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Simple formulations relating nutrient loadings and certain morphologic characteristics to trophic state have provided lake managers one means for describing lake problems and predicting the potential impact of management decisions. While the general utility of such models has been demonstrated for natural lakes, the applicability of models for reservoirs has not received adequate evaluation. Evaluation and the possible modification of existing models

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for predicting water quality and eutrophication potential, is the objective of EWQOS Work Unit IE.

This report documents the establishment of a computerized data base containing water quality, hydrologic, and morphometric information for 299 reservoirs operated by the U. S. Army Corps of Engineers (CE). Sources of information included STORET (including the National Eutrophication Survey data), ~~U. S.~~ Department of Agriculture sedimentation survey data sheets, project design memoranda and CE District and Division data files. Supplemental sources included maps, project brouchures, and reports. Programming for data manipulation and analysis is in the PL/I and FORTRAN IV languages. BMDP and SAS programs were employed during preliminary analysis. The data base presently contains over 2.5 million water quality observations taken at 4451 stations located in or around 271 CE reservoirs.

Methods for estimating volume and area variations with elevation, required for volume-averaging of water quality data and for calculating material loadings, have been developed. Preliminary analyses have also been performed to assess the importance of spatial and temporal variability to the computation of representative water quality values.

Appendix A contains data inventories for each project included in the data base.

PREFACE

This report was prepared by Dr. William W. Walker, Jr., Environmental Engineer, Concord, Mass., for the U. S. Army Engineer Waterways Experiment Station (WES) under Contract DACW39-78-0053 dated 7 June 1978. The study forms part of the Environmental and Water Quality Operational Studies (EWQOS) Work Unit IE, Simplified Techniques for Predicting Reservoir Water Quality and Eutrophication Potential. The EWQOS Program is sponsored by the Office, Chief of Engineers, and is assigned to the WES under the purview of the Environmental Laboratory (EL).

The study was under the direct WES supervision of Dr. Robert H. Kennedy and the general supervision of Mr. Donald L. Robey, Chief, Water Quality Modeling Group; Dr. Rex L. Eley, Chief, Ecosystem Research and Simulation Division; Dr. Jerry Mahloch, Program Manager, EWQOS; and Dr. John Harrison, Chief, EL.

The Commanders and Directors of WES during this study were COL John L. Cannon, CE, and COL Nelson P. Conover, CE. The Technical Director was Mr. Fred R. Brown.

This report should be cited as follows:

> Walker, W. W., Jr. 1981. "Empirical Methods for Predicting Eutrophication in Impoundments; Phase I: Data Base Development," Technical Report E-81-9, prepared by William W. Walker, Jr., Environmental Engineer, Concord, Mass., for the U. S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

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CONVERSION FACTORS, U. S. CUSTOMARY TO METRIC (SI)
UNITS OF MEASUREMENT

U. S. customary units of measurement used in this report can be converted to metric (SI) units as follows:

Multiply	By	To Obtain
acres	4046.873	square metres
acre-feet	1233.482	cubic metres
cubic feet per second	0.02831685	cubic metres per second
Fahrenheit degrees	5/9	Celsius degrees or Kelvins*
feet	0.3048	metres
inches	2.54	centimetres
miles (U. S. statute)	1.609344	kilometres
pounds (mass) per cubic foot	16.01846	kilograms per cubic metre
square miles	2.589988	square kilometres
tons (2000 lb, mass)	907.1847	kilograms

* To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use the following formula: $C = (5/9)(F - 32)$. To obtain Kelvin (K) readings, use: $K = (5/9)(F - 32) + 273.15$.

EMPIRICAL METHODS FOR PREDICTING

EUTROPHICATION IN IMPOUNDMENTS

PHASE I: DATA BASE DEVELOPMENT

PART I: INTRODUCTION

1. This report documents the development of a data base describing certain water quality aspects of reservoirs operated by the U. S. Army Corps of Engineers (CE). The data base includes information on project location, morphometry, water quality, hydrology, and sedimentation. As part of the Environmental and Water Quality Operational Sutdies (EWQOS) Program being conducted by the Office, Chief of Engineers, U. S. Army, this work has been conducted to provide groundwork for assessing empirical approaches to describing and predicting reservoir trophic status.

2. One basic strategy employed in assembling this data base has been to utilize existing, centralized sources of information first. These have included nationwide data bases maintained by various federal agencies, as well as a few sources of data tabulated at a regional level. A framework has been designed and implemented for storing and accessing this information, with flexibility for updating and general access, so as to meet the specific objectives of this project. Having utilized centralized data sources to their fullest extent, data gaps have been identified and used to set priorities for locating and incorporating information from relatively diffuse sources, such as specific project design memoranda and other published or unpublished reports dealing with individual projects. This stage-wise data-gathering procedure has been designed with efficiency and cost-effectiveness in mind.

3. Another basic strategy which has been employed in compiling water quality and hydrologic data has been to assemble individual observations in space and time (i.e., "raw data"), rather than average values. This strategy accomplishes the following:

a. It provides for the broadest possible range of future uses of the data base.

b. It eliminates possible variations due to the use of different averaging procedures.

c. It provides a basis for error analysis and assessment of data adequacy in future model testing.

These advantages must be weighed against the major disadvantage of the approach--it involves management of a large amount of information. The water quality file presently contains two million observations taken at 4451 stations located in or around 271* CE projects.

4. Management of these types and quantities of information entails use of a consistent framework. One basic strategy has been to tag each bit of information with district, project, and data source codes. While the validity of the information at its original source cannot be substantiated, use of a systematic approach in building the data base insures that the data are transferred and accessed properly. Keeping track of original data sources provides a means of checking any piece of information at its source and identifying discrepancies among multiple data sources for the same value. The latter provides one indication of data and source reliability. Another validity test involves checking for internal consistency in a given set of values. For example, the morphometric profiles have been tested by comparing reported volumes at any elevation with the integral of reported areas with respect to depth. The third validity test involves distribution of portions of the data base to district offices for verification and editing. This entails their cooperation and assumes that district-level sources of information for specific projects are the most accurate. This approach has been taken for upgrading the morphometric data file with reasonable success.

5. In its current state, the data base is a collection of information in a well-defined framework. It is not a user-oriented system designed for frequent interactive use. Such a system would require

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* A total of 299 projects are included in the data base; no water quality data have been located for 28.

extensive software development geared to a specific computer system and to the intended uses of the information in various areas of reservoir management. The scope of this project has been limited to compiling the information, organizing it, and extracting portions that are directly relevant to analysis of eutrophication problems in reservoirs. With additional software development and systems programming, the data base could be made accessible for more generalized purposes.

6. The complete data base consists of a collection of computer files, reports, data forms, and maps. As discussed above, each piece of information is referenced by CE district, project, and data source codes. Part II of this report describes the facilities, methods, and agency contacts used in this work. Part III describes the general structure of the data base. Parts IV through XI document the sources and approaches used in compiling each element and present data inventories. Parts XII-XIV summarize results of specific analyses which lay the groundwork for use of the data base in Phase II of this project. These analyses cover the following topics: (XII) numerical characterization of reservoir hypsographic curves; (XIII) assessment of the variability of trophic state indicators in reservoirs; and (XIV) testing of methods for estimation of nutrient budgets. Conclusions and Recommendations are given in Part XV and XVI, respectively. Appendix A contains data inventories by project and district.

PART II: FACILITIES AND METHODS

7. Compilation and manipulation of the various data files documented in this report have been done on an IBM 370-168 computer maintained by the Information Processing Center of the Massachusetts Institute of Technology (MIT). This facility has been used in a batch processing mode (OS/VS1) and in an interactive mode through IBM's Conversational Monitoring System (CMS). Three media have been used for data storage where appropriate: (1) 9-track tapes (6250 bytes per inch); (2) 3350 disc packs (OS and CMS); and (3) cards. Copies of the current versions of all files have been transferred to tapes for secure storage and future access.

8. While most of the information used to assemble the data base has been read from tapes supplied by various agencies, some files (in particular, the project lists, morphometry, and sedimentation files) have been assembled from tabulated data. In these cases, cards have been used for data entry. Keypunching has been done and verified using contract services offered by MIT.

9. Programming for data manipulation and analysis is in the PL/I and FORTRAN IV languages. The Biomedical Computer Program package (BMDP)[1] and SAS[2] have also been used in preliminary data analyses. Plots have been produced with a Calcomp line plotter.

10. Access to the Environmental Protection Agency (EPA) STORET system[3] has been acquired through the cooperation of the Water Quality Laboratory of the New England Division of the Corps of Engineers. The staff of the Systems Analysis Branch of the EPA Region I Office in Boston has been helpful in submitting STORET retrievals. The identification of water quality and quantity monitoring stations has been done partially using the services of the National Water Data Exchange of the U. S. Geological Survey in Reston, Virginia. The Corvallis Environmental Research Laboratory of the U. S. Environmental Protection Agency has provided reports and data files from the National Eutrophication Survey (NES)[4]. Sedimentation survey sheets have been obtained through the

Sedimentation Laboratory of the U. S. Department of Agriculture and the South Technical Service Center of the U. S. Soil Conservation Service in Fort Worth, Texas.

11. Staff members of the Environmental Laboratory of the U. S. Army Engineer Waterways Experiment Station (WES) have provided assistance in extracting and coding morphometric and drainage area data from project design memoranda and in coding water quality data complied outside of STORET. The Ohio River Division (ORD) of the Corps of Engineers provided tapes containing water quality data gathered by district monitoring programs in that division.

PART III: DATA BASE STRUCTURE

12. Figure 1 depicts the organization of the data base into eight major file groups:

CODES - Data Base Codes
LISTS - Project Lists
WATS - Watershed Characteristics
RESER - Reservoir Characteristics
HYDRO - Hydrology Data
WQ - Water Quality Data
SED - Sedimentation Data
NES - EPA National Eutrophication Survey Data

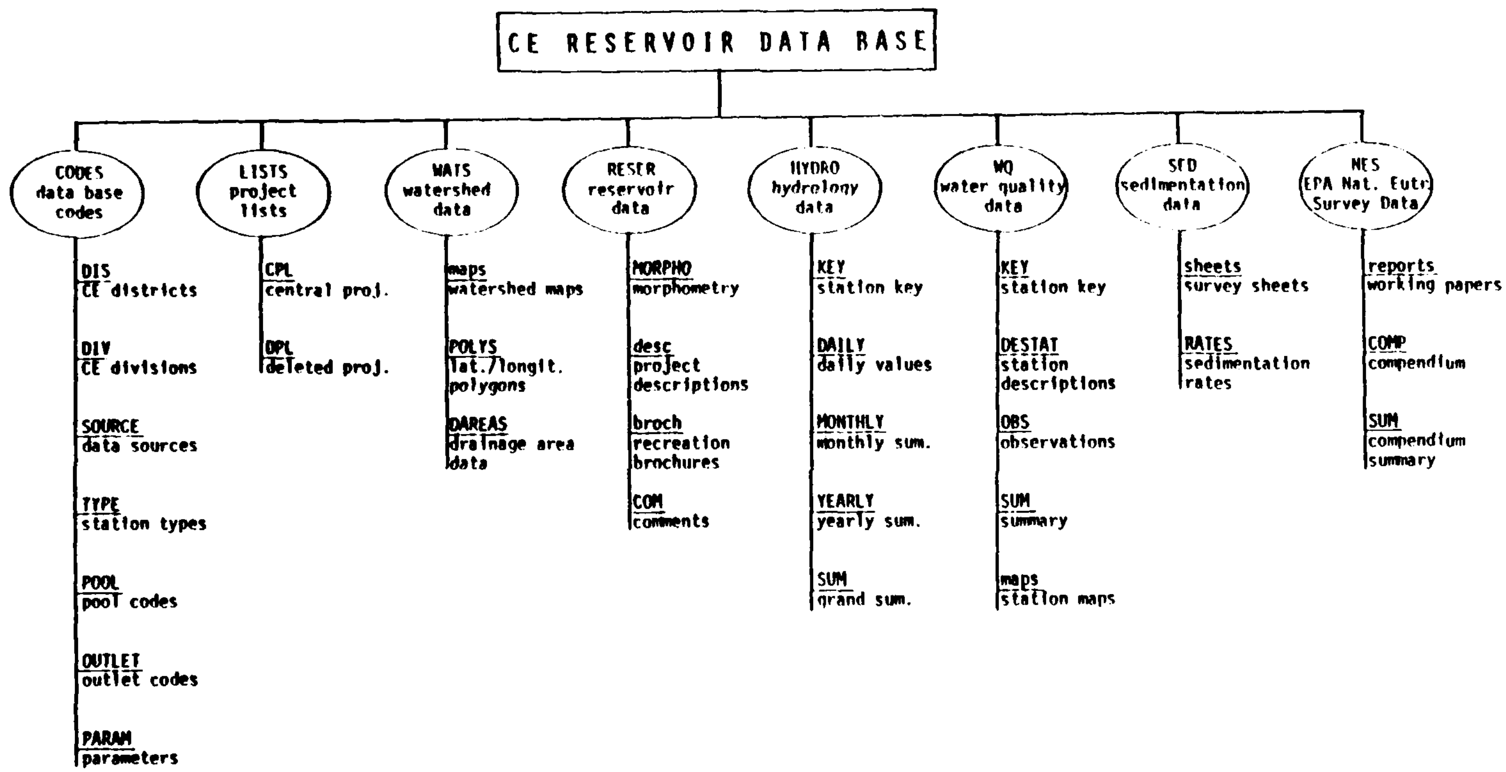
Each group contains a number of computer files, data forms, and/or maps. File names are in two parts. The first refers to the major file group and the second, to the specific file within that group. For example, the water quality station key is given the name WQ.KEY. A lowercase second name indicates that the element is a map or data form (not a computer file).

13. U. S. customary units have been used most extensively in the files. This has facilitated the transfer and verification of information, since most of the original sources of morphometric, drainage area, hydrologic, and sedimentation data were also in U. S. customary units. One exception to this convention is the EPA National Eutrophication Survey Compendium[4] file, which was supplied by the EPA in metric units.

14. The development, structure, and contents of each file group are discussed in the following sections. The sources and approaches used in compiling the information are described. Each file is characterized with respect to format and content. Since most files are too large for listing, data holdings are summarized in an inventory format, with categories defined by file, variable, and CE division. Data inventories by project and district are included in Appendix A. Record formats for the files described in this report are defined as PL/I data structures.

Figure 1

Elements and Structure of the CE Reservoir Data Base



PART IV: CODES - DATA BASE CODES

15. CODES consists of a group of files which define referencing systems used in various portions of the data base. These include the following:

CODES.DIS	CE District Codes
CODES.DIV	CE Division Codes
CODES.SOURCE	Data Source Codes
CODES.TYPE	Station Type Codes
CODES.POOL	Pool Codes
CODES.OUTLET	Outlet Codes
CODES.PARAM	Parameter Codes

Listings of these files are given in Tables 1 through 5.

16. District and division codes (Table 1) provide a numerical indexing system for each of 36 districts and 10 divisions, respectively. Districts are grouped within divisions. The New England Division is unique in that it is not comprised of districts. In order to permit referencing of all projects at the district level, district number one has been defined to represent the New England Division.

17. *Data source codes (Table 2) provide* a referencing system for nine data sources which are used frequently in the data base. Identifying each data entry by source provides a basis for validation and sorting out discrepancies among multiple data sources for a given project and characteristic.

18. A total of nine station type codes have been defined for use in the water quality and hydrology files (Table 3). These provide a frame of reference for locating monitoring stations within a given project. Broadly, these permit distinction among stations located on upstream tributaries, within reservoir pools, and in or below reservoir discharge streams. Within-pool stations are further classified as upper-pool, mid-pool, or near-dam. Mid-pool is used as a default for lake stations. The remaining two are used in cases where coordinates, maps, and/or station location descriptions provide an adequate basis for more refined classification. Secondary tributary codes (upstream and downstream from impoundments) have been used only for some EPA

National Eutrophication Survey stations to aid in hydrologic budget computations.

19. Pool and outlet codes (Table 4) are used in the morphometric file. These provide systems for referencing various elevations to pool allocations for specific uses, ranges of operating levels, and locations and types of principal outlets. The systems were initially designed at WES. Additional codes have been added as needed during subsequent morphometric data compilation.

20. The parameter codes file (Table 5)* is used to reference hydrologic and water quality data. The file contains 94 members, each identified by a water quality parameter code, STORET code[3], measurement type, and units. The 5-digit STORET code is used in retrieving water quality and hydrologic data from the STORET system. It is also used to identify measurements in the hydrology files. In addition to the 89 basic water quality parameter codes included in the file, there are 11 redundant parameter codes, which have been used in retrieving water quality data from STORET. Redundant codes result from multiple means of expressing a given type of observation (e.g., temperature in degrees C or degrees F or total phosphorus as P or as PO_4). Redundancies have been eliminated in final data storage by applying appropriate conversion factors in each case.

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* Table 5 contains U. S. customary units of measurement. A table of factors for converting U. S. customary units of measurement to metric (SI) units is presented on page 8.

Table 1

District and Division Codes

Code	District	Div
01	New England	01
02	New York	02
03	Philadelphia	02
04	Baltimore	02
05	Norfolk	02
06	Wilmington	03
07	Charleston	03
08	Savannah	03
09	Jacksonville	03
10	Mobile	03
11	Buffalo	05
12	Detroit	05
13	Chicago	05
14	Rock Island	05
15	St. Paul	05
16	Pittsburgh	04
17	Huntington	04
18	Louisville	04
19	Nashville	04
20	St. Louis	06
21	Memphis	06
22	Vicksburg	06
23	New Orleans	06
24	Little Rock	07
25	Tulsa	07
26	Fort Worth	07
27	Galveston	07
28	Albuquerque	07
29	Kansas City	08
30	Omaha	08
31	Walla Walla	09
32	Seattle	09
33	Portland	09
34	Sacramento	10
35	San Francisco	10
36	Los Angeles	10

Code	Division
01	New England
02	North Atlantic
03	South Atlantic
04	Ohio River
05	North Central
06	Lower Mississippi Valley
07	South West
08	Missouri River
09	North Pacific
10	South Pacific

Table 2

Data Source Codes

Code	Data Source
00	Leidy and Jenkins
01	EPA National Eutrophication Survey
02	District or Division
03	Sedimentation Survey Sheets
04	Design Memoranda
05	USGS State Water Resources Data Reports
06	USGS/WATSTORE File
07	EPA STORET
08	INFONET - Ohio River Division

Table 3

Station Type Codes

Code	Station Type
01	Tributary
02	Pool
03	Discharge
04	Pool (nr. dam)
05	Pool (headwaters)
06	Unused
07	Point source
08	Sec. trib. (downstr.)
09	Sec. trib. (upstr.)

Table 4

Pool and Outlet Codes

Code	Pool Type
01	Flood control
02	Conservation
03	Water quality
04	Minimum
05	Summer
06	Winter
07	Water supply
08	Power
09	Recreation
10	Dead storage
11	Multiple use
12	Stream bed
13	Top of dam
14	Period of record minimum
15	Period of record maximum
16	Normal
17	Maximum power
18	Minimum power
19	Sediment
20	Maximum regulated

Code	Outlet Type
01	Intake
02	Spillway crest
03	Surface outlet
04	Bottom of gated spillway

Table 5

Parameter Codes

STORET	HYDRO	WQ Component	Units
00027		01 Code for agency collecting sample	
00028		02 Code for agency analyzing sample	
72025		03 Depth of pond or reservoir	feet
00068		04 Maximum sample depth	feet
72020	72020	05 Elevation	ft > msl
00062		06 Elevation, reservoir surface	ft
72030		07 Elevation of reservoir pool	ft > msl
00054	00054	08 Reservoir storage	acre-ft
72033		09 Flow, average daily, spillway	cfs
72034		10 Flow, instantaneous, spillway	cfs
00061		11 Stream flow, instantaneous	cfs
00060	00060	12 Stream flow, daily	cfs
00065	00065	13 Stream stage	feet
00010	00010	14 Temp	deg-C
00011		*14 Temp	deg-F
00300	00300	15 02 Dissolved	mg/l
00299		16 02 Dissolved, electrode	mg/l
00090		17 Oxidation reduction potential	mv
00094		18 Specific conductivity, field	umhos/cm
00095	00095	19 Specific conductivity, lab	umhos/cm
00400	00400	20 pH (field)	su
00403		21 pH (lab)	su
00410		22 Alkalinity, total as CaCo3	mg/l
00435		23 Acidity, total as CaCo3	mg/l
00900		24 Hardness, total as CaCo3	mg/l
00940	00940	25 Chloride	mg/l
00945	00945	26 Sulfate total	mg/l
01045		27 Iron, total as Fe	ug/l
71885		*27 Iron total as Fe	mmg/l
01046		28 Iron, dissolved	ug/l
01055		29 Manganese, total as Mn	ug/l
71883		*29 Manganese total as Mn	mmg/l
01056		30 Manganese, dissolved	ug/l

(Continued)

* Redundant water quality parameter code.

(Sheet 1 of 4)

Table 5 (Continued)

STORET	HYDRO	WQ Component	Units
00916		31 Calcium, total	mg/l
00915		32 Calcium, dissolved	mg/l
00927		33 Magnesium, total	mg/l
00925		34 Magnesium, dissolved	mg/l
00929		35 Sodium, total	mg/l
00930		36 Sodium, dissolved	mg/l
00937		37 Potassium, total	mg/l
00935		38 Potassium, dissolved	mg/l
00070	00070	39 Turbidity	jtu
00074		40 Turbidity, transmissometer, percent transmission	percent
00076		41 Turbidity, Hach turbidometer	ftu
00078		42 Transparency, Secchi	m
00077		*42 Transparency, Secchi	in
00031		43 Light, percent remaining at given depth	percent
00034		44 Depth at which 1 percent of surface light rem	ft
00080		45 Color, true	pt-co units
00081		46 Color, apparent	pt-co units
00955		47 Silica, dissolved	mg/l
00956		48 Silica, total	mg/l
00310		49 BOD5	mg/l
00405		50 Carbon dioxide	mg/l
00680		51 Carbon total organic	mg/l
00681		52 Carbon dissolved organic	mg/l
00685		53 Carbon total inorganic	mg/l
00691		54 Carbon, dissolved inorganic	mg/l
00665		55 Phosphorus, total as P	mg/l
00650		*55 Phosphate, total as PO4	mg/l
71886		*55 Phosphorus total as PO4	mg/l
00666		56 Phosphorus, dissolved as P	mg/l
00669		57 Phosphorus total hydrolyzable as P	mg/l
00678		58 Phosphorus, hydrol + ortho, total, autoanal	mg/l
00671		59 Phosphorus, dissolved ortho as P	mg/l
00660		*59 Phosphate, ortho as PO4	mg/l
70507		60 Phosphorus, inorganic total ortho as P	mg/l

(Continued)

* Redundant water quality parameter code.

(Sheet 2 of 4)

Table 5 (Continued)

STORET	HYDRO	WQ Component	Units
00600		61 Total N	mg/l
71887		*61 Nitrogen total as NO3	mg/l
00605		62 Organic N	mg/l
00610		63 Ammonia N	mg/l
71845		*63 Ammonia, total as NH4	mg/l
00625		64 Total Kjeldahl N	mg/l
00630		65 NO2 + NO3-N	mg/l
00615		66 NO2-N	mg/l
71855		*66 Nitrite total as NO2	mg/l
00613		67 Nitrite nitrogen dissolved as N	mg/l
71856		*67 Nitrite dissolved as NO2	mg/l
00620		68 NO3-N	mg/l
71850		*68 Nitrate N as NO3	mg/l
00618		69 Nitrate nitrogen dissolved as N	mg/l
71851		*69 Nitrate N dissolved as NO3	mg/l
00500		70 Residue, total	mg/l
00505		71 Residue, total volatile	mg/l
00515		72 Residue, total filtrable dried at 105 deg C	mg/l
00530		73 Residue total non-filtrable dried at 105 deg C	mg/l
80154	80154	74 Suspended sediment conc - evap at 110 deg C	mg/l
70300	70300	75 Residue total filtrable at 180 deg C	mg/l
32209		76 Chlorophyll-A fluorometric, corrected	ug/l
32217		77 Chlorophyll-A fluorometric, uncorrected	ug/l
32211		78 Chlorophyll-A trichromatic, corrected	ug/l
32210		79 Chlorophyll-A trichromatic, uncorrected	ug/l
32230		80 Chlorophyll-A	mg/l
60050		81 Algae, total	cells/ml
00570		82 Biomass, plankton	ml/l
85209		83 Algal growth potential	mg/l
60990		84 Zooplankton, other	no/liter
31616		85 Fecal coliform, memb filter, m-fc broth 44.5 deg	no/100 ml
31673		86 Fecal streptococci, memb filter, kf agar, 35 deg	no/100 ml
31679		87 Fecal strep mf m-ent	no/100 ml

(Continued)

* Redundant water quality parameter code.

(Sheet 3 of 4)

Table 5 (Concluded)

STORET	HYDRO	WQ Component	Units
50051		88 Flow rate instantaneous	mgd
50053		89 Conduit flow - monthly	mgd
70301	70301	Dissolved solids - sum of constituents	mg/l
80155	80155	Sediment discharge	tons/day
70291	70291	Dissolved sulfate discharge	tons/day
70290	70290	Dissolved chloride discharge	tons/day
70302	70302	Dissolved solids discharge	tons/day

(Sheet 4 of 4)

PART V: LISTS - PROJECT LISTS

21. LISTS, the second major file group, defines the referencing system used for CE projects in the data base. It consists of the following files:

LISTS.CPL - Central Project List
LISTS.DPL - Deleted Project List

The development and contents of these files are discussed below.

22. The data base is built around a central list of 299 reservoirs which have been identified from various sources and placed in the LISTS.CPL file. The regional distribution of these projects is shown in Figure 2. Breakdowns by CE district and division are given in Table 6. The following have been used as criteria for inclusion:

_a_. projects currently operated by the Corps of Engineers.

_b_. projects having seasonal or permanent pools.

The second criterion has been applied to eliminate locks and small run-of-the-river impoundments with short hydraulic residence times and little opportunity for inducing water quality changes, at least with respect to eutrophication.

23. The two primary sources of information used to develop an initial project list include a tabulation of CE projects with surface areas greater than 500 acres compiled by Leidy and Jenkins[5] and a map of CE water resource projects[6]. Based upon CE Water Resource Development Reports[7] and information supplied by various CE district offices, the initial list has been screened to eliminate projects which are incomplete, not currently under CE control, and/or do not have appreciable pools. A separate list of impoundments which have been eliminated has been maintained for future reference (LISTS.DPL). Because it has not been feasible within the scope of this project to compile and incorporate data from detailed, project-specific reports, the current project list may contain some impoundments which do not conform to the above criteria. Similarly, some projects may have been missed. Inclusion and/or screening

of additional projects would be possible with more time devoted to compiling and examining detailed reports.

24. The record format used in the LISTS.CPL and LISTS.DPL files is given in Table 7. Files are listed in Tables 8 and 9, respectively. Each project has been assigned a unique, three-digit identification code to facilitate referencing in the data base. The location of each project is identified by CE division, district, state, county, latitude, longitude, and hydrologic unit. Hydrologic unit maps compiled by the U. S. Geological Survey (USGS)[8] have been used to provide basic location data. Reservoirs lying on the boundaries of states, counties, and/or hydrologic units have been referenced based upon dam location. State and county codes refer to the standard federal coding system (FIPS) documented in the EPA's STORET[3] user's manual. The latitudes and longitudes of projects in which surface elevation monitoring stations have been located refer to those stations, which occur most frequently at dam sites. In other situations, coordinates have been approximated from hydrologic unit maps and refer roughly to dam locations.

25. As shown in Table 1, the project list is cross-referenced to three independent data bases:

a. the EPA National Eutrophication Survey Working Papers[9].

b. the U. S. Department of Agriculture (USDA) compilation of reservoir sedimentation data[10].

c. the CE project file compiled by Leidy and Jenkins[5].

The cross-referencing system facilitates access to specific information on projects contained in these sources.

Figure 2

Regional Distribution of Reservoirs in Data Base

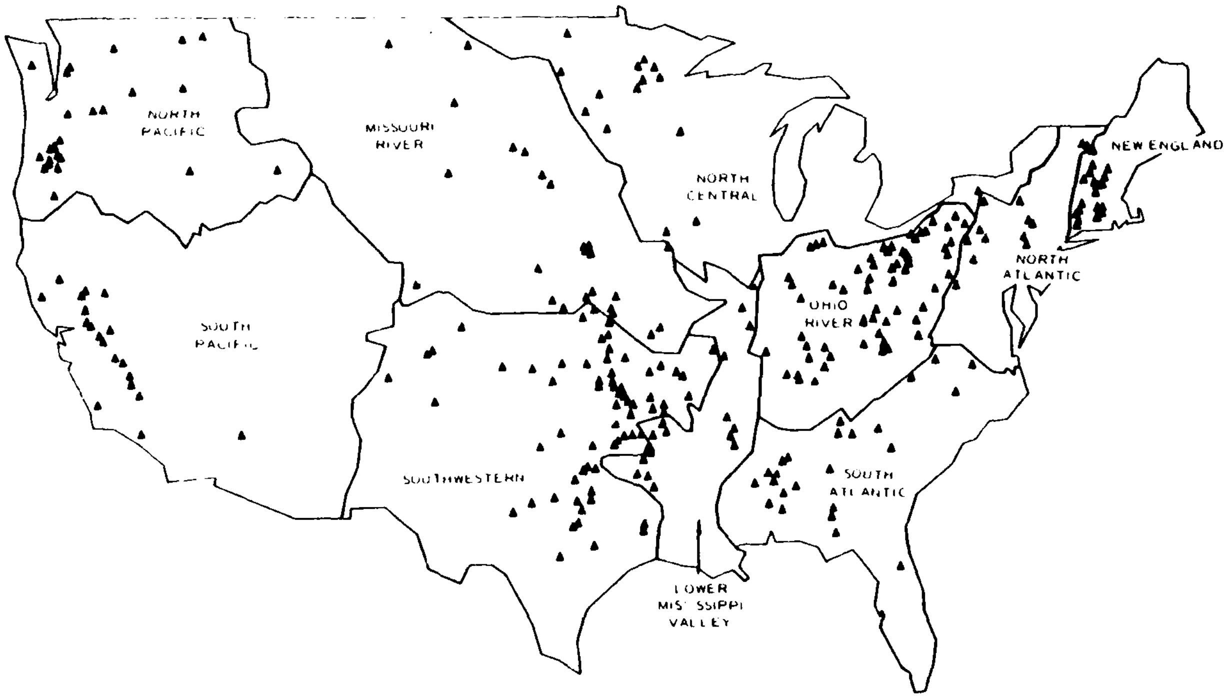

Table 6

Breakdown of Projects in the Central Project List by District and Division

Code	District	Number of Projects	Code	Division	Total Number of Projects
01	New England*	22	01	New England	22
02	New York	3			
03	Philadelphia	3			
04	Baltimore	9			
05	Norfolk	0	02	North Atlantic	15
06	Wilmington	3			
07	Charleston	1			
08	Savannah	2			
09	Jacksonville	1			
10	Mobile	17	03	South Atlantic	24
11	Buffalo	1			
12	Detroit	0			
13	Chicago	0			
14	Rock Island	2			
15	St. Paul	13	05	North Central	16
16	Pittsburg	14			
17	Huntington	28			
18	Louisville	15			
19	Nashville	7	04	Ohio River	64
20	St. Louis	3			
21	Memphis	1			
22	Vicksburg	7			
23	New Orleans	4	06	Lower Mississippi Valley	15
24	Little Rock	10			
25	Tulsa	35			
26	Fort Worth	17			
27	Galveston	0			
28	Albuquerque	4	07	South West	66
29	Kansas City	11			
30	Omaha	20	08	Missouri River	31
31	Walla Walla	4			
32	Seattle	6			
33	Portland	17	09	North Pacific	27
34	Sacramento	15			
35	San Francisco	2			
36	Los Angeles	2	10	South Pacific	19
	Total	299			299

Table 7

Record Format of the LISTS.CPL and LISTS.DPL Files

```
                                                  /*********************************************/
DECLARE 1 PL_RECORD                               /* LISTS.CPL FILE STRUCTURE (LENGTH = 100)   */
                                                  /*********************************************/
         2 RES              PIC'BZZZB'            /* RESERVOIR NUMBER                          */
         2 RNAME            CHAR(28)              /* RESERVOIR NAME                            */
         2 STATE            PIC'ZZB'              /* FIPS STATE CODE                           */
         2 DIV              PIC'ZZB'              /* CE DIVISION NUMBER                        */
         2 DIS              PIC'ZZB'              /* CE DISTRICT NUMBER                        */
         2 NESWP            PIC'ZZZB'             /* EPA-NES WORKING PAPER NUMBER              */
         2 NESTOR           CHAR(2)               /* EPA-NES STORET REF. NUMBER                */
         2 LJ               PIC'BZB'              /* LEIDY&JENKINS INDICATOR                   */
         2 SEDSURV          PIC'ZZZZZ'            /* SEDIMENTATION SURV. REF. NO.              */
         2 LAT              PIC'ZZV999'           /* LATITUDE (DEG)                            */
         2 LONG             PIC'ZZZV999B'         /* LONGITUDE (DEG)                           */
         2 HYDU             PIC'99999999B'        /* HYDROLOGIC UNIT CODE                      */
         2 COUNTY           PIC'ZZZB'             /* FIPS COUNTY CODE                          */
         2 TRIB             CHAR(16)              /* MAJOR TRIBUTARY NAME                      */
         2 UNUSED           CHAR(3)               /* BLANK                                     */
```

Table 8

Listing of the LISTS.CPL File

DIVISION	DISTRICT	RES	NAME	ST	STCTY	LAT	LONG	HYD UNIT	NES	SCS	L&J	MAJOR TRIB
1 NED	1 NEW ENGLAND	142	BUFFUMVILLE	MA	25027	42.116	71.908	01100001				LITTLE
1 NED	1 NEW ENGLAND	144	EAST BRIMFIELD	MA	25013	42.108	72.126	01100001				QUINEBAUG
1 NED	1 NEW ENGLAND	147	LITTLEVILLE	MA	25013	42.274	72.884	01080206				WESTFIELD
1 NED	1 NEW ENGLAND	148	TULLY	MA	25015	42.642	72.224	01080202				TULLY
1 NED	1 NEW ENGLAND	150	WESTVILLE	MA	25027	42.081	72.057	01100001				QUINEBAUG
1 NED	1 NEW ENGLAND	151	BLACK ROCK	CT	9005	41.657	73.103	01100005				BRANCH
1 NED	1 NEW ENGLAND	152	COLEBROOK RIVER	CT	9005	42.006	73.036	01080207			+	FARMINGTON/W BR
1 NED	1 NEW ENGLAND	155	HANCOCK BROOK	CT	9009	41.622	73.037	01100005				HANCOCK
1 NED	1 NEW ENGLAND	156	HOP BROOK	CT	9009	41.513	73.067	01100005				HOP
1 NED	1 NEW ENGLAND	158	MANSFIELD HOLLOW	CT	9013	41.756	72.182	01100002				NATCHAUG
1 NED	1 NEW ENGLAND	159	NORTHFIELD BROOK	CT	9005	41.680	73.090	01100005				NORTHFIELD
1 NED	1 NEW ENGLAND	162	WEST THOMPSON	CT	9015	41.944	71.899	01100001				QUINEBAUG
1 NED	1 NEW ENGLAND	164	EDWARD MCDOWELL	NH	33005	42.893	71.987	01070003				NUBANUSIT
1 NED	1 NEW ENGLAND	165	EVERETT	NH	33011	43.092	71.660	01070002				PISCATAQUOG
1 NED	1 NEW ENGLAND	166	FRANKLIN FALLS	NH	33013	43.469	71.661	01070001				PEMIGEWASSET
1 NED	1 NEW ENGLAND	167	HOPKINTON	NH	33013	43.189	71.748	01070003				CONTOOCOOK
1 NED	1 NEW ENGLAND	168	OTTER BROOK	NH	33005	42.945	72.237	01080201				OTTER
1 NED	1 NEW ENGLAND	169	SURRY MOUNTAIN	NH	33005	42.997	72.311	01080201				ASHUELOT
1 NED	1 NEW ENGLAND	170	BALL MOUNTAIN	VT	50025	43.127	72.776	01080107				WEST
1 NED	1 NEW ENGLAND	172	NORTH HARTLAND	VT	50027	43.601	72.353	01080106				OTTAQUECHEE
1 NED	1 NEW ENGLAND	173	NORTH SPRINGFIELD	VT	50027	43.336	72.509	01080106				BLACK
1 NED	1 NEW ENGLAND	174	TOWNSHEND	VT	50025	43.083	72.699	01080107				WEST
2 NAD	2 NEW YORK	171	EAST BARRE	VT	50023	44.154	72.444	02010003				WINOOSKI/JAIL BR
2 NAD	2 NEW YORK	176	WATERBURY	VT	50023	44.381	72.770	02010003	018		+	LITTLE
2 NAD	2 NEW YORK	177	WRIGHTSVILLE	VT	50023	44.310	72.575	02010003				WINOOSKI/N BR
2 NAD	3 PHILADELPHIA	307	BELTZVILLE	PA	42025	40.848	75.638	02040106	414		+	POHOPOCO
2 NAD	3 PHILADELPHIA	313	FRANCIS E WALTER	PA	42089	41.112	75.720	02040106				LEHIGH
2 NAD	3 PHILADELPHIA	316	PROMPTON	PA	42127	41.588	75.327	02040103				LACKAWAXEN/W BR
2 NAD	4 BALTIMORE	227	ALMOND	NY	36003	42.347	77.705	02050104				CANISTEO
2 NAD	4 BALTIMORE	229	WHITNEY POINT	NY	36007	42.342	75.965	02050102			+	OTSELIC
2 NAD	4 BALTIMORE	306	ALVIN R BUSH (KETTLE CREEK)	PA	42035	41.350	77.900	02050203				KETTLE
2 NAD	4 BALTIMORE	310	CURWENSVILLE	PA	42033	40.953	78.527	02050201			+	ANDERSON CK
2 NAD	4 BALTIMORE	312	F J SAYERS (BLANCHARD)	PA	42027	41.048	77.604	02050204	415		+	BALD EAGLE
2 NAD	4 BALTIMORE	320	RAYSTOWN	PA	42061	40.296	78.188	02050303			+	JUNIATA/RAYSTOWN
2 NAD	4 BALTIMORE	329	STILLWATER	PA	42069	41.696	75.486	02050107				UPPER TUNKANNOCK
2 NAD	4 BALTIMORE	398	BLOOMINGTON	WV	54057	39.350	79.000	02070002				NEW
2 NAD	4 BALTIMORE	401	SAVAGE	MD	24023	39.516	79.133	02070002		05010		SAVAGE
3 SAD	6 WILMINGTON	233	B EVERETT JORDAN (NEW HOPE)	NC	37037	35.654	79.069	03030002				CAPE FEAR
3 SAD	6 WILMINGTON	372	JOHN H KERR	VA	51117	36.598	78.301	03010102	462	06011	+	ROANOKE
3 SAD	6 WILMINGTON	375	PHILPOTT	VA	51089	36.781	80.027	03010103		06012	+	SMITH
3 SAD	7 CHARLESTON	232	W KERR SCOTT	NC	37193	36.134	81.224	03040101		06014	+	YADKIN
3 SAD	8 SAVANNAH	74	CLARK HILL	SC	45181	33.661	82.199	03060103	287		+	SAVANNAH

(Continued)

(Sheet 1 of 7)

Table 8 (Continued)

DIVISION	DISTRICT	RES	NAME	ST	STCTY	LAT	LONG	HYD UNIT	NES	SCS	L&J	MAJOR TRIB
3 SAD	8 SAVANNAH	330	HARTWELL	GA	13007	34.356	82.822	03060103	432		+	SAVANNAH
3 SAD	9 JACKSONVILLE	66	OCKLAWAHA(RODMAN)	FL	12107	29.508	81.804	03080102			+	OCKLAWAHA
3 SAD	10 MOBILE	1	CLAIBORNE	AL	1099	31.533	87.516	03150204			+	ALABAMA
3 SAD	10 MOBILE	2	COFFEEVILLE (JACKSON)	AL	1023	31.750	88.116	03160201				MOBILE
3 SAD	10 MOBILE	3	HOLT	AL	1125	33.252	87.450	03160112	226			BLACK WARRIOR
3 SAD	10 MOBILE	4	JONES BLUFF	AL	1085	32.350	86.800	03150201			+	ALABAMA
3 SAD	10 MOBILE	5	DEMOPOLIS	AL	1091	32.520	87.879	03160201				MOBILE
3 SAD	10 MOBILE	7	WARRIOR	AL	1065	32.779	87.844	03160113				BLACK WARRIOR
3 SAD	10 MOBILE	8	MILLERS FERRY	AL	1131	32.116	87.399	03150203			+	ALABAMA
3 SAD	10 MOBILE	69	ALLATOONA	GA	13015	34.163	84.727	03150104	281		+	ETOWAH
3 SAD	10 MOBILE	70	GEORGE W. ANDREWS	GA	13099	31.283	85.116	03130004				CHATTAHOOCHEE
3 SAD	10 MOBILE	71	SEMINOLE (WOODRUFF)	GA	13253	30.708	84.865	03130004	999		+	APALACHICOLA
3 SAD	10 MOBILE	72	WALTER F GEORGE (EUFAULA)	GA	13061	31.600	85.050	03130003	999		+	CHATTAHOOCHEE
3 SAD	10 MOBILE	73	WEST POINT	GA	13285	32.918	85.188	03130002				CHATTAHOOCHEE
3 SAD	10 MOBILE	75	CARTERS	GA	13123	34.604	84.667	03150102				COOSAWATTEE
3 SAD	10 MOBILE	76	SIDNEY LANIER	GA	13139	34.158	84.072	03130001	293		+	CHATTAHOOCHEE
3 SAD	10 MOBILE	191	OKATIBBEE	MS	28075	32.475	88.796	03170001			+	CHICHASAWHAY
3 SAD	10 MOBILE	405	GAINESVILLE L/D	AL	1063	32.816	88.149	03160106				TOMBIGBEE
3 SAD	10 MOBILE	411	BANKHEAD	AL	1125	33.449	87.349	03160112	226			BLACK WARRIOR
5 NCD	11 BUFFALO	228	MT MORRIS	NY	36051	42.733	77.911	04130002		04018		GENESSEE
5 NCD	14 ROCK ISLAND	98	CORALVILLE	IA	19103	41.724	91.527	07080208		25019	+	IOWA
5 NCD	14 ROCK ISLAND	99	RED ROCK	IA	19125	41.369	92.979	07100008	503		+	DES MOINES
5 NCD	15 ST PAUL	178	GULL	MN	27035	46.411	94.357	07010106	102		+	GULL
5 NCD	15 ST PAUL	179	LAC QUI PARLE	MN	27023	45.000	95.833	07020002			+	MINNESOTA
5 NCD	15 ST PAUL	180	TRAVERSE	MN	27155	45.630	96.852	09020101			+	BOIS DE SIOUX
5 NCD	15 ST PAUL	181	LEECH	MN	27057	47.206	94.308	07010102	105		+	LEECH
5 NCD	15 ST PAUL	182	ORWELL	MN	27111	46.215	96.177	09020103		30019		OTTER TAIL
5 NCD	15 ST PAUL	183	CROSS	MN	27021	46.669	94.112	07010105				PINE
5 NCD	15 ST PAUL	184	POKEGAMA	MN	27061	47.166	93.555	07010101			+	MISSISSIPPI
5 NCD	15 ST PAUL	185	SANDY	MN	27021	46.788	93.319	07010103			+	TAMARACK
5 NCD	15 ST PAUL	186	WINNIBIGOSHISH	MN	27057	47.428	94.049	07010101			+	MISSISSIPPI
5 NCD	15 ST PAUL	187	PINE RIVER	MN	27021	46.669	94.112	07010105			+	PINE
5 NCD	15 ST PAUL	236	HOMME	ND	38099	48.399	97.766	09020310		30017		PARK/ S BR
5 NCD	15 ST PAUL	237	ASHTABULA (BALDHILL)	ND	38003	47.033	98.083	09020203	565	30016	+	SHEYENNE
5 NCD	15 ST PAUL	399	EAU GALLE	WI	55093	44.856	92.244	07050003				EAU GALLE
4 ORD	16 PITTSBURG	243	BERLIN	OH	39133	41.045	81.002	05030103	395	21038	+	MAHONING
4 ORD	16 PITTSBURG	252	MICHAEL J KIRWAN	OH	39099	41.156	81.079	05030103			+	MAHONING/W BR
4 ORD	16 PITTSBURG	254	MOSQUITO CREEK	OH	39155	41.299	80.758	05030102	406		+	MOSQUITO
4 ORD	16 PITTSBURG	308	CONEMAUGH RIVER	PA	42063	40.469	79.368	05010007				CONEMAUGH
4 ORD	16 PITTSBURG	309	CROOKED CREEK	PA	42005	40.714	79.508	05010006		21024		CROOKED
4 ORD	16 PITTSBURG	311	EAST BRANCH CLARION R	PA	42047	41.559	78.594	05010005		04021	+	CLARION/E BR
4 ORD	16 PITTSBURG	314	LOYALHANNA	PA	42129	40.456	79.451	05010008		21022		LOYALHANNA

(Continued)

(Sheet 2 of 7)

Table 8 (Continued)

DIVISION	DISTRICT	RES	NAME	ST	STCTY	LAT	LONG	HYD UNIT	NES	SCS	L&J	MAJOR TRIB
4 ORD	16 PITTSBURG	315	MAHONING CREEK	PA	42005	40.921	79.278	05010006		21023		MAHONING
4 ORD	16 PITTSBURG	317	SHENANGO RIVER	PA	42085	41.264	80.463	05030102	426		+	SHENANGO
4 ORD	16 PITTSBURG	318	TIONESTA	PA	42053	41.473	79.438	05010003		21021	+	TIONESTA
4 ORD	16 PITTSBURG	319	YOUGHIOGHENY RIVER	PA	42051	39.798	79.368	05020006		21026	+	YOUGHIOGHENY
4 ORD	16 PITTSBURG	322	WOODCOCK	PA	42039	41.697	80.101	05010004				WOODCOCK
4 ORD	16 PITTSBURG	328	ALLEGHENY (KINZUA)	PA	42083	41.841	79.003	05010001	147		+	ALLEGHENY
4 ORD	16 PITTSBURG	393	TYGART	WV	54091	39.313	80.033	05020001	470	21025	+	TYGART VALLEY
4 ORD	17 HUNTINGTON	123	DEWEY	KY	21071	37.737	82.730	05070203			+	JOHNS/LEVISA FK
4 ORD	17 HUNTINGTON	124	FISHTRAP	KY	21195	37.433	82.416	05070202		19058	+	BIG SANDY/LEVISA
4 OPD	17 HUNTINGTON	125	GRAYSON	KY	21043	38.252	82.985	05090104		19060	+	LITTLE SANDY
4 ORD	17 HUNTINGTON	127	GREENUP L/D	KY	21069	38.647	82.861	05090103			+	OHIO
4 ORD	17 HUNTINGTON	239	PAINT CREEK	OH	39071	39.251	83.349	05060003				PAINT
4 ORD	17 HUNTINGTON	241	ATWOOD	OH	39019	40.526	81.285	05040001	393	21027	+	INDIAN
4 ORD	17 HUNTINGTON	242	BEACH CITY	OH	39151	40.634	81.558	05040001	394	21060		SUGAR
4 ORD	17 HUNTINGTON	245	CHARLES MILL	OH	39005	40.740	82.363	05040002	397	21003	+	MOHICAN/BLACK FK
4 ORD	17 HUNTINGTON	246	CLENDENING	OH	39067	40.269	81.278	05040001			+	STILLWTR/BRUSHY
4 ORD	17 HUNTINGTON	247	DEER CREEK	OH	39097	39.622	83.216	05060002	398		+	SCIOTO/DEER
4 ORD	17 HUNTINGTON	248	DELAWARE	OH	39041	40.358	83.069	05060001	399	19046	+	OLETANGY
4 ORD	17 HUNTINGTON	249	DILLON	OH	39119	39.992	82.082	05040006	400	21061	+	LICKING
4 ORD	17 HUNTINGTON	251	LEESVILLE	OH	39019	40.470	81.194	05040001			+	CONNONTTON/T
4 ORD	17 HUNTINGTON	255	PIEDMONT	OH	39013	40.191	81.215	05040001			+	STILLWATER
4 ORD	17 HUNTINGTON	256	PLEASANT HILL	OH	39139	40.623	82.325	05040002	408	21001	+	MOHICAN/CLEAR FK
4 ORD	17 HUNTINGTON	257	SENECAVILLE	OH	39059	39.925	81.434	05040005		21002	+	WILLS
4 ORD	17 HUNTINGTON	258	TAPPAN	OH	39067	40.356	81.227	05040001	412		+	LITTLE STILLWTR
4 ORD	17 HUNTINGTON	259	BURR OAK(TOM JENKINS)	OH	39127	39.541	82.057	05030204		21063		SUNDAY
4 ORD	17 HUNTINGTON	261	WILLS CREEK	OH	39031	40.156	81.849	05040005			+	WILLS
4 ORD	17 HUNTINGTON	373	JOHN W FLANNAGAN	VA	51051	37.233	82.348	05070202	463		+	POUND
4 ORD	17 HUNTINGTON	374	NORTH FORK OF POUND	VA	51195	37.124	82.631	05070202				POUND/N FK
4 ORD	17 HUNTINGTON	389	BLUESTONE	WV	54089	37.640	80.887	05050002	467	19056	+	NEW
4 ORD	17 HUNTINGTON	390	EAST LYNN	WV	54099	38.145	82.382	05090102			+	TWELVEPOLE/E FK
4 ORD	17 HUNTINGTON	391	SUMMERSVILLE	WV	54067	38.217	80.891	05050005	469		+	GAULEY
4 ORD	17 HUNTINGTON	392	SUTTON	WV	54007	38.661	80.694	05050007		19062	+	ELK
4 ORD	17 HUNTINGTON	394	WINFIELD	WV	54079	38.533	81.833	05050008			+	KANAWHA
4 ORD	17 HUNTINGTON	406	MOHICANVILLE	OH	39005	40.724	82.152	05040002				MOHICAN/LAKE FK
4 ORD	17 HUNTINGTON	416	ALUM CREEK	OH	39041	40.185	82.964	05060001				ALUM
4 ORD	18 LOUISVILLE	90	CAGLES MILL	IN	18133	39.487	86.917	05120203		17023	+	MILL
4 ORD	18 LOUISVILLE	91	HUNTINGTON	IN	18069	40.845	85.468	05120101			+	WABASH
4 ORD	18 LOUISVILLE	92	MISSISSINEWA	IN	18053	40.716	85.956	05120103	334		+	MISSISSINEWA
4 ORD	18 LOUISVILLE	93	MONROE	IN	18105	39.007	86.512	05120208	336		+	SALT
4 ORD	18 LOUISVILLE	94	SALAMONIE	IN	18009	40.807	85.679	05120102			+	SALAMONIE
4 ORD	18 LOUISVILLE	95	C M HARDEN (MANSFIELD)	IN	18121	39.717	87.072	05120108			+	BIG RACOON
4 ORD	18 LOUISVILLE	97	BROOKVILLE	IN	18047	39.439	85.003	05080003				WHITEWATER
4 ORD	18 LOUISVILLE	120	BARREN RIVER	KY	21009	36.891	86.124	05110002	350		+	BARREN
4 ORD	18 LOUISVILLE	121	BUCKHORN	KY	21193	37.339	83.470	05100202			+	KENTUCKY
4 ORD	18 LOUISVILLE	126	GREEN RIVER	KY	21217	37.247	85.339	05110001			+	GREEN
4 ORD	18 LOUISVILLE	128	NOLIN RIVER	KY	21061	37.278	86.247	05110001			+	NOLIN

(Continued)

(Sheet 3 of 7)

Table 8 (Continued)

DIVISION	DISTRICT	RES	NAME	ST	STCTY	LAT	LONG	HYD UNIT	NES	SCS	L&J	MAJOR TRIB
4 ORD	18 LOUISVILLE	129	ROUGH RIVER	KY	21027	37.619	86.499	05110004		18012	+	ROUGH
4 ORD	18 LOUISVILLE	134	CAVE RUN	KY	21205	38.119	83.533	05100101				LICKING
4 ORD	18 LOUISVILLE	260	WEST FORK OF MILL CK	OH	39017	39.259	84.494	05090203		19047		MILL/W FK
4 ORD	18 LOUISVILLE	263	CLARENCE J BROWN	OH	39023	39.950	83.747	05080001				BUCK
4 ORD	19 NASHVILLE	119	BARKLEY	KY	21143	37.021	88.221	05130205	442		+	CUMBERLAND
4 ORD	19 NASHVILLE	122	CUMBERLAND (WOLF CREEK)	KY	21207	36.869	85.145	05130103	351	18011	+	CUMBERLAND
4 ORD	19 NASHVILLE	337	CENTER HILL	TN	47041	36.097	85.828	05130108			+	CANEY FK
4 ORD	19 NASHVILLE	338	CHEATHAM	TN	47037	36.324	87.226	05130202	444		+	CUMBERLAND
4 ORD	19 NASHVILLE	340	J PERCY PRIEST	TN	47037	36.151	86.617	05130203	444		+	STONES
4 ORD	19 NASHVILLE	342	OLD HICKORY	TN	47165	36.297	86.655	05130201	444	18010	+	CUMBERLAND
4 ORD	19 NASHVILLE	343	DALE HOLLOW	TN	47027	36.538	85.441	05130105	352	18009	+	CUMBERLAND
6 LMVD	20 ST LOUIS	81	CARLYLE	IL	17027	38.618	89.351	07140202	297	24053	+	KASKASKIA
6 LMVD	20 ST LOUIS	87	SHELBYVILLE	IL	17173	39.406	88.783	07140201	315		+	KASKASKIA
6 LMVD	20 ST LOUIS	88	REND	IL	17055	38.037	88.956	07140106	313		+	BIG MUDDY
6 LMVD	21 MEMPHIS	196	WAPPAPELLO	MO	29223	36.928	90.284	08020202	551	16013	+	ST FRANCIS
6 LMVD	22 VICKSBURG	14	DE GRAY	AR	5019	34.214	93.113	08040102	485		+	CADDO
6 LMVD	22 VICKSBURG	18	GREESON (NARROWS)	AR	5109	34.148	93.715	08040103			+	LITTLE MISSOURI
6 LMVD	22 VICKSBURG	19	OUACHITA (BLAKELY MTN)	AR	5051	34.572	93.197	08040101	483		+	OUCHITA
6 LMVD	22 VICKSBURG	188	ARKABUTLA	MS	28137	34.757	90.124	08030204	359	15026	+	COLDWATER
6 LMVD	22 VICKSBURG	189	ENID	MS	28161	34.158	89.903	08030203	360	15031	+	YOCONA
6 LMVD	22 VICKSBURG	190	GRENADA	MS	28043	33.808	89.770	08030203	361	15032	+	YATOBUSHA
6 LMVD	22 VICKSBURG	192	SARDIS	MS	28107	34.399	89.786	08030201	363	15030	+	TALLAHATCHIE
6 LMVD	23 NEW ORLEANS	138	WALLACE	LA	22031	32.319	93.670	11140206		49008	+	CYPRESS BAYOU
6 LMVD	23 NEW ORLEANS	352	LAKE O' THE PINES(FERRELLS)	TX	48315	32.751	94.499	11140305	648	49010	+	BIG CYPRESS
6 LMVD	23 NEW ORLEANS	353	TEXARKANA(WRIGHT PATMAN)	TX	48307	33.304	94.160	11140302	669	49007	+	SULPHUR
6 LMVD	23 NEW ORLEANS	413	CADDO	LA	22017	32.703	93.920	11140306	637			WILLOW PASS
7 SWD	24 LITTLE ROCK	11	BEAVER	AR	5007	36.420	93.847	11010001	480		+	WHITE
7 SWD	24 LITTLE ROCK	12	BLUE MOUNTAIN	AR	5149	35.101	93.650	11110204	482		+	PETIT JEAN
7 SWD	24 LITTLE ROCK	13	BULL SHOALS	AR	5089	36.367	92.572	11010003	480		+	WHITE
7 SWD	24 LITTLE ROCK	16	GREERS FERRY	AR	5023	35.517	91.997	11010014	487		+	LITTLE RED
7 SWD	24 LITTLE ROCK	17	DARDANELLE	AR	5115	35.247	93.173	11110202		44013	+	ARKANSAS
7 SWD	24 LITTLE ROCK	21	NIMROD	AR	5149	34.951	93.160	11110206	490	44006	+	FOURCHE LA FAVE
7 SWD	24 LITTLE ROCK	22	NORFOLK	AR	5005	36.249	92.237	11010006	491	44007	+	WHITE/N FK
7 SWD	24 LITTLE ROCK	23	OZARK	AR	5047	35.472	93.812	11110201			+	ARKANSAS
7 SWD	24 LITTLE ROCK	193	CLEARWATER	MO	29179	37.133	90.775	11010007	547		+	BLACK
7 SWD	24 LITTLE ROCK	200	TABLE ROCK	MO	29209	36.595	93.311	11010001	480		+	WHITE
7 SWD	25 TULSA	20	MILLWOOD	AR	5081	33.691	93.965	11140109	489		+	LITTLE SALINE
7 SWD	25 TULSA	102	COUNCIL GROVE	KS	20127	38.679	96.506	11070201	512		+	NEOSHO
7 SWD	25 TULSA	103	ELK CITY	KS	20125	37.277	95.776	11070104	513			ELK
7 SWD	25 TULSA	104	FALL RIVER	KS	20073	37.646	96.077	11070102	514		+	FALL
7 SWD	25 TULSA	105	JOHN REDMOND	KS	20031	38.237	95.768	11070201	515	45056	+	NEOSHO

(Continued)

(Sheet 4 of 7)

Table 8 (Continued)

DIVISION	DISTRICT	RES	NAME	ST	STCTY	LAT	LONG	HYD UNIT	NES	SCS	L&J	MAJOR TRIB
7 SWD	25 TULSA	107	MARION	KS	20115	38.372	97.081	11070202	517		+	COTTONWOOD
7 SWD	25 TULSA	112	TORONTO	KS	20205	37.741	95.933	11070101	523	45040	+	VERDIGRIS
7 SWD	25 TULSA	264	BROKEN BOW	OK	40089	34.143	94.683	11140108			+	LITTLE/MTN FK
7 SWD	25 TULSA	265	CANTON	OK	40011	36.084	98.601	11100301		46013	+	CANADIAN/N
7 SWD	25 TULSA	266	CHOUTEAU	OK	40145	35.900	95.500	11070105				VERDIGRIS
7 SWD	25 TULSA	267	EUFAULA	OK	40061	35.306	95.362	11090204	584	45041	+	CANADIAN/S
7 SWD	25 TULSA	268	FORT GIBSON	OK	40145	35.871	95.228	11070209			+	NEOSHO
7 SWD	25 TULSA	269	FORT SUPPLY	OK	40045	36.553	99.571	11100203	586	46001	+	WOLF
7 SWD	25 TULSA	270	GREAT SALT PLAINS	OK	40003	36.744	98.135	11060004		46002	+	ARKANSAS/SALT FK
7 SWD	25 TULSA	271	HEYBURN	OK	40037	35.947	96.298	11110101		45039	+	POLECAT
7 SWD	25 TULSA	272	HULAH	OK	40113	36.928	95.068	11070106		45035	+	CANEY
7 SWD	25 TULSA	273	KEYSTONE	OK	40037	36.151	96.251	11060006	591	45057	+	ARKANSAS
7 SWD	25 TULSA	274	NEWT GRAHAM	OK	40145	36.050	95.600	11070105				VERDIGRIS
7 SWD	25 TULSA	275	OOLOGAH	OK	40131	36.421	95.678	11070103	592		+	VERDIGRIS
7 SWD	25 TULSA	276	PINE CREEK	OK	40089	34.111	95.079	11140107			+	LITTLE
7 SWD	25 TULSA	277	ROBERT S KERR	OK	40135	35.350	94.850	11110104			+	ARKANSAS
7 SWD	25 TULSA	278	TENKILLER FERRY	OK	40021	35.596	95.049	11110103	593		+	ILLINOIS
7 SWD	25 TULSA	279	W D MAYO	OK	40079	35.300	94.600	11110104				ARKANSAS
7 SWD	25 TULSA	280	WEBBERS FALLS	OK	40101	35.650	95.250	11110102			+	ARKANSAS
7 SWD	25 TULSA	281	WISTER	OK	40079	34.936	94.719	11110105	595	49012	+	POTEAU
7 SWD	25 TULSA	282	CLAYTON	OK	40127	34.600	95.400	11140105				JACKFORK
7 SWD	25 TULSA	283	KAW	OK	40071	36.699	96.921	11060001				ARKANSAS
7 SWD	25 TULSA	284	COPAN	OK	40147	36.894	95.966	11070106				LITTLE CANEY
7 SWD	25 TULSA	285	HUGO	OK	40023	34.011	95.380	11140105				KIAMICHI
7 SWD	25 TULSA	286	OPTIMA	OK	40139	36.659	101.000	11100102				CANADIAN/N
7 SWD	25 TULSA	287	WAURIKA	OK	40067	34.250	98.100	11130208				BEAVER
7 SWD	25 TULSA	348	TEXOMA (DENNISON)	TX	48181	33.818	96.572	11130210	663	50012	+	RED
7 SWD	25 TULSA	357	PAT MAYSE	TX	48147	33.852	95.543	11140101			+	SANDERS
7 SWD	25 TULSA	370	KEMP	TX	48023	33.758	99.150	11130206	646	50023		WICHITA
7 SWD	25 TULSA	402	GILLHAM	AR	5061	34.200	94.200	11140109				COSSATOT
7 SWD	26 FORT WORTH	344	BARDWELL	TX	48139	32.250	96.646	12030109			+	WAXAHACHIE
7 SWD	26 FORT WORTH	345	BELTON(BELL)	TX	48027	31.106	97.474	12070201	633	53047	+	LEON
7 SWD	26 FORT WORTH	346	BENBROOK	TX	48439	32.650	97.448	12030102			+	TRINITY/CLEAR FK
7 SWD	26 FORT WORTH	347	CANYON	TX	48091	29.868	98.198	12100201	639		+	GUADALUPE
7 SWD	26 FORT WORTH	349	GRAPEVINE	TX	48439	32.972	97.056	12030104			+	DENTON
7 SWD	26 FORT WORTH	351	HORDS CREEK	TX	48083	31.832	99.560	12090108		53049	+	HORDS
7 SWD	26 FORT WORTH	354	LAVON	TX	48085	33.031	96.482	12030106	649	51030	+	TRINITY/E FK
7 SWD	26 FORT WORTH	355	LEWISVILLE(GARZA LITTLE ELM)	TX	48121	33.069	96.964	12030103	650	51032	+	TRINITY
7 SWD	26 FORT WORTH	356	NAVARRO MILLS	TX	48349	31.957	96.689	12030108			+	RICHLAND
7 SWD	26 FORT WORTH	358	PROCTOR	TX	48093	31.968	98.485	12070201			+	LEON
7 SWD	26 FORT WORTH	359	SAM RAYBURN (MC GEE BEND)	TX	48405	31.060	94.105	12020005	657		+	ANGELINA
7 SWD	26 FORT WORTH	360	O C FISHER (SAN ANGELO)	TX	48451	31.484	100.481	12090104	656		+	CONCHO
7 SWD	26 FORT WORTH	361	SOMERVILLE	TX	48477	30.322	96.525	12070102	659		+	YEGUA
7 SWD	26 FORT WORTH	362	STILLHOUSE HOLLOW(LAPASAS)	TX	48027	31.022	97.532	12070203	661		+	LAMPASAS
7 SWD	26 FORT WORTH	363	WACO	TX	48309	31.579	97.197	12060203		53031	+	BOSQUE
7 SWD	26 FORT WORTH	364	WHITNEY	TX	48217	31.865	97.371	12060202	668	53042	+	BRAZOS
7 SWD	26 FORT WORTH	371	B A STEINHAGEN (TOWNBLUFF)	TX	48241	30.795	94.179	12020003		51033		NECHES

(Continued)

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Table 8 (Continued)

DIVISION	DISTRICT	RES	NAME	ST	STCTY	LAT	LONG	HYD UNIT	NES	SCS	L&J	MAJOR TRIB
7 SWD	28 ALBUQUERQUE	65	JOHN MARTIN (HASTY)	CO	8011	38.068	[illegible]	11020009		48001		ARKANSAS
7 SWD	28 ALBUQUERQUE	218	ABIQUIU	NM	35039	36.240	106.428	13020102		48008		RIO CHAMA
7 SWD	28 ALBUQUERQUE	219	CONCHAS	NM	35047	35.402	104.190	11080005	819	47001	+	CANADIAN/S
7 SWD	28 ALBUQUERQUE	407	TRINIDAD	CO	8071	37.100	104.600	11020010				PURGATOIRE
8 MRD	29 KANSAS CITY	100	RATHBUN	IA	19007	40.824	92.892	10280201	502		+	CHARITON
8 MRD	29 KANSAS CITY	106	KANOPOLIS	KS	20033	38.606	97.967	10260006	516	32003	+	SMOKY HILL
8 MRD	29 KANSAS CITY	108	MILFORD	KS	20061	39.077	96.891	10250017	519		+	REPUBLICAN
8 MRD	29 KANSAS CITY	109	MELVERN	KS	20139	38.509	95.709	10290101	518			MARAIS DE CYGNES
8 MRD	29 KANSAS CITY	110	PERRY	KS	20087	39.114	95.425	10270103	521		+	DELAWARE
8 MRD	29 KANSAS CITY	111	POMONA	KS	20139	38.647	95.563	10290101	522		+	110-MILE CK
8 MRD	29 KANSAS CITY	113	TUTTLE CREEK	KS	20149	39.254	96.602	10270205	524		+	BIG BLUE
8 MRD	29 KANSAS CITY	114	WILSON	KS	20167	38.966	98.493	10260009	525		+	SALINE
8 MRD	29 KANSAS CITY	194	POMME DE TERRE	MO	29085	37.901	93.316	10290107	548		+	POMME DE TERRE
8 MRD	29 KANSAS CITY	195	STOCKTON	MO	29039	37.695	93.765	10290106	549		+	SAC
8 MRD	29 KANSAS CITY	207	HARLAN COUNTY	NE	31083	40.069	99.208	10250015	555	32029	+	REPUBLICAN
8 MRD	30 OMAHA	64	CHERRY CREEK	CO	8005	39.655	104.854	10190003	768		+	CHERRY
8 MRD	30 OMAHA	203	FORT PECK	MT	30033	48.007	106.396	10040104		40002	+	MISSOURI
8 MRD	30 OMAHA	208	OLIVE CREEK	NE	31109	40.591	96.849	10200203				SALT CK/T
8 MRD	30 OMAHA	209	BLUESTEM	NE	31109	40.648	96.851	10200203				SALT CK/T
8 MRD	30 OMAHA	210	WAGON TRAIN	NE	31109	40.620	96.581	10200203				SALT CK/T
8 MRD	30 OMAHA	211	STAGECOACH	NE	31109	40.609	96.629	10200203				SALT CK/T
8 MRD	30 OMAHA	212	YANKEE HILL	NE	31109	40.729	96.780	10200203				SALT CK/T
8 MRD	30 OMAHA	213	CONESTOGA	NE	31109	40.764	96.847	10200203				SALT CK/T
8 MRD	30 OMAHA	214	TWIN	NE	31109	40.824	96.944	10220203				SALT CK/T
8 MRD	30 OMAHA	215	PAWNEE	NE	31109	40.838	96.865	10200203	560			MIDDLE CK
8 MRD	30 OMAHA	216	HOLMES PARK	NE	31109	40.783	[illegible]	10200203				SALT CK/T
8 MRD	30 OMAHA	217	BRANCHED OAK	NE	31109	40.970	96.850	10200203	554			OAK CK
8 MRD	30 OMAHA	234	BOWMAN-HALEY	ND	38011	45.983	103.247	10130301			+	GRAND/N FK
8 MRD	30 OMAHA	235	SAKAKAWEA(GARRISON)	ND	38055	47.503	101.431	10110101	575		+	MISSOURI
8 MRD	30 OMAHA	331	SHARPE (BIG BEND)	SD	46065	44.038	99.446	10140101			+	MISSOURI
8 MRD	30 OMAHA	332	COLD BROOK	SD	46033	43.453	103.487	10120109				FALL/T
8 MRD	30 OMAHA	334	FRANCIS CASE (FT RANDALL)	SD	46053	43.068	98.554	10140101			+	MISSOURI
8 MRD	30 OMAHA	335	LEWIS AND CLARKE (GAVINS PT)	SD	46135	42.819	97.482	10170101			+	MISSOURI
8 MRD	30 OMAHA	336	OAHE	SD	46119	44.352	100.359	10130105			+	MISSOURI
8 MRD	30 OMAHA	415	CHATFIELD	CO	8035	39.557	105.057	10190002				PLATTE CANYON
9 NPD	31 WALLA WALLA	77	DWORSHAK	ID	16035	46.516	116.299	17060308	779		+	CLEARWATER/N FK
9 NPD	31 WALLA WALLA	78	LUCKY PEAK	ID	16027	43.550	116.000	17050112			+	BOISE
9 NPD	31 WALLA WALLA	79	RIRIE	ID	16019	43.580	111.741	17040205				WILLOW
9 NPD	31 WALLA WALLA	379	ICE HARBOR	WA	53071	46.248	118.873	17060110			+	SNAKE
9 NPD	32 SEATTLE	80	ALBENI FALLS (PEND ORIELLE)	ID	16017	48.476	116.346	17010214			+	PEND OREILLE
9 NPD	32 SEATTLE	204	KOOKANUSA(LIBBY)	MT	30053	48.410	115.313	17010101	795			KOOTENAI
9 NPD	32 SEATTLE	377	RUFUS WOODS (CHIEF JOSEPH)	WA	53047	47.986	119.625	17020005			+	COLUMBIA
9 NPD	32 SEATTLE	384	MUD MOUNTAIN	WA	53053	47.150	121.870	17110014				WHITE

(Continued)

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Table 8 (Concluded)

DIVISION	DISTRICT	RES	NAME	ST	STCTY	LAT	LONG	HYD UNIT	NES	SCS	L&J	MAJOR TRIB
9 NPD	32 SEATTLE	385	WYNOOCHEE	WA	53027	47.384	123.605	17100104				WYNOOCHEE
9 NPD	32 SEATTLE	386	HOWARD A HANSON	WA	53033	47.277	121.784	17110013				GREEN
9 NPD	33 PORTLAND	288	BLUE RIVER	OR	41039	44.172	122.327	17090004			+	BLUE
9 NPD	33 PORTLAND	289	BONNEVILLE	OR	41027	45.643	121.939	17070105				COLUMBIA
9 NPD	33 PORTLAND	290	COTTAGE GROVE	OR	41039	43.716	123.048	17090002		74004	+	WILLAMETTE/COAST
9 NPD	33 PORTLAND	291	COUGAR	OR	41039	44.127	122.240	17090004			+	MCKENZIE/S
9 NPD	33 PORTLAND	292	CELILO (DALLES)	OR	41027	45.709	120.723	17070105				COLUMBIA
9 NPD	33 PORTLAND	293	DETROIT	OR	41047	44.722	122.248	17090003			+	SANTIAM/N
9 NPD	33 PORTLAND	294	DEXTER	OR	41039	43.916	122.816	17090001			+	WILLAMETTE/MDL
9 NPD	33 PORTLAND	295	DORENA	OR	41039	43.786	122.954	17090002		74017	+	WILLAMETTE/T
9 NPD	33 PORTLAND	296	FALL CREEK	OR	41039	43.944	122.755	17090001			+	FALL
9 NPD	33 PORTLAND	297	FERN RIDGE	OR	41039	44.120	123.299	17090003			+	LONG TOM
9 NPD	33 PORTLAND	298	FOSTER	OR	41043	44.416	122.673	17090006			+	SANTIAM/MDL
9 NPD	33 PORTLAND	299	GREEN PETER	OR	41043	44.452	122.544	17090006			+	SANTIAM/MIDDLE
9 NPD	33 PORTLAND	300	HILLS CREEK	OR	41039	43.708	122.423	17090001	830		+	WILLAMETTE/MDL
9 NPD	33 PORTLAND	301	JOHN DAY (UMATILLA)	OR	41021	45.722	120.203	17070101				COLUMBIA
9 NPD	33 PORTLAND	302	LOOKOUT POINT	OR	41039	43.913	122.750	17090001			+	WILLAMETTE/MDL
9 NPD	33 PORTLAND	304	LOST CREEK	OR	41029	42.750	122.550	17100307				ROGUE/T
9 NPD	33 PORTLAND	305	BIG CLIFF	OR	41047	44.733	122.283	17090005				SANTIAM/N
10 SPD	34 SACREMENTO	24	BLACK BUTTE	CA	6103	39.813	122.336	18020009		72032	+	STONY
10 SPD	34 SACREMENTO	26	ENGLEBRIGHT	CA	6115	39.239	121.268	18020016			+	YUBA
10 SPD	34 SACREMENTO	28	ISABELLA	CA	6029	35.647	118.480	18030001		71042	+	KERN
10 SPD	34 SACREMENTO	30	MARTIS CREEK	CA	6057	39.300	120.150	16050102				KOOTENAI
10 SPD	34 SACREMENTO	32	NEW HOGAN	CA	6009	38.149	120.812	18040008			+	CALAVERAS
10 SPD	34 SACREMENTO	33	PINE FLAT	CA	6019	36.831	119.323	18030010		71036	+	KINGS
10 SPD	34 SACREMENTO	36	SUCCESS	CA	6107	36.061	118.921	18030006		71041		TULE
10 SPD	34 SACREMENTO	37	KAWEAH (TERMINUS)	CA	6107	36.414	119.001	18030005		71043		KAWEAH
10 SPD	34 SACREMENTO	41	FOLSOM	CA	6017	38.699	121.149	18020022				AMERICAN
10 SPD	34 SACREMENTO	43	NEW BULLARDS BAR	CA	6091	39.409	121.143	18020016		72005		YUBA/N
10 SPD	34 SACREMENTO	44	CAMANCHE	CA	6009	38.224	121.021	18040009				MOKELUMNE
10 SPD	34 SACREMENTO	47	CHERRY VALLEY	CA	6109	38.000	119.900	18040005				CHERRY
10 SPD	34 SACREMENTO	48	NEW DON PEDRO	CA	6109	37.702	120.421	18040005	744	71008		TUOLUMNE
10 SPD	34 SACREMENTO	51	MCCLURE (NEW EXCHEQUER)	CA	6043	37.583	120.269	18040004		71009		MERCED
10 SPD	34 SACREMENTO	54	MILLERTON (FRIANT)	CA	6019	37.002	119.701	18040001				SAN JOAQUIN
10 SPD	35 SAN FRANCISCO	29	MENDOCINO	CA	6045	39.198	123.181	18010110	752		+	RUSSIAN
10 SPD	35 SAN FRANCISCO	39	SANTA MARGARITA (SALINAS)	CA	6079	35.337	120.502	18060005	756	71004	+	SALINAS
10 SPD	36 LOS ANGELES	9	ALAMO	AZ	4015	34.232	113.600	15030204				WILLIAMS
10 SPD	36 LOS ANGELES	27	HANSEN	CA	6037	34.260	118.384	18070004		70018		???

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Table 9

Listing of the LISTS.DPL File

DIVISION	DISTRICT	RES	NAME	ST	STCTY	LAT	LONG	HYD UNIT	NES	SCS	L&J MAJOR TRIB
1 NED	1 NEW ENGLAND	140	BARRE FALLS	MA	25027	42.350	72.100	01080204			
1 NED	1 NEW ENGLAND	141	BIRCH HILL	MA	25027	42.670	72.170	01080202			
1 NED	1 NEW ENGLAND	143	CONANT BROOK	MA	25015	42.050	72.300	01080204			
1 NED	1 NEW ENGLAND	145	HODGES VILLAGE	MA	25027	42.150	72.870	01100001			
1 NED	1 NEW ENGLAND	146	KNIGHTVILLE	MA	25013	42.300	72.850	01080206			
1 NED	1 NEW ENGLAND	149	WEST HILL	MA	25027	42.150	71.600	01090003			
1 NED	1 NEW ENGLAND	153	EAST BRANCH	CT	9005	41.850	73.150	01100005			
1 NED	1 NEW ENGLAND	154	HALL MEADOW	CT	9005	41.900	73.200	01100005			
1 NED	1 NEW ENGLAND	157	MAD RIVER	CT	9005	41.950	73.150	01080207			
1 NED	1 NEW ENGLAND	160	SUCKER BROOK	CT	9005	41.930	73.150	01080207			
1 NED	1 NEW ENGLAND	161	THOMASTON	CT	9005	41.700	73.100	01100005			
1 NED	1 NEW ENGLAND	163	BLACKWATER	NH	33013	43.350	71.750	01070003			
1 NED	1 NEW ENGLAND	175	UNION VILLAGE	VT	50017	43.800	72.250	01080103			
2 NAD	3 PHILADELPHIA	327	OYBERRY(JADWIN)	PA	42127	41.650	75.250	02040103			
2 NAD	4 BALTIMORE	230	ARKPORT	NY	36101	42.400	77.700	02050104			
2 NAD	4 BALTIMORE	231	SOUTH PLYMOUTH	NY	36025	42.350	75.100	02050101			
2 NAD	4 BALTIMORE	323	INDIAN ROCK	PA	42133	39.850	76.900	02050306			
2 NAD	4 BALTIMORE	324	HAMMOND	PA	42117	41.850	77.250	02050104			
2 NAD	4 BALTIMORE	325	TIOGA	PA	42117	41.800	77.050	02050104			
2 NAD	4 BALTIMORE	326	COWANESQUE	PA	42117	41.950	77.300	02050104			
2 NAD	5 NORFOLK	376	GATHRIGHT	VA	51017	38.050	79.900	02080201			
5 NCD	13 CHICAGO	82	FARMDALE	IL	17	0.0	0.0			24059	
5 NCD	13 CHICAGO	83	THOMAS J O'BRIEN L/D	IL	17	0.0	0.0				
5 NCD	13 CHICAGO	84	DRESDEN ISLAND L/D	IL	17063	41.400	88.250	07120005			
5 NCD	13 CHICAGO	85	PEORIA L/L	IL	17143	40.800	89.550	07130001			
5 NCD	13 CHICAGO	86	LAGRANCE L/D	IL	17017	40.000	90.500	07130003			
5 NCD	13 CHICAGO	89	FONDULAC	IL	17	0.0	0.0			24055	
5 NCD	14 ROCK ISLAND	101	SAYLORVILLE	IA	19153	41.750	93.700	07100004			
5 NCD	15 ST PAUL	400	LA FARGE	WI	55123	43.650	90.550	07070006			
4 ORD	16 PITTSBURG	397	STONEWALL JACKSON	WV	54041	38.900	80.500	05020002			
4 ORD	16 PITTSBURG	412	PYMATUNING	PA	42039	41.600	80.500	05030102	425		
4 ORD	17 HUNTINGTON	136	YATESVILLE	KY	21127	38.150	82.800	05070204			
4 ORD	17 HUNTINGTON	137	PAINTSVILLE	KY	21115	37.850	82.850	05070203			
4 ORD	17 HUNTINGTON	244	BOLIVAR	OH	39151	40.700	81.550	05040001			
4 ORD	17 HUNTINGTON	250	DOVER	OH	39157	40.550	81.400	05040001			
4 ORD	17 HUNTINGTON	253	MOHAWK	OH	39005	40.800	82.200	05040002			
4 ORD	17 HUNTINGTON	395	BURNSVILLE	WV	54007	38.850	80.600	05030203			
4 ORD	17 HUNTINGTON	396	R D BAILEY	WV	54109	37.600	81.700	05070101			
4 ORD	18 LOUISVILLE	96	PATOKA	IN	18117	38.400	86.600	05120209			

(Continued)

(Sheet 1 of 3)

Table 9 (Continued)

DIVISION	DISTRICT	RES	NAME	ST	STCTY	LAT	LONG	HYD UNIT	NES	SCS	L&J MAJOR TRIB
4 ORD	18 LOUISVILLE	130	TAYLORSVILLE	KY	21211	38.100	85.200	05140102			
4 ORD	18 LOUISVILLE	131	CARR FORK	KY	21119	37.250	83.000	05100201			
4 ORD	18 LOUISVILLE	135	RED RIVER	KY	21237	37.800	83.500	05100204			
4 ORD	18 LOUISVILLE	240	EAST FORK	OH	39025	39.050	84.150	05090202			
4 ORD	18 LOUISVILLE	262	CAESAR CREEK	OH	39165	39.500	84.050	05090202			
4 ORD	19 NASHVILLE	132	MARTINS FORK	KY	21095	36.800	83.300	05130101			
4 ORD	19 NASHVILLE	133	LAUREL RIVER	KY	21125	36.950	84.250	05130101			
4 ORD	19 NASHVILLE	339	CORDELL HULL	TN	47087	36.300	85.850	05130106			
6 LMVD	20 ST LOUIS	201	MERAMEC PARK	MO	29055	38.200	91.100	07140102			
6 LMVD	20 ST LOUIS	202	CLARENCE CANNON	MO	29173	39.500	91.750	07110007			
6 LMVD	23 NEW ORLEANS	139	BAYOU BODCAU	LA	22015	32.800	93.500	11140205		49006	
6 LMVD	23 NEW ORLEANS	369	COOPER	TX	48119	33.350	95.750	11140301			
6 LMVD	23 NEW ORLEANS	414	BLACK BAYOU	LA	22017	32.880	93.900	11140304	530		
7 SWD	25 TULSA	15	DIERKS	AR	5133	34.150	94.050	11140109			
7 SWD	25 TULSA	115	BIG HILL	KS	20099	37.350	95.500	11070103			
7 SWD	25 TULSA	116	EL DORADO	KS	20015	37.800	96.850	11030017			
7 SWD	25 TULSA	403	DEQUEEN	AR	5133	34.100	94.300	11140109			
7 SWD	26 FORT WORTH	365	NORTH FORK (SAN GABRIEL)	TX	48491	30.750	97.900	12070205			
7 SWD	26 FORT WORTH	366	LANE PORT	TX	48491	30.650	97.300	12070205			
7 SWD	27 GALVESTON	350	ADDICKS	TX	48201	29.830	95.600	12040104			
7 SWD	27 GALVESTON	367	WALLISVILLE	TX	48071	29.850	94.800	12030203			
7 SWD	27 GALVESTON	368	BARKER	TX	48201	29.750	95.720	12040104			
7 SWD	28 ALBUQUERQUE	220	GALISTEO	NM	35049	35.400	106.700	13020201			
7 SWD	28 ALBUQUERQUE	221	JEMEZ CANYON	NM	35043	35.450	106.200	13020202		57015	
7 SWD	28 ALBUQUERQUE	222	TWO RIVERS	NM	35005	33.250	104.850	13060008			
7 SWD	28 ALBUQUERQUE	223	LOS ESTEROS	NM	35019	35.200	104.900	13060001			
7 SWD	28 ALBUQUERQUE	224	COCHITI	NM	35043	35.650	106.300	13020201			
7 SWD	28 ALBUQUERQUE	225	ALAMOGORDO (SUMNER)	NM	35019	34.650	104.500	13060001	817	58002	
7 SWD	28 ALBUQUERQUE	226	LAS CRUCES	NM	35013	32.250	106.800	13030102			
7 SWD	28 ALBUQUERQUE	408	PINON CANYON	CO	8071	37.185	104.520	11020010			
8 MRD	29 KANSAS CITY	117	TOMAHAWK	KS	20121	38.650	94.950	10290102			
8 MRD	29 KANSAS CITY	118	CLINTON	KS	20045	38.900	95.500	10270104			
8 MRD	29 KANSAS CITY	197	HARRY S TRUMAN	MO	29083	38.250	93.700	10290108			
8 MRD	29 KANSAS CITY	198	SMITHVILLE	MO	29165	39.450	94.550	10240012			
8 MRD	29 KANSAS CITY	199	LONG BRANCH	MO	29121	39.750	92.550	10280203			
8 MRD	30 OMAHA	238	PIPESTEM	ND	38093	47.250	99.000	10160002			
8 MRD	30 OMAHA	333	COTTONWOOD SPRINGS	SD	46033	43.437	103.563	10120109			
8 MRD	30 OMAHA	404	BEAR CREEK	CO	8059	39.650	105.300	10190002			
9 NPD	31 WALLA WALLA	380	LITTLE GOOSE	WA	53013	46.600	118.000	17060107			

(Continued)

(Sheet 2 of 3)

Table 9 (Concluded)

DIVISION	DISTRICT	RES	NAME	ST	STCTY	LAT	LONG	HYD UNIT	NES	SCS	L&J MAJOR TRIB
9 NPD	31 WALLA WALLA	381	LOWER GRANITE	WA	53023	46.600	117.350	17060107	876		
9 NPD	31 WALLA WALLA	382	LOWER MONUMENTAL	WA	53071	46.580	118.500	17060110			
9 NPD	31 WALLA WALLA	383	MILL CREEK	WA	53071	46.050	118.200	17070102			
9 NPD	31 WALLA WALLA	387	WALLULA (MCNARY)	WA	53005	46.000	119.000	17070101		76014	
9 NPD	31 WALLA WALLA	388	PRIEST RAPIDS	WA	53025	46.700	119.950	17020016			
9 NPD	33 PORTLAND	303	ELK CREEK	OR	41029	42.750	122.700	17100307			
10 SPD	34 SACREMENTO	40	NORTH FORK (CLEMENTINE)	CA	6061	38.950	121.000	18020021			
10 SPD	34 SACREMENTO	42	OROVILLE	CA	6007	39.550	121.450	18020015			
10 SPD	34 SACREMENTO	45	FARMINGTON	CA	6099	37.950	119.900	18040007			
10 SPD	34 SACREMENTO	46	NEW MELONES	CA	6109	38.000	120.500	18040006			
10 SPD	34 SACREMENTO	49	BURNS	CA	6047	37.400	120.350	18040003			
10 SPD	34 SACREMENTO	50	BEAR	CA	6043	37.400	120.220	18040003			
10 SPD	34 SACREMENTO	52	MARIPOSA	CA	6043	37.300	120.150	18040003			
10 SPD	34 SACREMENTO	53	BUCHANAN	CA	6039	37.200	119.950	18040003			
10 SPD	34 SACREMENTO	55	BIG DRY CREEK	CA	6019	36.900	119.700	18040002			
10 SPD	34 SACREMENTO	56	HIDDEN	CA	6039	37.100	119.900	18040003			
10 SPD	34 SACREMENTO	205	PINE CANYON	NV	32017	37.450	114.350	15010013			
10 SPD	34 SACREMENTO	206	MATTHEWS CANYON	NV	32017	37.450	114.200	15010013			
10 SPD	35 SAN FRANCISCO	57	DRY CREEK	CA	6097	38.700	123.000	18010110			
10 SPD	35 SAN FRANCISCO	58	DEL VALLE	CA	6001	37.600	121.800	18050004			
10 SPD	36 LOS ANGELES	10	PAINTED ROCK	AZ	4013	33.000	112.800	15070101			
10 SPD	36 LOS ANGELES	25	BREA	CA	6059	33.900	117.900	18070005		70019	
10 SPD	36 LOS ANGELES	31	MOJAVE RIVER FORKS	CA	6071	34.300	117.300	18090208			
10 SPD	36 LOS ANGELES	34	PRADO	CA	6065	33.950	117.650	18070007		70016	
10 SPD	36 LOS ANGELES	35	SEPULVEDA	CA	6037	34.150	118.500	18070004		70086	
10 SPD	36 LOS ANGELES	38	WHITTIER NARROWS	CA	6037	34.050	118.050	18070004			
10 SPD	36 LOS ANGELES	59	SAN ANTONIO	CA	6071	34.150	117.700	18070007			
10 SPD	36 LOS ANGELES	60	SANTA FE	CA	6037	34.120	117.950	18070005			
10 SPD	36 LOS ANGELES	61	LOPEZ	CA	6037	34.270	118.500	18070004			
10 SPD	36 LOS ANGELES	62	CARBON CANYON	CA	6059	33.900	117.800	18070005			
10 SPD	36 LOS ANGELES	63	FULL TON	CA	6059	33.870	117.850	18070005			
10 SPD	36 LOS ANGELES	409	MC M. CKEN	AZ	4013	33.700	112.450	15070102			
10 SPD	36 LOS ANGELES	410	WHITLOW RANCH	AZ	4021	33.300	111.300	15050100			

(Sheet 3 of 3)

PART VI: WATS - WATERSHED CHARACTERISTICS

26. WATS, the third major file group, contains information on project watersheds. It consists of the following three elements:

WATS.maps - Watershed Maps
WATS.POLYS - Watershed Polygon Coordinates
WATS.DAREAS - Drainage Area Characteristics

This information supplements the location descriptors contained in the LISTS files. Each element is described below.

27. A set of watershed maps has been compiled from the USGS hydrologic unit maps[8], EPA National Eutrophication Survey Working Papers[9], and a report on CE projects in the New England Division[11]. The maps are labeled with descriptive data contained in the LISTS.CPL file and stored in a loose-leaf notebook. Hydrologic unit maps, used most extensively, are on a scale of 1:500,000. An example is given in Figure 3. In some cases, projects have been built after map publication and only the watersheds are shown.

28. WATS.POLYS contains the latitude/longitude coordinates of polygons which contain projects and their watersheds. These coordinates have been used to identify water quality monitoring stations in STORET (see Part IX). Each record contains up to five coordinate pairs and is referenced by district and project codes. Coordinates have been estimated from watershed maps contained in EPA National Eutrophication Survey reports[9]. The 108 projects which were sampled under that program are represented in WATS.POLYS file.

29. WATS.DAREAS contains additional descriptive information on project watersheds in the format given in Table 10. Each record is referenced by district, project, and data source codes. Table 11 lists the elements of the file along with corresponding data sources. Some discrepancies among multiple data sources for the same project and characteristic remain in the file, particularly in drainage areas and mean flows. These could be resolved through verification of the file at the district level. An inventory of the file contents by division is given in Table 12. Inventories by project and district are given in Appendix A.

Figure 3

Sample Watershed Map

```
****************************************
* RES: 194 POMME DE TERRE              *
* DISTRICT: 29 KANSAS CITY     MO      *
* DIVISION:  8 MISSOURI RIVER          *
* STATE: MO   HYDROLOGIC UNIT: 10290107 *
* LATITUDE: 37.901     LONGITUDE:  93.318 *
* MAJOR TRIBUTARY: POMME DE TERRE      *
* SCALE: |-----10 MILES-----|          *
****************************************
```

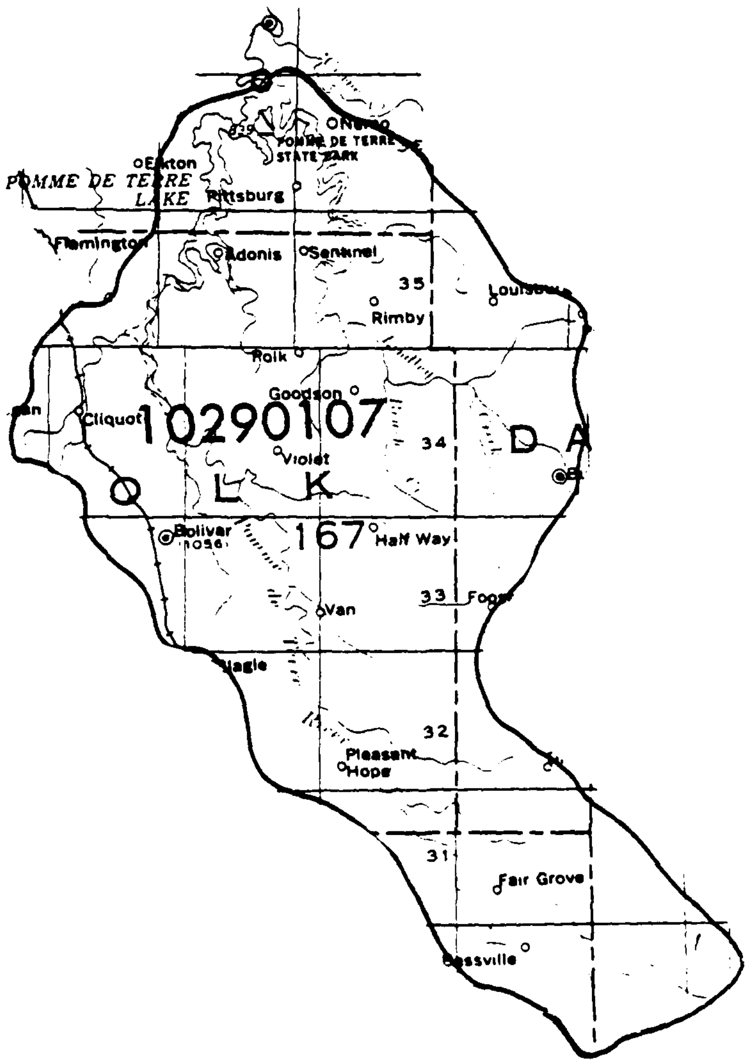


Table 10

Record Format of the WATS.DAREAS File

```
                                           /*********************************************/
DECLARE 1 DAREA_RECORD                     /* WATS.DAREA FILE STRUCTURE (LENGTH=80)     */
                                           /*********************************************/
        2 DIS             PIC'99'          /* DISTRICT NUMBER                           */
        2 RES             PIC'999'         /* RESERVOIR NUMBER                          */
        2 STATE           PIC'BZZ'         /* FIPS STATE CODE                           */
        2 YFIRST          PIC'ZZZZ'        /* DATE NORMAL OPERATION BEGAN               */
        2 ANET            PIC'ZZZZZZZV.9'  /* UNIMPOUNDED DRIANAGE AREA (MI2)           */
        2 ATOT            PIC'ZZZZZZZV.9'  /* TOTAL DRAINAGE AREA (MI2)                 */
        2 DISCH           PIC'(11)ZV.'     /* MEAN DISCHARGE (ACRE-FT/YR)               */
        2 YDISCH          PIC'ZZZ'         /* PD OF RECORD FOR DISCHARGE (YRS)          */
        2 INFLOW          PIC'(11)ZV.'     /* TOTAL INFLOW (ACRE-FT/YEAR)               */
        2 YINFLOW         PIC'ZZZ'         /* PD OF RECORD FOR INFLOW (YRS)             */
        2 PREC            PIC'ZZZV.99'     /* BASIN PRECIPITATION (IN)                  */
        2 YPREC           PIC'ZZZ'         /* PD OF RECORD FOR PRECIP. (YRS)            */
        2 TYPE            PIC'B9B'         /* STATION TYPE CODE                         */
        2 GSSTATION       CHAR(8)          /* STATION CODE (USGS)                       */
        2 SOURCE          PIC'B9'          /* DATA SOURCE CODE                          */
```

Table 11

Sources of Data for the WATS.DAREAS File by Component

Component	SOURCES: Leidy & Jenkins[5]	EPA/NES[4]	District	Sed. Survey[12]	Design Memos	USGS[13]
Year Impounded	X			X		
Direct Drainage Area			X	X	X	
Total Drainage Area	X	X	X	X	X	X
Mean Annual Discharge	X	X				X
Mean Annual Total Inflow				X		
Mean Annual Precipitation				X		
USGS Station Code						X

Table 12

Inventory of Data in the WATS.DAREAS File by CE Division

Division Totals

Division	Total Proj	Numbr Entries	Year Impd	Net DAREA	Total DAREA	Mean Disch	Mean Inflow	Mean Prec	USGS E/C	USGS Disch
1 NED	22	75	23	14	62	18	0	0	21	17
2 NAD	15	48	14	13	36	22	1	1	13	13
3 SAD	24	78	19	17	72	40	3	3	19	20
4 ORD	64	232	84	34	224	134	26	26	63	60
5 NCD	16	51	20	7	49	29	5	4	14	14
6 LMVD	15	64	23	11	62	38	9	9	13	13
7 SWD	66	251	82	46	230	143	24	19	59	60
8 MRD	31	93	23	21	77	52	3	0	20	19
9 NPD	27	85	24	15	73	42	2	2	20	24
10 SPD	19	56	27	10	53	28	7	3	17	18
Totals	299	1033	339	188	938	546	80	67	259	258

Number of Projects With One or More Entry by Division

Division	Total Proj	Numbr Entries	Year Impd	Net DAREA	Total DAREA	Mean Disch	Mean Inflow	Mean Prec	USGS E/C	USGS Disch
1 NED	22	22	22	14	22	18	0	0	21	17
2 NAD	15	15	14	12	14	14	1	1	13	13
3 SAD	24	24	16	16	23	22	3	3	19	20
4 ORD	64	64	63	34	64	62	26	26	63	60
5 NCD	16	15	15	7	15	15	5	4	14	14
6 LMVD	15	15	14	10	15	14	9	9	13	13
7 SWD	66	63	59	45	62	61	24	19	59	59
8 MRD	31	31	20	21	22	22	3	0	20	19
9 NPD	27	27	22	15	26	23	2	2	20	24
10 SPD	19	19	19	10	19	18	7	3	17	18
Totals	299	295	264	184	282	269	80	67	259	257

PART VII: RESER - RESERVOIR CHARACTERISTICS

30. The fourth major file grouping, RESER, contains detailed information on reservoir characteristics. It consists of the following four elements:

RESER.MORPHO - Project Morphometry
RESER.desc - Verbal Project Descriptions
RESER.broch - CE Recreational Brochures
RESER.COM - Comments

Each of these elements is described below.

31. The fluctuating pool levels characteristic of many reservoirs necessitates the compilation of morphometric data which are referenced to pool elevations. Volume and surface area variations with elevation are required for estimation of volume-averaged water quality conditions, given measurements made at specific depths. Seasonal variations in reservoir volume and discharge induce variations in mean depth and hydraulic residence time which may, in turn, influence the response of trophic state indicators to nutrient loading. Thus, detailed morphometric information is an essential component of the data base for eutrophication modelling and for other general uses.

32. The record format and contents of the RESER.MORPHO file are described in Table 13. Each record is referenced by district, project, elevation, and data source code. In addition to area, volume, length, width, and shoreline length data, the file contains a series of pool and outlet codes, as listed in Table 4. These codes provide supplementary descriptive information on pool allocations for various uses, ranges of operating levels, and locations and types of principal outlets.

33. The RESER.MORPHO file was initially based upon data extracted from project design memoranda. The other principal data sources include: (1) a report by Leidy and Jenkins[5]; (2) USGS water resources data reports, by state and year[13]; (3) sedimentation survey sheets[12]; and (4) district and division offices. Information compiled from these sources has been coded and sorted by project and elevation. Initial screening was done to identify and correct, where possible, any

Table 13

Record Format of the RESER.MORPHO File

```
                                         /**********************************************/
DECLARE 1 MORPHO_RECORD                  /* RESER.MORPHO FILE STRUCTURE (LENGTH=50)   */
                                         /**********************************************/
        2 DIS          PIC'99'           /* DISTRICT NUMBER                           */
        2 RES          PIC'999'          /* RESERVOIR NUMBER                          */
        2 ELEV         PIC'ZZZZZV.ZZ'    /* ELEVATION (FT.MSL)                        */
        2 AREA         PIC'ZZZZZZZ'      /* SURFACE AREA (ACRES)                      */
        2 VOL          PIC'(10)Z'        /* VOLUME (ACRE-FEET)                        */
        2 PCODE        PIC'ZZ'           /* POOL CODE                                 */
        2 LENGTH       CHAR(4)           /* POOL LENGTH (MI)                          */
        2 WIDTH        CHAR(3)           /* POOL WIDTH (MI)                           */
        2 SHORE        CHAR(4)           /* SHORELINE LENGTH (MI)                     */
        2 OCODE        PIC'ZZ'           /* OUTLET CODE                               */
        2 SCODE        PIC'BBBBZ';       /* DATA SOURCE CODE                          */
```

obvious errors, such as decreasing area or volume with increasing elevation within a given project. There were sufficient inconsistencies among the various data sources for many projects to warrant independent verification of the file. Accordingly, the file was distributed to the districts through WES and additions and corrections were made based upon district responses. Final editing was done to eliminate most of the redundancies in the file due to multiple data sources for the same project and elevation. A current data inventory by division is given in Table 14. Inventories by district and project are given in Appendix A.

34. RESER.desc consists of a collection of verbal project descriptions copied from USGS water resources data reports published annually by state[13]. The descriptions are referenced by district and project codes and assembled in a loose-leaf notebook. These descriptions summarize hydrologic monitoring activities by the USGS, along with important project characteristics and purposes. The file currently contains entries for 260 out of 299 projects in the central project list.

35. RESER.broch is a collection of brochures published by CE district and division offices as guides to recreation in specific projects. These usually contain detailed project maps which are useful for locating monitoring stations. Project purposes and characteristics are also summarized. Each folder is referenced by district and project number and stored in a hanging file. Currently, the file contains information from eight districts: Pittsburg, Huntington, Louisville, Nashville, Vicksburg, Tulsa, Forth Worth, and Sacramento.

36. The RESER.COM file contains miscellaneous descriptive information on various projects. This file has been designed to hold data or comments which do not conform to other file formats. Each record is 80 characters long and is referenced by district and project codes. A listing of the current version of this file is given Table 15.

Table 14

Inventory of Morphometric Data by CE Division

Division Totals

Division	Total Proj	N Elev	Min Elev	Max Elev	N Area	N Vol	Pool Codes	Outlt Codes	N Length	N Width	N Shore
1 NED	22	221	195	1017	220	220	48	21	22	22	22
2 NAD	15	168	500	1621	110	145	73	21	21	4	9
3 SAD	24	336	0	1108	305	319	80	23	70	49	22
4 ORD	64	743	280	1711	543	621	332	75	66	26	58
5 NCD	16	126	577	1303	86	98	52	5	11	7	14
6 LMVD	15	249	130	626	215	217	93	25	58	73	23
7 SWD	66	934	50	6362	706	767	352	95	38	37	65
8 MRD	31	502	750	5640	427	445	118	41	30	11	23
9 NPD	27	286	24	5119	184	232	102	31	32	23	20
10 SPD	19	263	104	5853	143	226	74	21	15	14	8
Totals	299	3828	0	6362	2939	3290	1324	358	363	266	264

Number of Projects With One or More Entry by Division

Division	Total Proj	N Elev	Min Elev	Max Elev	N Area	N Vol	Pool Codes	Outlt Codes	N Length	N Width	N Shore
1 NED	22	22	22	22	22	22	22	21	22	22	22
2 NAD	15	15	15	15	15	15	15	14	14	4	7
3 SAD	24	24	23	24	24	24	21	15	18	7	21
4 ORD	64	62	62	62	60	61	62	55	41	26	50
5 NCD	16	15	15	15	15	15	14	5	7	6	12
6 LMVD	15	15	15	15	15	15	14	14	12	12	13
7 SWD	66	66	66	66	65	66	62	58	37	36	57
8 MRD	31	31	31	31	31	31	31	29	26	8	19
9 NPD	27	27	27	27	27	25	26	20	25	16	18
10 SPD	19	19	19	19	14	19	18	15	10	9	8
Totals	299	296	295	296	288	293	285	246	212	146	227

Table 15

Listing of the RESER.COM File

01157	Mad River dam now under control of State of Connecticut
01165	Connected to Hopkinton (01167) at high water
01167	Connected to Everett (01165) at high water
07232	Project transferred to Wilmington District (06)
26363	Sediment survey refers to Old Waco
28408	No permanent pool
30214	2 Separate lakes (W. twin/E. twin) below elevation 1342
30333	Project never reached full pool
33298	Re-regulating dam for Green Peter (33299)
33305	Re-regulating dam for Detroit (33293)
34048	Sediment survey refers to Old Don Pedro
34051	Sediment survey refers to Old Exchequer

PART VIII: HYDRO - HYDROLOGY FILES

37. The fifth file group, HYDRO, contains detailed hydrologic data, organized in the following files:

HYDRO.KEY	-	Station Key
HYDRO.DAILY	-	Daily Values
HYDRO.MONTHLY	-	Monthly Summaries
HYDRO.YEARLY	-	Yearly Summaries
HYDRO.SUM	-	Grand Summaries

This information has been compiled to provide bases for nutrient budget calculations, estimating pool hydraulic residence times (as influenced by reservoir elevation and discharge), and depth-averaging of water quality observations (as influenced by reservoir morphometry and pool level). Because of the stringent water quality sampling requirements for estimation of nutrient budgets, streamflow data required for such calculations have been compiled only for those projects and years sampled by the EPA National Eutrophication Survey. Attempts have been made, however, to compile reservoir discharge and elevation/contents data from all projects for 1965 to date using three data sources: USGS/WATSTORE[14], the EPA National Eutrophication Survey[15], and sedimentation survey sheets[12]. The HYDRO.KEY file describes 1307 stations from all three data sources in the format depicted in Table 16.

38. The first data source includes USGS stations monitoring reservoir elevation/contents or streamflow at or below reservoir discharge points. These stations have been identified using the Master Water Data Index of the USGS National Water Data Exchange[16] and USGS water resources data reports by state and year[13]. Daily values have been retrieved through STORET[3] for the period from 1965 to the most recent available as of February, 1980. Only those stations with daily values entered in WATSTORE are included.

39. The EPA National Eutrophication Survey[4], which sampled 108 CE projects, assembled a hydrologic data base compatible with its water quality sampling network for use in nutrient budget computations. It includes streamflow estimates for upstream and downstream tributaries.

For each station, flows are estimated on three time scales: daily (only for the days on which water quality samples were taken), monthly (only for the months in which water quality samples were taken), and normalized monthly (normal flow for each month). This information has been retrieved from a tape provided by the EPA Corvallis laboratory[15]. Monthly and normalized monthly flows have been stored in the HYDRO.MONTHLY file. Because they only refer to water quality sampling dates, daily flows have been stored along with the water quality data in the WQ.OBS file.

40. The third source of hydrologic data, sedimentation survey sheets[12], has provided annual estimates of reservoir total inflow, minimum elevation, and maximum elevation, typically for 10 water years in most of the 84 projects for which sedimentation survey sheets have been located. This information has been stored in the HYDRO.YEARLY file.

41. The formats of the DAILY, MONTHLY, YEARLY, and SUM hydrology files are listed in Tables 17 through 20, respectively. HYDRO.DAILY, which contains data from USGS/WATSTORE stations only, is in the WATSTORE format. It is linked to the project list through the sequence number stored in the HYDRO.KEY file. The other hydrology files contain direct references to districts and projects. In retrieving daily values, all parameter codes recorded at each station were included. Thus, the daily file, and the monthly, yearly, and grand summaries generated from it, contain some water quality information monitored by the USGS on a daily basis (e.g., temperature, conductivity, suspended solids). Parameter codes and coverage are indicated in Table 5.

42. Monthly variations in reservoir discharge and elevation are needed in order to provide bases for calculating pool hydraulic residence times and volume-averaged water quality conditions on a seasonal basis. Table 21 presents an inventory of reservoir discharge, elevation, and contents data monitored at USGS stations and contained in the HYDRO.MONTHLY file. Table 21 is organized by division. Corresponding inventories by reservoir and district are contained in Appendix A. Since the monthly hydrologic summary has been generated from the daily values file, these inventories also reflect daily data holdings.

43. The files contain reservoir discharge data for 245 out of the 299 projects in the central project list. Elevation and contents data are included for 44 and 108 projects, respectively. Regional deficiencies in elevation or contents data are particularly evident for the New England, North Atlantic, South Atlantic, Ohio River, and Missouri River Divisions. These deficiencies need to be corrected, probably using district-level information sources, in order to provide a basis for model evaluations under Phase II of this project.

Table 16

Record Format of the HYDRO.KEY File

```
                                                 /*********************************************/
DECLARE 1 HYDROKEY_REC,                          /* HYDRO.KEY  FILE STRUCTURE (LENGTH=100)    */
                                                 /*********************************************/
        2 DIS             PIC'99'                /* DISTRICT NUMBER                           */
        2 RES             PIC'999'               /* RESERVOIR NUMBER                          */
        2 TYPE            PIC'B9'                /* STATION TYPE CODE                         */
        2 SOURCE          PIC'B9B'               /* DATA SOURCE CODE                          */
        2 STATION         CHAR(8)                /* STATION CODE                              */
        2 LATITUDE                                                                            */
          3 DEGREES       PIC'B99'               /* DEGREES LATITUDE                          */
          3 MINUTES       PIC'99'                /* MINUTES LATITUDE                          */
          3 SECONDS       PIC'99'                /* SECONDS LATITUDE                          */
        2 LONGITUDE                                                                           */
          3 DEGREES       PIC'B999'              /* DEGREES LONGITUDE                         */
          3 MINUTES       PIC'99'                /* MINUTES LONGITUDE                         */
          3 SECONDS       PIC'99'                /* SECONDS LONGITUDE                         */
        2 DAREA           PIC'-(9)ZV.99'         /* DRAINAGE AREA (MI2)                       */
        2 SEQ             PIC'ZZZZ'              /* SEQUENCE IN DAILY FILE (USGS ST.)         */
                                                 /* OR WQ STATION CODE (EPA/NES ST.)          */
        2 STATE           PIC'B99B'              /* FIPS STATE CODE                           */
        2 LOCATION        CHAR(39)               /* LOCATION DESCRIPTION                      */
        2 EDIT            CHAR(7)                /* EDIT INDICATOR                            */
```

Table 17

Record Format of the HYDRO.DAILY File

```
                                              /*****************************************/
DECLARE 1 HYDRODAY_RECORD                     /* HYDRO.DAILY FILE STRUCTURE (LENGTH=1656) */
                                              /* NOTE RECORD FORMAT IDENTICAL TO STORET   */
                                              /* RETRIEVAL FORMAT; DOCUMENTED IN PART FL  */
                                              /* OF THE STORET USER'S MANUAL              */
                                              /*****************************************/
        2 UNUSED1        CHAR(2)              /* UNUSED                                   */
        2 STATE          CHAR(2)              /* STATE CODE                               */
        2 AGENCY         CHAR(5)              /* AGENCY CODE                              */
        2 STATION        CHAR(15)             /* STATION CODE                             */
        2 XSEC           FLOAT(6)             /* CROSS-SECTION LOCATOR                    */
        2 DEPTH          FLOAT(6)             /* STATION DEPTH                            */
        2 PARAM          FIXED BIN(31)        /* PARAMETER CODE                           */
        2 HYEAR          FIXED BIN(15)        /* WATER YEAR                               */
        2 DSTATC         FIXED BIN(15)        /* DAILY VALUE STATISTIC CODE               */
        2 NOVAL          FLOAT(6)             /* MISSING VALUE INDICATOR                  */
        2 DATA(12,31)    FLOAT(6)             /* DAILY VALUE MATRIX(MONTH X DAY)          */
        2 UNUSED2        CHAR(3)              /* UNUSED                                   */
        2 DIST           CHAR(2)              /* USGS DISTRICT                            */
        2 COUNTY         CHAR(3)              /* COUNTY CODE                              */
        2 LOC            CHAR(42)             /* STATION LOCATION DESCRIPTION             */
        2 DAREA          FLOAT(6)             /* DRAINAGE AREA (MI2)                      */
        2 CDAREA         FLOAT(6)             /* CONTRIBUTING DRAINAGE AREA               */
        2 WELLD          FLOAT(6)             /* WELL DEPTH                               */
        2 DATUM          FIXED DEC(7,2)       /* DATUM OF GAUGE                           */
        2 HYDUNIT        FIXED BIN(31)        /* HYDROLOGIC UNIT CODE                     */
        2 SEQ            FIXED BIN(15)        /* RETRIEVAL SEQUENCE NUMBER                */
        2 FMONTH         FIXED BIN(15)        /* FIRST MONTH IN DATA MATRIX               */
        2 TYPE           CHAR(2)              /* USGS TYPE CODE (LK OR SW)                */
        2 LAT            CHAR(6)              /* LATITUDE (DEG/MIN/SEC)                   */
        2 LONG           CHAR(7)              /* LONGITUDE (DEG/MIN/SEC)                  */
        2 CSEQ           CHAR(2)              /* WITHIN QUADRAT SEQUENCE NUMBER           */
        2 GEOUNIT        CHAR(8)              /* GEOLOGIC UNIT CODE                       */
        2 UNUSED3        CHAR(19)             /* UNUSED                                   */
```

Table 18

Record Format of the HYDRO.MONTHLY File

```
                                                      /*****************************************/
DECLARE 1 HYDROMO_REC                                 /* HYDRO.MONTHLY FILE STRUCTURE (LENGTH=50) */
                                                      /*****************************************/
          2 DIS             PIC'99'                   /* DISTRICT NUMBER                           */
          2 RES             PIC'999'                  /* RESERVOIR NUMBER                          */
          2 SOURCE          PIC'9'                    /* DATA SOURCE CODE                          */
          2 STATION         CHAR(8)                   /* STATION CODE                              */
          2 PARAM           PIC'99999'                /* PARAM. CODE (USGS)                        */
          2 DSTATC          PIC'9'                    /* DAILY VALUE STATISTIC CODE                */
                                                      /* (1=MAX, 2=MIN, 3=MEAN, 4=INSTANTANEOUS)   */
          2 CYEAR           PIC'99'                   /* CALENDAR YEAR                             */
          2 WYEAR           PIC'99'                   /* WATER YEAR                                */
          2 MONTH           PIC'99'                   /* MONTH                                     */
          2 N               FIXED BIN(15)             /* NUMBER OF DAYS                            */
          2 DATUM           FLOAT(6)                  /* DATUM OF GAUGE                            */
          2 MIN             FLOAT(6)                  /* MONTHLY MINIMUM                           */
          2 MEAN            FLOAT(6)                  /* MONTHLY MEAN                              */
          2 MAX             FLOAT(6)                  /* MONTHLY MAXIMUM                           */
          2 END             FLOAT(6)                  /* MONTH-END VALUE                           */
          2 UNUSED          CHAR(2)                   /* BLANK                                     */
```

Table 19

Record Format of the HYDRO.YEARLY File

```
                                                /**********************************************/
DECLARE 1 HYDRDAN_REC                           /* HYDRO.YEARLY FILE STRUCTURE (LENGTH=50)   */
                                                /**********************************************/
        2 DIS           PIC'99'                 /* DISTRICT NUMBER                           */
        2 RES           PIC'999'                /* RESERVOIR NUMBER                          */
        2 SOURCE        PIC'9'                  /* DATA SOURCE CODE                          */
        2 STATION       CHAR(8)                 /* STATION CODE                              */
        2 PARAM         PIC'99999'              /* PARAMETER CODE (USGS)                     */
        2 DSTATC        PIC'9'                  /* DAILY VALUE STATISTIC CODE                */
        2 WYEAR         PIC'BB99BB'             /* WATER YEAR                                */
        2 NDAYS         FIXED BIN(15)           /* NUMBER OF OBSERVATIONS                    */
        2 DATUM         FLOAT(6)                /* DATUM OF GAUGE                            */
        2 MIN           FLOAT(6)                /* ANNUAL MINIMUM                            */
        2 MEAN          FLOAT(6)                /* ANNUAL MEAN                               */
        2 MAX           FLOAT(6)                /* ANNUAL MAXIMUM                            */
        2 END           FLOAT(6)                /* YEAR-END VALUE                            */
        2 UNUSED        CHAR(2)                 /* BLANK                                     */
```

Table 20

Record Format of the HYDRO.SUM File

```
                                                     /*********************************************/
DECLARE 1 HYDROSUM_REC                               /* HYDRO.SUM FILE STRUCTURE (LENGTH=90      */
                                                     /*********************************************/
        2 DIS              PIC'99'                   /* DISTRICT NUMBER                          */
        2 RES              PIC'999'                  /* RESERVOIR NUMBER                         */
        2 SOURCE           PIC'9'                    /* DATA SOURCE CODE                         */
        2 STATION          CHAR(8)                   /* STATION CODE                             */
        2 PARAM            PIC'99999'                /* PARAMETER CODE (USGS)                    */
        2 DSTATC           PIC'9'                    /* DAILY VALUE STATISTIC CODE               */
        2 MSTATC           PIC'9'                    /* MONTHLY VALUE STATISTIC CODE             */
                                                     /* (1=MIN,2=MEAN,3=MAX,4=MONTH-END)         */
        2 DATUM            PIC'-V.9999ES9'           /* DATUM OF GAUGE                           */
        2 NDAYS            PIC'ZZZZZ'                /* TOTAL NUMBER OF DAYS                     */
        2 NMONTHS          PIC'ZZZZZ'                /* TOTAL NUMBER OF MONTHS                   */
        2 DFIRST                                     /* FIRST DATE                               */
          3 YEAR           PIC'99'                   /* YEAR                                     */
          3 MONTH          PIC'99'                   /* MONTH                                    */
        2 DLAST                                      /* LAST DATE                                */
          3 YEAR           PIC'99'                   /* YEAR                                     */
          3 MONTH          PIC'99'                   /* MONTH                                    */
        2 MEAN             PIC'-V.(5)9ES9'           /* MEAN VALUE                               */
        2 STD_DEV          PIC'-V.(5)9ES9'           /* STANDARD DEVIATION                       */
        2 MINIMUM          PIC'-V.(5)9ES9'           /* MINIMUM VALUE                            */
        2 MAXIMUM          PIC'-V.(5)9ES9'           /* MAXIMUM VALUE                            */
```

Table 21

Inventory of USGS Hydrologic Data by CE Division

*** DIVISION TOTALS ***

DIVISION	TOTAL PROJ	FLOW STNS	FLOW MONTHS	FLOW DFIRST	FLOW DLAST	ELEVATION STNS	ELEVATION MONTHS	ELEVATION DFIRST	ELEVATION DLAST	CONTENTS STNS	CONTENTS MONTHS	CONTENTS DFIRST	CONTENTS DLAST
1 NED	22	17	2465	6410	7901	0	0	0	0	0	0	0	0
2 NAD	15	12	1920	6410	7902	3	466	6410	7709	0	0	0	0
3 SAD	24	20	2298	6410	7902	4	423	6410	7709	0	0	0	0
4 ORD	64	61	9062	6410	7902	3	15	7509	7612	1	9	7504	7512
5 NCD	16	14	2368	6410	7901	2	169	6410	7709	9	406	6410	7709
6 LMVD	15	13	1700	6410	7902	0	0	0	0	10	1442	6410	7709
7 SWD	66	64	9174	6410	7901	6	879	6410	7709	51	6809	6410	7709
8 MRD	31	19	2786	6410	7901	9	929	6410	7709	4	509	6410	7709
9 NPD	27	23	3348	2001	7902	17	724	6410	7709	16	1588	6510	7709
10 SPD	19	19	2524	6410	7902	0	0	0	0	18	2394	6410	7709
TOTALS	299	262	37645	2001	7902	44	3605	6410	7709	109	13157	6410	7709

*** NUMBER OF PROJECTS WITH ONE OR MORE ENTRY BY DIVISION***

DIVISION	TOTAL PROJ	FLOW STNS	FLOW MONTHS	FLOW DFIRST	FLOW DLAST	ELEVATION STNS	ELEVATION MONTHS	ELEVATION DFIRST	ELEVATION DLAST	CONTENTS STNS	CONTENTS MONTHS	CONTENTS DFIRST	CONTENTS DLAST
1 NED	22	17	17	17	17	0	0	0	0	0	0	0	0
2 NAD	15	12	12	12	12	3	3	3	3	0	0	0	0
3 SAD	24	18	18	18	18	4	4	4	4	0	0	0	0
4 ORD	64	57	57	57	57	3	3	3	3	1	1	1	1
5 NCD	16	14	14	14	14	2	2	2	2	9	9	9	9
6 LMVD	15	12	12	12	12	0	0	0	0	10	10	10	10
7 SWD	66	59	59	59	59	6	6	6	6	51	51	51	51
8 MRD	31	18	18	18	18	9	9	9	9	4	4	4	4
9 NPD	27	22	22	22	22	17	17	17	17	16	16	16	16
10 SPD	19	16	16	16	16	0	0	0	0	17	17	17	17
TOTALS	299	245	245	245	245	44	44	44	44	108	108	108	108

PART IX: WQ - WATER QUALITY FILES

Introduction

44. The sixth group of files, WQ, contains water quality information for CE projects. It is organized as follows:

WQ.KEY - Station Key
WQ.DESTAT - Detailed Station Descriptions
WQ.OBS - Observations
WQ.SUM - Data Summary by Station and Parameter
WQ.maps - Station Maps

Three sources of water quality data have been used: (1) EPA's STORET system[3]; (2) the INFONET[17] system used by the Ohio River Division of the Corps of Engineers; and (3) miscellaneous survey data for specific projects. The numbers of stations and observations obtained from each source are listed in Table 22. The use of these sources and resulting file structures and contents are described in the following sections.

STORET Data Acquisition and Processing

45. As in Table 22, STORET is the primary source of water quality information. The following sources have been used to identify station codes and to associate them with specific CE projects:

a. the Master Water Data Index (MWDI) maintained by the National Water Data Exchange of the USGS[16].

b. the USGS Catalogue of Information on Water Data[18,19].

c. a list of stations included in the National Stream Quality Accounting Network (NASQAN) maintained by the USGS[20].

d. the EPA National Eutrophication Survey Working Papers[9]. and

e. direct station identification retrievals from STORET using a latitude/longitude search technique.

These sources are described below in the order used.

Table 22

Inventory of Water Quality Data by Source

Agency	Stations	Sample Dates	Observations
STORET - EPA/NES	1,637	16,119	181,173
STORET - USGS	655	35,326	592,853
STORET - CE	470	34,890	322,337
STORET - States	541	18,243	235,894
STORET - Other	357	8,078	154,266
INFONET - ORD	763	16,995	534,412
Miscellaneous	28	170	2,259
TOTAL	4,451	129,821	2,023,194

46. The Master Water Data Index (MWDI) documents water quality and quantity monitoring activities by various local, state, and federal agencies throughout the U. S. and contains information on site location, agency, dates, types of measurements, and data storage media. It does not contain measurements, but serves as a means of locating them. The MWDI registers all stations in the EPA STORET and USGS WATSTORE systems, in addition to information on monitoring activities by agencies which do not participate in other federal data banks. Thus, this file represents the most comprehensive one available for identifying monitoring sites and locating data. An initial list of monitoring stations associated with specific projects was derived by applying a latitude/longitude search technique to two large station files acquired on tape from the National Water Data Exchange. One contained all stations in the U. S. monitored by the Corps of Engineers, and the other contained all lake or reservoir stations monitored by any agency in the U. S. The station/project matching derived from this search was verified manually by checking station location descriptions and consulting maps, when needed.

47. The station listings derived from the MWDI did not contain stations monitored by non-CE agencies on tributary streams. The second and third sources listed above provided additional tributary stations operated primarily by the USGS. NASQAN[20] stations are particularly data-rich, having been operated by monthly frequencies since 1975 with a broad water quality parameter coverage. Forty-nine such stations have been located in or directly below the watersheds of projects in the central project list.

48. The STORET station list also includes all stations operated by the EPA National Eutrophication Survey in 108 CE projects. These stations include upstream tributaries, point sources, reservoir stations, and reservoir discharge stations. Nutrient loading calculations for these projects will provide a basis for the testing loading models in Phase II.

49. Finally, a series of station identification retrievals were done directly in STORET using a search technique based upon the latitude/ longitude polygons contained in the WATS.POLYS file. Because of cost and time considerations, this technique was applied only to projects which were in one of two categories: (1) sampled by the EPA National Eutrophication Survey (since these will be the primary focus of Phase II modelling efforts); or (2) without water quality data derived from other station searching techniques. An extracting option available in STORET was also used to identify only stations for which total phosphorus measurements were available.

50. Experience with these alternative station searching techniques indicates that no one method is completely satisfactory. Each relies upon the accuracy of the station characteristics and coordinates entered in the STORET file. Polygon search techniques often retrieve extraneous stations or miss relevant stations because of inaccurate latitude/longitude entries in the STORET station file. Similarly, retrievals which depend upon station types (e.g., "stream" vs. "lake") will miss stations which have been inaccurately classified. For example, many stations located in reservoir pools (based upon location descriptions and/or coordinates) were classified as "stream" stations in STORET and MWDI. The variety of methods employed to identify stations has helped to provide reasonable project coverage. All station/project matchings in the final STORET station list have been checked manually with reference to verbal station location descriptions and maps.

51. Preliminary STORET retrievals have been used to screen out sites with little or no relevant information and to verify station codes. Results have been obtained in the STORET Inventory format, which lists station descriptions and statistical summaries of water quality components monitored. Based upon these inventories, most stations with only one sampling date have been eliminated from the station list.

52. Following the screening procedure, a second series of STORET retrievals has been used to obtain copies of the data on tape for all observations made after 1964. The most comprehensive retrieval format

available from STORET has been used. This format, termed "MORE=5", provides complete station descriptions along with observations of up to 50 different water quality variables at each station.

53. A total of 100 variables have been selected for inclusion in the data base, as listed in Table 5. This necessitated two retrievals for each station. The selection of variables is based upon the objectives of the project and upon the results of the preliminary station inventories, which gave initial indications of data availability as a function of parameter code. The list contains some redundancies due to multiple ways of expressing various types of measurements (e.g., temperature as degrees F or degrees C or phosphorus as P or PO_4). Conversion routines have been used to eliminate these redundancies in tape processing.

54. In a final step, the STORET tapes have been processed to generate one file containing station descriptions (WQ.DESTAT) and another containing water quality observations (WQ.OBS). This involved several sort/merge steps to combine data from the individual STORET tapes in a sequenced form. Overall, STORET has provided 1,486,523 observations at 3,660 stations.

INFONET Data Acquisition and Processing

55. The INFONET[17] system used by the Ohio River Division to manage water quality data has been accessed as a second source of information. Five tapes have been obtained from ORD, one containing station descriptions and the other four containing water quality observations for each of the four ORD districts (Pittsburgh, Huntington, Nashville, and Louisville). Because the organization and formats of the INFONET tapes are different from those obtained from STORET, a different set of programs has been written and employed to extract the data and process it into a form suitable for merging with output from the STORET tape processing.

56. A systematic procedure has been used in extracting data from the ORD tapes. In the first step, stations of interest have been selected

from the ORD station tape based upon ORD project identification codes and used to generate a station description file keyed to members of the central project list. A list of primary and secondary ORD station codes has been extracted from the station description tape. In the final step, the station code and parameter code files have been used to extract relevant observations from the ORD data tapes. This process has been repeated for each district and the resulting files have been merged. A total of 763 stations and 534,412 observations have been derived from this data source.

Miscellaneous Data Acquisition and Processing

57. Water quality data acquired from STORET and INFONET have been supplemented with miscellaneous data which has been manually coded and entered directly into the water quality files. This has been done to improve the regional coverage of the water quality data base. This relatively time-consuming approach has been limited to two sources: (1) survey data obtained from Baltimore District[21] for Almond, Whitney Point, and Alvin R. Bush Reservoirs; and (2) survey data obtained from the North Central Division[22] for Eau Galle Reservoir and Lac Qui Parle.

58. Water quality data and station descriptions from these sources have been coded at WES. Keypunching and verification have been done at MIT. The resulting files containing 28 stations and 2259 observations have been merged with data from STORET and INFONET in the formats described below.

WQ File Structures

59. The water quality data base consists of four files (WQ.KEY, WQ.DESTAT, WQ.OBS, WQ.SUM) and a set of station maps (WQ.maps). The formats of the four files are given in Tables 23 through 26, respectively. The structure and contents of each are discussed below.

Table 23

Record Format of the WQ.KEY File

```
                                                   /****************************************/
DECLARE 1 WQKEY_RECORD                             /* WQ.KEY FILE STRUCTURE (LENGTH=120)   */
                                                   /****************************************/
        2 DIS                PIC'99'               /* DISTRICT NUMBER                      */
        2 RES                PIC'999'              /* RESERVOIR NUMBER                     */
        2 STATION            PIC'999'              /* STATION NUMBER                       */
        2 TYPE               PIC'B9B'              /* TYPE CODE                            */
        2 AGENCY             CHAR(8)               /* AGENCY CODE                          */
        2 UNUSED             CHAR(1)               /* BLANK                                */
        2 AGSTA              CHAR(15)              /* AGENCY STATION CODE                  */
        2 NOBS               PIC'ZZZZZ9'           /* NUMBER OF OBSERVATIONS               */
        2 NDATES             PIC'ZZZZZ9'           /* NUMBER OF SAMPLE DATES               */
        2 DFIRST             PIC'B999999'          /* FIRST SAMPLE DATE                    */
        2 DLAST              PIC'B999999'          /* LAST SAMPLE DATE                     */
        2 ZMIN               PIC'ZZ9B'             /* MINIMUM SAMPLE DEPTH (FT)            */
        2 ZMAX               PIC'ZZ9B'             /* MAXIMUM SAMPLE DEPTH (FT)            */
        2 LATITUDE                                 /* LATITUDE                             */
          3 DEGREES          PIC'BBBBZZ'           /* DEGREES LATITUDE                     */
          3 MINUTES          PIC'ZZ'               /* MINUTES LATITUDE                     */
          3 SECONDS          PIC'ZZVZB'            /* SECONDS LATITUDE                     */
        2 LONGITUDE                                /* LONGITUDE                            */
          3 DEGREES          PIC'ZZZ'              /* DEGREES LONGITUDE                    */
          3 MINUTES          PIC'ZZ'               /* MINUTES LONGITUDE                    */
          3 SECONDS          PIC'ZZVZB'            /* SECONDS LONGITUDE                    */
        2 DESCRIPT           CHAR(30)              /* STATION LOCATION DESCRIPTION         */
```

Table 24

Record Format of the WQ.DESTAT File


```
                                              /*********************************************/
DECLARE 1 DESTAT_REC1                         /* WQ.DESTAT RECORD TYPE 1 (LENGTH=85)        */
                                              /*********************************************/
        2 DIS              PIC'99'            /* DISTRICT NUMBER                            */
        2 RES              PIC'999'           /* RESERVOIR NUMBER                           */
        2 STATION          PIC'999'           /* STATION NUMBER                             */
        2 SEQ              PIC'99'            /* RECORD NUMBER (=01)                        */
        2 UNUSED1          CHAR(1)            /* BLANK                                      */
        2 AGENCY           CHAR(8)            /* AGENCY CODE                                */
        2 UNUSED2          CHAR(1)            /* BLANK                                      */
        2 PRIMCODE         CHAR(15)           /* PRIMARY STATION CODE                       */
        2 UNUSED3          CHAR(1)            /* BLANK                                      */
        2 SECODE           CHAR(14)           /* SECONDARY STATION CODE                     */
        2 TYPE             PIC'BB9B'          /* STATION TYPE CODE                          */
        2 TDESC            CHAR(20)           /* TYPE DESCRIPTION                           */
        2 MAXDEPTH         PIC'BZZZB'         /* MAXIMUM DEPTH                              */
        2 UNIT             CHAR(1)            /* DEPTH UNITS                                */
        2 UNUSED4          CHAR(5)            /* BLANK                                      */

                                              /*********************************************/
DECLARE 1 DESTAT_REC2                         /* WQ.DESTAT RECORD TYPE 2 (LENGTH=85)        */
                                              /*********************************************/
        2 DIS              PIC'99'            /* DISTRICT NUMBER                            */
        2 RES              PIC'999'           /* RESERVOIR NUMBER                           */
        2 STATION          PIC'999'           /* STATION CODE                               */
        2 SEQ              PIC'99'            /* RECORD NUMBER (=02)                        */
        2 UNUSED1          CHAR(1)            /* BLANK                                      */
        2 STATE            CHAR(2)            /* STATE CODE                                 */
        2 COUNTY           CHAR(3)            /* COUNTY CODE                                */
        2 UNUSED2          CHAR(1)            /* BLANK                                      */
        2 STNAME           CHAR(12)           /* STATE NAME                                 */
        2 UNUSED3          CHAR(1)            /* BLANK                                      */
        2 LATITUDE                                                                          */
          3 DEGREES        PIC'99'            /* DEGREES LATITUDE                           */
          3 MINUTES        PIC'99'            /* MINUTES LATITUDE                           */
          3 SECONDS        PIC'99V9B'         /* SECONDS LATITUDE                           */
        2 LONGITUDE                                                                         */
          3 DEGREES        PIC'999'           /* DEGREES LONGITUDE                          */
          3 MINUTES        PIC'99'            /* MINUTES LONGITUDE                          */
          3 SECONDS        PIC'99V9B'         /* SECONDS LONGITUDE                          */
        2 LOCATION         CHAR(32)           /* LOCATION DESCRIPTION                       */
        2 UNUSED5          CHAR(6)            /* BLANK                                      */
```

(Continued)

Table 24 (Concluded)


```
                                                /*********************************************/
DECLARE 1 DESTAT_REC3                           /* WQ.DESTAT RECORD TYPE 3 (LENGTH=85)       */
                                                /*********************************************/
        2 DIS              PIC'99'              /* DISTRICT NUMBER                           */
        2 RES              PIC'999'             /* RESERVOIR NUMBER                          */
        2 STATION          PIC'999'             /* STATION CODE                              */
        2 SEQ              PIC'99'              /* RECORD NUMBER (=03)                       */
        2 UNUSED1          CHAR(1)              /* BLANK                                     */
        2 BSNCODE          CHAR(6)              /* BASIN CODE                                */
        2 UNUSED2          CHAR(1)              /* BLANK                                     */
        2 MAJBASIN         CHAR(24)             /* MAJOR BASIN NAME                          */
        2 UNUSED3          CHAR(1)              /* BLANK                                     */
        2 MINBASIN         CHAR(42)             /* MINOR BASIN NAME                          */

                                                /*********************************************/
DECLARE 1 DESTAT_REC4                           /* WQ.DESTAT RECORD TYPE 4 (LENGTH=85)       */
                                                /*********************************************/
        2 DIS              PIC'99'              /* DISTRICT NUMBER                           */
        2 RES              PIC'999'             /* RESERVOIR NUMBER                          */
        2 STATION          PIC'999'             /* STATION CODE                              */
        2 SEQ              PIC'99'              /* RECORD NUMBER                             */
        2 UNUSED1          CHAR(1)              /* BLANK                                     */
        2 COMMENTS         CHAR(71)             /* DESCRIPTIVE TEXT                          */
        2 UNUSED2          CHAR(3)              /* BLANK                                     */
```

Table 25

Record Format of the WQ.OBS File

```
                                                   /******************************************/
DECLARE 1 OBS_RECORD                               /* WQ.OBS FILE STRUCTURE (LENGTH=50)       */
                                                   /******************************************/
        2 DIS                  PIC'99'             /* DISTRICT NUMBER                         */
        2 RES                  PIC'999'            /* RESERVOIR NUMBER                        */
        2 STATION              PIC'999'            /* STATION NUMBER                          */
        2 YEAR                 PIC'99'             /* CALENDAR YEAR                           */
        2 MONTH                PIC'99'             /* MONTH                                   */
        2 DAY                  PIC'99'             /* DAY OF MONTH                            */
        2 TIME                 PIC'9999'           /* TIME OF DAY                             */
        2 DEPTH                PIC'999'            /* SAMPLE DEPTH (FEET)                     */
        2 PARAM                PIC'999'            /* PARAMETER CODE                          */
        2 QUAL                 CHAR(1)             /* QUALIFIER CODE                          */
        2 VALUE                PIC'-V.9999ES99'    /* MEASURED VALUE                          */
        2 COMPOSITE_DATA                           /* CODES BELOW DOCUMENTED IN STORET MANUAL */
                                                   /* MORE=5 RETRIEVAL FORMAT                 */
          3 SPCODE             CHAR(1)             /* SPACE-TIME CODE                         */
          3 ACODE              CHAR(1)             /* AVERAGING CODE                          */
          3 DLAST              CHAR(10)            /* FINAL DATE-TIME                         */
          3 NSAMP              PIC'ZZ'             /* NUMBER OF SAMPLES IN COMPOSITE          */
        2 UNUSED               CHAR(1)             /* UNUSED                   */
```

Table 26

Record Format of the WQ.SUM File

```
                                           /*********************************************/
DECLARE 1 WQSUM_RECORD                     /* WQ.SUM FILE STRUCTURE (LENGTH=80)         */
                                           /*********************************************/
        2 DIS            PIC'99'           /* DISTRICT NUMBER                           */
        2 RES            PIC'999'          /* RESERVOIR NUMBER                          */
        2 STATION        PIC'999'          /* STATION NUMBER                            */
        2 PARAM          PIC'B999'         /* PARAMETER CODE                            */
        2 NOBS           PIC'ZZZZZ9'       /* NUMBER OF OBSERVATIONS                    */
        2 NDATES         PIC'ZZZZZ9'       /* NUMBER OF SAMPLING DATES                  */
        2 DFIRST         PIC'B(6)9'        /* FIRST SAMPLING DATE                       */
        2 DLAST          PIC'B(6)9'        /* LAST SAMPLING DATE                        */
        2 ZMIN           PIC'ZZ9'          /* MINIMUM SAMPLE DEPTH                      */
        2 ZMAX           PIC'ZZ9'          /* MAXIMUM SAMPLE DEPTH                      */
        2 MEAN           FLOAT(6)          /* MEAN VALUE                                */
        2 STD            FLOAT(6)          /* STANDARD DEVIATION                        */
        2 XMIN           FLOAT(6)          /* MINIMUM VALUE                             */
        2 X25            FLOAT(6)          /* 25TH PERCENTILE                           */
        2 X50            FLOAT(6)          /* 50TH PERCENTILE (MEDIAN)                  */
        2 X75            FLOAT(6)          /* 75TH PERCENTILE                           */
        2 XMAX           FLOAT(6)          /* MAXIMUM VALUE                             */
        2 UNUSED         CHAR(8);          /* BLANK                                     */
```

60. WQ.KEY (Table 23) contains station source and location descriptors and accounting information on the amount of data in the WQ.OBS file, including the number of observations, number of sampling dates, date range, and depth range. Station descriptors have been derived from the WQ.DESTAT file, and accounting information from the WQ.OBS file. Each station has been given a unique, 8-digit identifying code. The first two digits represent CE district (Table 1) and the next three represent CE project (Table 8). The last three contain a code which is unique within each project. The following conventions have been used in assigning the last three digits of the station code:

001 - 100	STORET stations retrieved in March of 1979
101 - 200	STORET stations retrieved in March of 1980
301 - 400	EPA National Eutrophication Survey stations
501 - 600	INFONET stations (Ohio River Division)
801 - 900	stations entered manually

Station numbers have been assigned sequentially within each category and project, after sorting the stations by STORET agency and STORET station codes. The station coding scheme permits sorting and analysis by station, district, project, station, and/or data source. The WQ.KEY file contains 4451 records (one per station), sorted by the 8-digit station code.

61. WQ.DESTAT contains detailed information on station location and data source. As shown in Table 24, it contains four record types. The fourth type is repetitive and contains up to 15 lines of detailed descriptive text on each station. WQ.DESTAT contains about 31,000 records, sorted by the first ten digits of each record (station code/record sequence number).

62. WQ.OBS (Table 25) contains water quality observations. Each record is identified by station, date, time, depth, and parameter code. Standard STORET remark codes identify measurements which are less than or greater than indicated values or duplicate values. The last part of each record contains composite sample information. WQ.OBS, which contains 2,023,194 records, sorted by the first 24 columns (station/date/time/depth/parameter), is stored on tape (sequential access only).

63. WQ.SUM (Table 26) contains a water quality data summary by station and parameter, derived from analysis of the WQ.OBS file. Statistics include date range, depth range, value range, mean, standard deviation, and value percentiles (25%, 50%, and 75%). Summary statistics are derived from the first 1000 observations for each station/parameter combination. Each record represents one station/parameter combination and the file contains about 75,000 records sorted by station and parameter codes.

64. To provide direct access to water quality station descriptions and data summaries, the contents of the WQ.DESTAT and WQ.SUM file have been produced in microfiche form. Frame format is illustrated in Table 27. The heading of each frame contains the district, project, station, and station type codes and names. Station descriptions are entered from the WQ.DESTAT file. The data summary by parameter follows. Frames are sorted by district, project, and station codes. A new fiche card is begun with each district. Card labels indicate the district and project described in the first frame. The last frame of each card contains an index which lists the project, station, and associated frame coordinates.

65. WQ.maps is a collection of station maps (one per project) which have been produced on a Calcomp line plotter using information in the WQ.KEY file. An example is given in Figure 4 which can be compared with the watershed map in Figure 3. Stations are located based upon latitude/longitude coordinates. Different plot symbols are used to identify station types. Only stations with more than 10 observations are plotted. Adjustments in horizontal and vertical scales are made for each map so that a linear distance scale is preserved and the map fits within an 8.5 × 11 inch area. A scale factor in miles per inch is derived from the LISTS.CPL file and plotted with a triangle. These maps are useful for identifying station locations and for refining the station type codes. They are subject, however, to errors in the station coordinates derived from STORET or INFONET. Based upon the maps and station

Table 27

Sample Microfiche Water Quality Data Summary

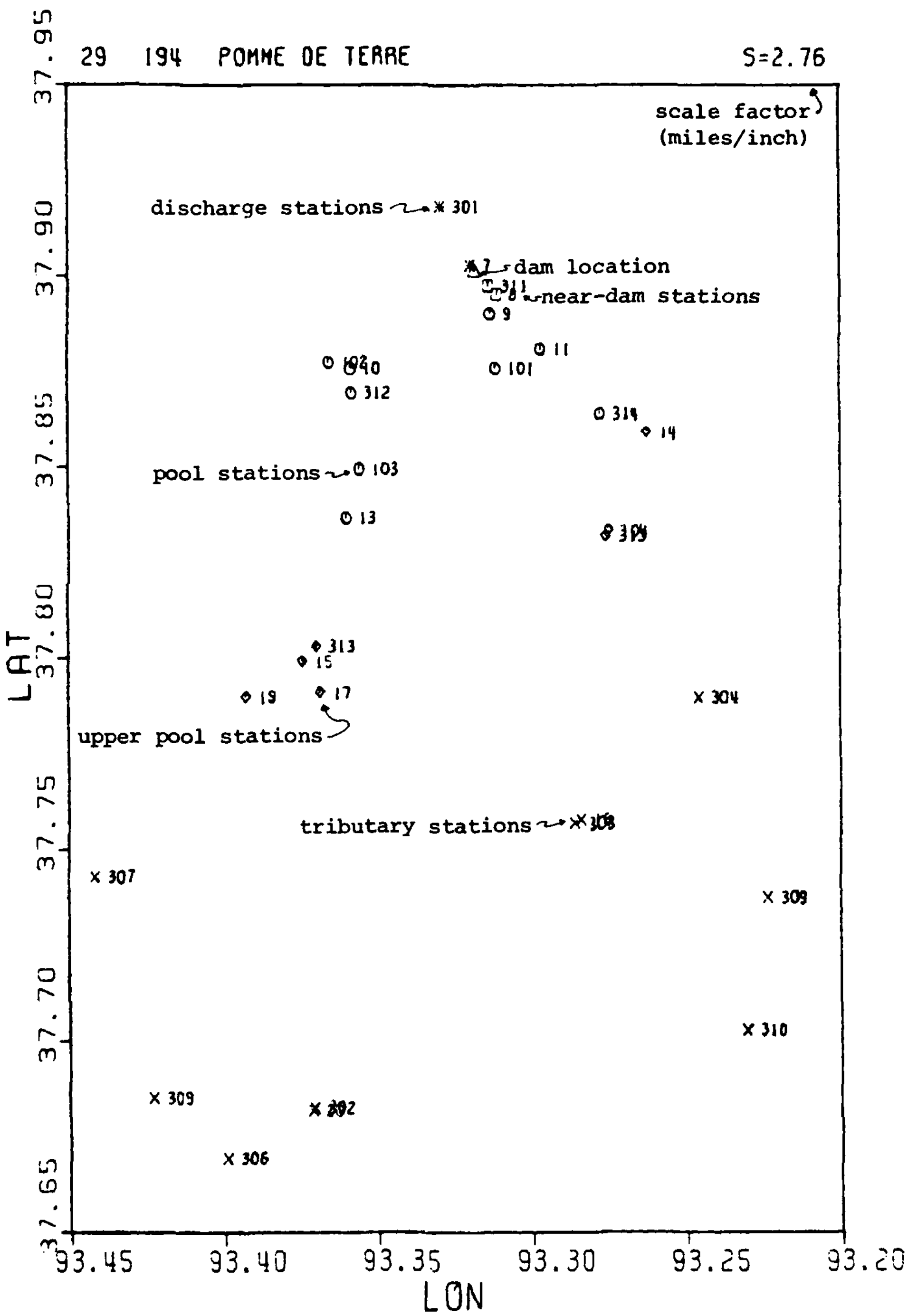
DISTRICT: 01 NEW ENGLAND PROJECT: 142 BUFFUMVILLE STATION: 004 TYPE: 1 TRIBUTARY

STATION DESCRIPTION: 11COENED 804 BUFFUMVLE 04 1 /TYPA/AMBNT/STREAM 001 F
STATION DESCRIPTION: 25027 MA 4205410 07154510 ORTER BROOK
STATION DESCRIPTION: 010591 THAMES RIVER BASIN BUFFUMVILLE LAKE
STATION DESCRIPTION: K=LESS THAN L=GREATER THAN J=ESTIMATED VALUE
STATION DESCRIPTION: POTTER BROOK,CHARLTON,MA. BRIDGE ON SOUTHBRIDGE ROAD APPROXIMATELY
STATION DESCRIPTION: 1/2 MILE WEST OF WHITING ROAD. **

COMPONENT		UNITS	FACTOR	NOBS	NDATES	DATE-RANGE		DEPTH-RANGE		MEAN	STD DEV	MINIMUM	25%	MEDIAN	75%	MAXIMUM
14 WATER	TEMP	CENT		166	166	710525	781226	0	0	14.520	6.902	1.169	8.939	16.449	20.000	28.099
15 DO		MG/L		166	166	710525	781226	0	0	9.312	2.215	4.699	7.699	8.699	10.524	15.000
18 CNDUCTVY	FIELD	MICROMHO		165	165	710525	781226	0	0	66.133	22.066	33.000	57.000	60.000	67.000	180.000
20 PH		SU		166	166	710525	781226	0	0	6.505	0.545	5.199	6.199	6.399	6.799	8.500
24 TOT HARD	CACO3	MG/L		102	102	710525	780720	0	0	20.271	17.309	3.000	11.074	14.899	22.449	134.000
25 CHLORIDE	CL	MG/L		75	75	730517	780619	0	0	22.669	22.372	5.399	10.299	17.000	26.000	140.000
26 SULFATE	SO4-TOT	MG/L		24	24	730321	780727	0	0	8.987	4.580	1.189	6.199	8.000	10.375	20.000
27 IRON	FE,TOT	UG/L	X 1000	100	100	730530	780720	0	0	0.223	0.168	0.019	0.142	0.199	0.247	1.099
29 MANGNESE	MN	UG/L		92	92	730321	780720	0	0	32.282	91.832	20.000	20.000	20.000	20.000	900.000
31 CALCIUM	CA-TOT	MG/L		98	98	710525	780720	0	0	6.466	6.408	1.199	3.199	4.299	7.324	47.500
33 MGNSIUM	MG,TOT	MG/L		98	98	710525	780720	0	0	0.845	0.179	0.019	0.750	0.834	0.932	1.649
35 SODIUM	NA,TOT	MG/L		97	97	731004	780720	0	0	4.923	2.671	1.199	3.799	4.299	5.049	24.599
37 PTSSIUM	K,TOT	MG/L		58	58	730321	760709	0	0	1.198	0.742	0.199	0.574	1.279	1.504	4.399
39 TURB	JKSN	JTU		162	162	710525	781226	0	0	1.084	0.863	0.399	0.699	0.899	1.199	7.500
46 AP COLOR	PT-CO	UNITS		35	35	730321	780824	0	0	37.114	15.758	15.000	30.000	35.000	40.000	85.000
47 SILICA	DISOLVED	MG/L		1	1	750204	750204	0	0	0.929	0.000	0.929	0.929	0.929	0.929	0.929
49 BOD	5 DAY	MG/L		1	1	730530	730530	0	0	0.339	0.000	0.339	0.339	0.339	0.339	0.339
55 TOTAL P		MG/L P		33	33	730615	780824	0	0	0.061	0.128	0.006	0.009	0.013	0.029	0.623
59 PHOS-DIS	ORTHO	MG/L P		8	8	730321	770414	0	0	0.019	0.020	0.000	0.007	0.011	0.024	0.066
63 NH3-N	TOTAL	MG/L		8	8	730321	750825	0	0	0.411	0.155	0.099	0.324	0.439	0.497	0.619
66 NO2-N	TOTAL	MG/L		12	12	730321	780720	0	0	0.005	0.004	0.001	0.001	0.003	0.007	0.014
68 NO3-N	TOTAL	MG/L		79	79	730517	780817	0	0	0.964	3.909	0.041	0.269	0.479	0.599	35.000

Figure 4

Sample Water Quality Station Map



descriptions, some editing of obvious coding errors in station coordinates has been possible.

WQ Data Inventories

66. Table 28 presents an inventory of water quality data by station type and division. Corresponding inventories by project and district are given in Appendix A. Overall, 271 out of 299 projects are represented in the water quality files. Remaining regional deficiencies include St. Paul District (6 out of 13 projects), Portland District (9 out of 17 projects), and Los Angeles District (0 out of 2 projects).

67. An inventory by station type and parameter code is given in Table 29. As expected, temperature, pH, and oxygen are the most frequently represented parameter codes in the file. No data were located for one code (09 -- average daily spillway flow).

68. Phosphorus, chlorophyll-a, and Secchi depth data are particularly relevant to assessing eutrophication problems and therefore to Phase II modelling efforts. Table 30 presents an inventory of these measurements made at pool stations (type codes 2, 4, or 5) by division. Corresponding inventories by project and district are given in Appendix A. Out of 299 projects in the central project list, total phosphorus data have been located for 211, chlorophyll-a data for 132, and Secchi depth data for 171. Some regional deficiencies in total phosphorus data are evident particularly in the New England Division (12 out of 22 projects), North Atlantic Division (6 out of 15 projects), North Central Division (6 out of 16 projects), and North Pacific Division (6 out of 27 projects). These are also reflected in the chlorophyll-a and Secchi depth inventories. These inventories indicate that the data base will not be sufficient to assess the trophic state of all CE projects with appreciable pools. The complete coverage for roughly 130 projects indicates, however, that the data base should be generally sufficient for model testing purposes, the primary objective of Phase II. Regional testing of models should also be possible, with a few exceptions (e.g.,

Table 28

Inventory of Water Quality Data by Station Type and CE Division

INVENTORY OF WATER QUALITY DATA BY STATION TYPE

*** DIVISION TOTALS ***

DIVISION	TOTAL PROJ	TRIBUTARY NSTA	TRIBUTARY NOBS	POOL NSTA	POOL NOBS	NEAR DAM NSTA	NEAR DAM NOBS	DISCHARGE NSTA	DISCHARGE NOBS	OTHER NSTA	OTHER NOBS	TOTAL NSTA	TOTAL NOBS
1 NED	22	51	65968	53	18871	40	15479	26	44515	0	0	170	144833
2 NAD	15	40	6192	25	2291	11	1416	20	4321	4	438	100	14658
3 SAD	24	420	127007	159	50181	34	20605	80	51451	41	3025	734	252269
4 ORD	64	534	115185	423	255705	115	181239	137	69368	91	12659	1300	634156
5 NCD	16	30	10009	27	7985	8	1953	8	711	2	90	75	20748
6 LMVD	15	168	73729	61	24301	24	28579	30	20091	21	1620	304	148320
7 SWD	66	399	190063	249	74982	80	52201	115	102866	57	3942	900	424054
8 MRD	31	172	73811	193	43504	61	23453	64	62721	40	3389	530	206878
9 NPD	27	96	36150	22	22545	11	12167	34	28957	1	93	164	99912
10 SPD	19	77	29473	35	9155	18	12815	40	25708	4	215	174	77366
TOTALS	299	1987	727587	1247	509520	402	349907	554	410709	261	25471	4451	2023194

INVENTORY OF WATER QUALITY DATA BY STATION TYPE

*** NUMBER OF PROJECTS WITH ONE OR MORE ENTRY BY DIVISION***

DIVISION	TOTAL PROJ	TRIBUTARY NSTA	TRIBUTARY NOBS	POOL NSTA	POOL NOBS	NEAR DAM NSTA	NEAR DAM NOBS	DISCHARGE NSTA	DISCHARGE NOBS	OTHER NSTA	OTHER NOBS	TOTAL NSTA	TOTAL NOBS
1 NED	22	22	22	15	15	11	11	22	22	0	0	22	22
2 NAD	15	9	9	10	10	8	8	9	9	1	1	12	12
3 SAD	24	19	19	16	16	14	14	20	20	6	6	22	22
4 ORD	64	61	61	58	58	60	60	64	64	22	22	64	64
5 NCD	16	7	7	7	7	5	5	7	7	1	1	9	9
6 LMVD	15	15	15	14	14	15	15	15	15	11	11	15	15
7 SWD	66	51	51	37	37	48	48	50	50	21	21	61	61
8 MRD	31	26	26	29	29	31	31	22	22	13	13	31	31
9 NPD	27	16	16	5	5	7	7	17	17	1	1	18	18
10 SPD	19	16	16	10	10	11	11	16	16	1	1	17	17
TOTALS	299	242	242	201	201	210	210	242	242	77	77	271	271

Table 29

Inventory of Water Quality Data by Component and Station Type

INVENTORY OF WQ DATA BY PARAMETER AND STATION TYPE

COMPONENT					TRIBUTARY NSTA	TRIBUTARY NOBS	POOL NSTA	POOL NOBS	NEAR DAM NSTA	NEAR DAM NOBS	DISCHARGE NSTA	DISCHARGE NOBS	OTHER NSTA	OTHER NOBS	TOTAL NSTA	TOTAL NOBS
1	00027	COLLECT	AGENCY	CODE	152	5390	76	4362	21	5236	93	2875	0	0	342	17863
2	00028	ANALYZE	AGENCY	CODE	156	2956	107	3923	28	4397	92	1975	0	0	383	13251
3	72025	DEPTH OF	POND	FEET	69	284	467	2117	125	573	6	29	0	0	667	3003
4	00068	MAX SAMP	DEPTH	FEET	20	720	6	95	3	95	7	245	0	0	36	1155
5	72020	ELEV	FEET AB	MSL	29	125	155	2904	30	1118	9	215	0	0	223	4362
6	00062	WATER	SURF ELE	IN FEET	12	175	28	632	10	309	7	204	0	0	57	1320
7	72030	FOREBAY	ELEV,FT	ABOV MSL	6	25	29	215	22	277	6	41	0	0	63	558
8	00054	RESVOIR	STORAGE	AC-FT	0	0	12	416	22	293	0	0	0	0	34	709
9	72033	AVG DAY	SPILLWAY	CFS	0	0	0	0	0	0	0	0	0	0	0	0
10	72034	NSTANT	SPILLWAY	CFS	2	110	0	0	0	0	18	1720	0	0	20	1830
11	00061	STREAM	FLOW,	INST-CFS	407	13927	13	153	13	238	204	7334	9	106	646	21758
12	00060	STREAM	FLOW	CFS	875	18874	56	661	25	416	260	8146	6	267	1222	28364
13	00065	STREAM	STAGE	FEET	119	2797	15	171	11	214	58	1793	1	2	204	4977
14	00010	WATER	TEMP	CENT	1149	54660	1194	92820	393	58811	434	37962	21	429	3191	244682
15	00300	DO		MG/L	701	28427	765	21774	263	20680	306	15178	3	222	2038	86281
16	00299	DO	PROBE	MG/L	394	13797	418	48877	116	28719	118	14056	18	116	1064	105565
17	00090	REDOX	ORP	MV	176	1366	166	10512	47	8143	53	681	0	0	442	20702
18	00094	CNDUCTVY	FIELD	MICROMHO	460	20826	674	35255	237	21324	151	9289	20	268	1542	86962
19	00095	CNDUCTVY	AT 25C	MICROMHO	663	27853	827	24369	247	20525	314	25725	7	291	2058	98763
20	00400	PH		SU	1110	47259	1107	49313	376	37154	412	24133	27	272	3032	158131
21	00403	LAB	PH	SU	273	4573	180	4070	54	1234	114	5124	15	295	636	15296
22	00410	T ALK	CACO3	MG/L	921	23458	901	16693	313	7966	383	15224	23	359	2541	63700
23	00435	T ACDITY	CACO3	MG/L	201	2107	111	3485	36	1154	73	3165	18	299	439	10210
24	00900	TOT HARD	CACO3	MG/L	802	25428	490	11181	192	7065	360	18055	23	351	1867	62080
25	00940	CHLORIDE	CL	MG/L	744	25246	358	6083	172	5069	344	14998	9	290	1627	51686
26	00945	SULFATE	SO4-TOT	MG/L	677	19653	358	5865	174	4985	328	12163	19	302	1556	42968
27	01045	IRON	FE,TOT	UG/L	720	12945	351	5444	161	5130	311	7956	21	204	1564	31679
28	01046	IRON	FE,DISS	UG/L	437	5620	211	3211	96	4253	172	2681	7	19	923	15784
29	01055	MANGNESE	MN	UG/L	700	12049	351	5294	156	5215	285	7429	21	186	1513	30173
30	01056	MANGNESE	MN,DISS	UG/L	408	4588	206	3090	92	4208	163	2440	7	21	876	14347
31	00916	CALCIUM	CA-TOT	MG/L	335	6551	133	1556	64	2085	145	4271	0	0	677	14463
32	00915	CALCIUM	CA,DISS	MG/L	340	10086	161	2180	97	1455	201	6978	1	3	800	20702
33	00927	MGNSIUM	MG,TOT	MG/L	330	6297	131	1616	66	1827	150	4132	0	0	677	13872
34	00925	MGNSIUM	MG,DISS	MG/L	337	10188	164	2221	96	1464	198	6947	0	0	795	20820
35	00929	SODIUM	NA,TOT	MG/L	295	6651	115	1446	59	1680	119	3989	2	90	590	13856
36	00930	SODIUM	NA,DISS	MG/L	269	11198	79	1148	74	1175	164	7683	3	59	589	21263
37	00937	PTSSIUM	K,TOT	MG/L	298	5092	131	1374	57	1578	123	3187	2	89	611	11320
38	00935	PTSSIUM	K,DISS	MG/L	250	8353	89	1001	70	1001	159	5749	2	54	570	16158
39	00070	TURB	JKSN	JTU	468	17340	197	4979	97	2624	217	8971	4	512	983	34426
40	00074	TURB	TRANS	%	19	45	449	6683	128	2654	10	36	0	0	606	9418
41	00076	TURB	TRBIDMTR	HACH FTU	523	7100	413	9454	122	5201	191	5737	13	62	1262	27554
42	00078	TRANSP	SECCHI	METERS	173	1184	749	4616	228	1962	37	426	0	0	1187	8188
43	00031	INCDT LT	REMNING	PERCENT	16	66	315	2684	89	1269	12	60	0	0	432	4079
44	00034	DEPTH-FT	1% LIGHT	REMAINS	69	180	43	162	17	163	4	11	0	0	133	516
45	00080	COLOR	PT-CO	UNITS	457	7406	228	3118	89	1265	148	4890	13	289	935	16968
46	00081	AP COLOR	PT-CO	UNITS	49	1087	18	384	10	90	27	743	0	0	104	2304

(Continued)

Table 29 (Concluded)

INVENTORY OF WQ DATA BY PARAMETER AND STATION TYPE

COMPONENT					TRIBUTARY NSTA	TRIBUTARY NOBS	POOL NSTA	POOL NOBS	NEAR DAM NSTA	NEAR DAM NOBS	DISCHARGE NSTA	DISCHARGE NOBS	OTHER NSTA	OTHER NOBS	TOTAL NSTA	TOTAL NOBS
47	00955	SILICA	DISOLVED	MG/L	242	7159	89	1131	66	790	153	5135	1	11	551	14226
48	00956	SILICA	TOTAL	MG/L	25	126	19	287	6	156	20	190	0	0	70	759
49	00310	BOD	5 DAY	MG/L	518	10033	200	2274	90	2002	227	4111	3	219	1038	18639
50	00405	CO2		MG/L	245	6432	121	1195	64	792	115	3992	0	0	545	12411
51	00680	T ORG C	C	MG/L	404	5375	124	1808	71	1027	148	2560	2	140	749	10910
52	00681	D ORG C	C	MG/L	132	1399	34	299	9	126	45	404	0	0	220	2228
53	00685	T. INORG	C	MG/L	23	745	6	56	3	89	12	263	0	0	44	1153
54	00691	D IORG C	C	MG/L	0	0	4	96	1	22	2	20	0	0	7	138
55	00665	TOTAL P		MG/L P	1803	33290	892	13000	324	8834	532	13925	250	2491	3801	71540
56	00666	PHOS-DIS		MG/L P	280	3624	177	2988	93	4555	126	1657	9	23	685	12847
57	00669	PHOS-TOT	HYDRO	MG/L P	5	21	1	2	0	0	3	30	0	0	9	53
58	00678	PHOS-TOT	HYD+ORTH	MG/L P	17	58	14	67	19	120	5	23	0	0	55	268
59	00671	PHOS-DIS	ORTHO	MG/L P	1190	16221	561	7326	177	3130	286	4095	232	2273	2446	33045
60	70507	PHOS-T	ORTHO	MG/L P	236	2231	111	1007	51	513	94	1137	2	90	494	4978
61	00600	TOTAL N	N	MG/L	321	6049	120	1996	48	1192	98	3275	0	0	587	12512
62	00605	ORG N	N	MG/L	314	4245	143	2375	53	1119	105	2020	2	13	617	9772
63	00610	NH3-N	TOTAL	MG/L	1637	24012	825	11174	293	7792	459	7857	240	2408	3454	53243
64	00625	TOT KJEL	N	MG/L	1581	21524	722	9879	273	7156	392	6786	243	2463	3211	47808
65	00630	NO2&NO3	N-TOTAL	MG/L	1548	22424	747	10611	247	7456	392	7464	245	2439	3179	50394
66	00615	NO2-N	TOTAL	MG/L	994	9592	73	730	47	502	237	2765	160	1315	1511	14904
67	00613	NO2-N	DISS	MG/L	114	1972	58	1179	25	465	64	1014	0	0	261	4630
68	00620	NO3-N	TOTAL	MG/L	1180	15722	212	2467	127	1654	305	5986	168	1451	1992	27280
69	00618	NO3-N	DISS	MG/L	210	7335	63	1691	42	751	142	5427	0	0	457	15204
70	00500	RESIDUE	TOTAL	MG/L	332	6750	188	4648	83	4046	137	2317	7	215	747	17976
71	00505	RESIDUE	TOT VOL	MG/L	214	2451	139	3308	51	2785	75	1065	3	3	482	9612
72	00515	RESIDUE	DISS-105 C	MG/L	261	4643	133	1612	56	783	112	1745	7	152	569	8935
73	00530	RESIDUE	TOT NFLT	MG/L	619	9261	301	6081	120	4501	237	4407	9	249	1286	24499
74	80154	SUSP SED	CONC	MG/L	99	2793	6	39	2	48	44	1359	0	0	151	4239
75	70300	RESIDUE	DISS-180 C	MG/L	395	10970	84	1383	72	985	182	6937	2	127	735	20402
76	32209	CHL-A	FLU-COR	UG/L	11	169	0	0	0	0	0	0	0	0	11	169
77	32217	CHL-A	FLU-UNC	UG/L	1	3	374	1151	110	350	2	6	0	0	487	1510
78	32211	CHL-A	TRIC-COR	UG/L	54	277	20	89	8	431	7	58	0	0	89	855
79	32210	CHL-A	TRIC-UNC	UG/L	59	406	96	955	29	379	22	128	0	0	206	1868
80	32230	CHL-A	UNSPEC	MG/L	15	337	19	538	3	162	9	190	0	0	46	1227
81	60050	ALGAE	TOTAL	#/ML	48	1058	67	613	56	463	32	875	0	0	203	3009
82	00570	BIOMASS	PLANKTON	ML/L	1	7	27	239	13	205	0	0	0	0	41	451
83	85209	ALGAL	GRO PNTL	MG/L	5	41	22	123	5	64	2	14	0	0	34	242
84	60990	ZOOPLANK	OTHER	/LITER	56	159	12	101	6	36	4	15	0	0	78	311
85	31616	FEC COLI	MFM-FCBR	/100ML	503	10487	271	5713	93	1565	194	4462	4	463	1065	22690
86	31673	FECSTREP	MFKFAGAR	/100ML	165	1983	58	1356	13	423	64	1418	2	267	302	5447
87	31679	FECSTREP	MF M-ENT	/100ML	135	2141	45	326	22	144	55	931	2	100	259	3642
88	50051	FLOW	RATE	INST MGD	0	0	0	0	0	0	0	0	185	1547	185	1547
89	50053	CONDUIT	FLOW-MGD	MONTHLY	0	0	0	0	0	0	0	0	187	1555	187	1555

Table 30

Inventory of Total Phosphorus, Chlorophyll-a, and Secchi Data at Pool Stations by CE Division

INVENTORY OF TOTAL-P, CHL-A, & SECCHI DATA (POOL STATIONS)
*** DIVISION TOTALS ***

	TOTAL	TOTAL P				CHLOROPHYLL-A				SECCHI DEPTH			
DIVISION	PROJ	NSTA	NOBS	DFIRST	DLAST	NSTA	NOBS	DFIRST	DLAST	NSTA	NOBS	DFIRST	DLAST
1 NED	22	29	382	710607	780831	0	0	0	0	0	0	0	0
2 NAD	15	21	222	720510	790501	16	68	720510	760721	16	38	680711	790501
3 SAD	24	141	2549	650104	800110	81	266	730407	790730	136	698	730407	790809
4 ORD	64	348	8120	660105	791101	190	1341	711024	781012	303	3162	710225	781012
5 NCD	16	30	605	670713	791001	28	177	720702	790806	30	114	720702	790806
6 LMVD	15	73	936	691204	790815	56	184	720505	741111	66	238	720505	790815
7 SWD	66	279	4627	650301	791204	154	629	720202	790723	249	1451	740304	791105
8 MRD	31	214	2257	650104	790802	76	256	740408	780731	138	612	690616	790802
9 NPD	27	28	1321	650104	781025	19	584	740611	780509	18	40	750328	751030
10 SPD	19	53	815	710412	791018	11	30	750310	751113	21	225	680709	791017
TOTALS	299	1216	21834	650104	800110	631	3535	711024	790806	977	6578	680709	791105

INVENTORY OF TOTAL-P, CHL-A, & SECCHI DATA (POOL STATIONS)
*** NUMBER OF PROJECTS WITH ONE OR MORE ENTRY BY DIVISION***

	TOTAL	TOTAL P				CHLOROPHYLL-A				SECCHI DEPTH			
DIVISION	PROJ	NSTA	NOBS	DFIRST	DLAST	NSTA	NOBS	DFIRST	DLAST	NSTA	NOBS	DFIRST	DLAST
1 NED	22	12	12	12	12	0	0	0	0	0	0	0	0
2 NAD	15	6	6	6	6	5	5	5	5	6	6	6	6
3 SAD	24	17	17	17	17	13	13	13	13	17	17	17	17
4 ORD	64	61	61	61	61	39	39	39	39	53	53	53	53
5 NCD	16	6	6	6	6	6	6	6	6	6	6	6	6
6 LMVD	15	13	13	13	13	13	13	13	13	13	13	13	13
7 SWD	66	46	46	46	46	34	34	34	34	34	34	34	34
8 MRD	31	31	31	31	31	15	15	15	15	31	31	31	31
9 NPD	27	6	6	6	6	4	4	4	4	4	4	4	4
10 SPD	19	13	13	13	13	3	3	3	3	7	7	7	7
TOTALS	299	211	211	211	211	132	132	132	132	171	171	171	171

the lack of chlorophyll-a or Secchi depth data for projects in New England).

69. The EPA National Eutrophication Survey is a primary source of data for testing nutrient loading models and relationships among within-pool measures of trophic state. An inventory of data holdings by agency, station type, and parameter code is given in Table 31. Two agency groupings are used: "EPA", representing the National Eutrophication Survey; and "OTHER", representing all other agencies and monitoring programs. Station types include tributary (type code 1), discharges (type code 3), and pool (type codes 2, 4, and 5). The parameter list includes a variety of nutrient, biological, chemical, and optical characteristics pertinent to eutrophication analysis. Within each category, the numbers of observations, sampling dates, stations, projects, and districts are indicated, along with the total period of record in station-months. Including data from agencies other than the EPA/NES has more than doubled the total numbers of observations of most parameters and provided additional useful measurements for some projects, such as algal cell numbers and volumes, turbidity, and suspended solids. At pool stations, non-EPA agencies provide more chlorophyll-a observations (2036 vs. 1499) concentrated in fewer projects (43 vs. 108). These and other statistics in Table 31 reflect the relative intensities of agency monitoring efforts -- many of the non-EPA programs are more intensive and extensive temporally than the three-date, one-growing-season program employed by the EPA/NES.

70. Based upon data inventories in Appendix A, some projects for which non-EPA data monitoring of trophic state indicators has been partic ly intense include the following:

06-372	John H. Kerr
15-399	Eau Galle
16-311	East Branch Clarion River
18-093	Monroe
18-120	Barren River
19-340	J. Percy Priest
26-359	Sam Rayburn
29-111	Pomona
32-204	Kookanusa

Table 31

Inventory of Eutrophication-Related Water Quality Components by Station Type and Monitoring Agency

TYPE:		TRIB			DSCH			POOL		
AGENCY:		EPA	OTHR	ALL	EPA	OTHR	ALL	EPA	OTHR	ALL
TOTAL P	NOBS	9794	23496	33290	1450	12475	13925	6689	15145	21834
TOTAL P	NDAT	9771	22370	32141	1428	11895	13323	1418	7889	9307
TOTAL P	NSTA	806	997	1803	116	416	532	479	737	1216
TOTAL P	NPRJ	109	214	236	108	211	237	108	186	211
TOTAL P	NDIS	27	30	31	27	29	30	27	28	29
TOTAL P	MTHS	8469	35292	43761	1230	21050	22280	2628	18388	21016
ORTHO-P	NOBS	9878	12198	22076	1456	5433	6889	6668	12851	19519
ORTHO-P	NDAT	9855	10886	20741	1434	5063	6497	1418	5931	7349
ORTHO-P	NSTA	808	726	1534	116	311	427	479	576	1055
ORTHO-P	NPRJ	109	186	223	108	193	225	108	167	205
ORTHO-P	NDIS	27	29	31	27	28	30	27	26	29
ORTHO-P	MTHS	8459	15628	24087	1218	8670	9888	2628	11554	14182
NH3-N	NOBS	10002	14010	24012	1464	6393	7857	6682	12284	18966
NH3-N	NDAT	9979	13380	23359	1442	6264	7706	1418	5978	7396
NH3-N	NSTA	808	829	1637	116	343	459	479	639	1118
NH3-N	NPRJ	109	197	221	108	198	226	108	169	202
NH3-N	NDIS	27	29	30	27	28	30	27	25	29
NH3-N	MTHS	8508	21659	30167	1231	11633	12864	2628	14074	16702
TKN	NOBS	9970	11554	21524	1461	5325	6786	6576	10459	17035
TKN	NDAT	9953	11032	20985	1439	5211	6650	1391	4754	6145
TKN	NSTA	804	777	1581	116	276	392	470	525	995
TKN	NPRJ	109	175	206	108	173	211	105	152	192
TKN	NDIS	27	29	31	27	26	30	26	24	28
TKN	MTHS	8505	18057	26562	1230	8830	10060	2599	10869	13468
NO2+3-N	NOBS	9999	12425	22424	1464	6000	7464	6682	11385	18067
NO2+3-N	NDAT	9976	11907	21883	1442	5906	7348	1418	5302	6720
NO2+3-N	NSTA	807	741	1548	116	276	392	479	515	994
NO2+3-N	NPRJ	109	165	194	108	154	188	108	128	167
NO2+3-N	NDIS	27	28	29	27	23	29	27	24	28
NO2+3-N	MTHS	8510	17667	26177	1231	9360	10591	2628	12146	14774
NO3-N	NOBS	5978	17079	23057	784	10629	11413	0	6563	6563
NO3-N	NDAT	5968	16133	22101	781	9987	10768	0	4770	4770
NO3-N	NSTA	773	526	1299	111	274	385	0	409	409
NO3-N	NPRJ	106	173	208	107	168	211	0	153	153
NO3-N	NDIS	25	28	30	25	26	29	0	25	26
NO3-N	MTHS	4904	20780	25684	617	13582	14199	0	7588	7588
CHL-A	NOBS	3	743	746	6	318	324	1499	2036	3535
CHL-A	NDAT	3	728	731	6	313	319	1490	1129	2619
CHL-A	NSTA	1	74	75	2	30	32	482	147	629
CHL-A	NPRJ	1	29	30	1	19	19	108	43	132
CHL-A	NDIS	1	14	15	1	12	12	27	13	28
CHL-A	MTHS	5	1189	1194	8	377	385	2660	3145	5805
ALGAE(#)	NOBS	0	1058	1058	0	875	875	0	1076	1076
ALGAE(#)	NDAT	0	1053	1053	0	875	875	0	907	907
ALGAE(#)	NSTA	0	48	48	0	32	32	0	123	123
ALGAE(#)	NPRJ	0	26	26	0	29	29	0	59	59
ALGAE(#)	NDIS	0	12	12	0	14	14	0	12	12
ALGAE(#)	MTHS	0	1272	1272	0	1122	1122	0	1437	1437

(Continued)

Table 31 (Concluded)

TYPE: / AGENCY:		TRIB EPA	TRIB OTHR	TRIB ALL	DSCH EPA	DSCH OTHR	DSCH ALL	POOL EPA	POOL OTHR	POOL ALL
ALGAE(V)	NOBS	0	7	7	0	0	0	0	444	444
ALGAE(V)	NDAT	0	7	7	0	0	0	0	430	430
ALGAE(V)	NSTA	0	1	1	0	0	0	0	40	40
ALGAE(V)	NPRJ	0	1	1	0	0	0	0	14	14
ALGAE(V)	NDIS	0	1	1	0	0	0	0	1	1
ALGAE(V)	MTHS	0	6	6	0	0	0	0	832	832
SECCHI	NOBS	3	1181	1184	6	420	426	1487	5091	6578
SECCHI	NDAT	3	1152	1155	6	349	355	1478	4969	6447
SECCHI	NSTA	1	172	173	2	35	37	481	496	977
SECCHI	NPRJ	1	42	43	1	28	29	108	121	171
SECCHI	NDIS	1	14	14	1	12	12	27	20	28
SECCHI	MTHS	5	2137	2142	8	597	605	2629	12314	14943
TRANS(%)	NOBS	5	40	45	24	12	36	6781	2556	9337
TRANS(%)	NDAT	2	23	25	6	9	15	1419	368	1787
TRANS(%)	NSTA	1	18	19	2	8	10	481	96	577
TRANS(%)	NPRJ	1	11	12	1	8	9	108	21	121
TRANS(%)	NDIS	1	2	3	1	1	2	27	4	27
TRANS(%)	MTHS	3	6	9	8	10	18	2484	816	3300
LIGHT(%)	NOBS	0	66	66	0	60	60	486	3467	3953
LIGHT(%)	NDAT	0	21	21	0	24	24	329	531	860
LIGHT(%)	NSTA	0	16	16	0	12	12	203	201	404
LIGHT(%)	NPRJ	0	10	10	0	12	12	52	42	91
LIGHT(%)	NDIS	0	1	1	0	3	3	12	7	18
LIGHT(%)	MTHS	0	7	7	0	17	17	335	494	829
TURBIDIT	NOBS	0	24440	24440	0	14708	14708	0	22258	22258
TURBIDIT	NDAT	0	23815	23815	0	14555	14555	0	10580	10580
TURBIDIT	NSTA	0	904	904	0	350	350	0	762	762
TURBIDIT	NPRJ	0	201	201	0	199	199	0	171	171
TURBIDIT	NDIS	0	30	30	0	28	28	0	25	25
TURBIDIT	MTHS	0	24945	24945	0	12907	12907	0	19675	19675
SUSP SOL	NOBS	0	12054	12054	0	5766	5766	0	10669	10669
SUSP SOL	NDAT	0	11470	11470	0	5672	5672	0	4234	4234
SUSP SOL	NSTA	0	686	686	0	264	264	0	429	429
SUSP SOL	NPRJ	0	168	168	0	169	169	0	116	116
SUSP SOL	NDIS	0	29	29	0	26	26	0	21	21
SUSP SOL	MTHS	0	18422	18422	0	8277	8277	0	8401	8401
OXYGEN	NOBS	8	42216	42224	18	29216	29234	6202	13848	20050
OXYGEN	NDAT	3	33919	33922	6	26106	26112	1494	17465	18959
OXYGEN	NSTA	1	1062	1063	2	412	414	482	1051	1533
OXYGEN	NPRJ	1	212	212	1	217	217	108	191	216
OXYGEN	NDIS	1	30	30	1	29	29	27	29	29
OXYGEN	MTHS	5	40323	40328	8	22191	22199	2668	31533	34201
FLOW	NOBS	7934	24977	32911	1447	15753	17200	0	1468	1468
FLOW	NDAT	7933	23692	31625	1447	15173	16620	0	1373	1373
FLOW	NSTA	590	533	1123	108	268	376	0	93	93
FLOW	NPRJ	106	156	185	106	175	210	0	35	35
FLOW	NDIS	27	30	31	27	25	30	0	17	17
FLOW	MTHS	6454	22028	28482	1174	14345	15519	0	1975	1975

Thus, it will not be necessary in Phase II to rely exclusively upon data from the EPA/NES for assessing relationships among within-pool measures of trophic state. The stringent water quality and flow sampling program requirements required for estimation of nutrient budgets and time limitations of this project suggest, however, that EPA/NES data be used exclusively for evaluating nutrient loading models.

PART X: SED - SEDIMENTATION DATA

71. The seventh major file group describes sedimentation characteristics of CE reservoirs. It contains the following elements:

SED.sheets - Sedimentation Survey Sheets
SED.RATES - Sedimentation Rate File

This information has been derived from a collection of sediment survey data for U. S. reservoirs compiled in 1975 by the Agricultural Research Service of the U. S. Department of Agriculture[10,12]. A total of 84 CE projects in the central project list were included in that compilation. These are identified by the sedimentation survey key in the LISTS.CPL file (Table 8).

72. SED.sheets consists of a collection of the most recent sedimentation survey sheets contained in the appendix to the U. S. Department of Agriculture (USDA) compilation[12]. These sheets contain detailed information on project location, morphometry, hydrology, as well as sedimentation. An example is given in Table 32. Sheets have been assembled in a loose-leaf notebook, identified, and arranged by district and project code.

73. SED.RATES is a file containing the most recent estimates of sedimentation rates for each of the 84 projects located in the USDA compilation[10]. The format of this file is given in Table 33. Many of the sedimentation rate measurements antedate the water quality file. For 45 projects, the most recent survey data available were taken during or before 1965. Rate estimates for some projects, however, will be useful for testing relationships between sedimentation rate and nutrient trapping efficiency during Phase II of this study.

Table 32

Sample Sedimentation Survey Sheet

RESERVOIR SEDIMENT DATA SUMMARY
SCS-34 Rev. 6-66

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

CANTON LAKE
NAME OF RESERVOIR

46-13b
DATA SHEET NO.

DAM	1. OWNER Corps of Engineers	2. STREAM North Canadian	3. STATE Oklahoma
	4. SEC 27,28,33 TWP. 19N RANGE 13W	5. NEAREST P. O. Canton 2 N	6. COUNTY Blaine
	7. LAT 36 ° 05 ' " LONG 98 ° 36 ' "	8. TOP OF DAM ELEVATION 1648.0	9. SPILLWAY CREST ELEV. 1/1638.0

RESERVOIR	10. STORAGE ALLOCATION	11. ELEVATION TOP OF POOL	12. ORIGINAL SURFACE AREA, ACRES	13. ORIGINAL CAPACITY, ACRE-FEET	14. GROSS STORAGE, ACRE-FEET	15. DATE STORAGE BEGAN
	a. FLOOD CONTROL	1638.0	15,750	272,300	401,500	2/ 25 Jul 47
	b. MULTIPLE USE					
	c. POWER					
	d. WATER SUPPLY	3/ 1615.2	8,360	106,450	129,200	16. DATE NORMAL OPER. BEGAN
	e. IRRIGATION					
	f. CONSERVATION	3/ 1596.5	3,340	22,750	22,750	4 Jul 48
	g. INACTIVE					
	17. LENGTH OF RESERVOIR 13.1 MILES		AV. WIDTH OF RESERVOIR 1.3 MILES			

WATERSHED	18. TOTAL DRAINAGE AREA 4/ 12,483 SQ. MI.		22. MEAN ANNUAL PRECIPITATION 19.30 INCHES
	19. NET SEDIMENT CONTRIBUTING AREA 5/ 6,081 SQ. MI.		23. MEAN ANNUAL RUNOFF 0.28 (28.58 yrs) INCHES
	20. LENGTH 300 MILES	AV. WIDTH 40 MILES	24. MEAN ANNUAL RUNOFF 186,400 AC. FT.
	21. MAX. ELEV. 6500	MIN. ELEV. 1575	25. ANNUAL TEMP. MEAN 58.5 RANGE 106 to -2.5

SURVEY DATA

26. DATE OF SURVEY	27. PERIOD YEARS	28. ACCL. YEARS	29. TYPE OF SURVEY	30. NO. OF RANGES OR CONTOUR INT.	31. SURFACE AREA, ACRES	32. CAPACITY, ACRE-FEET	33. C/I RATIO, AC. FT. PER AC. FT.
July 1947	-	-	Range (D)	44	15,750	401,500	2.15
6/May 1953	5.83	5.83	Range (D)	22	15,750	390,800	2.10
6/Oct 1959	6.42	12.25	Range (D)	22	15,750	385,900	2.07
Sept 1966	6.92	19.17	Range (D)	25	15,700	383,300	2.06

26. DATE OF SURVEY	34. PERIOD ANNUAL PRECIPITATION	35. PERIOD WATER INFLOW, ACRE-FEET			36. WATER INFL. TO DATE, AC.-FT.	
		a. MEAN ANNUAL	b. MAX. ANNUAL	c. PERIOD TOTAL	a. MEAN ANNUAL	b. TOTAL TO DATE
May 1953	20.05	288,890	540,420	1,684,200	288,890	1,684,200
Oct 1959	19.51	162,760	422,930	1,044,900	222,780	2,729,100
Sept 1966	18.69	99,170	159,390	686,260	178,160	3,415,360

26. DATE OF SURVEY	37. PERIOD CAPACITY LOSS, ACRE-FEET			38. TOTAL SED. DEPOSITS TO DATE, ACRE-FEET		
	a. PERIOD TOTAL	b. AV. ANNUAL	c. PER SQ. MI.-YEAR	a. TOTAL TO DATE	b. AV. ANNUAL	c. PER SQ. MI.-YEAR
May 1953	10,690	1,834	0.302	10,690	1,834	0.302
Oct 1959	4,880	760	0.125	15,570	1,271	0.209
Sept 1966	2,660	384	0.063	18,230	951	0.156
				7/18,500	7/ 965	7/0.159

26. DATE OF SURVEY	39. AV. DRY WGT., LBS. PER CU. FT.	40. SED. DEP., TONS PER SQ. MI.-YR.		41. STORAGE LOSS, PCT.		42. SED. INFLOW, PPM	
		a. PERIOD	b. TOTAL TO DATE	a. AV. ANNUAL	b. TOT. TO DATE	a. PERIOD	b. TOT. TO DATE
May 1953	70.9	466.4	466.4	0.457	2.66	7,224	7,212
Oct 1959	56.2	65.3	255.8	0.317	3.88	1,795	5,138
Sept 1966	56.1	76.4	190.6	0.237	4.54	3,447	4,799

(Continued)

Table 32 (Concluded)

28. DATE OF SURVEY	43. DEPTH DESIGNATION RANGE IN FEET BELOW, AND ABOVE, CREST ELEVATION											
	63-55	55-45	45-40	40-35	35-30	30-25	25-20	20-15	15-8	8-cr	cr +5	+5-+10
	PERCENT OF TOTAL SEDIMENT LOCATED WITHIN DEPTH DESIGNATION											
May 1953	4.3	12.1	11.9	15.7	17.1	15.2	12.0	7.4	4.3	0.0	0.0	0.0
Oct 1959	3.2	7.7	5.6	12.0	16.4	22.2	14.7	9.9	6.7	1.6	0.0	0.0
Sept. 1966	3.5	13.2	9.1	13.1	16.3	15.4	11.5	7.4	6.2	2.8	1.4	0.1

28. DATE OF SURVEY	44. REACH DESIGNATION PERCENT OF TOTAL ORIGINAL LENGTH OF RESERVOIR														
	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	-105	-110	-115	-120	-125
	PERCENT OF TOTAL SEDIMENT LOCATED WITHIN REACH DESIGNATION														
May 1953	2.5	6.4	10.7	19.3	21.3	17.9	15.6	4.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0
Oct 1959	2.3	2.2	4.7	17.0	27.2	19.1	17.1	6.1	3.1	1.2	0.0	0.0	0.0	0.0	0.0
Sept 1966	4.3	5.7	7.7	18.0	22.3	16.2	14.1	5.3	3.3	1.8	1.3	0.0	0.0	0.0	0.0

45. RANGE IN RESERVOIR OPERATION

WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC. FT.	WATER YEAR	MAX. ELEV.	MIN. ELEV.	INFLOW, AC. FT.
1947 (2 mo)	-	-	248	1957	1625.51	1596.32	422,930
1948	1599.30	-	90,800	1958	1616.12	1613.58	185,310
1949	1614.27	1595.91	437,640	1959	1615.40	1613.12	104,130
1950	1623.84	1602.85	532,180	1960	1615.56	1613.79	145,230
1951	1628.05	1602.36	540,420	1961	1614.65	1613.79	135,330
1952	1605.30	1598.65	81,170	1962	1615.16	1613.12	106,920
1953	1598.75	1588.66	29,530	1963	1614.21	1610.21	61,326
1954	1596.75	1588.30	52,846	1964	1611.93	1600.86	20,513
1955	1615.50	1585.66	223,790	1965	1616.18	1600.41	159,390
1956	1613.27	1604.33	10,953	1966	1615.52	1609.32	[illegible]

46. ELEVATION-AREA-CAPACITY DATA

ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY	ELEVATION	AREA	CAPACITY
1580	0	0	1610	6,323	79,150			
1585	242	256	1614	7,535	106,700			
1590	1,489	3,987	1615	7,879	114,400			
1595	2,678	14,160	1620	9,497	157,800			
1596.5	3,018	18,430	1625	11,258	209,300			
1600	3,652	29,950	1630	12,756	269,800			
1603	4,411	42,100	1635	14,510	338,100			
1605	4,873	51,390	1638	15,700	383,300			

47. REMARKS AND REFERENCES

1/ Top of spillway gates closed. Spillway crest is at elevation 1613.0.

2/ Date of diversion.

3/ Reservoir is being operated at "designated" pool elevation 1615.2 which temporarily provides municipal water supply for Oklahoma City.

4/ Area as determined by AWR committee for April 1954 drainage area data publication.

5/ Excludes 4,642 sq. mi. of watershed not contributing to sediment; 1735 sq. mi. above Fort Supply Dam and 25 sq. mi. surface area of Canton Lake.

6/ To provide a uniform presentation of data from all sedimentation resurveys of Canton Lake, data summaries for the 1953 and 1959 resurveys have been revised to conform with present instructions.

7/ Includes above crest deposits.

48. AGENCY MAKING SURVEY U. S. Army Engineer District, Tulsa

49. AGENCY SUPPLYING DATA U. S. Army Engineer District, Tulsa 50. DATE October 1970

Table 33

Record Format of the SED.RATES File

```
                                          /**********************************************/
DECLARE 1 RATES_RECORD                    /* SED.RATES FILE STRUCTURE (LENGTH=80)      */
                                          /**********************************************/
    2 DIS           PIC'99'               /* DISTRICT CODE                             */
    2 RES           PIC'999'              /* RESERVOIR CODE                            */
    2 SEDREF        PIC'B99999'           /* USDA  RESER CODE FOR SED. DATA            */
    2 DATOT         PIC'ZZZZZZZ'          /* TOTAL DRAINAGE AREA (MI2)                 */
    2 DANET         PIC'ZZZZZZZ'          /* NET DRAINAGE AREA (MI2)                   */
    2 YEAR          PIC'BZZ'              /* YEAR OF LAST SEDIM. SURVEY                */
    2 PERIOD        PIB'ZZZV.99'          /* YEARS FROM PREVIOUS SURVEY                */
    2 VOL           PIC'ZZZZZZZZZ'        /* VOLUME (ACRE-FEET)                        */
    2 T             PIC'ZZZV.999'         /* HYDRAULIC RES TIME (YEARS)                */
    2 SEDA          PIC'ZZV.999'          /* SED. ACC. (AC-FT/MI2-YR)                  */
    2 SEDM          PIC'ZZZZZV.9'         /* SED. ACC. (TONS/MI2-YR)                   */
    2 COM           CHAR(17)              /* COMMENTS                                  */
```

PART XI: NES - EPA NATIONAL EUTROPHICATION SURVEY DATA

74. The eighth file group consists of data and reports obtained from the EPA National Eutrophication Survey[4,9], exclusive of the water quality, hydrologic, and drainage area data described in previous sections. It consists of the following elements:

NES.reports - EPA/NES Working Papers
NES.COMP - Compendium of Lake and Reservoir Data
NES.SUM - Compendium Summary

This file group contains information on 108 CE projects as well as the other 704 lakes and reservoirs which were sampled by the EPA/NES throughout the U. S. Besides providing detailed information on point-source nutrient loadings to CE projects needed for nutrient budget estimation in Phase II, it provides a basis for comparisons of lakes and reservoirs with respect to morphometric, hydrologic, and nutrient loading response characteristics. Such comparisons, in turn, can provide means of interpreting the performance of lake nutrient loading models in reservoirs.

75. During 1972-75, the EPA conducted a systematic survey of 812 lakes and reservoirs in the U. S. The original objective of the National Eutrophication Survey was to develop a data base for assessing the impacts of point-source nutrient discharges on the trophic conditions of lakes and reservoirs. The NES produced a series of working papers[9] summarizing and interpreting the results for each impoundment or lake monitored. Results have also been summarized in a compendium format and published in four volumes[23].

76. NES.reports consists of the collection of working papers describing NES surveys and results in each of 108 CE projects. Each report has been referenced to the data base by district and reservoir code. Maps extracted from the reports have been included in the WATS.maps file.

77. NES.COMP is a computer file containing a nationwide summary of NES data for 775 lakes and reservoirs, obtained from the Corvallis laboratory of the EPA[4]. A sample printout of data from the file is given in Table 34. Similar printouts have been produced for all CE

projects in the compendium file and arranged in a notebook by district and project code. The compendium contains data for 106 out of 108 CE projects sampled by the EPA/NES.

78. NES.SUM is a summary of the NES.COMP file, with a few modifications. The format of the summary file (Table 35) is more convenient for input to statistical analysis programs, since one record is used for each lake or reservoir. A number of missing latitude and longitude coordinates have been added, based upon estimates derived from USGS Hydrologic Unit Maps[6]. Each lake or reservoir has also been referenced by CE division to provide a basis for regional contrasts of lake and reservoir characteristics.

79. A few simple analyses have been done to provide descriptions of types and amounts of data contained in the NES.SUM file. The regional distribution of lakes and reservoirs described in the file is depicted in Figure 5. A breakdown of impoundment numbers as a function of trophic state, impoundment type, and CE division is given in Table 36. The numbers of CE projects are listed as a function of division and trophic state in Table 37.

80. The results of preliminary lake/reservoir comparisons which have been made using data from the NES compendium tape are summarized in Table 38. Three groups of impoundments have been compared: natural lakes (N=310); non-CE reservoirs (N=359); and CE reservoirs (N=106). The stratification of thirty-six original and composite variables across these groups has been studied using the BMDP-77 computer program[1]. Within-group means and Analysis of Variance (ANOVA) statistics are listed in Table 38. Detailed results with histograms are presented in a previous report[24].

81. While the scope of this report precludes detailed interpretations of the data, a few comments on these results seem appropriate:

- a. At the 95% significance level, differences across groups are evident in all cases except longitude, conductivity, phosphorus retention coefficient, nitrogen retention coefficient, and the second Vollenweider phosphorus loading statistic[25].

b. Strongest differences across groups are apparent for drainage area (F=77.5), drainage area/surface area (F=73.6), outflow rate (F=60.7), and drainage area/maximum depth (F=53.4).

c. Reservoirs have higher potential phosphorus concentrations, based upon phosphorus loading and the Vollenweider statistics, but lower observed phosphorus and chlorophyll-a concentrations than natural lakes. This is an indication that the Vollenweider statistics may give biased predictions in reservoirs (i.e., over-predict loading impact).

d. Reservoirs have less transparency, despite less chlorophyll-a. This is probably an effect of mineral turbidity in reservoirs.

e. N/P loading ratios are somewhat lower for reservoirs than for natural lakes; the reverse is true, however, for inorganic N/dissolved P ratios measured during the summer within the impoundments.

f. The composite statistic (Secchi depth/mean depth) is strongly stratified across groups (F=44.8). Assuming that the depth of the photic zone is roughly twice the Secchi depth, the means in Table 38 indicate that typically 62% of the volume of lakes is available for photosynthesis, compared with 30% in the case of CE reservoirs. Reservoirs probably have greater shoreline development, however, and may be more influenced by photosynthetic processes occurring in littoral zones.

g. While a 4-degree difference is evident in the average latitude of CE reservoirs as compared with lakes, a detailed look at Figure 5 reveals that the distribution of NES lakes is bimodal, with clusters in the North (primarily Minnesota, Wisconsin, Michigan, and Maine) and in the extreme South (Florida). The maximum reservoir density occurs between these extremes.

Because of the strong regionality of the lake vs. reservoir distributions evident in Figure 5, it is difficult to separate the effects of impoundment type from those of region with analyses of the type described above. Thus, in future, more complete analyses, it will be important to control for regional differences by comparing subsets of lakes and reservoirs within defined regions.

Table 34

Sample EPA/NES Compendium Printout

COMPENDIUM OF NATIONAL EUTROPHICATION SURVEY LAKES IN WEST VIRGINIA

NAME - TYGART RESERVOIR (MESOTROPHIC)
COUNTY - BARBOUR, TAYLOR
STORET NO. - 5404 WORKING PAPER NO. 470, NTIS ACCESSION NO. PB-251 118/AB

I. MORPHOMETRY

LAKE TYPE	DRAINAGE AREA (SQ KM)	SURFACE AREA (SQ KM)	MEAN DEPTH (METERS)	TOTAL INFLOW (CMS)	RETENTION TIME (DAYS)
IMPOUNDMENT	3537.90	7.08	17.4	73.200	20.0

II. PHYSICAL AND CHEMICAL CHARACTERISTICS

MEDIAN ALKALINITY (MG/L)	MEDIAN CONDUCTIVITY (UMHOS)	MEAN SECCHI DISC (METERS)	MEDIAN TOTAL P (MG/L)	MEDIAN ORTHO P (MG/L)	MEDIAN INORG N (MG/L)	MEDIAN TOTAL N (MG/L)
10.	82.	3.1	0.006	0.005	0.430	0.680

III. BIOLOGICAL CHARACTERISTICS (LAKE)

MEAN CHLOROPHYLL A (UG/L)	ALGAL ASSAY CONTROL YIELD (MG/L--DRY WT)	LIMITING NUTRIENT AT SAMPLING TIME		
1.2	0.1	(4/23/73) P	(7/28/73) P	(10/ 5/73) P

SUMMARY OF PHYTOPLANKTON DATA

4/23/73 GENERA	COUNT	7/28/73 GENERA	COUNT	10/ 5/73 GENERA	COUNT
FLAGELLATES	104	GLENODINIUM	69	ANACYSTIS (MICROCYSTIS)	287
DINOBRYON	57	CENTRIC DIATOM	69	SCENEDESMUS	202
PENNATE DIATOMS	17	ANKISTRODESMUS	35	PHORMIDIUM	169
NITZSCHIA	13	FLAGELLATES	35	FLAGELLATES	118
NAVICULA	10			NITZSCHIA	67
OTHER	11	OTHER	0	OTHER	135
TOTAL	212	TOTAL	208	TOTAL	978

IV. NUTRIENT LOADING CHARACTERISTICS (LAKE)

A. INPUT

	POINT SOURCE MUNICIPAL (KG/YR)	POINT SOURCE INDUSTRIAL (KG/YR)	POINT SOURCE SEPTIC TANKS (KG/YR)	NON-POINT SOURCE (KG/YR)	TOTAL LOADING (KG/YR)
PHOSPHORUS	5330.	**********	15.	42750.	48095.
NITROGEN	15985.	**********	650.	1401020.	1417655.

B. OUTPUT

	OUTLET(S) (KG/YR)	PERCENT RETENTION	LAKE SURFACE AREA LOADING RATE (G/SQ M/YR)
PHOSPHORUS	43935.	9.	6.79
NITROGEN	1507515.	LOSS	200.2

V. NON-POINT-SOURCE NUTRIENT EXPORT

STREAM NAME	MEAN FLOW (CMS)	DRAINAGE AREA (SQ KM)	MEAN TOTAL P (MG/L)	MEAN TOTAL N (MG/L)	TOTAL P EXPORT (KG/SQ KM/YR)	TOTAL N EXPORT (KG/SQ KM/YR)
TYGART VALLEY RIVER	50.100	2447.5	0.020	0.574	11.	367.
SCAB RUN	0.100	4.3	0.159	2.490	115.	843.
FROG RUN	0.100	3.4	0.056	1.003	41.	769.
SWAMP RUN	0.200	9.7	0.077	1.241	30.	658.
SANDY CREEK	4.500	207.2	0.010	0.508	7.	354.
TETER CREEK	3.100	138.6	0.015	0.568	10.	404.
LAUREL CREEK	3.100	140.1	0.011	0.527	8.	372.
PLEASANT CREEK	0.700	32.6	0.027	0.774	19.	554.

CE RESERVOIR NUMBER: 393

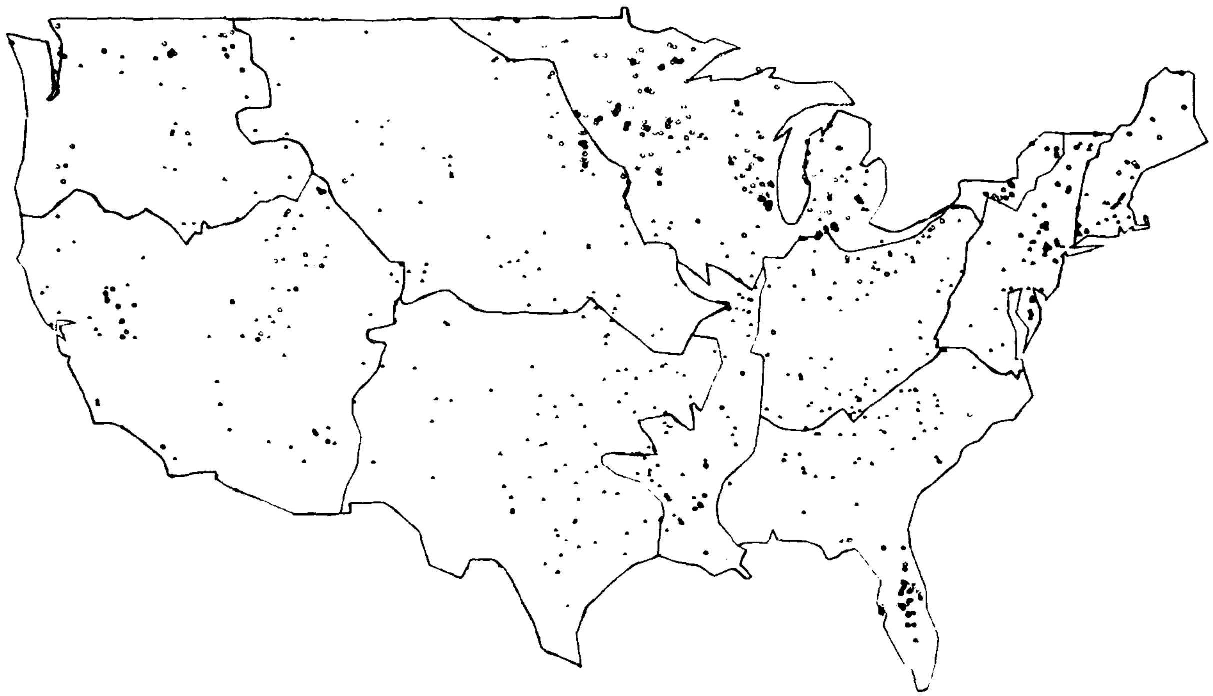
Table 35

Record Format of the NES.SUM File

```
                                                  /*********************************************/
DECLARE 1  NESSUM_REC                             /* NES.SUM FILE STRUCTURE (LENGTH=225)       */
                                                  /*********************************************/
        2 DIV             PIC'Z9'                 /* CE DIVISION                               */
        2 DIS             PIC'Z9'                 /* CE DISTRICT (CE PROJ. ONLY)               */
        2 RES             PIC'ZZ9'                /* CE PROJECT NUMBER                         */
        2 SEQ             PIC'ZZ9'                /* SEQUENCE NUMBER IN NES FILE               */
        2 STORET          CHAR(4)                 /* LAKE CODE USED IN STORET                  */
        2 WKP             PIC'ZZZ'                /* NES WORKING PARPER NUMBER                 */
        2 NAME            CHAR(24)                /* LAKE NAME                                 */
        2 LATITUDE        PIC'ZZZV.ZZ'            /* LATITUDE (DEGREES/HUNDREDTHS)             */
        2 LONGITUDE       PIC'ZZZV.ZZ'            /* LONGITUDE (DEGREES/HUNDREDTHS)            */
        2 TYPE            PIC'9'                  /* TYPE CODE (1=RES.,0=NAT.LAKE)             */
        2 TROPHIC         CHAR(2)                 /* TROPHIC STATE CODE                        */
        2 SAREA           PIC'(7)-V.ZZ'           /* SURFACE AREA (KM2)                        */
        2 DAREA           PIC'(7)-V.ZZ'           /* DRAINAGE AREA (KM2)                       */
        2 ZMEAN           PIC'---V.ZZ'            /* MEAN DEPTH (M)                            */
        2 ZMAX            PIC'---V.ZZ'            /* MAXIMUM DEPTH (M)                         */
        2 RESTIME         PIC'---V.ZZZZ'          /* HYD.RESIDENCE TIME (YRS)                  */
        2 PH              PIC'(4)-V.ZZZ'          /* MEDIAN PH                                 */
        2 ALK             PIC'(4)-V.ZZZ'          /* MEDIAN ALKALINITY (MG/L)                  */
        2 COND            PIC'(4)-V.ZZZ'          /* MEDIAN CONDUCTIVITY (MMHOS)               */
        2 TOTP            PIC'(4)-V.ZZZ'          /* MEDIAN TOTAL P (MG/L)                     */
        2 DISP            PIC'(4)-V.ZZZ'          /* MEDIAN DISSOLVED P  (MG/L)                */
        2 TOTN            PIC'(4)-V.ZZZ'          /* MEDIAN TOTAL N (MG/L)                     */
        2 INORGN          PIC'(4)-V.ZZZ'          /* MEDIAN INORGANIC N (MG/L)                 */
        2 SECCHI          PIC'(4)-V.ZZZ'          /* MEAN SECCHI DEPTH (M)                     */
        2 CHLA            PIC'(4)-V.ZZZ'          /* MEAN CHLOROPHYLL-A (MMG/L)                */
        2 ASSAY           PIC'(4)-V.ZZZ'          /* ALGAL ASSAY CONTROL YIELD(MG/L)           */
        2 LP              PIC'(4)-V.ZZZ'          /* TOTAL P LOAD (G/M2-YR)                    */
        2 RP              PIC'(4)-V.ZZZ'          /* TOTAL P RETENTION COEF                    */
        2 FNPSP           PIC'(4)-V.ZZZ'          /* FRACTION PLOAD NON-POINT                  */
        2 LN              PIC'(4)-V.ZZZ'          /* TOTAL N LOAD (G/M2-YR)                    */
        2 RN              PIC'(4)-V.ZZZ'          /* TOTAL N RETENTION COEF                    */
        2 FNPSN           PIC'(4)-V.ZZZ'          /* FRACTION NLOAD NON-POINT                  */
        2 LIMNUT          CHAR(3)                 /* LIMITING NUTRIENT CODES                   */
                                                  /* FIRST THREE SAMPLING DATES                */
        2 UNUSED          CHAR(3)                 /* BLANK                                     */
```

Figure 5

Regional Distribution of Lakes and Reservoirs
Contained in the EPA National Eutrophication Survey Compendium



AD-A101 553 WALKER (WILLIAM W) JR CONCORD MA F/G 13/2
EMPIRICAL METHODS FOR PREDICTING EUTROPHICATION IN IMPOUNDMENTS--ETC(U)
MAY 81 W W WALKER DACW39-78-C-0053
UNCLASSIFIED WES-TR-E-81-9-1 NL

2 OF 4
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Table 36

Summary of Impoundments in EPA National Eutrophication Survey Compendium by Region, Trophic State, and Impoundment Type

CE DIVISION	OLIGO-TROPHIC	MESO-TROPHIC	EU-TROPHIC	HYPEREU-TROPHIC	OTHER[a]	TOTAL
New England	5/0[b]	3/1	2/18	0/4	0/0	10/23
North Atlantic	1/0	4/8	8/31	0/0	0/0	13/39
South Atlantic	0/0	4/3	24/30	7/0	3/10	38/43
Ohio River	0/0	2/13	11/49	0/0	0/5	13/67
North Central	6/1	22/1	118/43	7/1	6/0	159/46
Lower Mississippi Valley	0/0	0/2	10/29	2/0	0/2	12/33
South West	0/0	0/16	0/54	0/0	0/9	0/79
Missouri River	0/1	0/5	18/41	1/1	0/7	19/55
North Pacific	5/2	5/5	4/17	1/0	8/0	23/24
South Pacific	9/3	4/12	9/34	2/0	1/5	25/54
TOTAL	26/7	44/66	204/346	20/6	18/38	312/463

a OTHER = combination of two or more trophic states

b Number of natural lakes/Number of reservoirs

Table 37

Summary of CE Impoundments in EPA National Eutrophication Survey Compendium by CE Division and Trophic State

CE DIVISION	OLIGO-TROPHIC	MESO-TROPHIC	EU-TROPHIC	HYPEREU-TROPHIC	OTHER[a]	TOTAL NES	GRAND TOTAL[b]
New England	0	0	0	0	0	0	22
North Atlantic	0	2	1	0	0	3	15
South Atlantic	0	1	4	0	2	7	24
Ohio River	0	4	19	0	2	25	64
North Central	0	1	3	0	0	4	16
Lower Mississippi Valley	0	2	11	0	0	13	17
South West	0	8	23	0	2	33	66
Missouri River	0	1	12	1	1	15	31
North Pacific	1	1	1	0	0	3	27
South Pacific	0	1	1	0	1	3	19
TOTAL	1	21	75	1	8	106	299

a OTHER = combination of two or more trophic states

b GRAND TOTAL = number of impoundments in LISTS.CPL file

Table 38

Summary of Lake/Reservoir Comparisons Derived from EPA/NES Compendium

		WITHIN-GROUP MEANS			ANOVA RESULTS	
		(N=309)	(N=360)	(N=106)		
C*	Variable	Nat. Lakes	Non-CE Reserv.	CE Reserv.	F	Prob (greater F)
A	Latitude (degrees N)	41.6	39.0	37.6	34.8	< .0001
A	Longitude (degrees W)	91.7	93.6	92.3	1.9	.16
G	Drainage Area (km^2)	222.	1358.	3228.	77.5	< .0001
G	Surface Area (km^2)	5.6	8.6	34.5	44.4	"
G	Volume (km^2m)	27.3	50.8	239.	36.4	"
G	Mean Depth (m)	4.5	5.7	6.9	10.4	"
G	Maxumum Depth (m)	10.7	15.8	19.8	18.8	"
G	Hydraulic Res. Time (yr)	.74	.23	.37	23.5	"
G	Overflow Rate (m/yr)	6.5	25.	19.	40.9	"
G	Outflow Rate (km^2m/yr)	47.9	236.	650.	60.7	"
G	Dr. Area/ Surf. Area	33.	156.	93.	73.6	"
G	Dr. Area/Volume(1/m)	6.6	26.	13.	39.5	"
G	Maximum Depth/Mean Depth	2.5	2.8	2.9	7.3	.0008
G	Relative Depth	.40	.47	.30	8.6	.0002
G	Surf A/ Max Depth	.53	.56	1.7	24.6	< .0001
G	Dr. Area/Max Depth	20.	86.	162.	53.4	
A	pH	8.06	7.74	7.63	24.1	< .0001
G	Alkalinity (mg/l)	87.	63.	65.	8.6	.0002
G	Conductivity (UMhos/cm)	253.	214.	208.	2.4	.0950
G	Total Phosphorus (mg/l)	.054	.053	.039	3.6	.0268
G	Dissolved P (mg/l)	.021	.018	.011	9.5	< .0001
G	Inorganic Nitrogen (mg/l)	.20	.26	.30	9.7	< .0001
G	Secchi Depth (m)	1.4	1.2	1.1	7.7	.0005
G	Chlorophyll-a (mg/l)	14.	10.	8.9	11.4	< .0001
G	Algal Assay Yld (mg/l)	2.5	2.2	1.3	4.0	.0194
G	P Loading (g/m^2-yr)	.87	2.9	1.7	29.1	< .0001
A	P Retention Coef.	.36	.35	.40	0.7	.51
A	NPS Load Fraction - P	.72	.80	.81	8.4	.0002
G	N Loading (g/m^2-yr)	18.	45.	28.	22.6	< .0001
A	N Retention Coef.	.24	.20	.17	2.5	.081
A	NPS Load Fraction - N	.87	.93	.96	18.7	< .0001
G	N Load/P Load	20.	16.	16.	8.0	.0004
G	Inorg N/ Diss. P	9.1	14.	26.	29.4	< .0001
G	+Vollenweider Stat. 1	.31	.56	.42	15.2	"
G	+Vollenweider Stat. 2	.056	.067	.057	1.9	.1586
G	Secchi D/ Mean Depth	.31	.20	.15	44.8	< .0001

* C = Code for Type of Mean (A = Arithmetic, G = Geometric)

\+ Statistics for Assessing Phosphorus Loading Impacts on Lake Eutrophication; Stat. 1 = $L_p/Q_s^{.5}$ - (ref.25); Stat.2 = $(L_p/Q_s)/(1 + \sqrt{T})$ - (ref.26)

PART XII: NUMERICAL CHARACTERIZATION OF RESERVOIR HYPSOGRAPHIC CURVES

Introduction

82. Estimates of reservoir volume and area variations with elevation are required for computing volume-averaged concentrations and pool hydraulic residence times. This information is generally available in the form of a table which lists area at and volume below specific elevations. Morphometry tables have been compiled for most of the 303 CE projects in the data base. This paper describes numerical investigations of these tables, specifically covering the relative accuracies of various curve-fitting and interpolation techniques. Results will be used to design methods for summarizing, storing, and applying morphometric information in other phases of the project. Results are also relevant to other aspects of reservoir management, specifically including the estimation of reservoir volumes and sedimentation rates from range survey or contour area data.

83. This study has been performed prior to completion of the project morphometry file. A subset of data has been selected which covers 147 projects, each with at least five listed elevations and without obvious errors (such as decreasing areas or volumes with increasing elevation). A total of 1285 elevation/area/volume data points have been compiled for these 147 projects from various sources. Results of this study are summarized below. Details can be found in a working paper submitted as a progress report under this contract[26].

Approach

84. The objective is to design and evaluate methods for estimating area and volume at any elevation, given information available for specific elevations. Methods can generally be classified as curve-fitting or interpolating. Accuracies of these methods can be assessed by comparing observations and predictions of the following:

a. $\hat{V}(V)$ = volume estimated from volume/elevation points

b. $\hat{A}(V)$ = area estimated from volume/elevation points

c. $\hat{A}(A)$ = area estimated from area/elevation points

d. $\Delta\hat{V}(A)$ = incremental volume estimated from area/elevation points

Statistics a and c are simple curve-fitting or interpolating problems. Statistic b involves differentiation of the volume curve to estimate area:

$$\hat{A}(V) = \frac{\partial V}{\partial Z} \tag{1}$$

where

Z is the total depth, ft

Statistic d involves integration of the area curve between specific depth limits (Z_1 and Z_2) to estimate incremental volume:

$$\Delta\hat{V}(A) = \int_{Z_1}^{Z_2} A\,dZ \tag{2}$$

85. In testing each method, a jackknife procedure[27] has been used to estimate the above statistics for internal elevation points (i.e., tests are not made for the top and bottom listed elevations in each project, although these elevations are used in the fitting or interpolating process). In applying the jackknife, information from the point being tested is not used in estimating the parameters of the predictive function. For instance, estimates of area or volume at the second listed elevation are derived exclusively from information in the first and third through last listed elevations.

86. Reported values and predictions are compared using the following error statistic:

$$D = \log_e \left[\frac{2Y}{Y + \hat{Y}}\right] \tag{3}$$

where

Y = reported value (V, A, or ΔV)

$\hat{Y}$ = estimated value

D = error statistic

For errors of the magnitude studied here, the value of D approaches the difference between the reported and predicted values, expressed as a fraction of their average. In most cases, the D statistic seems to have reasonably symmetric error distributions. For each of the four types of area/volume comparisons, estimates of bias and standard error in D have been derived for a variety of predictive methods, as described below.

Curve-Fitting Schemes

87. A single-term power function has some useful properties for fitting these types of curves and is the simplest of the methods evaluated:

$$\hat{V} = c_v Z^{b_v} \tag{4}$$

$$\hat{A} = c_a Z^{b_a} \tag{5}$$

$$Z = E - E_o \tag{6}$$

where

c_v, c_a, b_v, b_a = empirical parameters

Z = total depth (ft)

E = elevation (ft, msl)

E_o = elevation at V=A=0 (ft, msl)

Model parameters can be estimated using linear regression by transforming V, A, and Z values to logarithms. The following equalities should hold if the model is valid for a particular reservoir:

$$\frac{\partial V}{\partial Z} = b_v c_v Z^{b_v - 1} = A \tag{7}$$

$$\therefore c_a = b_v c_v \tag{8}$$

$$b_a = b_v - 1 \tag{9}$$

Equations (8) and (9) can be used to test the consistency of the volume and area curves. The slopes of volume and area vs. total depth on a log/log plot should differ by 1.0. Dividing equation (4) by equation (5) yields the following:

$$\left(\frac{\hat{V}}{A}\right) = \frac{c_v}{c_a} Z^{b_v - b_a} = b_v Z \tag{10}$$

If the basic model holds, the ratio of volume to area (or mean depth) should be proportional to the total depth. Thus, the model can be tested through regression analysis of the following equation:

$$\left(\frac{\hat{V}}{A}\right) = c_z Z^{b_z} \tag{11}$$

A t-test can be applied to the mean and standard error b_z within each project to determine whether the estimate is significantly different from 1.0.

88. In testing the power function model, the parameters in equations (4), (5), and (11) have been estimated for each of 147 reservoirs. The statistical distributions of the optimal slope parameters (b_v, b_a, b_z) are shown in Figure 6 on log-normal probability scales. Median values are 2.97, 1.97, and 0.97, respectively. Thus, in the "typical" reservoir, volume and area increase approximately as the cube and square of total depth, respectively. This corresponds to the solid geometry of an inverted cone or pyramid. About 10% of the projects have b_v values exceeding 4 and 4% have b_v values less than 2. The parameters b_a and b_v contain roughly the same information as the statistically-defined "lake form" proposed by Hakanson[28].

89. Based upon t-tests, the b_z parameter differs significantly ($p=.05$) from 1.0 in about 35% of the projects. This means that the single-term power function model fits about two thirds of the projects. In the remaining one third, the slope parameters b_v and b_a are inconsistent and/or variable with depth.

90. Table 39 lists error statistics for this model. Estimates of the first ($\hat{V}(V)$) and third ($\hat{A}(A)$) statistics are derived directly from equations (4) and (5), respectively. Areas are estimated from volume

Table 39

Evaluation of the Power Function Model

Statistic	Gross* Standard Error	Median** Standard Error
$\hat{V}(V)$	.097	.062
$\hat{A}(V)$	.115	.081
$\hat{A}(A)$	.097	.062
$\Delta\hat{V}(A)$	.177	.081

* estimated from mean-squared D value (equation (3))

** median of within-project mean-squared D values curves according to equation (7). Changes in volume within various strata are estimated from area curves according to:

$$\Delta\hat{V}(A) = \int_{Z_1}^{Z_2} A dZ = \int_{Z_1}^{Z_2} c_a Z^{b_a} dZ \tag{12}$$

$$= \frac{\hat{A}_2 Z_2 - \hat{A}_1 Z_1}{b_a + 1} \tag{13}$$

Standard errors of D range from .097 ($\hat{V}(V)$) to .177 ($\Delta\hat{V}(A)$). The higher standard error of $\Delta V(A)$ could be related to the fact that it is an incremental value which is more subject to measurement error on a percentage basis than is total volume or area. A D standard error of .097 corresponds roughly to a standard error of 10%, or to 95% confidence limits of $\pm$ 20% in an estimated area or volume. The differences between the gross standard error and the median, within-project standard error reflects the skewness of the error distribution across projects, i.e., the model seems to fit some projects considerably better than others, as indicated by the b_z distribution.

91. In order to improve upon the above model, variations in the slope parameters b_v and b_a with depth must be accounted for. The simplest way of doing this is to include higher-order terms in the regression equations:

$$\hat{V}^* = \sum_{i=0}^{m} c_i Z^{*i} \tag{14}$$

$$\hat{A}^* = \sum_{i=0}^{m} d_i Z^{*i} \tag{15}$$

where

c_i, d_i = empirical coefficients (i=0, m)
* = superscript denoting $\log_{10}$ transformation
m = maximum degree of polynomial

The error distributions of these functions have been evaluated for maximum degrees ranging from 1 to 5. For m=1, the scheme is equivalent to the single-term power function model discussed above. For comparative purposes, linear polynomial functions have also been tested:

$$\hat{V} = \sum_{i=0}^{m} c_i Z^i \qquad (16)$$

$$\hat{A} = \sum_{i=0}^{m} d_i Z^i \qquad (17)$$

For each reservoir, the maximum degree of the polynomial has been limited to the minimum of m and the number of elevations in the table minus two.

92. The error statistics in Table 40 indicate that logarithmic polynomials are preferable to linear ones according to most criteria. Log transformation tends to linearize the relationships and renders them easier to fit with low-order polynomial terms. Some reduction in error is achieved by including quadratic and cubic terms in depth. Addition of fourth- and fifth-order terms, however, tends to increase estimation error, presumably because higher-order polynomials can have local minima and/or maxima between the fitted points. These are artifacts of the fitting process which can cause large estimation errors between the fitted points. Cubic polynomials apparently have about the best combination of flexibility and smoothness for these purposes and data densities.

Interpolation Schemes

93. Interpolation methods can be used as alternatives to the curve-fitting techniques described above. Interpolation essentially involves fitting different curves to different sections of each volume/area/elevation table. A variety of interpolation methods have been tested on the same data set used above[26]. These involve different transformations of the volume and area points, including inverse power functions (first through fifth order) and logarithmic. Of the methods tested, one involving logarithmic transformations of volume, area, and total depth points has been shown to have the lowest error statistics[26]. The errors, however, are essentially equivalent to the error

Table 40

Evaluation of Polynomial Functions

Transformation	Maximum Degree	Gross Standard Error $\hat{V}(V)$	$\hat{A}(V)$	$\hat{A}(A)$	$\Delta\hat{V}(A)$
logarithmic	1	.097	.115	.101	.182
	2	.069	.083	.081	.166
	3	.062	.067	.081	.164
	4	.216	.292	.129	.173
	5	1.198	1.280	.534	.491
linear	1	.371	.615	.200	.281
	2	.249	.170	.134	.212
	3	.134	.088	.106	.196
	4	.150	.085	.111	.193
	5	.221	.136	.147	.265

characteristics of the best curve-fitting scheme (log/log cubic polynomials). Results suggest that either of these methods probably approaches the limits of data accuracy.

Conclusions

94. In one sense, numerical interpolation methods are preferable to fitted curves because the former are more flexible and do not rely strongly upon particular forms or curve shapes. Interpolation requires storage of and access to the entire table, however, as opposed to a few parameters in the case of a fitted function. Fitted curves also provide some smoothing of the entries in the table which may serve to filter errors.

95. Based upon relative errors, storage requirements, and computational considerations, log/log cubic polynomials seem to be the best alternative for summarizing hypsographic curves, given data of the type examined here. The approximate equivalence of the $\hat{V}(V)$ and $\hat{A}(V)$ error statistics indicates that storage of the parameters of the volume curve alone would be adequate as a basis for estimating both area and volume. Algebraic differentiation of the volume polynomial can be used to estimate area at any given depth. Thus, both the area and volume curves can be summarized by a total of four polynomial parameters according to the following scheme:

$$Z^* = \log_{10}(E - E_o) \tag{18}$$

$$V^* = \log_{10}(V) \tag{19}$$

$$A^* = \log_{10}(A) \tag{20}$$

$$V^* = c_o + c_1 Z^* + c_2 Z^{*2} + c_3 Z^{*3} \tag{21}$$

$$A = (c_1 + 2c_2 Z^* + 3c_3 Z^{*2}) V/(E - E_o) \tag{22}$$

For cases in which data from only a few elevations are available and/or the quadratic or cubic terms do not add appreciably to accuracy (as assessed via stepwise polynomial regression), first- or second-order polynomials may be used.

96. Use of the method requires knowledge of the base elevation, E_o. If not available, it can be estimated approximately by extrapolating a plot of $V^{1/3}$ vs. E to the horizontal axis. Any error in E_o estimated in this way would be offset in subsequent estimation of the polynomial coefficients.

97. The same functions can be used in very data-limited situations in which only estimates of mean depth, maximum depth, and surface area are available. Approximate parameter estimates in this case are given by:

$$c_2 = c_3 = 0 \tag{23}$$

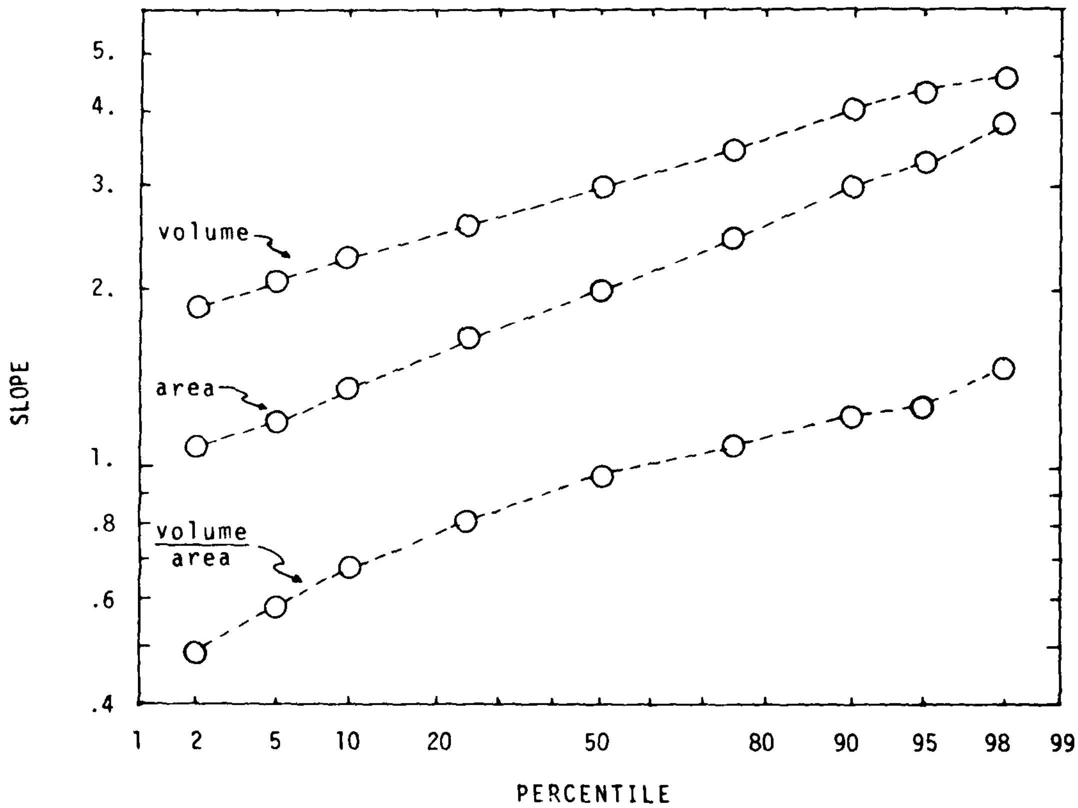
$$c_1 = Z_{max}/Z_{mean} \tag{24}$$

$$c_o = \log_{10}(AZ_{mean}) - c_1 \log_{10}(Z_{max}) \tag{25}$$

98. To insure that the fitted polynomial is not used outside of the range of data availability, maximum and minimum elevations should also be stored with the fitted coefficients. It will be necessary to test the fitted coefficients to insure that the areas estimated through differentiation (equation (22)) are positive and increasing with elevation throughout the application range.

Figure 6

Distributions of Volume and Area Slope Parameters



PART XIII: VARIABILITY OF TROPHIC STATE INDICATORS IN RESERVOIRS

Introduction

99. The development and testing of empirical eutrophication models for reservoirs requires averaging of water quality measurements over spatial and temporal scales. If within-pool water quality variations are not random with respect to date, station, or depth, then summary statistics for a given reservoir will depend to some extent upon the particular data-reduction method employed. The choice of reduction method may, in turn, influence conclusions regarding the adequacy of existing models as well as the parameter estimates of any new models which may be developed.

100. There is no standard data reduction procedure which can be used prior to model development, testing, or application. Methods have included, for example: (1) taking the median or mean of all within-pool observations[23]; (2) sequential averaging over depths, stations, and dates[29]; (3) seasonal averaging within specific depth ranges[30]; and (4) various weighted-averaging schemes which reflect morphometric characteristics. As compared with natural lakes, many reservoirs pose special data reduction problems due to extreme spatial and/or temporal variations in conditions.

101. In this section, a subset of the current CE water quality data base is analyzed in order to describe spatial and temporal variations in trophic state indicators within a group of reservoirs. The analysis covers spatial relationships, seasonal relationships, variance components, and error estimation. Implications of the results are discussed with respect to the design of monitoring programs and use of the data in model development and evaluation. Details on many of the procedures used and results discussed below can be found elsewhere[31,32]

Data Base

102. EPA National Eutrophication Survey (NES)[9] data from 484 stations located within 108 CE projects have been used as a basis for this analysis. The relatively uniform sampling program designs used by the NES provide data which are suitable for statistical treatment. One drawback, however, is that under this program, reservoirs were typically sampled only three times during one growing season. In Phase II of this project, there are plans to examine data from other agencies, which, in many cases, are more intensive and/or cover longer periods.

103. Surface total phosphorus, Secchi depth, and chlorophyll-a values have been expressed in terms of Carlson's Trophic State Indices (I_p, I_T and I_B, respectively)[30]:

$$I_p = 4.2 + 33.2 \log_{10} P \quad (26)$$

$$I_T = 60 - 33.2 \log_{10} Z_s \quad (27)$$

$$I_B = 30.6 + 22.6 \log_{10} B \quad (28)$$

where

P = total phosphorus concentration (mg/m^3)

Z_s = Secchi depth (m)

B = chlorophyll-a concentration (mg/m^3)

The indices are calibrated such that the three versions are equivalent, on the average, when applied to midsummer, epilimnetic data from northern, natural lakes. Expression of measurements on the above scales tends to reduce the skewness in the distributions of the variables and provides benchmarks for assessing reservoir trophic state relationships in comparison to those typical of natural lakes. A statistical data summary is given in Table 41.

Table 41

Statistical Summary of EPA/NES Trophic Index Data from 108 CE Projects

Variable	n	mean	standard deviation	minimum	maximum
I_P	1421	55.8	13.1	24.1	99.0
I_T	1493	58.9	12.7	25.4	112.9
I_B	1505	48.2	10.3	8.0	81.6

Case Studies of Spatial Relationships

104. Spatial variations typical of a few reservoirs are depicted in Figures 7-10. Mainstem stations are displayed in downstream order within each reservoir (not to scale) and mean values are plotted for each version of the Trophic State Index. These plots provide initial perspectives on the types of spatial trends and relationships which can be found in reservoirs and are important supplements to the more formal statistical treatment of the data presented in subsequent sections. The plots seem to illustrate a number of important controlling processes, which are discussed below in relation to each reservoir.

105. Figure 7 contains data from the White River system on the Arkansas/Missouri border. Four reservoirs are connected in series: Beaver, Table Rock, Taneycomo, and Bull Shoals. With the exception of Taneycomo, they are all deep reservoirs with hydraulic residence times in excess of 250 days. Trophic State Index behavior in the first reservoir, Beaver, is considerably different from that typical of the downstream impoundments. Concurrent reductions in I_P and I_T most likely reflect sedimentation and the three index curves do not converge until the dam. Once most of the sediment load has been removed in Beaver, agreement among the index curves is good at most downstream stations. Increases in Table Rock probably reflect the influence of a major point source which accounts for more than 70% of the total phosphorus loading to that reservoir. The relatively low values of I_B in Taneycomo can be explained by the direct influence of subsurface discharge from upstream Table Rock Dam. Taneycomo has a short hydraulic residence time (7 days) and surface water temperatures at the times when summer chlorophyll-a samples were taken roughly matched temperatures at the 100-foot level just above Table Rock Dam (~15°C). Taneycomo's short hydraulic residence time is apparently insufficient to permit recovery of temperatures and algal populations from those typical of the Table Rock hypolimnion. Decreases in all versions of the index are evident moving downstream in Bull Shoals, and relatively stable conditions are reached over the last four stations.

Figure 7 White River System

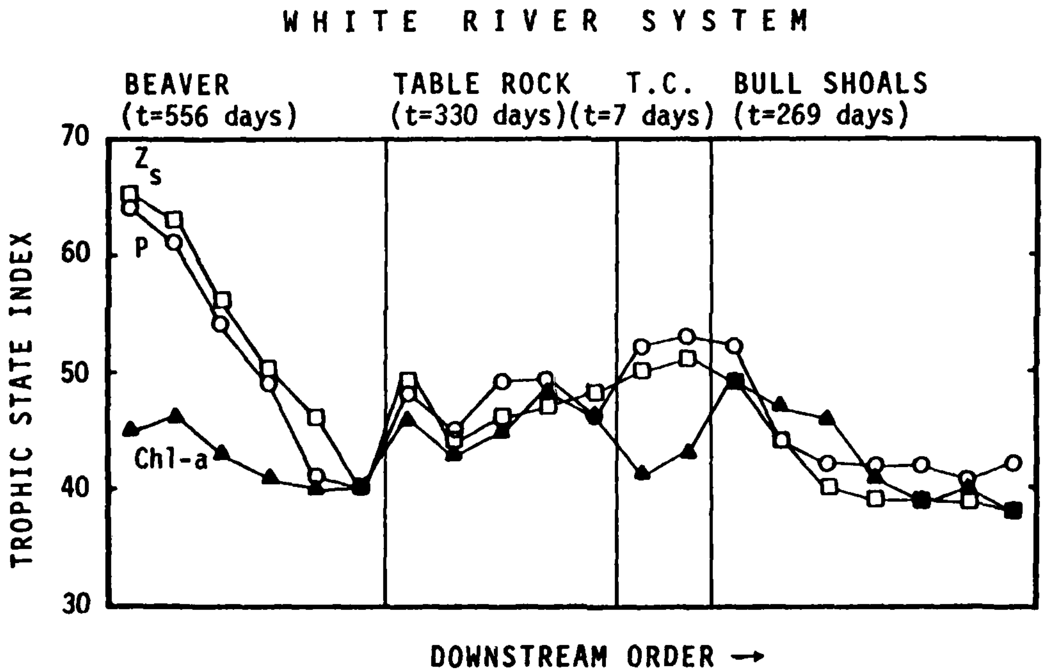


Figure 8 Sakakawea

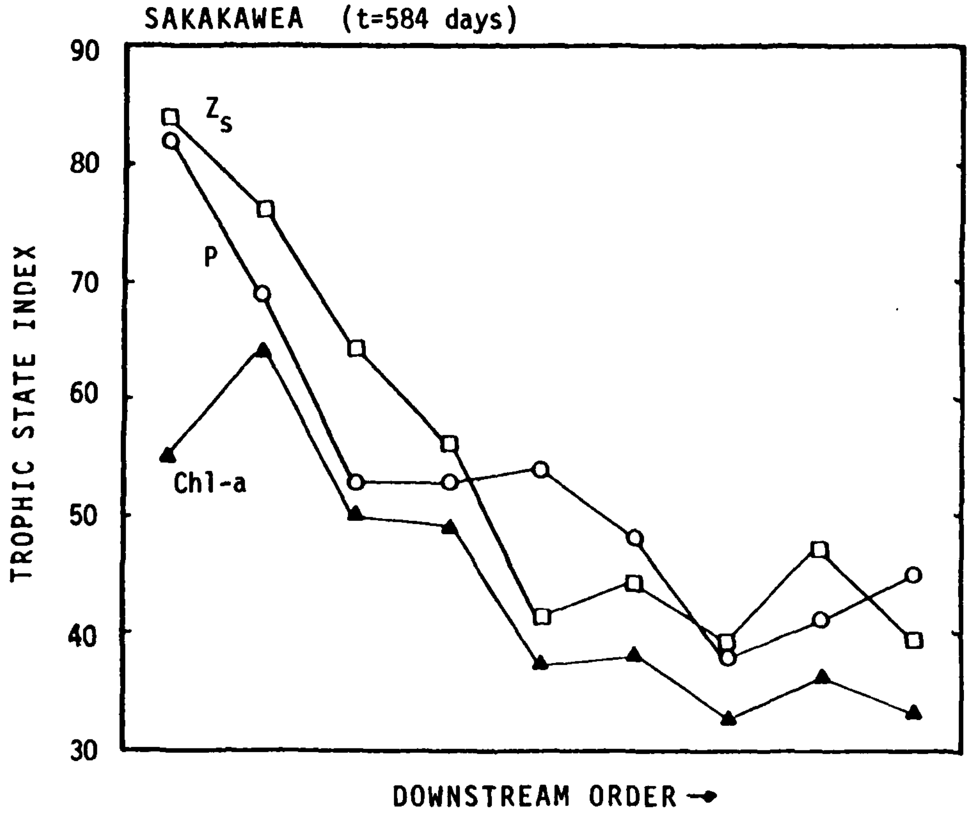


Figure 9 Old Hickory

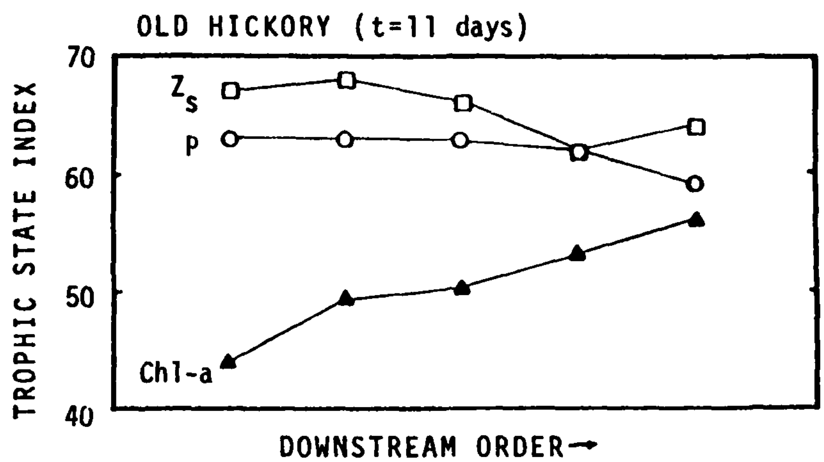
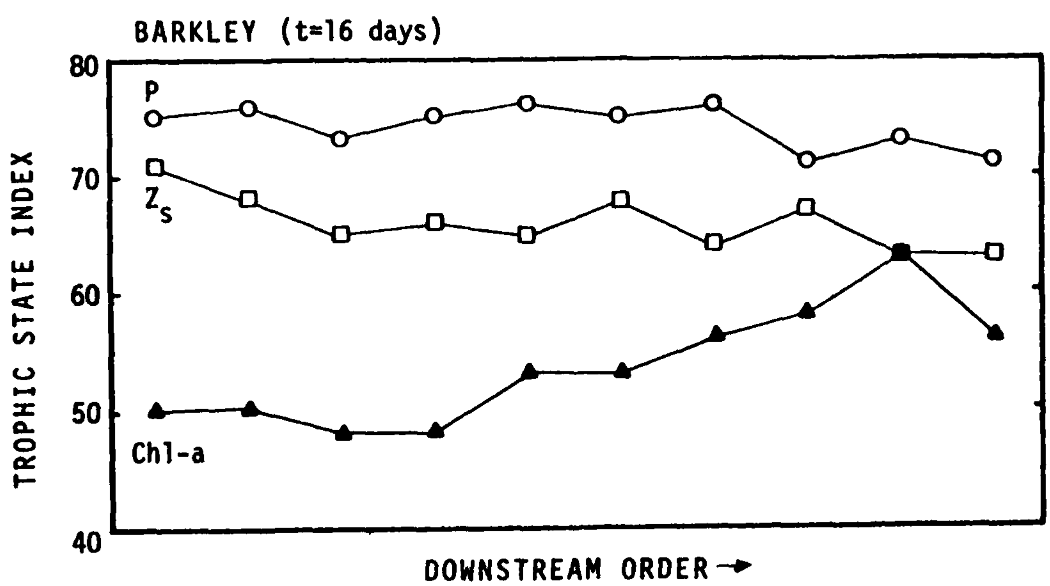


Figure 10 Barkley



106. Lake Sakakawea (Figure 8), on the Missouri River in Montana, shows TSI variations over 40 units, or sixteenfold differences in transparency and total phosphorus. Upstream portions were classified by the EPA/NES as "hyper-eutrophic" and stations near the dam as "oligotrophic". Below the second station, the chlorophyll-a index follows but remains roughly 5-10 index units below the phosphorus and transparency indices.

107. Old Hickory (Figure 9), on the Cumberland River in Tennessee, shows relatively small downstream reductions in phosphorus and transparency and a steady increase in chlorophyll-a. With a mean residence time of 11 days and sediment removal by upstream reservoirs on the Cumberland River, longitudinal variations in I_P and I_T are not as evident as in above panels. The gradual increase in I_B might be a hydraulic residence time effect, i.e., the time scale required for algal populations to "equilibrate" with available nutrient and light levels may be appreciable in relation to time-of-travel within the pool.

108. Similar behavior is evident in Lake Barkley (Figure 10), which is located further downstream on the Cumberland River and has a residence time of 16 days. One important difference is that the phosphorus index remains consistently higher than the other versions. Both ambient available nutrient concentrations and bioassays indicate, however, that algal populations in Lake Barkely were nitrogen-limited at the times of sampling. Use of I_P alone as a measure of nutrient availability may not be appropriate in this case.

109. The above case studies illustrate a number of factors which can be important in assessing reservoir trophic state relationships: sedimentation, upstream impoundment effects, hydraulic residence time effects, and nitrogen limitation. Reservoir hydrodynamics partially determine the transformations of these and other factors into spatial variations in the trophic state indicators. Upstream/downstream variations contain information on rates and directions of controlling processes. Graphing of spatial relationships and expression/analysis in terms of distance (river mile) and/or time (time-of-travel) will aid in quantitative data analysis and interpretation. Use of station means rather

than reservoir means seems to make more sense for model testing purposes.

Seasonal Relationships

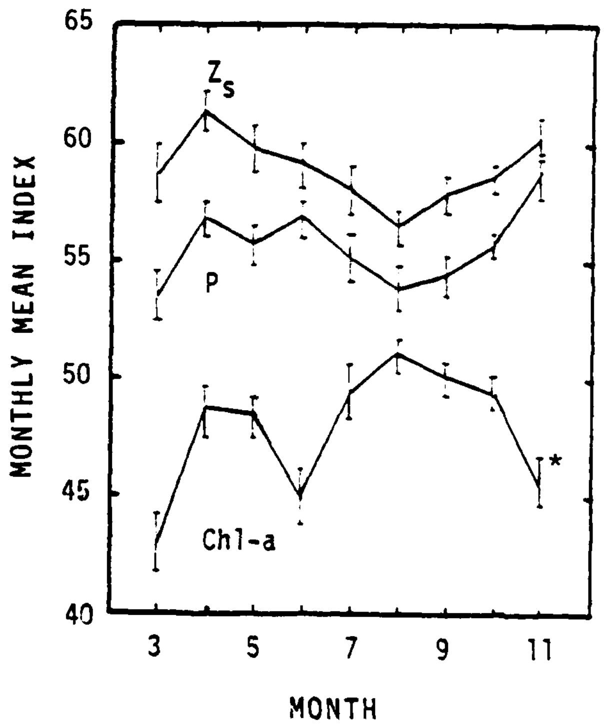
110. Average seasonal variations in the index components are depicted in Figure 11. Station means have been computed and their effects removed from the data prior to calculating the mean and standard error for each month (March-November) and index component. Analyses of variance indicate that monthly effects are significant ($p < .0001$) for each component and strongest in the case of chlorophyll-a. The seasonal variations depicted in Figure 11 are characteristic of this collection of reservoirs but not necessarily of each reservoir individually.

111. Average seasonal effects on phosphorus and transparency are similar: both tend to be lowest during March and midsummer and highest during April and November, possibly reflecting seasonal flow and turbidity variations and influences of turnover periods. Monthly effects on chlorophyll-a suggest a spring maximum (April-May), followed by a June depression, a midsummer maximum, and lower values in November. Temperature and light effects may be responsible for the relatively low chlorophyll-a levels during March and November. The June depression may be due to seasonal succession of algal species. A more detailed examination of the data indicates that lower June chlorophyll-a levels are characteristic of about half of the stations sampled in June, while the rest have June levels more typical of May or July values. In testing seasonal aspects of TSI behavior, Carlson[30] also noted a June depression in chlorophyll-a index relative to the phosphorus index in three natural lakes.

112. Differences among various versions of the index provide a measure of "lake-like" behavior, since the index system is calibrated so that I_B, I_T, and I_P values are equivalent, on the average, when applied to midsummer, epilimnetic data from northern, natural lakes. Figure 11 indicates that the range of index means is generally lowest during midsummer (approaching 5 during August) and highest during March, June, and November (approaching 15). Minor recalibration of the phosphorus and/or

Figure 11

Monthly Variations in Trophic State Indices



* mean ± 2 standard errors

transparency index would bring I_P and I_T into agreement for all seasons, since the monthly effect curves in Figure 12 are roughly parallel. Since seasonal chlorophyll-a behavior is fundamentally different, however, recalibration alone would not eliminate biases (i.e., significant differences between I_B and I_P or between I_B and I_T) for all seasons.

113. Thus, seasonal factors must be considered in reducing the data and in recalibrating/redesigning the index system for use in reservoirs. One approach would be to restrict averaging period to midsummer. An alternative would be to include explicit seasonal effect terms in the model or index system. These approaches will be investigated in future model development work.

Variance Component Estimation

114. Two-way Analyses of Variance have been applied to each reservoir and index component to test for the significance of variations associated with station and sampling date. Results are summarized in Table 42. Significant ($p < .1$) differences among station means in I_P, I_B, and I_T were found in 46, 37, and 52 out of 105 projects, respectively. Significant differences among date means were found in 62, 67, and 64 projects, respectively.

115. The following ANOVA model has been employed to derive pooled estimates of the variance components of each version of the index:

$$y_{hij} = \mu + r_h + s_{hi} + t_{hj} + e_{hij} \tag{29}$$

where

y_{hij} = index measurement in reservoir h at station i on date j

μ = grand mean

r_h = average effect of reservoir h on grand mean

s_{hi} = effect of station i in reservoir h

t_{hj} = effect of date j in reservoir h

e_{hij} = random effect

Table 42

Summary of ANOVA Results

Date Effects	Station Effects: Not Significant	Station Effects: Significant**
Phosphorus Index		
Not Significant	32*	11
Significant	27	35
Chlorophyll-a Index		
Not Significant	33	5
Significant	35	32
Transparency Index		
Not Significant	27	14
Significant	26	38

* number of projects in category (total = 105)

** significance defined at $p < .10$

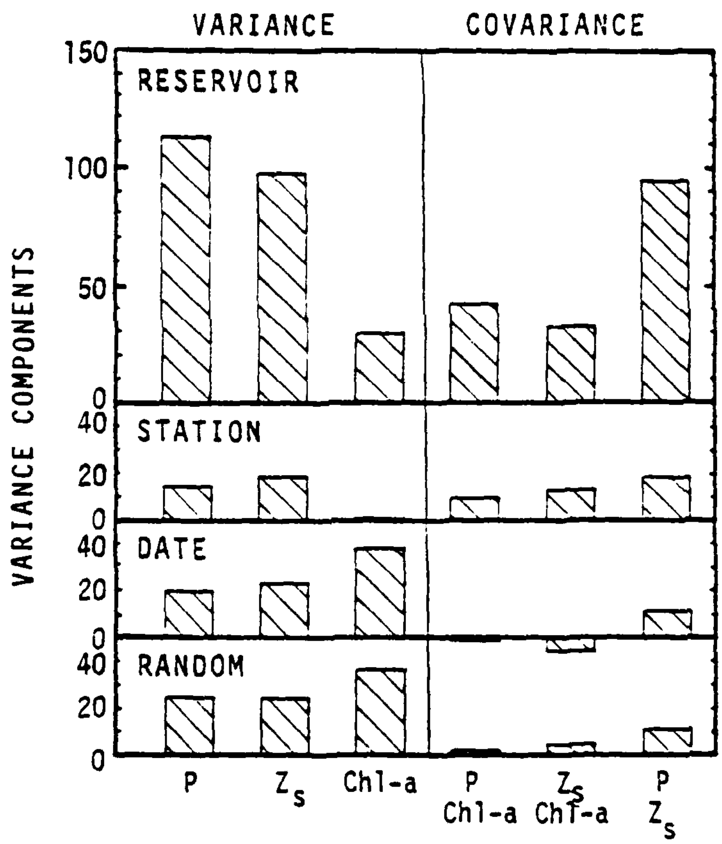
The relative magnitudes of the within- and between-reservoir components are of special significance to monitoring and modelling efforts. With relatively large within-reservoir components, it would be difficult to obtain much accuracy in reservoir summary statistics (e.g., reservoir mean) with limited data. This would reduce the explainable variance (R^2) of any model calibrated to the reduced data set, make it more difficult to distinguish among alternative model formulations, and increase the error associated with model parameter estimates.

116. SAS procedures[2] have been used to estimate the above variance components for each index separately and to estimate analogous covariance components for each pair of indices (I_B/I_T, I_B/I_P, I_T/I_P). Results are shown in Figure 12. The phosphorus and transparency index components exhibit similar patterns: between-reservoir differences account for 60-66% of the total index variance, as compared with 29% in the case of chlorophyll-a index. Between-reservoir variances indicate that differences in chlorophyll-a are considerably less marked than would be predicted based upon differences in the phosphorus or transparency indices. Conversely, there is greater temporal and random variance in chlorophyll-a than in phosphorus or in transparency.

117. The covariance components on the right-hand side of Figure 12 provide some insights into relationships among the indices at different averaging levels. The between-reservoir and between-station covariance components are positive in all cases. Thus, the various versions of the index correlate positively both among reservoirs and among stations within reservoirs. Temporal components indicate a positive covariance for phosphorus/transparency but slightly negative covariances for the pairs involving chlorophyll-a. Thus, when temporal variations at a given station are analyzed, one would expect, on the average, to find a positive correlation only between the phosphorus and transparency indices. This correlation might be attributed, for example, to turbidity variations following seasonal or short-term (storm-event) flow variations. Despite its positive covariance between reservoirs and between stations, chlorophyll-a does not covary temporally with the other indices.

Figure 12

Variance and Covariance Components of Trophic State Indices



118. The EPA/NES data base includes measurements from one growing season within any reservoir and does not permit testing for between-year variance or covariance components. Thus, it is not possible with this data set to test for year-to-year covariance between chlorophyll-a and phosphorus or transparency. Distinguishing between seasonal and year-to-year variance components will be possible with an expanded data base including data from other agencies and monitoring programs.

Error Analysis

119. The above analyses demonstrate that within-reservoir variations cannot be considered random with respect to dates or stations, the primary parameters used in monitoring program design. This has implications for estimating the accuracy of reservoir or station mean values calculated from the data set. If variations were random and serially independent with respect to station and date, the following statistic would be appropriate for estimating the variance of a reservoir mean:

$$\mathrm{Var}(\bar{y}) = \frac{\mathrm{Var}(y)}{N} \tag{30}$$

where

N = total number of observations within a reservoir for a given index

Using two-stage sampling theory[33], the following formula is more appropriate:

$$\mathrm{Var}(\bar{y}) = \frac{\sigma_s^2}{n_s} + \frac{\sigma_t^2}{n_t} + \frac{\sigma_e^2}{N} \tag{31}$$

where

σ^2 = mean squared deviation

n_s = number of stations sampled

n_t = number of dates sampled

The first term accounts for the influence of between-station variations, the second for between-date variations, and the third for random variations. Note that equation (31) reduces to equation (30) when spatial and temporal variations are insignificant ($\sigma_s^2 = \sigma_t^2 = 0$ and $Var(y) = \sigma_e^2$). Because both spatial and temporal variations often exhibit patterns or trends (see Figures 7-11), they cannot be considered serially independent. Thus, equation (31) provides error variance estimates which are approximate but useful for assessing the relative contributions of spatial and temporal variance to the variance of reservoir means.

120. Based upon the total number of observations, stations, and reservoirs in the NES data set, the "typical" reservoir survey program covers 5 stations (n_s) on 3 dates (n_t), for a total of 15 observations (N). Using these values and the pooled variance components depicted in Figure 5, equations (30) and (31) have been applied to each version of the index and results are displayed in Figure 13.

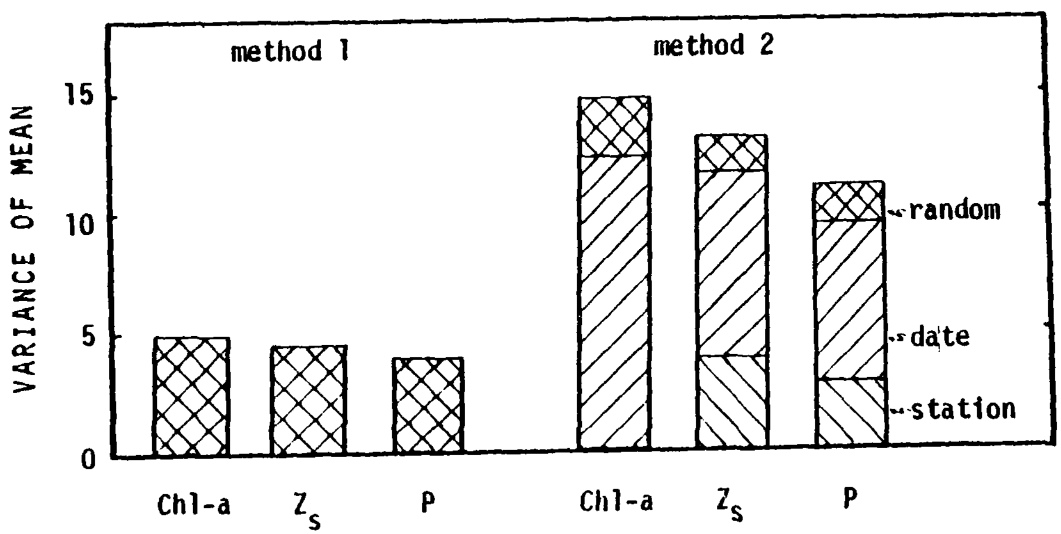
121. Considering the effects of spatial and temporal variance components (equation (31)) increases mean error by about a factor of three over estimates derived from equation (30). Most of the error variance is due to the temporal component, especially in the case of the chlorophyll-a index. The error variances indicate that the EPA/NES sampling strategy has provided estimates of reservoir geometric means which are typically accurate ($p < .05$) to within factors of 1.6, 2.2, and 1.7 for surface phosphorus concentration, chlorophyll-a concentration, and Secchi depth, respectively.

Monitoring Implications

122. Error analyses can be used to improve upon monitoring program designs. For example, given the objective of collecting data to be used in estimating a reservoir mean with minimum variance, the above results suggest that an increase in sampling dates would be more effective than an increase in sampling stations, because the date effect term dominates the error equation. Since the variance component estimates have been pooled, these results apply to this collection of reservoirs as a whole and not necessarily to each reservoir. The same approach could be

Figure 13

Variance Components of Trophic Index Means within Reservoirs



applied using parameters estimated for each reservoir individually (n_s, n_t, N, σ_s^2, σ_t^2, σ_e^2). "Optimal" designs could be formulated based upon the error analysis framework and upon functions which relate n_s, n_t, and N to monitoring cost. Given variance components estimated from prior monitoring data, improvements in program design (changes in n_s, n_t, and N) for a given reservoir could be formulated to yield minimum error for a fixed total cost or minimum cost for a fixed total error. The approach could be expanded to include depth as a third sampling dimension. This represents a logical application for the error analysis framework in a monitoring context.

Modelling Implications

123. In evaluating models, differences between observations and predictions can be attributed to three types of error: parameter error, data error, and model error. The first reflects uncertainty in the model coefficients, the second, errors in the predicted and/or predictor variables, and the third, influences of factors which are not considered in the model structure. Analyses of the type conducted above can be used to quantify potential data errors and separate them from the other components. This provides insights into the adequacy of a data base for use in model testing. If, for example, the data error component dominates, it would be difficult to distinguish among alternative models or to improve upon them without first improving the data base.

124. Table 43 summarizes results of regression analyses which have been done to summarize relationships among the three versions of the index using station mean and reservoir mean values. Results further demonstrate the need for recalibration of Carlson's index system in applications to reservoirs. The sensitivity of the chlorophyll-a component to phosphorus or transparency ranges from .30 to .37 and is in all cases significantly different from 1.0, the value obtained when the index system is calibrated to natural lakes. In contrast, the sensitivity of I_P to I_T is .88 for stations means and .91 for reservoir means.

Table 43

Regression and Corresponding Error Analyses

Model	r	s_b***	Total** Error	Sampling* Error	Sampling Error / Total Error
Station Means (n=484)					
$I_B = 28.7 + .35\ I_P$	.55	.024	42.3	23.1	.55
$I_B = 30.0 + .31\ I_T$	.46	.027	47.6	22.7	.48
$I_P = 4.0 + .88\ I_T$	.83	.027	47.6	25.9	.54
Reservoir Means (n=108)					
$I_B = 28.0 + .37\ I_P$	.59	.048	32.5	16.3	.50
$I_B = 31.0 + .30\ I_T$	.44	.059	41.0	16.0	.39
$I_P = 2.0 + .91\ I_T$	.83	.059	41.0	22.1	.54

* Sampling Error due to error in estimating mean index values within each station or reservoir; sampling errors for station mean phosphorus, chlorophyll-a , and transparency indices are estimated at 14.3, 21.3, and 15.0, respectively; corresponding sampling errors for reservoir-means are 11.2, 14.8, and 13.1.

** Total Error = mean squared residual

*** s_b = standard error of regression slope

While the correlation coefficients (and explained variance) are considerably lower for predicting chlorophyll-a (.44-.59) than for predicting phosphorus from transparency (.83), the mean squared prediction errors are similar.

125. Part of the mean squared error for each regression model can be attributed to sampling error in estimating the reservoir and station mean values. The sampling error component of the mean squared error for each model is estimated from:

$$\mathrm{Var}(\bar{y} - b\bar{x}) \simeq \mathrm{Var}(\bar{y}) + b^2\,\mathrm{Var}(\bar{x}) \qquad (32)$$

where,

y = predicted index

x = predictor index

b = slope of regression model

Results of error analyses have been used to estimate sampling errors in station mean and reservoir mean values. Results indicate that roughly half (39-54%) of the residual standard error can be attributed to sampling error in the data values. The remaining variance presumably reflects model error, or the effects of factors (e.g., season, sediment) which are not accounted for in the model. The choice of averaging method (stations vs. reservoirs) does not influence the model coefficient values significantly. Mean squared errors are reduced when reservoir mean values are used, partially resulting from a reduction in the sampling error component. The standard errors of the regression slopes, however, increase roughly twofold when reservoir mean values are used in place of station means. Thus, using station means permits better definition of model coefficients.

126. The intent of the regression analyses presented in Table 43 is to demonstrate the error analysis approach and identify influences of data reduction method. The models suggest that chlorophyll/phosphorus and chlorophyll/transparency relationships in these reservoirs are significantly different from those which are typical of natural lakes.

The models are inadequate for predictive use, however, because a number of important factors have not been considered, including season, nitrogen limitation, hydraulic residence time, region, and external sediment loading. These and other factors will be considered in developing a Trophic State Index system applicable to reservoirs under Phase II of this project.

Conclusions

127. Statistical models of index (or water quality) variations within reservoirs have been shown to be complicated by the effects of spatial and temporal variations and by non-randomness or serial dependence in these variations. The above analyses have demonstrated how some of these influences can be approximately treated and applied to assess data adequacy for computing reservoir means and to improve upon monitoring program designs. A more thorough statistical treatment would require more intensive data sets and involve the construction of more complex statistical models applied separately to each reservoir using simulation techniques. This level of detail is not justified or feasible within the context of this study.

128. The following general conclusions can be drawn from the analyses of EPA/NES data in previous sections:

- a. Spatial relationships among trophic state indicators are important in some reservoirs, especially when stations are viewed in downstream order.
- b. Analyses of Variance indicate that within-reservoir variations are often non-random with respect to stations and/or sampling dates within a given year. Variations with respect to date are typically stronger than variations between stations, particularly in the case of chlorophyll-a.
- c. Some of the temporal variance within reservoirs and stations is fixed with respect to month or season. Seasonal effects on phosphorus are qualitatively similar to seasonal effects on transparency but differ from seasonal effects on chlorophyll-a.

d. Between-reservoir variance in Carlson's chlorophyll-a index is roughly one third of the between-reservoir variances in the phosphorus and transparency indices.

e. For this data set, chlorophyll-a variance between sampling dates within reservoirs is greater than its variance between reservoir means. The reverse is true for phosphorus and transparency.

f. Covariance components indicate significant positive correlations among the three versions of the index system when variations between reservoirs and between stations within reservoirs are considered. The chlorophyll-a index does not correlate with either of the other indices, however, when temporal variations (at a given station or within a given reservoir) are considered.

g. Because of non-randomness with respect to stations and dates, the error variance of reservoir mean values for each index are typically three times those estimated from the familiar formula for mean variance (σ^2/n).

h. Given the objective of estimating reservoir means with minimum variance, error analyses indicate that increases in the number of sampling dates would be generally more effective than increases in the number of stations per reservoir for improvement in the EPA/NES sampling design.

i. Regression analyses indicate that chlorophyll-a levels are significantly less sensitive to phosphorus or transparency, as compared with the natural lakes used in developing Carlson's index system. Future development of an index system for reservoirs should consider the effects of season, region, nitrogen limitation, residence time, and sediment loading.

j. Use of station means, as opposed to reservoir means, in recalibrating the index system causes small increases in standard error of estimate but substantially reduces the standard errors of model parameters.

Implications for Data Reduction Strategies

129. The conclusions in the previous section suggest that the following data-reduction/analytical strategies be used in testing and developing models under Phase II of this project:

a. Since spatial variations and trends have been shown to be often statistically identifiable and useful for interpretation purposes, use of station means would seem to be more desirable than use of reservoir means for model testing. Use of station means would also permit better definition of model parameters.

b. It would be useful to develop a scheme for spatial orientation of stations within each reservoir with respect to major tributary (arm) and distance (river mile). Some aggregation of stations based upon proximity may be feasible within this framework.

c. Seasonal factors should be considered in averaging data within each station or station group. This would involve, for example, estimation of "spring", "summer", "fall", as well as "growing season" and "annual" averages.

d. For non-NES stations which are sampled during more than one year, tests for significant year-to-year differences should be made and used to decide whether aggregation of data from different years is justifiable.

e. While the above analyses have been based exclusively upon surface sampled for phosphorus, averaging with depth should be considered, at least within the photic zone, for testing of relationships among phosphorus, chlorophyll-a, and transparency.

f. To permit testing of loading response models, seasonal estimates of reservoir means could be derived by averaging across stations. Due to longitudinal variations in many reservoirs, however, near-dam or discharge conditions should also be used as bases for loading model evaluations.

PART XIV: EVALUATION OF METHODS FOR ESTIMATING PHOSPHORUS LOADINGS

Introduction

130. The estimation of reservoir nutrient budgets entails estimation of the total mass of nutrients passing given sampling points over a given period of time, typically at least one year. While continuous, flow-weighted composite sampling for concentrations would provide the best basis for deriving such estimates, usually only periodic grab-samples are available for stream concentrations. These concentrations must be integrated with flow records (typically continuous) in order to estimate the desired loadings. The purpose of this section is to test and compare alternative methods in order to provide some guidance for future nutrient budget calculations on CE reservoirs.

Preliminary Analysis

131. The relationship between concentraton and flow influences the appropriateness of a given loading calculation method at a given station. A subset of flow and phosphorus concentration data from the current CE data base has been analyzed in order to provide some perspective on this relationship[34]. The subset includes 86 tributary and 33 discharge stations, each with at least 25 total phosphorus/streamflow pairs obtained from STORET. Table 44 describes the symbols and fundamental equations used to characterize flow and concentration variations.

132. Results of the preliminary analysis are given in Table 45, with data grouped by station type. The regression model relating the logarithm of concentration to the logarithm of flow explains, on the average, 12.3% of the variance in concentration at tributary stations and 6.6% of the variance in concentration at discharge stations. Figure 14 shows that the upper percentiles of the R^2 distribution at tributary sites are roughly twice those found at discharge sides.

Table 44

Fundamental Equations and Symbols

Loading Definition:	$L = Q\ C$
	$W = X + Y$
Flow/Concentration Model:	$C = a\ Q^b$
	$Y = \log_{10} a + b\ X$
Distributions:	Y:(mean= μ_y, std.dev.= σ_y)
	X:(mean= μ_x, std.dev.= σ_x)
Symbols:	L = Loading (mass/time)
	Q = Flow (volume/time)
	C = Concentration (mass/volume)
	$W = \log_{10}(L)$
	$X = \log_{10}(Q)$
	$Y = \log_{10}(C)$
	a,b = Regression model parameters

Table 45

Preliminary Analysis of Flow/Total P Concentration Relationships

Statistic	Station Type: Tributary	Station Type: Discharge
number of stations	86	33
fraction of variance explained by regression model	.123 ± .151*	.066 ± .078
residual variance	.101 ± .075	.090 ± .050
serial correlation of residuals	.228 ± .205	.300 ± .276
conc/flow sensitivity (b)	.124 ± .250	.097 ± .138
standard dev. of $\log_{10}$(flow)	.573 ± .246	.600 ± .303
standard dev. of $\log_{10}$(conc)	.323 ± .133	.297 ± .088

* mean ± one standard deviation

Figure 14

Distributions of R^2 Values at Tributary and Discharge Stations

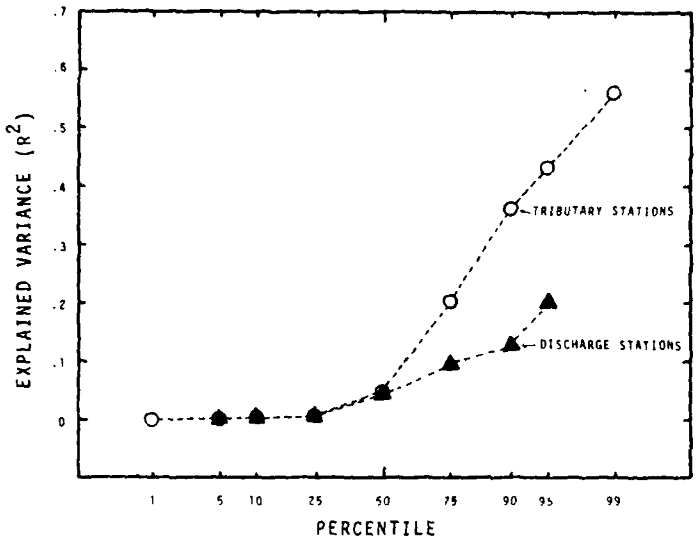
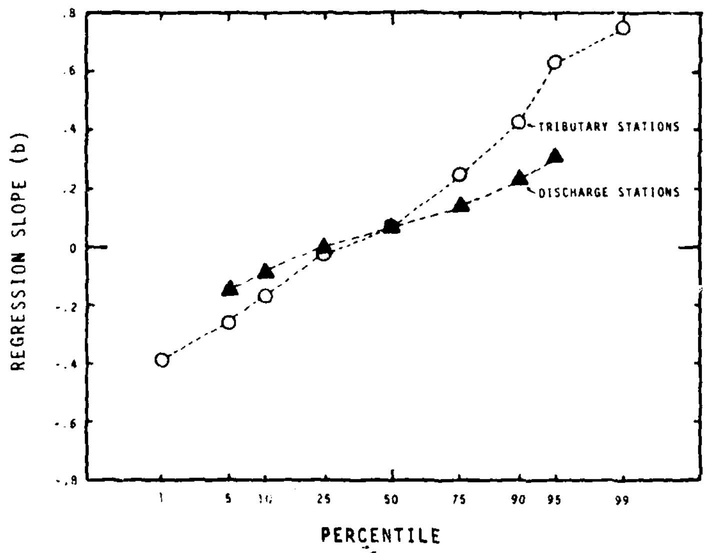


Figure 15

Distributions of Regression Slopes at Tributary and Discharge Stations



133. Both the mean and the standard deviation of the regression slope (b) are larger in the case of tributary stations. The distributions of b are compared on a normal probability scale in Figure 15. While the medians are nearly equal, the upper percentiles are higher and the lower percentiles are lower in the case of tributary stations. The wide distribution of b values across stations suggests that loading calculation methods must be capable of accounting for alternative flow/concentration relationships.

134. These results indicate that concentration tends to be more flow-dependent at upstream tributary stations than at discharge stations. Reservoir pools may buffer variations associated with runoff events (which would tend to produce high b values) or point source discharges (which would tend to produce low b values). The fact that streamflow is highly regulated at reservoir discharge points may also contribute to weaker flow/concentration relationships. The serial correlation of residuals (i.e., concentration, after the effect of flow is removed) tends to be higher in the case of discharge stations (.30 vs. .23 on the average). This suggests that seasonal factors or long-term trends may have greater influences at discharge points.

135. Table 46 lists means regression slopes by station type and component (dissolved P, total P-dissolved P, and total P, respectively). This breakdown is based upon measurements of total P and dissolved P at 52 tributary and 17 discharge stations. For both station types, the mean slopes of dissolved phosphorus with respect to flow are not significantly different from zero. In the case of total P-dissolved P, however, the mean slope is .34 $\pm$ .05 at tributary stations and .11 $\pm$ .09 at discharge stations, although the latter is not significantly different from zero. The influence of streamflow on the transport of particulate phosphorus probably accounts for these results. The dissolved component tends to be more independent of flow than the particulate component. The relative weakness of the dissolved phosphorus/flow relationship may reflect a buffering effect of adsorption chemistry on stream phosphorus levels and/or the fact that transport efficiency for dissolved phosphorus

Table 46

Concentration/Flow Sensitivities by Component and Station Type

Station Type	Number of Stations	Component: Total P - Dissolved P	Component: Dissolved P	Component: Total P
Tributary	52	.341 ± .050*	.019 ± .034	.239 ± .044
Discharge	17	.109 ± .087	.036 ± .101	.082 ± .038

* mean ± one standard error of mean

is not velocity-dependent, as in the case of the particulate fraction.

Estimation Methods

136. Four algorithms for estimating loadings have been tested:

a. average loading.

b. average concentration x average flow.

c. flow-weighted average concentration x average flow.

d. regression estimate based upon log (concentration) vs. log(flow) relationship.

These schemes are described in Table 47. A few other types of regression models have also been evaluated, but none proved better than the model used in Method 4 (see Table 47). Two approaches to evaluating these methods have been taken: one involves subsampling from simulated flow and concentration data and the other, subsampling from real flow and concentration data. These methods and results are described below.

Tests Based Upon Simulated Data

137. Table 48 describes an algorithm used to generate flow and concentration time series using Monte-Carlo techniques. This method has been used to produce five years of simulated daily-average flow and concentration data. Mean loadings have been calculated directly for each year and compared with estimates based upon subsampled taken at monthly intervals and employing the calculation methods listed in Table 47 For each year, a total of thirty trials (sets of subsamples) have been made, representing regular sampling on day 1 to day 30 of each month, respectively. Thus, error statistics are based upon a total of 150 trials for each method. Results have been found to be insensitive to the number of trials. The simulation algorithm is not adequate for evaluation of interpolation methods (in which the sequence of samples is considered), since no serial correlation or seasonal factors are included. The parameters of the simulation model are typical of the

Table 47

Estimation Methods

<u>**Method 1 : Average Loading**</u>

$$\hat{L}_1 = \frac{\Sigma q_i c_i}{n}$$

<u>**Method 2 : Average Concentration x Average Flow**</u>

$$\hat{L}_2 = \bar{Q} \frac{\Sigma c_i}{n}$$

<u>**Method 3 : Flow-weighted Average Concentration x Average Flow**</u>

$$\hat{L}_3 = \bar{Q} \frac{\Sigma q_i c_i}{\Sigma q_i}$$

<u>**Method 4 : Regression Estimate**</u>

$$\hat{L}_4 = \frac{\Sigma q_i c_i}{n} \left[\frac{n \bar{Q}}{\Sigma q_i} \right]^{b+1}$$

where,

q_i = flow on sample data i

c_i = concentration on sample date i

n = number of sample dates

b = slope of log(c) vs. log(q) regression

$\bar{Q}$ = average flow over entire period, based upon continuous flow record

Σ = sum over all sample dates (i=1 to n)

Table 48

Algorithm for Generation of Flow/Concentration Time Series

Input Values:

μ_x = mean of logarithm of flow = 0.

μ_y = mean of logarithm of concentration = 0.

d_x = standard deviation of logarithm of flow = .52

d_y = standard deviation of logarithm of conc = .26
(random component)

b = slope of flow/concentration model = (-.8 → .8)

Algorithm:

$$X_i = \mu_x + N(0,1)d_x$$

$$Y_i = \mu_y + N(0,1)d_y + (X_i - \mu_x)b$$

Symbol:

N(0,1) = normal random deviate with mean zero and standard deviation one data distributions depicted in Figure 15 and Table 45. A range of flow/concentration sensitivities (b in Table 47) have been used (-.8 to +.8).

138. The following error statistics have been used to compare "observed" and estimated loadings for method and trial:

$$\mathrm{Bias}_j = \frac{1}{M} \sum_{k=1}^{M} \left(L_k - \hat{L}_{jk}\right)/L_k \tag{33}$$

$$\mathrm{MSE}_j = \frac{1}{M} \sum_{k=1}^{M} \left(L_k - \hat{L}_{jk}\right)^2/L_k^2 \tag{34}$$

where,

Bias_j = bias associated with method j

MSE_j = mean squared error associated with method j

M = total number of trials = 150

L_k = actual loading for trial k (mass/time)

$\hat{L}_{jk}$ = estimated loading for method j and trial k (mass/time)

For each method, these error statistics are plotted vs. the flow/concentration sensitivity statistic in Figures 16 and 17, respectively.

139. Only Method 1 is unbiased for all values of b. The MSE of this method, however, is significantly higher than that of the other methods at values of b greater than -.2. This method is best under conditions where loading is relatively independent of flow ($b \rightarrow -1$). This might be the case, for instance, at a station which is located below a major point source of nutrients, but not where storm-event or non-point loads are significant.

140. The performance of Method 2, in which concentration and flow are averaged independently, is a strong function of b, both with respect to bias and variance. This method is unbiased only at b=0, but has biases of +35% and -23% at b values of -.2 and +.2, respectively. Trends in bias continue moving toward more negative or more positive b values. The method has a sharp minimum in MSE at b=0. This scheme is apparently best only when concentration and flow are truly independent, but gives

Figure 16

Bias in Loading Estimates as a Function of Regression Slope and Estimation Method

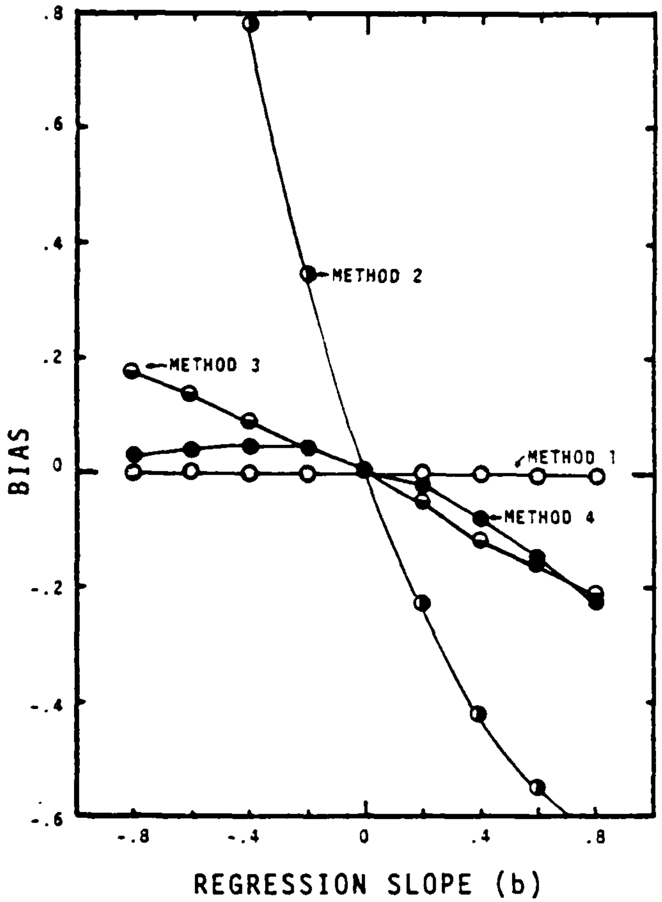
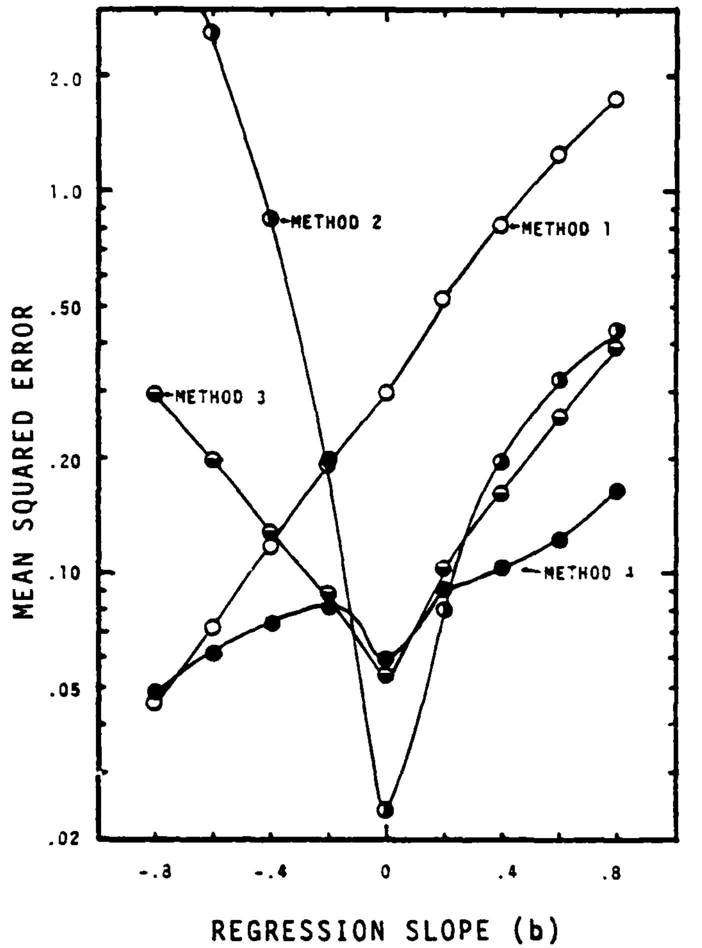


Figure 17

Mean Squared Error in Loading Estimates as a Function of Regression Slope and Estimation Method



substantial biases and MSE's for even weak flow/concentration relationships.

141. Method 3, which employs the flow-weighted average concentration, behaves qualitatively similar to Method 2, but is not as sensitive to b values. Zero bias and minimum variance are evident at b=0. This method is analogous to a "ratio estimate" used in classical sampling theory[35].

142. Method 4 has less bias and variance than Method 3 for most b values. Unlike the other methods, the regression model can adjust to different types of flow/concentration relationships and estimation errors are less sensitive to b values. Bias becomes more significant at high values of b. At b=.6, for example, Method 4 underpredicts loading by an average of 15%. The MSE at this b value is .13, which corresponds to a standard error of ± 36%. Thus, bias is less than one half of one standard error and accounts for 17% of the MSE ($.15^2/.13$) at b=.6. Additional tests indicate that applying the regression model separately to each daily flow in the year, a more tedious calculation, does not reduce the bias or variance of Method 4 at any b value.

Tests Based Upon Real Data

143. Calculation methods have also been tested using the flow and concentration data from the 119 stations analyzed above. Subsamples of 12 flow/concentration pairs have been taken at regular intervals from each station. Loadings estimated for each subsample and method have been compared with loadings estimated by applying Method 1 to all flow/concentration pairs available for each station. A total of 508 subsamples have been taken from 86 tributary stations and 190 subsamples from 33 discharge stations. Bias and MSE estimates are given in Table 49 for each method and station type. These results are approximate because of errors involved in estimating actual loading.

144. Generally, Methods 3 and 4 appear to perform better than Methods 1 or 2 for both station types. The MSE of Method 3 equals that

Table 49

Results of Method Testing Using Real Flow and Concentration Data

Statistic	Estimation Method** Method 1	Method 2	Method 3	Method 4
Tributary Stations (N=86,M=508)*				
Bias	-.002	-.027	-.029	-.023
MSE	.530	.297	.176	.176
Discharge Stations (N=33,M=190)				
Bias	.001	.068	-.017	-.000
MSE	.272	.585	.108	.156

* N = number of stations, M = number of trials

** see Table 47

of Method 4 in tributary stations (.176), but is lower in discharge stations (.108 vs. .156). When averaged over the range of b values in the data set, none of the methods is appreciably biased.

Prior Error Estimation

145. To provide bases error analysis and assessment of data adequacy, a means for estimating the variance of loading estimates derived from a given set of flow/concentration data is needed. Table 50 presents a formula appropriate for use with Method 4 (or with Method 3 when b=0). This approximate formula, derived from expected value theory, has two terms: one reflecting variance around the flow/concentration regression model, and one reflecting variance in the estimate of the slope parameter b.

146. Figure 18 compares the observed mean squared estimation errors for Method 4 with error variances estimated from the formula in Table 50 using simulated data. Reasonable agreement between observed and estimated variances is apparent over the range of b values typically encountered. Similar tests have been done using real flow and concentration data. The formula in Table 50 overestimates the error mean square by an average of 18% for tributary stations and underestimates the error mean square by an average of less than 1% at discharge stations.

Conclusions

147. Preliminary data analysis has characterized the distributions of flow/concentration relationships in tributary and discharge streams. Methods 3 and 4 are generally better than Methods 1 or 2 for estimating loadings, given the distribution of concentration/flow sensitivies encountered at various stations (see Figure 15). Method 3, which employs the flow-weighted average concentration, is actually a special case of Method 4, with b=0. In calculating loadings, it seems reasonable to use a regression analysis to estimate the slope parameter b and to use

Table 50

Formula for Estimating the Variance of Loadings Calculated Using Method 4

<u>**Loading Estimate:**</u>

$$\hat{L}_4 = \frac{\Sigma\, q_i\, c_i}{n} \left(\frac{n\,\bar{Q}}{\Sigma q_i}\right)^{b+1}$$

<u>**Variance:**</u>

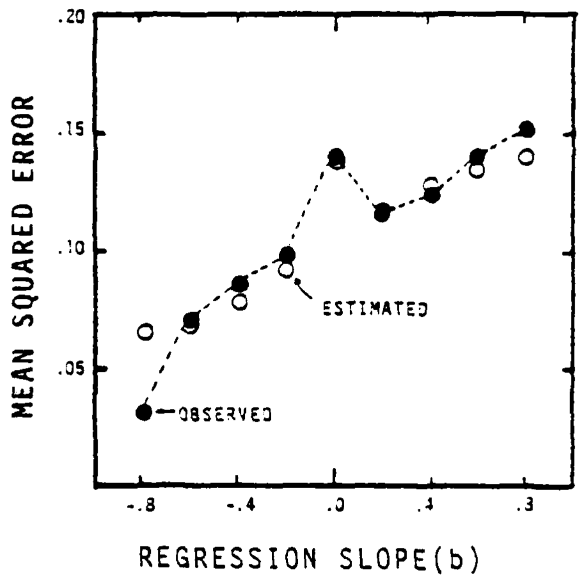
$$V(\hat{L}_4) = \left[\frac{\Sigma\left(q_i` c_i - a\, q_i^{\,b+1}\right)^2}{n\ (n-2)} + \left[\frac{\Sigma\, q_i\, c_i}{n}\ \ell n\left(\frac{\bar{Q}\, n}{\Sigma\, q_i}\right)\right]^2 \sigma_b^2\right] \cdot \left(\frac{\bar{Q}\, n}{\Sigma\, q_i}\right)^{2b}$$

where* σ_b^2 = variance of b estimate

* other symbols defined in Tables 46 and 47

Figure 18

Observed and Estimated Mean Squared Error in Loading Estimates



Method 4 unless the slope estimate is not significantly different from zero, in which case Method 3 would be used. The formula in Table 50 can be used to derive approximate estimates of error associated with a given mean loading calculated using Methods 3 or 4. Error variances can be used, in turn, to characterize the accuracies of reservoir nutrient loading and discharge estimates.

PART XV: CONCLUSIONS

148. The compilation, description, and preliminary analyses of the data base described in previous sections lead to the following conclusions:

- a. Using primarily centralized sources of information, it has been possible to compile sufficient data on water quality, hydrology, sedimentation, and other project characteristics to permit testing of empirical eutrophication models under Phase II of this study.
- b. The hydrology files need to be augmented with monthly elevation/contents data from several districts and projects.
- c. Information in the water quality files will not be adequate for assessing the trophic states of all 299 reservoirs in the central project list. It should be adequate, however, for characterizing about 130 reservoirs and for testing empirical models relating within-pool measures of trophic state.
- d. Use of data sources outside of the EPA/National Eutrophication Survey has generally more than doubled the total numbers of observations of various within-pool trophic state indicators. Non-NES data are generally more extensive temporally.
- e. Comparisons derived from the EPA National Eutrophication Survey compendium reveal significant differences between lakes and reservoirs in the means of most morphometric, hydrologic, and trophic state indicator variables. Compared with natural lakes, reservoirs have greater potential nutrient enrichment problems, as gauged by Vollenweider phosphorus loading models, but lower observed levels of chlorophyll-a, on the average. The validity of existing loading models in reservoirs is in question due to lake/reservoir differences in morphometry, hydrodynamics, sedimentation, and region. Because of the relative geographical distributions of lakes and reservoirs in the U. S., it is difficult to distinguish the effects of region from those of impoundment type.
- f. For the purposes of this project reservoir hypsographic curves can be conveniently summarized using low-order polynomial equations relating the logarithm of total volume to the logarithm of total depth. Errors characteristic of this curve-fitting scheme are similar to those characteristic of direct interpolation methods.

g. Within-reservoir variations of trophic state indicators generally cannot be considered random with respect to station and date, the primary parameters used in monitoring program design. Spatial variations contain information on rates and directions of processes controlling eutrophication within reservoirs. Variance component analyses indicate that phosphorus and transparency have variance structures which are similar to each other, but fundamentally different from the variance structure of chlorophyll-a. Implications of these variance structures for monitoring and modelling efforts have been discussed.

h. A method for estimating the mean and error variance of nutrient loadings derived from continuous-flow and grab-sample-concentration measurements has been developed and tested using real and simulated flow/concentration time series. The method employs a regression model relating concentration to flow and has been shown to compare favorably with alternative calculation methods with respect to bias and variance of loading estimates under a range of conditions.

PART XVI: RECOMMENDATIONS

149. The following additional data base development work is required in order to permit testing of empirical eutrophication models and should therefore be included in the scope of Phase II of this study:

  a. compilation of monthly elevation/contents data from many districts and projects, as indicated by the inventories in Appendix A.

  b. development of a scheme for sorting of water quality stations in downstream order within reservoirs.

150. While compiled for the specific purposes of this project, the data base described in this report could be adapted for other, more generalized uses. As discussed in the introduction to this report, the current data base consists of a number of computer files, reports, maps, and data forms organized in a consistent framework. It is not a system designed for frequent interactive use. Given the current data base, the development of such a system would involve the following:

  a. definition of objectives (desired scope of data base uses).

  b. definition of operating environment (direct users, maintainence personnel, and computer system).

  c. development of appropriate software for various purposes (e.g., accessing, updating, editing, summarizing, displaying, analyzing).

  d. compilation of any additional data required for intended uses of the data base (e.g., inclusion of priority pollutants, development of a digital reservoir mapping capability).

  e. appropriate modifications in file designs.

  f. establishment of channels and procedures for updating and verification of information.

  g. testing of the system in an operational environment.

  h. documentation of the system.

  i. orientation of potential users.

It is recommended that the Corps of Engineers consider expanding upon the existing data base, as outlined above, in order to permit more generalized use of the information which has been compiled under this project. The final product would represent a valuable resource for reservoir design, operation, and research at various organizational levels within the Corps of Engineers.

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APPENDIX A

DATA INVENTORIES BY PROJECT AND DIVISION

Table A1

Inventory of WATS.DAREAS File

INVENTORY OF DATA IN DAQ FILE

DIVISION	DISTRICT	PROJECT	NUMBR ENTRIES	YEAR IMPD	NET DAREA	TOTAL DAREA	MEAN DISCH	MEAN INFLOW	MEAN PREC	USGS E/C	USGS DISCH
1 NED	1 NEW ENGL	142 BUFFUMVILLE	4	1	1	3	1	0	0	1	1
1 NED	1 NEW ENGL	144 EAST BRIMFIELD	4	1	1	3	1	0	0	1	1
1 NED	1 NEW ENGL	147 LITTLEVILLE	4	1	1	3	1	0	0	1	1
1 NED	1 NEW ENGL	148 TULLY	3	1	0	3	1	0	0	1	1
1 NED	1 NEW ENGL	150 WESTVILLE	4	1	1	3	1	0	0	1	1
1 NED	1 NEW ENGL	151 BLACK ROCK	4	1	1	3	1	0	0	1	1
1 NED	1 NEW ENGL	152 COLEBROOK RIVER	2	2	0	2	1	0	0	0	0
1 NED	1 NEW ENGL	155 HANCOCK BROOK	3	1	1	2	0	0	0	1	0
1 NED	1 NEW ENGL	156 HOP BROOK	4	1	1	3	1	0	0	1	1
1 NED	1 NEW ENGL	158 MANSFIELD HOLLOW	4	1	1	3	1	0	0	1	1
1 NED	1 NEW ENGL	159 NORTHFIELD BROOK	3	1	1	2	0	0	0	1	0
1 NED	1 NEW ENGL	162 WEST THOMPSON	4	1	1	4	1	0	0	1	1
1 NED	1 NEW ENGL	164 EDWARD MCDOWELL	3	1	0	3	1	0	0	1	1
1 NED	1 NEW ENGL	165 EVERETT	2	1	0	2	0	0	0	1	0
1 NED	1 NEW ENGL	166 FRANKLIN FALLS	2	1	0	2	0	0	0	1	0
1 NED	1 NEW ENGL	167 HOPKINTON	4	1	1	3	1	0	0	1	1
1 NED	1 NEW ENGL	168 OTTER BROOK	4	1	1	3	1	0	0	1	1
1 NED	1 NEW ENGL	169 SURRY MOUNTAIN	3	1	0	3	1	0	0	1	1
1 NED	1 NEW ENGL	170 BALL MOUNTAIN	3	1	0	3	1	0	0	1	1
1 NED	1 NEW ENGL	172 NORTH HARTLAND	4	1	1	3	1	0	0	1	1
1 NED	1 NEW ENGL	173 NORTH SPRINGFIELD	4	1	1	3	1	0	0	1	1
1 NED	1 NEW ENGL	174 TOWNSHEND	3	1	0	3	1	0	0	1	1
2 NAD	2 NEW YORK	171 EAST BARRE	3	1	1	2	1	0	0	1	1
2 NAD	2 NEW YORK	176 WATERBURY	5	1	1	4	3	0	0	1	1
2 NAD	2 NEW YORK	177 WRIGHTSVILLE	3	1	1	2	1	0	0	1	1
2 NAD	3 PHILADEL	307 BELTZVILLE	6	1	2	4	3	0	0	1	1
2 NAD	3 PHILADEL	313 FRANCIS E WALTER	3	1	1	2	1	0	0	1	1
2 NAD	3 PHILADEL	316 PROMPTON	3	1	1	2	1	0	0	1	1
2 NAD	4 BALTIMOR	227 ALMOND	2	1	0	2	1	0	0	1	1
2 NAD	4 BALTIMOR	229 WHITNEY POINT	3	1	1	2	1	0	0	1	0
2 NAD	4 BALTIMOR	306 ALVIN R BUSH (KETTLE	2	1	0	2	1	0	0	1	1
2 NAD	4 BALTIMOR	310 CURWENSVILLE	4	1	1	3	2	0	0	1	1
2 NAD	4 BALTIMOR	312 F J SAYERS (BLANCHAR	5	1	1	4	3	0	0	1	1
2 NAD	4 BALTIMOR	320 RAYSTOWN	4	1	1	3	2	0	0	1	1
2 NAD	4 BALTIMOR	329 STILLWATER	2	1	0	2	1	0	0	1	1
2 NAD	4 BALTIMOR	398 BLOOMINGTON	1	0	1	0	0	0	0	0	0
2 NAD	4 BALTIMOR	401 SAVAGE	2	1	1	2	1	1	1	0	1
3 SAD	6 WILMINGT	233 B EVERETT JORDAN (NE	1	0	1	0	0	0	0	0	0
3 SAD	6 WILMINGT	372 JOHN H KERR	5	2	1	5	2	1	1	1	1
3 SAD	6 WILMINGT	375 PHILPOTT	4	2	1	4	2	1	1	1	1
3 SAD	7 CHARLEST	232 W KERR SCOTT	4	2	1	4	2	1	1	1	1

INVENTORY OF DATA IN DAQ FILE

DIVISION	DISTRICT	PROJECT	NUMBR ENTRIES	YEAR IMPD	NET DAREA	TOTAL DAREA	MEAN DISCH	MEAN INFLOW	MEAN PREC	USGS E/C	USGS DISCH
3 SAD	8 SAVANNAH	74 CLARK HILL	5	1	1	5	3	0	0	1	1
3 SAD	8 SAVANNAH	330 HARTWELL	5	1	1	5	3	0	0	1	1
3 SAD	9 JACKSONV	66 OCKLAWAHA(RODMAN)	3	1	0	3	2	0	0	1	1
3 SAD	10 MOBILE	1 CLAIBORNE	3	1	1	3	2	0	0	0	1
3 SAD	10 MOBILE	2 COFFEEVILLE (JACKSON	2	0	0	2	1	0	0	1	1
3 SAD	10 MOBILE	3 HOLT	3	0	0	3	2	0	0	1	1
3 SAD	10 MOBILE	4 JONES BLUFF	2	1	0	2	1	0	0	0	0
3 SAD	10 MOBILE	5 DEMOPOLIS	2	0	0	2	1	0	0	1	1
3 SAD	10 MOBILE	7 WARRIOR	2	0	0	2	1	0	0	1	1
3 SAD	10 MOBILE	8 MILLERS FERRY	[illegible]	1	1	3	2	0	0	0	1
3 SAD	10 MOBILE	69 ALLATOONA	5	1	1	4	3	0	0	1	1
3 SAD	10 MOBILE	70 GEORGE W ANDREWS	2	0	1	2	0	0	0	1	0
3 SAD	10 MOBILE	71 SEMINOLE (WOODRUFF)	4	1	1	4	2	0	0	1	1
3 SAD	10 MOBILE	72 WALTER F GEORGE (EUF	3	1	1	3	1	0	0	1	0
3 SAD	10 MOBILE	73 WEST POINT	4	1	2	3	1	0	0	1	1
3 SAD	10 MOBILE	75 CARTERS	3	1	1	2	1	0	0	1	1
3 SAD	10 MOBILE	76 SIDNEY LANIER	5	1	1	4	3	0	0	1	1
3 SAD	10 MOBILE	191 OKATIBBEE	3	1	0	3	2	0	0	1	1
3 SAD	10 MOBILE	405 GAINESVILLE L/D	2	0	1	1	1	0	0	0	1
3 SAD	10 MOBILE	411 BANKHEAD	3	0	0	3	2	0	0	1	1
5 NCD	11 BUFFALO	228 MT MORRIS	3	2	1	3	1	1	0	1	1
5 NCD	14 ROCK ISL	98 CORALVILLE	4	2	1	4	2	1	1	1	1
5 NCD	14 ROCK ISL	99 RED ROCK	5	1	0	5	3	0	0	1	1
5 NCD	15 ST PAUL	178 GULL	4	1	0	4	3	0	0	1	1
5 NCD	15 ST PAUL	179 LAC QUI PARLE	3	1	1	3	2	0	0	0	1
5 NCD	15 ST PAUL	180 TRAVERSE	2	1	0	1	1	0	0	1	0
5 NCD	15 ST PAUL	181 LEECH	4	1	0	4	3	0	0	1	1
5 NCD	15 ST PAUL	182 ORWELL	3	2	1	3	1	1	1	1	1
5 NCD	15 ST PAUL	183 CROSS	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	184 POKEGAMA	3	1	0	3	2	0	0	1	1
5 NCD	15 ST PAUL	185 SANDY	3	1	0	3	2	0	0	1	1
5 NCD	15 ST PAUL	186 WINNIBIGOSHISH	3	1	0	3	2	0	0	1	1
5 NCD	15 ST PAUL	187 PINE RIVER	3	1	0	3	2	0	0	1	1
5 NCD	15 ST PAUL	236 HOMME	3	2	1	3	1	1	1	1	1
5 NCD	15 ST PAUL	237 ASHTALULA (BALDHILL)	5	2	1	5	3	1	1	1	1
5 NCD	15 ST PAUL	399 EAU GALLE	3	1	1	2	1	0	0	1	1
4 ORD	16 PITTSBUR	243 BERLIN	5	2	1	5	3	1	1	1	1
4 ORD	16 PITTSBUR	252 MICHAEL J KIRWAN	3	1	0	3	2	0	0	1	1
4 ORD	16 PITTSBUR	254 MOSQUITO CREEK	5	1	1	4	3	0	0	1	1

INVENTORY OF DATA IN DAQ FILE

DIVISION	DISTRICT	PROJECT	NUMBR ENTRIES	YEAR IMPD	NET DAREA	TOTAL DAREA	MEAN DISCH	MEAN INFLOW	MEAN PREC	USGS E/C	USGS DISCH
4 ORD	16 PITTSBUR	308 CONEMAUGH RIVER	3	1	1	2	1	0	0	1	1
4 ORD	16 PITTSBUR	309 CROOKED CREEK	3	1	1	3	1	1	1	1	1
4 ORD	16 PITTSBUR	311 EAST BRANCH CLARION	4	2	1	4	2	1	1	1	1
4 ORD	16 PITTSBUR	314 LOYALHANNA	3	1	1	3	1	1	1	1	1
4 ORD	16 PITTSBUR	315 MAHONING CREEK	3	1	1	3	1	1	1	1	1
4 ORD	16 PITTSBUR	317 SHENANGO RIVER	4	1	0	4	3	0	0	1	1
4 ORD	16 PITTSBUR	318 TIONESTA	4	2	1	4	2	1	1	1	1
4 ORD	16 PITTSBUR	319 YOUGHIOGHENY RIVER	4	2	1	4	2	1	1	1	1
4 ORD	16 PITTSBUR	322 WOODCOCK	3	1	1	2	1	0	0	1	1
4 ORD	16 PITTSBUR	328 ALLEGHENY (KINZUA)	4	1	0	4	3	0	0	1	1
4 ORD	16 PITTSBUR	393 TYGART	5	2	1	5	3	1	1	1	1
4 ORD	17 HUNTINGT	123 DEWEY	3	1	0	3	2	0	0	1	1
4 ORD	17 HUNTINGT	124 FISHTRAP	4	2	1	4	2	1	1	1	1
4 ORD	17 HUNTINGT	125 GRAYSON	5	2	1	4	2	1	1	1	1
4 ORD	17 HUNTINGT	127 GREENUP L/D	3	1	0	3	2	0	0	1	1
4 ORD	17 HUNTINGT	239 PAINT CREEK	2	1	0	2	1	0	0	1	1
4 ORD	17 HUNTINGT	241 ATWOOD	5	2	1	5	3	1	1	1	1
4 ORD	17 HUNTINGT	242 BEACH CITY	4	1	1	4	2	1	1	1	1
4 ORD	17 HUNTINGT	245 CHARLES MILL	5	2	1	5	3	1	1	1	1
4 ORD	17 HUNTINGT	246 CLENDENING	2	1	0	2	1	0	0	1	0
4 ORD	17 HUNTINGT	247 DEER CREEK	5	1	1	4	3	0	0	1	1
4 ORD	17 HUNTINGT	248 DELAWARE	5	2	1	5	3	1	1	1	1
4 ORD	17 HUNTINGT	249 DILLON	5	2	1	5	3	1	1	1	1
4 ORD	17 HUNTINGT	251 LEESVILLE	3	1	0	3	2	0	0	1	1
4 ORD	17 HUNTINGT	255 PIEDMONT	3	1	0	3	2	0	0	1	1
4 ORD	17 HUNTINGT	256 PLEASANT HILL	5	2	1	5	3	1	1	1	1
4 ORD	17 HUNTINGT	257 SENECAVILLE	4	2	1	4	2	1	1	1	1
4 ORD	17 HUNTINGT	258 TAPPAN	4	1	0	4	3	0	0	1	1
4 ORD	17 HUNTINGT	259 BURR OAK(TOM JENKINS	2	1	1	2	0	1	1	1	0
4 ORD	17 HUNTINGT	261 WILLS CREEK	3	1	0	3	2	0	0	1	1
4 ORD	17 HUNTINGT	373 JOHN W FLANNAGAN	4	1	0	4	3	0	0	1	1
4 ORD	17 HUNTINGT	374 NORTH FORK OF POUND	2	1	0	2	1	0	0	1	1
4 ORD	17 HUNTINGT	369 BLUESTONE	5	2	1	5	3	1	1	1	1
4 ORD	17 HUNTINGT	390 EAST LYNN	3	1	0	3	2	0	0	1	1
4 ORD	17 HUNTINGT	391 SUMMERSVILLE	4	1	0	4	3	0	0	1	1
4 ORD	17 HUNTINGT	392 SUTTON	4	2	1	4	2	1	1	1	1
4 ORD	17 HUNTINGT	394 WINFIELD	1	0	0	1	1	0	0	0	0
4 ORD	17 HUNTINGT	406 MOHICANVILLE	2	1	0	2	1	0	0	1	1
4 ORD	17 HUNTINGT	416 ALUM CREEK	2	1	0	2	1	0	0	1	1
4 ORD	18 LOUISVIL	90 CAGLES MILL	4	2	1	4	2	1	1	1	1
4 ORD	18 LOUISVIL	91 HUNTINGTON	3	1	0	3	2	0	0	1	1
4 ORD	18 LOUISVIL	92 MISSISSINEWA	4	1	0	4	3	0	0	1	1
4 ORD	18 LOUISVIL	93 MONROE	4	1	0	4	3	0	0	1	1
4 ORD	18 LOUISVIL	94 SALAMONIE	3	1	0	3	2	0	0	1	1

INVENTORY OF DATA IN DAQ FILE

DIVISION	DISTRICT	PROJECT	NUMBR ENTRIES	YEAR IMPD	NET DAREA	TOTAL DAREA	MEAN DISCH	MEAN INFLOW	MEAN PREC	USGS E/C	USGS DISCH
4 ORD	18 LOUISVIL	95 C M HARDEN (MANSFIEL	4	1	1	3	2	0	0	1	1
4 ORD	18 LOUISVIL	97 BROOKVILLE	3	1	1	2	1	0	0	1	1
4 ORD	18 LOUISVIL	120 BARREN RIVER	4	1	0	4	3	0	0	1	1
4 ORD	18 LOUISVIL	121 BUCKHORN	3	1	0	3	2	0	0	1	1
4 ORD	18 LOUISVIL	126 GREEN RIVER	3	1	0	3	2	0	0	1	1
4 ORD	18 LOUISVIL	128 NOLIN RIVER	3	1	0	3	2	0	0	1	1
4 ORD	18 LOUISVIL	129 ROUGH RIVER	4	2	1	4	2	1	1	1	1
4 ORD	18 LOUISVIL	134 CAVE RUN	2	1	0	2	1	0	0	1	1
4 ORD	18 LOUISVIL	260 WEST FORK OF MILL CK	3	2	1	3	1	1	1	1	1
4 ORD	18 LOUISVIL	263 CLARENCE J BROWN	1	1	0	1	0	0	0	1	0
4 ORD	19 NASHVILL	119 BARKLEY	5	1	1	5	3	0	0	1	1
4 ORD	19 NASHVILL	122 CUMBERLAND (WOLF CRE	5	2	1	5	3	1	1	1	1
4 ORD	19 NASHVILL	337 CENTER HILL	3	1	0	3	2	0	0	1	1
4 ORD	19 NASHVILL	338 CHEATHAM	4	1	0	4	3	0	0	1	1
4 ORD	19 NASHVILL	340 J PERCY PRIEST	5	1	1	4	3	0	0	1	1
4 ORD	19 NASHVILL	342 OLD HICKORY	5	2	1	5	3	1	1	1	1
4 ORD	19 NASHVILL	343 DALE HOLLOW	5	2	1	5	3	1	1	1	1
6 LMVD	20 ST LOUIS	81 CARLYLE	5	2	1	5	3	1	1	1	1
6 LMVD	20 ST LOUIS	87 SHELBYVILLE	4	1	0	4	3	0	0	1	1
6 LMVD	20 ST LOUIS	86 REND	4	1	0	4	3	0	0	1	1
6 LMVD	21 MEMPHIS	196 WAPPAPELLO	5	2	1	5	3	1	1	1	1
6 LMVD	22 VICKSBUR	14 DE GRAY	5	1	1	4	3	0	0	1	1
6 LMVD	22 VICKSBUR	18 GREESON (NARROWS)	3	1	0	3	2	0	0	1	1
6 LMVD	22 VICKSBUR	19 OUACHITA (BLAKELY MT	4	1	0	4	3	0	0	1	1
6 LMVD	22 VICKSBUR	168 ARKABUTLA	5	2	1	5	3	1	1	1	1
6 LMVD	22 VICKSBUR	169 ENID	5	2	1	5	3	1	1	1	1
6 LMVD	22 VICKSBUR	190 GRENADA	5	2	1	5	3	1	1	1	1
6 LMVD	22 VICKSBUR	192 SARDIS	5	2	1	5	3	1	1	1	1
6 LMVD	23 NEW ORLE	138 WALLACE	2	2	1	2	0	1	1	0	0
6 LMVD	23 NEW ORLE	352 LAKE O' THE PINES(FE	6	2	2	5	3	1	1	1	1
6 LMVD	23 NEW ORLE	353 TEXARKANA(WRIGHT PAT	4	2	1	4	1	1	1	1	0
6 LMVD	23 NEW ORLE	413 CADDO	2	0	0	2	2	0	0	0	1
7 SWD	24 LITTLE R	11 BEAVER	5	1	1	4	3	0	0	1	1
7 SWD	24 LITTLE R	12 BLUE MOUNTAIN	4	1	0	4	3	0	0	1	1
7 SWD	24 LITTLE R	13 BULL SHOALS	4	1	0	4	3	0	0	1	1
7 SWD	24 LITTLE R	15 GREERS FERRY	4	1	0	4	3	0	0	1	1
7 SWD	24 LITTLE R	17 DARDANELLE	4	2	1	4	2	1	0	1	1
7 SWD	24 LITTLE R	21 NIMROD	5	2	1	5	3	1	1	1	1
7 SWD	24 LITTLE R	22 NORFOLK	5	2	1	5	3	1	1	1	1
7 SWD	24 LITTLE R	23 OZARK	3	1	0	3	2	0	0	1	1

INVENTORY OF DATA IN DAQ FILE

DIVISION	DISTRICT	PROJECT	NUMBR ENTRIES	YEAR IMPD	NET DAREA	TOTAL DAREA	MEAN DISCH	MEAN INFLOW	MEAN PREC	USGS E/C	USGS DISCH
7 SWD	24 LITTLE R	193 CLEARWATER	5	1	1	4	3	0	0	1	1
7 SWD	24 LITTLE R	200 TABLE ROCK	5	1	1	4	3	0	0	1	1
7 SWD	25 TULSA	20 MILLWOOD	5	1	1	4	3	0	0	1	1
7 SWD	25 TULSA	102 COUNCIL GROVE	5	1	1	4	3	0	0	1	1
7 SWD	25 TULSA	103 ELK CITY	4	1	1	3	2	0	0	1	1
7 SWD	25 TULSA	104 FALL RIVER	5	1	1	4	3	0	0	1	1
7 SWD	25 TULSA	105 JOHN REDMOND	5	2	1	5	3	1	1	1	1
7 SWD	25 TULSA	107 MARION	5	1	1	4	3	0	0	1	1
7 SWD	25 TULSA	112 TORONTO	5	2	1	5	3	1	1	1	1
7 SWD	25 TULSA	264 BROKEN BOW	4	1	1	3	2	0	0	1	1
7 SWD	25 TULSA	265 CANTON	4	2	1	4	2	1	1	1	1
7 SWD	25 TULSA	266 CHOUTEAU	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	267 EUFAULA	5	2	1	5	3	1	0	1	1
7 SWD	25 TULSA	268 FORT GIBSON	4	1	0	3	2	0	0	1	1
7 SWD	25 TULSA	269 FORT SUPPLY	5	1	1	5	3	1	0	1	1
7 SWD	25 TULSA	270 GREAT SALT PLAINS	4	2	1	4	2	1	1	1	1
7 SWD	25 TULSA	271 HEYBURN	4	2	1	4	2	1	1	1	1
7 SWD	25 TULSA	272 HULAH	4	2	1	4	2	1	1	1	1
7 SWD	25 TULSA	273 KEYSTONE	6	2	2	6	3	1	0	1	1
7 SWD	25 TULSA	274 NEWT GRAHAM	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	275 OOLOGAH	5	1	1	4	3	0	0	1	1
7 SWD	25 TULSA	276 PINE CREEK	4	1	1	3	2	0	0	1	1
7 SWD	25 TULSA	277 ROBERT S KERR	2	1	0	2	1	0	0	0	0
7 SWD	25 TULSA	278 TENKILLER FERRY	5	1	1	4	3	0	0	1	1
7 SWD	25 TULSA	279 W D MAYO	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	280 WEBBERS FALLS	2	1	1	2	1	0	0	0	0
7 SWD	25 TULSA	281 WISTER	5	2	1	5	3	1	1	1	1
7 SWD	25 TULSA	282 CLAYTON	1	0	1	0	0	0	0	0	0
7 SWD	25 TULSA	283 KAW	2	1	0	2	1	0	0	1	1
7 SWD	25 TULSA	284 COPAN	2	0	1	1	1	0	0	0	1
7 SWD	25 TULSA	285 HUGO	3	1	1	2	1	0	0	1	1
7 SWD	25 TULSA	286 OPTIMA	2	0	1	1	0	0	0	1	0
7 SWD	25 TULSA	287 WAURIKA	3	0	1	2	1	0	0	1	1
7 SWD	25 TULSA	348 TEXOMA (DENNISON)	5	2	1	5	3	1	1	1	1
7 SWD	25 TULSA	357 PAT MAYSE	4	1	1	3	2	0	0	1	1
7 SWD	25 TULSA	370 KEMP	4	1	1	4	2	1	0	1	1
7 SWD	25 TULSA	402 GILLHAM	3	1	1	2	1	0	0	1	1
7 SWD	26 FORT WOR	344 BARDWELL	4	1	1	3	2	0	0	1	1
7 SWD	26 FORT WOR	345 BELTON(BELL)	5	2	1	5	3	1	1	1	1
7 SWD	26 FORT WOR	346 BENBROOK	3	1	0	3	2	0	0	1	1
7 SWD	26 FORT WOR	347 CANYON	4	1	0	4	3	0	0	1	1
7 SWD	26 FORT WOR	349 GRAPEVINE	3	1	0	3	2	0	0	1	1
7 SWD	26 FORT WOR	351 HORDS CREEK	4	2	1	4	2	1	1	1	1
7 SWD	26 FORT WOR	354 LAVON	5	2	1	5	3	1	1	1	1

INVENTORY OF DATA IN DAQ FILE

DIVISION	DISTRICT	PROJECT	NUMBR ENTRIES	YEAR IMPD	NET DAREA	TOTAL DAREA	MEAN DISCH	MEAN INFLOW	MEAN PREC	USGS E/C	USGS DISCH
7 SWD	26 FORT WOR	355 LEWISVILLE(GARZA LIT	5	2	1	5	3	1	1	1	1
7 SWD	26 FORT WOR	356 NAVARRO MILLS	3	1	0	3	2	0	0	1	1
7 SWD	26 FORT WOR	358 PROCTOR	3	1	0	3	2	0	0	1	1
7 SWD	26 FORT WOR	359 SAM RAYBURN (MC GEE	4	1	0	4	3	0	0	1	1
7 SWD	26 FORT WOR	360 O C FISHER (SAN ANGE	4	1	0	4	3	0	0	1	1
7 SWD	26 FORT WOR	361 SOMERVILLE	4	1	0	4	3	0	0	1	1
7 SWD	26 FORT WOR	362 STILLHOUSE HOLLOW(LA	4	1	0	4	3	0	0	1	1
7 SWD	26 FORT WOR	363 WACO	4	2	1	4	2	0	1	1	1
7 SWD	26 FORT WOR	364 WHITNEY	5	2	1	5	3	1	1	1	1
7 SWD	26 FORT WOR	371 B A STEINHAGEN (TOWN	3	2	0	3	1	1	1	1	1
7 SWD	28 ALBUQUER	65 JOHN MARTIN (HASTY)	3	2	1	3	1	1	1	1	1
7 SWD	28 ALBUQUER	218 ABIQUIU	3	2	1	3	1	1	0	1	1
7 SWD	28 ALBUQUER	219 CONCHAS	5	2	1	5	3	1	1	1	1
7 SWD	28 ALBUQUER	407 TRINIDAD	3	1	0	3	2	0	0	1	2
8 MRD	29 KANSAS C	100 RATHBUN	5	1	1	4	3	0	0	1	1
8 MRD	29 KANSAS C	106 KANOPOLIS	5	2	1	5	3	1	0	1	1
8 MRD	29 KANSAS C	108 MILFORD	4	1	0	4	3	0	0	1	1
8 MRD	29 KANSAS C	109 MELVERN	4	1	1	3	2	0	0	1	1
8 MRD	29 KANSAS C	110 PERRY	4	1	0	4	3	0	0	1	1
8 MRD	29 KANSAS C	111 POMONA	4	1	0	4	3	0	0	1	1
8 MRD	29 KANSAS C	113 TUTTLE CREEK	5	1	1	5	3	0	0	1	1
8 MRD	29 KANSAS C	114 WILSON	4	1	0	4	3	0	0	1	1
8 MRD	29 KANSAS C	194 POMME DE TERRE	4	1	0	4	3	0	0	1	1
8 MRD	29 KANSAS C	195 STOCKTON	4	1	0	4	3	0	0	1	1
8 MRD	29 KANSAS C	207 HARLAN COUNTY	5	2	1	5	3	1	0	1	1
8 MRD	30 OMAHA	64 CHERRY CREEK	4	1	0	4	3	0	0	1	1
8 MRD	30 OMAHA	203 FORT PECK	4	2	1	4	2	1	0	1	1
8 MRD	30 OMAHA	208 OLIVE CREEK	1	0	1	0	0	0	0	0	0
8 MRD	30 OMAHA	209 BLUESTEM	1	0	1	0	0	0	0	0	0
8 MRD	30 OMAHA	210 WAGON TRAIN	1	0	1	0	0	0	0	0	0
8 MRD	30 OMAHA	211 STAGECOACH	1	0	1	0	0	0	0	0	0
8 MRD	30 OMAHA	212 YANKEE HILL	1	0	1	0	0	0	0	0	0
8 MRD	30 OMAHA	213 CONESTOGA	1	0	1	0	0	0	0	0	0
8 MRD	30 OMAHA	214 TWIN	1	0	1	0	0	0	0	0	0
8 MRD	30 OMAHA	215 PAWNEE	2	0	1	1	1	0	0	0	0
8 MRD	30 OMAHA	216 HOLMES PARK	1	0	1	0	0	0	0	0	0
8 MRD	30 OMAHA	217 BRANCHED OAK	2	0	1	1	1	0	0	0	0
8 MRD	30 OMAHA	234 BOWMAN-HALEY	3	1	0	3	2	0	0	1	1
8 MRD	30 OMAHA	235 SAKAKAWEA(GARRISON)	5	1	1	5	3	0	0	1	1
8 MRD	30 OMAHA	331 SHARPE (BIG BEND)	3	1	1	2	1	0	0	1	0
8 MRD	30 OMAHA	332 COLD BROOK	1	0	1	0	0	0	0	0	0
8 MRD	30 OMAHA	334 FRANCIS CASE (FT RAN	4	1	1	3	2	0	0	1	1
8 MRD	30 OMAHA	335 LEWIS AND CLARKE (GA	4	1	1	3	2	0	0	1	1

INVENTORY OF DATA IN DAQ FILE

DIVISION	DISTRICT	PROJECT	NUMBR ENTRIES	YEAR INPD	NET DAREA	TOTAL DAREA	MEAN DISCH	MEAN INFLOW	MEAN PREC	USGS E/C	USGS DISCH
8 MRD	30 OMAHA	336 OAHE	3	1	0	3	2	0	0	1	1
8 MRD	30 OMAHA	415 CHATFIELD	2	1	0	2	1	0	0	1	1
9 NPD	31 WALLA WA	77 DWORSHAK	5	1	1	4	2	0	0	1	1
9 NPD	31 WALLA WA	78 LUCKY PEAK	4	1	0	4	2	0	0	1	1
9 NPD	31 WALLA WA	79 RIRIE	3	0	1	3	1	0	0	1	1
9 NPD	31 WALLA WA	379 ICE HARBOR	3	1	0	3	2	0	0	0	1
9 NPD	32 SEATTLE	80 ALBENI FALLS (PEND O	3	1	0	3	2	0	0	1	1
9 NPD	32 SEATTLE	204 KOOKANUSA(LIBBY)	4	1	1	3	2	0	0	1	1
9 NPD	32 SEATTLE	377 RUFUS WOODS (CHIEF J	3	1	0	3	2	0	0	0	1
9 NPD	32 SEATTLE	384 MUD MOUNTAIN	3	1	1	2	1	0	0	1	1
9 NPD	32 SEATTLE	385 WYNOOCHEE	3	1	1	2	1	0	0	1	1
9 NPD	32 SEATTLE	386 HOWARD A HANSON	3	1	1	2	1	0	0	1	1
9 NPD	33 PORTLAND	288 BLUE RIVER	3	1	0	3	2	0	0	1	1
9 NPD	33 PORTLAND	289 BONNEVILLE	2	0	0	2	0	0	0	0	1
9 NPD	33 PORTLAND	290 COTTAGE GROVE	4	2	1	4	2	1	1	1	1
9 NPD	33 PORTLAND	291 COUGAR	3	1	0	3	2	0	0	1	1
9 NPD	33 PORTLAND	292 CELILO (DALLES)	2	0	0	2	1	0	0	0	1
9 NPD	33 PORTLAND	293 DETROIT	4	1	1	3	2	0	0	1	1
9 NPD	33 PORTLAND	294 DEXTER	3	1	1	2	2	0	0	0	1
9 NPD	33 PORTLAND	295 DORENA	4	2	1	4	2	1	1	1	1
9 NPD	33 PORTLAND	296 FALL CREEK	4	1	1	3	2	0	0	1	1
9 NPD	33 PORTLAND	297 FERN RIDGE	4	1	1	3	2	0	0	1	1
9 NPD	33 PORTLAND	298 FOSTER	4	1	1	3	2	0	0	1	1
9 NPD	33 PORTLAND	299 GREEN PETER	4	1	1	3	2	0	0	1	1
9 NPD	33 PORTLAND	300 HILLS CREEK	4	1	0	4	3	0	0	1	1
9 NPD	33 PORTLAND	301 JOHN DAY (UMATILLA)	1	0	0	1	0	0	0	0	0
9 NPD	33 PORTLAND	302 LOOKOUT POINT	3	1	0	3	2	0	0	1	1
9 NPD	33 PORTLAND	304 LOST CREEK	1	1	0	1	0	0	0	1	0
9 NPD	33 PORTLAND	305 BIG CLIFF	1	0	1	0	0	0	0	0	0
10 SPD	34 SACREMEN	24 BLACK BUTTE	4	2	1	4	2	1	0	1	1
10 SPD	34 SACREMEN	26 ENGLEBRIGHT	3	1	0	2	2	0	0	1	1
10 SPD	34 SACREMEN	23 ISABELLA	4	2	1	4	2	1	0	1	1
10 SPD	34 SACREMEN	30 MARTIS CREEK	2	1	0	2	1	0	0	1	1
10 SPD	34 SACREMEN	32 NEW HOGAN	3	1	0	3	2	0	0	1	1
10 SPD	34 SACREMEN	33 PINE FLAT	4	2	0	4	2	1	1	1	1
10 SPD	34 SACREMEN	36 SUCCESS	3	2	1	3	1	1	0	1	1
10 SPD	34 SACREMEN	37 KAWEAH (TERMINUS)	3	2	1	3	1	1	0	1	1
10 SPD	34 SACREMEN	41 FOLSOM	2	1	0	2	1	0	0	1	1
10 SPD	34 SACREMEN	43 NEW BULLARDS BAR	3	2	1	3	1	0	0	1	1
10 SPD	34 SACREMEN	44 CAMANCHE	2	1	0	2	1	0	0	1	1
10 SPD	34 SACREMEN	47 CHERRY VALLEY	2	1	0	2	1	0	0	1	1
10 SPD	34 SACREMEN	48 NEW DON PEDRO	3	1	0	3	2	0	0	1	1

INVENTORY OF DATA IN DAQ FILE

DIVISION	DISTRICT	PROJECT	NUMBR ENTRIES	YEAR IMPD	NET DAREA	TOTAL DAREA	MEAN DISCH	MEAN INFLOW	MEAN PREC	USGS E/C	USGS DISCH
10 SPD	34 SACREMEN	51 MCCLURE (NEW EXCHEQU	3	2	1	3	1	0	0	1	1
10 SPD	34 SACREMEN	54 MILLERTON (FRIANT)	2	1	0	2	1	0	0	1	1
10 SPD	35 SAN FRAN	29 MENDOCINO	5	1	1	4	3	0	0	1	1
10 SPD	35 SAN FRAN	39 SANTA MARGARITA (SAL	5	2	1	5	3	1	1	1	1
10 SPD	36 LOS ANGE	9 ALAMO	2	1	1	1	1	0	0	0	1
10 SPD	36 LOS ANGE	27 HANSEN	1	1	1	1	0	1	1	0	0

INVENTORY OF DATA IN DAQ FILE
*** DISTRICT TOTALS ***

DISTRICT	TOTAL PROJ	NUMBR ENTRIES	YEAR IMPD	NET DAREA	TOTAL DAREA	MEAN DISCH	MEAN INFLOW	MEAN PREC	USGS E/C	USGS DISCH
1 NEW ENGLAND	22	75	23	14	62	18	0	0	21	17
2 NEW YORK	3	11	3	3	8	5	0	0	3	3
3 PHILADELPHIA	3	12	3	4	8	5	0	0	3	3
4 BALTIMORE	9	25	8	6	20	12	1	1	7	7
5 NORFOLK	0	0	0	0	0	0	0	0	0	0
6 WILMINGTON	3	10	4	3	9	4	2	2	2	2
7 CHARLESTON	1	4	2	1	4	2	1	1	1	1
8 SAVANNAH	2	10	2	2	10	6	0	0	2	2
9 JACKSONVILLE	1	3	1	0	3	2	0	0	1	1
10 MOBILE	17	51	10	11	46	26	0	0	13	14
11 BUFFALO	1	3	2	1	3	1	1	0	1	1
12 DETROIT	0	0	0	0	0	0	0	0	0	0
13 CHICAGO	0	0	0	0	0	0	0	0	0	0
14 ROCK ISLAND	2	9	3	1	9	5	1	1	2	2
15 ST PAUL	13	39	15	5	37	23	3	3	11	11
16 PITTSBURG	14	53	19	11	50	28	8	8	14	14
17 HUNTINGTON	28	99	37	13	97	58	12	12	27	25
18 LOUISVILLE	15	48	18	5	46	29	3	3	15	14
19 NASHVILLE	7	32	10	5	31	20	3	3	7	7
20 ST LOUIS	3	13	4	1	13	9	1	1	3	3
21 MEMPHIS	1	5	2	1	5	3	1	1	1	1
22 VICKSBURG	7	32	11	5	31	20	4	4	7	7
23 NEW ORLEANS	4	14	6	4	13	6	3	3	2	2
24 LITTLE ROCK	10	44	13	6	41	28	3	2	10	10
25 TULSA	35	126	38	30	109	66	12	8	28	28
26 FORT WORTH	17	67	24	7	66	42	6	7	17	17
27 GALVESTON	0	0	0	0	0	0	0	0	0	0
28 ALBUQUERQUE	4	14	7	3	14	7	3	2	4	5
29 KANSAS CITY	11	48	13	5	46	32	2	0	11	11
30 OMAHA	20	45	10	16	31	20	1	0	9	8
31 WALLA WALLA	4	15	3	2	14	7	0	0	3	4
32 SEATTLE	6	19	6	4	15	9	0	0	5	6
33 PORTLAND	17	51	15	9	44	26	2	2	12	14
34 SACREMENTO	15	43	22	6	42	21	5	1	15	15
35 SAN FRANCISC	2	10	3	2	9	6	1	1	2	2
36 LOS ANGELES	2	3	2	2	2	1	1	1	0	1
TOTALS	299	1033	339	188	938	546	80	67	259	258

INVENTORY OF DATA IN DAQ FILE
*** NUMBER OF PROJECTS WITH ONE OR MORE ENTRY BY DISTRICT ***

DISTRICT	TOTAL PROJ	NUMBR ENTRIES	YEAR IMPD	NET DAREA	TOTAL DAREA	MEAN DISCH	MEAN INFLOW	MEAN PREC	USGS E/C	USGS DISCH
1 NEW ENGLAND	22	22	22	14	22	18	0	0	21	17
2 NEW YORK	3	3	3	3	3	3	0	0	3	3
3 PHILADELPHIA	3	3	3	3	3	3	0	0	3	3
4 BALTIMORE	9	9	8	6	8	8	1	1	7	7
5 NORFOLK	0	0	0	0	0	0	0	0	0	0
6 WILMINGTON	3	3	2	3	2	2	2	2	2	2
7 CHARLESTON	1	1	1	1	1	1	1	1	1	1
8 SAVANNAH	2	2	2	2	2	2	0	0	2	2
9 JACKSONVILLE	1	1	1	0	1	1	0	0	1	1
10 MOBILE	17	17	10	10	17	16	0	0	13	14
11 BUFFALO	1	1	1	1	1	1	1	0	1	1
12 DETROIT	0	0	0	0	0	0	0	0	0	0
13 CHICAGO	0	0	0	0	0	0	0	0	0	0
14 ROCK ISLAND	2	2	2	1	2	2	1	1	2	2
15 ST PAUL	13	12	12	5	12	12	3	3	11	11
16 PITTSBURG	14	14	14	11	14	14	8	8	14	14
17 HUNTINGTON	28	28	27	13	28	27	12	12	27	25
18 LOUISVILLE	15	15	15	5	15	14	3	3	15	14
19 NASHVILLE	7	7	7	5	7	7	3	3	7	7
20 ST LOUIS	3	3	3	1	3	3	[illegible]	1	3	3
21 MEMPHIS	1	1	1	1	1	1	1	1	1	1
22 VICKSBURG	7	7	7	5	7	7	4	4	7	7
23 NEW ORLEANS	4	4	3	3	4	3	3	3	2	2
24 LITTLE ROCK	10	10	10	6	10	10	3	2	10	10
25 TULSA	35	32	28	29	31	30	12	8	28	28
26 FORT WORTH	17	17	17	7	17	17	6	7	17	17
27 GALVESTON	0	0	0	0	0	0	0	0	0	0
28 ALBUQUERQUE	4	4	4	3	4	4	3	2	4	4
29 KANSAS CITY	11	11	11	5	11	11	2	0	11	11
30 OMAHA	20	20	9	16	11	11	1	0	9	8
31 WALLA WALLA	4	4	3	2	4	4	0	0	3	4
32 SEATTLE	6	6	6	4	6	6	0	0	5	6
33 PORTLAND	17	17	13	9	16	13	2	2	12	14
34 SACREMENTO	15	15	15	6	15	15	5	1	15	15
35 SAN FRANCISC	2	2	2	2	2	2	1	1	2	2
36 LOS ANGELES	2	2	2	2	2	1	1	1	0	1
TOTALS	299	295	264	184	282	269	80	67	259	257

Table A2

Inventory of RESTER.MORPHO File

TALLY OF DATA IN MORPHO FILE

DIVISION	DISTRICT	PROJECT	N ELEV	MIN ELEV	MAX ELEV	N AREA	N VOL	POOL CODES	OUTLT CODES	N LENGTH	N WIDTH	N SHORE
1 NED	1 NEW ENGL	142 BUFFUMVILLE	2	493	524	2	2	2	1	1	1	1
1 NED	1 NEW ENGL	144 EAST BRIMFIELD	4	619	653	4	4	2	0	1	1	1
1 NED	1 NEW ENGL	147 LITTLEVILLE	10	432	576	10	10	2	1	1	1	1
1 NED	1 NEW ENGL	148 TULLY	15	625	668	15	15	3	1	1	1	1
1 NED	1 NEW ENGL	150 WESTVILLE	8	515	572	8	8	2	1	1	1	1
1 NED	1 NEW ENGL	151 BLACK ROCK	8	410	520	8	8	2	1	1	1	1
1 NED	1 NEW ENGL	152 COLEBROOK RIVER	12	567	761	12	12	3	1	1	1	1
1 NED	1 NEW ENGL	155 HANCOCK BROOK	14	454	484	14	14	2	1	1	1	1
1 NED	1 NEW ENGL	156 HOP BROOK	9	292	364	9	9	2	1	1	1	1
1 NED	1 NEW ENGL	158 MANSFIELD HOLLOW	16	195	257	16	16	2	1	1	1	1
1 NED	1 NEW ENGL	159 NORTHFIELD BROOK	8	480	576	8	8	2	1	1	1	1
1 NED	1 NEW ENGL	162 WEST THOMPSON	8	292	342	8	8	2	1	1	1	1
1 NED	1 NEW ENGL	164 EDWARD MCDOWELL	15	904	967	14	14	3	1	1	1	1
1 NED	1 NEW ENGL	165 EVERETT	16	325	418	16	16	2	1	1	1	1
1 NED	1 NEW ENGL	166 FRANKLIN FALLS	15	300	389	15	15	2	1	1	1	1
1 NED	1 NEW ENGL	167 HOPKINTON	6	370	416	6	6	2	1	1	1	1
1 NED	1 NEW ENGL	168 OTTER BROOK	13	670	781	13	13	2	1	1	1	1
1 NED	1 NEW ENGL	169 SURRY MOUNTAIN	8	485	550	8	8	2	1	1	1	1
1 NED	1 NEW ENGL	170 BALL MOUNTAIN	10	806	1017	10	10	2	1	1	1	1
1 NED	1 NEW ENGL	172 NORTH HARTLAND	9	390	546	9	9	3	1	1	1	1
1 NED	1 NEW ENGL	173 NORTH SPRINGFIELD	7	450	546	7	7	2	1	1	1	1
1 NED	1 NEW ENGL	174 TOWNSHEND	8	457	553	8	8	2	1	1	1	1
2 NAD	2 NEW YORK	171 EAST BARRE	5	1125	1185	2	2	5	2	1	1	0
2 NAD	2 NEW YORK	176 WATERBURY	24	500	692	4	17	5	2	1	1	0
2 NAD	2 NEW YORK	177 WRIGHTSVILLE	8	612	715	3	4	6	2	0	0	0
2 NAD	3 PHILADEL	307 BELTZVILLE	18	501	672	16	18	5	1	1	0	1
2 NAD	3 PHILADEL	313 FRANCIS E WALTER	23	1250	1474	16	23	5	1	1	1	1
2 NAD	3 PHILADEL	316 PROMPTON	13	1090	1205	10	12	5	1	1	0	0
2 NAD	4 BALTIMOR	227 ALMOND	6	1229	1300	4	5	5	2	2	0	0
2 NAD	4 BALTIMOR	229 WHITNEY POINT	8	950	1025	5	8	5	2	2	0	2
2 NAD	4 BALTIMOR	306 ALVIN R BUSH (KETTLE	5	810	937	3	4	5	2	2	0	1
2 NAD	4 BALTIMOR	310 CURWENSVILLE	13	1126	1228	10	13	4	1	2	0	1
2 NAD	4 BALTIMOR	312 F J SAYERS (BLANCHAR	10	580	658	8	8	6	1	3	0	2
2 NAD	4 BALTIMOR	320 RAYSTOWN	14	600	826	12	12	5	1	1	0	1
2 NAD	4 BALTIMOR	329 STILLWATER	5	1568	1621	3	5	5	0	1	0	0
2 NAD	4 BALTIMOR	398 BLOOMINGTON	12	1240	1509	12	12	3	2	2	0	0
2 NAD	4 BALTIMOR	401 SAVAGE	4	1313	1499	2	2	4	1	1	1	0
3 SAD	6 WILMINGT	233 B EVERETT JORDAN (NE	18	154	260	18	18	4	0	9	9	1
3 SAD	6 WILMINGT	372 JOHN H KERR	24	193	332	21	23	7	2	16	16	1
3 SAD	6 WILMINGT	375 PHILPOTT	28	805	1016	26	26	7	1	23	20	1
3 SAD	7 CHARLEST	232 W KERR SCOTT	11	970	1108	10	10	4	1	1	1	1

TALLY OF DATA IN MORPHO FILE

DIVISION	DISTRICT	PROJECT	N ELEV	MIN ELEV	MAX ELEV	N AREA	N VOL	POOL CODES	OUTLT CODES	N LENGTH	N WIDTH	N SHORE
3 SAD	8 SAVANNAH	74 CLARK HILL	21	190	346	19	20	5	4	5	1	1
3 SAD	8 SAVANNAH	330 HARTWELL	21	475	674	19	20	5	3	4	1	1
3 SAD	9 JACKSONV	66 OCKLAWAHA(RODMAN)	14	0	23	12	12	4	0	1	1	1
3 SAD	10 MOBILE	1 CLAIBORNE	15	2	50	15	15	1	2	1	0	1
3 SAD	10 MOBILE	2 COFFEEVILLE (JACKSON	6	8	34	2	2	1	2	1	0	1
3 SAD	10 MOBILE	3 HOLT	9	115	202	9	9	2	0	1	0	1
3 SAD	10 MOBILE	4 JONES BLUFF	15	64	140	15	15	2	1	1	0	1
3 SAD	10 MOBILE	5 DEMOPOLIS	1	73	73	1	1	1	0	1	0	1
3 SAD	10 MOBILE	7 WARRIOR	2	75	95	2	1	0	0	1	0	1
3 SAD	10 MOBILE	6 MILLERS FERRY	15	17	100	15	15	2	1	1	0	1
3 SAD	10 MOBILE	69 ALLATOONA	13	700	861	11	12	5	0	0	0	0
3 SAD	10 MOBILE	70 GEORGE W ANDREWS	15	62	108	15	15	1	1	0	0	1
3 SAD	10 MOBILE	71 SEMINOLE (WOODRUFF)	17	44	79	15	17	3	1	0	0	1
3 SAD	10 MOBILE	72 WALTER F GEORGE (EUF	16	100	200	14	16	5	1	1	0	1
3 SAD	10 MOBILE	73 WEST POINT	30	560	645	28	29	9	0	0	0	1
3 SAD	10 MOBILE	75 CARTERS	10	660	1099	8	10	6	1	0	0	0
3 SAD	10 MOBILE	76 SIDNEY LANIER	18	920	1086	15	18	5	0	0	0	2
3 SAD	10 MOBILE	191 OKATIBBEE	2	342	343	1	1	0	0	1	0	1
3 SAD	10 MOBILE	405 GAINESVILLE L/D	2	75	109	1	1	1	1	1	0	1
3 SAD	10 MOBILE	411 BANKHEAD	13	200	270	13	13	0	1	1	0	0
5 NCD	11 BUFFALO	228 MT MORRIS	14	577	790	3	12	7	1	1	1	0
5 NCD	14 ROCK ISL	98 CORALVILLE	11	652	743	10	10	5	1	3	1	2
5 NCD	14 ROCK ISL	99 RED ROCK	12	690	780	12	12	4	0	3	2	2
5 NCD	15 ST PAUL	178 GULL	3	1190	1196	1	1	2	0	0	0	1
5 NCD	15 ST PAUL	179 LAC QUI PARLE	15	923	948	14	15	1	0	0	0	1
5 NCD	15 ST PAUL	180 TRAVERSE	1	982	982	1	1	0	0	0	0	1
5 NCD	15 ST PAUL	181 LEECH	19	1145	1297	17	17	2	0	0	0	1
5 NCD	15 ST PAUL	182 ORWELL	7	1046	1080	2	2	7	1	1	1	0
5 NCD	15 ST PAUL	183 CROSS	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	184 POKEGAMA	3	1268	1277	1	1	2	0	0	0	1
5 NCD	15 ST PAUL	185 SANDY	13	1132	1224	10	10	2	0	0	0	1
5 NCD	15 ST PAUL	186 WINNIBIGOSHISH	3	1288	1303	1	1	2	0	0	0	1
5 NCD	15 ST PAUL	187 PINE RIVER	3	1217	1234	1	1	2	0	0	0	1
5 NCD	15 ST PAUL	236 HOMME	7	1048	1099	3	3	7	1	1	1	0
5 NCD	15 ST PAUL	237 ASHTABULA (BALDHILL)	8	1238	1279	3	5	7	1	1	1	1
5 NCD	15 ST PAUL	399 EAU GALLE	7	925	998	7	7	2	0	1	0	1
4 ORD	16 PITTSBUR	243 BERLIN	13	949	1045	11	11	5	2	3	1	1
4 ORD	16 PITTSBUR	252 MICHAEL J KIRWAN	9	930	993	9	9	4	0	1	0	1
4 ORD	16 PITTSBUR	254 MUSQUITO CREEK	18	869	907	15	18	3	1	2	0	1

TALLY OF DATA IN MORPHO FILE

DIVISION	DISTRICT	PROJECT	N ELEV	MIN ELEV	MAX ELEV	N AREA	N VOL	POOL CODES	OUTLT CODES	N LENGTH	N WIDTH	N SHORE
4 ORD	16 PITTSBUR	308 CONEMAUGH RIVER	13	848	966	10	13	4	2	2	0	0
4 ORD	16 PITTSBUR	309 CROOKED CREEK	16	803	946	11	14	6	1	2	1	0
4 ORD	16 PITTSBUR	311 EAST BRANCH CLARION	24	1523	1707	21	21	9	1	3	1	1
4 ORD	16 PITTSBUR	314 LOYALHANNA	13	869	983	10	11	6	1	1	1	0
4 ORD	16 PITTSBUR	315 MAHONING CREEK	15	1008	1170	11	13	6	1	2	1	0
4 ORD	16 PITTSBUR	317 SHENANGO RIVER	7	881	919	5	7	6	0	4	0	1
4 ORD	16 PITTSBUR	318 TIONESTA	15	1043	1197	12	14	5	1	2	1	1
4 ORD	16 PITTSBUR	319 YOUGHIOGHENY RIVER	17	1313	1497	14	16	6	1	1	1	1
4 ORD	16 PITTSBUR	322 WOODCOCK	14	1138	1227	10	11	7	0	3	0	0
4 ORD	16 PITTSBUR	328 ALLEGHENY (KINZUA)	16	1195	1365	13	16	5	1	3	0	1
4 ORD	16 PITTSBUR	393 TYGART	16	960	1190	13	15	7	1	3	1	1
4 ORD	17 HUNTINGT	123 DEWEY	7	600	686	2	7	5	0	1	0	1
4 ORD	17 HUNTINGT	124 FISHTRAP	16	670	845	9	11	8	3	1	1	1
4 ORD	17 HUNTINGT	125 GRAYSON	16	585	710	11	11	8	1	1	1	1
4 ORD	17 HUNTINGT	127 GREENUP L/D	0	0	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	239 PAINT CREEK	14	748	860	12	12	4	1	2	0	1
4 ORD	17 HUNTINGT	241 ATWOOD	7	890	955	2	4	6	1	1	1	1
4 ORD	17 HUNTINGT	242 BEACH CITY	8	931	995	3	6	5	1	1	1	0
4 ORD	17 HUNTINGT	245 CHARLES MILL	8	982	1035	3	5	6	1	1	1	1
4 ORD	17 HUNTINGT	246 CLENDENING	5	862	911	1	5	4	2	0	0	1
4 ORD	17 HUNTINGT	247 DEER CREEK	12	765	845	10	10	4	1	0	0	1
4 ORD	17 HUNTINGT	248 DELAWARE	10	880	957	7	7	6	1	1	1	1
4 ORD	17 HUNTINGT	249 DILLON	12	700	818	7	7	7	1	1	1	1
4 ORD	17 HUNTINGT	251 LEESVILLE	5	528	978	1	4	4	2	0	0	1
4 ORD	17 HUNTINGT	255 PIEDMONT	5	882	925	1	4	4	2	0	0	1
4 ORD	17 HUNTINGT	256 PLEASANT HILL	7	972	1085	2	4	6	1	1	1	1
4 ORD	17 HUNTINGT	257 SENECAVILLE	7	810	857	3	5	6	1	1	1	1
4 ORD	17 HUNTINGT	258 TAPPAN	6	870	909	1	4	4	2	0	0	1
4 ORD	17 HUNTINGT	259 BURR OAK(TOM JENKINS	9	689	765	5	6	7	1	1	1	0
4 ORD	17 HUNTINGT	261 WILLS CREEK	5	733	779	1	4	3	1	0	0	1
4 ORD	17 HUNTINGT	373 JOHN W FLANNAGAN	12	1210	1450	10	12	2	1	1	0	1
4 ORD	17 HUNTINGT	374 NORTH FORK OF POUND	12	1550	1667	10	10	4	1	2	0	0
4 ORD	17 HUNTINGT	389 BLUESTONE	11	1368	1535	8	10	7	1	1	1	1
4 ORD	17 HUNTINGT	390 EAST LYNN	4	653	701	1	3	2	1	1	0	0
4 ORD	17 HUNTINGT	391 SUMMERSVILLE	8	1375	1711	6	8	2	0	0	0	1
4 ORD	17 HUNTINGT	392 SUTTON	12	810	1017	8	8	8	1	1	1	1
4 ORD	17 HUNTINGT	394 WINFIELD	0	0	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	405 MOHICANVILLE	4	932	963	0	4	3	1	0	0	0
4 ORD	17 HUNTINGT	416 ALUM CREEK	2	849	838	0	0	2	0	0	0	0
4 ORD	18 LOUISVIL	90 CAGLES MILL	7	563	730	2	4	6	1	1	1	1
4 ORD	18 LOUISVIL	91 HUNTINGTON	12	715	798	10	11	5	1	0	0	1
4 ORD	18 LOUISVIL	92 MISSISSINEWA	13	665	779	11	11	5	2	0	0	1
4 ORD	18 LOUISVIL	93 MONROE	10	490	556	8	8	4	1	0	0	1
4 ORD	18 LOUISVIL	94 SALAMONIE	14	684	793	12	12	5	1	0	0	1

TALLY OF DATA IN MORPHO FILE

DIVISION	DISTRICT	PROJECT	N ELEV	MIN ELEV	MAX ELEV	N AREA	N VOL	POOL CODES	OUTLT CODES	N LENGTH	N WIDTH	N SHORE
4 ORD	18 LOUISVIL	95 C M HARDEN (MANSFIEL	20	597	712	18	19	5	1	0	0	1
4 ORD	18 LOUISVIL	97 BROOKVILLE	13	628	775	11	11	6	1	0	0	1
4 ORD	18 LOUISVIL	120 BARREN RIVER	20	478	618	15	19	6	2	0	0	0
4 ORD	18 LOUISVIL	121 BUCKHORN	12	715	840	9	9	6	0	0	0	3
4 ORD	18 LOUISVIL	126 GREEN RIVER	14	590	713	12	12	5	1	0	0	1
4 ORD	18 LOUISVIL	126 NOLIN RIVER	17	415	560	12	13	6	2	0	0	1
4 ORD	18 LOUISVIL	129 ROUGH RIVER	12	430	554	8	8	6	1	1	1	1
4 ORD	18 LOUISVIL	134 CAVE RUN	12	656	765	10	10	6	1	0	0	1
4 ORD	18 LOUISVIL	260 WEST FORK OF MILL CK	7	636	736	2	5	7	1	1	1	1
4 ORD	18 LOUISVIL	263 CLARENCE J BROWN	15	965	1023	13	13	6	1	0	0	1
4 ORD	19 NASHVILL	119 BARKLEY	17	280	375	16	16	6	2	2	0	2
4 ORD	19 NASHVILL	122 CUMBERLAND (WOLF CRE	19	540	773	16	16	8	2	2	1	3
4 ORD	19 NASHVILL	337 CENTER HILL	15	500	685	14	14	6	2	3	0	3
4 ORD	19 NASHVILL	338 CHEATHAM	19	345	400	17	17	4	2	1	0	1
4 ORD	19 NASHVILL	340 J PERCY PRIEST	15	405	504	15	11	5	2	2	0	1
4 ORD	19 NASHVILL	342 OLD HICKORY	15	385	455	12	11	7	3	1	1	1
4 ORD	19 NASHVILL	343 DALE HOLLOW	15	500	678	11	11	8	3	1	1	2
6 LMVD	20 ST LOUIS	81 CARLYLE	15	405	472	10	10	7	1	1	1	1
6 LMVD	20 ST LOUIS	87 SHELBYVILLE	11	546	626	9	9	4	1	0	0	1
6 LMVD	20 ST LOUIS	89 REND	10	379	411	8	9	4	1	0	0	0
6 LMVD	21 MEMPHIS	196 WAPPAPELLO	13	311	420	8	9	7	2	1	1	1
6 LMVD	22 VICKSBUR	14 DE GRAY	35	210	453	34	34	8	4	10	13	3
6 LMVD	22 VICKSBUR	18 GREESON (NARROWS)	23	396	586	23	23	8	2	11	11	2
6 LMVD	22 VICKSBUR	19 OUACHITA (BLAKELY MT	26	380	616	24	24	8	2	10	12	3
6 LMVD	22 VICKSBUR	188 ARKABUTLA	18	189	264	16	16	9	2	7	9	3
6 LMVD	22 VICKSBUR	189 ENID	17	194	293	15	15	6	1	5	9	2
6 LMVD	22 VICKSBUR	190 GRENADA	15	160	256	13	13	8	2	4	7	2
6 LMVD	22 VICKSBUR	192 SARDIS	17	204	311	15	15	8	2	6	7	2
6 LMVD	23 NEW ORLE	178 WALLACE	10	130	176	10	10	3	1	1	1	1
6 LMVD	23 NEW ORLE	[illegible] AKE O' THE PINES(FE	15	185	277	10	10	7	2	1	1	1
6 LMVD	23 NEW ORLE	[illegible] KARKANA(WRIGHT PAT	11	180	296	7	7	6	2	1	1	1
6 LMVD	23 NEW ORLE	4[illegible] [illegible]OO	13	160	184	13	13	0	0	0	0	0
7 SWD	24 LITTLE R	11 BEAVER	13	914	1130	4	11	6	3	0	0	2
7 SWD	24 LITTLE R	12 [illegible] UNTAIN	12	354	422	8	10	5	2	0	0	3
7 SWD	24 LITTLE R	13 [illegible] OALS	18	452	695	15	16	6	2	0	0	3
7 SWD	24 LITTLE R	1[illegible] [illegible]ERRY	16	272	386	13	14	6	1	0	0	3
7 SWD	24 LITTLE R	[illegible] D[illegible]LLE	14	270	355	9	10	7	3	1	1	1
7 SWD	24 LITTLE R	2[illegible] NIMROD	15	300	400	9	11	7	2	1	1	1
7 SWD	24 LITTLE R	22 NORFOLK	16	370	590	10	12	7	2	1	1	1
7 SWD	24 LITTLE R	23 OZARK	9	312	373	1	7	4	3	0	0	1

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DIVISION	DISTRICT	PROJECT	N ELEV	MIN ELEV	MAX ELEV	N AREA	N VOL	POOL CODES	OUTLT CODES	N LENGTH	N WIDTH	N SHORE
7 SWD	24 LITTLE R	193 CLEARWATER	13	460	566	10	10	4	1	0	0	1
7 SWD	24 LITTLE R	200 TABLE ROCK	16	695	932	11	12	6	2	0	0	1
7 SWD	25 TULSA	20 MILLWOOD	12	213	287	9	10	5	2	0	0	1
7 SWD	25 TULSA	102 COUNCIL GROVE	12	1224	1289	10	10	4	0	0	0	1
7 SWD	25 TULSA	103 ELK CITY	12	760	826	9	10	5	1	0	0	1
7 SWD	25 TULSA	104 FALL RIVER	10	917	988	8	8	5	1	0	0	1
7 SWD	25 TULSA	105 JOHN REDMOND	14	1009	1082	11	11	6	2	1	1	1
7 SWD	25 TULSA	107 MARION	13	1308	1363	9	10	5	0	0	0	1
7 SWD	25 TULSA	112 TORONTO	12	862	946	9	9	6	1	1	1	1
7 SWD	25 TULSA	264 BROKEN BOW	14	424	628	12	12	6	1	0	0	1
7 SWD	25 TULSA	265 CANTON	12	1580	1648	8	8	5	2	1	1	1
7 SWD	25 TULSA	266 CHOUTEAU	14	480	530	14	14	0	0	0	0	0
7 SWD	25 TULSA	267 EUFAULA	13	495	612	10	10	6	2	1	1	1
7 SWD	25 TULSA	268 FORT GIBSON	7	547	582	2	4	5	1	0	0	1
7 SWD	25 TULSA	269 FORT SUPPLY	12	1987	2060	8	8	5	1	1	1	1
7 SWD	25 TULSA	270 GREAT SALT PLAINS	11	1115	1169	7	7	5	1	1	1	1
7 SWD	25 TULSA	271 HEYBURN	13	730	807	9	9	5	1	1	1	1
7 SWD	25 TULSA	272 HULAH	13	686	780	8	8	6	2	1	1	1
7 SWD	25 TULSA	273 KEYSTONE	25	648	771	20	20	7	2	1	1	1
7 SWD	25 TULSA	274 NEWT GRAHAM	15	490	550	15	15	0	0	0	0	0
7 SWD	25 TULSA	275 OOLOGAH	8	592	661	2	6	5	1	0	0	1
7 SWD	25 TULSA	276 PINE CREEK	14	384	480	11	11	5	1	0	0	1
7 SWD	25 TULSA	277 ROBERT S KERR	8	412	472	7	7	2	0	0	0	1
7 SWD	25 TULSA	278 TENKILLER FERRY	8	594	667	4	6	6	1	0	0	1
7 SWD	25 TULSA	279 W D MAYO	13	390	414	13	12	0	0	0	0	0
7 SWD	25 TULSA	280 WEBBERS FALLS	16	438	520	16	16	0	0	0	0	1
7 SWD	25 TULSA	281 WISTER	14	436	528	11	10	5	2	1	1	1
7 SWD	25 TULSA	282 CLAYTON	10	530	611	10	10	3	1	0	0	0
7 SWD	25 TULSA	283 KAW	16	931	1070	14	14	5	1	0	0	1
7 SWD	25 TULSA	284 COPAN	12	670	732	12	12	3	1	0	0	0
7 SWD	25 TULSA	285 HUGO	13	360	438	11	11	5	0	0	0	1
7 SWD	25 TULSA	286 OPTIMA	7	2703	2779	7	7	4	1	0	0	0
7 SWD	25 TULSA	287 WAURIKA	9	890	970	9	9	3	1	1	0	1
7 SWD	25 TULSA	348 TEXOMA (DENNISON)	15	510	670	10	12	7	1	1	1	1
7 SWD	25 TULSA	357 PAT MAYSE	10	393	477	10	10	3	1	0	0	1
7 SWD	25 TULSA	370 KEMP	13	1068	1183	0	10	7	2	1	1	0
7 SWD	25 TULSA	402 GILLHAM	15	430	586	10	13	7	1	0	0	0
7 SWD	26 FORT WOR	344 BARDWELL	11	380	460	8	8	6	2	1	1	1
7 SWD	26 FORT WOR	345 BELTON(BELL)	14	480	662	11	11	7	1	1	1	1
7 SWD	26 FORT WOR	346 BENBROOK	27	620	747	21	23	6	2	1	1	2
7 SWD	26 FORT WOR	347 CANYON	21	750	974	17	17	8	2	1	1	1
7 SWD	26 FORT WOR	349 GRAPEVINE	23	470	588	19	19	6	2	1	1	1
7 SWD	26 FORT WOR	351 HORDS CREEK	12	1854	1939	9	9	6	2	1	1	1
7 SWD	26 FORT WOR	354 LAVON	12	443	514	8	10	7	1	1	1	1

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7 SWD	26 FORT WOR	355 LEWISVILLE(GARZA LIT	17	455	560	14	15	6	2	1	1	1
7 SWD	26 FORT WOR	356 NAVARRO MILLS	17	390	457	14	14	6	3	1	1	1
7 SWD	26 FORT WOR	358 PROCTOR	14	1120	1.31	10	10	5	2	1	1	1
7 SWD	26 FORT WOR	359 SAM RAYBURN (MC GEE	20	80	190	15	17	7	1	1	1	1
7 SWD	26 FORT WOR	360 O C FISHER (SAN ANGE	24	1840	1904	19	21	6	3	1	1	1
7 SWD	26 FORT WOR	361 SOMERVILLE	20	200	280	14	16	6	2	1	1	1
7 SWD	26 FORT WOR	362 STILLHOUSE HOLLOW(LA	19	498	698	15	15	7	1	1	1	1
7 SWD	26 FORT WOR	363 WACO	13	400	510	9	10	7	2	1	1	1
7 SWD	26 FORT WOR	364 WHITNEY	17	425	584	11	12	8	1	1	1	1
7 SWD	26 FORT WOR	371 B A STEINHAGEN (TOWN	11	50	95	6	6	7	1	1	1	0
7 SWD	28 ALBUQUER	65 JOHN MARTIN (HASTY)	15	3765	3880	12	13	6	2	2	2	1
7 SWD	28 ALBUQUER	218 ABIQUIU	13	6060	6362	13	13	6	2	1	1	1
7 SWD	28 ALBUQUER	219 CONCHAS	19	4071	4235	18	18	8	3	1	1	1
7 SWD	28 ALBUQUER	407 TRINIDAD	18	6081	6281	18	18	7	2	1	1	1
8 MRD	29 KANSAS C	100 RATHBUN	20	855	946	15	16	7	2	2	1	1
8 MRD	29 KANSAS C	106 KANOPOLIS	13	1430	1537	11	11	4	0	0	0	1
8 MRD	29 KANSAS C	108 MILFORD	9	1141	1176	6	8	3	1	2	2	1
8 MRD	29 KANSAS C	109 MELVERN	15	956	1073	14	14	5	2	2	2	1
8 MRD	29 KANSAS C	110 PERRY	16	820	922	12	13	5	2	1	0	1
8 MRD	29 KANSAS C	111 POMONA	16	942	1006	13	14	5	1	1	0	1
8 MRD	29 KANSAS C	113 TUTTLE CREEK	23	1010	1140	21	22	5	1	2	2	1
8 MRD	29 KANSAS C	114 WILSON	13	1430	1582	11	11	4	1	1	1	1
8 MRD	29 KANSAS C	194 POMME DE TERRE	19	750	874	16	17	4	1	1	0	1
8 MRD	29 KANSAS C	195 STOCKTON	14	760	892	13	13	5	0	1	0	1
8 MRD	29 KANSAS C	207 HARLAN COUNTY	14	1880	1982	12	12	5	1	1	1	1
8 MRD	30 OMAHA	64 CHERRY CREEK	21	5523	5640	17	18	3	1	1	0	1
8 MRD	30 OMAHA	203 FORT PECK	18	2030	2281	12	13	7	2	1	1	1
8 MRD	30 OMAHA	208 OLIVE CREEK	14	1310	1357	14	12	3	1	1	0	0
8 MRD	30 OMAHA	209 BLUESTEM	17	1276	1332	16	16	3	1	1	0	0
8 MRD	30 OMAHA	210 WAGON TRAIN	15	1256	1309	15	15	3	1	1	0	0
8 MRD	30 OMAHA	211 STAGECOACH	16	1248	1291	15	15	3	1	1	0	0
8 MRD	30 OMAHA	212 YANKEE HILL	15	1219	1267	15	15	3	1	1	0	0
8 MRD	30 OMAHA	213 CONESTOGA	17	1197	1258	16	16	3	1	1	0	0
8 MRD	30 OMAHA	214 TWIN	17	1306	1361	16	16	3	1	0	0	0
8 MRD	30 OMAHA	215 PAWNEE	16	1206	1269	15	15	3	1	1	0	0
8 MRD	30 OMAHA	216 HOLMES PARK	17	1216	1269	16	16	3	1	1	0	0
8 MRD	30 OMAHA	217 BRANCHED OAK	17	1250	1317	16	16	3	1	1	0	0
8 MRD	30 OMAHA	234 BOWMAN-HALEY	13	2715	2781	9	10	5	2	0	0	1
8 MRD	30 OMAHA	235 SAKAKAWEA(GARRISON)	24	1668	1860	16	18	4	3	1	0	2
8 MRD	30 OMAHA	331 SHARPE (BIG BEND)	18	1340	1430	15	17	2	2	1	1	2
8 MRD	30 OMAHA	332 COLD BROOK	4	3578	3606	4	4	2	2	0	0	0
8 MRD	30 OMAHA	334 FRANCIS CASE (FT RAN	21	1227	1390	15	18	3	2	1	0	2
8 MRD	30 OMAHA	335 LEWIS AND CLARKE (GA	18	1160	1230	15	15	3	1	1	0	2

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DIVISION	DISTRICT	PROJECT	N ELEV	MIN ELEV	MAX ELEV	N AREA	N VOL	POOL CODES	OUTLT CODES	N LENGTH	N WIDTH	N SHORE
8 MRD	30 OMAHA	336 OAHE	14	1420	1620	10	11	5	3	0	0	1
8 MRD	30 OMAHA	415 CHATFIELD	18	5380	5530	16	18	2	1	1	0	0
9 NPD	31 WALLA WA	77 DWORSHAK	10	970	1640	10	10	1	2	8	8	1
9 NPD	31 WALLA WA	78 LUCKY PEAK	20	2822	3080	12	18	5	2	1	1	2
9 NPD	31 WALLA WA	79 RIRIE	6	5023	5119	6	6	2	0	1	1	0
9 NPD	31 WALLA WA	379 ICE HARBOR	3	375	440	3	3	1	0	1	1	1
9 NPD	32 SEATTLE	80 ALBENI FALLS (PEND O	6	2046	2071	2	1	4	0	1	0	2
9 NPD	32 SEATTLE	204 KOOKANUSA(LIBBY)	14	2110	2459	14	14	5	2	1	0	0
9 NPD	32 SEATTLE	377 RUFUS WOODS (CHIEF J	20	785	956	16	20	2	2	1	0	1
9 NPD	32 SEATTLE	384 MUD MOUNTAIN	14	835	1241	2	12	4	2	1	0	0
9 NPD	32 SEATTLE	385 WYNOOCHEE	12	640	800	7	10	6	2	1	0	0
9 NPD	32 SEATTLE	386 HOWARD A HANSON	15	1035	1222	1	15	5	3	1	0	0
9 NPD	33 PORTLAND	288 BLUE RIVER	11	1102	1357	9	9	4	1	1	1	1
9 NPD	33 PORTLAND	289 BONNEVILLE	4	24	76	3	0	2	0	1	1	1
9 NPD	33 PORTLAND	290 COTTAGE GROVE	14	719	808	10	11	6	1	1	1	1
9 NPD	33 PORTLAND	291 COUGAR	10	1274	1699	7	9	5	1	1	1	1
9 NPD	33 PORTLAND	292 CELILO (DALLES)	3	121	160	2	2	0	1	0	0	0
9 NPD	33 PORTLAND	293 DETROIT	11	1200	1569	8	7	7	2	1	1	1
9 NPD	33 PORTLAND	294 DEXTER	2	690	695	2	1	1	0	1	0	1
9 NPD	33 PORTLAND	295 DORENA	12	735	866	9	9	6	1	1	1	1
9 NPD	33 PORTLAND	296 FALL CREEK	12	670	839	10	10	2	1	1	1	1
9 NPD	33 PORTLAND	297 FERN RIDGE	9	339	375	7	7	6	1	1	1	1
9 NPD	33 PORTLAND	298 FOSTER	14	525	641	11	11	5	0	1	1	1
9 NPD	33 PORTLAND	299 GREEN PETER	10	700	1015	7	7	6	1	1	1	1
9 NPD	33 PORTLAND	300 HILLS CREEK	13	1245	1544	7	9	6	1	1	1	1
9 NPD	33 PORTLAND	301 JOHN DAY (UMATILLA)	2	210	265	1	0	1	1	1	1	0
9 NPD	33 PORTLAND	302 LOOKOUT POINT	23	688	934	6	19	4	3	0	0	1
9 NPD	33 PORTLAND	304 LOST CREEK	12	1550	1872	10	10	4	0	1	0	0
9 NPD	33 PORTLAND	305 BIG CLIFF	4	1162	1210	2	2	2	1	1	0	0
10 SPD	34 SACREMEN	24 BLACK BUTTE	13	381	515	9	9	5	1	1	1	1
10 SPD	34 SACREMEN	26 ENGLEBRIGHT	17	295	550	17	17	0	0	1	0	1
10 SPD	34 SACREMEN	28 ISABELLA	14	2455	2634	11	11	5	1	1	1	1
10 SPD	34 SACREMEN	30 MARTIS CREEK	9	5745	5853	2	9	4	2	1	0	0
10 SPD	34 SACREMEN	32 NEW HOGAN	19	516	720	3	16	5	3	0	0	1
10 SPD	34 SACREMEN	33 PINE FLAT	19	560	970	14	14	6	1	1	1	1
10 SPD	34 SACREMEN	36 SUCCESS	13	538	692	10	10	6	1	1	1	0
10 SPD	34 SACREMEN	37 KAWEAH (TERMINUS)	16	507	750	13	13	6	1	1	1	0
10 SPD	34 SACREMEN	41 FOLSOM	12	240	467	10	11	4	0	0	1	1
10 SPD	34 SACREMEN	43 NEW BULLARDS BAR	14	1600	1960	0	12	4	0	0	0	0
10 SPD	34 SACREMEN	44 CAMANCHE	10	104	236	0	8	3	1	0	0	0
10 SPD	34 SACREMEN	47 CHERRY VALLEY	15	4430	4700	13	14	2	0	0	0	0
10 SPD	34 SACREMEN	48 NEW DON PEDRO	14	550	830	0	12	3	1	0	0	0

TALLY OF DATA IN MORPHO FILE

DIVISION	DISTRICT	PROJECT	N ELEV	MIN ELEV	MAX ELEV	N AREA	N VOL	POOL CODES	OUTLT CODES	N LENGTH	N WIDTH	N SHORE
10 SPD	34 SACREMEN	51 MCCLURE (NEW EXCHEQU	15	440	670	0	13	3	2	0	0	0
10 SPD	34 SACREMEN	54 MILLERTON (FRIANT)	14	375	560	0	12	3	2	0	0	0
10 SPD	35 SAN FRAN	29 MENDOCINO	21	637	800	14	18	4	2	6	6	1
10 SPD	35 SAN FRAN	39 SANTA MARGARITA (SAL	11	1190	1320	11	11	5	1	1	1	1
10 SPD	36 LOS ANGE	9 ALAMO	9	1040	1259	9	9	3	1	0	0	0
10 SPD	36 LOS ANGE	27 HANSEN	8	990	1087	7	7	3	1	1	1	0

TALLY OF DATA IN MOR... FILE
*** DISTRICT TOTALS ***

DISTRICT	TOTAL PROJ	N ELEV	MIN ELEV	MAX ELEV	N AREA	N VOL	POOL CODES	OUTLT CODES	N LENGTH	N WIDTH	N SHORE
1 NEW ENGLAND	22	221	195	1017	220	220	48	21	22	22	22
2 NEW YORK	3	37	500	1185	9	23	16	6	2	2	0
3 PHILADELPHIA	3	54	501	1474	42	53	15	3	3	1	2
4 BALTIMORE	9	77	580	1621	59	69	42	12	16	1	7
5 NORFOLK	0	0	0	0	0	0	0	0	0	0	0
6 WILMINGTON	3	70	154	1016	65	67	18	3	48	45	3
7 CHARLESTON	1	11	970	1108	10	10	4	1	1	1	1
8 SAVANNAH	2	42	190	674	38	40	10	7	9	2	2
9 JACKSONVILLE	1	14	0	23	12	12	4	0	1	1	1
10 MOBILE	17	199	2	1099	80	190	44	12	11	0	15
11 BUFFALO	1	14	577	790	3	12	7	1	1	1	0
12 DETROIT	0	0	0	0	0	0	0	0	0	0	0
13 CHICAGO	0	0	0	0	0	0	0	0	0	0	0
14 ROCK ISLAND	2	23	652	780	22	22	9	1	6	3	4
15 ST PAUL	13	89	923	1303	61	64	36	3	4	3	10
16 PITTSBURG	14	206	803	1707	165	189	79	13	32	8	9
17 HUNTINGTON	28	224	585	1711	124	171	125	29	19	12	20
18 LOUISVILLE	15	198	415	1023	153	165	84	17	3	3	16
19 NASHVILLE	7	115	280	773	101	96	44	16	12	3	13
20 ST LOUIS	3	36	379	626	27	28	15	3	1	1	2
21 MEMPHIS	1	13	311	420	8	9	7	2	1	1	1
22 VICKSBURG	7	151	160	616	140	140	55	15	53	68	17
23 NEW ORLEANS	4	49	130	286	40	40	16	5	3	3	3
24 LITTLE ROCK	10	142	270	1130	90	113	58	21	3	3	17
25 TULSA	35	435	213	2779	335	359	156	35	13	12	27
26 FORT WORTH	17	292	50	1964	220	233	111	30	17	17	17
27 GALVESTON	0	0	0	0	0	0	0	0	0	0	0
28 ALBUQUERQUE	4	65	3765	6362	61	62	27	9	5	5	4
29 KANSAS CITY	11	172	750	1982	144	151	52	12	14	9	11
30 OMAHA	20	330	1160	5640	283	294	66	29	16	2	12
31 WALLA WALLA	4	39	375	5119	31	37	9	4	11	11	4
32 SEATTLE	6	81	640	2459	42	72	26	11	6	0	3
33 PORTLAND	17	166	24	1872	111	123	67	16	15	12	13
34 SACREMENTO	15	214	104	5853	102	181	59	16	7	6	6
35 SAN FRANCISC	2	32	637	1520	25	27	9	3	7	7	2
36 LOS ANGELES	2	17	990	1259	16	16	6	2	1	1	0
TOTALS	299	3828	0	6362	2939	3290	1324	358	363	266	264

TALLY OF DATA IN MORPHO FILE
*** NUMBER OF PROJECTS WITH ONE OR MORE ENTRY BY DISTRICT ***

DISTRICT	TOTAL PROJ	N ELEV	MIN ELEV	MAX ELEV	N AREA	N VOL	POOL CODES	OUTLT CODES	N LENGTH	N WIDTH	N SHORE
1 NEW ENGLAND	22	22	22	22	22	22	22	21	22	22	22
2 NEW YORK	3	3	3	3	3	3	3	3	2	2	0
3 PHILADELPHIA	3	3	3	3	3	3	3	3	3	1	2
4 BALTIMORE	9	9	9	9	9	9	9	8	9	1	5
5 NORFOLK	0	0	0	0	0	0	0	0	0	0	0
6 WILMINGTON	3	3	3	3	3	3	3	2	3	3	3
7 CHARLESTON	1	1	1	1	1	1	1	1	1	1	1
8 SAVANNAH	2	2	2	2	2	2	2	2	2	2	2
9 JACKSONVILLE	1	1	0	1	1	1	1	0	1	1	1
10 MOBILE	17	17	17	17	17	17	14	10	11	0	14
11 BUFFALO	1	1	1	1	1	1	1	1	1	1	0
12 DETROIT	0	0	0	0	0	0	0	0	0	0	0
13 CHICAGO	0	0	0	0	0	0	0	0	0	0	0
14 ROCK ISLAND	2	2	2	2	2	2	2	1	2	2	2
15 ST PAUL	13	12	12	12	12	12	11	3	4	3	10
16 PITTSBURG	14	14	14	14	14	14	14	11	14	8	9
17 HUNTINGTON	28	26	26	26	24	25	26	23	17	12	20
18 LOUISVILLE	15	15	15	15	15	15	15	14	3	3	14
19 NASHVILLE	7	7	7	7	7	7	7	7	7	3	7
20 ST LOUIS	3	3	3	3	3	3	3	3	1	1	2
21 MEMPHIS	1	1	1	1	1	1	1	1	1	1	1
22 VICKSBURG	7	7	7	7	7	7	7	7	7	7	7
23 NEW ORLEANS	4	4	4	4	4	4	3	3	3	3	3
24 LITTLE ROCK	10	10	10	10	10	10	10	10	3	3	10
25 TULSA	35	35	35	35	34	35	31	27	13	12	27
26 FORT WORTH	17	17	17	17	17	17	17	17	17	17	16
27 GALVESTON	0	0	0	0	0	0	0	0	0	0	0
28 ALBUQUERQUE	4	4	4	4	4	4	4	4	4	4	4
29 KANSAS CITY	11	11	11	11	11	11	11	9	10	6	11
30 OMAHA	20	20	20	20	20	20	20	20	16	2	8
31 WALLA WALLA	4	4	4	4	4	4	4	2	4	4	3
32 SEATTLE	6	6	6	6	6	6	6	5	6	0	2
33 PORTLAND	17	17	17	17	17	15	16	13	15	12	13
34 SACREMENTO	15	15	15	15	10	15	14	1	7	6	6
35 SAN FRANCISC	2	2	2	2	2	2	2	2	2	2	2
36 LOS ANGELES	2	2	2	2	2	2	2	2	1	1	0
TOTALS	299	296	295	296	288	293	285	246	212	146	227

Table A3

Inventory of USGS Hydrologic Data

INVENTORY OF USGS MONTHLY HYDROLOGIC DATA

DIVISION	DISTRICT	PROJECT	FLOW STNS	FLOW MONTHS	FLOW DFIRST	FLOW DLAST	ELEVATION STNS	ELEVATION MONTHS	ELEVATION DFIRST	ELEVATION DLAST	CONTENTS STNS	CONTENTS MONTHS	CONTENTS DFIRST	CONTENTS DLAST
1 NED	1 NEW ENGL	142 BUFFUMVILLE	1	169	6410	7810	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	144 EAST BRIMFIELD	1	62	7210	7811	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	147 LITTLEVILLE	1	160	6410	7901	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	148 TULLY	1	157	6410	7810	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	150 WESTVILLE	1	157	6410	7810	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	151 BLACK ROCK	1	47	7410	7812	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	152 COLEBROOK RIVER	0	0	0	0	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	155 HANCOCK BROOK	0	0	0	0	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	156 HOP BROOK	1	110	6910	7811	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	158 MANSFIELD HOLLOW	1	172	6410	7901	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	159 NORTHFIELD BROOK	0	0	0	0	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	162 WEST THOMPSON	1	138	6606	7811	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	164 EDWARD MCDOWELL	1	159	6410	7812	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	165 EVERETT	0	0	0	0	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	166 FRANKLIN FALLS	0	0	0	0	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	167 HOPKINTON	1	169	6410	7810	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	168 OTTER BROOK	1	157	6410	7810	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	169 SURRY MOUNTAIN	1	170	6410	7811	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	170 BALL MOUNTAIN	1	159	6410	7901	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	172 NORTH HARTLAND	1	160	6410	7901	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	173 NORTH SPRINGFIELD	1	160	6410	7901	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	174 TOWNSHEND	1	159	6410	7812	0	0	0	0	0	0	0	0
2 NAD	2 NEW YORK	171 EAST BARRE	1	160	6410	7901	0	0	0	0	0	0	0	0
2 NAD	2 NEW YORK	176 WATERBURY	0	0	0	0	1	156	6410	7709	0	0	0	0
2 NAD	2 NEW YORK	177 WRIGHTSVILLE	1	160	6410	7901	0	0	0	0	0	0	0	0
2 NAD	3 PHILADEL	307 BELTZVILLE	1	138	6708	7901	0	0	0	0	0	0	0	0
2 NAD	3 PHILADEL	313 FRANCIS E WALTER	1	171	6410	7901	0	0	0	0	0	0	0	0
2 NAD	3 PHILADEL	316 PROMPTON	1	156	6410	7709	0	0	0	0	0	0	0	0
2 NAD	4 BALTIMOR	227 ALMOND	1	172	6410	7901	1	154	6412	7709	0	0	0	0
2 NAD	4 BALTIMOR	229 WHITNEY POINT	0	0	0	0	1	156	6410	7709	0	0	0	0
2 NAD	4 BALTIMOR	306 ALVIN R BUSH (KETTLE	1	170	6410	7811	0	0	0	0	0	0	0	0
2 NAD	4 BALTIMOR	310 CURWENSVILLE	1	170	6410	7811	0	0	0	0	0	0	0	0
2 NAD	4 BALTIMOR	312 F J SAYERS (BLANCHAR	1	170	6410	7811	0	0	0	0	0	0	0	0
2 NAD	4 BALTIMOR	320 RAYSTOWN	1	111	6910	7901	0	0	0	0	0	0	0	0
2 NAD	4 BALTIMOR	329 STILLWATER	1	170	6410	7811	0	0	0	0	0	0	0	0
2 NAD	4 BALTIMOR	398 BLOOMINGTON	0	0	0	0	0	0	0	0	0	0	0	0
2 NAD	4 BALTIMOR	401 SAVAGE	1	172	6410	7902	0	0	0	0	0	0	0	0
3 SAD	6 WILMINGT	233 B EVERETT JORDAN (NE	0	0	0	0	0	0	0	0	0	0	0	0
3 SAD	6 WILMINGT	372 JOHN H KERR	0	0	0	0	0	0	0	0	0	0	0	0
3 SAD	6 WILMINGT	375 PHILPOTT	1	169	6410	7810	0	0	0	0	0	0	0	0
3 SAD	7 CHARLEST	232 W KERR SCOTT	1	172	6410	7901	0	0	0	0	0	0	0	0
3 SAD	8 SAVANNAH	74 CLARK HILL	2	173	6410	7812	1	84	7110	7709	0	0	0	0
3 SAD	8 SAVANNAH	330 HARTWELL	2	175	6410	7812	1	84	7110	7709	0	0	0	0
3 SAD	9 JACKSONV	66 OCKLAWAHA (RODMAN)	1	120	6810	7809	1	99	6907	7709	0	0	0	0

INVENTORY OF USGS MONTHLY HYDROLOGIC DATA

DIVISION	DISTRICT	PROJECT	FLOW STNS	FLOW MONTHS	FLOW DFIRST	FLOW DLAST	ELEVATION STNS	ELEVATION MONTHS	ELEVATION DFIRST	ELEVATION DLAST	CONTENTS STNS	CONTENTS MONTHS	CONTENTS DFIRST	CONTENTS DLAST
3 SAD	10 MOBILE	1 CLAIBORNE	1	72	7510	7809	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	2 COFFEEVILLE (J/?KSON	1	156	6410	7809	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	3 HOLT	1	24	7610	7809	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	4 JONES BLUFF	0	0	0	0	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	5 DEMOPOLIS	1	169	6410	7810	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	7 WARRIOR	1	24	7610	7809	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	8 MILLERS FERRY	0	0	0	0	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	69 ALLATOONA	1	165	6410	7901	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	70 GEORGE W ANDREWS	0	0	0	0	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	71 SEMINOLE (WOODRUFF)	1	170	6410	7901	1	156	6410	7709	0	0	0	0
3 SAD	10 MOBILE	72 WALTER F GEORGE (EUF	0	0	0	0	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	73 WEST POINT	1	173	6410	7902	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	75 CARTERS	1	132	6410	7709	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	76 SIDNEY LANIER	1	88	7110	7901	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	191 OKATIBBEE	1	123	6810	7901	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	405 GAINESVILLE L/D	1	169	6410	7810	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	411 BANKHEAD	1	24	7610	7809	0	0	0	0	0	0	0	0
5 NCD	11 BUFFALO	228 MT MORRIS	1	172	6410	7901	1	156	6410	7709	0	0	0	0
5 NCD	14 ROCK ISL	98 CORALVILLE	1	168	6410	7809	0	0	0	0	1	84	7010	7709
5 NCD	14 ROCK ISL	99 RED ROCK	1	172	6410	7901	0	0	0	0	1	84	7010	7709
5 NCD	15 ST PAUL	178 GULL	1	168	6410	7809	0	0	0	0	1	36	6410	6709
5 NCD	15 ST PAUL	179 LAC QUI PARLE	1	171	6410	7812	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	180 TRAVERSE	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	181 LEECH	1	168	6410	7809	0	0	0	0	1	36	6410	6709
5 NCD	15 ST PAUL	182 ORWELL	1	171	6410	7812	1	13	6509	6609	1	25	6509	6709
5 NCD	15 ST PAUL	183 CROSS	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	184 POKEGAMA	1	172	6410	7901	0	0	0	0	1	35	6410	6709
5 NCD	15 ST PAUL	185 SANDY	1	168	6410	7809	0	0	0	0	1	35	6410	6709
5 NCD	15 ST PAUL	186 WINNIBIGOSHISH	1	168	6410	7809	0	0	0	0	1	36	6410	6709
5 NCD	15 ST PAUL	187 PINE RIVER	1	168	6410	7809	0	0	0	0	1	35	6410	6709
5 NCD	15 ST PAUL	236 HOMME	1	170	6410	7812	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	237 ASHTABULA (BALDHILL)	1	172	6410	7901	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	399 EAU GALLE	1	160	6410	7901	0	0	0	0	0	0	0	0
4 ORD	16 PITTSBUR	243 BERLIN	1	171	6410	7812	0	0	0	0	0	0	0	0
4 ORD	16 PITTSBUR	252 MICHAEL J KIRWAN	1	122	6810	7811	0	0	0	0	0	0	0	0
4 ORD	16 PITTSBUR	254 MOSQUITO CREEK	1	170	6410	7811	0	0	0	0	0	0	0	0
4 ORD	16 PITTSBUR	308 CONEMAUGH RIVER	0	0	0	0	0	0	0	0	0	0	0	0
4 ORD	16 PITTSBUR	309 CROOKED CREEK	1	173	6410	7902	0	0	0	0	0	0	0	0
4 ORD	16 PITTSBUR	311 EAST BRANCH CLARION	1	172	6410	7901	0	0	0	0	0	0	0	0
4 ORD	16 PITTSBUR	314 LOYALHANNA	1	172	6410	7901	0	0	0	0	0	0	0	0
4 ORD	16 PITTSBUR	315 MAHONING CREEK	1	171	6410	7901	0	0	0	0	0	0	0	0
4 ORD	16 PITTSBUR	317 SHENANGO RIVER	1	171	6410	7812	0	0	0	0	0	0	0	0
4 ORD	16 PITTSBUR	318 TIONESTA	1	172	6410	7901	0	0	0	0	0	0	0	0
4 ORD	16 PITTSBUR	319 YOUGHIOGHENY RIVER	1	171	6410	7901	0	0	0	0	0	0	0	0
4 ORD	16 PITTSBUR	322 WOODCOCK	1	50	7410	7812	0	0	0	0	0	0	0	0
4 ORD	16 PITTSBUR	328 ALLEGHENY (KINZUA)	1	75	7210	7812	0	0	0	0	0	0	0	0

INVENTORY OF USGS MONTHLY HYDROLOGIC DATA

DIVISION	DISTRICT	PROJECT	FLOW STNS	FLOW MONTHS	FLOW DFIRST	FLOW DLAST	ELEVATION STNS	ELEVATION MONTHS	ELEVATION DFIRST	ELEVATION DLAST	CONTENTS STNS	CONTENTS MONTHS	CONTENTS DFIRST	CONTENTS DLAST
4 ORD	16 PITTSBUR	393 TYGART	1	156	6410	7709	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	123 DEWEY	2	178	6410	7812	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	124 FISHTRAP	2	177	6410	7812	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	125 GRAYSON	2	155	6610	7812	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	127 GREENUP L/D	1	242	6604	7809	1	6	7610	7612	0	0	0	0
4 ORD	17 HUNTINGT	239 PAINT CREEK	1	136	6710	7901	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	241 ATWOOD	1	132	6410	7509	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	242 BEACH CITY	1	171	6410	7812	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	245 CHARLES MILL	1	170	6410	7811	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	246 CLENDENING	0	0	0	0	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	247 DEER CREEK	1	151	6607	7901	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	248 DELAWARE	1	171	6410	7812	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	249 DILLON	1	171	6410	7812	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	251 LEESVILLE	1	171	6410	7812	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	255 PIEDMONT	1	170	6410	7811	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	256 PLEASANT HILL	1	169	6410	7810	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	257 SENECAVILLE	1	171	6410	7812	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	258 TAPPAN	1	171	6410	7812	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	259 BURR OAK(TOM JENKINS	0	0	0	0	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	261 WILLS CREEK	1	172	6410	7901	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	373 JOHN W FLANNAGAN	1	172	6410	7901	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	374 NORTH FORK OF POUND	1	172	6410	7901	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	389 BLUESTONE	1	89	6410	7901	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	390 EAST LYNN	2	131	6710	7901	1	6	7509	7510	1	9	7504	7512
4 ORD	17 HUNTINGT	391 SUMMERSVILLE	1	142	6603	7901	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	392 SUTTON	1	159	6410	7812	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	394 WINFIELD	0	0	0	0	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	406 MOHICANVILLE	1	172	6410	7901	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	416 ALUM CREEK	1	171	6410	7812	0	0	0	0	0	0	0	0
4 ORD	18 LOUISVIL	90 CAGLES MILL	1	156	6410	7709	0	0	0	0	0	0	0	0
4 ORD	18 LOUISVIL	91 HUNTINGTON	1	156	6410	7709	0	0	0	0	0	0	0	0
4 ORD	18 LOUISVIL	92 MISSISSINEWA	1	156	6410	7709	0	0	0	0	0	0	0	0
4 ORD	18 LOUISVIL	93 MONROE	1	156	6410	7709	0	0	0	0	0	0	0	0
4 ORD	18 LOUISVIL	94 SALAMONIE	1	156	6410	7709	0	0	0	0	0	0	0	0
4 ORD	18 LOUISVIL	95 C M HARDEN (MANSFIEL	1	156	6410	7709	0	0	0	0	0	0	0	0
4 ORD	18 LOUISVIL	97 BROOKVILLE	1	172	6410	7901	0	0	0	0	0	0	0	0
4 ORD	18 LOUISVIL	120 BARREN RIVER	1	172	6410	7901	0	0	0	0	0	0	0	0
4 ORD	18 LOUISVIL	121 BUCKHORN	1	171	6410	7812	0	0	0	0	0	0	0	0
4 ORD	18 LOUISVIL	126 GREEN RIVER	1	168	6410	7809	0	0	0	0	0	0	0	0
4 ORD	18 LOUISVIL	128 NOLIN RIVER	1	172	6410	7901	0	0	0	0	0	0	0	0
4 ORD	18 LOUISVIL	129 ROUGH RIVER	1	172	6410	7901	0	0	0	0	0	0	0	0
4 ORD	18 LOUISVIL	134 CAVE RUN	1	171	6410	7812	0	0	0	0	0	0	0	0
4 ORD	18 LOUISVIL	260 WEST FORK OF MILL CK	1	173	6410	7902	0	0	0	0	0	0	0	0
4 ORD	18 LOUISVIL	263 CLARENCE J BROWN	0	0	0	0	0	0	0	0	0	0	0	0
4 ORD	19 NASHVILL	119 BARKLEY	1	172	6410	7901	1	3	7610	7612	0	0	0	0
4 ORD	19 NASHVILL	122 CUMBERLAND (WOLF CRE	1	173	6410	7902	0	0	0	0	0	0	0	0
4 ORD	19 NASHVILL	337 CENTER HILL	0	0	0	0	0	0	0	0	0	0	0	0
4 ORD	19 NASHVILL	338 CHEATHAM	1	171	6410	7812	0	0	0	0	0	0	0	0

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4 ORD	19 NASHVILL	340 J PERCY PRIEST	1	36	6410	6709	0	0	0	0	0	0	0	0
4 ORD	19 NASHVILL	342 OLD HICKORY	1	171	6410	7812	0	0	0	0	0	0	0	0
4 ORD	19 NASHVILL	343 DALE HOLLOW	0	0	0	0	0	0	0	0	0	0	0	0
6 LMVD	20 ST LOUIS	81 CARLYLE	1	161	6410	7902	0	0	0	0	0	0	0	0
6 LMVD	20 ST LOUIS	87 SHELBYVILLE	1	161	6410	7902	0	0	0	0	0	0	0	0
6 LMVD	20 ST LOUIS	88 REND	1	72	6410	7009	0	0	0	0	0	0	0	0
6 LMVD	21 MEMPHIS	196 WAPPAPELLO	1	156	6410	7709	0	0	0	0	1	156	6410	7709
6 LMVD	22 VICKSBUR	14 DE GRAY	1	117	6701	7609	0	0	0	0	1	86	6908	7609
6 LMVD	22 VICKSBUR	18 GREESON (NARROWS)	1	144	6410	7609	0	0	0	0	1	132	6510	7609
6 LMVD	22 VICKSBUR	19 OUACHITA (BLAKELY MT	2	145	6410	7609	0	0	0	0	1	132	6510	7609
6 LMVD	22 VICKSBUR	188 ARKABUTLA	1	144	6410	7609	0	0	0	0	1	156	6410	7709
6 LMVD	22 VICKSBUR	189 ENID	1	144	6410	7609	0	0	0	0	1	156	6410	7709
6 LMVD	22 VICKSBUR	190 GRENADA	1	144	6410	7609	0	0	0	0	1	156	6410	7709
6 LMVD	22 VICKSBUR	192 SARDIS	1	144	6410	7609	0	0	0	0	1	156	6410	7709
6 LMVD	23 NEW ORLE	138 WALLACE	0	0	0	0	0	0	0	0	0	0	0	0
6 LMVD	23 NEW ORLE	352 LAKE O' THE PINES(FE	0	0	0	0	0	0	0	0	1	156	6410	7709
6 LMVD	23 NEW ORLE	353 TEXARKANA(WRIGHT PAT	0	0	0	0	0	0	0	0	1	156	6410	7709
6 LMVD	23 NEW ORLE	413 CADDO	1	168	6410	7809	0	0	0	0	0	0	0	0
7 SWD	24 LITTLE R	11 BEAVER	2	160	6506	7709	0	0	0	0	1	144	6510	7709
7 SWD	24 LITTLE R	12 BLUE MOUNTAIN	1	171	6410	7812	0	0	0	0	1	144	6510	7709
7 SWD	24 LITTLE R	13 BULL SHOALS	0	0	0	0	0	0	0	0	1	144	6510	7709
7 SWD	24 LITTLE R	16 GREERS FERRY	1	169	6410	7810	0	0	0	0	1	144	6510	7709
7 SWD	24 LITTLE R	17 DARDANELLE	1	168	6410	7809	0	0	0	0	1	144	6510	7709
7 SWD	24 LITTLE R	21 NIMROD	2	184	6410	7901	0	0	0	0	1	144	6510	7709
7 SWD	24 LITTLE R	22 NORFOLK	1	156	6410	7709	0	0	0	0	1	144	6510	7709
7 SWD	24 LITTLE R	23 OZARK	1	12	7410	7509	0	0	0	0	1	94	6912	7709
7 SWD	24 LITTLE R	193 CLEARWATER	1	172	6410	7901	0	0	0	0	1	156	6410	7709
7 SWD	24 LITTLE R	200 TABLE ROCK	1	156	6410	7709	0	0	0	0	1	156	6410	7709
7 SWD	25 TULSA	20 MILLWOOD	2	136	6610	7709	0	0	0	0	1	134	6608	7709
7 SWD	25 TULSA	102 COUNCIL GROVE	1	157	6410	7810	1	156	6410	7709	0	0	0	0
7 SWD	25 TULSA	103 ELK CITY	1	145	6510	7810	1	139	6603	7709	0	0	0	0
7 SWD	25 TULSA	104 FALL RIVER	1	157	6410	7810	1	156	6410	7709	0	0	0	0
7 SWD	25 TULSA	105 JOHN REDMOND	1	157	6410	7810	1	156	6410	7709	0	0	0	0
7 SWD	25 TULSA	107 MARION	1	112	6807	7810	1	116	6802	7709	0	0	0	0
7 SWD	25 TULSA	112 TORONTO	1	157	6410	7810	1	156	6410	7709	0	0	0	0
7 SWD	25 TULSA	264 BROKEN BOW	1	169	6410	7810	0	0	0	0	1	108	6810	7709
7 SWD	25 TULSA	265 CANTON	1	169	6410	7810	0	0	0	0	1	144	6510	7709
7 SWD	25 TULSA	266 CHOUTEAU	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	267 EUFAULA	1	169	6410	7810	0	0	0	0	1	144	6510	7709
7 SWD	25 TULSA	268 FORT GIBSON	1	169	6410	7810	0	0	0	0	1	156	6510	7709
7 SWD	25 TULSA	269 FORT SUPPLY	1	169	6410	7810	0	0	0	0	1	144	6510	7709
7 SWD	25 TULSA	270 GREAT SALT PLAINS	1	169	6410	7810	0	0	0	0	1	144	6510	7709
7 SWD	25 TULSA	271 HEYBURN	1	169	6410	7810	0	0	0	0	1	144	6510	7709
7 SWD	25 TULSA	272 HULAH	1	169	6410	7810	0	0	0	0	1	144	6510	7709
7 SWD	25 TULSA	273 KEYSTONE	1	169	6410	7810	0	0	0	0	1	144	6510	7709

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7 SWD	25 TULSA	274 NEWT GRAHAM	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	275 OOLOGAH	2	170	6410	7810	0	0	0	0	1	144	6510	7709
7 SWD	25 TULSA	276 PINE CREEK	1	169	6410	7810	0	0	0	0	1	112	6906	7709
7 SWD	25 TULSA	277 ROBERT S KERR	1	169	6410	7810	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	278 TENKILLER FERRY	1	169	6410	7810	0	0	0	0	1	144	6510	7709
7 SWD	25 TULSA	279 W D MAYO	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	280 WEBBERS FALLS	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	281 WISTER	1	167	6410	7810	0	0	0	0	1	144	6510	7709
7 SWD	25 TULSA	282 CLAYTON	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	283 KAW	1	18	7604	7709	0	0	0	0	1	18	7604	7709
7 SWD	25 TULSA	284 COPAN	1	169	6410	7810	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	285 HUGO	1	24	7010	7109	0	0	0	0	1	90	7401	7709
7 SWD	25 TULSA	286 OPTIMA	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	287 WAURIKA	1	169	6410	7810	0	0	0	0	1	2	7708	7709
7 SWD	25 TULSA	348 TEXOMA (DENNISON)	1	169	6410	7810	0	0	0	0	1	144	6510	7709
7 SWD	25 TULSA	357 PAT MAYSE	1	120	6710	7709	0	0	0	0	1	120	6710	7709
7 SWD	25 TULSA	370 KEMP	1	169	6410	7810	0	0	0	0	1	156	6410	7709
7 SWD	25 TULSA	402 GILLHAM	1	172	6410	7901	0	0	0	0	1	29	7505	7709
7 SWD	26 FORT WOR	344 BARDWELL	1	168	6410	7809	0	0	0	0	1	143	6511	7709
7 SWD	26 FORT WOR	345 BELTON(BELL)	1	170	6410	7811	0	0	0	0	1	156	6410	7709
7 SWD	26 FORT WOR	346 BENBROOK	1	169	6410	7810	0	0	0	0	1	156	6410	7709
7 SWD	26 FORT WOR	347 CANYON	1	172	6410	7901	0	0	0	0	1	156	6410	7709
7 SWD	26 FORT WOR	349 GRAPEVINE	1	169	6410	7810	0	0	0	0	1	156	6410	7709
7 SWD	26 FORT WOR	351 HORDS CREEK	1	169	6410	7810	0	0	0	0	1	156	6410	7709
7 SWD	26 FORT WOR	354 LAVON	1	169	6410	7810	0	0	0	0	1	156	6410	7709
7 SWD	26 FORT WOR	355 LEWISVILLE(GARZA LIT	1	169	6410	7810	0	0	0	0	1	156	6410	7709
7 SWD	26 FORT WOR	356 NAVARRO MILLS	1	172	6410	7901	0	0	0	0	1	156	6410	7709
7 SWD	26 FORT WOR	358 PROCTOR	1	172	6410	7901	0	0	0	0	1	156	6410	7709
7 SWD	26 FORT WOR	359 SAM RAYBURN (MC GEE	1	96	6510	7309	0	0	0	0	1	153	6501	7709
7 SWD	26 FORT WOR	360 O C FISHER (SAN ANGE	1	169	6410	7810	0	0	0	0	1	156	6410	7709
7 SWD	26 FORT WOR	361 SOMERVILLE	1	169	6410	7810	0	0	0	0	1	140	6602	7709
7 SWD	26 FORT WOR	362 STILLHOUSE HOLLOW(LA	1	170	6410	7811	0	0	0	0	1	133	6609	7709
7 SWD	26 FORT WOR	363 WACO	1	168	6410	7809	0	0	0	0	1	156	6410	7709
7 SWD	26 FORT WOR	364 WHITNEY	1	172	6410	7901	0	0	0	0	1	156	6410	7709
7 SWD	26 FORT WOR	371 B A STEINHAGEN (TOWN	1	170	6410	7811	0	0	0	0	1	156	6410	7709
7 SWD	28 ALBUQUER	65 JOHN MARTIN (HASTY)	1	169	6410	7810	0	0	0	0	0	0	0	0
7 SWD	28 ALBUQUER	218 ABIQUIU	1	172	6410	7901	0	0	0	0	1	143	6510	7709
7 SWD	28 ALBUQUER	219 CONCHAS	1	96	6410	7209	0	0	0	0	1	144	6510	7709
7 SWD	28 ALBUQUER	407 TRINIDAD	2	180	6410	7811	0	0	0	0	1	2	7708	7709
8 MRD	29 KANSAS C	100 RATHBUN	1	184	6410	7901	0	0	0	0	1	96	6910	7709
8 MRD	29 KANSAS C	106 KANOPOLIS	1	160	6410	7901	1	156	6410	7709	0	0	0	0
8 MRD	29 KANSAS C	108 MILFORD	1	157	6410	7810	1	130	6612	7709	0	0	0	0
8 MRD	29 KANSAS C	109 MELVERN	0	0	0	0	1	59	7211	7709	0	0	0	0
8 MRD	29 KANSAS C	110 PERRY	1	115	6903	7809	1	103	6903	7709	0	0	0	0
8 MRD	29 KANSAS C	111 POMONA	1	157	6410	7810	1	156	6410	7709	0	0	0	0
8 MRD	29 KANSAS C	113 TUTTLE CREEK	1	157	6410	7810	1	156	6410	7709	0	0	0	0
8 MRD	29 KANSAS C	114 WILSON	1	157	6410	7810	1	144	6510	7709	0	0	0	0
8 MRD	29 KANSAS C	194 POMME DE TERRE	2	184	6410	7901	0	0	0	0	1	173	6410	7709

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8 MRD	29 KANSAS C	195 STOCKTON	1	170	6410	7901	0	0	0	0	1	96	6910	7709
8 MRD	29 KANSAS C	207 HARLAN COUNTY	1	160	6410	7801	1	12	7210	7309	1	144	6510	7709
8 MRD	30 OMAHA	64 CHERRY CREEK	1	168	6410	7809	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	203 FORT PECK	1	170	6410	7812	1	13	7309	7409	0	0	0	0
8 MRD	30 OMAHA	208 OLIVE CREEK	0	0	0	0	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	209 BLUESTEM	0	0	0	0	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	210 WAGON TRAIN	0	0	0	0	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	211 STAGECOACH	0	0	0	0	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	212 YANKEE HILL	0	0	0	0	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	213 CONESTOGA	0	0	0	0	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	214 TWIN	0	0	0	0	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	215 PAWNEE	0	0	0	0	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	216 HOLMES PARK	0	0	0	0	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	217 BRANCHED OAK	0	0	0	0	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	234 BOWMAN-HALEY	1	171	6410	7812	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	235 SAKAKAWEA(GARRISON)	1	96	6910	7709	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	331 SHARPE (BIG BEND)	0	0	0	0	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	332 COLD BROOK	0	0	0	0	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	334 FRANCIS CASE (FT RAN	1	168	6410	7809	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	335 LEWIS AND CLARKE (GA	1	172	6410	7901	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	336 OAHE	1	72	6410	7809	0	0	0	0	0	0	0	0
8 MRD	30 OMAHA	415 CHATFIELD	1	168	6410	7809	0	0	0	0	0	0	0	0
9 NPD	31 WALLA WA	77 DWORSHAK	1	34	6410	6806	0	0	0	0	1	72	7110	7709
9 NPD	31 WALLA WA	78 LUCKY PEAK	1	156	6410	7709	1	48	6410	6809	1	144	6510	7709
9 NPD	31 WALLA WA	79 RIRIE	1	169	6410	7810	0	0	0	0	1	13	7601	7709
9 NPD	31 WALLA WA	379 ICE HARBOR	1	168	6410	7809	0	0	0	0	0	0	0	0
9 NPD	32 SEATTLE	80 ALBENI FALLS (PEND O	1	40	7510	7901	1	72	6410	7009	0	0	0	0
9 NPD	32 SEATTLE	204 KOOKANUSA(LIBBY)	1	136	6710	7901	1	80	7202	7709	0	0	0	0
9 NPD	32 SEATTLE	377 RUFUS WOODS (CHIEF J	1	169	6410	7810	1	12	7510	7609	0	0	0	0
9 NPD	32 SEATTLE	384 MUD MOUNTAIN	1	173	6410	7902	1	12	7610	7709	1	144	6510	7709
9 NPD	32 SEATTLE	385 WYNOOCHEE	1	159	6510	7812	0	0	0	0	0	0	0	0
9 NPD	32 SEATTLE	386 HOWARD A HANSON	1	175	6410	7902	0	0	0	0	1	144	6510	7709
9 NPD	33 PORTLAND	288 BLUE RIVER	2	155	6610	7901	1	36	7410	7709	1	72	6810	7409
9 NPD	33 PORTLAND	289 BONNEVILLE	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	290 COTTAGE GROVE	1	172	6410	7901	1	36	7410	7709	1	96	6510	7409
9 NPD	33 PORTLAND	291 COUGAR	1	171	6410	7812	1	48	6410	7709	1	96	6510	7409
9 NPD	33 PORTLAND	292 CELILO (DALLES)	1	185	2001	7711	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	293 DETROIT	1	171	6410	7812	1	48	6410	7709	1	108	6510	7409
9 NPD	33 PORTLAND	294 DEXTER	1	344	6410	7901	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	295 DORENA	1	173	6410	7902	1	36	7410	7709	1	108	6510	7409
9 NPD	33 PORTLAND	296 FALL CREEK	1	172	6410	7901	1	36	7410	7709	1	108	6510	7409
9 NPD	33 PORTLAND	297 FERN RIDGE	1	148	6410	7901	1	36	7410	7709	1	101	6510	7509
9 NPD	33 PORTLAND	298 FOSTER	1	82	6610	7307	1	36	7410	7709	1	94	6612	7409
9 NPD	33 PORTLAND	299 GREEN PETER	1	24	6410	6609	1	36	7410	7709	1	96	6610	7409
9 NPD	33 PORTLAND	300 HILLS CREEK	1	172	6410	7901	1	48	6410	7709	1	96	6510	7409
9 NPD	33 PORTLAND	301 JOHN DAY (UMATILLA)	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	302 LOOKOUT POINT	0	0	0	0	1	96	6410	7709	1	96	6510	7409

INVENTORY OF USGS MONTHLY HYDROLOGIC DATA

DIVISION	DISTRICT	PROJECT	FLOW STNS	FLOW MONTHS	FLOW DFIRST	FLOW DLAST	ELEVATION STNS	ELEVATION MONTHS	ELEVATION DFIRST	ELEVATION DLAST	CONTENTS STNS	CONTENTS MONTHS	CONTENTS DFIRST	CONTENTS DLAST
9 NPD	33 PORTLAND	304 LOST CREEK	0	0	0	0	1	8	7702	7709	0	0	0	0
9 NPD	33 PORTLAND	305 BIG CLIFF	0	0	0	0	0	0	0	0	0	0	0	0
10 SPD	34 SACREMEN	24 BLACK BUTTE	2	197	6410	7902	0	0	0	0	1	144	6410	7709
10 SPD	34 SACREMEN	26 ENGLEBRIGHT	1	173	6410	7902	0	0	0	0	1	48	7310	7709
10 SPD	34 SACREMEN	28 ISABELLA	1	168	6410	7809	0	0	0	0	1	156	6410	7709
10 SPD	34 SACREMEN	30 MARTIS CREEK	1	172	6410	7901	0	0	0	0	1	67	7203	7709
10 SPD	34 SACREMEN	32 NEW HOGAN	1	173	6410	7902	0	0	0	0	2	158	6410	7709
10 SPD	34 SACREMEN	33 PINE FLAT	1	168	6410	7809	0	0	0	0	1	168	6410	7709
10 SPD	34 SACREMEN	36 SUCCESS	1	168	6410	7809	0	0	0	0	1	156	6410	7709
10 SPD	34 SACREMEN	37 KAWEAH (TERMINUS)	1	168	6410	7809	0	0	0	0	1	156	6410	7709
10 SPD	34 SACREMEN	41 FOLSOM	2	185	6410	7902	0	0	0	0	1	156	6410	7709
10 SPD	34 SACREMEN	43 NEW BULLARDS BAR	1	151	6608	7902	0	0	0	0	1	105	6901	7709
10 SPD	34 SACREMEN	44 CAMANCHE	1	173	6410	7902	0	0	0	0	1	156	6410	7709
10 SPD	34 SACREMEN	47 CHERRY VALLEY	2	162	6410	7801	0	0	0	0	1	156	6410	7709
10 SPD	34 SACREMEN	48 NEW DON PEDRO	1	88	7010	7801	0	0	0	0	1	156	6410	7709
10 SPD	34 SACREMEN	51 MCCLURE (NEW EXCHEQU	0	0	0	0	0	0	0	0	1	156	6410	7709
10 SPD	34 SACREMEN	54 MILLERTON (FRIANT)	1	160	6410	7801	0	0	0	0	1	156	6410	7709
10 SPD	35 SAN FRAN	29 MENDOCINO	1	170	6410	7811	0	0	0	0	1	144	6510	7709
10 SPD	35 SAN FRAN	39 SANTA MARGARITA (SAL	1	48	7310	7709	0	0	0	0	1	156	6410	7709
10 SPD	36 LOS ANGE	9 ALAMO	0	0	0	0	0	0	0	0	0	0	0	0
10 SPD	36 LOS ANGE	27 HANSEN	0	0	0	0	0	0	0	0	0	0	0	0

INVENTORY OF USGS MONTHLY HYDROLOGIC DATA
*** DISTRICT TOTALS ***

DISTRICT	TOTAL PROJ	FLOW STNS	FLOW MONTHS	FLOW DFIRST	FLOW DLAST	ELEVATION STNS	ELEVATION MONTHS	ELEVATION DFIRST	ELEVATION DLAST	CONTENTS STNS	CONTENTS MONTHS	CONTENTS DFIRST	CONTENTS DLAST
1 NEW ENGLAND	22	17	2465	6410	7901	0	0	0	0	0	0	0	0
2 NEW YORK	[illegible]	2	320	6410	7901	1	156	6410	7709	0	0	0	0
3 PHILADELPHIA	[illegible]	3	465	6410	7901	0	0	0	0	0	0	0	0
4 BALTIMORE	9	7	1135	6410	7902	2	310	6410	7709	0	0	0	0
5 NORFOLK	0	0	0	0	0	0	0	0	0	0	0	0	0
6 WILMINGTON	3	1	169	6410	7810	0	0	0	0	0	0	0	0
7 CHARLESTON	1	1	172	6410	7901	0	0	0	0	0	0	0	0
8 SAVANNAH	2	4	348	6410	7812	2	168	7110	7709	0	0	0	0
9 JACKSONVILLE	1	1	120	6810	7809	1	99	6907	7709	0	0	0	0
10 MOBILE	17	13	1489	6410	7902	1	156	6410	7709	0	0	0	0
11 BUFFALO	1	1	172	6410	7901	1	156	6410	7709	0	0	0	0
12 DETROIT	0	0	0	0	0	0	0	0	0	0	0	0	0
13 CHICAGO	0	0	0	0	0	0	0	0	0	0	0	0	0
14 ROCK ISLAND	2	2	340	6410	7901	0	0	0	0	2	168	7010	7709
15 ST PAUL	13	11	1856	6410	7901	1	13	6509	6609	7	238	6410	6709
16 PITTSBURG	14	13	1946	6410	7902	0	0	0	0	0	0	0	0
17 HUNTINGTON	28	29	4086	6410	7901	2	12	7509	7612	1	9	7504	7512
18 LOUISVILLE	15	14	2307	6410	7902	0	0	0	0	0	0	0	0
19 NASHVILLE	7	5	723	6410	7902	1	3	7610	7612	0	0	0	0
20 ST LOUIS	3	3	394	6410	7902	0	0	0	0	0	0	0	0
21 MEMPHIS	1	1	156	6410	7709	0	0	0	0	1	156	6410	7709
22 VICKSBURG	7	8	982	6410	7609	0	0	0	0	7	974	6410	7709
23 NEW ORLEANS	4	1	168	6410	7809	0	0	0	0	2	312	6410	7709
24 LITTLE ROCK	10	11	1348	6410	7901	0	0	0	0	10	1414	6410	7709
25 TULSA	35	31	4396	6410	7901	6	879	6410	7709	21	2509	6410	7709
26 FORT WORTH	17	17	2813	6410	7901	0	0	0	0	17	2597	6410	7709
27 GALVESTON	0	0	0	0	0	0	0	0	0	0	0	0	0
28 ALBUQUERQUE	4	5	617	6410	7901	0	0	0	0	3	289	6510	7709
29 KANSAS CITY	11	11	1601	6410	7901	8	916	6410	7709	4	509	6410	7709
30 OMAHA	20	8	1185	6410	7901	1	13	7309	7409	0	0	0	0
31 WALLA WALLA	4	4	527	6410	7810	1	48	6410	6809	3	229	6510	7709
32 SEATTLE	6	6	852	6410	7902	4	176	6410	7709	2	288	6510	7709
33 PORTLAND	17	13	1969	2001	7902	12	500	6410	7709	11	1071	6510	7509
34 SACREMENTO	15	17	2306	6410	7902	0	0	0	0	16	2094	6410	7709
35 SAN FRANCISC	2	2	218	6410	7811	0	0	0	0	2	300	6410	7709
36 LOS ANGELES	2	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	299	262	37645	2001	7902	44	3605	6410	7709	109	13157	6410	7709

INVENTORY OF USGS MONTHLY HYDROLOGIC DATA
*** NUMBER OF PROJECTS WITH ONE OR MORE ENTRY BY DISTRICT ***

DISTRICT	TOTAL PROJ	FLOW STNS	FLOW MONTHS	FLOW OFIRST	FLOW OLAST	ELEVATION STNS	ELEVATION MONTHS	ELEVATION OFIRST	ELEVATION OLAST	CONTENTS STNS	CONTENTS MONTHS	CONTENTS OFIRST	CONTENTS OLAST
1 NEW ENGLAND	22	17	17	17	17	0	0	0	0	0	0	0	0
2 NEW YORK	3	2	2	2	2	1	1	1	1	0	0	0	0
3 PHILADELPHIA	3	3	3	3	3	0	0	0	0	0	0	0	0
4 BALTIMORE	9	7	7	7	7	2	2	2	2	0	0	0	0
5 NORFOLK	0	0	0	0	0	0	0	0	0	0	0	0	0
6 WILMINGTON	3	1	1	1	1	0	0	0	0	0	0	0	0
7 CHARLESTON	1	1	1	1	1	0	0	0	0	0	0	0	0
8 SAVANNAH	2	2	2	2	2	2	2	2	2	0	0	0	0
9 JACKSONVILLE	1	1	1	1	1	1	1	1	1	0	0	0	0
10 MOBILE	17	13	13	13	13	1	1	1	1	0	0	0	0
11 BUFFALO	1	1	1	1	1	1	1	1	1	0	0	0	0
12 DETROIT	0	0	0	0	0	0	0	0	0	0	0	0	0
13 CHICAGO	0	0	0	0	0	0	0	0	0	0	0	0	0
14 ROCK ISLAND	2	2	2	2	2	0	0	0	0	2	2	2	2
15 ST PAUL	13	11	11	11	11	1	1	1	1	7	7	7	7
16 PITTSBURG	14	13	13	13	13	0	0	0	0	0	0	0	0
17 HUNTINGTON	28	25	25	25	25	2	2	2	2	1	1	1	1
18 LOUISVILLE	15	14	14	14	14	0	0	0	0	0	0	0	0
19 NASHVILLE	7	5	5	5	5	1	1	1	1	0	0	0	0
20 ST LOUIS	3	3	3	3	3	0	0	0	0	0	0	0	0
21 MEMPHIS	1	1	1	1	1	0	0	0	0	1	1	1	1
22 VICKSBURG	7	7	7	7	7	0	0	0	0	7	7	7	7
23 NEW ORLEANS	4	1	1	1	1	0	0	0	0	2	2	2	2
24 LITTLE ROCK	10	9	9	9	9	0	0	0	0	10	10	10	10
25 TULSA	35	29	29	29	29	6	6	6	6	21	21	21	21
26 FORT WORTH	17	17	17	17	17	0	0	0	0	17	17	17	17
27 GALVESTON	0	0	0	0	0	0	0	0	0	0	0	0	0
28 ALBUQUERQUE	4	4	4	4	4	0	0	0	0	3	3	3	3
29 KANSAS CITY	11	10	10	10	10	8	8	8	8	4	4	4	4
30 OMAHA	20	8	8	8	8	1	1	1	1	0	0	0	0
31 WALLA WALLA	4	4	4	4	4	1	1	1	1	3	3	3	3
32 SEATTLE	6	6	6	6	6	4	4	4	4	2	2	2	2
33 PORTLAND	17	12	12	12	12	12	12	12	12	11	11	11	11
34 SACREMENTO	15	14	14	14	14	0	0	0	0	15	15	15	15
35 SAN FRANCISC	2	2	2	2	2	0	0	0	0	2	2	2	2
36 LOS ANGELES	2	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	299	245	245	245	245	44	44	44	44	108	108	108	108

Table A4

Inventory of Water Quality Data by Station Type

INVENTORY OF WATER QUALITY DATA BY STATION TYPE

DIVISION	DISTRICT	PROJECT	TRIBUTARY NSTA	TRIBUTARY NOBS	POOL NSTA	POOL NOBS	NEAR DAM NSTA	NEAR DAM NOBS	DISCHARGE NSTA	DISCHARGE NOBS	OTHER NSTA	OTHER NOBS	TOTAL NSTA	TOTAL NOBS
1 NED	1 NEW ENGL	142 BUFFUMVILLE	2	3437	6	209	2	56	1	2048	0	0	11	5750
1 NED	1 NEW ENGL	144 EAST BRIMFIELD	1	1244	1	92	0	0	1	1720	0	0	3	3056
1 NED	1 NEW ENGL	147 LITTLEVILLE	1	1429	7	1701	4	2166	1	1129	0	0	13	6425
1 NED	1 NEW ENGL	148 TULLY	2	2176	1	1279	0	0	2	2144	0	0	5	5599
1 NED	1 NEW ENGL	150 WESTVILLE	2	2914	1	1104	0	0	1	1819	0	0	4	5837
1 NED	1 NEW ENGL	151 BLACK ROCK	2	3532	0	0	1	101	1	2270	0	0	4	5903
1 NED	1 NEW ENGL	152 COLEBROOK RIVER	1	2137	0	0	0	0	1	1049	0	0	2	3186
1 NED	1 NEW ENGL	155 HANCOCK BROOK	2	1991	0	0	0	0	1	2256	0	0	3	4247
1 NED	1 NEW ENGL	156 HOP BROOK	8	7823	3	1311	2	2643	2	2456	0	0	15	14233
1 NED	1 NEW ENGL	158 MANSFIELD HOLLOW	2	2858	0	0	0	0	1	1645	0	0	3	4503
1 NED	1 NEW ENGL	159 NORTHFIELD BROOK	1	1913	4	1972	4	780	1	2199	0	0	10	6864
1 NED	1 NEW ENGL	162 WEST THOMPSON	3	2973	1	1936	7	4162	3	2483	0	0	14	11554
1 NED	1 NEW ENGL	164 EDWARD MCDOWELL	2	3126	0	0	0	0	1	1997	0	0	3	5123
1 NED	1 NEW ENGL	165 EVERETT	2	1407	0	0	0	0	1	2111	0	0	3	3518
1 NED	1 NEW ENGL	166 FRANKLIN FALLS	2	3280	0	0	0	0	1	1884	0	0	3	5164
1 NED	1 NEW ENGL	167 HOPKINTON	1	2119	3	1867	6	1421	1	2143	0	0	11	7550
1 NED	1 NEW ENGL	168 OTTER BROOK	2	2897	3	1752	3	1456	1	2135	0	0	9	8240
1 NED	1 NEW ENGL	169 SURRY MOUNTAIN	3	4851	1	1321	6	2010	1	2289	0	0	11	10471
1 NED	1 NEW ENGL	170 BALL MOUNTAIN	3	3417	7	2130	3	669	1	2232	0	0	14	8448
1 NED	1 NEW ENGL	172 NORTH HARTLAND	4	3378	4	33	2	15	1	2221	0	0	11	5647
1 NED	1 NEW ENGL	173 NORTH SPRINGFIELD	3	4447	4	596	0	0	1	2200	0	0	8	7243
1 NED	1 NEW ENGL	174 TOWNSHEND	2	2619	7	1568	0	0	1	2085	0	0	10	6272
2 NAD	2 NEW YORK	171 EAST BARRE	0	0	0	0	0	0	0	0	0	0	0	0
2 NAD	2 NEW YORK	176 WATERBURY	14	1284	3	145	2	217	4	196	0	0	23	1842
2 NAD	2 NEW YORK	177 WRIGHTSVILLE	0	0	1	9	0	0	0	0	0	0	1	9
2 NAD	3 PHILADEL	307 BELTZVILLE	4	385	3	377	1	250	2	213	0	0	10	1225
2 NAD	3 PHILADEL	313 FRANCIS E WALTER	1	201	0	0	0	0	0	0	0	0	1	201
2 NAD	3 PHILADEL	316 PROMPTON	2	288	5	386	0	0	1	292	0	0	8	966
2 NAD	4 BALTIMOR	227 ALMOND	1	13	1	53	1	84	1	57	0	0	4	207
2 NAD	4 BALTIMOR	229 WHITNEY POINT	0	0	2	96	1	5	1	53	0	0	4	154
2 NAD	4 BALTIMOR	306 ALVIN R BUSH (KETTLE	0	0	3	102	1	108	2	33	0	0	6	243
2 NAD	4 BALTIMOR	310 CURWENSVILLE	1	39	1	28	1	185	0	0	0	0	3	252
2 NAD	4 BALTIMOR	312 F J SAYERS (BLANCHAR	8	1453	2	150	3	385	3	1064	4	438	20	3490
2 NAD	4 BALTIMOR	320 RAYSTOWN	8	2468	4	945	1	182	4	1161	0	0	17	4756
2 NAD	4 BALTIMOR	329 STILLWATER	1	61	0	0	0	0	2	1252	0	0	3	1313
2 NAD	4 BALTIMOR	398 BLOOMINGTON	0	0	0	0	0	0	0	0	0	0	0	0
2 NAD	4 BALTIMOR	401 SAVAGE	0	0	0	0	0	0	0	0	0	0	0	0
3 SAD	6 WILMINGT	233 B EVERETT JORDAN (NE	21	20921	0	0	0	0	5	3994	0	0	26	24915
3 SAD	6 WILMINGT	372 JOHN H KERR	35	20835	28	12841	7	5504	8	3197	7	547	85	42924
3 SAD	6 WILMINGT	375 PHILPOTT	0	0	0	0	0	0	1	1168	0	0	1	1168
3 SAD	7 CHARLEST	232 W KERR SCOTT	7	976	0	0	0	0	6	1206	0	0	13	2182

AD-A101 553 WALKER (WILLIAM W) JR CONCORD MA F/G 13/2
EMPIRICAL METHODS FOR PREDICTING EUTROPHICATION IN IMPOUNDMENTS--ETC(U)
MAY 81 W W WALKER DACW39-78-C-0053
UNCLASSIFIED WES-TR-E-81-9-1 NL

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INVENTORY OF WATER QUALITY DATA BY STATION TYPE

DIVISION	DISTRICT	PROJECT	TRIBUTARY NSTA	TRIBUTARY NOBS	POOL NSTA	POOL NOBS	NEAR DAM NSTA	NEAR DAM NOBS	DISCHARGE NSTA	DISCHARGE NOBS	OTHER NSTA	OTHER NOBS	TOTAL NSTA	TOTAL NOBS
3 SAD	8 SAVANNAH	74 CLARK HILL	21	5625	12	3334	2	1276	3	1103	3	198	41	11536
3 SAD	8 SAVANNAH	330 HARTWELL	69	6161	12	3100	1	273	3	2314	26	2029	111	13877
3 SAD	9 JACKSONV	66 OCKLAWAHA (RODMAN)	7	4737	7	2793	2	1744	10	5626	0	0	26	14900
3 SAD	10 MOBILE	1 CLAIBORNE	6	1886	2	662	1	315	4	4453	0	0	13	7316
3 SAD	10 MOBILE	2 COFFEEVILLE (JACKSON	0	0	0	0	0	0	1	2190	0	0	1	2190
3 SAD	10 MOBILE	3 HOLT	6	655	1	187	1	215	4	1846	0	0	12	2903
3 SAD	10 MOBILE	4 JONES BLUFF	18	7180	1	335	0	0	0	0	0	0	19	7515
3 SAD	10 MOBILE	5 DEMOPOLIS	25	438	1	208	0	0	1	78	0	0	27	724
3 SAD	10 MOBILE	7 WARRIOR	16	351	1	27	0	0	1	10	0	0	18	388
3 SAD	10 MOBILE	8 MILLERS FERRY	15	4383	0	0	3	980	0	0	0	0	18	5363
3 SAD	10 MOBILE	69 ALLATOONA	12	3006	11	4173	3	1802	10	3041	0	0	36	12022
3 SAD	10 MOBILE	70 GEORGE W ANDREWS	0	0	0	0	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	71 SEMINOLE (WOODRUFF)	20	7290	5	549	1	135	4	4789	1	56	31	12819
3 SAD	10 MOBILE	72 WALTER F GEORGE (EUF	43	3210	12	1866	3	597	1	98	1	88	60	5861
3 SAD	10 MOBILE	73 WEST POINT	54	30371	31	8986	3	565	4	5618	0	0	92	45540
3 SAD	10 MOBILE	75 CARTERS	6	1047	10	7082	2	4833	6	3859	0	0	24	16821
3 SAD	10 MOBILE	76 SIDNEY LANIER	13	1755	19	3073	3	2014	6	4600	0	0	41	11442
3 SAD	10 MOBILE	191 OKATIBBEE	0	0	0	0	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	405 GAINESVILLE L/D	0	0	0	0	0	0	1	2149	0	0	1	2149
3 SAD	10 MOBILE	411 BANKHEAD	26	6180	6	963	2	352	1	112	3	107	38	7714
5 NCD	11 BUFFALO	228 MT MORRIS	1	323	0	0	0	0	0	0	0	0	1	323
5 NCD	14 ROCK ISL	98 CORALVILLE	0	0	0	0	0	0	1	90	0	0	1	90
5 NCD	14 ROCK ISL	99 RED ROCK	11	2940	6	2959	1	143	1	105	2	90	21	6237
5 NCD	15 ST PAUL	178 GULL	3	326	3	568	2	438	1	111	0	0	9	1443
5 NCD	15 ST PAUL	179 LAC QUI PARLE	1	2103	6	2838	0	0	1	77	0	0	8	5018
5 NCD	15 ST PAUL	180 TRAVERSE	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	181 LEECH	7	684	3	385	2	1184	1	112	0	0	13	2365
5 NCD	15 ST PAUL	182 ORWELL	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	183 CROSS	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	184 POKEGAMA	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	185 SANDY	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	186 WINNIBIGOSHISH	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	187 PINE RIVER	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	236 HOMME	0	0	1	36	0	0	0	0	0	0	1	36
5 NCD	15 ST PAUL	237 ASHTABULA (BALDHILL)	5	3515	4	316	2	177	1	88	0	0	12	4096
5 NCD	15 ST PAUL	399 EAU GALLE	2	118	4	883	1	11	2	128	0	0	9	1140
4 ORD	16 PITTSBUR	243 BERLIN	15	1905	15	3666	3	1538	5	2060	1	61	39	9230
4 ORD	16 PITTSBUR	252 MICHAEL J KIRWAN	1	236	4	1649	2	1014	3	1840	0	0	10	4739
4 ORD	16 PITTSBUR	254 MOSQUITO CREEK	8	938	11	3575	8	1224	4	2069	1	87	30	7893

INVENTORY OF WATER QUALITY DATA BY STATION TYPE

DIVISION	DISTRICT	PROJECT	TRIBUTARY NSTA	TRIBUTARY NOBS	POOL NSTA	POOL NOBS	NEAR DAM NSTA	NEAR DAM NOBS	DISCHARGE NSTA	DISCHARGE NOBS	OTHER NSTA	OTHER NOBS	TOTAL NSTA	TOTAL NOBS
4 ORD	16 PITTSBUR	308 CONEMAUGH RIVER	2	1165	3	203	1	197	2	1403	0	0	8	2968
4 ORD	16 PITTSBUR	309 CROOKED CREEK	5	122	2	199	2	328	1	1161	0	0	10	1810
4 ORD	16 PITTSBUR	311 EAST BRANCH CLARION	12	3176	5	5525	1	2279	2	1866	0	0	20	12846
4 ORD	16 PITTSBUR	314 LOYALHANNA	2	1311	2	99	1	210	3	1397	0	0	8	3017
4 ORD	16 PITTSBUR	315 MAHONING CREEK	7	204	1	147	1	235	2	1351	0	0	11	1937
4 ORD	16 PITTSBUR	317 SHENANGO RIVER	21	2205	11	7267	2	1674	4	1869	6	557	44	13572
4 ORD	16 PITTSBUR	318 TIONESTA	2	78	3	416	1	268	1	1325	0	0	7	2087
4 ORD	16 PITTSBUR	319 YOUGHIOGHENY RIVER	14	727	5	6144	1	1653	1	1435	7	556	28	10515
4 ORD	16 PITTSBUR	322 WOODCOCK	9	1865	3	3445	1	2207	2	2123	0	0	15	9640
4 ORD	16 PITTSBUR	328 ALLEGHENY (KINZUA)	26	4097	14	17560	7	5530	2	1957	19	1551	68	30695
4 ORD	16 PITTSBUR	393 TYGART	21	1996	11	13423	2	2232	4	2131	4	117	42	19899
4 ORD	17 HUNTINGT	123 DEWEY	3	1637	8	9171	1	4926	2	1181	0	0	14	16915
4 ORD	17 HUNTINGT	124 FISHTRAP	1	567	14	4097	2	5246	2	1050	0	0	19	10960
4 ORD	17 HUNTINGT	125 GRAYSON	9	1793	20	7374	1	4840	1	708	0	0	31	14715
4 ORD	17 HUNTINGT	127 GREENUP L/D	0	0	0	0	0	0	1	1317	0	0	1	1317
4 ORD	17 HUNTINGT	239 PAINT CREEK	5	1546	7	1628	2	4299	2	1055	0	0	16	8528
4 ORD	17 HUNTINGT	241 ATWOOD	6	821	8	1619	3	2228	2	564	0	0	19	5232
4 ORD	17 HUNTINGT	242 BEACH CITY	14	1950	0	0	2	423	3	749	0	0	19	3122
4 ORD	17 HUNTINGT	245 CHARLES MILL	7	637	2	186	3	566	3	813	0	0	15	2202
4 ORD	17 HUNTINGT	246 CLENDENING	1	327	0	0	2	2644	2	684	0	0	5	3655
4 ORD	17 HUNTINGT	247 DEER CREEK	7	1427	6	1383	3	3268	3	1045	0	0	19	7123
4 ORD	17 HUNTINGT	248 DELAWARE	8	1630	7	1599	2	1893	3	949	2	187	22	6258
4 ORD	17 HUNTINGT	249 DILLON	13	3687	3	239	3	1822	3	848	1	115	23	6711
4 ORD	17 HUNTINGT	251 LEESVILLE	2	401	0	0	2	1176	2	660	0	0	6	2237
4 ORD	17 HUNTINGT	255 PIEDMONT	1	449	3	133	2	2151	2	875	0	0	8	3608
4 ORD	17 HUNTINGT	256 PLEASANT HILL	8	1123	1	82	1	128	3	740	1	113	14	2186
4 ORD	17 HUNTINGT	257 SENECAVILLE	2	185	5	70	2	427	2	560	0	0	11	1242
4 ORD	17 HUNTINGT	258 TAPPAN	6	1065	8	1510	3	1645	4	1015	0	0	21	5235
4 ORD	17 HUNTINGT	259 BURR OAK(TOM JENKINS	1	167	3	452	2	978	3	217	0	0	9	1814
4 ORD	17 HUNTINGT	261 WILLS CREEK	2	583	4	277	2	667	1	428	0	0	9	1955
4 ORD	17 HUNTINGT	373 JOHN W FLANNAGAN	11	3046	17	6091	2	5627	3	932	0	0	33	15696
4 ORD	17 HUNTINGT	374 NORTH FORK OF POUND	3	1034	4	1831	1	3752	1	600	0	0	9	7217
4 ORD	17 HUNTINGT	389 BLUESTONE	20	10397	4	1071	2	3101	2	539	12	6448	40	21556
4 ORD	17 HUNTINGT	390 EAST LYNN	9	1112	14	7539	1	7948	1	946	0	0	25	17545
4 ORD	17 HUNTINGT	391 SUMMERSVILLE	8	1157	6	976	2	4037	2	412	2	180	20	6762
4 ORD	17 HUNTINGT	392 SUTTON	5	349	23	4248	3	4102	1	201	0	0	32	8900
4 ORD	17 HUNTINGT	394 WINFIELD	0	0	0	0	0	0	1	3755	0	0	1	3755
4 ORD	17 HUNTINGT	406 MOHICANVILLE	0	0	0	0	0	0	2	538	0	0	2	538
4 ORD	17 HUNTINGT	416 ALUM CREEK	1	351	7	3232	2	3596	1	394	0	0	11	7573
4 ORD	18 LOUISVIL	90 CAGLES MILL	2	1114	2	2612	1	4670	1	801	0	0	6	9202
4 ORD	18 LOUISVIL	91 HUNTINGTON	3	862	1	1133	1	2582	1	756	0	0	6	5333
4 ORD	18 LOUISVIL	92 MISSISSINEWA	12	4423	4	3875	2	4019	3	1021	7	683	28	14021
4 ORD	18 LOUISVIL	93 MONROE	18	3877	7	6138	2	5165	2	854	3	214	32	16248
4 ORD	18 LOUISVIL	94 SALAMONIE	2	1279	2	3500	1	3796	1	727	0	0	6	9302

INVENTORY OF WATER QUALITY DATA BY STATION TYPE

DIVISION	DISTRICT	PROJECT	TRIBUTARY NSTA	TRIBUTARY NOBS	POOL NSTA	POOL NOBS	NEAR DAM NSTA	NEAR DAM NOBS	DISCHARGE NSTA	DISCHARGE NOBS	OTHER NSTA	OTHER NOBS	TOTAL NSTA	TOTAL NOBS
4 ORD	18 LOUISVIL	95 C M HARDEN (MANSFIEL	1	812	2	4239	1	4123	1	796	0	0	5	9970
4 ORD	18 LOUISVIL	97 BROOKVILLE	2	1923	2	4119	1	4096	1	956	0	0	6	11094
4 ORD	18 LOUISVIL	120 BARREN RIVER	17	4917	18	20296	2	8333	2	1110	2	44	41	34700
4 ORD	18 LOUISVIL	121 BUCKHORN	14	1484	5	5758	1	6098	1	891	0	0	21	14231
4 ORD	18 LOUISVIL	126 GREEN RIVER	3	1746	5	9404	1	7812	1	888	0	0	10	19850
4 ORD	18 LOUISVIL	128 NOLIN RIVER	7	2994	4	19516	1	11364	2	1090	0	0	14	34964
4 ORD	18 LOUISVIL	129 ROUGH RIVER	2	1648	6	11188	1	6173	2	937	4	372	15	20318
4 ORD	18 LOUISVIL	134 CAVE RUN	5	3587	2	3164	1	3446	1	772	0	0	9	10969
4 ORD	18 LOUISVIL	260 WEST FORK OF MILL CK	1	567	1	2716	0	0	2	897	3	134	7	4314
4 ORD	18 LOUISVIL	263 CLARENCE J BROWN	2	1819	1	1347	2	3510	1	872	0	0	6	7548
4 ORD	19 NASHVILL	119 BARKLEY	22	3268	14	2755	2	452	4	2528	3	174	45	9177
4 ORD	19 NASHVILL	122 CUMBERLAND (WOLF CRE	34	4859	11	2871	2	1815	3	875	1	107	51	10527
4 ORD	19 NASHVILL	337 CENTER HILL	3	1406	5	5202	1	2176	2	305	0	0	11	9089
4 ORD	19 NASHVILL	338 CHEATHAM	18	1834	24	3340	2	479	3	1672	6	368	53	7693
4 ORD	19 NASHVILL	340 J PERCY PRIEST	35	7222	16	17442	2	6150	2	1092	3	281	58	32187
4 ORD	19 NASHVILL	342 OLD HICKORY	20	3455	13	2478	2	1259	5	1179	2	206	42	8577
4 ORD	19 NASHVILL	343 DALE HOLLOW	15	2623	14	4481	2	1642	2	587	1	104	34	9437
6 LMVD	20 ST LOUIS	81 CARLYLE	17	4691	2	271	1	137	3	1750	1	92	24	6941
6 LMVD	20 ST LOUIS	87 SHELBYVILLE	10	1525	6	759	1	164	4	1594	2	132	23	4174
6 LMVD	20 ST LOUIS	88 REND	10	2389	4	392	1	108	2	1563	2	112	19	4564
6 LMVD	21 MEMPHIS	196 WAPPAPELLO	6	439	5	462	1	125	1	90	0	0	13	1116
6 LMVD	22 VICKSBUR	14 DE GRAY	9	3149	6	4925	1	309	1	89	0	0	17	8472
6 LMVD	22 VICKSBUR	18 GREESON (NARROWS)	4	3068	0	0	1	5181	1	405	0	0	6	8654
6 LMVD	22 VICKSBUR	19 OUACHITA (BLAKELY MT	15	4629	6	1142	2	6264	2	1180	1	90	26	13305
6 LMVD	22 VICKSBUR	188 ARKABUTLA	6	385	2	211	1	150	2	214	3	274	14	1234
6 LMVD	22 VICKSBUR	189 ENID	7	1031	2	256	1	150	1	31	4	375	15	1843
6 LMVD	22 VICKSBUR	190 GRENADA	7	655	2	284	1	171	3	811	1	76	14	1997
6 LMVD	22 VICKSBUR	192 SARDIS	8	471	3	456	1	164	1	62	1	95	14	1248
6 LMVD	23 NEW ORLE	138 WALLACE	2	1845	1	586	1	640	1	965	0	0	5	4036
6 LMVD	23 NEW ORLE	352 LAKE O' THE PINES(FE	23	15078	9	12596	4	5598	2	2476	3	176	41	35924
6 LMVD	23 NEW ORLE	353 TEXARKANA(WRIGHT PAT	29	25185	8	1493	3	4335	4	7475	2	115	46	38603
6 LMVD	23 NEW ORLE	413 CADDO	15	9189	5	468	4	5083	2	1386	1	83	27	16209
7 SWD	24 LITTLE R	11 BEAVER	12	6240	10	2758	3	8039	3	1422	1	51	29	18510
7 SWD	24 LITTLE R	12 BLUE MOUNTAIN	8	2892	6	1044	3	730	2	411	1	70	20	5147
7 SWD	24 LITTLE R	13 BULL SHOALS	19	1510	20	12438	1	472	3	3219	0	0	43	17639
7 SWD	24 LITTLE R	16 GREERS FERRY	9	3074	11	5445	2	13139	5	4718	1	86	28	26462
7 SWD	24 LITTLE R	17 DARDANELLE	1	275	0	0	1	189	2	2081	0	0	4	2545
7 SWD	24 LITTLE R	21 NIMROD	8	3010	10	1635	3	752	2	412	0	0	23	5809
7 SWD	24 LITTLE R	22 NORFOLK	18	1982	14	9994	1	368	4	3608	0	0	37	15952
7 SWD	24 LITTLE R	23 OZARK	9	5186	3	747	1	249	2	2391	0	0	15	8573

INVENTORY OF WATER QUALITY DATA BY STATION TYPE

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7 SWD	24 LITTLE R	193 CLEARWATER	5	1400	5	450	2	340	2	162	1	73	15	2425
7 SWD	24 LITTLE R	200 TABLE ROCK	19	10799	14	4418	2	7315	4	1229	2	43	41	23804
7 SWD	25 TULSA	20 MILLWOOD	24	10997	9	634	2	204	5	517	5	315	45	12667
7 SWD	25 TULSA	102 COUNCIL GROVE	9	749	3	730	1	147	3	1952	1	66	17	3644
7 SWD	25 TULSA	103 ELK CITY	5	607	2	293	1	152	2	1404	2	72	12	2528
7 SWD	25 TULSA	104 FALL RIVER	4	1466	2	426	1	134	3	2956	1	59	11	5041
7 SWD	25 TULSA	105 JOHN REDMOND	9	6322	2	554	1	82	4	3928	6	338	22	11224
7 SWD	25 TULSA	107 MARION	4	245	1	106	1	166	3	2576	2	346	11	3439
7 SWD	25 TULSA	112 TORONTO	5	1355	1	92	2	433	3	2992	1	59	12	4931
7 SWD	25 TULSA	264 BROKEN BOW	9	1434	5	306	1	72	4	2384	0	0	19	4196
7 SWD	25 TULSA	265 CANTON	1	1924	0	0	1	2379	1	862	0	0	3	5165
7 SWD	25 TULSA	266 CHOUTEAU	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	267 EUFAULA	19	16525	16	4177	1	290	2	5925	6	325	44	27242
7 SWD	25 TULSA	268 FORT GIBSON	2	2657	5	809	1	190	1	3371	0	0	9	7027
7 SWD	25 TULSA	269 FORT SUPPLY	7	527	1	72	1	124	1	86	0	0	10	809
7 SWD	25 TULSA	270 GREAT SALT PLAINS	4	7985	0	0	0	0	2	6548	0	0	6	14533
7 SWD	25 TULSA	271 HEYBURN	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	272 HULAH	1	650	0	0	0	0	0	0	0	0	1	650
7 SWD	25 TULSA	273 KEYSTONE	17	14241	11	3652	1	188	4	6071	2	127	35	24279
7 SWD	25 TULSA	274 NEWT GRAHAM	3	3931	0	0	0	0	1	3740	0	0	4	7671
7 SWD	25 TULSA	275 OOLOGAH	13	9314	9	941	1	284	3	3425	1	90	27	14054
7 SWD	25 TULSA	276 PINE CREEK	2	1796	0	0	0	0	2	709	0	0	4	2505
7 SWD	25 TULSA	277 ROBERT S KERR	2	405	0	0	3	3749	0	0	0	0	5	4154
7 SWD	25 TULSA	278 TENKILLER FERRY	20	6166	7	1393	2	440	3	3978	1	21	33	11998
7 SWD	25 TULSA	279 W D MAYO	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	280 WEBBERS FALLS	9	12204	0	0	0	0	1	33	0	0	10	12237
7 SWD	25 TULSA	281 WISTER	15	1907	4	319	2	259	4	1442	0	0	25	3927
7 SWD	25 TULSA	282 CLAYTON	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	283 KAW	1	5032	0	0	0	0	0	0	0	0	1	5032
7 SWD	25 TULSA	284 COPAN	0	0	0	0	0	0	1	844	0	0	1	844
7 SWD	25 TULSA	285 HUGO	2	2038	0	0	0	0	2	725	0	0	4	2763
7 SWD	25 TULSA	286 OPTIMA	0	0	0	0	0	0	1	3504	0	0	1	3504
7 SWD	25 TULSA	287 WAURIKA	0	0	0	0	0	0	1	676	0	0	1	676
7 SWD	25 TULSA	348 TEXOMA (DENNISON)	19	11578	6	1145	1	265	4	5207	5	373	35	18568
7 SWD	25 TULSA	357 PAT MAYSE	0	0	1	136	0	0	0	0	0	0	1	136
7 SWD	25 TULSA	370 KEMP	2	2292	3	289	2	279	2	1621	0	0	9	4481
7 SWD	25 TULSA	402 GILLHAM	1	75	0	0	0	0	1	33	0	0	2	108
7 SWD	26 FORT WOR	344 BARDWELL	0	0	0	0	1	134	0	0	0	0	1	134
7 SWD	26 FORT WOR	345 BELTON(BELL)	3	230	6	1619	3	969	2	153	3	253	17	3224
7 SWD	26 FORT WOR	346 BENBROOK	0	0	0	0	1	120	0	0	0	0	1	120
7 SWD	26 FORT WOR	347 CANYON	2	180	4	1211	1	302	1	90	0	0	8	1783
7 SWD	26 FORT WOR	349 GRAPEVINE	1	204	0	0	1	122	0	0	0	0	2	326
7 SWD	26 FORT WOR	351 HORDS CREEK	0	0	0	0	1	216	0	0	0	0	1	216
7 SWD	26 FORT WOR	354 LAVON	9	653	5	1478	3	1253	1	89	6	471	24	3944

INVENTORY OF WATER QUALITY DATA BY STATION TYPE

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7 SWD	26 FORT WOR	355 LEWISVILLE(GARZA LIT	12	2999	10	2092	2	454	1	89	5	399	30	6033
7 SWD	26 FORT WOR	356 NAVARRO MILLS	0	0	0	0	1	198	0	0	0	0	1	198
7 SWD	26 FORT WOR	358 PROCTOR	0	0	0	0	1	175	0	0	0	0	1	175
7 SWD	26 FORT WOR	359 SAM RAYBURN (MC GEE	22	15846	14	6867	2	1829	4	5327	4	305	46	30174
7 SWD	26 FORT WOR	360 O C FISHER (SAN ANGE	1	83	0	0	2	324	1	21	0	0	4	428
7 SWD	26 FORT WOR	361 SOMERVILLE	5	349	6	1003	3	792	1	83	0	0	15	2227
7 SWD	26 FORT WOR	362 STILLHOUSE HOLLOW(LA	4	316	2	465	2	500	1	74	0	0	9	1355
7 SWD	26 FORT WOR	363 WACO	2	1369	0	0	1	112	0	0	0	0	3	1481
7 SWD	26 FORT WOR	364 WHITNEY	9	2307	8	2481	2	436	2	1053	0	0	21	6277
7 SWD	26 FORT WOR	371 B A STEINHAGEN (TOWN	0	0	0	0	0	0	1	3054	0	0	1	3054
7 SWD	28 ALBUQUER	65 JOHN MARTIN (HASTY)	1	557	0	0	2	459	3	2873	0	0	6	3889
7 SWD	28 ALBUQUER	218 ABIQUIU	5	600	3	428	2	815	1	316	0	0	11	2159
7 SWD	28 ALBUQUER	219 CONCHAS	6	3580	10	2335	4	1561	3	2482	0	0	23	9958
7 SWD	28 ALBUQUER	407 TRINIDAD	0	0	0	0	0	0	0	0	0	0	0	0
8 MRD	29 KANSAS C	100 RATHBUN	9	708	10	1273	2	921	3	296	1	97	25	3295
8 MRD	29 KANSAS C	106 KANOPOLIS	8	3846	11	963	2	783	4	3468	3	219	28	9279
8 MRD	29 KANSAS C	108 MILFORD	9	3422	10	2584	1	177	4	4255	4	244	28	10682
8 MRD	29 KANSAS C	109 MELVERN	4	299	9	1596	2	850	6	3189	1	55	22	5989
8 MRD	29 KANSAS C	110 PERRY	11	1166	12	1817	2	1358	5	2359	4	349	34	7049
8 MRD	29 KANSAS C	111 POMONA	6	607	15	3459	2	230	2	497	4	718	29	5511
8 MRD	29 KANSAS C	113 TUTTLE CREEK	23	6697	6	577	4	1684	6	5943	9	598	48	15499
8 MRD	29 KANSAS C	114 WILSON	6	3809	9	4874	3	357	3	1282	2	140	23	10462
8 MRD	29 KANSAS C	194 POMME DE TERRE	10	882	17	1286	3	1887	2	580	0	0	32	4635
8 MRD	29 KANSAS C	195 STOCKTON	11	1000	27	5002	6	3233	5	2503	4	274	53	12012
8 MRD	29 KANSAS C	207 HARLAN COUNTY	9	6814	5	431	3	1090	6	1072	2	103	25	9510
8 MRD	30 OMAHA	64 CHERRY CREEK	5	263	5	597	2	195	2	118	0	0	14	1173
8 MRD	30 OMAHA	203 FORT PECK	3	2830	2	973	1	473	3	7035	0	0	9	11311
8 MRD	30 OMAHA	208 OLIVE CREEK	2	40	1	144	1	165	0	0	0	0	4	349
8 MRD	30 OMAHA	209 BLUESTEM	1	19	2	250	1	263	0	0	0	0	4	532
8 MRD	30 OMAHA	210 WAGON TRAIN	0	0	2	270	1	328	0	0	0	0	3	598
8 MRD	30 OMAHA	211 STAGECOACH	0	0	2	206	1	131	0	0	0	0	3	337
8 MRD	30 OMAHA	212 YANKEE HILL	0	0	3	138	1	168	0	0	0	0	4	306
8 MRD	30 OMAHA	213 CONESTOGA	1	71	1	197	1	303	0	0	0	0	3	571
8 MRD	30 OMAHA	214 TWIN	1	38	1	310	1	136	0	0	0	0	3	484
8 MRD	30 OMAHA	215 PAWNEE	2	154	3	381	2	423	1	72	0	0	8	1030
8 MRD	30 OMAHA	216 HOLMES PARK	0	0	3	307	1	184	0	0	0	0	4	491
8 MRD	30 OMAHA	217 BRANCHED OAK	5	349	5	542	2	437	1	77	0	0	13	1405
8 MRD	30 OMAHA	234 BOWMAN-HALEY	3	3171	2	126	3	1608	2	1070	0	0	10	5975
8 MRD	30 OMAHA	235 SAKAKAWEA(GARRISON)	26	18264	14	3134	3	787	2	7391	4	395	49	29971
8 MRD	30 OMAHA	331 SHARPE (BIG BEND)	1	515	1	100	1	408	1	4283	0	0	4	5306
8 MRD	30 OMAHA	332 COLD BROOK	0	0	0	0	2	763	0	0	0	0	2	763
8 MRD	30 OMAHA	334 FRANCIS CASE (FT RAN	2	2772	3	516	1	495	2	9351	0	0	8	13134
8 MRD	30 OMAHA	335 LEWIS AND CLARKE (GA	1	1030	0	0	2	488	2	1476	1	93	6	3087

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8 MRD	30 [illegible]	336 OAHE	12	14990	11	11112	3	2993	1	6341	1	104	28	[illegible]
8 MRD	30 OMAHA	415 CHATFIELD	1	55	1	339	1	135	1	63	0	0	4	[illegible]
9 NPD	31 WALLA WA	77 DWORSHAK	23	1360	4	1008	1	265	5	3820	0	0	33	6453
9 NPD	31 WALLA WA	78 LUCKY PEAK	13	2436	0	0	0	0	3	1321	0	0	16	3757
9 NPD	31 WALLA WA	79 RIRIE	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	31 WALLA WA	379 ICE HARBOR	1	70	4	194	2	1950	3	4309	0	0	10	6523
9 NPD	32 SEATTLE	80 ALBENI FALLS (PEND O	5	4065	4	2069	0	0	2	700	0	0	11	6834
9 NPD	32 SEATTLE	204 KOOKANUSA(LIBBY)	11	2356	9	19057	2	6949	2	7903	1	93	25	36358
9 NPD	32 SEATTLE	377 RUFUS WOODS (CHIEF J	4	3275	0	0	0	0	1	443	0	0	5	3718
9 NPD	32 SEATTLE	384 MUD MOUNTAIN	2	586	0	0	0	0	2	583	0	0	4	1169
9 NPD	32 SEATTLE	385 WYNOOCHEE	0	0	0	0	0	0	2	2445	0	0	2	2445
9 NPD	32 SEATTLE	386 HOWARD A HANSON	5	284	0	0	0	0	3	895	0	0	8	1179
9 NPD	33 PORTLAND	288 BLUE RIVER	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	289 BONNEVILLE	15	13322	0	0	3	2621	2	2155	0	0	20	18098
9 NPD	33 PORTLAND	290 COTTAGE GROVE	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	291 COUGAR	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	292 CELILO (DALLES)	2	3506	0	0	1	85	2	3268	0	0	5	6859
9 NPD	33 PORTLAND	293 DETROIT	4	770	0	0	0	0	0	0	0	0	4	770
9 NPD	33 PORTLAND	294 DEXTER	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	295 DORENA	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	296 FALL CREEK	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	297 FERN RIDGE	1	214	0	0	0	0	2	145	0	0	3	359
9 NPD	33 PORTLAND	298 FOSTER	2	261	0	0	0	0	1	103	0	0	3	364
9 NPD	33 PORTLAND	299 GREEN PETER	1	320	0	0	0	0	1	95	0	0	2	415
9 NPD	33 PORTLAND	300 HILLS CREEK	4	292	1	217	1	229	1	60	0	0	7	798
9 NPD	33 PORTLAND	301 JOHN DAY (UMATILLA)	3	3033	0	0	1	68	1	660	0	0	5	3761
9 NPD	33 PORTLAND	302 LOOKOUT POINT	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	304 LOST CREEK	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	305 BIG CLIFF	0	0	0	0	0	0	1	52	0	0	1	52
10 SPD	34 SACREMEN	24 BLACK BUTTE	1	1986	0	0	1	407	1	1486	0	0	3	3879
10 SPD	34 SACREMEN	26 ENGLEBRIGHT	0	0	0	0	0	0	1	260	0	0	1	260
10 SPD	34 SACREMEN	28 ISABELLA	6	3251	3	158	2	291	2	801	0	0	13	4501
10 SPD	34 SACREMEN	30 MARTIS CREEK	3	349	1	237	0	0	1	313	0	0	5	899
10 SPD	34 SACREMEN	32 NEW HOGAN	1	394	2	32	2	39	1	528	0	0	6	993
10 SPD	34 SACREMEN	33 PINE FLAT	7	4201	0	0	1	20	3	1416	0	0	11	5637
10 SPD	34 SACREMEN	36 SUCCESS	5	1328	0	0	0	0	3	1923	0	0	8	3251
10 SPD	34 SACREMEN	37 KAWEAH (TERMINUS)	11	4656	0	0	1	20	4	2681	0	0	16	7357
10 SPD	34 SACREMEN	41 FOLSOM	10	4349	7	4891	3	9149	4	7105	0	0	24	25494
10 SPD	34 SACREMEN	43 NEW BULLARDS BAR	1	206	0	0	0	0	0	0	0	0	1	206
10 SPD	34 SACREMEN	44 CAMANCHE	2	591	0	0	0	0	2	1932	0	0	4	2523
10 SPD	34 SACREMEN	47 CHERRY VALLEY	1	16	2	41	0	0	1	49	0	0	4	106
10 SPD	34 SACREMEN	48 NEW DON PEDRO	9	459	6	1035	2	335	3	963	4	215	24	3007

INVENTORY OF WATER QUALITY DATA BY STATION TYPE

DIVISION	DISTRICT	PROJECT	TRIBUTARY NSTA	TRIBUTARY NOBS	POOL NSTA	POOL NOBS	NEAR DAM NSTA	NEAR DAM NOBS	DISCHARGE NSTA	DISCHARGE NOBS	OTHER NSTA	OTHER NOBS	TOTAL NSTA	TOTAL NOBS
10 SPD	34 SACREMEN	51 MCCLURE (NEW EXCHEQU	9	3822	6	1020	1	61	5	1072	0	0	21	5975
10 SPD	34 SACREMEN	54 MILLERTON (FRIANT)	3	1376	4	1215	2	916	3	1846	0	0	12	5353
10 SPD	35 SAN FRAN	29 MENDOCINO	3	1937	2	182	2	1339	2	2956	0	0	9	6414
10 SPD	35 SAN FRAN	39 SANTA MARGARITA (SAL	5	552	2	344	1	238	4	377	0	0	12	1511
10 SPD	36 LOS ANGE	9 ALAMO	0	0	0	0	0	0	0	0	0	0	0	0
10 SPD	36 LOS ANGE	27 HANSEN	0	0	0	0	0	0	0	0	0	0	0	0

INVENTORY OF WATER QUALITY DATA BY STATION TYPE
*** DISTRICT TOTALS ***

DISTRICT	TOTAL PROJ	TRIBUTARY NSTA	TRIBUTARY NOBS	POOL NSTA	POOL NOBS	NEAR DAM NSTA	NEAR DAM NOBS	DISCHARGE NSTA	DISCHARGE NOBS	OTHER NSTA	OTHER NOBS	TOTAL NSTA	TOTAL NOBS
1 NEW ENGLAND	22	51	65968	53	18871	40	15479	26	44515	0	0	170	144833
2 NEW YORK	3	14	1284	4	154	2	217	4	196	0	0	24	1851
3 PHILADELPHIA	3	7	874	8	763	1	250	3	505	0	0	19	2392
4 BALTIMORE	9	19	4034	13	1374	8	949	13	3620	4	438	57	10415
5 NORFOLK	0	0	0	0	0	0	0	0	0	0	0	0	0
6 WILMINGTON	3	56	41756	28	12841	7	5504	14	8359	7	547	112	69007
7 CHARLESTON	1	7	976	0	0	0	0	6	1206	0	0	13	2182
8 SAVANNAH	2	90	11786	24	6434	3	1549	6	3417	29	2227	152	25413
9 JACKSONVILLE	1	7	4737	7	2793	2	1744	10	5626	0	0	26	14900
10 MOBILE	17	260	67752	100	28113	22	11808	44	32843	5	251	431	140767
11 BUFFALO	1	1	323	0	0	0	0	0	0	0	0	1	323
12 DETROIT	0	0	0	0	0	0	0	0	0	0	0	0	0
13 CHICAGO	0	0	0	0	0	0	0	0	0	0	0	0	0
14 ROCK ISLAND	2	11	2940	6	2959	1	143	2	195	2	90	22	6327
15 ST PAUL	13	18	6746	21	5026	7	1810	6	516	0	0	52	14098
16 PITTSBURG	14	143	20025	90	63318	33	20589	36	23987	38	2929	340	130848
17 HUNTINGTON	28	153	37441	174	54808	51	71490	58	23775	18	7043	454	194557
18 LOUISVILLE	15	91	33052	62	99010	18	75187	22	13368	19	1447	212	222064
19 NASHVILLE	7	147	24667	97	38569	13	13973	21	8238	16	1240	294	86687
20 ST LOUIS	3	37	8605	12	1422	3	409	9	4907	5	336	66	15679
21 MEMPHIS	1	6	439	5	462	1	125	1	90	0	0	13	1116
22 VICKSBURG	7	56	13388	21	7274	8	12389	11	2792	10	910	106	36753
23 NEW ORLEANS	4	69	51297	23	15143	12	15056	9	12302	6	374	119	94772
24 LITTLE ROCK	10	108	36368	93	38929	19	31593	29	19653	6	323	255	126866
25 TULSA	35	209	124422	88	16074	26	9837	64	67509	33	2191	420	220033
26 FORT WORTH	17	70	24536	55	17216	27	7936	15	10033	18	1428	185	81149
27 GALVESTON	0	0	0	0	0	0	0	0	0	0	0	0	0
28 ALBUQUERQUE	4	12	4737	13	2763	8	2835	7	5671	0	0	40	16006
29 KANSAS CITY	11	106	29250	131	23862	30	12570	46	25444	34	2797	347	93923
30 OMAHA	20	66	44561	62	19642	31	10883	18	37277	6	592	183	112955
31 WALLA WALLA	4	37	3866	8	1202	3	2215	11	9450	0	0	59	16733
32 SEATTLE	6	27	10566	13	21126	2	6949	12	12969	1	93	55	51703
33 PORTLAND	17	32	21718	1	217	6	3003	11	6538	0	0	50	31476
34 SACREMENTO	15	69	26984	31	8629	15	11238	34	22375	4	215	153	69441
35 SAN FRANCISC	2	8	2489	4	526	3	1577	6	3333	0	0	21	7925
36 LOS ANGELES	2	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	299	1987	727587	1247	509520	402	349907	554	410709	261	25471	4451	2023194

INVENTORY OF WATER QUALITY DATA BY STATION TYPE
*** NUMBER OF PROJECTS WITH ONE OR MORE ENTRY BY DISTRICT ***

DISTRICT	TOTAL PROJ	TRIBUTARY NSTA	TRIBUTARY NOBS	POOL NSTA	POOL NOBS	NEAR DAM NSTA	NEAR DAM NOBS	DISCHARGE NSTA	DISCHARGE NOBS	OTHER NSTA	OTHER NOBS	TOTAL NSTA	TOTAL NOBS
1 NEW ENGLAND	22	22	22	15	15	11	11	22	22	0	0	22	22
2 NEW YORK	3	1	1	2	2	1	1	1	1	0	0	2	2
3 PHILADELPHIA	3	3	3	2	2	1	1	2	2	0	0	3	3
4 BALTIMORE	9	5	5	6	6	6	6	6	6	1	1	7	7
5 NORFOLK	0	0	0	0	0	0	0	0	0	0	0	0	0
6 WILMINGTON	3	2	2	1	1	1	1	3	3	1	1	3	3
7 CHARLESTON	1	1	1	0	0	0	0	1	1	0	0	1	1
8 SAVANNAH	2	2	2	2	2	2	2	2	2	2	2	2	2
9 JACKSONVILLE	1	1	1	1	1	1	1	1	1	0	0	1	1
10 MOBILE	17	13	13	12	12	10	10	13	13	3	3	15	15
11 BUFFALO	1	1	1	0	0	0	0	0	0	0	0	1	1
12 DETROIT	0	0	0	0	0	0	0	0	0	0	0	0	0
13 CHICAGO	0	0	0	0	0	0	0	0	0	0	0	0	0
14 ROCK ISLAND	2	1	1	1	1	1	1	2	2	1	1	2	2
15 ST PAUL	13	5	5	6	6	4	4	5	5	0	0	6	6
16 PITTSBURG	14	14	14	14	14	14	14	14	14	6	6	14	14
17 HUNTINGTON	28	25	25	22	22	25	25	28	28	5	5	28	28
18 LOUISVILLE	15	15	15	15	15	14	14	15	15	5	5	15	15
19 NASHVILLE	7	7	7	7	7	7	7	7	7	6	6	7	7
20 ST LOUIS	3	3	3	3	3	3	3	3	3	3	3	3	3
21 MEMPHIS	1	1	1	1	1	1	1	1	1	0	0	1	1
22 VICKSBURG	7	7	7	6	6	7	7	7	7	5	5	7	7
23 NEW ORLEANS	4	4	4	4	4	4	4	4	4	3	3	4	4
24 LITTLE ROCK	10	10	10	9	9	10	10	10	10	5	5	10	10
25 TULSA	35	27	27	18	18	19	19	27	27	12	12	31	31
26 FORT WORTH	17	11	11	8	8	16	16	10	10	4	4	17	17
27 GALVESTON	0	0	0	0	0	0	0	0	0	0	0	0	0
28 ALBUQUERQUE	4	3	3	2	2	3	3	3	3	0	0	3	3
29 KANSAS CITY	11	11	11	11	11	11	11	11	11	10	10	11	11
30 OMAHA	20	15	15	18	18	20	20	11	11	3	3	20	20
31 WALLA WALLA	4	3	3	2	2	2	2	3	3	0	0	3	3
32 SEATTLE	6	5	5	2	2	1	1	6	6	1	1	6	6
33 PORTLAND	17	8	8	1	1	4	4	8	8	0	0	9	9
34 SACREMENTO	15	14	14	8	8	9	9	14	14	1	1	15	15
35 SAN FRANCISC	2	2	2	2	2	2	2	2	2	0	0	2	2
36 LOS ANGELES	2	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	299	242	242	201	201	210	210	242	242	77	77	271	271

Table A5

Inventory of Phosphorus, Chlorophyll-a, and Secchi Data at Pool Stations

INVENTORY OF TOTAL-P, CHL-A, & SECCHI DATA (POOL STATIONS)

DIVISION	DISTRICT	PROJECT	TOTAL P NSTA	TOTAL P NOBS	TOTAL P DFIRST	TOTAL P DLAST	CHLOROPHYLL-A NSTA	CHLOROPHYLL-A NOBS	CHLOROPHYLL-A DFIRST	CHLOROPHYLL-A DLAST	SECCHI DEPTH NSTA	SECCHI DEPTH NOBS	SECCHI DEPTH DFIRST	SECCHI DEPTH DLAST
1 NED	1 NEW ENGL	142 BUFFUMVILLE	1	1	710607	710607	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	144 EAST BRIMFIELD	0	0	0	0	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	147 LITTLEVILLE	0	0	0	0	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	148 TULLY	1	22	710628	780821	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	150 WESTVILLE	1	18	710706	780811	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	151 BLACK ROCK	1	1	730731	730731	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	152 COLEBROOK RIVER	0	0	0	0	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	155 HANCOCK BROOK	0	0	0	0	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	156 HOP BROOK	4	35	730530	780831	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	158 MANSFIELD HOLLOW	0	0	0	0	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	159 NORTHFIELD BROOK	1	35	710708	780831	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	162 WEST THOMPSON	8	107	750825	780821	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	164 EDWARD MCDOWELL	0	0	0	0	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	165 EVERETT	0	0	0	0	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	166 FRANKLIN FALLS	0	0	0	0	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	167 HOPKINTON	8	64	760622	780829	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	168 OTTER BROOK	1	29	760715	780824	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	169 SURRY MOUNTAIN	1	28	710628	780831	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	170 BALL MOUNTAIN	1	22	710727	780829	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	172 NORTH HARTLAND	0	0	0	0	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	173 NORTH SPRINGFIELD	0	0	0	0	0	0	0	0	0	0	0	0
1 NED	1 NEW ENGL	174 TOWNSHEND	1	20	750826	780829	0	0	0	0	0	0	0	0
2 NAD	2 NEW YORK	171 EAST BARRE	0	0	0	0	0	0	0	0	0	0	0	0
2 NAD	2 NEW YORK	176 WATERBURY	3	24	720602	790501	2	5	720602	721005	4	8	680711	790501
2 NAD	2 NEW YORK	177 WRIGHTSVILLE	0	0	0	0	0	0	0	0	1	1	690822	690822
2 NAD	3 PHILADEL	307 BELTZVILLE	4	53	720824	731004	4	10	720824	731004	3	9	730417	731004
2 NAD	3 PHILADEL	313 FRANCIS E WALTER	0	0	0	0	0	0	0	0	0	0	0	0
2 NAD	3 PHILADEL	316 PROMPTON	5	43	720510	731205	2	6	720510	720823	0	0	0	0
2 NAD	4 BALTIMOR	227 ALMOND	0	0	0	0	0	0	0	0	0	0	0	0
2 NAD	4 BALTIMOR	229 WHITNEY POINT	0	0	0	0	0	0	0	0	0	0	0	0
2 NAD	4 BALTIMOR	306 ALVIN R BUSH (KETTLE	0	0	0	0	0	0	0	0	0	0	0	0
2 NAD	4 BALTIMOR	310 CURWENSVILLE	1	1	740717	740717	0	0	0	0	1	1	740717	740717
2 NAD	4 BALTIMOR	312 F J SAYERS (BLANCHAR	4	25	720831	731002	4	9	720831	731002	3	7	730413	731002
2 NAD	4 BALTIMOR	320 RAYSTOWN	4	76	740514	760721	4	38	740514	760721	4	12	740514	740919
2 NAD	4 BALTIMOR	329 STILLWATER	0	0	0	0	0	0	0	0	0	0	0	0
2 NAD	4 BALTIMOR	398 BLOOMINGTON	0	0	0	0	0	0	0	0	0	0	0	0
2 NAD	4 BALTIMOR	401 SAVAGE	0	0	0	0	0	0	0	0	0	0	0	0
3 SAD	6 WILMINGT	233 B EVERETT JORDAN (NE	0	0	0	0	0	0	0	0	0	0	0	0
3 SAD	6 WILMINGT	372 JOHN H KERR	25	597	650104	790925	15	52	730407	790730	24	259	730407	790809
3 SAD	6 WILMINGT	375 PHILPOTT	0	0	0	0	0	0	0	0	0	0	0	0
3 SAD	7 CHARLEST	232 W KERR SCOTT	0	0	0	0	0	0	0	0	0	0	0	0

INVENTORY OF TOTAL-P, CHL-A, & SECCHI DATA (POOL STATIONS)

DIVISION	DISTRICT	PROJECT	TOTAL P NSTA	TOTAL P NOBS	TOTAL P DFIRST	TOTAL P DLAST	CHLOROPHYLL-A NSTA	CHLOROPHYLL-A NOBS	CHLOROPHYLL-A DFIRST	CHLOROPHYLL-A DLAST	SECCHI DEPTH NSTA	SECCHI DEPTH NOBS	SECCHI DEPTH DFIRST	SECCHI DEPTH DLAST
3 SAD	8 SAVANNAH	74 CLARK HILL	14	288	730623	800110	11	33	730623	731112	12	33	730623	790517
3 SAD	8 SAVANNAH	330 HARTWELL	13	252	710826	791211	12	36	730626	731113	12	36	730626	731113
3 SAD	9 JACKSONV	66 OCKLAWAHA(RODMAN)	9	153	700507	770719	2	4	750513	750812	4	14	750224	751113
3 SAD	10 MOBILE	1 CLAIBORNE	3	33	770824	780928	3	18	770824	771208	3	34	770824	780928
3 SAD	10 MOBILE	2 COFFEEVILLE (JACKSON	0	0	0	0	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	3 HOLT	2	34	730607	731031	2	6	730607	731031	2	6	730607	731031
3 SAD	10 MOBILE	4 JONES BLUFF	1	11	770816	780915	1	6	770816	771129	1	11	770816	780915
3 SAD	10 MOBILE	5 DEMOPOLIS	1	2	781005	781005	0	0	0	0	1	1	781005	781005
3 SAD	10 MOBILE	7 WARRIOR	1	1	780801	780801	0	0	0	0	1	1	780801	780801
3 SAD	10 MOBILE	8 MILLERS FERRY	3	33	770822	780922	3	17	770822	771207	3	30	770822	780922
3 SAD	10 MOBILE	69 ALLATOONA	14	206	730630	771206	6	18	730630	731114	14	52	730630	771206
3 SAD	10 MOBILE	70 GEORGE W ANDREWS	0	0	0	0	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	71 SEMINOLE (WOODRUFF)	6	55	730620	741031	6	16	730620	741031	5	15	730620	731103
3 SAD	10 MOBILE	72 WALTER F GEORGE (EUF	9	67	730619	780927	4	12	730619	731103	9	37	730619	780927
3 SAD	10 MOBILE	73 WEST POINT	7	269	740716	791016	0	0	0	0	25	81	750519	790213
3 SAD	10 MOBILE	75 CARTERS	7	126	760914	771213	0	0	0	0	4	40	770719	780110
3 SAD	10 MOBILE	76 SIDNEY LANIER	18	303	730629	780413	12	36	730629	731110	12	36	730629	731110
3 SAD	10 MOBILE	191 OKATIBBEE	0	0	0	0	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	405 GAINESVILLE L/D	0	0	0	0	0	0	0	0	0	0	0	0
3 SAD	10 MOBILE	411 BANKHEAD	8	119	721025	731030	4	12	730608	731030	4	12	730608	731030
5 NCD	11 BUFFALO	228 MT MORRIS	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	14 ROCK ISL	98 CORALVILLE	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	14 ROCK ISL	99 RED ROCK	4	129	680412	761130	6	10	740418	740924	6	10	740418	740924
5 NCD	15 ST PAUL	178 GULL	5	74	720702	780817	3	9	720702	721024	5	26	720702	780817
5 NCD	15 ST PAUL	179 LAC QUI PARLE	6	179	670713	791001	5	36	780926	790806	5	25	780926	790806
5 NCD	15 ST PAUL	180 TRAVERSE	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	181 LEECH	5	103	710728	780615	4	12	720711	721021	4	11	720711	721021
5 NCD	15 ST PAUL	182 ORWELL	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	183 CROSS	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	184 POKEGAMA	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	185 SANDY	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	186 WINNIBIGOSHISH	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	187 PINE RIVER	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	236 HOMME	0	0	0	0	0	0	0	0	0	0	0	0
5 NCD	15 ST PAUL	237 ASHTABULA (BALDHILL)	5	35	740430	740917	5	12	740430	740917	5	12	740430	740917
5 NCD	15 ST PAUL	399 EAU GALLE	5	85	780922	790718	5	98	780922	790718	5	30	780922	790718
4 ORD	16 PITTSBUR	243 BERLIN	12	100	730424	750827	7	23	730424	731008	10	28	730424	750827
4 ORD	16 PITTSBUR	252 MICHAEL J KIRWAN	4	31	730524	770829	0	0	0	0	5	8	730926	770829
4 ORD	16 PITTSBUR	254 MOSQUITO CREEK	11	88	730421	760824	2	6	730421	731009	10	41	730421	760824

INVENTORY OF TOTAL-P, CHL-A, & SECCHI DATA (POOL STATIONS)

DIVISION	DISTRICT	PROJECT	TOTAL P NSTA	TOTAL P NOBS	TOTAL P DFIRST	TOTAL P DLAST	CHLOROPHYLL-A NSTA	CHLOROPHYLL-A NOBS	CHLOROPHYLL-A DFIRST	CHLOROPHYLL-A DLAST	SECCHI DEPTH NSTA	SECCHI DEPTH NOBS	SECCHI DEPTH DFIRST	SECCHI DEPTH DLAST
4 ORD	16 PITTSBUR	308 CONEMAUGH RIVER	2	5	730702	730702	0	0	0	0	1	4	730702	750505
4 ORD	16 PITTSBUR	309 CROOKED CREEK	2	16	730717	740612	0	0	0	0	3	7	730717	740612
4 ORD	16 PITTSBUR	311 EAST BRANCH CLARION	4	40	730620	760922	3	124	740603	741024	4	8	730830	750716
4 ORD	16 PITTSBUR	314 LOYALHANNA	1	3	730703	730703	0	0	0	0	2	4	730703	750506
4 ORD	16 PITTSBUR	315 MAHONING CREEK	1	9	730719	740613	0	0	0	0	2	2	740613	740613
4 ORD	16 PITTSBUR	317 SHENANGO RIVER	10	217	720523	770816	3	9	730420	731008	13	39	730420	770609
4 ORD	16 PITTSBUR	318 TIONESTA	3	19	730621	750714	0	0	0	0	3	5	740702	750714
4 ORD	16 PITTSBUR	319 YOUGHIOGHENY RIVER	5	117	730508	750618	0	0	0	0	6	57	730815	750618
4 ORD	16 PITTSBUR	322 WOODCOCK	4	305	740528	771019	0	0	0	0	4	12	750814	770614
4 ORD	16 PITTSBUR	328 ALLEGHENY (KINZUA)	15	393	660105	780726	4	12	730420	731005	16	175	730420	750604
4 ORD	16 PITTSBUR	393 TYGART	9	255	730423	780718	3	9	730423	731005	12	85	730423	740925
4 ORD	17 HUNTINGT	123 DEWEY	4	196	740529	780721	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	124 FISHTRAP	6	120	750312	780622	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	125 GRAYSON	5	130	740705	780622	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	127 GREENUP L/D	0	0	0	0	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	239 PAINT CREEK	5	120	741112	780726	0	0	0	0	1	2	750506	750905
4 ORD	17 HUNTINGT	241 ATWOOD	8	93	730420	771005	4	12	730420	731008	5	14	730420	760830
4 ORD	17 HUNTINGT	242 BEACH CITY	2	18	730420	760922	1	3	730420	731006	1	3	730420	731006
4 ORD	17 HUNTINGT	245 CHARLES MILL	5	36	730420	780808	3	9	730420	731006	4	11	730420	780808
4 ORD	17 HUNTINGT	246 CLENDENING	2	70	740820	780817	0	0	0	0	1	2	760427	760903
4 ORD	17 HUNTINGT	247 DEER CREEK	7	118	730428	780724	3	8	730428	731010	4	10	730428	750912
4 ORD	17 HUNTINGT	248 DELAWARE	6	85	730426	780819	3	9	730426	731010	3	9	730426	731010
4 ORD	17 HUNTINGT	249 DILLON	6	83	730426	770812	3	8	730426	731008	4	10	730426	770812
4 ORD	17 HUNTINGT	251 LEESVILLE	2	32	740918	760921	0	0	0	0	1	2	760518	760831
4 ORD	17 HUNTINGT	255 PIEDMONT	5	78	730730	771005	0	0	0	0	1	2	770412	770811
4 ORD	17 HUNTINGT	256 PLEASANT HILL	2	18	730420	731006	2	6	730420	731006	2	6	730420	731006
4 ORD	17 HUNTINGT	257 SENECAVILLE	2	16	740820	760817	0	0	0	0	1	2	760420	760817
4 ORD	17 HUNTINGT	258 TAPPAN	7	81	730421	760921	3	9	730421	731006	4	11	730421	760902
4 ORD	17 HUNTINGT	259 BURR OAK(TOM JENKINS	1	21	740823	751111	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	261 WILLS CREEK	2	26	740521	771006	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	373 JOHN W FLANNAGAN	10	195	730405	791101	5	11	730405	730927	5	10	730405	730927
4 ORD	17 HUNTINGT	374 NORTH FORK OF POUND	5	94	750614	780614	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	389 BLUESTONE	6	140	730403	780711	4	10	730403	730926	4	10	730403	730926
4 ORD	17 HUNTINGT	390 EAST LYNN	5	211	730213	780804	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	391 SUMMERSVILLE	6	134	730403	780709	4	12	730403	730928	4	11	730403	730928
4 ORD	17 HUNTINGT	392 SUTTON	6	123	740320	780712	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	394 WINFIELD	0	0	0	0	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	406 MOHICANVILLE	0	0	0	0	0	0	0	0	0	0	0	0
4 ORD	17 HUNTINGT	416 ALUM CREEK	4	108	750615	780820	0	0	0	0	1	2	760413	760827
4 ORD	18 LOUISVIL	90 CAGLES MILL	3	152	710727	780405	3	39	730620	770803	3	117	710727	771121
4 ORD	18 LOUISVIL	91 HUNTINGTON	2	102	711110	771108	2	15	731010	770720	2	56	710713	771108
4 ORD	18 LOUISVIL	92 MISSISSINEWA	6	159	710630	780412	6	31	730503	770721	6	75	730503	771109
4 ORD	18 LOUISVIL	93 MONROE	9	254	710721	780418	9	57	730510	770822	9	154	710603	771129
4 ORD	18 LOUISVIL	94 SALAMONIE	3	127	711005	780411	3	16	740625	770512	3	95	710712	771108

INVENTORY OF TOTAL-P, CHL-A, & SECCHI DATA (POOL STATIONS)

			TOTAL P				CHLOROPHYLL-A				SECCHI DEPTH			
DIVISION	DISTRICT	PROJECT	NSTA	NOBS	DFIRST	DLAST	NSTA	NOBS	DFIRST	DLAST	NSTA	NOBS	DFIRST	DLAST
4 ORD	18 LOUISVIL	95 C M HARDEN (MANSFIEL	3	120	711027	780404	3	17	760427	770902	3	109	710707	771122
4 ORD	18 LOUISVIL	97 BROOKVILLE	2	190	740328	771116	3	32	740605	770921	3	77	740328	771116
4 ORD	18 LOUISVIL	120 BARREN RIVER	14	317	710326	780329	14	71	730518	770907	20	284	710615	771101
4 ORD	18 LOUISVIL	121 BUCKHORN	2	125	720816	771027	4	18	731030	770901	5	146	710608	771027
4 ORD	18 LOUISVIL	126 GREEN RIVER	4	160	701012	780420	3	40	730918	770913	5	179	710602	771115
4 ORD	18 LOUISVIL	128 NOLIN RIVER	1	166	730319	780406	3	34	740418	770927	5	173	710617	771108
4 ORD	18 LOUISVIL	129 ROUGH RIVER	1	156	730316	780316	4	43	711024	770920	6	194	710720	771026
4 ORD	18 LOUISVIL	134 CAVE RUN	1	112	740510	780410	2	23	740710	770921	3	55	740326	771020
4 ORD	18 LOUISVIL	260 WEST FORK OF MILL CK	1	103	740429	780405	1	6	740906	770818	1	27	740710	771121
4 ORD	18 LOUISVIL	263 CLARENCE J BROWN	3	185	740326	771117	2	18	740604	770927	3	51	740424	771117
4 ORD	19 NASHVILL	119 BARKLEY	16	182	711014	780726	15	34	730516	780726	15	35	711014	780726
4 ORD	19 NASHVILL	122 CUMBERLAND (WOLF CRE	11	191	710714	770803	9	27	730529	770803	11	60	710427	770803
4 ORD	19 NASHVILL	337 CENTER HILL	6	152	710728	760406	4	20	760406	760406	8	91	710527	760406
4 ORD	19 NASHVILL	338 CHEATHAM	14	139	710708	790821	9	31	730521	780719	12	38	710708	780719
4 ORD	19 NASHVILL	340 J PERCY PRIEST	17	706	710722	780929	16	407	730521	781012	17	391	710225	781012
4 ORD	19 NASHVILL	342 OLD HICKORY	12	163	710707	790716	8	53	730522	780711	12	57	710707	780711
4 ORD	19 NASHVILL	343 DALE HOLLOW	15	227	710712	770802	10	29	730518	770802	16	106	710429	770802
6 LMVD	20 ST LOUIS	81 CARLYLE	3	33	730508	731018	3	9	730508	731018	3	9	730508	731018
6 LMVD	20 ST LOUIS	87 SHELBYVILLE	7	79	711020	731018	6	18	730508	731018	6	18	730508	731018
6 LMVD	20 ST LOUIS	88 REND	5	41	730508	790626	4	12	730508	731019	4	12	730508	731019
6 LMVD	21 MEMPHIS	196 WAPPAPELLO	4	45	740409	741008	4	12	740409	741008	4	12	740409	741008
6 LMVD	22 VICKSBUR	14 DE GRAY	6	87	740325	741017	6	20	720505	741017	6	20	720505	741017
6 LMVD	22 VICKSBUR	18 GREESON (NARROWS)	0	0	0	0	0	0	0	0	0	0	0	0
6 LMVD	22 VICKSBUR	19 OUACHITA (BLAKELY MT	7	114	740325	760602	6	18	740325	741018	6	18	740325	741018
6 LMVD	22 VICKSBUR	188 ARKABUTLA	3	31	730613	731101	3	9	730613	731101	3	9	730613	731101
6 LMVD	22 VICKSBUR	189 ENID	3	35	730612	731101	3	9	730612	731101	3	9	730612	731101
6 LMVD	22 VICKSBUR	190 GRENADA	3	40	730613	731102	3	9	730613	731102	3	9	730613	731102
6 LMVD	22 VICKSBUR	192 SARDIS	4	53	730613	731101	4	12	730613	731101	4	12	730613	731101
6 LMVD	23 NEW ORLE	138 WALLACE	0	0	0	0	0	0	0	0	0	0	0	0
6 LMVD	23 NEW ORLE	352 LAKE O' THE PINES(FE	10	178	691204	790815	4	16	740322	741108	9	42	740322	790815
6 LMVD	23 NEW ORLE	353 TEXARKANA(WRIGHT PAT	11	160	691204	790809	4	16	740322	741108	9	44	740322	790809
6 LMVD	23 NEW ORLE	413 CADDO	7	40	740323	750728	6	24	740323	741111	6	24	740323	741111
7 SWD	24 LITTLE R	11 BEAVER	10	231	721003	780928	6	24	740403	741010	13	113	740403	781205
7 SWD	24 LITTLE R	12 BLUE MOUNTAIN	6	63	720817	780926	2	6	740328	741018	7	42	740328	780926
7 SWD	24 LITTLE R	13 BULL SHOALS	13	316	670907	781003	8	32	740406	741015	20	141	740406	781206
7 SWD	24 LITTLE R	16 GREERS FERRY	10	309	740327	791204	4	16	740327	741017	12	180	740327	791105
7 SWD	24 LITTLE R	17 DARDANELLE	1	9	720918	721002	0	0	0	0	0	0	0	0
7 SWD	24 LITTLE R	21 NIMROD	11	86	721004	780926	2	6	740327	741018	8	53	740327	780928
7 SWD	24 LITTLE R	22 NORFOLK	10	242	670906	780929	7	28	740405	741010	14	114	740405	781206
7 SWD	24 LITTLE R	23 OZARK	4	49	720830	720913	0	0	0	0	0	0	0	0

INVENTORY OF TOTAL-P, CHL-A, & SECCHI DATA (POOL STATIONS)

DIVISION	DISTRICT	PROJECT	TOTAL P NSTA	TOTAL P NOBS	TOTAL P DFIRST	TOTAL P DLAST	CHLOROPHYLL-A NSTA	CHLOROPHYLL-A NOBS	CHLOROPHYLL-A DFIRST	CHLOROPHYLL-A DLAST	SECCHI DEPTH NSTA	SECCHI DEPTH NOBS	SECCHI DEPTH DFIRST	SECCHI DEPTH DLAST
7 SWD	24 LITTLE R	193 CLEARWATER	5	41	740409	781005	3	9	740409	741008	7	19	740409	781005
7 SWD	24 LITTLE R	200 TABLE ROCK	12	311	740405	781004	9	36	740405	741011	16	116	740405	781206
7 SWD	25 TULSA	20 MILLWOOD	11	57	730904	741017	3	9	740325	741017	3	9	740325	741017
7 SWD	25 TULSA	102 COUNCIL GROVE	3	18	740411	741002	3	9	740411	741002	3	9	740411	741002
7 SWD	25 TULSA	103 ELK CITY	2	10	740410	741003	2	4	740410	741003	2	5	740410	741003
7 SWD	25 TULSA	104 FALL RIVER	2	13	740410	741002	2	6	740410	741002	2	6	740410	741002
7 SWD	25 TULSA	105 JOHN REDMOND	2	11	740411	741001	2	6	740411	741001	2	6	740411	741001
7 SWD	25 TULSA	107 MARION	2	21	740412	741002	2	6	740412	741002	2	6	740412	741002
7 SWD	25 TULSA	112 TORONTO	2	12	740410	741002	2	6	740410	741002	2	6	740410	741002
7 SWD	25 TULSA	264 BROKEN BOW	6	30	770614	770808	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	265 CANTON	1	42	671002	761015	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	266 CHOUTEAU	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	267 EUFAULA	17	249	740401	790830	9	36	740401	741022	10	38	740401	790829
7 SWD	25 TULSA	268 FORT GIBSON	6	55	790301	790519	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	269 FORT SUPPLY	2	14	740329	741024	2	6	740329	741024	2	6	740329	741024
7 SWD	25 TULSA	270 GREAT SALT PLAINS	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	271 HEYBURN	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	272 HULAH	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	273 KEYSTONE	12	219	650301	741023	11	33	740402	741023	11	33	740402	741023
7 SWD	25 TULSA	274 NEWT GRAHAM	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	275 OOLOGAH	10	97	740402	741021	10	24	740402	741021	10	24	740402	741021
7 SWD	25 TULSA	276 PINE CREEK	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	277 ROBERT S KERR	3	151	730731	791204	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	278 TENKILLER FERRY	9	114	740403	790808	4	16	740403	741021	4	16	740403	741021
7 SWD	25 TULSA	279 W D MAYO	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	280 WEBBERS FALLS	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	281 WISTER	6	47	740328	770803	2	8	740328	741021	2	8	740328	741021
7 SWD	25 TULSA	282 CLAYTON	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	283 KAW	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	284 COPAN	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	285 HUGO	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	286 OPTIMA	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	287 WAURIKA	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	348 TEXOMA (DENNISON)	7	95	740309	741031	7	27	740309	741031	7	28	740309	741031
7 SWD	25 TULSA	357 PAT MAYSE	1	1	691203	691203	0	0	0	0	0	0	0	0
7 SWD	25 TULSA	370 KEMP	4	39	740304	741028	4	12	740304	741028	4	12	740304	741028
7 SWD	25 TULSA	402 GILLHAM	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	26 FORT WOR	344 BARDWELL	1	1	691202	691202	0	0	0	0	0	0	0	0
7 SWD	26 FORT WOR	345 BELTON(BELL)	9	189	740313	790803	4	16	740313	741101	9	43	740313	790803
7 SWD	26 FORT WOR	346 BENBROOK	1	1	700114	700114	0	0	0	0	0	0	0	0
7 SWD	26 FORT WOR	347 CANYON	5	80	740313	760909	4	16	740313	741105	5	19	740313	750820
7 SWD	26 FORT WOR	349 GRAPEVINE	1	1	691201	691201	0	0	0	0	0	0	0	0
7 SWD	26 FORT WOR	351 HORDS CREEK	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	26 FORT WOR	354 LAVON	8	149	700112	790723	7	66	720517	790723	7	47	740308	790723

INVENTORY OF TOTAL-P, CHL-A, & SECCHI DATA (POOL STATIONS)

DIVISION	DISTRICT	PROJECT	TOTAL P NSTA	TOTAL P NOBS	TOTAL P DFIRST	TOTAL P DLAST	CHLOROPHYLL-A NSTA	CHLOROPHYLL-A NOBS	CHLOROPHYLL-A DFIRST	CHLOROPHYLL-A DLAST	SECCHI DEPTH NSTA	SECCHI DEPTH NOBS	SECCHI DEPTH DFIRST	SECCHI DEPTH DLAST
7 SWD	26 FORT WOR	355 LEWISVILLE(GARZA LIT	12	201	691201	790807	6	23	740311	741031	12	52	740311	790807
7 SWD	26 FORT WOR	356 NAVARRO MILLS	1	1	691202	691202	0	0	0	0	0	0	0	0
7 SWD	26 FORT WOR	358 PROCTOR	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	26 FORT WOR	359 SAM RAYBURN (MC GEE	16	486	651101	790815	8	74	720202	790620	15	83	740318	790815
7 SWD	26 FORT WOR	360 O C FISHER (SAN ANGE	1	10	740304	741029	1	4	740304	741029	1	4	740304	741029
7 SWD	26 FORT WOR	361 SOMERVILLE	9	129	700303	790803	3	11	740314	741106	9	37	740314	790803
7 SWD	26 FORT WOR	362 STILLHOUSE HOLLOW(LA	3	50	740313	741104	3	12	740313	741104	3	12	740313	741104
7 SWD	26 FORT WOR	363 WACO	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	26 FORT WOR	364 WHITNEY	10	210	740308	790810	4	16	740308	741104	10	48	740308	790810
7 SWD	26 FORT WOR	371 B A STEINHAGEN (TOWN	0	0	0	0	0	0	0	0	0	0	0	0
7 SWD	28 ALBUQUER	65 JOHN MARTIN (HASTY)	2	38	750722	780301	0	0	0	0	0	0	0	0
7 SWD	28 ALBUQUER	218 ABIQUIU	3	32	750501	780814	2	6	760525	780428	5	51	750501	781117
7 SWD	28 ALBUQUER	219 CONCHAS	7	97	750422	780627	6	20	750501	780627	10	65	741016	790215
7 SWD	28 ALBUQUER	407 TRINIDAD	0	0	0	0	0	0	0	0	0	0	0	0
8 MRD	29 KANSAS C	100 RATHBUN	12	72	710512	780817	6	18	740419	740924	10	31	710414	780817
8 MRD	29 KANSAS C	106 KANOPOLIS	9	54	690321	770809	8	17	740412	770809	3	13	710429	741001
8 MRD	29 KANSAS C	108 MILFORD	10	89	690325	770913	4	12	740411	741003	6	22	710421	770913
8 MRD	29 KANSAS C	109 MELVERN	10	89	730604	760909	3	9	740412	741001	3	9	740412	741001
8 MRD	29 KANSAS C	110 PERRY	13	143	670330	750711	5	14	740412	741004	13	40	690616	741004
8 MRD	29 KANSAS C	111 POMONA	17	101	690223	780731	13	76	740411	780731	6	22	710408	780510
8 MRD	29 KANSAS C	113 TUTTLE CREEK	9	62	690422	770914	3	9	740411	741002	5	20	710422	770914
8 MRD	29 KANSAS C	114 WILSON	10	162	680217	770901	3	9	740412	741001	4	19	710428	741001
8 MRD	29 KANSAS C	194 POMME DE TERRE	16	140	680429	790802	5	14	740408	741008	15	31	710727	790802
8 MRD	29 KANSAS C	195 STOCKTON	19	203	710407	760624	5	15	740408	741008	8	25	710407	741008
8 MRD	29 KANSAS C	207 HARLAN COUNTY	8	75	690402	750731	3	9	740416	740930	4	18	710427	740930
8 MRD	30 OMAHA	64 CHERRY CREEK	7	49	750507	780809	3	9	750507	751009	7	23	750507	770713
8 MRD	30 OMAHA	203 FORT PECK	3	90	680508	780821	0	0	0	0	2	27	760610	781005
8 MRD	30 OMAHA	208 OLIVE CREEK	2	11	741008	770720	0	0	0	0	1	9	760506	781018
8 MRD	30 OMAHA	209 BLUESTEM	3	21	730424	770830	0	0	0	0	2	19	760504	781017
8 MRD	30 OMAHA	210 WAGON TRAIN	3	24	740523	780418	0	0	0	0	2	16	760520	781017
8 MRD	30 OMAHA	211 STAGECOACH	3	15	740925	770720	0	0	0	0	2	7	760513	781017
8 MRD	30 OMAHA	212 YANKEE HILL	4	16	730425	770707	0	0	0	0	3	11	760505	781103
8 MRD	30 OMAHA	213 CONESTOGA	2	21	740916	770830	0	0	0	0	1	13	760506	781018
8 MRD	30 OMAHA	214 TWIN	2	16	710728	770706	0	0	0	0	2	17	760430	781103
8 MRD	30 OMAHA	215 PAWNEE	5	36	720412	770831	2	6	740417	740926	4	21	740417	781018
8 MRD	30 OMAHA	216 HOLMES PARK	4	21	740917	770707	0	0	0	0	3	16	760518	781102
8 MRD	30 OMAHA	217 BRANCHED OAK	7	46	740417	770831	3	9	740417	740926	6	28	740417	781102
8 MRD	30 OMAHA	234 BOWMAN-HALEY	4	86	710517	770811	0	0	0	0	3	12	760602	781006
8 MRD	30 OMAHA	235 SAKAKAWEA(GARRISON)	16	257	650104	781019	10	30	740430	740917	13	54	740430	781019
8 MRD	30 OMAHA	331 SHARPE (BIG BEND)	2	31	680520	780816	0	0	0	0	1	15	760414	781011
8 MRD	30 OMAHA	332 COLD BROOK	1	45	710619	770706	0	0	0	0	1	6	760721	770706
8 MRD	30 OMAHA	334 FRANCIS CASE (FT RAN	4	58	680508	780817	0	0	0	0	2	26	760413	781011
8 MRD	30 OMAHA	335 LEWIS AND CLARKE (GA	2	25	680501	770819	0	0	0	0	1	16	760412	781010

INVENTORY OF TOTAL-P, CHL-A, & SECCHI DATA (POOL STATIONS)

DIVISION	DISTRICT	PROJECT	TOTAL P NSTA	TOTAL P NOBS	TOTAL P DFIRST	TOTAL P DLAST	CHLOROPHYLL-A NSTA	CHLOROPHYLL-A NOBS	CHLOROPHYLL-A DFIRST	CHLOROPHYLL-A DLAST	SECCHI DEPTH NSTA	SECCHI DEPTH NOBS	SECCHI DEPTH DFIRST	SECCHI DEPTH DLAST
8 MRD	30 OMAHA	336 OAHE	5	181	680515	781109	0	0	0	0	3	15	760415	781012
8 MRD	30 OMAHA	415 CHATFIELD	2	18	710901	780809	0	0	0	0	2	11	750926	780809
9 NPD	31 WALLA WA	77 DWORSHAK	5	113	750407	750911	5	15	750407	750911	5	15	750407	750911
9 NPD	31 WALLA WA	78 LUCKY PEAK	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	31 WALLA WA	79 RIRIE	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	31 WALLA WA	379 ICE HARBOR	6	110	650104	750730	0	0	0	0	5	6	750730	750826
9 NPD	32 SEATTLE	80 ALBENI FALLS (PEND O	2	68	740619	760616	2	66	740619	760616	0	0	0	0
9 NPD	32 SEATTLE	204 KOOKANUSA(LIBBY)	11	878	671011	781025	10	497	740611	780509	6	14	750602	750905
9 NPD	32 SEATTLE	377 RUFUS WOODS (CHIEF J	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	32 S[illegible]TLE	384 MUD MOUNTAIN	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	3[illegible]E	385 WYNOOCHEE	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	[illegible]E	386 HOWARD A HANSON	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	[illegible] PORTLAND	288 BLUE RIVER	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	289 BONNEVILLE	2	113	650407	760927	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	290 COTTAGE GROVE	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	291 COUGAR	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	292 CELILO (DALLES)	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	293 DETROIT	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	294 DEXTER	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	295 DORENA	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	296 FALL CREEK	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	297 FERN RIDGE	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	298 FOSTER	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	299 GREEN PETER	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	300 HILLS CREEK	2	39	750328	751030	2	6	750328	751030	2	5	750328	751030
9 NPD	33 PORTLAND	301 JOHN DAY (UMATILLA)	0	0	0	0	0	0	C	0	0	0	0	0
9 NPD	33 PORTLAND	302 LOOKOUT POINT	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	304 LOST CREEK	0	0	0	0	0	0	0	0	0	0	0	0
9 NPD	33 PORTLAND	305 BIG CLIFF	0	0	0	0	0	0	0	0	0	0	0	0
10 SPD	34 SACRAMEN	24 BLACK BUTTE	1	28	780524	791018	0	0	0	0	0	0	0	0
10 SPD	34 SACRAMEN	26 ENGLEBRIGHT	0	0	0	0	0	0	0	0	0	0	0	0
10 SPD	34 SACRAMEN	28 ISABELLA	5	14	770602	790710	0	0	0	0	1	1	790710	790710
10 SPD	34 SACRAMEN	30 MARTIS CREEK	1	15	730816	790523	0	0	0	0	0	0	0	0
10 SPD	34 SACRAMEN	32 NEW HOGAN	4	4	711102	770421	0	0	0	0	0	0	0	0
10 SPD	34 SACRAMEN	33 PINE FLAT	1	1	771018	771018	0	0	0	0	0	0	0	0
10 SPD	34 SACRAMEN	36 SUCCESS	0	0	0	0	0	0	0	0	0	0	0	0
10 SPD	34 SACRAMEN	37 KAWEAH (TERMINUS)	1	1	770920	770920	0	0	0	0	0	0	0	0
10 SPD	34 SACRAMEN	41 FOLSOM	10	441	710413	790808	0	0	0	0	6	187	680709	791017
10 SPD	34 SACRAMEN	43 NEW BULLARDS BAR	0	0	0	0	0	0	0	0	0	0	0	0
10 SPD	34 SACRAMEN	44 CAMANCHE	0	0	0	0	0	0	0	0	0	0	0	0
10 SPD	34 SACRAMEN	47 CHERRY VALLEY	2	4	761026	770714	0	0	0	0	0	0	0	0
10 SPD	34 SACRAMEN	48 NEW DON PEDRO	8	117	750311	790814	5	14	750311	751113	5	15	750311	751113

INVENTORY OF TOTAL-P, CHL-A, & SECCHI DATA (POOL STATIONS)

DIVISION	DISTRICT	PROJECT	TOTAL P NSTA	TOTAL P NOBS	TOTAL P DFIRST	TOTAL P DLAST	CHLOROPHYLL-A NSTA	CHLOROPHYLL-A NOBS	CHLOROPHYLL-A DFIRST	CHLOROPHYLL-A DLAST	SECCHI DEPTH NSTA	SECCHI DEPTH NOBS	SECCHI DEPTH DFIRST	SECCHI DEPTH DLAST
10 SPD	34 SACRAMEN	51 MCCLURE (NEW EXCHEQU	7	26	750710	770913	0	0	0	0	1	6	761109	770809
10 SPD	34 SACRAMEN	54 MILLERTON (FRIANT)	6	58	770616	790821	0	0	0	0	3	9	780627	790821
10 SPD	35 SAN FRAN	29 MENDOCINO	4	55	750312	780606	3	7	750312	751111	2	4	750312	750626
10 SPD	35 SAN FRAN	39 SANTA MARGARITA (SAL	3	51	750310	751112	3	9	750310	751112	3	3	750625	750625
10 SPD	36 LOS ANGE	9 ALAMO	0	0	0	0	0	0	0	0	0	0	0	0
10 SPD	36 LOS ANGE	27 HANSEN	0	0	0	0	0	0	0	0	0	0	0	0

INVENTORY OF TOTAL-P, CHL-A, & SECCHI DATA (POOL STATIONS)
*** DISTRICT TOTALS ***

DISTRICT	TOTAL PROJ	TOTAL P NSTA	TOTAL P NOBS	TOTAL P DFIRST	TOTAL P DLAST	CHLOROPHYLL-A NSTA	CHLOROPHYLL-A NOBS	CHLOROPHYLL-A DFIRST	CHLOROPHYLL-A DLAST	SECCHI DEPTH NSTA	SECCHI DEPTH NOBS	SECCHI DEPTH DFIRST	SECCHI DEPTH DLAST
1 NEW ENGLAND	22	29	382	710607	780831	0	0	0	0	0	0	0	0
2 NEW YORK	3	3	24	720602	790501	2	5	720602	721005	5	9	680711	790501
3 PHILADELPHIA	3	9	96	720510	731205	6	16	720510	731004	3	9	730417	731004
4 BALTIMORE	9	9	102	720831	760721	8	47	720831	760721	8	20	730413	740919
5 NORFOLK	0	0	0	0	0	0	0	0	0	0	0	0	0
6 WILMINGTON	3	25	597	650104	790925	15	52	730407	790730	24	259	730407	790809
7 CHARLESTON	1	0	0	0	0	0	0	0	0	0	0	0	0
8 SAVANNAH	2	27	540	710826	800110	23	69	730623	731113	24	69	730623	790517
9 JACKSONVILLE	1	9	153	700507	770719	2	4	750513	750812	4	14	750224	751113
10 MOBILE	17	80	1259	721025	791016	41	141	730607	771208	84	356	730607	790213
11 BUFFALO	1	0	0	0	0	0	0	0	0	0	0	0	0
12 DETROIT	0	0	0	0	0	0	0	0	0	0	0	0	0
13 CHICAGO	0	0	0	0	0	0	0	0	0	0	0	0	0
14 ROCK ISLAND	2	4	129	680412	761130	6	10	740418	740924	6	10	740418	740924
15 ST PAUL	13	26	476	670713	791001	22	167	720702	790806	24	104	720702	790806
16 PITTSBURGH	14	83	1598	660105	780726	22	183	730420	741024	91	475	730420	770829
17 HUNTINGTON	28	119	2344	730213	791101	35	97	730403	731010	46	117	730403	780808
18 LOUISVILLE	15	55	2418	701012	780420	62	460	711024	770927	77	1792	710602	771129
19 NASHVILLE	7	91	1760	710707	790821	71	601	730516	781012	89	778	710225	781012
20 ST LOUIS	3	15	153	711020	790626	13	39	730508	731019	13	39	730508	731019
21 MEMPHIS	1	4	45	740409	741008	4	12	740409	741008	4	12	740409	741008
22 VICKSBURG	7	26	360	730612	760602	25	77	720505	741018	25	77	720505	741018
23 NEW ORLEANS	4	28	378	691204	790815	14	56	740322	741111	24	110	740322	790815
24 LITTLE ROCK	10	82	1657	670906	791204	41	157	740327	741018	97	778	740327	791105
25 TULSA	35	108	1295	650301	791204	65	208	740304	741031	66	212	740304	790829
26 FORT WORTH	17	77	1508	651101	790815	40	238	720202	790723	71	345	740304	790815
27 GALVESTON	0	0	0	0	0	0	0	0	0	0	0	0	0
28 ALBUQUERQUE	4	12	167	750422	780814	8	26	750501	780627	15	116	741016	790215
29 KANSAS CITY	11	133	1190	670330	790802	58	202	740408	780731	77	250	690616	790802
30 OMAHA	20	81	1067	650104	781109	18	54	740417	751009	61	362	740417	781103
31 WALLA WALLA	4	11	223	650104	750911	5	15	750407	750911	10	21	750407	750911
32 SEATTLE	6	13	946	671011	781025	12	563	740611	780509	6	14	750602	750905
33 PORTLAND	17	4	152	650407	760927	2	6	750328	751030	2	5	750328	751030
34 SACRAMENTO	15	46	709	710412	791018	5	14	750311	751113	16	218	680709	791017
35 SAN FRANCISC	2	7	106	750310	780608	6	16	750310	751112	5	7	750312	750626
36 LOS ANGELES	2	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	299	1218	21834	650104	800110	631	3535	711024	790806	977	8578	680709	791105

INVENTORY OF TOTAL-P, CHL-A, & SECCHI DATA (POOL STATIONS)
*** NUMBER OF PROJECTS WITH ONE OR MORE ENTRY BY DISTRICT ***

	TOTAL	TOTAL P				CHLOROPHYLL-A				SECCHI DEPTH			
DISTRICT	PROJ	NSTA	NOBS	DFIRST	DLAST	NSTA	NOBS	DFIRST	DLAST	NSTA	NOBS	DFIRST	DLAST
1 NEW ENGLAND	22	12	12	12	12	0	0	0	0	0	0	0	0
2 NEW YORK	3	1	1	1	1	1	1	1	1	2	2	2	2
3 PHILADELPHIA	3	2	2	2	2	2	2	2	2	1	1	1	1
4 BALTIMORE	9	3	3	3	3	2	2	2	2	3	3	3	3
5 NORFOLK	0	0	0	0	0	0	0	0	0	0	0	0	0
6 WILMINGTON	3	1	1	1	1	1	1	1	1	1	1	1	1
7 CHARLESTON	1	0	0	0	0	0	0	0	0	0	0	0	0
8 SAVANNAH	2	2	2	2	2	2	2	2	2	2	2	2	2
9 JACKSONVILLE	1	1	1	1	1	1	1	1	1	1	1	1	1
10 MOBILE	17	13	13	13	13	9	9	9	9	13	13	13	13
11 BUFFALO	1	0	0	0	0	0	0	0	0	0	0	0	0
12 DETROIT	0	0	0	0	0	0	0	0	0	0	0	0	0
13 CHICAGO	0	0	0	0	0	0	0	0	0	0	0	0	0
14 ROCK ISLAND	2	1	1	1	1	1	1	1	1	1	1	1	1
15 ST PAUL	13	5	5	5	5	5	5	5	5	5	5	5	5
16 PITTSBURGH	14	14	14	14	14	6	6	6	6	14	14	14	14
17 HUNTINGTON	28	25	25	25	25	11	11	11	11	17	17	17	17
18 LOUISVILLE	15	15	15	15	15	15	15	15	15	15	15	15	15
19 NASHVILLE	7	7	7	7	7	7	7	7	7	7	7	7	7
20 ST LOUIS	3	3	3	3	3	3	3	3	3	3	3	3	3
21 MEMPHIS	1	1	1	1	1	1	1	1	1	1	1	1	1
22 VICKSBURG	7	6	6	6	6	6	6	6	6	6	6	6	6
23 NEW ORLEANS	4	3	3	3	3	3	3	3	3	3	3	3	3
24 LITTLE ROCK	10	10	10	10	10	8	8	8	8	8	8	8	8
25 TULSA	35	20	20	20	20	15	15	15	15	15	15	15	15
26 FORT WORTH	17	13	13	13	13	9	9	9	9	9	9	9	9
27 GALVESTON	0	0	0	0	0	0	0	0	0	0	0	0	0
28 ALBUQUERQUE	4	3	3	3	3	2	2	2	2	2	2	2	2
29 KANSAS CITY	11	11	11	11	11	11	11	11	11	11	11	11	11
30 OMAHA	20	20	20	20	20	4	4	4	4	20	20	20	20
31 WALLA WALLA	4	2	2	2	2	1	1	1	1	2	2	2	2
32 SEATTLE	6	2	2	2	2	2	2	2	2	1	1	1	1
33 PORTLAND	17	2	2	2	2	1	1	1	1	1	1	1	1
34 SACRAMENTO	15	11	11	11	11	1	1	1	1	5	5	5	5
35 SAN FRANCISC	2	2	2	2		2	2	2	2	2	2	2	2
36 LOS ANGELES	2	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	299	211	211	211	211	132	132	132	132	171	171	171	171

In accordance with letter from DAEN-RDC, DAEN-ASI dated 22 July 1977, Subject: Facsimile Catalog Cards for Laboratory Technical Publications, a facsimile catalog card in Library of Congress MARC format is reproduced below.

Walker, William W.
Empirical methods for predicting eutrophication in impoundments : Report 1 : Phase I, data base development / by William W. Walker, Jr. (Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station). -- Vicksburg, Miss. : The Station ; Springfield, Va. : available from NTIS, [1981].
153, 55 p. : ill. ; 27 cm. -- (Technical report / U.S. Army Engineer Waterways Experiment Station ; E-81-9).
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"Monitored by Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station."
Bibliography: p. 151-153.

1. Computer programs. 2. Eutrophication. 3. Mathematical models. 4. Prediction theory. 5. Reservoirs.

Walker, William W.
Empirical methods for predicting eutrophication : ... 1981.
(Card 2)

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TA7.W34 no.E-81-9

AD-A101 553 EMPIRICAL METHODS FOR PREDICTING EUTROPHICATION IN IMPOUNDMENTS REPORT 1..(U) WALKER (WILLIAM W) JR CONCORD MA W W WALKER MAY 81 WES-TR-E-81-9-1 4/4

UNCLASSIFIED DACW39-78-C-0053 F/G 13/2 NL

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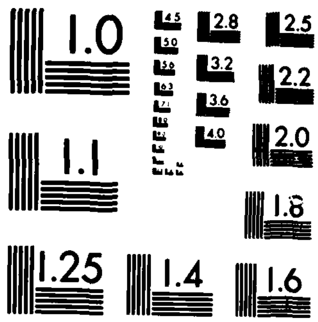

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

SUPPLEMENTARY

INFORMATION

DEPARTMENT OF THE ARMY
WATERWAYS EXPERIMENT STATION, CORPS OF ENGINEERS
P.O. BOX 631
VICKSBURG, MISSISSIPPI 39180

AD-A101 553

REPLY TO
ATTENTION OF

WESEV-I

11 March 1985

Errata Sheet

No. 2

EMPIRICAL METHODS FOR PREDICTING
EUTROPHICATION IN IMPOUNDMENTS

Report 1

PHASE I: DATA BASE DEVELOPMENT

Technical Report E-81-9

May 1981

Page 139, Equations 33 and 34: change $(L_k - \hat{L}_{jk})$ to $(\hat{L}_{jk} - L_k)$.

END

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