



9/3/2009

Guidance for Submitting Comments on the Comprehensive Assessment and Listing Methodology (CALM)
(for the 2010 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 2010 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 2010.

A copy of the most recent CALM used for the 2008 assessments may be found in the following three documents:

- Main Document:
http://des.nh.gov/organization/divisions/water/wmb/swqa/2008/documents/appendix_04_calm.pdf
- Methodology for assessing estuaries based on eelgrass
http://des.nh.gov/organization/divisions/water/wmb/swqa/2008/documents/appendix_05_eelgrass_calm.pdf and
- Methodology to evaluate the numeric nutrient criteria for the Great Bay Estuary (attached)

Additionally, at the end of this document you will find the following two methodologies that the Department of Environmental Services (DES) is proposing to add to the CALM for use in the 2010 assessments.

1. Methodology to assess nutrient criteria (i.e., phosphorus) for Lakes (new for the 2010 CALM).
2. General methodology to calculate the occurrences of High Quality Waters (new for the 2010 CALM).

We encourage you to review the current CALM and proposed changes noted above. Should you have any comments please follow the instructions below.

Thank you.



9/3/2009

SCHEDULE

If you have suggested revisions for the CALM please submit them to the Watershed Management Bureau by Friday, October 2, 2009.

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 or visit our website at
<http://des.nh.gov/organization/divisions/water/wmb/swqa/index.htm>

QUESTIONS? Please call 603-271-2457

THE METHODOLOGY TO EVALUATE THE NUMERIC NUTRIENT CRITERIA FOR THE GREAT BAY ESTUARY

(Derived from: Numeric Nutrient Criteria for the Great Bay Estuary_ <http://des.nh.gov/organization/divisions/water/wmb/wqs/index.htm>)

Use: Aquatic Life

Definition: Waters that provide suitable chemical and physical conditions for supporting a balanced, integrated and adaptive community of aquatic organisms.

Applicability: All surface waters

Core Indicator(s):

Core Indicator(s)	Applicable Surface Waters
Biological based on benthic macroinvertebrates	Rivers/Streams $\leq 4^{\text{th}}$ order
Biological based on Fish Assemblage	Applicable Rivers/Streams
Biological based on at least 2 assemblages (fish and benthic macroinvertebrates) or a minimum of dissolved oxygen, pH and documentation by a water quality professional trained in biology that there is no obvious impairment to the biological community	All other surface waters (fresh and tidal)
NEW: TN	NEW: Waters of the Great Bay Estuary

Assessment Criteria: The following criteria are in addition to the general assessment and listing criteria provided in Section 3.1.

INDICATORS FOR DISSOLVED OXYGEN IMPAIRMENTS

Four quantitative indicators are related to violations of the water quality standards for dissolved oxygen. DES already uses direct measurements of dissolved oxygen and dissolved oxygen saturation and compares those to the numeric water quality criteria in Env-Wq 1703.07. The new numeric criteria for total nitrogen and chlorophyll-a concentrations can also be used as indicators of violations of the dissolved oxygen criteria in the CALM. The methodology for directly assessing dissolved oxygen and

dissolved oxygen saturation measurements are provided in the CALM. The methodologies for assessing the nitrogen and chlorophyll-a indicators are described below as derived from “Numeric Nutrient Criteria for the Great Bay Estuary” (<http://des.nh.gov/organization/divisions/water/wmb/wqs/index.htm>).

Indicator: Dissolved Oxygen Impairments Predicted from Total Nitrogen Concentrations (TN)

Fully Supporting: Median TN concentrations are ≤ 0.45 mg N/L

Not Supporting: Median TN concentrations are > 0.45 mg N/L

Notes:

1. Data Requirements

- a Assessments shall be based on TN data that is 5 years or less in age and the median TN concentration shall be used to make the criteria comparison.
- b The median TN concentration shall be calculated from representative data that cover all four seasons of the year.
- c The minimum sample size of independent results for TN shall be 15 for a given waterbody.
- d If older data indicated Non Support, the more recent data used to make a Full Support decision must have been collected under similar conditions (i.e., wet weather, dry weather, season, etc) as when the older exceedances occurred.

2. DES subcategories shall be assigned according to the following:

- a For Category 2, the DES category shall be 2-G if the TN indicator is less than 75% of the criterion. Otherwise, the DES category shall be 2-M.
- b For Category 3, the DES category shall be 3-PAS if there are fewer samples than required for the sample size but the available data have a median value less than the criterion. The DES category shall be 3-PNS if there are fewer samples than required for the sample size but the available data have a median value greater than the criterion; however, DES may assign Category 5 if the median value of the available TN data is several times greater than the criterion. The DES category shall be 3-ND if there are no data for this indicator.
- c For Category 5, the DES category shall be 5-P if the TN indicator is more than 50% greater than the criterion. Otherwise, the DES category shall be 5-M.



9/3/2009

Indicator: Dissolved Oxygen Impairments Predicted from Chlorophyll-a Concentrations (Chl-a)

Fully Supporting: 90th Percentile Chl-a concentrations are ≤ 10 ug/L

Not Supporting: 90th Percentile Chl-a concentrations are > 10 ug/L

Notes:

1. Data Requirements

- a Assessments shall be based on Chl-a data that is 5 years or less in age and the 90th percentile Chl-a concentration shall be used to make the criteria comparison.
- b The 90th percentile Chl-a concentration shall be calculated from representative data that cover all four seasons of the year.
- c The minimum sample size of independent results for Chl-a shall be 15 for a given waterbody.
- d If older data indicated Non Support, the more recent data used to make a Full Support decision must have been collected under similar conditions (i.e., wet weather, dry weather, season, etc) as when the older exceedances occurred.

2. DES subcategories shall be assigned according to the following:

- a. For Category 2, the DES category shall be 2-G if the Chl-a indicator is less than 75% of the criterion. Otherwise, the DES category shall be 2-M.
- b. For Category 3, the DES category shall be 3-PAS if there are fewer samples than required for the sample size but the available data have a 90th percentile value less than the criterion. The DES category shall be 3-PNS if there are fewer samples than required for the sample size but the available data have a 90th percentile value greater than the criterion. The DES category shall be 3-ND if there are no data for this indicator.
- c. For Category 5, the DES category shall be 5-P if the Chl-a indicator is more than 50% greater than the criterion. Otherwise, the DES category shall be 5-M.

INDICATORS FOR EELGRASS IMPAIRMENTS

Three quantitative indicators are related to violations of the water quality criteria for Biological and Aquatic Community Integrity (Env-Wq 1703.19), one manifestation of which is significant eelgrass loss. DES already uses trends in eelgrass cover as an indicator (appendix 5 at <http://des.nh.gov/organization/divisions/water/wmb/swqa/2008/index.htm>). The new numeric criteria for water clarity and total nitrogen concentrations can also be used as indicators of violations of the Biological and Aquatic Community Integrity criteria. The methodologies for assessing the nitrogen and water clarity indicators are described below.

Indicator: Biological and Aquatic Community Integrity Impairments
Predicted from Water Clarity (light attenuation coefficient, Kd)

Fully Supporting: Median Kd values are \leq criteria in table below note 2

Not Supporting: Median Kd values are $>$ criteria in table below note 2

Notes:

1. Data Requirements

- a Assessments shall be based on Kd data that is 5 years or less in age and the median Kd value shall be used to make the criteria comparison.
 - b The median Kd value shall be calculated from representative data that cover all four seasons of the year.
 - c The minimum sample size of independent results for Kd shall be 15 for a given waterbody.
 - d If older data indicated Non Support, the more recent data used to make a Full Support decision must have been collected under similar conditions (i.e., wet weather, dry weather, season, etc) as when the older exceedances occurred.
 - e The waterbody being assessed must have been assigned an eelgrass restoration depth. The default restoration depth is 2 m below mean water level (MWL). Restoration depths of 2.5 and 3.0 m below MWL should be considered for deeper waterbodies.
2. The Kd criteria vary by eelgrass restoration depth. The criteria for different depths are depicted in the table below.

Restoration Depth (m below MWL)	Median Kd (m^{-1})
2.0	0.75
2.5	0.60
3.0	0.50

3. DES subcategories shall be assigned according to the following:

- a For Category 2, the DES category shall be 2-G if the Kd indicator is less than 75% of the criterion. Otherwise, the DES category shall be 2-M.
- b For Category 3, the DES category shall be 3-PAS if there are fewer samples than required for the sample size but the available data have a median value less than the criterion. The DES category shall be 3-



9/3/2009

- PNS if there are fewer samples than required for the sample size but the available data have a median value greater than the criterion. The DES category shall be 3-ND if there are no data for this indicator.
- c For Category 5, the DES category shall be 5-P if the Kd indicator is more than 50% greater than the criterion. Otherwise, the DES category shall be 5-M.

Indicator: Biological and Aquatic Community Integrity Impairments
Predicted from Total Nitrogen Concentrations (TN)

Fully Supporting: Median TN concentrations are \leq criteria in table below note 2

Not Supporting: Median TN concentrations are $>$ criteria in table below note 2

Notes:

1. Data Requirements

- a Assessments shall be based on TN data that is 5 years or less in age and the median TN concentration shall be used to make the criteria comparison.
- b The median TN concentration shall be calculated from representative data that cover all four seasons of the year.
- c The minimum sample size of independent results for TN shall be 15 for a given waterbody.
- d If older data indicated Non Support, the more recent data used to make a Full Support decision must have been collected under similar conditions (i.e., wet weather, dry weather, season, etc) as when the older exceedances occurred.
- e The waterbody being assessed must have been assigned an eelgrass restoration depth. The default restoration depth is 2 m below mean water level (MWL). Restoration depths of 2.5 and 3.0 m below MWL should be considered for deeper waterbodies.

2. The TN criteria vary by eelgrass restoration depth. The criteria for different depths are depicted in the table below.

Restoration Depth (m below MWL)	Median TN (mg N/L)
2.0	0.30
2.5	0.27
3.0	0.25

3. DES subcategories shall be assigned according to the following:

- a For Category 2, the DES category shall be 2-G if the TN indicator is less than 75% of the criterion. Otherwise, the DES category shall be 2-M.
- b For Category 3, the DES category shall be 3-PAS if there are fewer samples than required for the sample size but the available data have a median value less than the criterion. The DES category shall be 3-PNS if there are fewer samples than required for the sample size but the available data have a median value greater than the criterion; however, DES may assign Category 5 if the median value of the available TN data is several times greater than the criterion. The DES category shall be 3-ND if there are no data for this indicator.
- c For Category 5, the DES category shall be 5-P if the TN indicator is more than 50% greater than the criterion. Otherwise, the DES category shall be 5-M.

The final use support determination shall be made per table 1.

Table 1: Decision matrix to assign a final assessment category for nitrogen in estuarine assessment units using the results from both response and nitrogen indicators.

		Preliminary Assessment for Nutrient Indicator				
		Category 4 or 5 (Not Supporting)	Category 2 (Fully Supporting)	Category 3 (Insufficient Information)		
Final Assessment for Response Indicator	Category 4 or 5 (Not Supporting)	Category 4 or 5	Category 3-PNS	Category 3-PNS		
	Category 2 (Fully Supporting)	Category 3-PNS	Category 2	Category 3 (See Note 2)		
	Category 3 (Insufficient Information)	If Response Indicator is 3-PNS, then Category 4 or 5. If Response Indicator is 3-PAS or 3-ND, then Category 3-PNS. See Note 3	If Response Indicator is 3-PAS, then Category 2. If Response Indicator is 3-PNS or 3-ND, then Category 3-PAS. See Note 3		3-ND	3-PAS
			3-ND	3-ND	3-PAS	3-PNS
			3-PAS	3-ND	3-PAS	Note 4
			3-PNS	3-ND	Note 4	3-PNS

Note 1: If the conditions warrant, DES reserves the right to deviate from this matrix.

Note 2: The category for the nutrient will be 3-PAS, 3-PNS, or 3-ND based on the assessment of the nutrient indicator.

Note 3: If there are incomplete data for the response indicator which are consistent with the category for the nutrient indicator, then the category for the nutrient indicator will be used. If the incomplete data for the response indicator are inconsistent with the nutrient indicator or if there are no data for the response indicator, the category for the nutrient will be 3-PNS or 3-PAS as shown in the matrix.

Note 4: In the case where there are incomplete or missing data for both the nutrient and the response indicators, the sub-table in the lower right corner will be used. The category for the nutrient indicator will be used for the nutrient category except for the two cases marked by Note 4. For these cases, where the available data for the response indicator and nutrient indicator conflict, the category for the higher quality dataset will be used. If data quality is the same for the two indicators, then the category for the nutrient indicator will be used.

DRAFT - CALM LANGUAGE FOR LAKE NUTRIENT CRITERIA

(Derived from: “Assessment of Chlorophyll-a and Phosphorus in New Hampshire Lakes for Nutrient Criteria Development” at <http://des.nh.gov/organization/divisions/water/wmb/wqs/index.htm>)

Use: Aquatic Life

Definition: Waters that provide suitable chemical and physical conditions for supporting a balanced, integrated and adaptive community of aquatic organisms.

Applicability: All surface waters

Core Indicator(s):

Core Indicator(s)	Applicable Surface Waters
Biological based on benthic macroinvertebrates	Rivers/Streams \leq 4 th order
Biological based on Fish Assemblage	Applicable Rivers/Streams
Biological based on at least 2 assemblages (fish and benthic macroinvertebrates) or a minimum of dissolved oxygen, pH and documentation by a water quality professional trained in biology that there is no obvious impairment to the biological community	All other surface waters (fresh and tidal)
NEW: Chlorophyll a	NEW: Lakes and Impoundments

Assessment Criteria: The following criteria are in addition to the general assessment and listing criteria provided in Section 3.1.

Indicator ##: Chlorophyll a (CHLa) & Total Phosphorus (TP)

FS: See criteria presented in table 2

NS: See criteria presented in table 2

Table 2: Decision matrix to assign a final assessment category to phosphorus for lake assessment units using the results from both response and nutrient indicators. Chlorophyll will be assigned the use support category determined by the chlorophyll concentration.

		Preliminary Assessment for Nutrient Indicator					
		Category 4 or 5 (Not Supporting)	Category 2 (Fully Supporting)	Category 3 (Insufficient Information)			
Final Assessment for Response Indicator	Category 4 or 5 (Not Supporting)	Category 4 or 5	Category 3-PNS (Category 4 or 5 if responsive is Chl a) Note 5	Category 3-PNS (Category 4 or 5 if responsive is Chl a) Note 5			
	Category 2 (Fully Supporting)	Category 3-PNS	Category 2	Category 3 (See Note 2)			
	Category 3 (Insufficient Information)	If Response Indicator is 3-PNS, then Category 4 or 5. If Response Indicator is 3-PAS or 3-ND, then Category 3-PNS. See Note 3	If Response Indicator is 3-PAS, then Category 2. If Response Indicator is 3-PNS or 3-ND, then Category 3-PAS. See Note 3		3-ND	3-PAS	3-PNS
				3-ND	3-ND	3-PAS	3-PNS
3-PAS				3-ND	3-PAS	Note 4	
			3-PNS	3-ND	Note 4	3-PNS	

Note 1: If the conditions warrant, DES reserves the right to deviate from this matrix.

Note 2: The category for the nutrient will be 3-PAS, 3-PNS, or 3-ND based on the assessment of the nutrient indicator.

Note 3: If there are incomplete data for the response indicator which are consistent with the category for the nutrient indicator, then the category for the nutrient indicator will be used. If the incomplete data for the response indicator are inconsistent with the nutrient indicator or if there are no data for the response indicator, the category for the nutrient will be 3-PNS or 3-PAS as shown in the matrix.

Note 4: In the case where there are incomplete or missing data for both the nutrient and the response indicators, the sub-table in the lower right corner will be used. The category for the nutrient indicator will be used for the nutrient category except for the two cases marked by Note 4. For these cases, where the available data for the response indicator and nutrient indicator conflict, the category for the higher quality dataset will be used. If data quality is the same for the two indicators, then the category for the nutrient indicator will be used.

Note 5: The nutrient indicator will only be assessed as not supporting when the nutrient in question is phosphorus and the response indicator is chlorophyll a.

Notes:

4. Data Requirements

- a Assessments shall be based on data collected between May 24th to September 15th that is 10 years or less in age and the median value is used to make the criteria comparison.

9/3/2009

- b Median calculations for TP or CHL a must have 5 or more independent sampling dates on a given waterbody to be considered for Full Support or Not Support designations.
 - c Samples shall represent the open water condition of the waterbody where depth zone is Epilimnion, Composite, or Upper. If the depth zone is not defined the sample must be collected at a depth of ≤ 2 m.
 - d If there is more than one result for chlorophyll-a or phosphorus at the same station on the same date with the same depth zone, the two values are averaged. If there is a “composite” sample, that value is preferentially selected over other values to represent a station visit.
 - e If older data indicated NS, the more recent data used to make a FS decision must meet the requirements in Table 3-### and must include at least 2 samples collected at the same or more water quality limited sites and under similar conditions (i.e., wet weather, dry weather, season, etc) as when the older exceedances occurred.
5. The ALUS nutrient and chlorophyll a criteria shall only be applied to waterbodies where the trophic class has been determined.
 6. The ALUS nutrient and chlorophyll a criteria vary by lake trophic class. Trophic class for a given lake shall be determined by at (http://des.nh.gov/organization/divisions/water/wmb/lakes/documents/data_sources_explanation.doc pg 12-14). Where multiple trophic class evaluations have been conducted over the years, the “cleanest” trophic class observed shall be used to set the TP and CHLa thresholds.
 7. The ALUS nutrient and chlorophyll a criteria by trophic class are depicted in the table below.

	TP (ug/L)	Chl (ug/L)
oligotrophic	< 8.0	< 3.3
mesotrophic	≤ 12.0	≤ 5.0
eutrophic	≤ 28	≤ 11

(from: <http://des.nh.gov/organization/divisions/water/wmb/wqs/index.htm>)



9/3/2009

DRAFT GENERAL METHODOLOGY TO CALCULATE OCCURENCES OF HIGH QUALITY WATERS (PROPOSED FOR USE IN 2010 CALM)

Use(s): Assorted

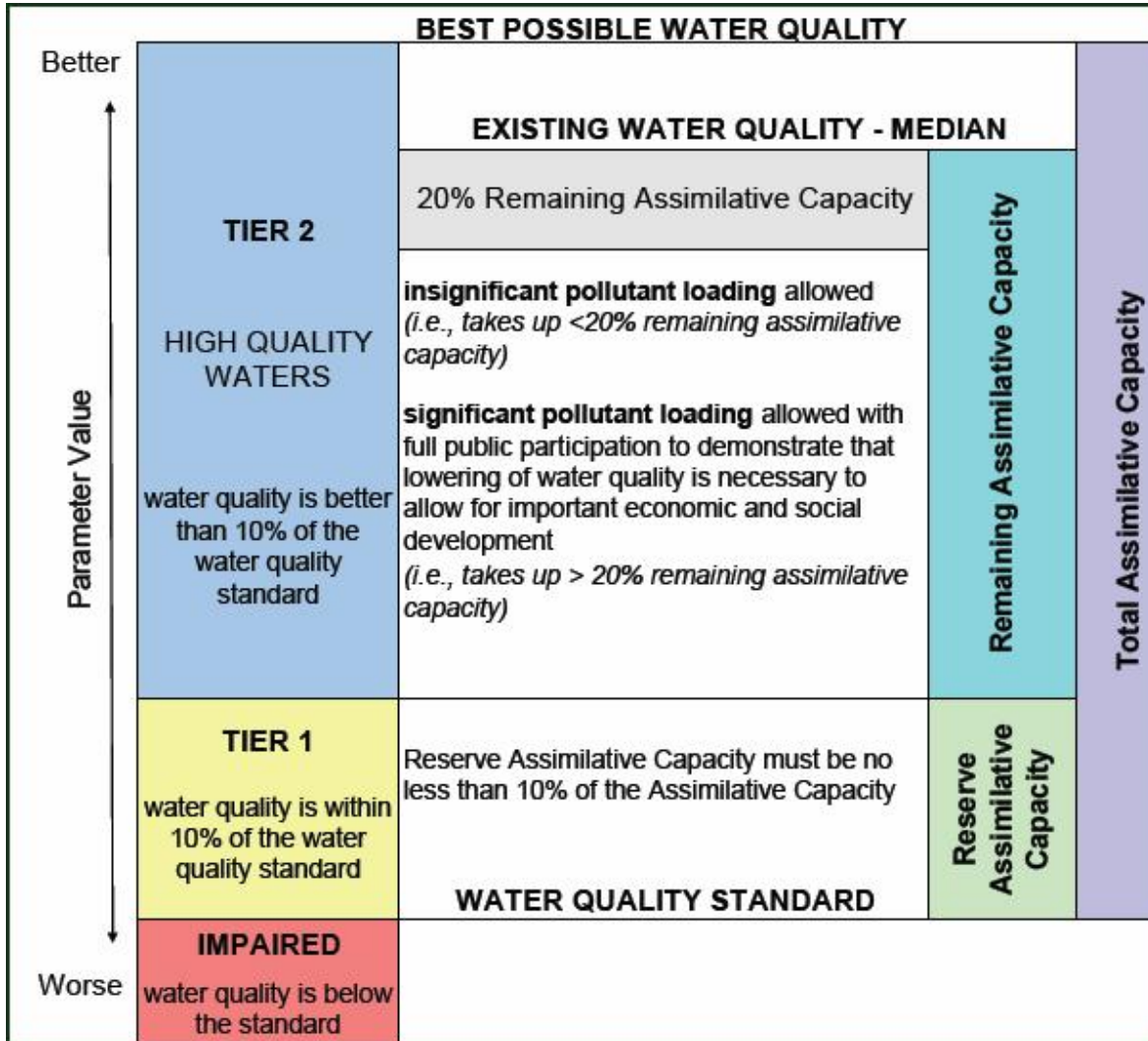
Applicability: All surface waters

For each parameter with sufficient data in each assessment unit, the department will estimate Existing Water Quality, Tier 1, and Tier 2 thresholds in accordance with the graphic below (see Volume 1, Chapter 5 of the department's new stormwater manual (<http://des.nh.gov/organization/divisions/water/stormwater/manual.htm> for a good discussion of this graphic).

Parameters that are Tier 1 have no remaining assimilative capacity available for use. From a practical standpoint this means that no additional loading of that parameter is allowed into that assessment unit.

Tier 2 parameters are those which have some remaining assimilative capacity available for use and are therefore considered to be High Quality parameters. That is, the assessment unit can handle some additional loading of that parameter without violating surface water quality standards. However, before anyone can degrade a surface water by adding more loading, the antidegradation provisions of the state surface water quality standards (Env-Wq 1708) must be satisfied (see <http://des.nh.gov/organization/commissioner/legal/rules/index.htm#waterq>)

For 2010, any assessment unit with one or more Tier 2 parameters will be assigned a High Quality Water status.



(From : Volume 1, Chapter 5 <http://des.nh.gov/organization/divisions/water/stormwater/manual.htm>)