



7/22/2011

***Guidance for Submitting Comments on the Comprehensive  
Assessment and Listing Methodology (CALM)***  
***(for the 2012 Section 305(b) Water Quality Report and Section 303(d) List of Impaired Waters)***

Dear Interested Party,

The New Hampshire Department of Environmental Services (DES) is seeking public comment on the Comprehensive Assessment and Listing Methodology (CALM) to be used in the 2012 surface water quality assessments. The CALM describes, in detail, the process used to make surface water quality attainment decisions in accordance with state surface water quality standards. In other words, the CALM explains how the state determines if surface waters are healthy for fish to live or suitable for other uses such as swimming.

Surface water quality assessments are required by Sections 305(b) and 303(d) of the federal Clean Water Act. Section 305(b) requires each state to prepare a water quality inventory of its surface waters every two years. Section 303(d) requires states to prepare a list of impaired surface waters for which comprehensive water quality studies [i.e., Total Maximum Daily Load (TMDL) studies] must be prepared to help guide restoration efforts. This list, which is commonly called the "303(d) List", represents a subset of all impaired waters as some impaired waters do not require a TMDL study. The next Section 305(b)/303(d) surface water quality assessment is scheduled to be ready in the spring of 2012.

A copy of the most recent CALM (NHDES 2010) used for the 2010 assessments may be found at <http://des.nh.gov/organization/divisions/water/wmb/swqa/documents/2010calm.pdf>. In addition,, at the end of this document you will find an assessment protocol that the DES is proposing to add to the CALM for use in the 2012 assessments.

We encourage you to review the current CALM and proposed addition presented at the end of this document. Should you have any comments please follow the instructions below.

Thank you.



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## ***SCHEDULE***

If you have suggested revisions for the CALM please submit them to the Watershed Management Bureau by Monday, August 22, 2011.

## ***WHAT TO SUBMIT***

General comments pertaining to sections of the current CALM are useful but specific recommendations with supporting background information are preferred.

Submittals should include the following:

- ✓ Contact Information:
  - Your name and organization
  - Mailing Address
  - E-mail
  - Phone number
- ✓ Your comments referenced to specific sections of the current CALM.
- ✓ Documentation supporting why you believe that section of the CALM requires the changes suggested.

## ***HOW TO SEND COMMENTS TO DES***

Submit your comments along with any supporting documentation, to DES by mail, fax or E-mail at the addresses shown below.

By mail:                      Water Quality Data  
                                    New Hampshire Department of Environmental Services  
                                    Watershed Management Bureau  
                                    P.O. Box 95  
                                    Concord, New Hampshire 03302-0095

By fax:                        Water Quality Data  
                                    603-271-7894

By E-mail:                   [wqdata@des.state.nh.us](mailto:wqdata@des.state.nh.us) or visit our website at  
                                    <http://des.nh.gov/organization/divisions/water/wmb/swqa/index.htm>

***QUESTIONS?***            Please call 603-271-8864 (ask for Ken Edwardson)



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NH Department of Environmental Services (DES)  
Proposed Addition to the  
Consolidated Assessment and Listing Methodology (CALM)

DES is proposing the following addition to the CALM. The intent of the proposed assessment criteria presented below is to protect river reaches from Stream Channel Instability where a river is in Stage II Incision as described in "Channel Evolution Model" described in Schumm *et. al.* (1984). The proposed criteria represent a numeric translator for the following narrative criteria in the New Hampshire surface water quality regulations, Env-Wq 1700 (NHDES 2008).

*Env-Wq 1703.01 Water Use Classifications.*

*(b) All surface waters shall be restored to meet the water quality criteria for their designated classification including existing and designated uses, and to maintain the chemical, physical, and biological integrity of surface waters.*

*1703.03 General Water Quality Criteria.*

*(c) The following physical, chemical and biological criteria shall apply to all surface waters:*

*(1) All surface waters shall be free from substances in kind or quantity which:*

*a. Settle to form harmful deposits;*

Proposed Addition to the CALM

**Indicator ##: Stream Channel Stability – Stage II - Incision**

**FS:** Stream channel is stable. That is, the site's Incision Ratio is less than 1.5 or the Bank Erosion Hazard Index is less than 40.

**NS:** Stream channel is unstable as a result of hydromodification. That is, the site's Incision Ratio is greater than or equal to 1.5 and the Bank Erosion Hazard Index is greater than or equal to 40.

**Notes**

1. Stream stability is defined as "the ability of the stream, over time, to transport the flows and sediment of its watershed in such a manner that the dimension, pattern, and profile of the river is maintained without either aggrading or degrading (Rosgen, 1996).
2. Hydromodification is defined as a change in a stream's physical structure and its natural function that is associated with channelization and channel modifications due to human activity (<http://www.epa.gov/owow/nps/hydromod/index.htm>).
3. Stream channel instability is a non-pollutant; consequently waters impaired by channel instability, will be placed in category 4c, not in category 5.
4. Stage II dis-equilibrium illustrated in Figure 1.
5. Two of the two metrics must fail for the geomorphology to be considered in Stage II dis-equilibrium. The two metrics are; Incision Ratio (IR) and Bank Erosion Hazard Index (BEHI).
6. Incision Ratio (IR) is the degree of channel incision is the ratio of lowest bank height and maximum bankfull depth (Figure 2). Maximum bankfull depth is

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measured at the thalweg. Incision is the first step in a process which can lead to massive erosion, channel widening, loss of riparian vegetation, habitat and water quality degradation, and property damage (Figure 1). Additionally, incision typically propagates upstream, and even into tributary streams, via headcutting until some geologic or structural control is encountered. This headcutting process typically “spreads” the instability through the watershed, whereas over-widened channels are often more discreet with respect to the area of impact.

- A) Incision Ration (IR) Geomorphic Assessment data shall be collected in accordance with the Low Bank Height Method as seen in Rosgen 2001.
  - B) The site shall be considered incised if the  $IR \geq 1.5$
  - C) Calculating the degree of channel incision is not appropriate for streams situated in geologically-confined valleys which produce naturally incised (more appropriately referred to as entrenched) streams (e.g. “A” stream types). It is appropriate to use this metric only in moderately confined or unconfined valleys where the streams could be expected to have active floodplains or at least narrow floodplain benches and the stable stream types would be expected to be B, C, or E.
  - D) Note that channel widening (as measured by the hydraulic geometry curves, typically occurs after, and in direct response to incision; though widening can, and often does occur, in the absence of channel incision (such as when riparian vegetation is removed).
  - E) For impairment, areas of incision must be a result of hydromodification, not natural in origin and must be indicative of the conditions in the stream reach, not merely a trouble point.
7. Bank Erosion Hazard Index (BEHI) is a composite index to measure the lateral stability or instability of a reach. A high BEHI score will confirm the incised in unstable condition of a river reach. The BEHI is comprised of; Bank Height to Bank Full Height (ft/ft), Root Depth/Bank Height (%), Root Density (%), Bank Angle (degrees), and Surface Protection (%), with index adjustments for Bank Materials and Stratification (a points based adjustment).
- A) For the Bank Erosion Hazard Index (BEHI), geomorphic assessment data shall be collected in accordance with Rosgen 1996.
  - B) The site shall be considered a hazardous instability if the  $BEHI \geq 40$
  - C) Calculating the degree of channel incision is not appropriate for streams situated in geologically-confined valleys which produce naturally incised (more appropriately referred to as entrenched) streams (e.g. “A” stream types). It is appropriate to use this metric only in moderately confined or unconfined valleys where the streams could be expected to have active floodplains or at least narrow floodplain benches and the stable stream types would be expected to be B, C, or E.
  - D) For impairment, areas of bank instability must be a result of hydromodification, not be natural in origin and must be indicative of the conditions in the stream reach, not merely a trouble point.
8. This approach will not be used to determine ‘Non-Support’ at sites solely based upon non-equilibrium under a crossing. Some non-equilibrium must also exist

upstream or downstream of the crossing as a direct result of the crossing point's dis-equilibrium.

FIGURE 1. Channel Evolution Model (Schumm *et al.* 1984)

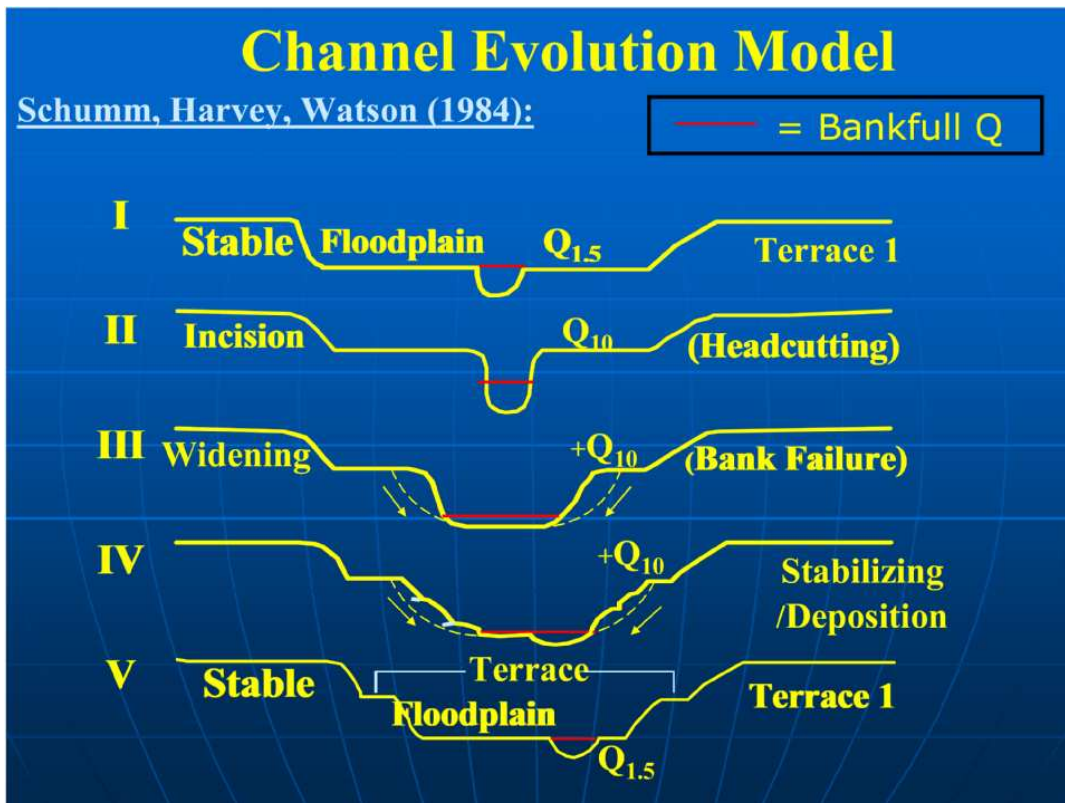
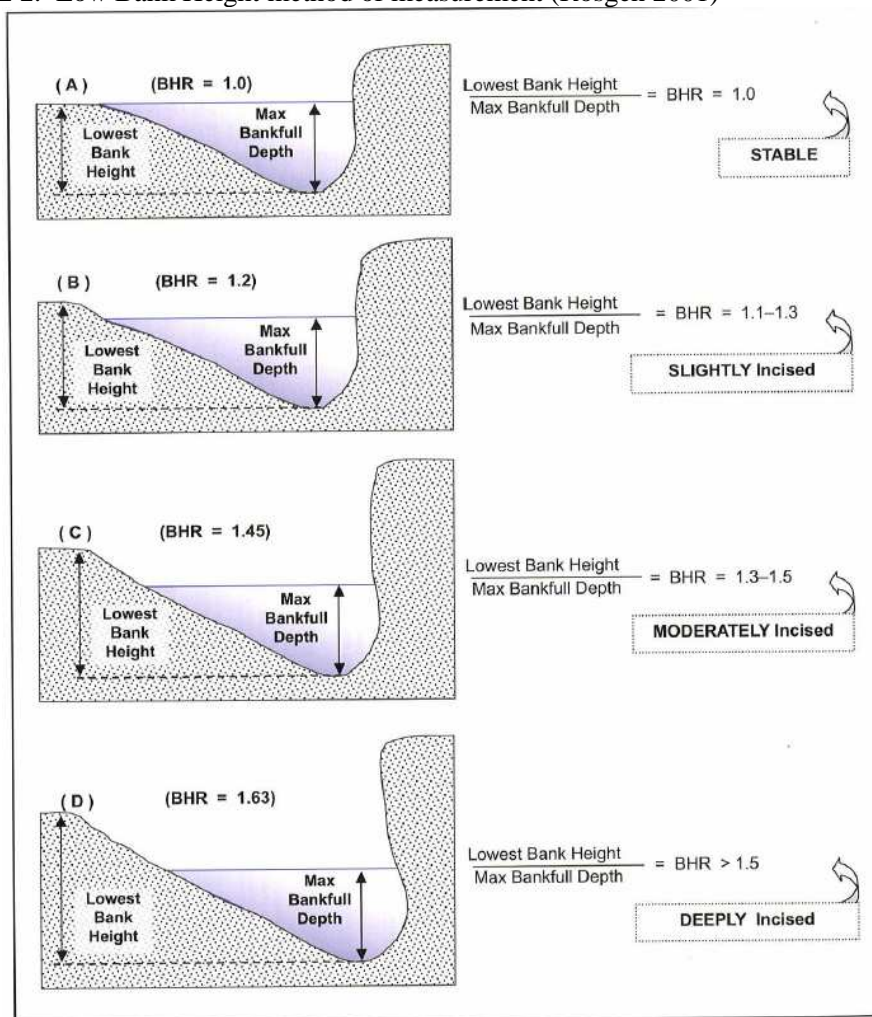


FIGURE 2. Low Bank Height method of measurement (Rosgen 2001)



NHDES, 2008. State of New Hampshire Surface Water Quality Regulations, Chapter 1700. May 21, 2008. New Hampshire Department of Environmental Services.

<http://des.nh.gov/organization/commissioner/legal/rules/index.htm#waterq>

NHDES, 2010. New Hampshire 2010 Section 305(b) and 303(d) Consolidated Assessment and Listing Methodology and Comprehensive Monitoring Strategy. NHDES-R-WD-10-3.

February, 2010. New Hampshire Department of Environmental Services

<http://des.nh.gov/organization/divisions/water/wmb/swqa/documents/2010calm.pdf>

Rosgen 1996. Rosgen, D.R. Applied River Morphology. Wildland Hydrology. Pagosa Springs, CO.

Rosgen 2001. Rosgen, D.R. A Practical Method of Computing Streambank Erosion Rates. Proceedings of the Seventh Federal Interagency Sedimentation Conference, Vol. 2)

[www.wildlandhydrology.com/assets/streambank\\_erosion\\_paper.pdf](http://www.wildlandhydrology.com/assets/streambank_erosion_paper.pdf)

Schumm, S. A., Harvey, M. D., and Watson, C. C. 1984. "Incised Channels: Morphology, Dynamics and Control," Water Resources Publications, Littleton, CO.