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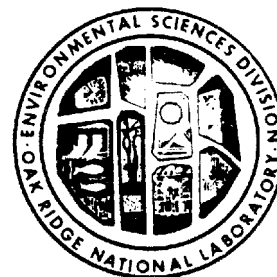
**OAK RIDGE
NATIONAL
LABORATORY**

**National Surface Water Survey:
Western Lake Survey-Phase I,
Data Base Dictionary**

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Environmental Sciences Division
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ENVIRONMENTAL SCIENCES DIVISION

NATIONAL SURFACE WATER SURVEY:
WESTERN LAKE SURVEY-PHASE I,
DATA BASE DICTIONARY

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ABSTRACT

Kanciruk, Paul, Marilyn Gentry, Raymond McCord¹, Les Hook, Joseph Eilers, and Mary D. Best. 1987. National Surface Water Survey: Western Lake Survey-Phase I, Data Base Dictionary. ORNL/TM-10307. Oak Ridge National Laboratory, Oak Ridge, Tennessee. 90 pp.

The Western Lake Survey-Phase I (WLS-I), conducted in the fall of 1985, was the second part of a U.S. Environmental Protection Agency field sampling effort known as the National Surface Water Survey. The WLS-I followed the Eastern Lake Survey-Phase I, which was conducted in the fall of 1984 and included the northeastern, southeastern, and upper midwestern regions of the United States (see "Related Documents"). Both surveys were designed to quantify synoptically the lake chemistry in areas of the United States where the majority of lakes were expected to exhibit low alkalinity. These surveys were conducted as part of the National Acid Precipitation Assessment Program.

The survey involved a three-month field effort in which 720 probability sample lakes and 32 special interest lakes in the western regions of the United States were sampled. The Environmental Sciences Division of the Oak Ridge National Laboratory designed and implemented data management and provided data analysis for the WLS-I.

This document provides the information necessary for researchers to accurately transfer the WLS-I data base to their own computer systems. As a data dictionary, this document also includes complete descriptions of the variables in the data base and of the data set formats.

Keywords: National Lake Survey; NSWS; Western Lake Survey; Water Quality; Acidic Deposition; Acid Rain; EPA; Research Data Management.

1. INTRODUCTION

This data dictionary describes the U.S. Environmental Protection Agency's (EPA's) Western Lake Survey-Phase I (WLS-I) data base. A description of the purpose, design, and results of the survey is contained in the two-volume report on the WLS-I (Landers et al. 1987; Eilers et al. 1987). Table 1 summarizes the information collected during the survey.

This dictionary does not report the results of the survey nor it describe its purpose, design, or protocols. The purpose of the base dictionary is to provide to data managers and programmers the information necessary to transfer accurately the WLS-I data to their own computer systems.

Table 1. Summary of information collected during the U.S. EPA Western Lake Survey-Phase 1^a

Geographic information

Bedrock	Lake name
County	Latitude
Elevation	Longitude
Geographic face	Presence of inlets/outlets
Geomorphic unit	State
Lake area	USGS map names
Lake ID	Watershed area

Collected on the lake

Air temperature	Number of inlets/outlets	Watershed disturbances
Conductance	pH	Water temperature
Depth	Secchi disk transparency	

Measured in the field laboratory

Color	Dissolved inorganic carbon	pH	Turbidity
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Measured in the analytical laboratory

Acid neutralizing capacity	Dissolved organic carbon	Phosphorus
Acidity	Extractable aluminum	Potassium
Air-equilibrated pH	Fluoride	Silica
Ammonium	Initial titration pH	Sodium
Calcium	Iron	Sulfate
Chloride	Magnesium	Total aluminum
Conductance	Manganese	
Dissolved inorganic carbon	Nitrate	

Calculated or interpolated

Anion deficit	Precipitation
Bicarbonate ion	Runoff
Calculated conductance	Sum of anions
Carbonate ion	Sum of base cations
Distance from ocean	Sum of cations
Estimated hydraulic residence time	Sum of cations/sum of anions
Lake volume	Watershed/lake area
Organic anions	

^aFor a complete list and definition of variables, see Sects. 4 and 5. For a description of the survey purpose, design, and results, see the "Related Documents" listed on pp. vii and viii of this report.

2. DATA BASE DESIGN

The WLS-I data base was developed at the Oak Ridge National Laboratory (ORNL) on tandem IBM* 3033 mainframe computers using the SAS statistical analysis software system. The data were entered into a series of relational (tabular) SAS files which, after extensive error checking and validation, were merged to create the data sets distributed for public use. A description of data base design and implementation is presented in Kanciruk, Olson, and McCord (1986).

Two working data sets (1 and 2) were used internally to verify and validate the WLS-I data base. These are not distributed. There are three distributed W-S-I data sets (Table 2): data set 3 (the validated data set), data set 4 (the final data set), and a subset of data set 4 [the personal computer (PC) data set, distributed on IBM PC format disks]. Data sets 3 and 4, which are distributed on magnetic tape in both SAS and card-image formats, contain similar sets of variables but duplicate lake samples [collected for quality assurance (QA)] are identified separately only in data set 3. In data set 4 and the PC data set the duplicate samples were averaged, and only the average value is reported for each lake; additionally, some missing data were substituted with estimates based upon duplicate analyses (Eilers, Blick, and DeHaan, 1987). For example, if the analytical laboratory calcium value was missing, a calcium value determined from the split sample with the EPA Corvallis laboratory was substituted.

*IBM is the registered trademark of International Business Machines Corporation, Boca Raton, Florida 33432.

†SAS is the registered trademark of SAS Institute Inc., Cary, North Carolina 27511.

Table 2. Characteristics of data sets 3 and 4 and the PC data set.

Characteristic	Data set 3 (Validated)	Data set 4 (final)	PC data set (final)
Format, media	SAS or card image 9-track magtape	SAS or card image 9-track magtape	Card image IBM PC disks
Number of files	1	1	2
File names ^a	WLSI.SAS (DS3) (SAS format) WLSI.DS3C (Card format)	WLS.SAS (DS4) (SAS format) WLSI.DS4C (Card format)	WLS-I.REG (Regular) WLS-I.SPC (Special)
Approximate Size in MBytes	3.0	1.1	0.26 (total)
Number of observations	1106	752	752
Number of variable	277	159	47
Duplicate lake samples	Retained	Averaged	Averaged
Number of Observations per lake	1 or 2	1	1
Tags present	Yes	No	No
Flags present	Yes	Yes	No
Missing data	Not substituted	Substituted when possible(b)	Substituted when possible ^b
Missing value representation ^c	-999 if numeric, space if character	-999 if numeric space if character	-999 if numeric, space if character
Unique key	LAKE_ID with SAMCOD	LAKE_ID	LAKE_ID

^aMagnetic tape files may or may not be named. PC data files are always named.

^bEilers, Blick and DeHaan (1987).

^cmissing value representation is for card-image files only. Standard SAS notation for missing values is used in the SAS files.

Data set 4 was used for analyzing and reporting results in Landers et al. (1987) and Eilers et al. (1987). Data set 3 is useful when the researcher desires unaveraged, unsubstituted data. In data set 3, LAKE_ID concatenated with SAMCOD is the unique record identifier. Data set 4 and the PC data set are easier to use for general analysis, with LAKE_ID the unique record identifier. The PC data set (two files - one for probability sample lakes and one for all special interest lakes) is smaller and duplicates information presented in some of the tables in Eilers et al. (1987).

3. DATA TAGS AND FLAGS

In addition to the WLS-I analytic and descriptive variables, some variables on the data sets were designated as "tags" or "flags." These data qualifiers provide additional information for an individual value. Tags were one-letter codes contained in a variable used to qualify data as the data were recorded on the field or laboratory data forms. For example, if a pH reading was not acceptable because the pH meter was slow to stabilize or was erratic and a second attempt was necessary, then the pH was recorded with a tag "B" to associate this information specifically with this variable. Tag variable names have the same names as the variables they qualify, but with the suffix "T." A list of tag codes is given in Table 3. Tags are provided only in data set 3 for historic purposes. Tags values were adjusted, if necessary, in data set 4 and the tags themselves deleted.

Flags are two-character codes (Table 4) that also qualify data. Flags were not entered by the observer conducting the measurement but were entered later during the data verification and validation process. For flag variable names, an "F" was appended to the name of the variable being qualified.

Both tags and flags can contain multiple, concatenated codes. Variables that are tags or flags are included in the list of variables presented in Sect. 4. The use of tags and flags during the WLS-I is described in Kanciruk, Olson, and McCord (1986). Analytical QA and validation procedures, including QA flagging, are provided in Silverstein et al. (1986, 1987) and Eilers, Blick, and DeHaan (1987).

Table 3. Tag^a code definitions, U.S. EPA Western Lake Survey-Phase I

Tag code	Definition ^b
A	Instrument unstable.
B	Redone; first reading not acceptable.
C	Instruments and sampling gear not Vertical in water column.
D	Slow stabilization.
E	HYDROLAB cable too short.
F	Results outside of criteria with consent of the quality assurance manager.
J	Results not available; insufficient sample volume shipped to the analytical laboratory from the field.
K	Results not available; entire aliquot not shipped.
L	Results not available due to interference.
M	Results not available; sample lost or destroyed by analytical laboratory.
N	Not required.
R	Results from reanalysis.
S	Contamination suspected.
T	Leaking container.
U	Results not required by procedure; unnecessary.
X	User-defined on the field form (defined in variable TAG_X).
Y	User-defined on the field form (defined in variable TAG_Y).
Z	User-defined on the field form (defined in variable TAG_Z).
<	Measurements taken at <0.75 m.

^aTags are included only in data set 3.

^bFor a description of the analytical quality assurance verification process, see Silverstein et al. (1986, 1987).

Table 4. Flag code definitions, U.S. EPA Western Lake Survey-Phase I

Flag code	Definition ^a
A0	Anion/cation percent ion balance difference was outside of criteria due to unknown cause.
A1	Anion/cation percent ion balance difference was outside of criteria due to nitrate contamination.
A2	Anion/cation percent ion balance difference was outside of criteria due to anion (other than nitrate) contamination.
A3	Anion/cation percent ion balance difference was outside of criteria due to cation contamination.
A4	Anion/cation percent ion balance difference was outside of criteria due to unmeasured organic protolytes (fits Oliver Model, Kerfoot and Faber 1986)
A5	Anion/cation percent ion balance difference was outside of criteria due to possible analytical error; anion concentration too high.
A6	Anion/cation percent ion balance difference was outside of criteria due to possible analytical error; cation concentration too low.
A7	Anion/cation percent ion balance difference was outside of criteria due to possible analytical error; anion concentration too low.
A8	Anion/cation percent ion balance difference was outside of criteria due to possible analytical error; cation concentration too high.
B0	External (field) blank was above expected criteria (for pH, DIC, DOC, conductance, alkalinity, and acidity determinations where the blank was above expected criteria).
B1	Internal (laboratory) blank was greater than twice the required detection limit (this flag used for pH, DIC, DOC, conductance, alkalinity, and acidity determinations where the blank was above expected criteria).

Table 4. (continued)

Flag code	Definition ^a
B2	External (field) blank was above expected criteria and contributed more than 20 percent to sample concentrations that were greater than ten times the required detection limit (flag not used for pH, DIC, DOC, acidity, or alkalinity determinations).
B3	Internal (laboratory) blank was more than twice the required detection limit and contributed more than 10 percent to the sample concentrations that were greater than ten times the required detection limit (flag not used for pH, DIC, DOC, acidity, or alkalinity determinations).
B4	Potential negative sample bias based on internal (laboratory) blank data.
B5	Potential negative sample bias based on external (field) blank data.
C0	Percent conductance difference was outside of criteria due to an unknown cause (possible analytical error; ion concentration too high).
C1	Percent conductance difference was outside of criteria due to possible analytical error; anion concentration too high.
C2	Percent conductance difference was outside of criteria due to anion contamination.
C3	Percent conductance difference was outside of criteria due to cation contamination.
C4	Percent conductance difference was outside of criteria due to unmeasured organic anions (fits Oliver Model, Kerfoot and Faber 1986).
C5	Percent conductance difference was outside of criteria due to possible analytical error in conductance measurement.
C6	Percent conductance difference was outside of criteria due to possible analytical error; anion concentration too low.
C7	Percent conductance difference was outside of criteria due to unmeasured protolyte anions (does not fit Oliver Model, Kerfoot and Faber 1986).

Table 4. (continued)

Flag code	Definition ^a
C8	Percent conductance difference was outside of criteria due to possible analytical error; cation concentration too low.
C9	Percent conductance difference was outside of criteria due to possible analytical error; cation concentration too high.
D0	External (field) duplicate precision exceeded the maximum expected percent relative standard deviation, but either the routine or the duplicate concentration was greater than ten times the required detection limit.
D2	External (field) duplicate precision exceeded the maximum expected percent relative standard deviation, and both the routine and the duplicate sample concentrations were greater than ten times the required detection limit.
D3	Internal (laboratory) duplicate precision exceeded the maximum required percent relative standard deviation, and both the routine and duplicate sample concentrations were greater than ten times the required detection limit.
F0	Percent conductance difference exceeded criteria when HYDROLAB conductance value was substituted.
F1	Protolyte analysis program indicated field pH problem when HYDROLAB pH value was substituted.
F2	Protolyte analysis program indicated unexplained field pH/DIC problem when HYDROLAB pH value was substituted.
H0	The maximum holding-time criteria were not met.
N5	Nitrate data obtained from analysis of aliquot 5.
P0	Field problem; station pH.
P1	Field problem; station DIC.
P2	Field problem; unexplained (pH or DIC).
P3	Laboratory problem; initial alkalinity pH.

Table 4. (continued)

Flag code	Definition ^a
P4	Laboratory problem; initial acidity pH.
P5	Laboratory problem; unexplained, initial pH (acidity or alkalinity).
P6	Laboratory problem; initial DIC.
P7	Laboratory problem; air-equilibrated pH or DIC.
P8	Laboratory problem; unexplained, initial pH or DIC
P9	Laboratory problem; alkalinity determination.
U0	Known error based on relationships with other variables and/or impossible values; substitutions were made in data set 4.
U1	Data value is a substitution; original value was missing.
U2	Data value is a substitution; original value was considered to be in error.
V0	Data value represents the average from a duplicate split and measurement of the lake sample.
V1	Data value is from the duplicate lake sample and is not averaged because the regular sample had "WO" flag limitations.
W0	Data value has possible measurement error, based on relationships with other variables, has QA violations or is outside of QA criteria for acceptable data.
Z0	Original value was less than zero and has been replaced with zero.

^aFor a description of the analytical verification process and validation methods, see Silverstein et al. (1986, 1987) and Eilers, Blick, and DeHaan (1987).

4. LIST OF VARIABLES

Table 5, which lists the variables in data sets 3 or 4 or the PC data set, is alphabetized by variable name and provides variable type (numeric or character), length (in bytes, as structured in SAS), the SAS label, and the data set(s) in which the variable is found. Units of measure are defined in Sect. 5.

Variable labels are printed as they appear in the SAS data sets. To ensure accuracy, these lists are unedited file transfers from the mainframe computer. The use of all capital letters and "UEQ/L" for " $\mu\text{eq/l}$ " and "US" for " $\mu\text{S/cm}$ " are examples of some unavoidable constraints on the aesthetics of table presentation imposed by limitations of the mainframe computer character set.

To avoid confusion, programmers loading data into their local software systems should retain original variable names and labels when possible.

Table 5. List of variables, all data sets, U.S. EPA Western Lake Survey-Phase I

Variable name	Label ^a	Variable type	Variable length ^b	Variable present in data set ^c		
				3	4	PC
ACC011	CO2 ACIDITY (UEQ/L)	NUM	8	Y	Y	•
ACC011F	FLAG FOR ACC011	CHAR	12	Y	Y	•
ACC011T	TAG FOR ACC011	CHAR	6	Y	•	•
AIRTMP	AIR TEMPERATURE (DEG C)	NUM	8	Y	Y	•
AIRTMPF	FLAG FOR AIRTMP	CHAR	12	Y	Y	•
ALEX11	EXTRACTABLE ALUMINUM (UG/L)	NUM	8	Y	Y	Y
ALEX11F	FLAG FOR ALEX11	CHAR	12	Y	Y	•
ALEX11T	TAG FOR ALEX11	CHAR	6	Y	•	•
ALKA11	ALKALINITY (UEQ/L)	NUM	8	Y	Y	Y
ALKA11F	FLAG FOR ALKA11	CHAR	12	Y	Y	•
ALKA11T	TAG FOR ALKA11	CHAR	6	Y	•	•
ALK_CLSS	ALKALINITY CLASS (1,2,3)	CHAR	1	Y	Y	•
ALTIM	ALTIMETER (FT)	NUM	8	Y	Y	•
ALTIMT	TAG FOR ALTIM	CHAR	6	Y	•	•
AITL11	TOTAL ALUMINUM (UG/L)	NUM	8	Y	Y	Y
AITL11F	FLAG FOR AITL11	CHAR	12	Y	Y	•
ALTL11T	TAG FOR ALTL11	CHAR	6	Y	•	•
ANCAT	CATSUM/ANSUM	NUM	8	Y	Y	Y
ANDEF	CATSUM - ANSUM (UEQ/L)	NUM	8	Y	Y	•
ANSUM	SUM OF ANIONS (UEQ/L)	NUM	8	Y	Y	Y
ANSUMF	FLAG FOR ANSUM	CHAR	12	Y	Y	•
BAT_ID	BATCH ID	CHAR	6	Y	Y	•
BAT_IDT	TAG FOR BAT_ID	CHAR	6	Y	•	•
BEDROCK	NORTON BEDROCK CLASSIFICATION	CHAR	1	Y	Y	•
BNSTAR	POPULATION SIZE BY STRATA	NUM	8	Y	Y	Y
CA1	CALCIUM (MG/L)	NUM	8	Y	Y	•
CA11F	FLAG FOR CA11	CHAR	12	Y	Y	•
CA11T	TAG FOR CA11	CHAR	6	Y	•	•
CA16	CALCIUM (UEQ/L)	NUM	8	Y	Y	Y
CATSUM	SUM OF CATIONS (UEQ/L)	NUM	8	Y	Y	Y
CATSUMF	FLAG FOR CATSUM	CHAR	12	Y	Y	•
CL11	CHLORIDE (MG/L)	NUM	8	Y	Y	•
CL11F	FLAG FOR CL11	CHAR	12	Y	Y	•
CL11T	TAG FOR CL11	CHAR	6	Y	•	•
CL16	CHLORIDE (UEQ/L)	NUM	8	Y	Y	Y
CO316	CARBONATE ALKALINITY (UEQ/L)	NUM	8	Y	Y	•
CO316F	FLAG FOR CO316	CHAR	12	Y	Y	•
COLVAL	COLOR (PCU)	NUM	8	Y	Y	Y
COLVALF	FLAG FOR COLVAL	CHAR	12	•	Y	•
COLVALT	TAG FOR COLVAL	CHAR	6	Y	•	•
COM01	COMMENT FROM FORM 1	CHAR	75	Y	•	•
COMMNT	COMMENT FROM FORM 2	CHAR	75	Y	•	•
CONCAL	CALCULATED SPECIFIC CONDUCTANCE (US/CM)	NUM	8	Y	Y	Y
CONCALF	FLAG FOR CONCAL	CHAR	14	Y	Y	•

Table 5. (continued)

Variable name	Label ^a	Variable type	Variable length ^b	Variable present in data set		
				3	4	PC
COND11	CONDUCTANCE, ANALYTICAL LAB (US/CM)	NUM	8	Y	Y	Y
COND11F	FLAG FOR COND11	CHAR	12	Y	Y	•
COND11T	TAG FOR COND11	CHAR	6	Y	•	•
CONFI	FINAL CONDUCTANCE (US/CM)	NUM	8	Y	•	•
CONFIT	TAG FOR CONFI	CHAR	6	Y	•	•
CONIN	INITIAL CONDUCTANCE (US/CM)	NUM	8	Y	•	•
CONINT	TAG FOR CONIN	CHAR	6	Y	•	•
CONTOP	CONDUCTANCE AT SURFACE (1. SM) (US/CM)	NUM	8	Y	Y	•
CONTOPF	FLAG FOR CONTOP	CHAR	12	Y	Y	•
CONTOPT	TAG FOR CONTOP	CHAR	6	Y	•	•
CON_1	CONDUCTANCE AT 4 OR 5 M (US/CM)	NUM	8	Y	•	•
CON_10	CONDUCTANCE AT 50 M (US/CM)	NUM	8	Y	•	•
CON_1T	TAG FOR CON_1	CHAR	6	Y	•	•
CON_2	CONDUCTANCE AT 6 OR 10 M (US/CM)	NUM	8	Y	•	•
CON_2T	TAG FOR CON_2	CHAR	6	Y	•	•
CON_3	CONDUCTANCE AT 8 OR 15 M (US/CM)	NUM	8	Y	•	•
CON_3T	TAG FOR CON_3	CHAR	6	Y	•	•
CON_4	CONDUCTANCE AT 10 OR 20 M (US/CM)	NUM	8	Y	•	•
CON_4T	TAG FOR CON_4	CHAR	6	Y	•	•
CON_5	CONDUCTANCE AT 12 OR 25 M (US/CM)	NUM	8	Y	•	•
CON_5T	TAG FOR CON_5	CHAR	6	Y	•	•
CON_6	CONDUCTANCE AT 14 OR 30 M (US/CM)	NUM	8	Y	•	•
CON_60	CONDUCTANCE AT 0.60*SITE DEPTH (US/CM)	NUM	8	Y	Y	•
CON_60T	TAG FOR CON_60	CHAR	6	Y	•	•
CON_6T	TAG FOR CON_6	CHAR	6	Y	•	•
CON_7	CONDUCTANCE AT 16 OR 35 M (US/CM)	NUM	8	Y	•	•
CON_7T	TAG FOR CON_7	CHAR	6	Y	•	•
CON_8	CONDUCTANCE AT 18 OR 40 M (US/CM)	NUM	8	Y	•	•
CON_8T	TAG FOR CON_8	CHAR	6	Y	•	•
CON_9	CONDUCTANCE AT 20 OR 45 M (US/CM)	NUM	8	Y	•	•
CON_B	CONDUCTANCE AT BOTTOM-1 SM (US/CM)	NUM	8	Y	Y	•
CON_BT	TAG FOR CON_B	CHAR	6	Y	•	•
COUNTY	FIPS CODE (STATE, COUNTY)	CHAR	8	Y	Y	•
CRW_ID	CREW ID	CHAR	6	Y	Y	•
DATPRO	DATE PROCESSED, FORM 2	NUM	8	Y	•	•
DATSHP	DATE SHIPPED, FORM 2	NUM	8	Y	•	•
DATSMP	DATE SAMPLED (DDMMYY), FORM 1	NUM	8	Y	Y	Y
DATTR	DATE RECEIVED AT TRAILER, FORM 1	NUM	8	Y	•	•
DICE11	EQUILIBRATED DIC, ANALYTICAL LAB (MG/L)	NUM	8	Y	Y	Y
DICE11F	FLAG FOR DICE11	CHAR	12	Y	Y	•
DICE11T	TAG FOR DICE11	CHAR	6	Y	•	•
DIC11	INITIAL DIC, ANALYTICAL LAB (MG/L)	NUM	8	Y	Y	•
DIC11F	FLAG FOR DIC11	CHAR	12	Y	Y	•
DIC11T	TAG FOR DIC11	CHAR	6	Y	•	•

Table 5. (continued)

Variable	Label ^a	Variable type	Variable length ^b	Variable present in data set ^c		
				3	4	PC
DICQCS	DIC OCCS, FIELD LAB (MG/L)	NUM	8	Y	•	•
DICQCST	TAG FOR DICQCS	CHAR	6	Y	•	•
DICVAL	DIC, FIELD LAB (MG/L)	NUM	8	Y	Y	Y
DICVALF	FLAG FOR DICVAL	CHAR	12	Y	Y	•
DICVALT	TAG FOR DICVAL	CHAR	6	Y	•	•
DISM	DISTANCE FROM COAST (KM)	NUM	8	Y	Y	•
DOC11	DOC, ANALYTICAL LAB (MG/L)	NUM	8	Y	Y	Y
DOC11F	FLAG FOR DOC11	CHAR	12	Y	Y	•
DOC11T	TAG FOR DOC11	CHAR	6	Y	•	•
DP_60	DEPTH AT 0.6*SITE DEPTH (M)	NUM	8	Y	Y	•
DP_60T	TAG FOR DP_60	CHAR	6	Y	•	•
DP_B	DEPTH AT BOTTOM-1.5 M (M)	NUM	8	Y	Y	•
DP_BT	TAG FOR DP_B	CHAR	6	Y	•	•
DP_TOP	DEPTH AT SURFACE (1.5 M) (M)	NUM	8	Y	Y	•
DP_TOPT	TAG FOR DP_TOP	CHAR	6	Y	•	•
ELEV	LAKE ELEVATION (M)	NUM	8	Y	Y	Y
FACE	GEOMORPHIC SLOPE (E/W)	CHAR	1	Y	Y	•
FE11	IRON (UG/L)	NUM	8	Y	Y	•
FE11F	FLAG FOR FE11	CHAR	12	Y	Y	•
FE11T	TAG FOR FE11	CHAR	6	Y	•	•
FOREST	FOREST-NF PAR-NP NATREC-NRA	CHAR	30	Y	Y	•
FTL11	FLUORIDE (MG/L)	NUM	8	Y	Y	•
FTL11F	FLAG FOR FTL11	CHAR	12	Y	Y	•
FTL11T	TAG FOR FTL11	CHAR	6	Y	•	•
FTL16	FLUORIDE (UEQ/L)	NUM	8	Y	Y	Y
GMU	GEOMORPHIC UNIT	CHAR	6	Y	Y	•
H16	HYDRONIUM FROM PHAC (UEQ/L)	NUM	8	Y	Y	•
H16F	FLAG FOR H16	CHAR	12	Y	Y	•
HC0316	HCO ₃ (UEQ/L)	NUM	8	Y	Y	Y
HCO316F	FLAG FOR HCO316	CHAR	12	Y	Y	•
HELGR	H/HELICOPTER, G/GROUND TEAM	CHAR	1	Y	Y	•
HEL_ID	HELICOPTER ID	CHAR	9	Y	•	•
HYDROTYP	DRAINAGE, SEEPAGE, CLOSED, RESERVOIR	CHAR	9	Y	Y	Y
HYD_ID	HYDROLAB_ID	CHAR	3	Y	•	•
INLETS	INLETS (N) (FORM 1)	NUM	8	Y	•	•
INLETST	TAG FOR INLETS	CHAR	6	Y	•	•
IN_OUT	PRESENCE/ABSENCE OF INLETS/OUTLETS	CHAR	6	Y	Y	•
K11	POTASSIUM (MG/L)	NUM	8	Y	Y	•
K11F	FLAG FOR K11	CHAR	12	Y	Y	•
K11T	TAG FOR K11	CHAR	6	Y	•	•
K16	POTASSIUM (UEQ/L)	NUM	8	Y	Y	Y
LABNAM	LABORATORY FOR ANALYSIS	CHAR	30	Y	Y	•
LAKENAAE	LAKE NAME	CHAR	30	Y	Y	Y
LAKE_ID	LAKE IDENTIFICATION CODE	CHAR	7	Y	Y	Y
LAKE_SIZ	LAKE SURFACE AREA (HA)	NUM	8	Y	Y	Y

Table 5. (continued)

Variable name	Label ^a	Variable type	Variable length ^b	Variable present in data set (c)		
				3	4	PC
LAKE_VOL	CALCULATED LAKE VOLUME (10*k6 CU M)	NUM	8	Y	Y	•
LAKVER	LOCATION VERIFIED BY, FORM 1	CHAR	25	Y	•	•
LAT	LATITUDE	CHAR	10	Y	Y	Y
LATINS	LORAN LATITUDE (DDMM.DM)	CHAR	10	Y	Y	•
LAT INST	TAG FOR LATINS	CHAR	6	Y	•	•
LATMAP	MAP LATITUDE (DDMM.DM)	CHAR	10	Y	•	•
LATMAPT	TAG FOR LATMAP	CHAR	6	Y	•	•
LAT_DD	LATITUDE (DECIMAL DEGREES)	NUM	4	Y	Y	•
LNGINS	LORAN LONGITUDE (DDDMM.DM)	CHAR	10	Y	Y	•
LNG INS T	TAG FOR INGENS	CHAR	6	Y	•	•
LNGMAP	MAP LONGITUDE (DDDMM.DM)	CHAR	10	Y	•	•
LNGMAPT	TAG FOR LNGMAP	CHAR	6	Y	•	•
LONG	LONGITUDE	CHAR	11	Y	Y	Y
LONG_DD	LONGITUDE (DECIMAL DEGREES)	NUM	4	Y	Y	•
MAP_BIG	MAP NAME, 1:250,000 SCALE	CHAR	25	Y	Y	•
MAP_MED	MAP NAME, 1:100,000 SCALE	CHAR	60	Y	Y	•
MAP_SML	MAP NAME, 15 OR 7.5 OUADE	CHAR	40	Y	Y	•
MG11	MAGNESIUM (MG/L)	NUM	8	Y	Y	•
MG11F	FLAG FOR MG11	CHAR	12	Y	Y	•
MG11T	TAG FOR MG11	CHAR	6	Y	•	•
MG16	MAGNESIUM (UEQ/L)	NUM	8	Y	Y	Y
MN11	MANGANESE (UG/L)	NUM	8	Y	Y	Y
MN11F	FLAG FOR MN11	CHAR	12	Y	Y	•
MN11T	TAG FOR MN11	CHAR	6	Y	•	•
NA11	SODIUM (MG/L)	NUM	8	Y	Y	•
NA11F	FLAG FOR NA11	CHAR	12	Y	Y	•
NA11T	TAG FOR NA11	CHAR	6	Y	•	•
NA16	SODIUM (UEQ/L)	NUM	8	Y	Y	Y
NH411	AMMONIUM (MG/L)	NUM	8	Y	Y	•
NH411F	FLAG FOR NH411	CHAR	12	Y	Y	•
NH411T	TAG FOR NH411	CHAR	6	Y	•	•
NH416	AMMONIUM (UEQ/L)	NUM	8	Y	Y	Y
NO311	NITRATE (MG/L)	NUM	8	Y	Y	•
NO311F	FLAG FOR NO311	CHAR	12	Y	Y	•
NO311T	TAG FOR NO311	CHAR	6	Y	•	•
NO316	NITRATE (UEQ/L)	NUM	8	Y	Y	Y
NUM_IO	NUMBER OF INLETS/OUTLETS (MAP)	CHAR	5	Y	Y	•
ORGION	ORGANIC ANION (UEQ/L)	NUM	8	Y	Y	•
ORGIONF	FLAG FOR ORGION	CHAR	12	Y	Y	•
OUTLET	OUTLETS (#) (FORM 1)	NUM	8	Y	•	•
OUTLETT	TAG FOR OUTLET	CHAR	6	Y	•	•
PHAC11	PH, ACIDITY INITIAL	NUM	8	Y	Y	•
PHAC11F	FLAG FOR PHAC11	CHAR	12	Y	Y	•
PHAC11T	TAG FOR PHAC11	CHAR	6	Y	•	•
PHAL11	PH, ALKALINITY INITIAL	NUM	8	Y	Y	•

Table 5. (continued)

Variable name	Label ^a	Variable type	Variable length ^b	Variable present in data set(c)		
				3	4	PC
PHA11F	FLAG FOR PHAL11	CHAR	12	Y	Y	•
PHAL11T	TAG FOR PHAL11	CHAR	6	Y	•	•
PHEQ11	PH, AIR EQUILIBRATED	NUM	8	Y	Y	Y
PHEQ11F	FLAG FOR PHEQ11	CHAR	12	Y	Y	•
PHEQ11T	TAG FOR PHEQ11	CHAR	6	Y	•	•
PHFIOI	PH FINAL CALIBRATION	NUM	8	Y	•	•
PHFIO1T	TAG FOR PHFIOI	CHAR	6	Y	•	•
PHINOI	PH INITIAL CALIBRATION	NUM	8	Y	•	•
PHINO1T	TAG FOR PHINOI	CHAR	6	Y	•	•
PHSTOC	PH OCCS, FIELD LAB	NUM	8	Y	•	•
PHSTQCT	TAG FOR PHSTO	CHAR	6	Y	•	•
PHSTVL	PH, FIELD VALUE	NUM	8	Y	Y	Y
PHSTVLF	FLAG FOR PHSTVL	CHAR	12	Y	Y	•
PHSTVLT	TAG FOR PHSTVL	CHAR	6	Y	•	•
PH_60	PH AT 0.60*SITE DEPT	NUM	8	Y	Y	•
PH_60F	FLAG FOR PH_60	CHAR	12	Y	Y	•
PH_60T	TAG FOR PH_60	CHAR	6	Y	•	•
PH_B	PH AT BOTTOM-1.5M	NUM	8	Y	Y	•
PH_BF	FLAG FOR PH_B	CHAR	12	Y	Y	•
PH_BT	TAG FOR PH_B	CHAR	6	Y	•	•
PH_TOP	PH AT SURFACE (1.5M)	NUM	8	Y	Y	•
PHJOPF	FLAG FOR PH_TOP	CHAR	12	Y	Y	•
PHJOPT	TAG FOR PH_TOP	CHAR	6	Y	•	•
PRECIP	ANNUAL PRECIPITATION (M/YR)	NUM	8	Y	Y	•
PTL11	TOTAL PHOSPHORUS (UG/L)	NUM	8	Y	Y	Y
PTL11F	FLAG FOR PTL11	CHAR	12	Y	Y	•
PTL11T	TAG FOR PTL11	CHAR	6	Y	•	•
REGION	NSWS REGION	CHAR	12	Y	Y	Y
RT	RESIDENCE TIME (YR)	NUM	8	Y	Y	•
RUNIN	SURFACE WATER RUNOFF (INCHES)	NUM	8	Y	Y	•
SAMCOD	SAMPLE CODE	CHAR	9	Y	Y	•
SAM_ID	SAMPLE_ID	CHAR	6	Y	Y	•
SAM_IDF	FLAG FOR SAM_ID	CHAR	12	Y	Y	•
SAM_IDT	TAG FOR SAM_ID	CHAR	6	Y	•	•
SECDIS	SECCHI DISAPPEARANCE DEPTH (M)	NUM	8	Y	Y	•
SECDIST	TAG FOR SECDIS	CHAR	6	Y	•	•
SECMEAN	SECCHI MEAN DEPTH (M)	NUM	8	Y	Y	Y
SECREA	SECCHI REAPPEARANCE DEPTH (M)	NUM	8	Y	Y	•
SECREAT	TAG FOR SECREA	CHAR	6	Y	•	•
SIO211	SILICA (MG/L)	NUM	8	Y	Y	Y
SIO211F	FLAG FOR SIO211	CHAR	12	Y	Y	•
SIO211T	TAG FOR SIO211	CHAR	6	Y	•	•
SITDPF	SITE DEPTH (FT)	NUM	8	Y	•	•
SITDPFT	TAG FOR SITDPF	CHAR	6	Y	•	•

Table 5. (continued)

Variable name	Label ^a	Variable type	Variable length ^b	Variable present in data set ^c		
				3	4	PC
SITDPM	SITE DEPTH (M)	NUM	8	Y	Y	Y
SITDPMT	TAG FOR SITDPM	CHAR	6	Y	•	•
SO411	SULFATE (MG/L)	NUM	8	Y	•	•
SO411F	FLAG FOR SO411	CHAR	12	Y	Y	•
SO411T	TAG FOR SO411	CHAR	6	Y	•	•
S0416	SULFATE (UEQ/L)	NUM	8	Y	Y	Y
SOBC	SUM OF BASE CATIONS (UEQ/L)	NUM	8	Y	Y	•
SOBCF	FLAG FOR SOBC	CHAR	12	Y	Y	•
SPLCOD	SPLIT CODES	CHAR	4	Y	•	•
ST	STATE (TWO-LETTER ABBREVIATION)	CHAR	2	Y	Y	•
STA_ID	STATION ID	CHAR	6	Y	Y	•
STRAT	STRATIFICATION TYPE (MIXED, WEAK, STRONG)	CHAR	6	Y	Y	Y
STRATA	NSWS STRATA	CHAR	3	Y	Y	•
SUB_RGN	NSWS SUBREGION	CHAR	1	Y	Y	•
TAG_X	MEANING OF TAG X, FORM 1	CHAR	40	Y	•	•
TAG_X2	MEANING OF TAG X, FORM 2	CHAR	40	Y	•	•
TAG_Y	MEANING OF TAG Y, FORM 1	CHAR	20	Y	•	•
TAG_Y2	MEANING OF TAG Y, FORM 2	CHAR	25	Y	•	•
TAG_Z	MEANING OF TAG Z, FORM 1	CHAR	20	Y	•	•
TAG_Z2	MEANING OF TAG Z, FORM 2	CHAR	25	Y	•	•
TIMSMP	TIME SAMPLED (HH:MM), FORM 1	NUM	8	Y	Y	•
TIMTR	TIME RECEIVED AT TRAILER, FORM 1	NUM	8	Y	•	•
TMPOF1	TEMP DIFFERENCE TOP-BOTTOM (DEG C)	NUM	8	Y	Y	•
TMPDF1T	TAG FOR TMPOF1	CHAR	6	Y	•	•
TMPDF2	TEMP DIFFERENCE T0P-0.6*DEPTH (DEG C)	NUM	8	Y	Y	•
TMPDF2T	TAG FOR TMPDF2	CHAR	6	Y	•	•
TMPTOP	TEMPERATURE AT SURFACE (1.5M)	NUM	8	Y	Y	Y
TMPTOPT	TAG FOR TMPTOP	CHAR	6	Y	•	•
TMP_1	TEMPERATURE AT 4 OR 5 M (DEG C)	NUM	8	Y	•	•
TMP_10	TEMPERATURE AT 50 M (DEG C)	NUM	8	Y	•	•
TMP_1T	TAG FOR TMP_1	CHAR	6	Y	•	•
TMP_2	TEMPERATURE AT 6 OR 10 M (DEG C)	NUM	8	Y	•	•
TMP_2T	TAG FOR TMP_2	CHAR	6	Y	•	•
TMP_3	TEMPERATURE AT 8 OR 15 M (DEG C)	NUM	8	Y	•	•
TMP_4	TEMPERATURE AT 10 OR 20 M (DEG C)	NUM	8	Y	•	•
TMP_5	TEMPERATURE AT 12 OR 25 M (DEG C)	NUM	8	Y	•	•
TMP_6	TEMPERATURE AT 14 OR 30 M (DEG C)	NUM	8	Y	•	•
TMP_60	TEMPERATURE AT 0.6*SITE DEPTH (DEG C)	NUM	8	Y	Y	•
TMP_60T	TAG FOR TMP_60	CHAR	6	Y	•	•
TMP_7	TEMPERATURE AT 16 OR 35 M (DEG C)	NUM	8	Y	•	•
TMP_7T	TAG FOR TMP_7	CHAR	6	Y	•	•
TMP_8	TEMPERATURE AT 18 OR 40 M (DEG C)	NUM	8	Y	•	•
TMP_9	TEMPERATURE AT 20 OR 45 M (DEG C)	NUM	8	Y	•	•
TMP_B	TEMPERATURE AT BOTTOM-1.5 M (DEG C)	NUM	8	Y	Y	•
TMP_BT	TAG FOR TMP_B	CHAR	6	Y	•	•

Table 5. (continued)

Variable name	Label ^a	Variable type	Variable length ^b	Variable present in data set ^c		
				3	4	PC
TUROCS	TURBIDITY QCCS, FIELD LAB (NTU)	NUM	8	Y	•	•
TURVAL	TURBIDITY, FIELD LAB (NTU)	NUM	8	Y	Y	Y
TURVALF	FLAG FOR TURVAL	CHAR	12	Y	•	•
TURVALT	TAG FOR TURVAL	CHAR	6	Y	•	•
USFS	FOREST SERVICE REGION(APPROX)	CHAR	1	Y	Y	•
WALA	WATERSHED AREA / LAKE AREA	NUM	8	Y	Y	Y
WEIGHT 1	POPULATION EXTRAPOLATION FACTOR	NUM	8	Y	Y	Y
WILDNA	USFS WILDERNESS NAME	CHAR	30	Y	Y	•
WSHED	WATERSHED AREA (HA)	NUM	8	Y	Y	Y
WS_DIS D)	WELL FIRE LOG M)INE R)OAD S)TOCK	CHAR	8	Y	Y	•
WS_OTH	OTHER DISTURBANCE	CHAR	25	Y	Y	•

^aLabels are provided only in the SAS-formatted version of data sets 3 and 4. Labels are not provided in the PC data sets.

^bLength for character fields is the integer field length.

^c"Y" in the column indicates the variable is in the data set; "•" indicates that the variable is not in the data set.

5. DEFINITION OF VARIABLES

Table b provides units of measure and extended definitions for variables contained in data sets 3 and 4 and the PC data set. Variable tags and flags are not included because their definitions would invariably be just "tag (or flag) for variable X." A complete description of data collected and WLS-I protocol is provided in Landers et al. (1987). In situ measurements are outlined in Kerfoot and Faber (1986) and Bonoff and Groeger (1986). EPA methods are from U.S. EPA (1983) and U.S. Geological Survey (USGS) methods are from Skougstad et al. (1979).

Conventions used in the computer-coded equations are:

- + represents addition,
- represents subtraction,
- * represents multiplication,
- ** represents exponentiation,
- / represents division, and
- () represents operational grouping.

Table 6. Definition of variables, U.S. EPA 'Western Lake Survey-Phase I

Name	Units	Definition
ACCO11	$\mu\text{eq/L}$	Carbon dioxide acidity (or base-neutralizing capacity) is the measured acidity in a sample due to dissolved CO_2 , hydronium, and hydroxide. Determined in the analytical laboratory, using base titration and modified Gran analysis. Used in conjunction with alkalinity to refine alkalinity and acidity calculations.
AIRMP	$^{\circ}\text{C}$	Air temperature measured from the helicopter with a thermometer.
ALEX11	$\mu\text{g/L}$	Extractable aluminum is an estimate of labile monomeric aluminum (Al^{+3}). Aluminum in an unacidified, filtered sample was complexed with 8-hydroxyquinoline and extracted with methyl-isobutyl ketone (MIBK) in the field laboratory. The extract was analyzed in the analytical laboratory, using the method described in Kerfoot and Faber (1986).
ALK_CLSS		Alkalinity class, defined by an area's expected alkalinity. Classes are 1 = $<100 \mu\text{eq/L}$, 2 = 100 to $200 \mu\text{eq/L}$, and 3 = $>200 \mu\text{eq/L}$.
ALKA11	$\mu\text{eq/L}$	Acid-neutralizing capacity is a measure of the amount of acid necessary to neutralize the bicarbonate, carbonate, alumino-hydroxy complexes, and other bases in a sample. Determined in the analytical laboratory in an unfiltered, unacidified aliquot, using acidimetric titration and modified Gran analysis (Kerfoot and Faber 1986; Kramer 1984).
ALTIM	ft	Altimeter reading (helicopter samples only).
ALTL11	$\mu\text{g/L}$	Total aluminum, measured in the analytical laboratory in an unfiltered, acidified (HNO_3) aliquot, using EPA method 202.2 (atomic absorption spectroscopy (MS) and graphite furnace).

Table 6. (continued)

Name	Units	Definition
ANCAT		Ratio of measured cations to measured anions: ANCAT = CATSUM/ANSUM.
ANDEF	$\mu\text{eq/L}$	Anion deficit is the measured cations minus the measured anions: ANDEF = CATSUM - ANSUM.
ANSUM	$\mu\text{eq/L}$	Sum of major anion concentrations: ANSUM = $\text{CL16} + \text{FTL16} + \text{NO316} + \text{HC0316} + \text{CO316} + \text{SO416}$.
BAT_ID		Batch identification number, lake and quality assurance samples processed and analyzed together on the same day and in the same field laboratory were given common batch numbers.
BEDROCK		Bedrock classification, describes the dominant bedrock class (Norton 1982) within the lake basin. Classes are ordered from one to five, in order of lowest to highest acid-neutralizing capacity: Class 1 = Low to no acid-neutralizing capacity (eg., granitic gneiss), Class 2 = Medium to low acid-neutralizing capacity (eg., sandstones, shales, etc.), Class 3 = High to medium acid-neutralizing capacity (eg., ultramafic rocks and glassy volcanic rocks), Class 4 = "Infinite" acid-neutralizing capacity (eg., limestone), and Class 5 = Glacial debris obscuring bedrock.
BNSTAR		Number of lakes identified in a stratum (see STRATA) from the USGS 1:100,000 scale maps. Lakes to be sampled were randomly selected within strata to represent this frame population.
CA11	mg/L	Dissolved calcium, measured in the analytical laboratory in filtered, acidified (HNO_3) aliquot (EPA method 215.1, MS, flame or ICPAES).
CA16	$\mu\text{eq/L}$	Dissolved calcium: $\text{CA16} = \text{CA11} * 49.90 \mu\text{eq/mg}$.
CATSUM	$\mu\text{eq/L}$	Summation of major cation concentrations: $\text{CATSUM} = \text{CA16} + \text{MG16} + \text{NA16} + \text{K16} + \text{NH416} + \text{H16}$.
CL11	mg/L	Chloride ion, measured in the analytical laboratory in a filtered, unacidified aliquot (ASTM 1984; O'Dell et al. 1984; ion chromatographic method).

Table 6. (continued)

Name	Units	Definition
CL16	$\mu\text{eq/L}$	Chloride ion: $\text{CL16} = \text{CL11} * 28.21 \mu\text{eq/mg}$.
CO316	$\mu\text{eq/L}$	Carbonate, an estimate (Butler 1982) of
		$\text{CO}_3^{-2} = \frac{4.996 \times [\text{DICmg} / \text{L}] \times K_1 K_2}{[\text{H}^+]^2 + [\text{H}^+] \times K_1 + K_1 K_2},$ <p>which is coded as</p> $\text{CO316} = 60009 * (\text{DIC11} / 12011) * \text{ALPHA2} * 33.33,$ <p>where $\text{ALPHA2} = \frac{K_1 * K_2}{((10^{-(\text{PHAC11}))})^2 + (10^{\text{PHAC11}}) * K_1 + K_1 * K_2}$,</p> <p>where $K_1 = 4.3 * 10^{-7}$, $K_2 = 5.61 * 10^{-11}$.</p>
COLVAL	PCU	True color (platinum cobalt units), measured in the field laboratory by first centrifuging the sample to remove particles, then using an HACH Model CO-1 Comparator (EPA method 110.2, modified).
COMMNT		Comment from field laboratory.
COM01		Comment from field sampling crew.
		<u>Field specific conductance</u>
		The following measurements of conductance (CONTOP thru CONF1) were made with the HYDROLAB probe from the helicopter. These are not in alphabetical order but are ordered as usually measured. Measurements paralleled field temperature measurements.
CONTOP	$\mu\text{S/cm}$	Conductance at surface (usually 1.5 m below the surface).
CON_B	$\mu\text{S/cm}$	Conductance at SITDPM - 1.5 m.
CON_60	$\mu\text{S/cm}$	Conductance at 0.6*SITDPM. Measurement taken when $\text{TMPDFI} \geq 4^\circ\text{C}$.

Table 6. (continued)

Name	Units	Definition
<u>Profile measurements</u>		
Specific conductance profile measurements were taken when TMPDF2 > 4°C. Profile measurement depths were determined by maximum lake depth measured (SITDPM). If SITDPM < 20 m, profile measurements were taken at 4 m and at 2m increments to the bottom. If SITDPM > 20 m, the profile was taken at 5 m and at 5m increments to a maximum depth of 50 m.		
CON_1	μS/cm	Conductance at 4 m (SITDPM ≤ 20) or 5 m (SITDPM > 20).
CON_2	μS/cm	Conductance at 6 m (SITDPM ≤ 20) or 10 m (SITDPM > 20).
CON_3	μS/cm	Conductance at 8 m (SITDPM ≤ 20) or 15 m (SITDPM > 20).
CON_4	μS/cm	Conductance at 10 m (SITDPM ≤ 20) or 20 m (SITDPM > 20).
CON_5	μS/cm	Conductance at 12 m (SITDPM ≤ 20) or 25 m (SITDPM > 20).
CON_6	μS/cm	Conductance at 14 m (SITDPM ≤ 20) or 30 m (SITDPM > 20).
CON_7	μS/cm	Conductance at 16 m (SITDPM ≤ 20) or 35 m (SITDPM > 20).
CON_8	μS/cm	Conductance at 18 m (SITDPM ≤ 20) or 40 m (SITDPM > 20).
CON_9	μS/cm	Conductance at 20 m (SITDPM ≤ 20) or 45 m (SITDPM > 20).
CON_10	μS/cm	Conductance at 50 m.
CONIN	μS/cm	Initial conductance values, obtained from initial analysis of a 50-μS/cm QC check sample used to verify HYDROLAB calibration.

Table 6. (continued)

Name	Units	Definition
CONFI	$\mu\text{S}/\text{cm}$	Final conductance values, obtained from final analysis of a 50- $\mu\text{S}/\text{cm}$ QC check sample used to verify HYDROLAB calibration (see CONIN).
CONCAL	$\mu\text{S}/\text{cm}$	<p>Calculated conductance, sum of the products of ion concentration times equivalent conductance.</p> <p>The cations summed were Ca^{+2}, Mg^{+2}, Na^+, K^+, NH_4^+, and H^+.</p> <p>The anions summed were $\text{SO}_4 - 2$, $\text{HCO}_3 - 2$, Cl^-, NO_3^-, F^-, CO_3^{-2}, and OH^-.</p> <p>Coded as</p> $\text{CONCAL} = ((\text{CA16} * 9.47) + (\text{MG16} * 53.0) + (\text{K16} * 73.48) + (\text{NA16} * 50.08) + (\text{NH416} * 73.5) + (\text{H16} * 349.65) + (\text{SO416} * 80.0) + (\text{HCO316} * 44.5) + (\text{CL16} * 16.31) + (\text{NO316} * 71.42) + (\text{F16} * 5.4) + (\text{CO316} * 69.3) + (\text{OH} * 198)) / 1000.$ <p>This calculation converts $\mu\text{eq}/\text{L}$ to $\mu\text{S}/\text{cm}$ (Kerfoot and Faber 1986).</p>
COND11	$\mu\text{S}/\text{cm}$	Specific conductance, measured in the analytical laboratory using a conductivity cell (EPA method 120.1).
COUNTY		Federal Information Processing Standard (FIPS 1979) state and county code.
CRW_ID		Lake sampling crew ID number.
DATPRO		Date samples were processed by the field laboratory. ODDMMYY format.
DATTR		Date sample was received by the field laboratory. DDMMYY format.
DAT SHP		Date samples were shipped from field laboratories to the analytical laboratories. DDMMYY format.
DATSMP		Date lake was sampled. DDMMYY format.

Table 6. (continued)

Name	Units	Definition
DICE11	mg/L	Air-equilibrated, dissolved inorganic carbon, measured in the analytical laboratory in an unfiltered, unacidified aliquot bubbled with 300-ppm O ₂ , drawn into a syringe, filtered, and analyzed without exposure to the atmosphere (EPA method 415.2 modified, infrared spectrophotometric detector).
DICI11	mg/L	Dissolved inorganic carbon, measured in the analytical laboratory in an unfiltered, unacidified aliquot. The sample was drawn into a syringe, filtered, and analyzed without exposure to the atmosphere (EPA method 415.2 modified, infrared spectrophotometric detector).
DICQCS	mg/L	Dissolved inorganic carbon OC check sample (field laboratory). DIC was measured in the field laboratory on a 2.0-mg/L sodium carbonate solution using a detector. The check sample was measured before the first sample measurement and after every eight samples.
DICVAL	μg/L	Dissolved inorganic carbon, measured in the field laboratory on a sample drawn directly into a syringe from the Van Dorn water sampler, filtered, and analyzed without exposure to the atmosphere, using a DOHRMANN DC430 carbon analyzer with infrared spectrophotometric detector (EPA method 415.2, modified).
DISM	km	Distance of the lake from the Pacific Ocean. A calculated variable for lakes within 150 km from the coast line (otherwise this value is missing).
DOC11	mg/L	Dissolved organic carbon, measured in the analytical laboratory in a filtered, acidified (H ₂ SO ₄) aliquot (EPA method 415.2, infrared spectrophotometric detector).
DP_B	m	Depth at which bottom temperature and conductance were measured: DP_B = SITDPM - 1.5.
DP_CAT		Lake depth category, 4 (if SITDPM ≤ 20 m) or 5 (if SITDPM > 20 m).
DP_TOP	m	Depth of surface water sample, usually 1.5 m.

Table 6. (continued)

Name	Units	Definition
DP_60	m	Sixty percent of site depth: DP_60 = 0.6*SITDPM.
ELEV	m	Lake elevation, taken from USGS topographic maps.
FACE		Geomorphic slope (E/W), defines the east- or west-facing slope of the Cascade or Sierra Nevada mountain ranges, determined on the basis of topographic divide.
FE11	μg/L	Dissolved iron, measured in the analytical laboratory in a filtered, acidified (HNO ₃) aliquot (EPA method 236.1, MS, flame or ICPAES).
FOREST		Name of national forest, national park, or national recreation area in which lake is located.
FTL11	mg/L	Total dissolved fluoride, measured in the analytical laboratory in a filtered, unacidified aliquot, analyzed using an ion-selective electrode (ISE, EPA method 340.2, modified).
FTL16	μeq/L	Total dissolved fluoride: FTL16 = FTL11 * 52.64 μeq/mg.
GMU		Geomorphic unit, a physiographic area defined on the basis of topography and common geologic history (Snead 1980).
H16	μeq/L	Hydrogen ion concentration: H16 = 10**(-PHAC11)*10**6.
HC0316	μeq/L	Bicarbonate, an estimate (Butler 1982) of

$$HCO_3^- = \frac{5.080 \times [DIC_{mg/L}] \times [H^+] \times K_1}{[H^+]^2 + K_1 + K_1 K_2},$$

which is coded as

$$HCO316 = 61017 * (DIC11 / 12011) * ALPHA1 * 16.39,$$

$$\text{where } ALPHA1 = \frac{(10^{-(PHAC11)}) * K_1}{(10^{-(PHAC11)})^2 + (10^{-(PHAC11)}) * K_1 + K_1 * K_2},$$

$$\text{where } K_1 = 4.3 * 10^{-7}, \\ K_2 = 5.61 * 10^{-11}.$$

Table 6. (continued)

Name	Units	Definition				
HELGR		Helicopter/Ground, designates whether sample was taken from a helicopter or by a ground crew: H = Helicopter; G = Ground.				
HEL_ID		Helicopter identification number.				
HYD_ID		Identification number for the HYDROLAB meter used for field measurements.				
HYDROTYP		Hydrologic type, defined from geographic data (see IN_OUT). Classes are <table style="margin-left: 40px; border: none;"> <tr> <td>CLOSED (I/NO)</td> <td>DRAINAGE (I/O; or NI/O)</td> </tr> <tr> <td>RESERVOIR (RES)</td> <td>SEEPAGE (NI/NO)</td> </tr> </table>	CLOSED (I/NO)	DRAINAGE (I/O; or NI/O)	RESERVOIR (RES)	SEEPAGE (NI/NO)
CLOSED (I/NO)	DRAINAGE (I/O; or NI/O)					
RESERVOIR (RES)	SEEPAGE (NI/NO)					
INLETS		Number of lake inlets observed from the helicopter.				
IN_OUT		Presence and/or absence of inlets and outlets, determined from USGS topographic maps: I/O = both, NI/O outlets only, I/NO = inlets only; NI/NO neither, and RES = Reservoir.				
K11	mg/L	Dissolved potassium, measured in the analytical laboratory in a filtered, acidified (HNO ₃) aliquot (EPA method 258.1, MS, flame).				
K16	μeq/L	Dissolved potassium: K16 = K11*25.57 μeq/mg.				
LABNAM		Name of the analytical laboratory that performed the chemical analyses. The two laboratories were Versar, Inc. (VERSAR) and Environmental Monitoring and Services, Inc. (EMSI).				
LAKE_ID		Seven-character unique identification code assigned to each lake. The first character represents the region (4); the second character, the subregion; the third character, the alkalinity map class; a dash; and the last three digits the assigned lake number. The first three characters also designate the stratum (see STRATA). LAKE ID is unique for every record in data set 4 and the PC data set but is repeated in data set 3 for those lakes that were sampled twice for quality assurance purposes.				

Table 6. (continued)

Name	Units	Definition
LAKE_SIZ	ha	Lake surface area, measured using an electric planimeter on USGS topographic maps.
LAKE_VOL	10 ⁶ m ³	Estimated lake volume: LAKE_VOL = ((LAKE_SIZ*10**4)*SITDPM*0.464) / 10**6.
LAKENAME		Lake name taken from USGS topographic maps. When a number of small lakes were identified by only one name on the map, another qualifier, such as "southern," was added to the name to identify the lake. Where no name was listed, "(NO NAME)" was entered into the data base as the lake name.
LAKVER		Source of information by which field crew verified lake location.
LAT	deg	Latitude taken from the USGS topographic maps in DD-MM-SS (degrees-minutes-seconds) format.
LAT INS		Latitude determined from LORAN-C guidance system (helicopter samples only).
LATMAP		Latitude recorded by the field crew.
LAT_DD	deg	Latitude expressed as degrees and decimal degrees in DD.DDDD format.
LNGINS		Longitude determined from LORAN-C guidance system (helicopter samples only).
LNGMAP		Longitude recorded by the field crew.
LONG	deg	Longitude read from the USGS topographic maps in DDD-MM-SS format.
LONG_DD	deg	Longitude expressed as degrees and decimal degrees in DDD.DDDD format.
MAP_BIG		Name of the 1:250,000-scale USGS topographic map on which the lake is located.
MAP_MED		Name of the 1:100,000-scale USGS topographic map on which the lake is located.

Table 6. (continued)

Name	Units	Definition
MAP_SML		Name of the 15- or 7.5-in scale USGS topographic map on which the lake is located.
MG11	mg/L	Dissolved magnesium, measured in the analytical laboratory in a filtered, acidified (HNO ₃) aliquot (EPA method 242.1, MS, flame or ICPAES).
MG16	μeq/L	Dissolved magnesium: MG16 = MG11*82.26 μeq/mg.
MN11	μg/L	Dissolved manganese, measured in the analytical laboratory in a filtered, acidified (HNO ₃) aliquot (EPA method 243.1, MS, flame or ICPAES).
NA11	mg/L	Dissolved sodium, measured in the analytical laboratory in a filtered, acidified (HNO ₃) aliquot (EPA method 273.1, MS, flame).
NA16	μeq/L	Dissolved sodium: NA16 = NA11*43.50 μeq/mg.
NH411	mg/L	Ammonium ion, measured in the analytical laboratory in a sample from the filtered, acidified (H ₂ SO ₄) aliquot (EPA method 350.1, colorimetric, automated).
NH416	μeq/L	Ammonium ion: NH416 = NH411*55.44 μeq/mg.
NO311	mg/L	Nitrate ion, measured in the analytical laboratory in a filtered, unacidified aliquot (ASTM 1984; O'Dell et al. 1984; ion chromatography).
NO316	μeq/L	Nitrate ion: NO316 = NO311*16.13 μeq/mg.
NUM_10		Number of inlets/outlets of a lake, determined from the map (MAP_SML) by the field crew.
ORGION	μeq/L	Estimate of the organic anion concentration (Oliver et al. 1983): $\text{ORGION} = K \cdot \text{CT} / (K + (10^{**(-\text{PHAC11}))})$ <p>where $K = 10^{**(-\text{PK})}$; $\text{CT} = \text{DOC11} \cdot 10$ and $\text{PK} = 0.96 + 0.9 \cdot \text{PHAC11} - 0.039 \cdot \text{PHAC11}^{**2}$.</p>
OUTLET		Number of lake outlets observed from the helicopter.

Table 6. (continued)

Name	Units	Definition
<u>Field pH measurements</u>		
The following measurements were made from the helicopter with the HYDROLAB probe (PH_TOP through PHFI01). They are listed in the usual order of sampling. Measurements of pH paralleled field temperature measurements.		
PH_TOP	pH	pH measurement at surface (usually 1.5 m below the surface).
PH_B	pH	pH at SITDPM - 1.5 m.
PH_60	pH	pH at 0.6*SITDPM.
PHIN01	pH	Initial measurement of a pH 3.91 QC check sample, used to calibrate the HYDROLAB.
PHFI01	pH	Final measurement of a pH 3.91 OC check sample, used to calibrate the HYDROLAB.
<u>Laboratory pH measurements</u>		
PHAC11	pH	Initial pH from the acidity titration, measured in the analytical laboratory. A sample from an unfiltered, unacidified aliquot was placed into a CO ₂ -free titration vessel and stirred. The pH was measured with an electrode (without exposure to the atmosphere) before addition of base titrant.
PHAL11	pH	Initial pH from the alkalinity titration, measured in the analytical laboratory. A sample from the unfiltered, unacidified aliquot was placed into a titration vessel (not CO ₂ free) and stirred. The pH was measured with an electrode before the first addition of acid titrant.
PHEQ11	pH	Air-equilibrated pH, measured in the analytical laboratory in an unfiltered, unacidified aliquot bubbled with 300-ppm CO ₂ (EPA method 150.1, electrode).
PHSTQC	pH	Measurement of a pH 4.0 QC check sample, used by the field laboratory to calibrate closed-system pH measurements.

Table 6. (continued)

Name	Units	Definition
PHSTVL	pH	Closed-system pH, measured in the field laboratory using an ORION Model 611 meter and an ORION ROSS combination pH electrode on a syringe sample unexposed to the atmosphere (EPA method 150.1).
PRECIP	m	Annual precipitation, estimated from 30-year precipitation norm values (1931 - 1960) by overlaying the location of lakes on a contour map of normal annual total precipitation (USDC 1968) and assigning the lower value to each lake.
PTL11	$\mu\text{g/L}$ acidified	Total phosphorous, measured in the analytical laboratory in an unfiltered, (H_2SO_4) aliquot, using either of two automated, colorimetric phosphomolybdate methods: for normal phosphorus levels, using a 15-mm absorption cell; for low levels, a preliminary method using a 50 mm absorption cell was employed (USGS method 1-4600-78).
REGION		Region is a major area of the conterminous United States where a substantial number of lakes with alkalinity $<400 \mu\text{eq/L}$ can be found. For the WLS-I there was one region, Region 4 (West).
REG_SPC		Reason for lake being sampled. This can be any combination of the following codes (the categories are not mutually exclusive): REG: part of the probability sample, SPC: special interest lake, and LTM: EPA long-term monitoring lake.
RT	yr	Estimated hydraulic residence time, defined as years required to replace the volume of the lake. Calculated only for drainage lakes and reservoirs(see HYDROTYP)

$$RT = \frac{LA \times \text{site depth}}{\text{runoff} \times (\text{watershed area} - LA) + (\text{precip} \times LA)},$$

where LA = lake area.

Coded as

$$RT = \frac{((LAKE_SIZ * 10^{**4}) * (SITDPM * 0.464))}{(((RUNIN * 2.54 * 10^{**2}) * (WSHED * 10^{**4}) - (LAKE_SIZ * 10^{**4})) + ((LAKE_SIZ * 10^{**4}) * (PRECIP)))}$$

Table 6. (continued)

Name	Units	Definition
RUNIN	in/yr	Surface water runoff interpolated from USGS map (Busby 1966).
SAM_ID		Identifies individual samples within a batch (see BAT_ID). In combination BAT_ID and SAM_ID are the unique sample identifiers.
SAMCOD		<p>Sample code (consisting of up to three characters) indicating the type of sample. The first character can be one of the following:</p> <p style="padding-left: 40px;">D = duplicate, R = routine, or T = triplicate.</p> <p>The second character can be one of the following:</p> <p style="padding-left: 40px;">G = ground or H = helicopter.</p> <p>The third character can be one of the following:</p> <p style="padding-left: 40px;">C = calibration lake or 2 = indicating a second sample and second visit.</p>
SECDIS	m	Secchi disk disappearance depth.
SECMEAN	m	Mean of Secchi disk disappearance and reappearance depths. SECMEAN is set to SITDPM if the disk was visible on the lake bottom.
SECREA	m	Secchi disk reappearance depth.
SIO211	mg/L	Silica, measured in the analytical lab in an unfiltered aliquot (USGS method 1-2700-78, colorimetric, molybdate blue, automated method).
SITDPF	ft	Sampling site depth, measured using a weighted line. Not necessarily maximum lake depth.
SITDPM	m	Sampling site depth, measured using a weighted line. Not necessarily maximum lake depth.
SO411	mg/L	Sulfate ion, measured in the analytical laboratory in a filtered, unacidified aliquot (ASTM 1984; O'Dell et al. 1984; ion chromatographic methods).

Table 6. (continued)

Name	Units	Definition
SO416	$\mu\text{eq/L}$	Sulfate ion: $50416 = \text{SO411} * 20.82 \mu\text{eq/mg}$.
SOBC	$\mu\text{eq/L}$	Sum of base cations: $\text{SOBC} = \text{NA16} + \text{K16} + \text{CA16} + \text{MG16}$.
SPLCOD		Split code, indicates that duplicate sample aliquots were sent to cooperating analytical laboratories, where E = U.S. EPA Environmental Research Laboratory at Corvallis and L = U.S. EPA Environmental Monitoring Systems Laboratory at Las Vegas.
ST		State: standard two-character postal abbreviation.
STA_ID		Station ID of the field laboratory where lake samples were processed. STA_ID codes: 11 = Missoula, MT; 12 = Bozeman, MT; 13 = Aspen, CO; 14 = Wenatchee, WA; or 15 = Carson City, NV.
STRAT		Thermal stratification status: MIXED = Lakes where the difference between top temperature and bottom temperature (TMPDF1) was $<4^{\circ}\text{C}$, WEAK = Lakes where the temperature difference between top and bottom (TMPDF1) was $\geq 4^{\circ}\text{C}$ and the difference between top and the 60% depth temperature (TMPDF2) was $<4^{\circ}\text{C}$, STRONG = Lakes with a temperature difference $\geq 4^{\circ}\text{C}$ between the top temperature (TMPTOP) and the temperature at 60% of lake depth (TMP_60).
STRATA		Stratum, a subpopulation of lakes within a geographic area defined before sampling by the expected alkalinity of surface waters within a subregion and within a region.

Table 6. (continued)

Name	Units	Definition
SUB_RGN		<p>Subregions are areas within each region that, based on historic data, are similar in water quality, physiography, vegetation, climate, and soil. All WLS-I lakes were within Region 4, the western United States. The five subregions in the WLS-I were</p> <p style="margin-left: 40px;">A: California, B: Pacific Northwest, C: Northern Rockies, D: Central Rockies, and E: Southern Rockies.</p>
TAG_X		Meaning of the user-defined tag "X" reported on the field form.
TAG_X2		Meaning of the user-defined tag "X" reported on the field laboratory form.
TAG_V		Meaning of the user-defined tag "V" reported on the field form.
TAG_Y2		Meaning of the user-defined tag "V" reported on the field laboratory form.
TAG_Z		Meaning of the user-defined tag "Z" reported on the field form.
TAG_Z2		Meaning of the user-defined tag "Z" reported on the field laboratory form.
TIMSMP		Time lake was sampled in HH:MM format (24 H).
TIMTR		Time sample was received by the field lab in HH:MM format (24 H).
		<p><u>Field temperature measurement</u></p> <p>The following temperature measurements (TMPTOP to TMP_10) were made from the helicopter with the HYDROLAB probe. They are not in alphabetical order but are ordered as usually measured. Comparisons of top and bottom temperatures determined the need to conduct profile measurements.</p>
TMPTOP	°C	Lake water temperature at surface (1.5 m).

Table 6. (continued)

Name	Units	Definition
TMP_B	°C	Temperature at SITDPM - 1.5 m.
TMPDFI	°C	Difference between top and bottom temperatures: TMPDFI = TMPTOP - TMP_B.
TMP_60	°C	Temperature at 0.6*SITDPM. Measurement taken if TMPDFI \geq 4°C.
TMPDF2	°C	Difference between temperature at top and temperature at 0.6*SITDPM: TMPDF2 = TMPTOP - TMP_60.
<u>Profile measurements</u>		
<p>Temperature profile measurements were taken when TMPDF2 \geq 4°C. Profile measurement depths were determined by maximum lake depth measured (SITDPM). If SITDPM \leq 20 m, profile measurements were taken at 4 m and at 2m increments to the bottom. If SITDPM > 20 m, the profile was taken at 5 m and at 5~n increments to a maximum depth of 50 m.</p>		
TMP_1	°C	Temperature at 4 m (SITDPM \leq 20) or at 5 m (SITOPM > 20).
TMP_2	°C	Temperature at 6 m (SITDPM \leq 20) or at 10 m (SITDPM > 20).
TMP_3	°C	Temperature at 8 m (SITDPM \leq 20) or at 15 m (SITDPM > 20).
TMP_4	°C	Temperature at 10 m (SITDPM \leq 20) or at 20 m (SITDPM > 20).
TMP_5	°C	Temperature at 12 m (SITDPM \leq 20) or at 25 m (SITDPM > 20).
TMP_6	°C	Temperature at 14 m (SITDPM \leq 20) or at 30 m (SITDPM > 20).
TMP_7	°C	Temperature at 16 m (SITDPM \leq 20) or at 35 m (SITDPM > 20).
TMP_8	°C	Temperature at 18 m (SITDPM \leq 20) or at 40 m (SITDPM > 20).

Table 6. (continued)

Name	Units	Definition
TMP_9	°C	Temperature at 20 m (SITDPM < ZO) or at 45 m (SITDPM > 20).
TMP_10	'C	Temperature at 50 m.
TURQCS	NTU	Turbidity, measured by the field laboratory on a 50-NTU nephelometric turbidity QC check sample used to verify nephelometer calibration. Values for the check sample were recorded before and after eight sample measurements.
TURVAL	NTU	Turbidity, measured in the unfiltered sample in the field laboratory using a MONITEK model 21 nephelometer (EPA method 180.1).
USFS		United States Forest Service (USFS) region.
WALA		Ratio of watershed area to lake area. Watershed area includes lake area.
WEIGHTI		Stratum-specific population expansion factor (probability sample lakes only), equal to the inverse of a sample lake's inclusion probability.
WILDNA		USFS Wilderness Area name.
WSHED	ha	Watershed area, the geographic area from which surface water drains into a particular lake, determined using an electronic planimeter on USGS topographic maps. Lake area was included in watershed area.
WS_DIS		Disturbances of the natural environment in a watershed within 100 m of the shore, noted by field crew, where D = dwellings L = logging R = roads F = fire M = mining S = livestock.
WS_0TH		Disturbances of the natural environment in a watershed within 100 m of the shore, other than those described by WS_DIS, noted by field crew.

6. CARD-IMAGE FORMAT DEFINITION

WLS-I data sets 3 and 4 are provided as both SAS-formatted files and as card-image files. The PC data set is provided in card-image format only. The formats for the card-image files for all data sets are presented in Tables 7-9. Table 9 provides the card-image format used for both PC data set files. The two PC data set files -- WLS-I.REG and WLS-I.SPC--provide information for the probability sample lakes and the special interest lakes, respectively.

Most numeric variables were transferred to the card-image files for data sets 3 and 4 in 9.4 format (total length 9, including decimal point, with 4 decimals), regardless of their original formats (however, WSHED is in 9.2; LAKE_SIZ, WALA, and ALTIM are all in 9.3 format). The column "Dec" in Tables 7 and 8 indicates the original number of digits to the right of the decimal point in the SAS data sets. This value should be used as a part of the input format to prevent the generation of overly significant data on other computer systems.

Dates are in DDMMYY format, and times are in HH:MM format (24-h clock) for all data sets.

The two comment variables in data set 3 (COMMNT and CCMOI) were each split into two parts because of their lengths (becoming COMMNT1, COMMNT2, and COMOI1, COMOI2, respectively). Therefore, the card-image form of data set 3 has 279 (not 277) variables.

Note that missing numeric variables are represented as -999. These values must be removed before statistical analysis.

Table 7. Card-image format definition, data set 3, U.S. EPA Western Lake Survey-Phase I

Card No. ^a	Variable	Label	Variable Type	Variable length ^b	Dec ^c	Column start	Column end	Card No.
1	HELGR	H/HELICOPTER) G/GROUND TEAM	CHAR	1		1	1	1
1	LAKE_ID	LAKE IDENTIFICATION CODE	CHAR	7		3	9	1
1	LATMAP	MAP LATITUDE (DDMM.DM)	CHAR	10		11	20	1
1	LATMAPT	TAG FOR LATMAP	CHAR	6		22	27	1
1	LNGMAP	MAP LONGITUDE (DDDMM.DM)	CHAR	10		29	38	1
1	LNGMAPT	TAG FOR LNGMAP	CHAR	6		40	45	1
1	LATINS	LORAN LATITUDE (DDMM.DM)	CHAR	10		47	56	1
1	LATINST	TAG FOR LATINS	CHAR	6		58	63	1
1	LNGINS	LORAN LONGITUDE (DDDMM.DM)	CHAR	10		65	74	1
2	LNGINST	TAG FOR LNGINS	CHAR	6		1	6	2
2	DATSMP	DATE SAMPLED (DDMMYY), FORM 1	NUM	7		8	14	2
2	TIMSMP	TIME SAMPLED (HH:MM), FORM 1	NUM	5		16	20	2
2	HYD_ID	HYDROLAB ID	CHAR	3		22	24	2
2	PHIN01	PH INITIAL CALIBRATION	NUM	9.4	2	26	34	2
2	PHIN01T	TAG FOR PHIN01	CHAR	6		36	41	2
2	PIFI01	PH FINAL CALIBRATION	NUM	9.4	2	43	51	2
2	PHF101T	TAG FOR PHFI01	CHAR	6		53	58	2
2	CONIN	INITIAL CONDUCTANCE (US/CM)	NUM	9.4	0	60	68	2
2	CONINT	TAG FOR CONIN	CHAR	6		70	75	2
3	CONFI	FINAL CONDUCTANCE (US/CM)	NUM	9.4	0	1	9	3
3	CONFIT	TAG FOR CONFI	CHAR	6		11	16	3
3	ALTIM	ALTIMETER (FT)	NUM	9.3	0	18	26	3
3	ALTIMT	TAG FOR ALTIM	CHAR	6		28	33	3
3	WS_OTH	DISTURBANCE	CHAR	25		35	59	3
3	SITDPM	OTHER SITE DEPTH (M)	NUM	9.41		61	69	3
4	SITDPMT	TAG FOR SITDPM	CHAR	6		1	6	4
4	AIRTMP	AIR TEMPERATURE (DEG C)	NUM	9.4	0	8	16	4
4	AIRTMPF	FLAG FOR AIRTMP	CHAR	12		18	29	4
4	SITDPF	SITE DEPTH (FT)	NUM	9.4	0	31	39	4
4	SITDPFT	TAG FOR SITDPF	CHAR	6		41	46	4
4	SECDIS	SECCHI DISAPPEARANCE DEPTH (M)	NUM	9.4		48	56	4
4	SECDIST	TAG FOR SECOIS	CHAR	6		58	63	4
4	SECREA	SECCHI REAPPEARANCE DEPTH (M)	NUM	9.41		65	73	4
5	SECREAT	TAG FOR SECREA	CHAR	6		1	8	5
5	DP_TOP	DEPTH AT SURFACE (1.5 M) (M)	NUM	9.4		8	16	5
5	DP_T0PT	TAG FOR DP_TOP	CHAR	6		18	23	5
5	DP_B	DEPTH AT BOTTOM-1.5 M (M)	NUM	9.4		25	33	5
5	DP_BT	TAG FOR DP_B	CHAR	6		35	40	5
5	TMPTOP	TEMPERATURE AT SURFACE (1.5M)	NUM	9.4		42	50	5
5	TMPTOPT	TAG FOR TMPTOP	CHAR	6		52	57	5
5	TMP_B	TEMPERATURE AT BOTTOM-1.5 M (DEG C)	NUM	9.41		59	67	5
5	TMP_BT	TAG FOR TMP_B	CHAR	6		69	74	5

Table 7. (continued)

Card NO. ^a	Variable	Label	Variable type	Variable length ^b	Dec ^c	Column start	Column end	Card No.
6	CONTOP	CONDUCTANCE AT SURFACE (1.5M) (US/CM)	NUM	9.4	0	1	9	6
6	CONTOPF	FLAG FOR CONTOP	CHAR	12		11	22	6
6	CONTOPT	TAG FOR CONTOP	CHAR	6		24	29	6
6	CON_B	CONDUCTANCE AT BOTTOM-1.5M (US/CM)	NUM	9.4	0	31	39	6
6	CON_BT	TAG FOR CON B	CHAR	6		41	46	6
6	PH_TOP	PH AT SURFACE (1.5M)	NUM	9.4	2	48	56	6
6	PH_TOPF	FLAG FOR PH_TOP	CHAR	12		58	69	6
7	PH_TOPT	TAG FOR PH TOP	CHAR	6		1	6	7
7	PH_B	PH AT BOTTOM-1.5	NUM	9.4	2	8	16	7
7	PH_BT	TAG FOR PH_B	CHAR	6		18	23	7
7	TMPDF1	TEMP DIFFERENCE TOP-BOTTOM (DEG C)	NUM	9.4	1	25	33	7
7	TMPDFIT	TAG FOR TMPDF 1	CHAR	6		35	40	7
7	DP_60	DEPTH AT 0.6*SITE DEPTH (M)	NUM	9.4	1	42	50	7
7	DP_60T	TAG FOR DP 60	CHAR	6		52	57	7
7	TMP_60	TEMPERATURE AT 0.6*SITE DEPTH (DEG C)	NUM	9.4		59	67	7
7	TMP_60T	TAG FOR TMP_60	CHAR	6		69	74	7
8	CON_60	CONDUCTANCE AT 0.60*SITE DEPTH (US/CM)	NUM	9.4	0	1	9	8
8	CON_60T	TAG FOR CON 60	CHAR	6		11	16	8
8	PH_60	PH AT 0.60*SITE DEPTH	NUM	9.4	2	18	26	8
8	PH_60T	TAG FOR PH_60	CHAR	6		28	33	8
8	TMPDF2	TEMP DIFFERENCE TOP-0.6*DEPTH (DEG C)	NUM	9.4		35	43	8
8	TMPDF2T	TAG FOR TMPDF2	CHAR	6		45	50	8
8	OUTLET	OUTLETS (#)	NUM	9.4	0	52	60	8
8	OUTLETT	TAG FOR OUTLET	CHAR	6		62	67	8
9	INLETS	INLETS (N)	NUM	9.4	0	1	9	9
9	INLETST	TAG FOR INLETS	CHAR	6		11	16	9
9	LAKVER	LOCATION VERIFIED BY, FORM 1	CHAR	25		18	42	9
9	TMP_1	TEMPERATURE AT 4 OR 5 M (DEG C)	NUM	9.4	1	44	52	9
9	TMP_1T	TAG FOR TMP_1	CHAR	6		54	59	9
9	TMP_2	TEMPERATURE AT 6 OR 10 M (DEG C)	NUM	9.4	1	69	69	9
10	TMP_2T	TAG FOR TMP 2	CHAR	6		1	6	10
10	TMP_3	TEMPERATURE AT8 OR 15 M (DEG C)	NUM	9.4		8	16	10
10	TMP_4	TEMPERATURE AT 10 OR 20 M (DEG C)	NUM	9.4		18	26	10
10	TMP_5	TEMPERATURE AT12 OR 25 M (DEG C)	NUM	9.4		28	36	10
10	TMP_6	TEMPERATURE AT14 OR 30 M (DEG C)	NUM	9.4		38	46	10
10	TMP_7	TEMPERATURE AT16 OR 35 M (DEG C)	NUM	9.4		48	56	10
10	TMP_7T	TAG FOR TMP 7	CHAR	6		58	63	10
10	TMP_8	TEMPERATURE AT18 OR 40 M (DEG C)	NUM	9.4	1	65	73	10
11	TMP_9	TEMPERATURE AT 20 OR 45 M (DEG C)	NUM	9.4	1	1	9	11
11	TMP_10	TEMPERATURE AT50 M(DEG C)	NUM	9.4		11	19	11
11	CON_1T	TAG FOR CON_1	CHAR	6		31	36	11
11	CON_2	CONDUCTANCE AT 6 OR 10 M (US/CM)	NUM	9.4	0	38	46	11
11	CON_2T	TAG FOR CON_2	CHAR	6		48	53	11
11	CON_3	CONDUCTANCE AT 8 OR 15 M (US/CM)	NUM	9.4	0	55	63	11
11	CON_3T	TAG FOR CON_3	CHAR	6		65	70	11

Table 7. (continued)

Card No. ^a	Variable	Label	Variable type	Variable length ^b	Dec ^c	Column start	Column end	Card No.
12	CON_4	CONDUCTANCE AT 10 OR 20 M (US/CM)	NUM	9.4	0	1	9	12
12	CON_4T	TAG FOR CON 4	CHAR	6		11	16	12
12	CON_5	CONDUCTANCE~AT 12 OR 25 M (US/CM)	NUM	9.4	0	18	26	12
12	CON_5T	TAG FOR CON 5	CHAR	6		28	33	12
12	CON_6	CONDUCTANCE AT 14 OR 30 M (US/CM)	NUM	9.4	0	35	43	12
12	CON_6T	TAG FOR CON 6	CHAR	6		45	50	12
12	CON_7	CONDUCTANCE AT 16 OR 35 M (US/CM)	NUM	9.4	0	52	60	12
	CON_7T	TAG FOR CON_7	CHAR	6		62	67	12
13	CON 8	CONDUCTANCE AT 18 OR 40 M (US/CM)	NUM	9.4	0	1	9	13
13	CON_8T	TAG FOR CON 8	CHAR	6		11	16	13
13	CON_9	CONDUCTANCE AT 20 OR 45 M (US/CM) M (US/CM)	NUM	9.4	0	18	26	13
13	CON-10	CONDUCTANCE AT 50	NUM	9.4	0	28	36	13
14	TAG_X	MEANING OF TAG X, FORM 1	CHAR	40		1	40	14
14	TAG_Y	MEANING OF TAG Y, FORM 1	CHAR	20	4	2	61	14
15	TAG_Z	MEANING OF TAG Z, FORM 1	CHAR	20		1	20	15
15	BAT_ID	BATCH ID	CHAR	6		22	27	15
15	SAM_ID	SAMPLE ID	CHAR	6		29	34	15
15	DATTR	DATE RECEIVED AT TRAILER, FORM 1	NUM	7		36	42	15
15	TIMTR	TIME RECEIVED AT TRAILER, FORM 1	NUM	5		44	48	15
15	HEL_ID	HELICOPTER ID	CHAR	9		50	58	15
15	CRW_ID	CREW ID	CHAR	6		60	65	15
16	PH_BF	FLAG FOR PH_B	CHAR	12		1	12	16
16	PH_60F	FLAG FOR PH_60	CHAR	12		14	25	16
16	LAKE SIZ	LAKE SURFACE AREA (HA)	NUM	9.3	1	27	35	16
16	LAKENAME	LAKE NAME	CHAR	30		37	66	16
16	ST	STATE (TWO-LETTER ABBREVIATION)	CHAR	2		68	69	16
17	WSHED	WATERSHED AREA (HA)	NUM	9.2	2	1	9	17
17	ELEV	LAKE ELEVATION (M)	NUM	9.4	1	11	19	17
17	IN_OUT	PRESENCE/ABSENCE OF INLETS/OUTLETS	CHAR	6		21	26	17
17	LAT_DD	LATITUDE (DECIMAL DEGREES)	NUM	9.4	4	28	36	17
17	LON_DD	LONGITUDE (DECIMAL DEGREES)	NUM	9.4	4	38	46	17
17	REGION	NSWS REGION	CHAR	1		48	48	17
17	SUB_RGN	NSWS SUBREGION	CHAR	1		50	50	17
17	ALK_CLSS	ALKALINITY CLASS (1,2,3)	CHAR	1		52	52	17
18	MAP_BIG	MAP NAME, 1:250,000 SCALE	CHAR	25		1	25	18
18	MAP_SML	MAP NAME, 15 OR 7.5 QUAD	CHAR	40		27	66	18
19	LAT	LATITUDE	CHAR	10		1	10	19
19	LONG	LONGITUDE	CHAR	11		12	22	19
19	STRATA	NSWS STRATA	CHAR	3		24	26	19
19	COUNTY	FIPS CODE (STATE, COUNTY)	CHAR	5		28	32	19
19	USFS	FOREST SERVICE REGION(APPROX)	CHAR	1		34	34	19
19	WILDNA	USFS WILDERNESS NAME	CHAR	30		36	65	19
20	FOREST	FOREST-NF PAR-NP NATREC-NRA	CHAR	30		1	30	20
21	MAP MED	MAP NAME, 1:100,000 SCALE	CHAR	60		1	60	21
21	NUM_IO	NUMBER OF INLETS/OUTLETS	CHAR	5		62	66	21
21	BAT_ID T	TAG FOR BAT_ID	CHAR	6		68	73	21

Table 7. (continued)

Card NO. ^a	Variable	Label	Variable type	Variable length ^b	Dec ^c	Column start	Column end	Card No.
22	LABNAM	LABORATORY FOR ANALYSIS	CHAR	30		1	30	22
22	DATPRO	DATE PROCESSED, FORM 2	NUM	7		32	38	22
22	DATSHP	DATE SHIPPED, FORM 2	NUM	7		40	46	22
22	STA_ID	STATION ID	CHAR	6		48	53	22
22	SAM_IDF	FLAG FOR SAM_ID	CHAR	12		55	6	22
22	SAM_DT	TAG FOR SAM_ID	CHAR	6		68	73	22
23	SAMCOD	SAMPLE CODE	CHAR	9		1	9	23
23	DICVAL	DIC, FIELD LAB (MG/L)	NUM	9.4	4	11	19	23
23	DICVALF	FLAG FOR DICVAL	CHAR	12		21	32	23
23	DICVALT	TAG FOR DICVAL	CHAR	6		34	39	23
23	DICQCS	DIC QCCS, FIELD LAB (MG/L)	NUM	9.4	3	41	49	23
23	DICQCST	TAG FOR DICQCS	CHAR	6		51	56	23
23	PHSTVL	PH, FIELD VALUE	NUM	9.4	2	58	66	23
24	PHSTVLF	FLAG FOR PHSTVL	CHAR	12		1	12	24
24	PHSTVLT	TAG FOR PHSTVL	CHAR	6		14	19	24
24	PHSTQC	PH QCCS, FIELD LAB	NUM	9.4	2	21	29	24
24	PHSTQCT	TAG FOR PHSTOC	CHAR	6		31	36	24
24	TURVAL	TURBIDITY, FIELD LAB (NTU)	NUM	9.4		38	46	24
24	TURVALT	TAG FOR TURVAL	CHAR	6		48	53	24
24	TUROCS	TURBIDITY QCCS, FIELD LAB (NTU)	NUM	9.4	1	55	63	24
24	COLVAL	COLOR (PCU)	NUM	9.4	0	65	73	24
25	COLVALT	TAG FOR COLVAL	CHAR	6		1	6	25
25	SPLCOD	SPLIT CODES	CHAR	4		8	11	25
25	TAG_X2	MEANING OF TAG X, FORM 2	CHAR	40		13	52	25
26	TAG_Y2	MEANING OF TAG Y, FORM 2	CHAR	25		1	25	26
26	TAG_Z2	MEANING OF TAG 2, FORM 2	CHAR	25		27	51	26
26	WS_DIS	D)WELL F)IRE L)OG M)INE R)OAD S)TOCK	CHAR	8		53	60	26
26	LAKE-VOL	CALCULATED LAKE VOLUME (1~6 CU M)	NUM	9.4	4	62	70	26
27	WALA	WATERSHED AREA / LAKE AREA	NUM	9.4	3	1	9	27
27	RUNIN	SURFACE WATER RUNOFF (INCHES)	NUM	9.4	1	11	19	27
27	DISM	DISTANCE FROM COAST (KM)	NUM	9.4	0	21	29	27
27	CONCALF	FLAG FOR CONCAL	CHAR	14		31	44	27
27	ANSUMF	FLAG FOR ANSUM	CHAR	12		46	57	27
27	CATSUMF	FLAG FOR CATSUM	CHAR	12		59	70	27
28	SOBCF	FLAG FOR SOBC	CHAR	12		1	12	28
28	ORGIONF	FLAG FOR ORGION	CHAR	12		14	25	28
28	ANSUM	SUM OF ANIONS (UEQ/L)	NUM	9.4	2	27	35	28
28	CATSUM	SUM OF CATIONS (UEQ/L)	NUM	9.4	2	37	45	28
28	SOBC	SUM OF BASE CATIONS (UEQ/L)	NUM	9.4	4	47	55	28
28	ORGION	ORGANIC ANION (UEQ/L)	NUM	9.4	4	57	65	28
28	ANDEF	CATSUM - ANSUM (UEQ/L)	NUM	9.4	4	67	15	28
29	HCO316	HCO3 (UEQ/L)	NUM	9.4	3	1	9	29
29	HCO316F	FLAG FOR HCO316	CHAR	12	11	22	1	29
29	CA16	CALCIUM (UEQ/L)	NUM	9.4	3	24	32	29
29	C0316	CARBONATE ALKALINITY (UEQ/L)	NUM	9.4	3	34	42	29
29	CO316F	FLAG FOR CO316	CHAR	12		44	55	29
29	CL16	CHLORIDE (UEQ/L)	NUM	9.4	3	57	65	29
29	MG16	MAGNESIUM (UEQ/L)	NUM	9.4	3	67	75	29

Table 7. (continued)

Card No. ^a	Variable	Label	Variable type	Variable length ^b	Dec ^c	Column start	Column end	Card No.
30	NO316	NITRATE (UEQ/L)	NUM	9.4	3	1	9	30
30	K16	POTASSIUM (UEQ/L)	NUM	9.4	3	11	19	30
30	NA16	SODIUM (UEQ/L)	NUM	9.4	3	21	29	30
30	SO416	SULFATE (UEQ/L)	NUM	9.4	3	31	39	30
30	FTL16	FLUORIDE (UEQ/L)	NUM	9.4	3	41	49	30
30	NH416	AMMONIUM (UEQ/L)	NUM	9.4	3	51	59	30
30	H16	HYDRONIUM FROM PHAC (UEQ/L)	NUM	9.4	3	61	69	30
31	H16F	FLAG FOR H16	CHAR	12		1	12	31
31	CA11	CALCIUM (MG/L)	NUM	9.4	3	14	22	31
31	CA11F	FLAG FOR CA11	CHAR	12		24	35	31
31	CA11T	TAG FOR CA11	CHAR	6		37	42	31
31	MG11	MAGNESIUM (MG/L)	NUM	9.4	3	44	52	31
31	MG11F	FLAG FOR MGII	CHAR	12		54	65	31
31	MG11T	TAG FOR MGII	CHAR	6		67	72	31
32	K11	POTASSIUM (MG/L)	NUM	9.4	3	1	9	32
32	K11F	FLAG FOR 11	CHAR	12		11	22	32
32	K11T	TAG FOR K11	CHAR	6		24	29	32
32	N11	SODIUM (MG/L)	NUM	9.4	3	31	39	32
32	NA11F	FLAG FOR NA11	CHAR	12		41	52	32
32	NA11T	TAG FOR NA11	CHAR	6		54	59	32
32	MN1	MANGANESE (UG/L)	NUM	9.4	0	61	69	32
33	MN11F	FLAG FOR MN11	CHAR	12		1	12	33
33	MN11T	TAG FOR MN11	CHAR	6		14	19	33
33	FE11	IRON (UG/L)	NUM	9.4	0	21	29	33
33	FE11F	FLAG FOR FE11	CHAR	12		31	42	33
33	FE11T	TAG FOR FE11	CHAR	6		44	49	33
33	ALEX11	EXTRACTABLE ALUMINUM (UG/L)	NUM	9.4	1	51	59	33
33	ALEX11F	FLAG FOR ALEX11	CHAR	12		61	72	33
34	ALEX11T	TAG FOR ALEX11	CHAR	6		1	6	34
34	CL11	CHLORIDE (MG/L)	NUM	9.4	3	8	16	34
34	CL11F	FLAG FOR CL11	CHAR	12		18	29	34
34	C11T	TAG FOR CL11	CHAR	6		31	36	34
34	S0411	SULFATE (MG/L)	NUM	9.4	3	38	46	34
34	S0411F	FLAG FOR S0411	CHAR	12		48	59	34
34	S0411T	TAG FOR S0411	CHAR	6		61	66	34
35	NO311	NITRATE (MG/L)	NUM	9.4	4	1	9	35
35	NO311F	FLAG FOR NO311	CHAR	12		11	22	35
35	NO311T	TAG FOR NO311	CHAR	6		24	29	35
35	SIO211	SILICA (MG/L)	NUM	9.4	3	31	39	35
35	SIO211F	FLAG FOR S10211	CHAR	12		41	52	35
35	SIO211T	TAG FOR S10211	CHAR	6		54	59	35
35	FTL11	FLUORIDE (MG/L)	NUM	9.4	4	61	69	35
36	FTL11F	FLAG FOR FTL11	CHAR	12		1	12	36
36	FTL11T	TAG FOR FTL11	CHAR	6		14	19	36
36	DOC11	DOC, ANALYTICAL LAB (MG/L)	NUM	9.4	2	21	29	36
36	DOC11F	FLAG FOR DOC11	CHAR	12		31	42	36
36	DOC11T	TAG FOR DOC11	CHAR	6		44	49	36
36	NH411	AMMONIUM (MG/L)	NUM	9.4	3	51	59	36
36	NH411F	FLAG FOR NH411	CHAR	12		61	72	36

Table 7. (continued)

Card No. ^a	Variable	Label	Variable type	Variable length ^b	DecC	Column start	Column end	Card No.
37	NH411T	TAG FOR NH411	CHAR	6	1	6		37
37	PHEQ11	PH, AIR EOUILBRATED	NUM	9.4	8	16		37
37	PHEQ11F	FLAG FOR PHEQ11	CHAR	12		18	29	37
37	PHEQ11T	TAG FOR PHE	CHAR	6		31	36	37
37	PHAL11	PH, ALKALINITY INITIAL	NUM	9.4	2	38	46	37
37	PHAL11F	FLAG FOR PHAL11	CHAR	12		48	59	37
37	PHAL11T	TAG FOR PHAL11	CHAR	6		61	66	37
38	PHAC11	PH, ACIDITY INITIAL	NUM	9.4	2	1	9	38
38	PHAC11F	FLAG FOR PHAC11	CHAR	12		11	22	38
38	PHAC11T	TAG FOR PHA	CHAR	6		24	29	38
38	ACCO11C02	ACIDITY (UEQ/L)	NUM	9.4	2	31	39	38
38	ACCO11F	FLAG FOR ACCO11	CHAR	12		41	52	38
38	ACCO11T	TAG FOR ACCO1	CHAR	6		54	59	38
38	ALKA11	ALKALINITY (UEQ/L)	NUM	9.4	2	61	69	38
39	ALKA11F	FLAG FOR ALKA11	CHAR	12		1	12	39
39	ALK11T	TAG FOR ALKA11	CHAR	6		14	19	39
39	COND11	CONDUCTANCE, ANALYTICAL LAB (US/CM)	NUM	9.4	1	21	29	39
39	COND11F	FLAG FOR COND11	CHAR	12		31	42	39
39	COND11T	TAG FOR COND11	CHAR	6		44	49	39
39	DICE11ED	UILBRATED DIC, ANALYTICAL LAB (MG/L)	NUM	9.4	3	51	59	39
39	DICE11F	FLAG FOR DICE11	CHAR	12		61	72	39
40	DICE11T	TAG FOR DICE11	CHAR	6		1	6	40
40	DICI11	INITIAL DIC, ANALYTICAL LAB (MG/L)	NUM	9.4	3	8	16	40
40	DICI11F	FLAG FOR DICI11	CHAR	12		18	29	40
40	DICI11T	TAG FOR DICI11	CHAR	6		31	36	40
40	PTL11	TOTAL PHOSPHORUS (UG/L)	NUM	9.4	1	38	46	40
40	PTL11F	FLAG FOR PTL11	CHAR	12		48	59	40
40	PTL11T	TAG FOR PTL11	CHAR	6		61	66	40
41	ALTL11	TOTAL ALUMINUM (UG/L)	NUM	9.4	1	1	9	41
41	ALTL11F	FLAG FOR ALTL11	CHAR	12		11	22	41
41	ALTL11T	TAG FOR ALTL11	CHAR	6		24	29	41
41	CONCAL	CALCULATED SPECIFIC CONDUCTANCE (US/CM)	NUM	9.4	4	31	39	41
41	GMU	GEOMORPHIC UNIT	CHAR	6		41	46	41
41	FACE	GEOMORPHIC SLOPE (E/W)	CHAR	1		48	48	41
41	PRECIP	ANNUAL PRECIPITATION (M/YR)	NUM	9.4		50	58	41
41	RT	RESIDENCE TIME (YR)	NUM	9.4		60	68	41
42	REG_SPC	/REG/SPC/LTM	CHAR	12		1	12	42
42	BNSTAR	POPULATION SIZE BY STRATA	NUM	9.4	0	14	22	42
42	WEIGHT 1	POPULATION EXTRAPOLATION FACTOR	NUM	9.4	4	24	32	42
42	HYDROTYP	DRAINAGE, SEEPAGE, CLOSED, RESERVOIR	CHAR	9		34	42	42
42	BEDROCK	NORTON BEDROCK CLASSIFICATIO	CHAR	1		44	44	42
42	ANCAT	CATSUM/ANSUM	NUM	9.4	4	46	54	42
42	SECMEAN	SECCHI MEAN DEPTH (M)	NUM	9.4	2	56	64	42
42	STRAT	STRATIFICATON TYPE (MIXED, WEAK, STRONG)	CHAR	6		66	71	42
43	COMO11	COMMENT FROM FORM 1 PT 1	CHAR	75		1	75	43
44	COMO12	COMMENT FROM FORM 1 PT 2	CHAR	45		1	45	44
45	COMMNT1	COMMENT FROM FORM 2 PT1	CHAR	75		1	75	45
46	COMMNT2	COMMENT FROM FORM2 PT2	CHAR	75		1	75	46

^acard No. is a variable on each record in columns 78-79.

^bLength for CHAR (character) fields is the integer field length. The length for NUM (numeric) fields is in W.D format, where W = the total field length (decimal point included) and D the number decimal places. For example, 34.78 is in 5.2 format.

^cDec is the number of decimal places with which the original data were reported.

Table 8. Card-image format definition, data set 4, U.S. EPA Western Lake Survey-Phase I

Card No.a	Variable	Label	Variable type	Variable length ^b	Dec ^c	Column start	Column end	Card No.
1	HELGR	H/HELICOPTER, G/GROUND TEAM	CHAR	1		1	1	1
1	LAKE_ID	LAKE IDENTIFICATION CODE	CHAR	7		3	9	1
1	LATINS	LORAN LATITUDE (DDMM.DM)	CHAR	10		11	20	1
1	LNGINS	LORAN LONGITUDE (DDDMM.DM)	CHAR	10		22	31	1
1	DATSNP	DATE SAMPLED (DDNNYY), FORM 1	NUM	7		33	39	1
1	TIMSMP	TIME SAMPLED (NH: MM)) FORM 1	NUM	5		41	45	1
1	ALT IN	ALTIMETER (FT)	NUM	9.3	0	47	55	1
1	SITDPM	SITE DEPTH (M)	NUM	9.4	1	57	65	1
1	AIRTMP	AIR TEMPERATURE (DEG C)	NUM	9.4	0	67	75	1
2	AIRTNPF	FLAG FOR AIRTNP	CHAR	12		1	12	2
2	SECOIS	SECCHI DISAPPEARANCE DEPTH (M)	NUM	9.4	1	14	22	2
2	SECREA	SECCHI REAPPEARANCE DEPTH (M)	NUM	9.4	1	24	32	2
2	DPJOP	DEPTH AT SURFACE (1.5 M) (M)	NUM	9.4	1	34	42	2
2	DP_B	DEPTH AT BOTTOM-1.5 N (M)	NUM	9.4	1	44	52	2
2	TMPTOP	TEMPERATURE AT SURFACE (1.5 M)	NUM	9.4	1	54	62	2
2	TMP_B	TEMPERATURE AT BOTTON-1.5 M (DEG C)	NUM	9.4		64	72	2
3	CONTOP	CONDUCTANCE AT SURFACE (1.5M) (US/CM)	NUM	9.4	0	1	9	3
3	CONTOPF	FLAG FOR CONTOP	CHAR	12		11	22	3
3	CON_B	CONDUCTANCE AT BOTTON-1.5 (US/CM)	NUM	9.4	0	24	32	3
3	PH_TOP	PH AT SURFACE (1.5M)	NUM	9.4	2	34	42	3
3	PH_TOPF	FLAG FOR PH TOP	CHAR	12		44	55	3
3	PH_B	PH AT BOTTOM-1.5M	NUM	9.4	2	57	65	3
3	TMPDF1	TEMP DIFFERENCE TOP-BOTTOM (DEG C)	NUM	9.4	1	67	75	3
4	DP_60	DEPTH AT 0.6*SITE DEPTH (M)	NUM	9.4	1	1	9	4
4	TMP_60	TEMPERATURE AT 0.6*SITE DEPTH (DEG C)	NUM	9.4	1	11	19	4
4	CON_60	CONDUCTANCE AT 0.60*sITE DEPTH (US/CM)	NUM	9.4	0	21	29	4
4	PH_60	PH AT 0.60*SITE DEPTH	NUM	9.4	2	31	39	4
4	TMPDF2	TEMP DIFFERENCE TOP-O.6*OEPTH (DEG C)	NUM	9.4	1	41	49	4
4	BAT_ID	BATCH ID	CHAR	6		51	56	4
4	SAM_ID	SAMPLE ID	CHAR	6		58	63	4
4	CRW_ID	CREW ID	CHAR	6		65	70	4
5	PH_BF	FLAG FOR PH B	CHAR	12		1	12	5
5	PH_60F	FLAG FOR PH_60	CHAR	12		14	25	5
5	LAKE_SIZ	LAKE SURFACE AREA (HA)	NUM	9.3	1	27	35	5
5	LAKENAME	LAKE NAME	CHAR	30		37	66	5
5	ST	STATE (TWO-LETTER ABBREVIATION)	CHAR	2		68	69	5
6	WSHED	WATERSHED AREA (HA)	NUM	9.2	2	1	9	6
6	ELEV	LAKE ELEVATION (N)	NUM	9.4	1	11	19	6
6	IN OUT	PRESENCE/ABSENCE OF INLETS/OUTLETS	CHAR	6		21	26	6
6	LAT_DD	LATITUDE (DECIMAL DEGREES)	NUM	9.4	4	28	36	6
6	LONG_DD	LONGITUDE (DECIMAL DEGREES)	NUM	9.4	4	38	46	6
6	REGION	NSWS REGION	CHAR	1		48	48	6
6	SUB_RGN	NSWS SUBREGION	CHAR	1		50	50	6
6	ALK_CLSS	ALKALINITY CLASS (1,2)3)	CHAR	1		52	52	6

Table 8. (continued)

Card NO. ^a	Variable	Label	Variable type	Variable length ^b	Dec ^c	Column start	Column end	Card No.
7	MAP_BIG	MAP NAME, 1:250,000 SCALE	CHAR	25		1	25	7
7	MAP_SML	MAP NAME, 15 OR 7.5 QUAD	CHAR	40		27	66	7
8	LAT	LATITUDE	CHAR	10		1	10	8
8	LONG	LONGITUDE	CHAR	11		12	22	8
8	STRATA	NSWS STRATA	CHAR	3		24	26	8
8	COUNTY FIPS	CODE (STATE, COUNTY)	CHAR	5		28	32	8
8	USFS	FOREST SERVICE REGION (APPROX)	CHAR	1		34	34	8
8	WILDNA	USFS WILDERNESS NAME	CHAR	30		36	65	8
9	FOREST	FOREST-NF PAR-NP NATREC-NRA	CHAR	30		1	30	9
9	NUM 10	NUMBER OF INLETS/OUTLETS	CHAR	5		32	36	9
9	LABNAM	LABORATORY FOR ANALYSIS	CHAR	30		38	67	9
10	SAM IDF	FLAG FOR SAM_ID	CHAR	12		1	12	10
10	SANCOD	SAMPLE CODE	CHAR	9		14	22	10
10	DICVAL	DIC, FIELD LAB (NG/L)	NUM	9.4	4	24	32	10
10	DICVALF	FLAG FOR DICVAL	CHAR	12		34	45	10
10	PHSTVL	PH, FIELD VALUE	NUM	9.4	2	47	55	10
10	PHSTVLF	FLAG FOR PHSTVL	CHAR	12		57	68	10
11	TURVAL	TURBIDITY, FIELD LAB (NTU)	NUM	9.4	1	1	9	11
11	COLVAL	COLOR (PCU)	NUM	9.4	0	11	19	11
11	LAKE_VOL	CALCULATED LAKE VOLUME (10**6 CU M)	NUM	9.4	4	21	29	11
11	WALA	WATERSHED AREA / LAKE AREA	NUM	9.4	3	31	39	11
11	RUNIN	SURFACE WATER RUNOFF (INCHES)	NUM	9.4	1	41	49	11
11	DISM	DISTANCE FROM COAST (KM)	NUM	9.4	0	51	59	11
11	CONCALF	FLAG FOR CONCAL	CHAR	14		61	74	11
12	ANSUMF	FLAG FOR ANSUM	CHAR	12		1	12	12
12	CATSUMF	FLAG FOR CATSUN	CHAR	12		14	25	12
12	SOBCF	FLAG FOR SOBC	CHAR	12		27	38	12
12	ORGIDNF	FLAG FOR ORGION	CHAR	12		40	51	12
12	ANSUM	SUN OF ANIONS (UEQ/L)	NUM	9.4	2	53	61	12
12	CATSUN	SUN OF CATIONS (UEQ/L)	NUM	9.4	2	63	71	12
13	SOBC	SUN OF BASE CATIONS (UEQ/L)	NUM	9.4	4	1	9	13
13	ORGION	ORGANIC ANION (UEQ/L)	NUM	9.4	4	11	19	13
13	ANDEF	CATSUN - ANSUM (UEQ/L)	NUM	9.4	4	21	29	13
13	HCO316	HCO3 (UEQ/L)	NUM	9.4	3	31	39	13
13	HCO316F	FLAG FOR HC0316	CHAR	12		41	52	13
13	CA16	CALCIUM (UEQ/L)	NUM	9.4	3	54	62	13
13	C0316	CARBONATE ALKALINITY (UEQ/L)	NUM	9.4	3	64	72	13
14	C0316F	FLAG FOR C0316	CHAR	12		1	12	14
14	CL16	CHLORIDE (UEQ/L)	NUM	9.4	3	14	22	14
14	NG16	MAGNESIUM (UEQ/L)	NUM	9.4	3	24	32	14
14	N0316	NITRATE (UEQ/L)	NUM	9.4	3	34	42	14
14	K16	POTASSIUM (UEQ/L)	NUM	9.4	3	44	52	14
14	NA16	SODIUM (UEQ/L)	NUM	9.4	3	54	62	14
14	50416	SULFATE (UEQ/L)	NUM	9.4	3	64	72	14
15	FTL16	FLUORIDE (UEQ/L)	NUM	9.4	3	1	9	15
15	NH416	AMMONIUM (UEQ/L)	NUM	9.4	3	11	19	15
15	H16	HYDRONIUM FROM PHAC (UEQ/L)	NUM	9.4	3	21	29	15
15	H16F	FLAG FOR H16	CHAR	12		31	42	15
15	CA11	CALCIUM (MG/L)	NUM	9.4	3	44	52	15

Table 8. (continued)

Card No. ^a	Variable	Label	Variable type	Variable length ^b	Decc	Column start	Column end	Card No.
15	CA11F	FLAG FOR CA11	CHAR	12		54	65	15
15	MG11	MAGNESIUM (MG/L)	NUM	9.4	3	67	75	15
16	MG11F	FLAG FOR MG11	CHAR	12		1	12	16
16	K11	POTASSIUM (MG/L)	NUM	9.4	3	14	22	16
16	K11F	FLAG FOR K11	CHAR	12		24	35	16
16	NA11	SODIUM (MG/L)	NUM	9.4	3	37	45	16
16	NA11F	FLAG FOR NA11	CHAR	12		47	58	16
16	MN11	MANGANESE (UG/L)	NUM	9.4	0	60	68	16
17	MN11F	FLAG FOR MN11	CHAR	12		1	12	17
17	FE11	IRON (UG/L)	NUM	9.4	0	14	22	17
17	FE11F	FLAG FOR FE11	CHAR	12		24	35	17
17	ALEX11	EXTRACTABLE ALUMINUM (UG/L)	NUM	9.4	1	37	45	17
17	ALEX11F	FLAG FOR ALEX11	CHAR	12		47	58	17
17	CL11	CHLORIDE (MG/L)	NUM	9.4	3	60	68	17
18	CL11F	FLAG FOR CL11	CHAR	12		1	12	18
18	S0411	SULFATE (MG/L)	NUM	9.4	3	14	22	18
18	S0411F	FLAG FOR S0411	CHAR	12		24	35	18
18	NO311	NITRATE (MG/L)	NUM	9.4	4	37	45	18
18	NO311F	FLAG FOR NO311	CHAR	12		47	58	18
18	SIO211	SILICA (MG/L)	NUM	9.4	3	60	68	18
19	SIO211F	FLAG FOR SIO211	CHAR	12		1	12	19
19	FTL11	FLUORIDE (MG/L)	NUM	9.4	4	14	22	19
19	FTL11F	FLAG FOR FTL11	CHAR	12		24	35	19
19	DOC11	DOC, ANALYTICAL LAB (MG/L)	NUM	9.4	2	37	45	19
19	DOC11F	FLAG FOR DOC11	CHAR	12		47	58	19
19	NH1411	AMMONIUM (MG/L)	NUM	9.4	3	60	68	19
20	NH1411F	FLAG FOR NH411	CHAR	12	1	12		20
20	PEEQ11	PH, AIR EQUILIBRATED	NUM	9.4	2	14	22	20
20	PHEQ11F	FLAG FOR PHEQ11	CHAR	12		24	35	20
20	PHAL11	PH, ALKALINITY INITIAL	NUM	9.4	2	37	45	20
20	PHAL11F	FLAG FOR PHAL11	CHAR	12		47	58	20
20	PHAC11	PH, ACIDITY INITIAL	NUM	9.4	2	60	68	20
21	PHAC11F	FLAG FOR PHAC11	CHAR	12		1	12	21
21	ACCO11	CO2 ACIDITY (UEQ/L)	NUM	9.4	2	14	22	21
21	ACCO11F	FLAG FOR ACCO11	CHAR	12		24	35	21
21	ALKA11	ALKALINITY (UEQ/L)	NUM	9.4	2	37	45	21
21	ALKA11F	FLAG FOR ALKA11	CHAR	12		47	58	21
21	COND11	CONDUCTANCE, ANALYTICAL LAB (US/CM)	NUM	9.4	1	60	68	21
22	COND11F	FLAG FOR COND11	CHAR	12		1	12	22
22	DICE11	EQUILIBRATED DIC, ANALYTICAL LAB (MG/L)	NUM	9.4	3	14	22	22
22	DICE11F	FLAG FOR DICE11	CHAR	12		24	35	22
22	DICI11	INITIAL DIC, ANALYTICAL LAB (MG/L)	NUM	9.4	3	37	45	22
22	DICI11F	FLAG FOR DICI11	CHAR	12		47	58	22
22	PTL11	TOTAL PHOSPHORUS (UG/L)	NUM	9.4	1	60	68	22
23	PTL11F	FLAG FOR PTL11	CHAR	12		1	12	23
23	ALTL11	TOTAL ALUMINUM (UG/L)	NUM	9.4	1	14	22	23
23	ALTL11F	FLAG FOR ALTL11	CHAR	12		24	35	23

Table 8. (continued)

Card NO ^a	Variable	Label	Variable type	Variable length ^b	Dec ^c	Column start	Column end	Card No.
23	CONCAL	CALCULATED SPECIFIC CONDUCTANCE (US/CM)	NUM	9.4	4	37	45	23
23	GNU	GEOMORPHIC UNIT	CHAR	6		47	52	23
23	FACE	GEOMORPHIC SLOPE (E/W)	CHAR	1		54	54	23
23	PRECIP	ANNUAL PRECIPITATION (N/YR)	NUM	9.4	3	56	64	23
23	RT	RESIDENCE TIME (YR)	NUM	9.4	4	66	74	23
24	REG_SPC	/REG/SPC/LTM	CHAR	12		1	12	24
24	TURVALF	FLAG FOR TURVAL	CHAR	12		14	25	24
24	COLVALF	FLAG FOR COLVAL	CHAR	12		27	38	24
24	ANCAT	CATSUN/ANSUN	NUM	9.4	4	40	48	24
24	SEGNEAN	SECCHI MEAN DEPTH (M)	NUM	9.4	2	50	58	24
24	BNSTAR	POPULATION SIZE BY STRATA	NUM	9.4	0	60	68	24
25	WEIGHT1	POPULATION EXTRAPOLATION FACTOR	NUM	9.4	4	1	9	25
25	HYDROTYP	DRAINAGE, SEEPAGE, CLOSED, RESERVOIR	CHAR	9		11	19	25
25	STRAT	STRATIFICATION TYPE (MIXED, WEAK, STRONG)	CHAR	6		21	26	25
25	BEDROCK	NORTON BEDROCK CLASSIFICATION	CHAR	1		28	28	25
25	MAP_MED	NAP NAME, 1:100,000 SCALE	CHAR	35		30	64	25
26	WS_0TH	OTHER DISTURBANCE	CHAR	25		1	25	26
26	WS_DIS	D)WELL F)IRE L)OG N)INE)OAD S)TOCK	CHAR	8		27	34	26
26	STA_ID	STATION ID	CHAR	6		36	41	26

^aCard No. is a variable on each record in columns 78 and 79.

^bLength for CHAR (character) fields is the integer field length. The length for NUM (numeric) format, where W = the total field length (decimal point included) and D = the number of decimal places. For example, 34.78 is in 5.2 format fields is in W.D decimal places.

^cDec is the number of decimal places with which the original data were reported.

Table 9 Card-image format definition, PC data set, U.S. EPA Western Lake Survey-Phase I

Card No ^a	Variable	Label	Variable type	Variable length(b)	Column start	Column end	Card No.
1	LAKE_ID	LAKE ID	CHAR	7	1	7	1
1	LAKENAME	LAKE NAME	CHAR	26	9	34	1
1	LAT	LATITUDE	CHAR	10	36	45	1
1	LONG	LONGITUDE	CHAR	11	46	57	1
1	ELEV	LAKE ELEVATION (N)	NUM	4.0	59	62	1
1	LAKE SIZ	LAKE SURFACE AREA (HA)	NUM	7.1	64	70	1
1	WSHED	WATERSHED AREA (HA)	NUM	7.0	72	78	1
2	WALA	WATERSHED AREA/LAKE AREA	NUM	7.1	1	7	2
2	HYDROTYP	DRAINAGE, SEEPAGE, CLOSED, RESERVOIR	CHAR	9	9	17	2
2	IMPTOP	TEMPERATURE AT SURFACE	NUM	6.1	19	24	2
2	STRAT	STRATIFICATION (NONE, WEAK, STRONG)	CHAR	6	26	31	2
2	SITDRN	SITE DEPTH (N)	NUM	5.1	33	37	2
2	SECNEAN	SECCHI, MEAN DEPTH (N)	NUM	6.1	39	44	2
2	TURVAL	TURBIDITY, FIELD LAB (NTU)	NUM	5.1	46	50	2
2	COLVAL	COLOR (PCU)	NUM	4.0	52	55	2
2	FE11	IRON (UG/L)	NUM	6.1	57	62	2
2	ANSUM	SUM OF ANIONS (UEQ/L)	NUM	6.1	64	69	2
2	CATSUM	SUM OF CATIONS (UEQ/L)	NUM	6.1	71	76	2
3	ANCAT	CAT SUM/ANSUN	NUM	4.2	1	4	3
3	PHEQ11	PH, AIR EQUILIBRATED	NUM	4.2	6	9	3
3	PHSTVL	PH, FIELD LAB	NUM	4.2	11	14	3
3	ALKA11	ALKALINITY (UEQ/L)	NUM	6.1	16	21	3
3	COND11	CONDUCTANCE, ANALYTICAL LAB (US/CM)	NUM	5.1	23	27	3
3	CONCAL	CALCULATED SPECIFIC CONDUCTANCE (US/CM)	NUM	5.1	29	33	3
3	DICE11	EQUIL DIC, ANALYTICAL LAB (MG/L)	NUM	5.2	35	39	3
3	DICVAL	DIC, FIELD LAB (NG/L)	NUM	5.2	41	45	3
3	DOC11	DOC, ANALYTICAL LAB (NG/L)	NUM	5.2	47	51	3
3	ALEX11	EXTRACTABLE ALUMINUM (UG/L)	NUM	5.1	53	57	3
3	ALTL11	TOTAL ALUMINUM (UG/L)	NUM	6.1	59	64	3
3	CA16	CALCIUM (UEQ/L)	NUM	6.1	66	71	3
3	MG16	MAGNESIUM (MG/I)	NUM	6.1	73	78	3
4	NA16	SODIUM (UEQ/L)	NUM	6.1	1	6	4
4	K16	POTASSIUM (UEQ/L)	NUM	5.1	8	12	4
4	NH416	AMMONIUM (UEQ/L)	NUM	4.1	14	17	4
4	SO416	SULFATE (UEQ/L)	NUM	6.1	19	24	4
4	HC0316	HC03 (UEQ/L)	NUM	6.1	26	31	4
4	CL1 6	CHLORIDE (UEQ/L)	NUM	6.1	33	38	4
4	NO316	NITRATE (UEQ/L)	NUM	4.1	40	43	4
4	FTL16	FLUORIDE (UEQ/L)	NUM	5.1	45	49	4
4	PTL11	TOTAL PHOSPHORUS (UG/L)	NUM	5.1	51	55	4
4	SIO211	SILICA (MG/I)	NUM	6.2	57	62	4
4	REG_SPC	/REG/SPEC/LTN	CHAR	12	64	75	4
4	ST	STATE (TWO-LETTER ABBREV)	CHAR	2	77	78	4
5	MN11	MANGANESE (UG/L)	NUM	6.1	1	6	5
5	DATSMP	DATE SAMPLED, FORM 1	CHAR	7	8	14	5
5	WEIGHT1	POPULATION EXTRAPOLATION FACTOR	NUM	6.3	16	21	5
5	BNSTAR	POPULATION SIZE BY STRATA	NUM	4.0	23	26	5

^aCard number is a variable on each 80-column record. For cards 1-4, it is in column 80 and in column 28 for card 5.

^bFormat for CHAR (character) fields is the integer field length. The length for NUM (numeric) fields is in W.D format where W = the total field length and D = the number of decimal places. For example, 34.78 is in 5.2 format.

7. DATA TRANSPORT VERIFICATION

The WLS-I data sets Can be read as fully formatted SAS data sets or as card-image files (Sect. 6). Regardless, users should Verify that the data have been transported correctly to their systems by generating some or all of the statistics presented in Tables 10-13. These statistics were generated using SAS (PROC MEANS) but can be duplicated in other statistical packages or languages. If the statistics generated by the user differ from those presented here, the data sets may have been corrupted in transport. Note that missing values in the card-image data sets, represented as -999, must be removed before generating the summary statistics to check data transport.

Tables 14-16 are Card-image printouts of the first five lakes in data sets 3 and 4 and the PC data set (file WLS-I.REG). They can be used to check data formats for those using the card-image versions.

These statistics are presented only as a tool to ensure proper reading of the data sets. They are not to be construed as summarizing the WLS-I results.

Table 10. Characteristics of numeric variables, data set 3, U.S. EPA Western Lake Survey-Phase I

Variable	N	Mean	Standard deviation	Mm	Max
ACC011	1105	25.29	32.92	-270.30	450.70
AIRTMP	1105	6.19	5.76	-17.00	23.00
ALEX11	1105	6.97	29.30	-6.00	723.80
ALKA11	1105	244.41	426.37	-24.00	4948.60
ALTIM	573	7332.98	2939.82	20.00	12800.00
ALTL11	1105	36.87	71.58	-2.30	1154.00
ANCAT	1104	1.16	0.15	0.70	2.76
ANDEF	1104	32.60	123.82	-639.79	2565.19
ANSUM	1104	274.11	541.96	14.62	7320.76
BNSTAR	1106	849.96	574.31	150.00	2317.00
CA11	1105	3.65	6.58	0.09	95.38
CA16	1105	182.03	328.57	4.29	4759.51
CATSUM	1105	306.61	565.84	18.04	6680.97
CL11	1104	0.44	3.21	0.01	74.22
CL16	1104	12.34	90.69	0.31	2093.66
C0316	1105	3.90	22.61	0.00	311.12
COLVAL	1104	8.69	9.50	0.00	110.00
CONCAL	1104	31.68	62.12	2.14	852.16
COND11	1105	29.64	51.96	1.60	695.00
CONFI	579	43.98	7.01	0.00	60.00
CONIN	579	47.39	6.62	30.00	64.00
CONTOP	564	35.16	64.18	-2.00	667.00
CON_1	21	36.48	58.01	1.00	206.00
CON_10	1	7.00	--	7.00	7.00
CON_2	21	36.19	57.91	1.00	206.00
CON_3	21	38.19	59.06	3.00	212.00
CON_4	21	43.29	65.36	3.00	225.00
CON_5	18	44.56	67.25	3.00	225.00
CON_6	18	46.17	66.94	3.00	224.00
CON_60	33	35.06	52.63	3.00	225.00
CON_7	12	50.00	82.45	4.00	224.00
CON_8	10	51.80	90.38	4.00	223.00
CON_9	7	8.71	6.05	3.00	17.00
CON_B	474	34.95	66.95	-3.00	668.00
DICell	1105	2.84	4.69	0.14	50.22
DICIII	1105	2.98	5.21	0.16	61.83
DICQCS	355	2.10	0.22	1.82	5.96
DICVAL	1103	3.17	5.82	0.20	88.67
DISM	346	71.68	38.42	1.00	149.00
DOC11	1105	1.72	1.68	0.05	16.72
OP_60	63	19.77	8.14	3.60	42.20
DP_8	944	11.91	10.30	0.30	53.40
DP_TOP	1096	1.50	0.00	1.50	1.50

Table 10. (continued)

Variable	N	Mean	Standard deviation	Mm	Max
ELEV	1106	2405.99	843.87	10.67	3912.78
FE11	1105	31.61	68.24	-9.00	974.00
FTL11	1104	0.05	0.19	0.00	3.54
FIL16	1104	2.84	10.22	0.00	186.57
H16	1105	0.20	0.87	0.00	28.18
HC0316	1105	214.79	379.46	2.63	3732.72
INLETS	989	1.22	1.58	0.00	25.00
K11	1105	0.37	0.97	0.03	20.00
K16	1105	9.47	24.72	0.10	511.40
LAKE_SIZ	1106	34.53	357.27	1.00	10010.70
LAKE_VOL	1104	4.27	39.96	0.01	919.70
LAT_DO	1106	42.95	3.57	36.09	48.99
LONG_DO	1106	114.85	5.89	105.06	123.78
MG11	1105	0.81	1.84	0.02	17.88
MG16	1105	66.44	151.45	1.32	1471.14
MN11	1105	3.84	18.54	-49.00	227.00
NA11	1105	1.11	5.38	0.02	124.50
NA16	1105	48.47	234.09	1.00	5415.75
NH411	1105	0.00	0.03	-0.08	0.29
NH416	1105	0.00	1.45	-4.60	15.91
NO311	1104	0.10	0.21	-0.01	2.67
N0316	1104	1.53	3.39	-0.22	43.05
ORGION	1105	16.72	16.45	0.48	167.02
OUTLET	1063	0.90	0.37	0.00	3.00
PHAC11	1105	7.01	0.54	4.55	9.59
PHAL11	1105	7.01	0.54	4.60	9.61
PHEQ11	1104	7.27	0.50	4.06	9.05
PHFIO1	579	3.94	0.08	3.77	4.26
PHINO1	579	3.95	0.08	3.73	4.34
PHSTQC	388	4.06	0.02	4.00	4.10
PHSTVL	1103	7.19	0.60	4.79	9.83
PH_60	34	6.67	0.52	5.95	7.77
PH_8	471	7.04	0.79	4.50	9.69
PH_TOP	1093	6.71	0.85	4.48	10.52
PRECIP	1103	1.04	0.61	0.20	3.25
PTL11	1105	8.08	14.71	-3.00	88.10
RT	880	0.74	1.41	0.00	18.69
RUNIN	1106	27.22	23.35	0.20	120.00
SECDIS	1096	6.21	4.06	0.30	28.50
SECMEAN	1096	6.08	3.99	0.25	27.75
SECREA	687	6.48	4.25	0.20	27.00
SIO211	1104	3.71	6.64	-0.05	114.05
SITDPF	569	41.85	44.38	3.00	360.00
SITDPM	1104	12.42	12.53	0.50	109.70

Table 10. (continued)

Variable	N	Mean	Standard deviation	Mm	Max
SO411	1104	1.86	8.02	0.00	142.17
SO416	1104	38.64	166.91	0.08	2960.02
SOBC	1105	306.41	565.25	17.40	6668.25
TMPUF1	945	0.88	1.78	-20.60	8.80
TMPDF2	60	4.63	3.29	0.00	20.30
TMPTOP	1103	7.57	2.70	0.30	20.10
TMP_1	37	10.56	1.08	8.20	12.90
TMP_10	1	4.70	--	4.70	4.70
TMP_2	37	8.68	2.30	4.80	12.60
TMP_3	38	6.65	2.28	3.70	11.30
TMP_4	38	5.65	2.63	3.60	18.70
TMP_5	31	5.48	2.99	3.60	20.00
TMP_6	28	5.53	4.43	3.60	27.40
TMP_60	62	6.55	3.42	3.60	26.50
TMP_7	13	4.78	0.73	4.10	6.30
TMP_8	11	4.69	0.59	4.00	5.70
TMP_9	7	4.64	0.62	4.00	5.50
TMP_8	945	6.77	2.51	0.30	27.40
TURQCS	319	4.78	0.13	4.50	5.30
TURVAL	1104	0.76	1.86	0.00	30.00
WALA	1106	55.44	177.86	1.27	3332.45
WEIGHT1	1106	14.10	9.60	3.26	36.87
WSHED	1106	1354.44	11997.97	5.18	291592.56

Table 11. Characteristics of numeric variables, data set 4, U.S. EPA Western Lake Survey-Phase I

Variable	N	Mean	Standard deviation	Mm	Max
ACCO11	752	25.23	32.49	-270.30	380.80
AIRTMP	751	6.08	5.82	-17.00	23.00
ALEX11	752	6.41	25.05	0.00	658.95
ALKA11	752	260.55	443.71	-24.00	4948.60
ALTIM	435	7364.45	2961.86	20.00	12800.00
ALTL11	752	37.82	69.49	0.70	1119.00
ANCAT	752	1.16	0.13	0.78	2.15
ANDEF	752	33.31	66.45	-337.10	736.36
ANSUM	752	287.24	527.67	14.62	6967.79
BNSTAR	752	868.75	586.52	150.00	2317.00
CA11	752	3.80	6.39	0.09	95.30
CA16	752	189.81	319.10	4.32	4755.57
CATSUM	752	320.55	550.44	18.38	6696.22
CL11	752	0.43	2.82	0.02	72.73
CL16	752	12.24	79.67	0.65	2051.77
C0316	752	4.28	23.57	0.00	311.12
COLVAL	752	9.19	10.11	0.00	110.00
CONCAL	752	33.00	59.77	2.17	834.43
CONO11	752	30.85	49.86	1.60	676.00
CONTOP	427	35.04	59.01	-2.00	667.00
CON_60	20	36.60	50.02	4.00	225.00
CON_8	356	33.73	60.82	-3.00	668.00
DICE1 1	752	3.04	4.93	0.14	50.22
DIC11	752	3.15	5.25	0.31	61.83
DICVAL	752	3.30	5.57	0.27	86.72
DISM	238	73.26	39.37	1.00	149.00
DOC11	752	1.83	1.83	0.06	16.72
OP_60	39	19.67	8.23	3.60	42.20
OP_B	636	11.87	10.31	1.50	53.40
DP_TOP	745	1.50	0.00	1.50	1.50
ELEV	752	2394.50	855.84	10.67	3912.78
FE11	752	35.40	75.97	0.00	974.00
FTL11	752	0.06	0.19	0.00	3.45
FTL16	752	2.90	10.09	0.00	181.61
H16	752	0.20	1.04	0.00	28.18
HC0316	752	229.44	394.42	2.63	3732.72
K11	752	0.38	0.90	0.03	19.65
K16	752	9.72	23.00	0.64	502.45
LAKE_SIZ	752	43.62	429.33	1.00	10010.70
LAKE_VOL	750	5.03	45.14	0.01	919.70
LAT_DO	752	42.88	3.60	36.09	48.99
LONG_DO	752	114.82	5.92	105.06	123.78

Table 11.(continued)

Variable	N	Mean	Standard deviation	Mm	Max
MG11	752	0.86	1.86	0.02	17.88
MG16	752	70.71	152.75	1.81	1471.14
MN11	752	7.38	17.06	0.00	212.00
NA11	752	1.14	4.92	0.02	124.50
NA16	752	49.73	213.99	1.00	5415.75
NH411	752	0.01	0.02	0.00	0.26
NH416	752	0.38	1.15	0.00	14.61
N0311	752	0.10	0.22	0.00	2.67
N0316	752	1.66	3.59	0.00	43.05
ORGLON	752	17.81	17.97	0.58	167.02
PHAC11	752	7.03	0.55	4.55	9.56
PHAL11	752	7.03	0.55	4.60	9.61
PHEQ11	752	7.29	0.50	4.65	9.05
PHSTVL	752	7.20	0.61	4.79	9.81
PH_60	21	6.78	0.56	5.95	7.77
PH_8_3	55	7.06	0.80	4.50	9.69
PH_TOP	752	6.80	0.87	4.48	10.52
PRECIP	750	1.03	0.60	0.20	3.25
PTL1	752	8.44	15.43	0.00	188.10
RT	602	0.76	1.42	0.00	18.69
RUNIN	752	26.40	22.43	0.20	120.00
SECOIS	748	6.07	4.03	0.30	28.50
SECMEAN	748	5.94	3.96	0.25	27.75
SECREA	476	6.21	4.20	0.20	27.00
S10211	752	3.82	6.77	0.04	114.05
SITOPM	750	12.37	12.78	0.50	109.70
SO411	752	1.76	7.02	0.01	139.72
S0416	752	36.71	146.08	0.23	2909.06
SOBC	752	319.97	549.97	17.40	6682.94
TMPDF1	637	0.82	1.78	-20.60	8.80
TMPDF2	37	4.45	3.71	0.00	20.30
TMPTOP	750	7.52	2.76	0.30	20.10
TMP_60	38	7.03	4.03	3.60	26.50
TMP_B	637	6.77	2.59	0.30	27.40
TURVAL	752	0.81	1.89	0.00	30.00
WALA	752	59.86	200.84	1.27	3332.45
WEIGHT1	752	14.39	9.79	3.26	36.87
WSHED	752	1701.14	14336.26	5.18	291592.56

Table 12. Characteristics of numeric variables, PC data Set, file WLS-I.REG, U.S. EPA Western Lake Survey-Phase I

Variable	N	Mean	Standard deviation	Mm	Max
ALEX11	720	6.56	25.58	0.00	658.95
ALKA11	720	265.37	450.95	-24.00	4948.60
ALTL11	720	38.42	70.85	0.70	1119.00
ANCAT	720	1.16	0.13	0.85	2.15
ANSUM	720	292.20	536.67	14.62	6967.79
BNSTAR	720	873.12	595.86	150.00	2317.00
CAI6	720	193.62	324.67	4.32	4755.57
CATSUM	720	325.97	559.65	18.38	6696.22
CLI6	720	12.13	80.68	0.65	2051.77
COLVAL	720	9.23	10.24	0.00	110.00
CONCAL	720	33.55	60.79	2.17	834.43
CONDi 1	720	31.33	50.66	1.60	676.00
DICEI 1	720	3.09	5.01	0.14	50.22
OICVAL	720	3.37	5.67	0.27	86.72
OOCI 1	720	1.85	1.87	0.06	16.72
ELEV	720	2381.52	862.82	10.67	3885.33
FE11	720	35.88	77.26	0.00	974.00
FTL16	720	2.98	10.31	0.00	181.61
HCO316	720	233.80	400.89	2.63	3732.72
K16	720	9.17	23.40	0.64	502.45
LAKE_SIZ	720	33.01	382.17	1.00	10010.70
MG16	720	71.59	155.06	1.81	1471.14
MN11	720	7.52	17.39	0.00	212.00
NA1 6	720	50.40	218.11	1.00	5415.75
NH416	720	0.38	1.15	0.00	14.61
N0316	720	1.66	3.54	0.00	43.05
PHEQ11	720	7.30	0.50	4.65	9.05
PHSTVL	720	7.20	0.61	4.79	9.82
PTL11	720	8.39	15.64	0.00	188.10
SECMEAN	717	5.95	3.98	0.25	27.75
SIO211	720	3.88	6.88	0.04	114.05
SITOPM	720	12.16	12.10	0.50	93.90
SO416	720	37.20	149.07	0.23	2909.06
TMPTOP	719	7.55	2.77	0.30	20.10
TURVAL	720	0.82	1.92	0.00	30.00
WALA	720	61.01	205.06	2.59	3332.45
WEIGHT1	720	14.44	9.94	3.26	36.88
WSHED	720	1694.16	14615.34	5.18	291592.56

Table 13. Characteristics of numeric variables, PC data set, file WLS-I.SPC, U.S. EPA Western Lake Survey-Phase I

Variable	N	Mean	Standard deviation	Mm	Max
ALEX11	32	3.09	2.73	0.00	9.40
ALKA11	32	152.19	200.79	23.20	1100.00
ALTL11	32	24.30	18.97	3.50	74.80
ANCAT	32	1.16	0.14	0.78	1.42
ANSUM	32	175.54	228.04	29.19	1022.71
BNSTAR	32	770.53	297.94	150.00	1061.00
CA16	32	104.02	118.31	10.48	675.80
CATSUM	32	198.52	244.02	32.87	1146.13
CL16	32	14.73	52.71	0.75	302.55
COLVAL	32	8.20	6.45	0.00	25.00
CONCAL	32	20.59	25.84	3.67	118.99
CONO11	32	19.86	23.95	3.40	112.00
DICE11	32	1.80	2.22	0.41	12.35
DICVAL	32	1.93	2.18	0.46	12.00
DOC11	32	1.40	0.73	0.24	4.28
ELEV	32	2692.52	630.33	1423.60	3912.78
FE11	32	24.52	35.39	0.00	162.50
FTL16	32	1.17	1.16	0.19	4.89
HC0316	32	131.41	175.36	16.35	967.24
K16	32	8.67	10.48	1.53	50.09
LAKE_SIZ	32	282.30	1008.23	1.00	5396.70
MG16	32	50.78	84.51	4.94	423.97
MN11	32	4.05	5.25	0.00	20.00
NA16	32	34.60	75.66	5.57	445.66
NH416	32	0.31	1.26	0.00	7.10
N0316	32	1.78	4.53	0.00	21.36
PHEQ11	32	7.20	0.31	6.68	8.21
PHSTVL	32	7.22	0.51	6.36	8.73
PTL11	32	9.50	9.50	0.00	41.40
SECMEAN	31	5.87	3.65	1.65	15.25
S10211	32	2.57	3.60	0.16	19.04
SITOPM	30	17.48	23.69	2.40	109.70
SO416	32	25.73	37.55	1.39	221.94
TMPTOP	31	6.77	2.57	2.70	12.00
TURVAL	32	0.70	1.05	0.10	5.85
WALA	32	34.00	34.67	1.27	132.04
WEIGHT1	32	13.21	5.40	3.26	19.74
WSHED	32	1856.24	4972.87	23.31	26570.69

Table 14. (continued)

G 4A1-003 0381382			1193885						1
16OCT85	7:30	T03	-999.0000			-999.0000		-999.0000	2
-999.0000			-999.000					15.2000	3
	0.0000		-999.0000				4.3000	4.0000	4
1.5000		13.7000				5.0000		5.0000	5
-999.0000			-999.0000				6.2000	WO	6
X -999.0000			0.0000			-999.0000		-999.0000	7
-999.0000			-999.0000			-999.0000		1.0000	8
1.0000					USDAFS EMIGRANT WILD. MAP	-999.0000		-999.0000	9
-999.0000			-999.0000	-999.0000	-999.0000	-999.0000		-999.0000	10
-999.0000	-999.0000	-999.0000				-999.0000		-999.0000	11
-999.0000			-999.0000		-999.0000		-999.0000		12
-999.0000			-999.0000	-999.0000					13
DUPLICATE PH 6.2									14
	1522	05		16OCT85	21:45		0004		15
WO	WO				4.100	LOST LAKE		CA	16
93.24	2964.3184	NI/0		38.2303	119.6475	4 A 1			17
WALKER LAKE					15	TOWER PEAK			18
38-13'49"N			119-38'51"W	4A1	06109	5	EMIGRANT WILDERNESS		19
STANISLAUS NF									20
WALKER LAKE								0/1	21
EMSI				16OCT85	17OCT85	15			22
RG			1.8870			-999.0000		7.4200	23
		4.0500		0.8000			-999.0000	0.0000	24
EL									25
								0.2890	26
22.7400			40.0000	-999.0000	D2	D2		D2	27
	B5D2		154.6500	166.9300	166.9454		7.2111	12.2811	28
145.3140	D2			127.0450	0.4000	D2	1.3260	17.6040	29
0.0000	1.		20.5320		7.2040	0.4050	-0.0550	0.0400	30
D2	2.5460						0.2140		31
0.0690					0.4720			-6.0000	32
B5				13.0000				1.5000	33
0.0470					0.3460				34
0.0000					0.3060			0.0077	35
		0.7300		B5			-0010		36
7.2600	D2				7.3600	D2			37
7.3900	D2				20.8000	B0		164.9000	38
	B0			16.9000			1.9840		39
1.9130	80				12.6000				40
17.0000				16.B503	SIERRA W		1.0160	0.3052	41
/REG	1885.0000		31.9780	DRAINAGE	3		1.0794	4.1500	MIXED 42
									43
									44
									45
									46

Table 14. (continued)

G 4A1-003	0381382		1193885						1		
	16OCT85	7:30	T03	-999.0000	999.0000		-999.0000		2		
	-999.0000		-999.0000				15.2000		3		
		0.0000		-999.0000	4.3000		4.0000		4		
		1.5000		13.7000	5.0000		5.0000		5		
		-999.0000		-999.0000			6.2000	WO	6		
X		-999.0000		0.0000	-999.0000		-999.0000		7		
		-999.0000		-999.0000	-999.0000		1.0000		8		
		1.0000		USDAFS EMIGRANT WILD. MAP	-999.0000		-999.0000		9		
		-999.0000	-999.0000	-999.0000	-999.0000	-999.0000		-999.0000	10		
	-999.0000	-999.0000	-999.0000		-999.0000		-999.0000		11		
	-999.0000	-999.0000		-999.0000			-999.0000		12		
	-999.0000	-999.0000		-999.0000					13		
	DULPLICATE PH 6.2								14		
		1552	09		16OCT85 21:45		0004		15		
WO		WO		4.100	LOST LAKE			CA	16		
	93.24	2964.3184	NI/O	38.2303	119.6475	4 A 1			17		
	WALKER LAKE 15' TOWER PEAK								18		
	38-13'49"N 119-38'51"W 4A1 06109 5 EMIGRANT WILDERNESS								19		
	STANISLAUS NF								20		
	BRIDGEPORT								21		
							0/1		21		
EMSI				16OCT85	17OCT85	15			22		
DG		1.8900				1.8190		7.3800	23		
			4.0500			0.8000		4.7000	0.0000	24	
	EL								25		
								0.2890	26		
	22.7400	40.0000	-999.0000	D2		D2		D2	27		
		B5D2		146.8100		169.4400	169.3490	5.2919	22.6221	28	
136.880	D2		129.6400		0.1760	D2		1.4950	17.7680	29	
	0.0810	1.7130	20.2280		7.7870	0.3950		0.0000	0.0900	30	
D2		2.5980				0.2160				31	
	0.0670				0.4650			0.0000		32	
B5			19.0000					1.5000		33	
		0.0530				0.3740				34	
	0.0050					0.3200			0.0075	35	
				0.5400	B5			0.0000		36	
		7.4400	D2			7.1200	D2			37	
	7.0600	D2			33.2000	B0			163.5000	38	
B0				17.3000					1.09740	39	
		1.9780	B0			2.4000				40	
	16.1000				16.6898	SIERRA W		1.0160	0.3052	41	
REG		1885.0000	31.9780	DRAINAGE	3			1.1541	4.1500	MIXED	42
											43
											44
											45
											46

Table 14. (continued)

G 4A1-004	0381065			1194827											1	
	11OCT85	11:30	T91	-999.0000		-999.0000			-999.0000						2	
	-999.0000		-999.0000								3.5000				3	
		8.0000		-999.0000				3.5000	X		-999.0000				4	
		1.5000		2.0000				7.0000			6.8000				5	
		-999.0000		-999.0000						5.5000	WO				6	
			-999.0000	0.2000				-999.0000			-999.0000				7	
	-999.0000		-999.0000			-999.0000				1.0000					8	
	2.0000					PINECREST 7.5 QUAD		-999.0000			-999.0000				9	
	-999.0000		-999.0000	-999.0000		-999.0000		-999.0000			-999.0000				10	
	-999.0000		-999.0000	-999.0000		-999.0000				-999.0000					11	
	-999.0000		-999.0000			-999.0000				-999.0000					12	
	-999.0000		-999.0000	-999.0000											13	
						SECCHI VISIBLE ON BOTTOM									14	
			1518	12		11OCT85	21:10				0006				15	
	WO		WO			4.100	LEOPOLD LAKE					CA			16	
	36.26	2695.9439		NI/O		38.1775	119.8044	4 A 1							17	
						WALKER LAKE									18	
						15' PINECREST									19	
						38-10'39"N 119-48'16"W 4A1	06109	5			EMIGRANT WILDERNESS				20	
						STANISLAUS NF									21	
						BRIDGEPORT						0/1			22	
						EMSI		11OCT85	12OCT85	15				T	23	
						RG		0.3640		2.0590				6.2500	24	
								-999.0000		0.2000				-999.0000	0.0000	25
						EL									26	
														0.0670	27	
						8.8400	20.0000	-999.0000	B2D2		B2D2			D2	28	
						D2	D2		24.2000		28.5300	25.5594		13.7928	4.3391	29
						11.5800		9.0320		0.0020				3.4980	3.8660	30
						1.5320	3.2220	9.4400		7.1830	0.4000			2.1620	0.8100	31
							0.1810				0.0470					32
						0.1260				0.2170	D2			4.0000		33
										18.0000				4.5000		34
										1240	D2NO			0.3450		35
						0.0950	B2D2NO				1.0980			0.0076		36
										1.4900	D2NO			0.0390		37
										6.4200				6.1200		38
						6.0900					34.5000	B0		16.4000		39
										3.8000				0.4510		40
										0.4020				2.2000		41
						32.4000					3.3823	SIERRA W		1.2192	0.3121	42
						/REG		1885.0000		31.9780	DRAINAGE	3	1.1789	3.5000	MIXED	43
						CT/5C;					DUPLICATE SCHEDULED, BUT NOT TAKEN					44
																45
																46

Table 14. (continued)

G 4A1-005 0380788			1194397							1
16OCT85 8:30 T85	-999.0000		-999.0000		-999.0000		-999.0000			2
-999.0000		-999.0000		SNOW & ICE			1.5000			3
10.0000			-999.0000		1.5000 X		-999.0000			4
1.5000 <			-999.0000		7.0000		-999.0000			5
-999.0000			-999.0000		5.5000	WO				6
Y -999.0000			-999.0000		-999.0000		-999.0000			7
-999.0000			-999.0000		-999.0000		0.0000			8
0.0000			USFS AIR PHOTOS; MAPS		-999.0000		-999.0000			9
-999.0000			-999.0000		-999.0000		-999.0000		-999.0000	10
-999.0000			-999.0000		-999.0000		-999.0000		-999.0000	11
-999.0000			-999.0000		-999.0000		-999.0000		-999.0000	12
-999.0000			-999.0000		-999.0000		-999.0000		-999.0000	13
SECCHI ON BOTTOM-DEPTH ESTIMATED						DUPLICATE	PH 5.5			14
		1522	07		16OCT8521:45		0001			15
WO	WO			2.000	(NO NAME)			CA		16
31.08	2549.5578	NI/NO		38.1314		119.7328	4 A 1			17
WALKER LAKE					15' TOWER PEAK					18
38-07' 53"N		119-43'58"W	4A1	06109	5	EMIGRANT WILDERNESS				19
STANISLAUS NF										20
BRIDGEPORT							0/0			21
EMSI					16OCT85	17OCT85	15			22
DG	0.5690				-999.0000		5.7600			23
	Q	-999.0000			0.3000		4.7000	0.0000		24
EL										25
							0.0140			26
15.5400	20.0000	-999.0000		D2		D2	D2			27
	B5D2	29.6100	34.7000		32.3545	21.6334	5.0911			28
11.9000 D2		12.8740	0.0010	D2		7.0530	5.5940			29
1.1940	3.7080	10.1790	9.0980	0.3630		0.8320	1.1500			30
D2		0.2580			0.0680					31
0.1450			0.2340				7.0000			32
B5		38.0000				12.6000				33
	0.2500				0.4370					34
0.0740				1.2990			0.0069			35
			2.4100	B5		0.0150				36
	6.2300	D2			5.8400	D2				37
5.8200	D2			53.0000	B0		14.1000			38
B0			3.9000				0.3680			39
	0.6460	B0			3.0000					40
55.9000				4.3345	SIERRA W	1.2192	-999.0000			41
/REG	1885.0000	31.9780	SEEPAGE	1	1.1719	1.5000	MIXED			42
SAMPLE TAKEN FROM ROCK OUTCROP; VAN DORN HAND HELD, HAND TRIGGERED; ENTIRE										43
SAMP TAKEN @ <.7SM; SHALLOW AREAS WERE FROZEN										44
										45
										46

Table 15. Card-image listing (first five lakes), data set 4,
U.S. EPA Western Lake Survey-Phase I

H 4A1-01 0383182	1194657	03OCT85	13:28	8250.000	2.7000	15.0000	1
	1.2000	1.0000	1.5000	-999.0000	9.9000	-999.0000	2
20.0000		-999.0000	8.7000		-999.0000	-999.0000	3
-999.0000	-999.0000	-999.0000	-999.0000	-999.0000	1512	06	4
		1.7000	NOBLE LAKE			CA	5
10.36	27.02.0433	NI/NO	38.5278	119.7764	4 A	1	6
WALKER LAKE		7.5'	EBBETTS PASS				7
38-31' 40"N	119-46'35"W	4A1	06003	4 ZZZ	NOT IN USFS WILDERNESS	ZZZ	8
TOIYABE NF		0/1	EMSI				9
	RH	3.3770		8.5100			10
2.5000	35.0000	0.0210	6.0900	20.0000	-999.0000	D3W0	11
D3W0	D3		D3	267.8200	337.6300		12
336.9278	64.0323	69.8070	259.8460	D3	118.4130	0.3120	13
D3	4.0060	115.9870	0.8230	33.6250	68.9040	0.9580	14
1.8790	0.6100	0.0900	D3	2.3730		1.4100	15
	1.3150		1.5840		21.0000		16
	401.0000		2.2000		0.1420		17
	0.0460	WO	0.0510		9.2180		18
	0.0357		6.5400		0.0110		19
	7.5100		7.0600	D3	7.0300		20
D3	55.8000		317.5000		33.8000		21
	3.5700		3.8000		72.3000		22
	43.9000		31.3171	SIERRA E	1.0160	0.3476	23
/REG			1.2606	1.1000	1885.0000		24
31.9780	DRAINAGE MIXED	3	SMITH VALLEY				25
			15				26

Table 15. (continued)

G 4A1-O3		16OCT85		7:30	-999.000		15.2000	0.0000	1
	4.3000	4.0000		1.5000	13.7000		5.0000	5.0000	2
	-999.0000		-999.0000		6.2000	WO		-999.0000	0.0000
	-999.0000	-999.0000	-999.0000	-999.0000	-999.0000	1522	05	0004	4
			4.100	LOST LAKE				CA	5
	93.24	2964.3184	NI/O	38.2303	119.6475	4 A 1			6
	WALKER LAKE		15'	TOWER PEAK					7
	38-13'49"N	119-38'51"W	4A1	06109	5	EMIGRANT WILDERNESS			8
	STANISLAUSNF		0/1	EMSI					9
		RG	1.8885	VO			7.4000	VO	10
	0.8000	0.0000	0.2890	22.7400		40.0000	-999.0000	D2VOZO	11
D2V0	D2V0Z0	VO			B5D2VO	151.7700	168.2100		12
	168.1472	6.2506	16.4321		142.1610	D2V0	128.3430	0.2680	13
	D2V0	1.4110		17.6860	0.0400	1.7390	20.3800	7.4950	14
	0.4000	0.0000		0.0600	D2V0	2.5720	VO	0.2150	15
	VO		0.0680	VO		0.4685	VO	0.0000	16
	B5VOZO		16.0000	VO		1.5000	VO	0.0500	17
	VO		0.3600	VO		0.0025	VO	0.3130	18
	VO		0.0076	VO		0.6350	B5V0	0.0000	19
	VOZO		7.3500	D2V0		7.2400	D2V0	7.2250	20
	D2V0		27.0000	B0V0		164.20000	B0V0	17.1000	21
	V0		1.9790	V0		1.9455	B0V0	7.5000	22
	V0		16.5500	V0		16.8163	SIERRA W	1.0160	0.3052
/REG		V0		V0		1.1083	4.1500	1885.0000	24
	31.9780	DRAINAGE	MIXED	3	BRIDGEPORT				25
					15				26

Table 15. (continued)

G 4A1-004		11OCT85	11:30	-999.000	3.5000	8.0000	1	
	3.5000	-999.0000	1.5000	2.0000	7.0000	6.8000	2	
-999.0000		-999.0000	5.5000	WO	-999.0000	0.2000	3	
-999.0000	-999.0000	-999.0000	-999.0000	-999.0000	1518	12 0006	4	
		4.100	LEOPOLD LAKE			CA	5	
36.26	2695.9439	NI/O	38.1775	119.8044	4 A	1	6	
WALKER LAKE			15'	PINECREST			7	
38-10' 39"N	119-48' 16"W	4A1	06109	5	EMIGRANT WILDERNESS		8	
STANISLAU	NF		0/1	EMSI			9	
	RG		0.3640		6.2500		10	
0.2000	0.0000	0.0670	8.8400	20.0000	-999.0000	B2D2	11	
B2D2	D2		D2	D2	24.2000	28.5300	12	
25.5594	13.7928		4.3391	11.5800	9.0320	0.0020	13	
		3.4980	3.8660	1.5320	3.2220	9.4400	7.1830	14
0.4000	2.1620		0.8100		0.1810		0.0470	15
	0.1260			0.2170	D2	4.0000		16
	18.0000			4.5000		0.1240		17
D3N0	0.3450			0.0950	B2D2N0	1.0980		18
	0.0076			1.4900	D2N0	0.0390		19
	6.4200			6.1200		6.0900		20
	34.5000	B0		16.4000		3.8000		21
	0.4510			0.4020		2.2000		22
	32.4000			3.3823	SIERRA W	1.2192	0.3121	23
/REG				1.1793	3.5000	1885.0000		24
31.9780	DRAINAGE	MIXED	3	BRIDGEPORT				25
			15					26

Table 15. (continued)

G 4A1-005			16OCT85	8:30	-999.000	1.5000	10.0000		1
	1.5000	-999.0000		1.5000	-999.0000	7.0000	-999.0000		2
-999.0000		-999.0000		5.5000	WO	-999.0000	-999.0000		3
-999.0000	-999.0000	-999.0000		-999.0000	-999.0000	1522	08	0001	4
				2.000	(NO NAME)			CA	5
31.08	2549.5578	NI/NO	38.1314	119.7328	4 A I				6
WALKER LAKE			15'	TOWER PEAK					7
38-07'53"N	119-43'58"W	4A1	06109	5	EMIGRANT WILDERNESS				8
STANISLAUS NF			0/0	EMSI					9
	RG		0.6275	VO		5.8450	VO		10
0.3000	0.0000	0.0140	15.5400	20.0000	-999.0000	D2VO			11
D2VO	D2VO	VO		B5D2VO	29.9200	34.6100			12
32.2449	21.6192	4.6849	11.7940	D2VO	12.7490	0.0010			13
D2VO	7.2220	5.5530	1.2340		3.7200	10.2230	9.3070		14
0.3660	0.8320	1.5300	D2v0		0.2555	VO	0.0675		15
VO	0.1455	VO		0.2350	VO	6.0000			16
B5VO	32.5000	VO		11.0500	VO	0.2560			17
VO	0.4470	VO		0.0765	VO	1.3040			18
VO	0.0069	VO		2.4100	B5VO	0.0150			19
VO	6.2350	D2VO		5.8400	D2VO	5.8150			20
D2VO	53.6500	B0VO		14.5000	B0VO	4.0000			21
VO	0.3785	VO		0.6460	B0V1	2.8500			22
VO	56.8000	VO		4.3629	SIERRA W	1.2192	-999.0000		23
/REG	VO	VO		1.566	1.5000	1885.0000			24
31.9780	SEEPAGE	MIXED 1	BRIDGEPORT						25
SNOW & ICE			15						26

Table 15. (continued)

	H 4A1-006	0380529	1194235	03OCT85	11:19	8290.000	18.600	16.0000	1
	11.7000	11.0000	1.5000	17.1000			11.900	11.6000	2
2.0000		3.0000	6.2400				6.2200	0.3000	3
-999.0000	-999.0000	-999.0000	-999.0000	-999.0000	1512		08	5754	4
			3.600 (NO NAME)					CA	5
33.67	2720.3416	NI/O	38.0867	119.1053	4 A 1				6
	WALKER LAKE		15' TOWER PEAK						7
38-05'12"N	11942'19"W	4A1	06109	5	ZZZ NOT IN USFS WILDERNESS	ZZZ			8
YOSEMITE NP			0/1	EMSI					9
	RH	0.3015	VO		6.3150	VO			10
	0.2500	0.0000	0.3110	9.3500	20.0000	-999.0000	D3VOZO		11
D3VO		D3VOZO	VO		D3VO		19.5600	21.2000	12
	20.5681	5.9851	1.6414	11.7600	D3VO		9.4310	0.0020	13
D3VO		1.9750	2.7970	0.8390		2.2500	6.0900	4.6740	14
	0.3080	0.0000	0.6300	D3VO		0.1890	VO	0.0340	15
VO		0.0880	VO		0.1400	VO		12.0000	16
VO			4.5000	VO		2.0000	VO	0.0700	17
VO		0.2245	VO		0.0520	VO		0.7450	18
	VO		0.0058	VO		0.6400	VO	0.0000	19
V0ZO		6.3100	VO		6.1700	D3VO		6.2000	20
D3VO		26.5500	VO		15.6000	VO		2.6000	21
VO		0.4310	VO		0.3485	VO		0.0000	22
VOZO		21.0500	VO		2.5248	SIERRA W		1.2192	23
/REG		VO	VO		1.0839	11.3500		1885.0000	24
31.9780	DRAINAGE	MIXED	1	BRIDGEPORT					25
				15					26

Table 16. Card-image listing (first five lakes), PC data set,
file WLS-I.REG, U.S. EPA Western Lake Survey-Phase I

4A1-001	NOBLE LAKE							38-31'40"N		119+46'35"W	2702				1.7			10	1
	6.1 DRAINAGE	9.9 MIXED						2.7 1.1		2.5 35	401.0				267.8			337.6	2
	1.26 7.51	8.51 317.5	33.8 31.3	3.57 3.38						6.54 2.2				43.9	118.4			116.0	3
	68.9	33.6 0.6	1.0 259.8	4.0 0.8						1.9 72.3				9.22					CA 4
		21.0 03OCT85	31.978	1885 5															
4A1-003	LOST LAKE							38-13'49"N		119-38'51"W	2964				4.1			93	1 22.7
	DRAINAGE	5.0 MIXED						15.2 4.1		0.8 0				16.0				151.8	168.2 2
	1.11 7.35	7.40 164.2	17.1 16.8	1.98 1.89						0.63 1.5				16.5				128.3	17.7 3
	20.4	1.7 0.0	7.5 142.2	1.4 0.0						0.4 7.5				0.31					CA 4
		0.0 16OCT85	31.978	1885 5															
4A1-004	LEOPOLD LAKE							38-10'39"N		119-48'16"W	2696				4.1			36	1
	8.8 DRAINAGE	7.0 MIXED						3.5 3.5		0.2 0				18.0				24.2	28.5 2
	1.18 6.42	6.25 16.4	3.8	3.4				0.45 0.36		1.49 4.5				32.4				9.0	3.9 3
	9.4	3.2 2.2	7.2	11.6				3.5 1.5		0.4 2.2				1.10					CA 4
		4.0 11OCT85	31.978	1885 5															
4A1-005	(NO NAME)							38-07'53"N		119+43'58"W	2550				2.0			31	1
	15.5 SEEPAGE	7.0 MIXED						1.5 1.5		0.3 0				32.5				29.9	34.6 2
	1.16 6.23	5.84 14.5	4.0	4.4				0.38 0.63		2.41 11.0				56.8				12.7	5.6 3
	10.2	3.7 0.8	9.3	11.8				7.2		1.2 0.4				2.8 1.30					CA 4
		6.0 16OCT85	31.978	1885 5															
4A1-006	(NO NAME)							38-05'12"N		119-42'19"W	2720				3.6			34	1
	9.3 DRAINAGE	11.9 MIXED						18.6 11.3		0.2 0				4.5				19.6	21.2 2
	1.08 6.31	6.31 15.6	2.6 2.5					0.43 0.30		0.64 2.0				21.0				9.4	2.8 3
	6.1	2.2	0.0 4.7	11.8				2.0 0.8		0.3 0.0				0.74					CA 4
		12.0 03OCT85	31.978	1885 5															

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