

US EPA ARCHIVE DOCUMENT

CATALOG DOCUMENTATION  
NATIONAL LAKE ASSESSMENT DATABASE  
NORTHEAST REGION 2007  
REPORTED CONDITION CLASSES FOR LAKES

TABLE OF CONTENTS

1. DATASET IDENTIFICATION
  2. INVESTIGATOR INFORMATION
  3. DATASET ABSTRACT
  4. OBJECTIVES AND INTRODUCTION
  5. DATA ACQUISITION AND PROCESSING METHODS
  6. DATA MANIPULATIONS
  7. DATA DESCRIPTION
  8. GEOGRAPHIC AND SPATIAL INFORMATION
  9. QUALITY CONTROL AND QUALITY ASSURANCE
  10. DATA ACCESS AND DISTRIBUTION
  11. REFERENCES
  12. TABLE OF ACRONYMS
  13. PERSONNEL INFORMATION
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1. DATASET IDENTIFICATION
    - 1.1 Title of Catalog document  
National Lake Assessment (NLA) Database  
Northeast Region 2007  
Reported Condition Classes for Lakes
    - 1.2 Author of the Catalog entry  
Melissa Hughes, Raytheon MOS
    - 1.3 Catalog revision date  
July 2011
    - 1.4 Dataset name  
Reported Condition Classes for Lakes
    - 1.5 Task Group  
National Lake Assessment
    - 1.6 Dataset identification code  
NA
    - 1.7 Version  
NA
    - 1.8 Request for Acknowledgment  
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  2. INVESTIGATOR INFORMATION
    - 2.1 Principal Investigators  
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## 2.2 Sample Collection Investigators

NA

## 2.3 Sample Processing Investigators

NA

## 3. DATASET ABSTRACT

### 3.1 Abstract of the Dataset

The objective of the National Lakes Assessment (NLA) is to characterize the ecological condition of the nation's lakes throughout the conterminous United States. The NLA is an ecological assessment of lakes based on chemical, physical, and biological data. It employs a statistically-valid probability design stratified to allow estimates of the condition of lakes on a national and regional scale. The two key questions the NLA addresses are: 1) To what degree are the Nation's lakes in good, fair, and poor condition? and 2) What is the relative importance of the different stressors evaluated in the NLA? This Technical Addendum is a supplemental document used to support the results in a national NLA report. It describes the process used to collect, evaluate, and analyze data for the NLA to report condition classes for lakes. It outlines steps taken to assess the biological condition of the nation's freshwater lakes and identify the relative impact of stressors on this condition. The NLA data analysis procedures described in this technical report were developed from the input and experience of participating cooperators and technical experts. NLA analysts used two processes for establishing the good/fair/poor findings in the NLA report. For trophic status and recreational indicators, analysts used fixed, nationally consistent thresholds. The second approach was to establish regionally consistent reference-based thresholds.

### 3.2 Keywords for the Dataset

National Lakes Assessment, Lakes Ecosystem Services, Chemical condition class, Condition class, Cyanophyta, Diatom Condition Index, Ecosystem Services, Microcystis, Nutrient condition class, Recreational Condition Class, microcystin, Trophic state, Vegetation Cover Condition Class

## 4. OBJECTIVES AND INTRODUCTION

### 4.1 Program Objective

The U.S. Environmental Protection Agency (EPA), in partnership with state and tribal organizations, has designed the Survey of the Nation's Lakes to periodically assess the condition of the Nation's surface waters. The National Lake Assessment is a statistical assessment of the condition of our Nation's lakes, ponds, and reservoirs and is designed to: 1) Assess the condition of the Nation's Lakes; 2) Establish a baseline to compare future surveys for trends assessment and evaluate trends since the 1970's National Eutrophication Survey Study and 3) Help build State and Tribal capacity for monitoring and assessment and promote collaboration across jurisdictional boundaries. This survey will generate a statistically-valid report on the condition of our Nation's water resources and identify key stressors to this system. The goal of the Nation's Lakes project is to address two key questions about the quality of the Nation's lakes, ponds, and reservoirs: 1) What percent of the Nation's lakes are in good, fair, and poor condition for key indicators of trophic state, ecological health, and recreation? and 2) What is the relative importance of key stressors such as nutrients and pathogens?

The Survey is designed to be completed during the summer growing season before lake turnover (June through September). Field crews will collect a variety of measurements and indicators from an "index site" located at the deepest point

of the lake ( $\leq 50$  meters, and near the center if sampling a reservoir), and document conditions of the littoral zone and shoreline from stations around the lake.

EPA selected sampling locations using a probability based survey design. Sample Surveys have been used to determine the status of a population or resources of interest using a representative sample of a relatively few members or sites. Using this survey design allows data from the subset of sampled lakes to be applied to the larger target population and assessments with known confidence bounds to be made.

#### 4.2 Dataset Objective

The objective of the Reported Condition Class data set is to describe the processes used to collect, evaluate, and analyze data from the NLA to report condition classes for lakes.

#### 4.3 Dataset Background Discussion

The data set contains data derived from measurements collected in 2007 from Northeast region lakes from the states of Maine to West Virginia.

NLA analysts used two processes for establishing the good/fair/poor findings in the NLA report. For trophic status and recreational indicators, analysts used fixed, nationally consistent thresholds. The second approach was to establish regionally consistent reference-based thresholds. To assess current ecological condition, it is necessary to compare measurements today to an estimate of 'good' quality. Setting reasonable expectations for each indicator was one of the greatest challenges for NLA analysts. Because of the difficulty in estimating historical conditions for many NLA indicators, the 2007 NLA used 'least-disturbed condition' as the reference condition. Least-disturbed condition can be defined as the best available chemical, physical, and biological habitat conditions given the current state of the landscape – or 'the best of what's left'. Data from reference sites were used to develop seven regional specific reference conditions against which test results could be compared. Sites sampled during the NLA index period using consistent sampling protocols and analytical methods were screened to meet regional specific physical and chemical criteria. These included both sites selected from the probability sample sites and an additional 124 hand-picked sites thought to be reference by best professional judgment. Like the probability sample sites, the hand-picked sites were sampled using the NLA methods. These sites were obtained from a number of sources. Some states submitted their best reference sites to be sampled as part of the NLA while other sites from the west and northeast were selected in a prescreening analysis utilizing land use to find least-disturbed lake watersheds. Regardless of whether sites were probability-based or hand-selected, only those that met the final screening criteria were used in developing the reference condition.

#### 4.4 Summary of Dataset Parameters

Lake condition classes are reported.

### 5. DATA ACQUISITION AND PROCESSING METHODS

#### 5.1 Data Acquisition

The sample collection methods used by USEPA NLA trained field crews will be described here.

##### 5.1.1 Sampling Objective

NA

#### 5.1.2 Sample Collection: Methods Summary

Water quality and nutrient samples were collected as a basis for calculation of condition classes.

#### 5.1.3 Beginning Sampling Dates

5/8/2007

#### 5.1.4 Ending Sampling Dates

10/18/2007

#### 5.1.5 Sampling Platform

Samples were collected from gasoline or diesel powered boats.

#### 5.1.6 Sampling Equipment

Not applicable

#### 5.1.7 Manufacturer of Sampling Equipment

Not applicable

#### 5.1.8 Key Variables

Not applicable

#### 5.1.9 Sample Collection: Calibration

NA

#### 5.1.10 Sample Collection: Quality Control

NA

#### 5.1.11 Sample Collection: References

USEPA. 2007. Survey of the Nation's Lakes. Field Operations Manual.  
EPA 841-B-07-004. US Environmental Protection Agency, Washington, DC.  
([http://water.epa.gov/type/lakes/lakessurvey\\_index.cfm#CP\\_JUMP\\_474534](http://water.epa.gov/type/lakes/lakessurvey_index.cfm#CP_JUMP_474534))

#### 5.1.12 Sample Collection: Alternate Methods

NA

### 5.2 Data Preparation and Sample Processing

NA

#### 5.2.1 Sample Processing Objective

NA

#### 5.2.2 Sample Processing: Methods Summary

NA

#### 5.2.3 Sample Processing: Calibration

NA

#### 5.2.4 Sample Processing: Quality Control

NA

#### 5.2.5 Sample Processing: References

NA

#### 5.2.6 Sample Processing: Alternate Methods

Not Applicable

## 6. DATA ANALYSIS AND MANIPULATIONS

### 6.1 Name of New or Modified Value

NA

### 6.2 Data Manipulation Description

Descriptions reported in:

USEPA. 2010. National Lakes Assessment. Technical Appendix. EPA 841-R-09-001a.  
US Environmental Protection Agency, Office of Water, Office of Research and  
Development, Washington, D.C. 20460

## 7. DATA DESCRIPTION

### 7.1 Description of Parameters

#### 7.1.1 Components of the Dataset

| Attribute Name  | Format            | Description                                                                              |
|-----------------|-------------------|------------------------------------------------------------------------------------------|
| WB_ID           | NUMBER(10)        | Unique Waterbody ID                                                                      |
| NLA_ID          | VARCHAR2(60 BYTE) | National Lake Assessment study unique ID for each lake                                   |
| VISIT_NO        | NUMBER(4)         | Sequential visit number within year                                                      |
| PTL_COND        | VARCHAR2(60 BYTE) | Nutrient condition class (Total P)                                                       |
| NTL_COND        | VARCHAR2(60 BYTE) | Nutrient condition class (Total N)                                                       |
| CHLA_COND       | VARCHAR2(60 BYTE) | Condition class (Chlorophyll a)                                                          |
| TURB_COND       | VARCHAR2(60 BYTE) | Condition class (Turbidity)                                                              |
| ANC_COND        | VARCHAR2(60 BYTE) | Chemical condition class (Acid neutralizing capacity)                                    |
| SALINITY_COND   | VARCHAR2(60 BYTE) | Chemical condition class (Conductivity/Salinity)                                         |
| DO2_COND        | VARCHAR2(60 BYTE) | Condition class (mean Dissolved Oxygen in upper 2m)                                      |
| CORE_CONFIDENCE | VARCHAR2(30 BYTE) | Bottom slice represent pre-disturbance conditions? (YES/NO/UNCERTAIN)                    |
| PTL_INF_TOP     | NUMBER(8,2)       | Diatom-inferred Total Phosphorus (ug/L) in top core sample based on jackknifed values    |
| PTL_INF_BOT     | NUMBER(8,2)       | Diatom-inferred Total Phosphorus (ug/L) in bottom core sample based on jackknifed values |
| PTL_INF_DIF     | NUMBER(8,2)       | Difference (Top-Bottom) in Diatom-inferred Total Phosphorus (ug/L)                       |
| PTL_INF_COND    | VARCHAR2(60 BYTE) | Top-Bottom difference class for PTL                                                      |
| PTL_INF_COND3   | VARCHAR2(60 BYTE) | T-B difference class for PTL (3 level)                                                   |
| NTL_INF_TOP     | NUMBER(8,2)       | Diatom-inferred Total Nitrogen (ug/L) in top core sample based on jackknifed values      |
| NTL_INF_BOT     | NUMBER(8,2)       | Diatom-inferred Total Nitrogen (ug/L) in bottom core sample based on jackknifed values   |
| NTL_INF_DIF     | NUMBER(8,2)       | Difference (Top - Bottom) in Diatom-inferred Total Nitrogen (ug/L)                       |
| NTL_SIGTEST     | VARCHAR2(25 BYTE) | Is NTL_INF_DIF significantly different from 0? (Yes/No)                                  |
| NTL_INF_COND    | VARCHAR2(60 BYTE) | Top-Bottom difference class for NTL                                                      |
| NTL_INF_COND3   | VARCHAR2(60 BYTE) | T-B difference class for NTL (3-level)                                                   |
| LDC_ADJ         | NUMBER(9,4)       | Lake Diatom Condition Index (Adjusted for natural variation at reference sites)          |
| LDC_COND        | VARCHAR2(60 BYTE) | Condition class (Lake Diatom Condition Index)                                            |
| OE5             | NUMBER(10,6)      | Plankton Observed/Estimated (O/E) value                                                  |

|                |                   |                                                                                              |
|----------------|-------------------|----------------------------------------------------------------------------------------------|
| OE5_COND       | VARCHAR2(60 BYTE) | Condition class (Plankton O/E Indicator) based on fixed taxa loss thresholds (0.8, 0.6)      |
| OE5_COND_985   | VARCHAR2(60 BYTE) | Condition class (Plankton O/E Indicator) based on fixed taxa loss thresholds (0.9, 0.8, 0.6) |
| OE5_COND_R     | VARCHAR2(60 BYTE) | Condition class (Plankton O/E Indicator) based on thresholds derived from reference sites    |
| RDIS_COND      | VARCHAR2(60 BYTE) | Riparian Disturbance Condition Class (RDis_IX)                                               |
| RVEG_COND      | VARCHAR2(60 BYTE) | Riparian Vegetation Condition Class (RVegQ_OE)                                               |
| LITCVR_COND    | VARCHAR2(60 BYTE) | Littoral Vegetation Cover Condition Class (LitCvr_OE)                                        |
| LITRIPCVR_COND | VARCHAR2(60 BYTE) | Littoral-Riparian Vegetation Cover Condition Class (LitRipCvr_OE)                            |
| MCYST_TL_UGL   | NUMBER(5,2)       | Total microcystin concentration (ug/L)                                                       |
| CYANDENS       | NUMBER(16,9)      | Cyanophyta density (#/cm2)                                                                   |
| REC_CHLA_COND  | VARCHAR2(60 BYTE) | Recreational Condition Class (Chl a)                                                         |
| MCYST_PRES     | VARCHAR2(60 BYTE) | Recreational Condition Class (Microcystin presence < RL)                                     |
| MCYST_COND     | VARCHAR2(60 BYTE) | Recreational Condition Class (Microcystin)                                                   |
| MCYST_COND_HI  | VARCHAR2(60 BYTE) | Recreational Condition Class (Microcystin) High vs. Low+Moderate Risk                        |
| CYANO_COND     | VARCHAR2(60 BYTE) | Recreational Condition Class (Cyanobacteria density)                                         |
| TSTATE_TP      | VARCHAR2(60 BYTE) | Trophic state based on total P (10, 25, 50 ug/L)                                             |
| TSTATE_TN      | VARCHAR2(60 BYTE) | Trophic state based on total N (0.35, 0.75, 1.4 mg/L)                                        |
| TSTATE_CHL     | VARCHAR2(60 BYTE) | Trophic state based on Chl a (2, 7, 30 ug/L)                                                 |
| TSTATE_SECCHI  | VARCHAR2(60 BYTE) | Trophic state based on secchi transparency (4, 2.1, 0.7 m)                                   |

#### 7.1.2 Precision of Reported Values

NA

#### 7.1.3 Minimum Value in Dataset / 7.1.4 Maximum Value in Dataset

| PARAMETER    | MIN       | MAX        |
|--------------|-----------|------------|
| VISIT_NO     | 1         | 2          |
| PTL_INF_TOP  | 1.25      | 1576.38    |
| PTL_INF_BOT  | 1.46      | 3224.52    |
| PTL_INF_DIF  | -3184.72  | 1139.55    |
| NTL_INF_TOP  | 76.9      | 13847.42   |
| NTL_INF_BOT  | 35.63     | 20481.2    |
| NTL_INF_DIF  | -15698.71 | 10980.63   |
| LDC_ADJ      | -50.3433  | 38.1558    |
| OE5          | 0.101585  | 1.473362   |
| MCYST_TL_UGL | 0.05      | 225        |
| CYANDENS     | 0         | 498222.222 |

#### 7.2 Data Record Example

##### 7.2.1 Column Names for Example Records

NLA\_ID, VISIT\_NO, PTL\_COND, NTL\_COND, CHLA\_COND, TURB\_COND, ANC\_COND,

SALINITY\_COND, DO2\_COND, CORE\_CONFIDENCE, PTL\_INF\_TOP, PTL\_INF\_BOT, PTL\_INF\_DIF, PTL\_INF\_COND, PTL\_INF\_COND3, NTL\_INF\_TOP, NTL\_INF\_BOT, NTL\_INF\_DIF, NTL\_SIGTEST, NTL\_INF\_COND, NTL\_INF\_COND3, LDC\_ADJ, LDC\_COND, OE5, OE5\_COND, OE5\_COND\_985, OE5\_COND\_R, RDIS\_COND, RVEG\_COND, LITCVR\_COND, LITRIPCVR\_COND, MCYST\_TL\_UGL, CYANDENS, REC\_CHLA\_COND, MCYST\_PRES, MCYST\_COND, MCYST\_COND\_HI, CYANO\_COND, TSTATE\_TP, TSTATE\_TN, TSTATE\_CHL, TSTATE\_SECCHI, WB\_ID

#### 7.2.2 Example Data Records

NLA06608-0001, 1, 1: LEAST DISTURBED, 1: LEAST DISTURBED, 1: LEAST DISTURBED, 1: LEAST DISTURBED, 1: LEAST DISTURBED, 1: HIGH ( $\geq 5$  mg/L), , , , , 02: NO DATA, 02: NO DATA, , , , , 02: NO DATA, 02: NO DATA, , 4: NOT ASSESSED, 0.504031, 3:  $> 40\%$  TAXA LOSS, 3:  $> 20$ -50% TAXA LOSS, 3: MOST DISTURBED, 1: LEAST DISTURBED, 1: LEAST DISTURBED, 1: LEAST DISTURBED, 1: LEAST DISTURBED, 0.05, 30.11696365, 1: Low Risk, 1: LESS THAN RL (0.1 ug/L), 1: Low Risk, 1: Low to Moderate Risk, 1: Low Risk ( $< 20,000$ /mL), 1: OLIGOTROPHIC ( $\leq 10$  ug/L), 1: OLIGOTROPHIC ( $\leq 0.35$  mg/L), 1: OLIGOTROPHIC ( $\leq 2$  ug/L), 1: OLIGOTROPHIC ( $> 4$  m), NLA06608-0002, 1, 2: INTERMEDIATE DISTURBANCE, 2: INTERMEDIATE DISTURBANCE, 1: LEAST DISTURBED, 1: LEAST DISTURBED, 1: LEAST DISTURBED, 1: LEAST DISTURBED, 9: NO DATA, , , , , 00: NOT ASSESSED, 00: NOT ASSESSED, , , , , 00: NOT ASSESSED, 00: NOT ASSESSED, 8.3991, 1: LEAST DISTURBED, 0.592696, 3:  $> 40\%$  TAXA LOSS, 3:  $> 20$ -50% TAXA LOSS, 3: MOST DISTURBED, 2: INTERMEDIATE DISTURBANCE, 1: LEAST DISTURBED, 1: LEAST DISTURBED, 1: LEAST DISTURBED, 0.05, 6047.380714, 1: Low Risk, 1: LESS THAN RL (0.1 ug/L), 1: Low Risk, 1: Low to Moderate Risk, 1: Low Risk ( $< 20,000$ /mL), 3: EUTROPHIC ( $> 25$ -50 ug/L), 2: MESOTROPHIC ( $> 0.35$ -0.75 mg/L), 2: MESOTROPHIC ( $> 2$ -7 ug/L), 4: HYPEREUTROPHIC ( $\leq 0.7$  m),

#### 8. GEOGRAPHIC AND SPATIAL INFORMATION

##### 8.1 Minimum Longitude (Westernmost)

-80.208767 decimal degrees

##### 8.2 Maximum Longitude (Easternmost)

-66.99852 decimal degrees

##### 8.3 Minimum Latitude (Southernmost)

36.702015 decimal degrees

##### 8.4 Maximum Latitude (Northernmost)

47.416054 decimal degrees

##### 8.5 Name of area or region

The National Lake Assessment Northeast Region covers the northeastern US from Maine to West Virginia.

#### 9. QUALITY CONTROL AND QUALITY ASSURANCE

##### 9.1 Measurement Quality Objectives

NA

##### 9.2 Data Quality Assurance Procedures

NA

##### 9.3 Actual Measurement Quality

NA



## 10. DATA ACCESS

### 10.1 Data Access Procedures

Access data at: <http://www.epa.gov/aed/lakesecoservices> by clicking on the Database link.

### 10.2 Data Access Restrictions

None

### 10.3 Data Access Contact Persons

John Kiddon, U.S. EPA NHEERL-AED, Narragansett, RI  
401-782-3034, 401-782-3030 (FAX), [kiddon.john@epa.gov](mailto:kiddon.john@epa.gov)

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401-782-3183, 401-782-3030 (FAX), [buffum.harry@epa.gov](mailto:buffum.harry@epa.gov)

### 10.4 Dataset Format

Comma-delimited ASCII files

### 10.5 Information Concerning Anonymous FTP

Not available

### 10.6 Information Concerning WWW

See Section 10.1 for WWW access

### 10.7 EMAP CD-ROM Containing the Dataset

Data not available on CD-ROM

## 11. REFERENCES

USEPA. 2007. Survey of the Nation's Lakes. Field Operations Manual.  
EPA 841-B-07-004. US Environmental Protection Agency, Washington, DC.  
([http://water.epa.gov/type/lakes/lakesurvey\\_index.cfm#CP\\_JUMP\\_474534](http://water.epa.gov/type/lakes/lakesurvey_index.cfm#CP_JUMP_474534))

USEPA. 2009. Survey of the Nation's Lakes: Integrated Quality Assurance  
Project Plan. EPA/841-B-07-003. US Environmental Protection Agency,  
Washington, DC. ([http://water.epa.gov/type/lakes/lakesurvey\\_index.cfm#CP\\_JUMP\\_474534](http://water.epa.gov/type/lakes/lakesurvey_index.cfm#CP_JUMP_474534))

USEPA. 2006. Survey of the Nation's Lakes. Lake Evaluation Guidelines.  
EPA 841-B-06-003. US Environmental Protection Agency, Washington, DC.

USEPA. 2010. National Lakes Assessment. Technical Appendix. EPA 841-R-09-001a.  
US Environmental Protection Agency, Office of Water, Office of Research and  
Development, Washington, D.C. 20460

## 12. TABLE OF ACRONYMS

|       |                                   |
|-------|-----------------------------------|
| EPA   | Environmental Protection Agency   |
| NLA   | National Lakes Assessment         |
| QA/QC | Quality Assurance/Quality Control |
| WWW   | World Wide Web                    |

## 13. PERSONNEL INFORMATION

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