENTS

### James Donison, City of Concord

*SUBJECT: Section 3.25 Use: drinking water after adequate treatment*

**COMMENT (1):** The City of Concord recommends that the use of copper sulfate in the drinking water supply lake should not result in the assessment of the Penacook Lake being assessed as NS. There are additional conventional water treatment means (other than those listed) that can be implemented to control taste and odor issues in a water supply source including granular activated carbon, powdered activated carbon and ozone. The Mass MWRA consistently applies copper sulfate to their main water supply reservoir, the Quabbin Reservoir, as a routine taste and odor control method and the Quabbin reservoir is not a NS category there are many other water suppliers w/ lakes that use copper sulfate for T&O control when necessary.

**DES RESPONSE:** According to RSA 485-A:8, I and II, Class A and B surface waters shall be "... acceptable for water supply uses after adequate treatment". The statute does not state that such waters shall be acceptable for water supply uses after conventional treatment, as implied in the 2004 CALM. Copper sulfate is a relatively common form of treatment used by many water suppliers to control taste and odor problems and, therefore, meets the definition of "adequate treatment" necessary to make waters acceptable for water supply uses. Consequently, use of copper sulfate to control taste and odor problems in water supplies is not considered a violation of water quality standards. As such, use of copper sulfate to control taste and odor problems has been removed as an indicator of impairment for the drinking water use in the 2006 CALM.

### Bill Schroeder, Vice-president Canobie Lake Protective Association, on behalf of the Canobie Lake Protective Association

*SUBJECT: DES has proposed a New Element regarding "guidance for determining "naturally occurring" for parameters for which the Class A standard is "none unless naturally occurring" should be included". In the overview statement DES is proposing using a reference condition method to determine "none unless naturally occurring".*

**COMMENT (2):** We support the idea of using reference conditions, or reference lakes, to establish guidelines for what is "naturally occurring" in NH lakes. However we are greatly concerned that these guidelines may become de facto standards, and they should not. For any given parameter the naturally occurring level in one lake may be different from the naturally occurring level in another, and we must not lose sight of that. Already I have heard some of the members of WQSAC saying: " the level of phosphorus in a particular lake is within the range of Class A lakes in NH, so it meets the standard and could take some more". The standard is "naturally occurring", and what is naturally occurring for a particular lake may be different from the guideline.

Let me illustrate with an example. Env-Ws 1703.10 (a) states: "Class A waters shall contain no color, unless naturally occurring." Color is affected by the environment the water flows through before entering a lake or stream. Water that flows through boggy areas tends to have high color. If a guideline for color is established based on reference lakes, some lakes will exceed the guideline due to totally natural causes. And they will be listed as impaired, incorrectly. Even worse, some lakes which are naturally low in color will be well below the guideline number, and will be considered "available" to take on color from human activity. In this case, there will be no impediment to activities which degrade the naturally occurring color. In time, all lakes will regress to the upper limit which is accepted as (possibly) "natural".

If DES ultimately decides to use guidance numbers in the CALM, we urge that the wording emphasize the values are for guidance only, and do not replace or redefine the standard, which is "naturally occurring".

**DES RESPONSE:** A draft guidance for determining “naturally occurring” was not included in the 2006 CALM or used in the 2006 assessments. Although not used in the assessment, it is worth mentioning that the intent of the “naturally occurring” draft guidance is to estimate naturally occurring thresholds for various parameters based on statistical analyses of “reference” waterbodies. If the concentration of a particular parameter exceeds the “naturally occurring” threshold (i.e., is of worse water quality), the concentration is most likely not solely due to natural conditions. If, however, the concentration of the parameter is less than or equal to the naturally occurring threshold (i.e., is of better water quality), then the parameter concentration is most likely due to natural conditions. In either case, the antidegradation provisions of Env-Ws 1700 always apply and would be used to protect the waterbody from further degradation. The Department recognizes that the naturally occurring thresholds are estimates that can be overridden if more specific information in a watershed suggest otherwise. The Department does not anticipate making many naturally occurring assessments in the 2006 but may in the future. Any that are made in 2006 will be well documented in the Assessment Database (ADB) and will likely only include low pH due to naturally occurring organic acids where color measurements are used to make this determination.

**SUBJECT:** *Section 3.2.5. Use: drinking water after adequate treatment. DES proposes to "remove treatment with copper sulfate as an indicator of impairment" (for drinking water).*

**COMMENT (3):** We oppose this. If a waterbody has to be treated with copper sulfate to kill the algae causing taste and odor problems in the drinking water, it is impaired. Furthermore, the treatment deals with the effect and not the cause, which is most likely too much nutrient in the water.

We believe that progressive municipal water boards would also oppose this. If a water supply is listed as impaired for this reason, it gives the water board a reason to impose controls in the watershed. For example, the water board could require septic system improvements and use of low-phosphorus fertilizer in the watershed. Too little of this is done in many places today. Removal of copper sulfate treatment as an indicator of impairment removes a tool that water boards can use: "our water source is impaired, therefore we need to take measures...".

**DES RESPONSE:** See the DES response to Comment (1).

**Bill Arcieri, Great Bay Environmental Consulting**

**SUBJECT:** *Allowing the use of partial data Sets and grab samples to determine %Sat on DO measurements with full 24 hr data sets.*

**COMMENT (4):** Fully support proposed change since grab samples and partial data sets can provide relevant information

**DES RESPONSE:** The Department agrees.

**SUBJECT:** *Elimination metals assessment table for “non-clean” sampling techniques.*

**COMMENT (5):** Not sure – no comment

**DES RESPONSE:** The Department has revised the approach taken for the evaluation of metals samples taken with “non-clean” techniques. The new procedure acknowledges that if clean techniques are not used (i.e. non-clean techniques), contamination during sampling or in the

**laboratory is likely to occur and will yield results that are not likely to be representative of ambient conditions. Because of this, the Department could have simply stated in the CALM that only metals data using clean techniques can be used in assessments. The Department, however, opted not to do this as it would have ignored the vast majority of metals data which has been collected and/or analyzed using non-clean techniques. Instead, the Department sought a way to use the non-clean data in the assessment process wherever possible. This was accomplished by adopting the following approach.**

**If the result from a sample collected via non-clean techniques was less than the water quality criteria in Env-Ws 1700 then that sample may be used toward a full-support determination. In other words, if a non-clean, potentially contaminated, sample meets the standard, there is no doubt that the uncontaminated concentration in the surface water that the sample is intended to represent also meets the standard.**

**For determining impairment based on non-clean metals data, the Department developed a table (i.e., the “dirty metals” table) that includes literature-based contamination factors added to the water quality criteria in Env-Ws 1700. The non-clean assessment thresholds are higher to account for the fact that non-clean metal samples are likely contaminated and therefore have concentrations higher than ambient conditions. In other words, use of the higher thresholds account for probable contamination in the non-clean samples and helps to minimize the number of waters incorrectly assessed as impaired which are actually meeting standards. If the non-clean data was greater than the thresholds in the “dirty metals” table then that sample was used toward a non-support determination. If the result was greater than the water quality criteria in Env-Ws 1700 but less than the value in the “dirty metals” table then that sample was inconclusive and could not be used to make a use support determination. In such cases, it is recommended that the site be re-sampled using clean technique procedures and analyzed in a certified clean lab.**

*SUBJECT: Implement use of “reference condition to determine “naturally occurring” levels.*

*COMMENT (6): Fully support proposed revision; quantifying “naturally occurring” always been difficult, suggest upstream or non-affected area to represent reference condition.*

**DES RESPONSE: See the DES Response to Comment (2).**

*SUBJECT: Incorporate frequency/duration of possible exceedance when continuous data sets are available.*

*COMMENT (7): fully support proposed change – more closely reflects wq standard if a 4-day or 1-day average can be calculated; still difficult to address or compare not to occur more than once in 3 yr period.*

**DES RESPONSE: The Department agrees. Where less than three years worth of continuous data sets are available, one exceedance of the chronic (4 day average) or acute (1 hour average) will be sufficient to list an Assessment Unit (AU) as impaired for a particular toxic. Once larger data sets become available the Department will conduct statistical evaluations of the data to determine frequency of occurrence. In most cases, grab samples will continue to be used in conjunction with the 10% rule [see Comment (8)] to determine compliance with the chronic and acute criteria.**

*SUBJECT: Should “Binomial Method” be abandoned – possibly based impairment on 3 or more violations regardless of number of samples.*

COMMENT (8): Seems like reasonable approach – a minimum # of samples would be required?

**DES RESPONSE**: For 2006, the Department has decided to abandon the “binomial method”. For the suite of parameters that were subject to the binomial method in the 2004 CALM (dissolved oxygen (DO), pH, chlorophyll a, & toxics) a new approach, called the 10% Rule, will be used in 2006 assessment process.

In general, the 10% rule simply means that at least 10% of the samples must violate water quality criterion before a waterbody will be listed as impaired. Like the binomial approach, the number of samples needed to list a water as impaired increases with the total sample size, although fewer exceedances are needed using the 10% rule.

There are a few exceptions to the 10% rule. The first is for situations where 10% of the total number of samples is less than two. In such cases, a minimum of two samples is used to determine compliance. This is consistent with a basis premise of the CALM that an assessment will not be based on just one sample. The second exception is for relatively large exceedances of the criterion. In such cases, only two exceedances are needed to assess the water as impaired. This is discussed in more detail below (Magnitude of Exceedance Criteria). The third exception is that the 10% Rule is not used for probabilistic assessments. Finally, the fourth exception is that this rule only applies to DO, pH, chlorophyll a and toxics.

The 10% rule is primarily intended to address situations where samples violate criterion but not by large amounts (i.e, values are within the accuracy of sampling and method of analysis). To capture gross exceedances of water quality criterion that are truly representative of violations in the waterbody, the CALM includes magnitude of exceedance (MAGEX) criteria which are usually set a little higher than the acute water quality criterion. Regardless of the total number of samples, a water may be listed as impaired if two or more samples exceed the MAGEX criteria.

Specifics regarding how the 10% Rule and MAGEX criteria will be applied in 2006 for DO, pH, chlorophyll a and toxics are provided below:

**Dissolved Oxygen (mg/L & % saturation)** – The CALM will require application of the 10% rule with a minimum of two exceedances to list an assessment unit (AU) as not supporting. This procedure will screen out anomalous data so that waterbodies would not be listed because of a few questionable samples. That is, in cases where a waterbody has just a few exceedances and those exceedances are small (potentially within the meter error) the waterbody would not be listed as impaired.. To capture significant water quality exceedances, the magnitude of exceedance criteria (MAGEX) for both parameters will be set just outside the range of meter error (ex. 4.5 mg/L for a Class B water). If two or more samples exceed the MAGEX criteria, the AU will be listed as impaired regardless of the total number of samples.

**pH** - The CALM will require application of the 10% rule with a minimum of two exceedances to list an AU as not supporting. The MAGEX criteria will be set at the 2004 levels of 1 standard pH unit less than (5.5) and greater than (9.0) the water quality criteria. If two or more samples exceed the MAGEX criteria, the AU will be listed as impaired.

**Chlorophyll a** – The CALM will require application of the 10% rule with a minimum of two exceedances to list an AU as not supporting. The MAGEX criteria will be set at twice the criteria

**used with the 10% Rule (FW=30 ug/L, MW=40 ug/L If two or more samples exceed the MAGEX criteria, the AU will be listed as impaired regardless of the total number of samples. Toxics –For assessments based on grab samples, the CALM will require application of the 10% rule with a minimum of two exceedences to list an AU as not supporting. The MAGEX criteria will be set at twice the water quality criteria. If two or more samples exceed the MAGEX criteria, the AU will be listed as impaired. If continuous data sets are available (minimum 15 minute data collected for 1 hour for acute and 1 hour data collected for 4 continuous days for chronic) the CALM will require comparison of the data to the frequency, duration and magnitude of exceedance criteria used to develop the acute and chronic water quality criteria for determining compliance.**

*SUBJECT: Refinement of “critical period” for Sec 3.2.4 Aquatic Life, for example parameters related to storm water/ meltwater runoff.*

*COMMENT (9): It seems reasonable to require that only data collected during such a event be applicable – define storm event using EPA criteria e.g., min 0.5” rain after 72 hrs*

**DES RESPONSE: In most cases, data collected during any time period. Including storms, can be used to assess a water as not supporting (i.e., impaired). The only exception is when the water quality criterion specifically states the time period when the criterion applies (i.e., compliance with the higher dissolved oxygen criterion associated with cold water natural reproducing fisheries shall only be based on data collected between October 1 and May 14). In such cases, only data taken during the specified time frame can be used to assess compliance with the criterion.**

As a general rule, critical time periods are most important for determining if a parameter meets standards. In such cases the critical time period is purposely established during the time when impairments are most apt to occur (i.e., low dissolved oxygen levels are most likely to occur in the summer when temperatures are high and river flows are low). Consequently, if sampling is conducted during the critical period, and it shows compliance with water quality criterion, one can be quite sure that it meets water quality standards all of the time.

For the 2006 cycle the department is adding a critical period definition for chloride. While chloride is not a core parameter for Aquatic Life Use Support it is important that use support decisions are based on chloride samples that cover the critical periods to prevent biased sampling that could result in erroneous assessments.

For a Full Support (FS)determination at least 50% of the minimum number of independent samples needed for FS, shall be taken between June 1 and September 30, which is when there is the greatest likelihood of seeing impacts due to long term groundwater loading (i.e., baseflow) and/or ion exchange water softeners that rely on chloride for recharge. The remaining 50% of the minimum number of independent samples needed for FS, shall be taken during melt events between December 1 and March 15, which is when high chloride inputs from the melt of “managed snow” in paved areas (i.e., road salting practices) are likely to be the greatest.

Note that specific conductivity may be used as a surrogate for chloride so long as at least 2 chloride samples are collected within each time period to confirm that the area fits the statewide specific-conductance-chloride relationship. In the event that the

**confirmation samples do not adequately fit the state-wide relationship a site specific relationship may be developed.**

SUBJECT: Determine periphyton criteria for primary contact recreation indicator 4 COMMENT

(10): Agree that both chlorophyll a and periphyton standards would be useful; use of lay lake monitoring data for chl a would seem appropriate and lit. values for periph.

**DES RESPONSE: As in 2004, the 2006 CALM includes phytoplankton water column chlorophyll a thresholds of 15 ug/L in freshwaters and 20 ug/L in marine waters. In its assessments, the Department will use all available phytoplankton chlorophyll a data which has been properly reviewed for quality assurance and quality control. Periphyton chlorophyll a levels have not yet been established and consequently were not included in the 2006 CALM. This omission, however, is not expected to impact assessments in 2006 because of a lack of quantitative periphyton data. By 2008, the Department expects to include periphyton chlorophyll a thresholds in the CALM, which will likely be based on literature values.**

SUBJECT: Evaluate pH criteria.

COMMENT (11): Yes. Lowering the min pH criteria to 6.0 should be considered; often observe lower values in streams given low pH rain and buffering capacity – naturally occurring.

**DES RESPONSE: An important premise of the CALM is that it must be consistent with the State's water quality standards. RSA 485-A:8, II and Env-Ws 1703.18(b) states that the pH of Class B surface waters shall be between 6.5 and 8.0, unless naturally occurring. Consequently, until the statute and regulations are changed, compliance for pH must be based on this range. If changes to the standards are proposed, the Department will go through a public process for input.**

For determination of naturally occurring low pH, the 2006 CALM includes the same methodology used in the 2004 CALM, which is based on the amount of color in the water. If the color is greater than 30 cpu, the low pH is attributed to naturally occurring organic acids (i.e., humic and fulvic acids). Ideally, more work will be done in the future to try to predict what the natural pH conditions are within a given waterbody based upon factors such as geology, pre-acidified precipitation, and natural system productivity (a seasonal component). Once the natural seasonal pH range of water is determined, the department could evaluate samples from that waterbody in terms of deviation from the norm for that water.

**Diane Switzer / Tom Faber / Al Basile,**  
**United States Environmental Protection Agency, Region 1**

SUBJECT: Page 3-2

COMMENT (12): We have a concern about the assumption that an Assessment Unit (AU) is automatically homogenous unless the state has data supporting that contention. If the State is applying a maximum number of miles for an AU size, it should be with the understanding that an AU is not homogenous at all unless monitoring data at multiple sites and depths support this designation. Throughout this document, the state mentions homogeneity as a feature, and at all points of this application, we disagree with the premise.

**DES RESPONSE: Assessment Units are sufficiently homogeneous to focus the necessary attention and resources to areas of concern within the state. The sampling efforts that would be required to conduct a statistically robust evaluation of the homogeneity for the nearly 5200 AUs in the state are well beyond the resources available. Such analysis would need to be conducted on a parameter by parameter, and season by season basis greatly multiplying the resources necessary. Where data shows a clear change in water quality disproving the homogeneity hypothesis the department will make necessary adjustments to the spatial extents of a given AU.**

*SUBJECT: Page 3-7*

*COMMENT (13): Naturally occurring: We support the efforts to identify those waters which are impaired due to “natural” conditions and also to track them in the ADB system in some way.*

**DES RESPONSE: The Department agrees and recommends that EPA revise the ADB to facilitate tracking of parameters that exceed criterion, but are considered fully supporting for that parameter since the source of the exceedance is due to naturally occurring conditions. Currently, the Assessment database (ADB) will only track causes and sources of impairment for uses assessed as Not Supporting or Insufficient Information. If a parameter exceeds State water quality criterion but is determined to be due to natural sources, the use would be Fully Supporting for that parameter even though it exceeds the numeric water quality criterion. Unfortunately, the ADB is not set up to track this type of information. Therefore, similar to 2004, the Department will track natural exceedances in the 2006 ADB by putting the cause under “Observed Effects” and include comments about the natural source in the use level comment field.**

*SUBJECT: Page 3-14*

*COMMENT (14): The term “independent” has a definition which is confounding. The provision that samples collected 500 feet apart are independent, and those closer than 500 feet apart are not, does not appear to be rational. Why view samples collected closer than 500 feet as composite or a decision point for taking only one sample result? It’s not based on a realistic application, but an arbitrary determination.*

**DES RESPONSE: In cases where two samples are collected within 500 feet of one another on the same date, the sample which is most likely to exceed water quality standards is kept for criteria comparison. By doing so the Department eliminates a portion of the autocorrelation that could be induced by a series of samples collected at closer intervals. If there is quantitative evidence to suggest that a number other than 500 feet should be used, the Department will consider it.**

*SUBJECT: Page 3-14*

*COMMENT (15): As we do not accept the premise that each AU is homogenous, theoretically or actually unless monitoring confirms this, compositing of samples for averaging results does not appear appropriate. The highs and lows of results may be telling a story the State is missing.*

**DES RESPONSE: This comment refers to section 3.1.14 in the 2004 CALM. In cases where two samples are collected greater than 500 feet from one another on the same date, those samples have a smaller likelihood of autocorrelation. The term ‘aggregation’ was used to mean that samples from different sites could be used to calculate the geometric mean for bacteria within the AU and that each of the samples (any parameter) would be used to make a support decision for the AU.**

*SUBJECT: Page 3-15*

**COMMENT (16):** A set spatial coverage of an AU is a general recommendation if there are not factors to indicate a smaller geographic coverage is more appropriate. The extent of an AU in Kansas may be different than in New England where heterogeneity is more commonly the case.

**DES RESPONSE:** The Department agrees; to account for heterogeneity, the State's surface waters were divided into more than 5200 AUs.

*SUBJECT: Page 3-16*

**COMMENT (17):** We object to the design and the application of the "Binomial Method". The State has taken the Designated Use support categories presented in EPA's 1997 305(b) Guidance and misapplied them to produce a phenomenon that is extremely unprotective of the environment which our agencies are charged with protecting. In the 1997 Guidance, a Fully Support Category for Aquatic Life Use is defined as having data in which up to 10% of the samples may exceed the applicable standard. Beyond the 10%, the Partial Support and Fully Support categories are designated, depending upon the severity of impairment. The Partial Support category is not an indicator of attainment of standards. The State, however, has placed the Partial Support category into a "no man's land" in which no impairment designation of any kind is made. The binomial method is manufactured to provide a high bar of up to 30% of the samples required to exceed criteria before an AU is determined to be not attaining a standard or supporting a use. On page 3-17 of this CALM, the state declares a 53% chance of error in identifying an AU which is actually impaired as attaining standards! This is not acceptable.

**DES RESPONSE:** See DES Response to Comment ( 8). As indicated, in 2006 the more stringent 10% Rule will be used in lieu of the Binomial method to determine compliance with water quality standards based on grab samples.

*SUBJECT: Page 3-19*

**COMMENT (18):** We do not think MAGEXC needs to exist, as it compromises the state standards. Any sample result over the criteria should indicate impairment. The extremely high percentage of MAGEXC seems to indicate a very wide buffer in which the state may be indicating that a number in the standard is not the "real" number for some reason.

**DES RESPONSE:** The magnitude of exceedence (MAGEX) criteria is in direct response to the 10% Rule in EPA's 1997 guidance. If a dataset contains daily dissolved oxygen samples for a summer critical season (June 1<sup>st</sup> – Sept 30<sup>th</sup> or 122 days) the 10% Rule [see Comment (8)] says that if no more than 12 of those samples violate the State Class B criteria of 5 mg/L the waterbody can be assessed as Fully Supporting for dissolved oxygen. What the MAGEX criteria says is that if there are two or more exceedences in that dataset that exceed the dissolved oxygen criteria by a sufficient degree (in 2004 this was more then 1 mg/L below the standard) then the AU can be listed as impaired. What this captures is gross exceedences hiding in large datasets. The MAGEX does not provide a buffer to the State water quality standards. For additional information on how the Department plans on tightening the MAGEX criteria for dissolved oxygen in 2006, see the DES Response to Comment (8).

*SUBJECT: Page 3-19*

**COMMENT (19):** The general description of "predictive models" is of concern. There is no mention of specific models or their applications. We are not comfortable with models alone being used to indicate attainment in Categories 1 and 2 of the Integrated Report.

**DES RESPONSE:** To date, use of predictive models to make or assist with assessments have been used relatively infrequently and limited to simple dilution calculations or QUAL2E and WASP on point source impaired waters. The intent of the CALM is to allow use of such models for

**making assessments if the model has been properly calibrated. The Department does not currently have specific guidelines for what constitutes a properly calibrated model, but may in the future.**

**It is the Department's position that if the results from a calibrated model can be used to assess a water as impaired and to list it on the 303(d) List (Category 5), then it can also be used in the predictive model to assess waters that are fully supporting and to delist them from the 303(d) List if appropriate. This is consistent with the 2006 EPA Integrated Report Guidance (Section V.H.2., page 58) which states that, "Consistent with 40 CFR 130.7(b), "good cause" for not including segments in Category 5 may be based on the following determinations: ... The results of more sophisticated water quality modeling demonstrate that the applicable WQS(s) is being met."**

*SUBJECT: Page 3-21*

**COMMENT (20):** New Hampshire used the Weight-of-Evidence approach for Aquatic Life Use Support (ALUS) determinations, as many other states do. EPA has a Policy of Independent Applicability, in which the determination of support can be decided based upon biological, physical/chemical, and/or ambient toxicology data. An indication of impairment by any one the three categories of data should indicate an impairment in ALUS and applicable numeric and narrative water quality standards.

**DES RESPONSE:** The Department generally agrees. Similar to 2004, use of the weight-of-evidence approach in 2006 will only be applied when there are gross differences in data quality or applicability. Such decisions will be well documented and are expected to be relatively few in number.

*SUBJECT: Page 3- 22*

**COMMENT (21):** With regard to "Sample Location" comments, there is a contradiction by the state with regard to a presumption of homogeneity. As stated previously in our review, the homogeneity of an AU should not be a given. Cover the range or breadth of an AU, so that all features of the water body are included, depending upon the water quality standard or designated use. We are not sure whether more weight should be given to "downstream" samples, as all areas of the AU should experience the same standards and assessment rigor.

With regard to "Quantity of Samples" comments, we are not sure whether it is a safe assumption that the indicator with the most data is the one that is the most representative of the population being sampled. An occasion in which there are multiple DO readings, and just a few IBI's, would be a challenge to this assumption. Water quality readings vs. ambient toxicity measures may also be an exception.

**DES RESPONSE:** See DES Response to Comment (12) regarding AU homogeneity.

**With regards to the "Quantity of Samples" comments, it was never the Department's intent to make an assessment based solely on the parameter with the most data. In all cases, each parameter is assessed independently. If the data conflicts one another (i.e., one parameter suggests fully supporting and another suggests not supporting), the data is then scrutinized more closely in accordance with the criteria included in the "Weight of Evidence" section of the CALM. In such cases factors such as the type, quality and age of the data are considered before making a final assessment.**

SUBJECT: Page 3-31

COMMENT (22): In Table 3-15, Note #1 Water Quality Criteria B the column titled “75% of GMC” is supposed to be the 75<sup>th</sup> percent confidence interval as expressed in the implementation guidance, so this appears to be an error. We don’t understand the use of the 75% value, when the geometric mean and SSMC are already provided.

**DES RESPONSE:** The single sample bacteria criteria for New Hampshire freshwater beaches and all tidal waters (including tidal beaches) are based on a 75% confidence level. For all other freshwaters (i.e., non-beach areas), the single sample criterion is based on a 90% confidence level. As explained below the 75% of the GMC value included in Table 3-15 is not intended represent the confidence level for single samples.

The preferred data for assessing Primary Contact Recreation as Fully Supporting is a geometric mean (GM) based on at least 3 bacteria samples collected within 60 consecutive days as specified in RSA 485-A:8,II. Although State water quality standards would allow it, the CALM does not allow a Fully Supporting decision to be made on just one bacteria sample even if it falls below the Single Sample Maximum Criterion (i.e., 406 *E. coli* for Class B waters that are not designated beaches). This is because the Department has embraced the premise that hat a single sample will not be used to make an assessment. The CALM does, however, allow a Fully Supporting assessment to be made if there are only two single samples and both samples are less than 75% of the GM criterion. This is based on data collected to date which indicates that when individual bacteria samples fall below the GM criteria they are usually around 10 cts/100mL. If a third sample was collected for calculation of a true GM, it would have to exceed 20,000 cts/100mL to violate the non-beach Class B, GM criterion of 126 cts/100ml. The likelihood of a third sample from the same site being high enough to cause a GM criterion violation is, therefore, exceedingly low. Consequently, the Department has a high degree of confidence in assessing waters as Fully Supporting for Primary Contact Recreation if there are only two samples and both are less than 75 % of the GM criterion.

SUBJECT: Page 3-32

COMMENT (23): Note 4c: We are comfortable with analyzing samples for the geomean from the same location within the AU, but not from different sites. Compositing results may be acceptable from well-defined homogenous areas, such as a designated bathing beach or from a transect across the width of a small stream.

**DES RESPONSE:** This goes back to the question of whether AUs are sufficiently homogeneous. The Department believes that they are sufficiently homogeneous to mix samples from different sites for the geometric mean criteria (see DES Response to Comment (12). Note that the geometric mean criteria (GMC) and the single sample maximum criteria (SSMC) have independent applicability in the New Hampshire CALM. Consequently, diluting a couple high counts with samples from a space or time yielding low values is not an effective way of keeping an AU from being listed. That is , if two or more single samples exceed the Single Sample Maximum Criterion, the waterbody would be assessed as impaired, even if the GM criterion was met. Further, in sampling a stream cross section that was less than 500 feet wide on a given day, the highest bacteria concentration (i.e., worse case value) from that cross section is the value that would be used in the assessment process.

SUBJECT: Page 3-33

COMMENT (24): There is a typographical error in the column “Total # WQC Exceedances”: Each reference to table 3-10 should be changed to table 3-11. We do, however, strongly encourage dropping the binomial method approach the state has created, as it is not protective at all, and seems to be a misapplication of other guidance.

There are two applications: one is the assessment for 305(b)/303(d) listing, and the second is the immediate decision for open/closure. The 15ppb as an instantaneous value for a fresh water closure decision seems reasonable right now. Why is the 20ppb figure used for tidal waters?

**DES RESPONSE:** The Department acknowledges the typographical error and will make appropriate corrections in the 2006 CALM. As previously discussed [see DES Response to Comment (8)] the binomial table 3-11 will be replaced with the straight 10% Rule.

**The 15 ppb and 20 ppb phytoplankton chlorophyll a thresholds are used for assessing primary contact recreation and not for making open/closure decisions for the shellfishing use. As stated in the 2004 CALM, the 20 ppb chlorophyll a criterion in tidal waters is based on the Department’s Interim Chlorophyll Criteria for Tidal Waters (DES-WMB Guidance Number 009, 2003). The guidance document notes that EPA used 20 ug/L as their cut-off to designate tidal waters as being of "poor quality" for the latest National Coastal Condition report (EPA, National Coastal Condition Report II. EPA-620/R-03/002. U.S. Environmental Protection Agency, Office of Research and Development/Office of Water, Washington, DC., 2005). This criteria was specific to East Coast and Gulf Coast estuaries.**

**The Department will continue to use 20 ug/L as the threshold chlorophyll-a in tidal waters for the 2006 305b assessments. As noted above, this threshold value has the benefit of having passed peer-review at EPA and will result in 305b assessments based on chlorophyll a that are consistent with EPA's NCA reports.**

SUBJECT: Page 3-35 and Page 3-36

COMMENT (25): We have similar comments to those for Primary Contact on page 3-33, including the “75% of GMC” being a misunderstanding of the implementation guidance.

**DES RESPONSE:** See DES Response to Comment (22).

SUBJECT: Page 3-39

COMMENT (26): The second bullet under “2b”: Is there a typographical error with reference to cold water fisheries and the dates of October 1 and May 14. Should the dates be switched so its from Spring to Fall? Otherwise it’s just winter sampling.

**DES RESPONSE:** The time periods stipulated in the CALM are correct. Env-Ws 1703.07(c) states that “For the period from October 1<sup>st</sup> to May 14<sup>th</sup> in areas identified by the fish and game department as cold water fish spawning areas...” The intent of this section of the state surface water quality standards is to protect over-wintering fish eggs by setting higher instantaneous and 7 day average dissolved oxygen concentration criteria. The 5 or 6 mg/L criteria depends upon stream class and applies at all other times of year.

SUBJECT: Page 3-41 and 3-42

COMMENT (27): For the tables for DO, why is there an “insufficient information” designation for a band of percents? If the data is of known quality, why the wide buffer between attaining and not attaining. This seems to be non-protective, and providing for excursions beyond standards.

**DES RESPONSE:** Prior to the 2004 assessment, the Department evaluated a set (n~40) of DO datalogger installations to determine if and how *grab samples* for DO percent saturation could be used to determine compliance with the average daily DO percent saturation criterion (i.e., 75% saturation). The Department determined that at certain times of the day and at particular DO percent saturation readings an *instantaneous grab sample* can not be used to confidently estimate compliance with the average daily DO percent saturation criterion. Consequently, in the tables mentioned, there are certain times of the day and/or ranges of DO percent saturation readings that result in a conclusion of insufficient information.

Before proceeding it is worth noting that if a 24 hour DO percent saturation dataset is available (i.e., samples taken at least every hour for 24 hours), the Department directly applies the 75% DO saturation criterion to the 24 hour average of the individual measurements to determine compliance.

SUBJECT: Page 3-43

COMMENT (28): The application of the States binomial distribution table, as mentioned before, is not suitable for pH criteria determinations.

**DES RESPONSE:** As previously discussed, the binomial method will be replaced by the 10% Rule in the 2006 CALM [see DES Response to Comment ( 8 )].

*EPA's comments on the list of topics generated within DES*

SUBJECT: Beach Assessment Procedure

COMMENT (29): We are not at all comfortable with the state's construction of its "binomial method" and would prefer that this approach be eliminated for the 2006 reporting cycle for all assessments

**DES RESPONSE:** The binomial approach was never used for beach assessments. Further, as previously discussed, the binomial approach will not be used in the 2006 assessment [see DES Response to Comment ( 8 ).]

SUBJECT: Assessment of uses besides Primary Contact Recreation at Beach AUIDs

COMMENT (30): Applying assessments from other nearshore areas around the designated beach area may be warranted, although the concern of habitat disturbance is a factor. We'd prefer that there be at least initial beach seining, perhaps a macroinvertebrate assessment as applicable, and a physical habitat assessment to support the contention that the extrapolation makes sense.

**DES RESPONSE:** As in 2004, assessment of uses (other than Primary Contact Recreation) for Beach AUIDs in 2006 will be based on the same core data requirements as the Non-Beach AUIDs. Further, the Department will apply Aquatic Life assessments based on non-biotic parameters (i.e, pH, dissolved oxygen, metals, etc.) from the parent waterbody AU to the adjacent Beach AU(s). For future assessment cycles, the Department will consider gathering additional information as suggested to support extrapolation of assessments from a parent waterbody to adjacent Beach AUIDs.

SUBJECT: Application of dissolved oxygen percent saturation (%DO) criteria in the case of: Partial day, continuous data logger data sets, and grab samples

COMMENT (31): We could not evaluate the state's proposed changes to this section, since the reviewer feels this section's methodology is inconsistent with the "State of New Hampshire Surface

Water Quality Regulations Chapter 1700”, section 1703.07 (Env-Ws 1703.07). This references a “daily average”, “instantaneous minimum”, and specified waters a “7 day mean”. The NH CALM Section 3.2.4, Use : Aquatic Life is inconsistent with Env-Ws 1703.07. The use of a “MAGEXC” and binomial method (listed in Table 3-18) for Dissolved Oxygen is inconsistent with the regulated “instantaneous minimum”.

There are critical windows over the course of the day which should be included in datasets that are less than 24 hours in length. Borrowing from compliance monitoring, data sets that incorporate time periods no longer than 6 hours apart over a 24 hour period may be suitable. There should be more clarification here as to dataset requirements.

**DES RESPONSE: For the reasons stated below, the Department believes that the CALM dissolved oxygen criteria are consistent with Env-WS 1700.**

**Average Daily 75% Saturation Criterion: :**

**According to Env-Ws 1703.07(a) and (b), unless naturally occurring, Class A and B waters “...shall have a dissolved oxygen content of at least 75% saturation, based on a daily average”.**

**According to the 2006 CALM, if a 24 hour DO percent saturation dataset is available (i.e., readings taken at least every hour for 24 hours), the 24 hour average of the individual measurements is used to determine compliance with the average daily 75% saturation criterion.**

**The reviewer is likely referring to the application of *grab samples* for determining if an AU meets the average daily 75 % saturation criterion. According to the CALM, grab samples can be used to determine compliance with the average daily 75% saturation criterion depending on the time of day the samples were taken and the measured value of percent saturation. The thresholds included in the CALM for this purpose are based on a study done by the Department in 2004 wherein data from 40 DO datalogger installations were evaluated to determine if and how grab samples for DO percent saturation could be used to approximate the average daily 75% saturation DO criterion. The study showed that grab samples could be used to determine compliance with the criterion if the samples were collected within certain times of the day and if the grab sample percent saturation results were above or below certain percent saturation thresholds. If the grab samples were not collected during the specified time or if the results did not meet the specified thresholds, the grab samples could not be used as a reliable indicator of the average daily 75% saturation criterion. In such cases, the data would be assessed as insufficient information as it was insufficient to reliably determine compliance with the average daily 75% saturation criterion. Prior to making a final use support assessment the data is checked against the 10% Rule criteria [see DES Response to Comment (8)]**

**Instantaneous Minimum Dissolved Oxygen Criterion (in mg/L):**

**According to Env-Ws 1703.07(a), unless naturally occurring, Class A waters shall have “...an instantaneous minimum of at least 6 mg/L at any place or time...”.**

**According to Env-Ws 1703.07(b), unless naturally occurring, Class B waters shall have “...an instantaneous minimum of at least 5 mg/L”.**

**According to the CALM, the preferred data for determining compliance with the instantaneous minimum dissolved oxygen (DO) criteria is a full days worth of instantaneous data from a data logger. In such cases the lowest value (i.e., worse case) for the day is used for assessment purposes.**

**The reviewer is likely referring to the application of *single grab samples* for determining if an AU meets the 5 or 6 mg/L criteria. When only grab samples are available, the CALM states that in order to conclude that the instantaneous minimum DO criterion is satisfied (i.e., fully supporting), grab samples used to make this assessment must be collected during the season and time of day when DO is most likely the lowest (i.e., during the early morning hours of the summer). However, to conclude that the instantaneous minimum DO criterion is not met (i.e., not supporting) any sample during any time of the day can be used as the criterion must be met at all times of the day. Prior to making a final use support assessment the data is checked against the MAGEX (discussed below) and the 10% Rule criteria [see DES Response to Comment (8)].**

#### **Magnitude of Exceedence (MAGEX) Criteria: –**

**The magnitude of exceedence (MAGEX) criteria is included in the CALM to complement the 10% Rule [see EPA’s 1997 guidance and DES Response to Comment (8) regarding the 10% Rule]. For example, in a dataset contains daily dissolved oxygen samples for a summer critical season and time of day (June 1st – Sept 30th or 122 days) the 10% Rule says that if 11 of those samples violate the State Class B criterion of 5 mg/L, the waterbody is Fully Supporting of the 5 mg/L criterion. The purpose of the 10% Rule is to account for exceedances that may be due to such things as instrument error. It is does not address situations where there are gross exceedances of water quality criterion which are truly indicative of water quality violations. In such cases fewer samples should be needed to list a water as impaired. This is exactly the purpose of the MAGEX criteria; regardless of the total number of samples collected, it allows waters to be listed as impaired based on only 2 samples, provided that the samples exceed the MAGEX criteria established in the CALM. For dissolved oxygen the MAGEX criteria was set at 4.0 mg/L in 2004 ; in the 2006 CALM it is expected to be increased to 4.5 mg/L [see DES Response to Comment (8)]. Without the MAGEX criteria, it’s quite possible that fewer waters would be listed as impaired.**

**SUBJECT: *Spatial applicability of stations in the Little Bay/Great Bay area***

**COMMENT (32): We do not encourage seeking out “boundaries” between AU’s in order to avoid monitoring the AUs themselves properly. With regard to the second bullet, the local impacts of nearshore activities like marinas on ALU and bacteria should be monitored directly, as they are not necessarily “homogenous” with nearby AUs.**

**DES RESPONSE: The spatial applicability of stations in the estuaries will not be used to apply ALUS core parameters into marina areas. Estuary and Ocean AUs are spatially coincident with the designated shellfishing zones so that the shellfishing classification can be applied to**

**assessment of the shellfishing designated use. Since these zones are not strictly hydrologically based and, depending upon the hydrologic mixing characteristics in the area, data collected in one AU may also be representative of a bordering AU. If data from one AU is used to assess another tidal water AU, the reasons for this decision will be documented in the 2006 assessment.**

SUBJECT: *Elimination of the assessment table used for determining metal impairment...*

COMMENT (33): This seems to be reasonable.

**DES RESPONSE**: **As previously discussed, the Department has revised the approach for evaluating metal samples taken with “non-clean” techniques [see DES Response to Comment ( 5 ).]**

SUBJECT: *The guidance for determining “naturally occurring” for parameters for which the class A standard is “none unless naturally occurring” should be included*

COMMENT (34): We have not seen the method as described, and it was not provided with this revision proposal. We withhold comment until the method is presented.

**DES RESPONSE**: **See DES Response to Comment (2).**

SUBJECT: *Revision of the criteria used to determine use support for “Drinking Water After Adequate Treatment”*

COMMENT (35): Since the application of CuSO<sub>4</sub>, is not considered conventional treatment, it is difficult to justify the proposed revision. The treatment of the source water is performed to make it easier on the treatment plant, so it should continue to be included. The means by which the treatment is expressed with regard to source water versus finished water is an area for discussion with source water, drinking water and 305(b)/303(d) programs.

**DES RESPONSE**: **See DES Response to Comment (3).**

SUBJECT: *Where continuous data logger datasets exist for applicable parameters, incorporation of frequency/duration for determining impairment*

COMMENT (36): The proposed change for continuous data logger data set is a modification to the existing binomial approach. The proposed change states “This (the binomial approach) can erroneously lead to the conclusion that the water is not impaired due to large sample size which increases the number of exceedances needed to list a water as impaired”. This statement is true and the current methodology is not appropriate for reviewing large data sets. In reviewing the state’s Surface Water Quality Standards, it is not clear what duration the chronic and acute criteria for chloride are based on. A more comprehensive review is needed to confirm what criteria duration should be used.

**DES RESPONSE**: **See DES Response to Comment (8). As indicated, in 2006 the more stringent 10% Rule will be used in lieu of the Binomial method to determine compliance with water quality standards based on grab samples. With regards to use of data logger data and frequency/duration considerations, see DES Response to Comment (7).**

SUBJECT: *General application of the “Binomial Method”*

COMMENT (37): While we strongly recommend dropping the state’s created binomial approach, as non-protective, we do not at all support the proposal that 3 or more violations, regardless of sample number is the lowest bar for determining that there is an impairment. The 1997 EPA 305(b) guidance provides for a 10% measure for ALU and some other criteria, although this may not be applicable for all criteria and uses.

**DES RESPONSE**: **See DES Response to Comment (8).**

*SUBJECT: Refinement of the “critical period” for applicable parameters and designated uses*

*COMMENT (38): The need to define “critical period” seems reasonable, and would want to review the definitions once they are proposed, rather than just the examples provided. The critical periods would be those that would be priority times, but not necessarily the only times for monitoring.*

**DES RESPONSE: See DES Response to Comment (9).**

*SUBJECT: Determine periphyton criteria*

*COMMENT (39): We recommend investigating this application, and look forward to what the state proposes.*

**DES RESPONSE: The 2006 CALM will not include assessment thresholds for periphyton as a literature review has not yet been completed. This is not, however, expected to impact the 2006 assessments as there is currently little, if any, quantitative periphyton data to assess. In addition to the literature review, the Department is also working on sampling protocols and will likely begin sampling for periphyton on selected streams in 2006/2007. In anticipation of having periphyton data in the next year or two, it is expected that the 2008 CALM will include assessment criteria for periphyton.**

*SUBJECT: Evaluate pH criteria*

*COMMENT (40): The proposed change would be to the existing Surface Water Regulations, Section Env-Ws 1703.18. This proposed change should be reviewed by the appropriate EPA staff that review NH’s Water Quality Standards. It would involve a less stringent pH standard. Currently the state is using a binomial approach to evaluate pH exceedances, and, as with DP, this is not specified in the state standards.*

**DES RESPONSE: See DES Response to Comment (11).**

*SUBJECT: Application of the cyanobacteria criteria*

*COMMENT (41): No comment at this time.*

**DES RESPONSE: The 2006 CALM will include the same cyanobacteria assessment criteria as the 2004 CALM.**

*SUBJECT: Evaluation of the spatial applicability of exotics infestations*

*COMMENT (42): Can a section of a lake be segmented into a separate AU that has the impairment, if it is certain that the impairment is limited to a local cove or section? Can the new impaired AU have an ID that indicates it was formerly a part of the original AU?*

**DES RESPONSE: Any AU can be divided into smaller segments and given an AUID that indicates the AU it was originally from. Depending on time and resources, the Department will consider doing this for lakes impaired by exotic infestations in the 2006 assessment. Although dividing an AU into smaller segments may provide a more accurate assessment of the acres of lakes actually impacted by exotic infestations, it can throw off the accuracy of other assessments unless one assumes that sampling stations in an adjacent AU also apply to the newly created AU. This can be done, but takes a considerable amount of time to document, set up and automate.**

**Jim Fitch, Woodward & Curran**

*SUBJECT: ANTIDegradation*

*The third component of water quality standards is antidegradation which are provisions designed to preserve and protect the existing beneficial uses and to minimize degradation of the State's surface waters. Antidegradation regulations are included in Part Env-Ws 1708 of the State's surface water quality regulations (NHDES, 1999). According to Env-Ws 1708.03, antidegradation applies to the following:*

**COMMENT (43):** Is there a method for the State to capture improvements in water quality that enhance it's probable quality and is this a technique to offset a degradation. For example, if a point or non-point source is eliminate or reduced due to some activity can another activity benefit from this even though there is a degradation associated with the activity. Also, would these two occurrences need to be completed by the same entity?

**DES RESPONSE:** The Department does not currently have a system in place to comprehensively track implementation of all pollution control measures or to allow trading of pollutant reductions between projects or activities. Pending resources and other priorities, it is possible that such a system will be considered in the future. Where pollution control measures are implemented, sampling should show improvements in water quality. As water quality improves, more assimilative capacity becomes available for other projects, provided that the provisions of antidegradation (Env-Ws 1708) are satisfied.

**Other than the use of predictive models to assist with or make assessments, this is has not been specifically addressed in the CALM.**

***SUBJECT:** Waterbody Coverage, Waterbody Types and Assessment Units - Since the creation of the Assessment Units for the 2002 assessment some discrepancies have arisen between the AU IDs and HUC-12 boundaries due to NRCS recoding of some HUC-12 regions. DES will reconcile these differences once the HUC-12 boundary recoding and the 1:24,000 NHD is completed.*

**COMMENT (44):** As use patterns and quality changes in waterbodies (improvements hopefully) will the AU's be redefined?

**DES RESPONSE:** Yes, if data becomes available that indicates clear water quality or quantity differences within an AU, that AU may be subdivided. Similarly, if changes in the watershed occur such that adjacent AUs are now similar (ie. such as when a dam is removed) the adjacent AUs will be merged. Additionally, as data becomes available for waters that are not currently mapped on the 1:100,000 scale coverage, those waters are added to the AU coverage. Finally, the 1:24,000 National Hydrography Dataset (NHD) was completed for New Hampshire in October 2005. While too late for the 2006 assessment cycle the Department, time permitting, expects to move the AUs from the current 1:100,000 scale NHD to the 1:24,000 NHD for the 2008 assessment cycle. It is expected that this will result in the addition of many more AUs due to the higher resolution.

***SUBJECT:** Table 3-3, Explanation of AU ID Naming Convention*

**COMMENT (45):** What about Marshes, fresh and salt water?

**DES RESPONSE:** Quantitative criteria for making wide-spread designated use assessments of wetlands, have not yet been developed, but will be in the future as time and resources allow. Once developed, AUIDs will be added for wetland waterbody types.

***SUBJECT:** 2.1.2 Use Support Attainment Options and Threatened Flag - Fully Supporting: A use is fully supporting if, in accordance with this document, there is sufficient data or evidence for the core*

*indicators (see Section 3.1.12) to determine that the use is fully supporting and, there is no other data or evidence indicating an impaired or threatened status.*

**COMMENT (46):** Does this mean that waters with limited or no data fall into categories 3 and 4 rather than the assumption that a pristine stream is fully supporting? I wonder if it would be better to assume fully supporting and focus energies not on finding out if it is fully supporting but on resolving those that you know are not supporting.

**DES RESPONSE:** The department relies on data driven decisions. While an assessment of fully supporting may be correct for many surface waters of the State, EPA guidance specifically discourages presumptive assessments (i.e., assessments not based on data). Consequently, an AU with no data, or insufficient data to make an assessment, is assigned to Category 3 (Insufficient Information).

DES agrees that devoting limited resources to gather data on all pristine streams should not take precedent over restoring impaired waters. Nonetheless, EPA expects States to assess all surface waters. To accomplish this with limited resources, the Department has instituted random sampling to facilitate probabilistic assessments. For example, to assess headwater streams, approximately 50 random stations could be sampled over a period of 5 years. The data from the 50 representative stations could then be statistically extrapolated to provide an assessment for all headwater streams in the State. Similar analyses have already been done on estuarine waters and the 2006 assessment is expected to include a probabilistic assessment for aquatic life in all wadeable streams. Pending resources, the Department expects to conduct random sampling to facilitate probabilistic assessments on other waterbody types in the future.

In addition to probabilistic assessments, the Department is also considering statistical analyses of water quality data and land use to determine if land use GIS coverages can be used to reasonably predict water quality in various waterbody types. If successful, this would be another way to increase the number of assessed waters without diverting limited resources from other important projects.

All Category 4 waters (i.e., category 4A, 4B and 4C) are, by definition, impaired. If an AU is impaired and has an approved TMDL, it is placed in sub-category 4A; if the AU is impaired and some action other than a TMDL is expected to result in water quality standards being met, it is assigned to 4B; and lastly, if it is impaired by a non-pollutant (i.e., something for which a load can not be assigned to correct the problem such as exotic weeds), it is assigned to sub-category 4C.

**SUBJECT:** “Naturally Occurring” Water Quality Exceedances -

**COMMENT (47):** What about low pH due to acid rain and high levels of mercury or fish consumption advisories due to atmospheric deposition?

**DES RESPONSE:** Env-Ws 1702.29 defines “Naturally occurring conditions” as “conditions which exist in the absence of human influences.” Low pH due to acid rain, and atmospheric deposition of mercury, are due, at least in part, to the burning of fossil fuels. Consequently, neither one can be attributed to “naturally occurring” conditions.

**SUBJECT:** Table 3-6, Level of Information Descriptions for Data Quality – Level of Information  
=Fair, Description = SOPs or a QA/QC plan is available

COMMENT (48): Is this an acceptable plan? If not I'd suggest this should be low

**DES RESPONSE**: The presence of detailed Standard Operating Protocols (SOPs) and/or a Quality Assurance Project Plan (QAPP) allows the Department to determine the quality of the data submitted. If there was a QAPP but either it was not followed or the Quality Assurance/Quality Control (QA/QC) stated in the QAPP was insufficient, that dataset would be downgraded to "Low" quality and not used for final assessments.

SUBJECT: *Data Age*

COMMENT (49): I don't understand why you would rule out data if no new data were available.

Again due to data age limited sampling and analysis resources could be focused in areas where there is limited likelihood of a problem instead of focusing on solving or better understanding known problems.

**DES RESPONSE**: The data age requirement is an attempt to ensure that the data used to make assessments reasonably represents current conditions in the waterbody. Setting a data age requirement increases the accuracy of the assessment. Without it, the results could be very misleading. For example, if old data indicating fully supporting conditions was used to make assessments in a fast growing area of the State, it may no longer represent current water quality conditions due to the adverse impacts that development can have on water quality.

Consequently, assessing the water as fully supporting would likely be inaccurate. In this example, the waterbody would be assessed as Insufficient Information (Category 3). Although assessed as having insufficient information, the Department has created a database which will continue to track the old data and assign it as either Potentially Attaining Standards (PAS) or Potentially Not Supporting (PNS). In this case it would be assigned to PAS as the old data indicated fully supporting conditions. PNS would be assigned to Category 3 waters that have some data which indicates possible impairment but not enough data to make an assessment in accordance with the CALM. This valuable information is used to set monitoring priorities in subsequent years. In most cases, AUs which are PNS are monitored first because they indicate a potential for being impaired.

As stipulated in the CALM, the data age requirement does not apply to a waterbody that is listed as impaired. That is, data age can not be used as an excuse to remove a waterbody from the list of impaired waters. This encourages action to be taken to conduct additional monitoring to see if the assessment is still accurate and/or to implement action plans to restore the waterbody (i.e., TMDLS or watershed plans).

With regards to steps the Department is taking or considering how to assess more waters with limited resources, see DES Response to Comment (46).

SUBJECT: *Definition of Independent Samples - For lakes, ponds and large impoundments, only data from the upper layers (i.e., the epilimnion) was used*

COMMENT (50): It strikes me that estuaries need further guidance wrt tide cycle to obtain a representative sample.

**DES RESPONSE**: With few exceptions, water quality standards apply to all surface waters at all times. To ensure that samples are taken when violations are most likely to occur (i.e., the critical period), the CALM specifies the minimum number of samples that must be taken during critical time period. This helps to ensure that samples are representative of near worst case conditions. This adds credibility to the assessments and is especially important if the data

**indicates full support. Other than for dissolved oxygen, the CALM does not currently specify when samples must be taken relative to the tidal cycle to ensure representativeness. If there is quantitative evidence to suggest that the current methodology should be amended, the Department will consider such changes in future versions of the CALM.**

*SUBJECT: Minimum Number of Samples - Binomial Method*

*COMMENT (51): What about the situation where you have a number of sample points in an AU that have been evaluated a number of times and you have consistent failure at a point, should this be considered? Maybe it's a DO sag issue.*

**DES RESPONSE: See DES Response to Comment (8) regarding replacement of the binomial method with the 10% Rule. It is not the intent of the 10% Rule to allow violations in an AU to be diluted with samples from non-critical areas within the same AU so that a waterbody won't be listed as impaired. Unless otherwise stipulated in statute or regulations, water quality criteria apply to all surface waters, all of the time. If the location of a DO sag is known, samples for determining compliance and for making an assessment should be taken during the critical period at the sag point as this represents the time and location when DO is expected to be the lowest.**

*SUBJECT: Reasons Why a Waterbody May Change Categories (including De-listing)*

*If there are changes in the assessment methodology and reassessment indicates that the AU should be placed in another category. This includes changes in water quality standards and/or changes in surrogate water quality criteria used to make use support decisions.*

*COMMENT (52): I would expect that there could also be changes if the water quality standards were changed.*

**DES RESPONSE: The Department agrees.**

*SUBJECT: Use: Aquatic Life - Core Indicators, Applicable Surface Water - Rivers/Streams and associated impoundments < 4th order*

*COMMENT (53): I don't remember seeing anything on the basis of this ordering*

**DES RESPONSE: For the 2004 assessment cycle the stream ordering was based upon the work done by the former Department of Resources and Economic Development to determine stream order for the Shoreland Protecting act (<http://des.nh.gov/cspa/>). In 2006, it is expected that stream order will be determined from the Strahler method applied to the 1:24,000 stream network.**

*SUBJECT: Use: Aquatic Life - Exceedances of the Water Quality Criteria for DO are defined as:*

*COMMENT (54): Percent saturations are difficult for me, I'm not sure that the resident biota care and to accurately measure it you need to take a minimum of two measurements (in salt water three) this induces an error that can be avoided by using a concentration standard.*

**DES RESPONSE: The CALM must be in compliance with State water quality standards. Since the dissolved oxygen standards currently include a criterion based on the average daily percent saturation, measurements of average daily percent saturation are needed to determine compliance with the dissolved standard.**

*SUBJECT: Use: Aquatic Life - Notes 2. Section 401 Water Quality Certifications must be obtained from DES for any project requiring a federal permit or license. This includes most wetland dredge or fill projects as well as Federal Energy Regulatory Commission (FERC) projects (i.e., hydropower projects). As part of this process, DES has the obligation to establish conditions to ensure that the*

*construction and operation of the project will not result in violations of water quality standards. This includes establishment of flow conditions where necessary to ensure that aquatic life is not adversely impacted.*

COMMENT (55): What about flow diversion or pumping for irrigation? Is there a regulatory consideration or permitting process to allow this assessment?

**DES RESPONSE:** In New Hampshire there is currently no direct permitting process for water withdrawals. If data existed to show that a flow diversion or pumping for irrigation was not adequately protecting an existing or designated use, the impacted AUs would be listed as not supporting for those uses. This is based on the Env-WS 1703.01(d) which states that, “Unless the flows are caused by naturally occurring conditions, surface water quantity shall be maintained at levels adequate to protect existing and designated uses.” Under New Hampshire Common Law riparian land owners have a right to the “reasonable use” of that water so long as that use does not impair the reasonable use by another riparian landowner. Further, the use by any riparian landowner is always subject to the public trust. “Public Trust” generally means that the state holds all waters in trust for the good of all the State. Consequently, a use by a riparian landowner may not impair any of the designated uses of a waterbody.

SUBJECT: Use: Drinking Water After Adequate Treatment, Indicator 3, Notes - Conventional treatment is defined as coagulation, sedimentation, disinfection, and conventional filtration

COMMENT (56): What about disinfection and byproducts that may result due to source waters.

**DES RESPONSE:** The Department relies on the Water Supply Engineering Bureau (WSEB) for determining compliance with the Safe Drinking Water (SDW) standards. If the WSEB determines that the SDW standards can not be met, then the water supply would be listed as impaired. In addition and as discussed in DES Response to Comment (1), State statute requires surface waters to be “acceptable for water supply uses after adequate treatment”. Since treatment can be provided to address disinfection byproducts (i.e., “adequate” treatment is possible) the Department does not currently anticipate listing any surface waters as impaired because of organics which may be producing disinfection byproducts.

REGARDING: Use: Shellfish Consumption, Indicator 1, Full Support - The surface water is classified as “approved” based on fecal coliform violations measured and assessed in accordance with the NSSP criteria

COMMENT (57): If a facility has a fecal coliform violation the flats would be closed until proof of compliance. Shouldn't this be considered in this classification, say no more than X temporary closures due to fecal violations at facilities in the region?

**DES RESPONSE:** See DES Response to Comment (58) regarding assessments of areas that are closed because of their proximity to potential sources of bacteria, such as WWTFs (i.e., these areas are classified as “prohibited”). If a shellfish water is outside of a prohibited zone, fecal coliform sampling is conducted in accordance with the National Shellfish Sanitation Program (NSSP) to determine whether the tidal water should be opened or closed for shellfishing.

SUBJECT: Use: Shellfish Consumption, Indicator 1, Notes

COMMENT (58): Isn't there a closure zone around marine outfalls that should be mentioned as not regulated or determined to be in non compliance due to shellfishing restrictions?

**DES RESPONSE:** The National Shellfish Sanitation Program (NSSP) requires delineation of prohibited areas around WWTF outfalls. Therefore, such areas are “regulated.” These areas

**are closed to shellfishing because they are deemed to pose too great a public health risk for the use of shellfish consumption.**

**The risk zone is typically derived from hydrographic studies that examine the dilution, dispersion, and transport of effluent in the receiving water. Prohibited areas are typically sized to account for contamination resulting from a failure of the WWTF treatment process (the prohibited area also accounts for minimum dilution of viruses under normal operating conditions, as some viruses show resistance to chlorine disinfection). The prohibited area is typically closed based on a hypothetical failure, whereas other areas may be closed due to actual measurements of high fecal coliform. According to the 2006 CALM, if a shellfish water is closed because of high fecal coliform levels, it will be listed as impaired for the shellfishing use. If, however, the shellfish area is closed because of the hypothetical potential for fecal coliform exceedances (ie. prohibited areas), then the AU would be assessed as Category 3 (Insufficient Information). This recognizes the fact that prohibited areas are closed more for administrative reasons (i.e., NSSP requires such closures where potential threats such as WWTFs or marinas exist), rather than actual water quality violations. Because such waters will always be closed for shellfishing regardless of actual water quality and as long as the potential threat exists, routine sampling of prohibited waters is not typically conducted. For similar reasons, there would be no benefit to listing the prohibited AUs as impaired and requiring a TMDL.**

*SUBJECT: Use: Shellfish Consumption, Indicator 2, Notes, 3. For this cycle, all tidal waters in New Hampshire were placed in Category 5 primarily as a result of the shellfish consumption advisory for mercury and polychlorinated biphenyls (PCB) and dioxins. For regionally generated pollutants such as mercury, PCBs and dioxins (in some cases) which are beyond the ability of the State to control, it is recommended that EPA take the lead in conducting the TMDLs*

*COMMENT (59): What about closures that are time specific due to red tide?*

**DES RESPONSE: Red Tide is a natural algae that exists in the offshore area each year. The degree to which red tide impacts New Hampshire tidal waters each spring/summer depends on the intensity of the offshore bloom, and if weather patterns are favorable for transporting the bloom to the nearshore environment. Red tide significantly impacted the 2005 summer shellfish harvesting period. With regards to assessments, it is generally accepted that red tide is a naturally occurring phenomenon. Consequently, tidal waters closed for shellfishing because of red tide, are not listed as impaired. Instead, they are tracked as an “Observed Effect” in the Assessment Database in a manner similar to the way the Department tracks low pH in naturally acidic lakes [see DES Response to Comments (11) and (13)].**