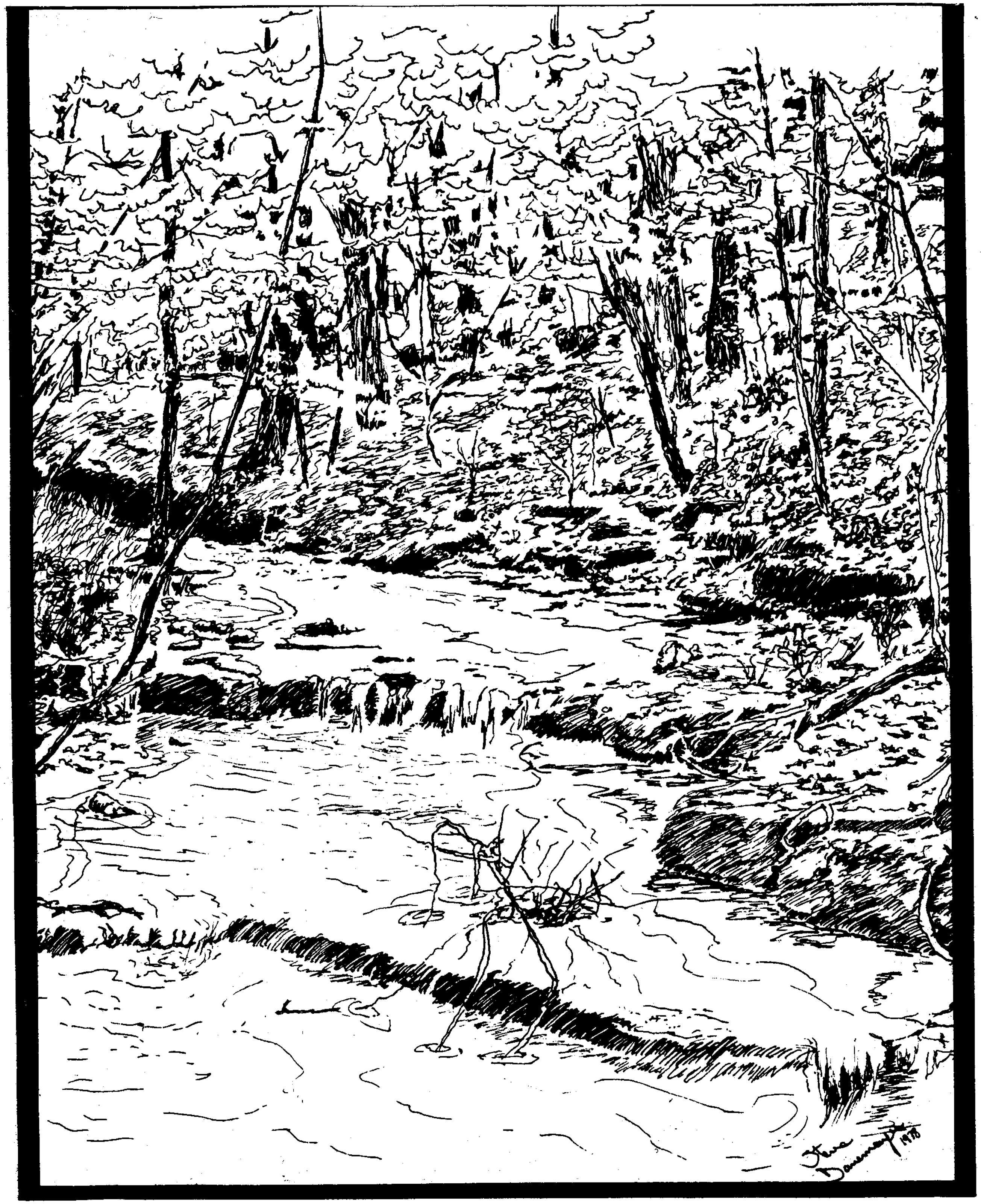

1978

KENTUCKY

305(b)

REPORT TO CONGRESS

ON

Water Quality

1978

Kentucky Water Quality

305 (b)

Report to Congress

COMMONWEALTH OF KENTUCKY
DEPARTMENT FOR NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER QUALITY

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CHAPTER ONE: INTRODUCTION AND SUMMARY

INTRODUCTION

This report is an inventory of Kentucky's water quality conditions. It fulfills reporting requirements for state water quality management agencies set forth in Section 305(b) of PL 94-217 (the 1977 amendments to PL 92-500). From this year forward state water quality reports will become biennial.

This report is designed to present an overview of the state's water quality in a simple narrative form supplemented by tabulated data. Data and explanations are organized by specific problems, river basins, lakes, and non-point sources.

The appendix contains more detailed information and the data source for readers who wish to obtain specific information about a given area, time period, or particular water quality indicator. The reader is advised that it is difficult to reach specific conclusions from a report of this nature.

SUMMARY

Kentucky, with more miles of streams than any other state except Alaska, has always been concerned with the quality of its water resources as they affect the health and economic welfare of its citiziens. Data collection and analysis to measure and quantify water quality is performed by the United States Geological Survey, the U. S. Army Corps of Engineers, the Ohio River Valley Sanitation Commission (ORSANCO), the Kentucky Division of Water Quality, and the EPA Water Quality Index Process.

The information collected to date indicates that Kentucky's waters are generally of acceptable quality. There are exceptions to this judgement and these are summarized below.

Continual Water Quality Problems

- The health related indicator organism fecal coliform bacteria is found in streams below populated areas including cities with combined sewers, urban runoff problems and smaller communities. These are shown in Figure 4, Chapter Two.

- Acid mine drainage in the Tradewater and Green River basins. These are indicated by Figure 5 and 6 in Chapter Two.

Intermittent Water Quality Problems

- Dissolved Oxygen depletion below point source loads. Table 5, Chapter Two shows the relative impact during design conditions. These conditions occur between one week and four months in any given year depending on the character of the stream and wasteload.
- Nonpoint sources are of an intermittent nature. The statewater Water Quality Management Plan is addressing this problem. Chapter Five is a status review of this effort.

Unpredictable Water Quality Problems

- Chapter Two summarizes Kentucky's experience with spills which affect water quality. The control and prevention of spills requires more attention each year as economic expansion occurs without accompanying measures to protect the environment.

Although Kentucky has the largest number of streams, the largest number of point sources and the greatest potential nonpoint source problem in Region IV EPA, the state ranks last in federal funding among its regional counterparts.

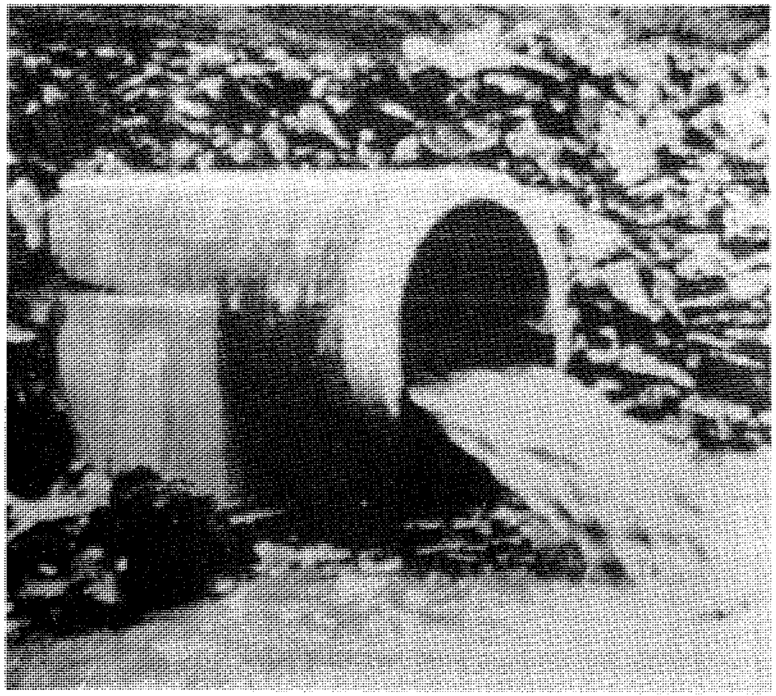
The state has therefore directed its efforts toward construction grants administration, construction approval of all wastewater treatment facilities, spill response, minimal surveillance and enforcement, and minimal monitoring of its streams. The state has initiated a monitoring project to study the total water quality influences within its stream basins.

The overall program within Kentucky's Division of Water Quality is challenging and will require the full support of EPA in order to achieve its objectives.

CHAPTER TWO: STATEWIDE ANALYSIS OF WATER QUALITY

This section is an assessment of Kentucky's major water quality problems and a description of efforts by the Division of Water Quality, Department for Natural Resources and Environmental Protection, to prevent and reduce water pollution.

Accidental spills and projected waste loads present the greatest potential for water pollution in Kentucky. Nonpoint sources of pollution, discussed in Chapter Five of this report, may prove to be a significant problem in some areas of the state. Additional problem assessment and stream monitoring are necessary before a precise calculation of nonpoint sources is possible.



SOURCE OF DATA

The information which has been compiled and is presented is an update of the 1977 Kentucky Water Quality Report to Congress. This report consists of a re-compilation of water quality data for periods prior to January 1, 1977 and data collected during calendar year 1977. These water quality data were collected and reported to "STORET" by the U. S. Geological Survey. The

USGS operates a number of monitoring stations in Kentucky (Figure 1). Data generated at these stations are summarized in tabular form in the Appendix.

Complementing the USGS data gathering process, the Kentucky Division of Water Quality maintains a network of bacteriological and trace metal monitoring stations (Figure 2 and 3). Data from these stations are tabulated in the Appendix.

Information concerning point source discharges was obtained from the Section 303(e) continuing planning process. The status of municipal construction grants has been updated. The U. S. Army Corps of Engineers provided data for revising the summary chapter on lakes. The Ohio River Sanitation Commission prepared the assessment of the Ohio River main stem.

The Environmental Protection Agency has initiated an effort to represent overall water quality for a stream by combining several weighted parameters along with spatial and temporal variations in a computerized graphic display. This analysis, called the Water Quality Index Process, has been applied to the Kentucky, Green, and Cumberland Rivers.

While the preliminary analysis suggests a consistency with previously collected data for individual parameters, the existence of large data gaps and a limited time frame prohibit any conclusive interpretation. In the future, the Water Quality Index Process will become increasingly important as a tool for assessment of water quality. A complete analysis of the Index as used in Kentucky is presented in the Appendix.

WATER QUALITY STANDARDS

Early in 1977, representatives from industry, public environmental groups, and universities were appointed by the Secretary of the Department for Natural Resources and Environmental Protection

Figure 1

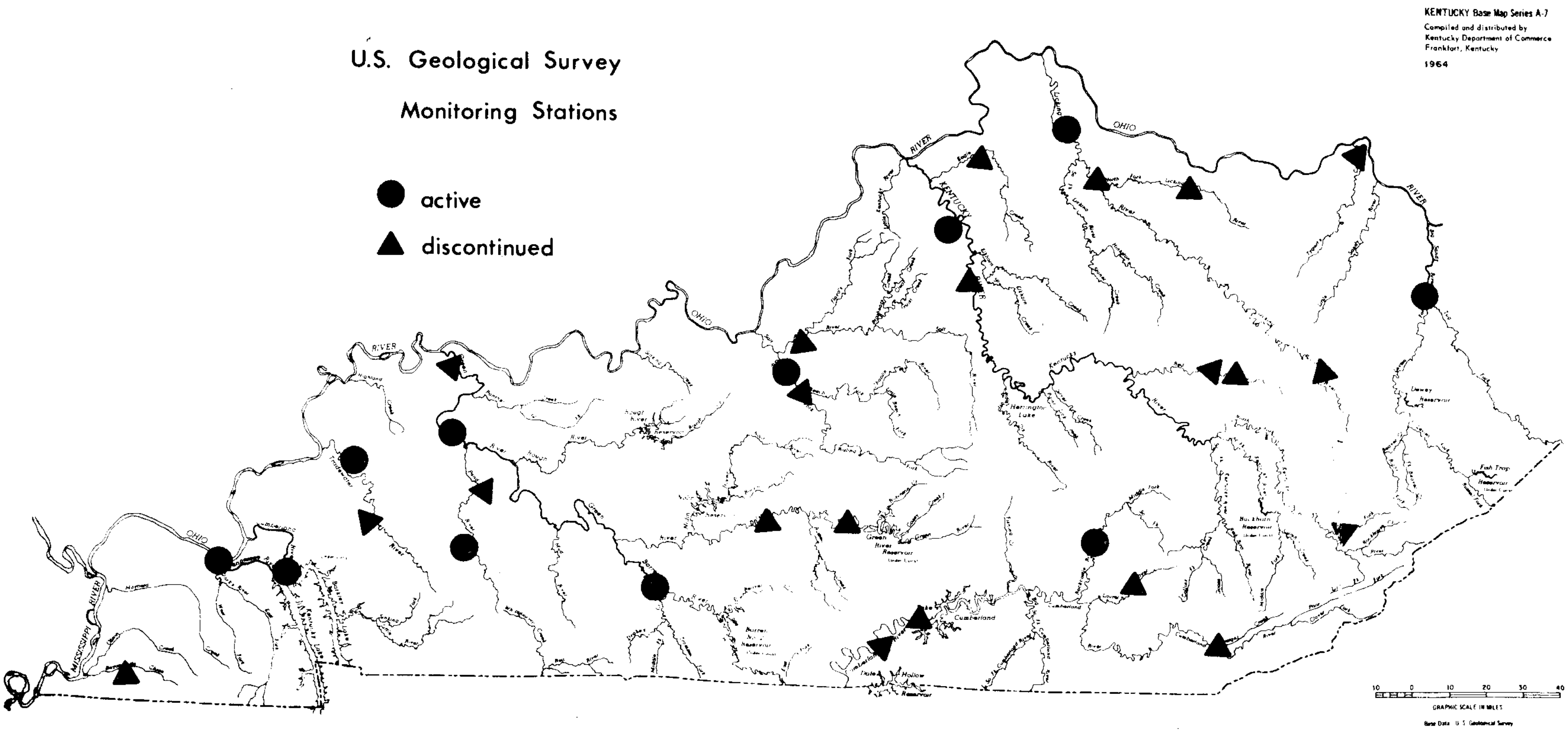

U.S. Geological Survey
Monitoring Stations
active
discontinued
KENTUCKY Base Map Series A-7
Compiled and distributed by
Kentucky Department of Commerce
Frankfort, Kentucky
1964
OHIO
RIVER
KENTUCKY
MISSISSIPPI
GRAPHIC SCALE IN MILES

Figure 2

Division of Water Quality

Bacteriological Monitoring Stations

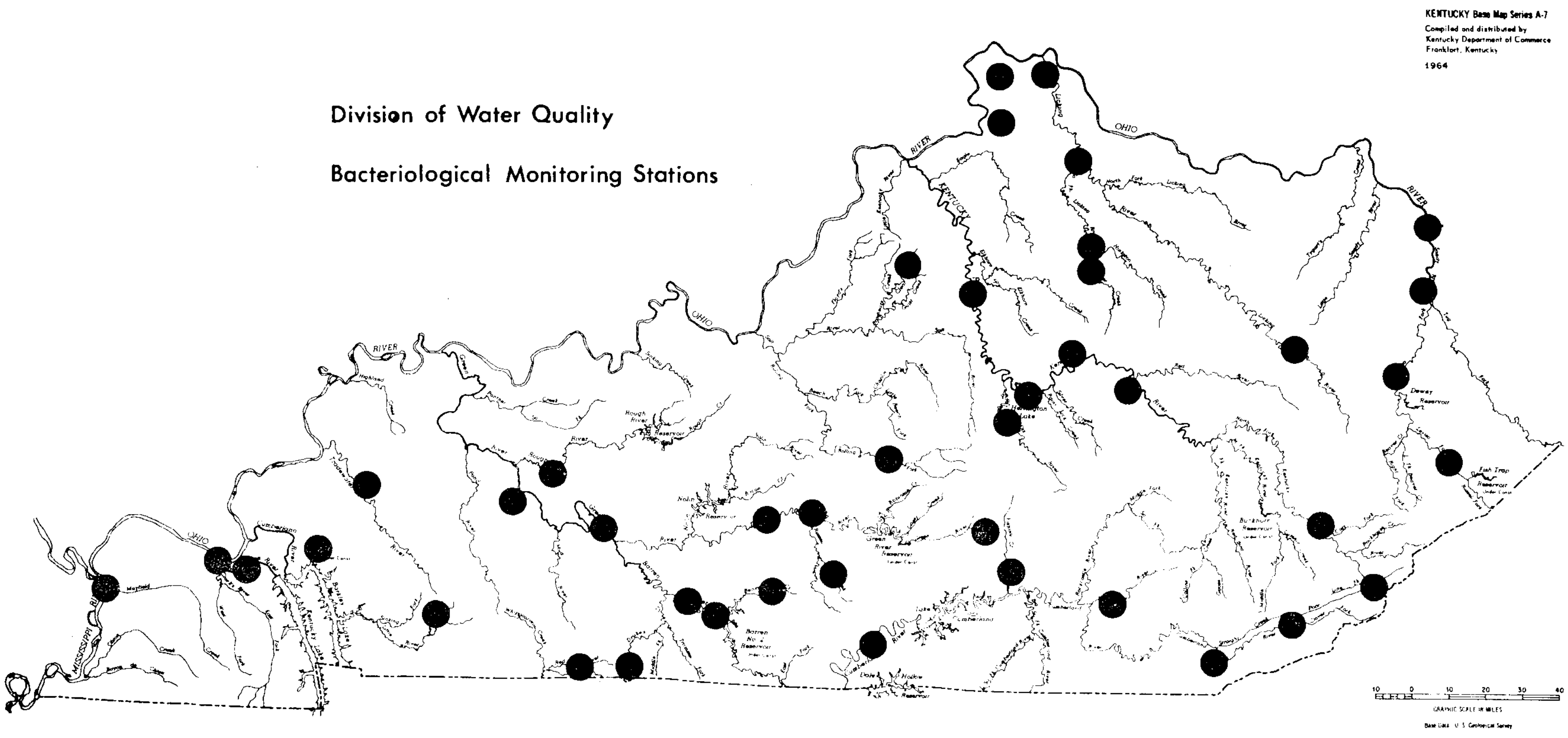
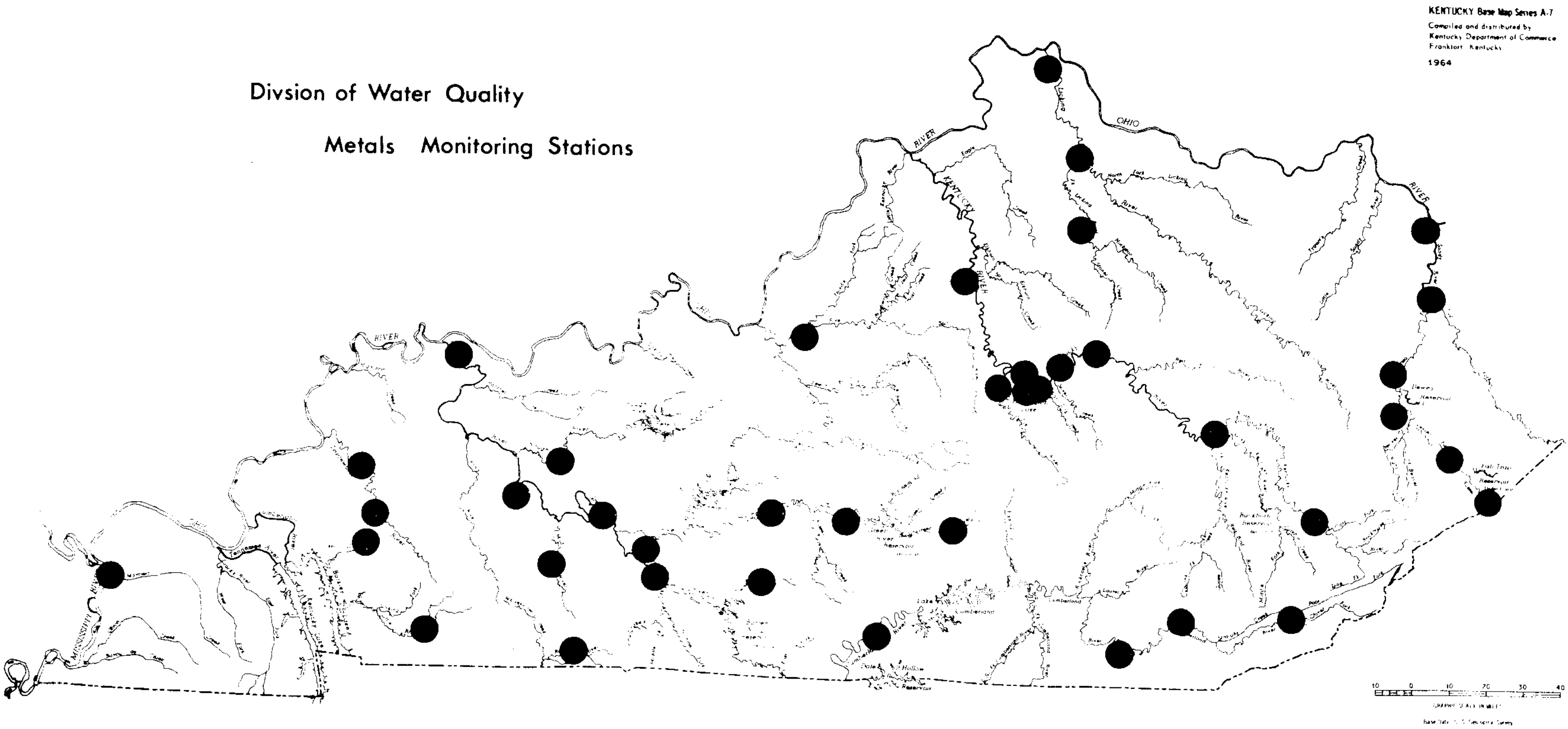


Figure 3


Divsion of Water Quality
Metals Monitoring Stations
KENTUCKY Base Map Series A-7
Compiled and distributed by
Kentucky Department of Commerce
Frankfort Kentucky
1964
OHIO
RIVER

to form the Water Quality Steering Committee which is completing the most comprehensive surface water regulations ever assembled in Kentucky. This revision should be finished by the end of 1978. Kentucky Regulation 401 KAR 5:025 is still in effect and a full copy is included in the Appendix. The following is a summary of that regulation.

401 KAR 5:025 WATER QUALITY STANDARDS

Section 1. No person or group of persons shall violate any of the minimum standards set forth in the following sections.

Section 2. The following apply to all waters of Kentucky.

(1) Free from sludge forming materials.

(2) Free from floating debris.

(3) Free from odor causing materials.

(4) Free from toxic materials.

(5) All persons shall remove from their discharge materials listed in sub-sections (1) - (4).

Section 3. In addition to the minimum conditions in Section 2, the use classification in Sections 4 - 9 shall apply to all waters of Kentucky.

Section 4. The following criteria apply to surface water at the point of withdrawal for public water supply:

(1) Bacteria: Coliform count must be less than 5,000 per 100 ml for the monthly average, or in 20% of the samples, and not exceed 20,000 per 100 ml in more than 5% of the samples.

(2) Threshold odor number must be above 3.

(3) Dissolved solids must be less than 500 mg/l monthly average and never more than 750 mg/l at any time.

(4) Radioactive substances: Gross Beta - less than 1000 pCi/l, Strontium 90 - less than 10 pCi/l, Dissolved Alpha - 3 pCi/l.

(5) Chemical constituents shall not exceed the following concentrations:

Constituents	Concentrations, mg/l
Arsenic	0.05
Barium	1.0
Cadmium	0.01
Chromium (hexavalent)	0.05
Cyanide	0.025
Fluoride	1.0
Lead	0.05
Selenium	0.01
Silver	0.05

Section 5. Industrial Water Supply

(1) pH between 5.0 and 9.0.

(2) Temperature less than 95°F.

(3) Dissolved solids less than 750 mg/l as a monthly average and never exceeding 1000 mg/l.

Section 6. Aquatic Life

(1) Dissolved Oxygen shall average at least 5.0 mg/l per calendar day and never go below 4.0 mg/l.

(2) pH between 6.0 and 9.0.

(3) Temperature less than 89°F.

(4) Toxics shall not exceed one-tenth of the ninety-six hour median tolerance limit of fish.

Section 7. Put and Take Trout Streams

(1) Dissolved oxygen never less than 6.0 mg/l and never less than 7.0 mg/l in spawning areas.

(2) Stream temperature shall not be increased artificially.

Section 8. Recreation

Total coliform should average less than 1000 per 100 ml monthly and not exceed 2400/100 ml on any day. Fecal coliform should not exceed 200/100 ml as a monthly geometric mean, nor exceed 400/100 ml in 10% of the samples from May through October. The rest of the year fecal coliform shall not exceed 1000/100 ml monthly average nor exceed 2000/100 ml in more than 10% of the samples.

Section 9. Agricultural - No additional criteria.

Section 10. If there is more than one use then the more stringent standards apply.

PERMITTING AND ENFORCEMENT

A dual system of permitting point source discharges is currently in effect. State operational permits are issued in accordance with the requirements of Kentucky Revised Statutes 224.033 (19) and 224.060. The state permitting system is independent of the National Pollution Discharge Elimination System (NPDES) presently managed by the U. S. Environmental Protection Agency, Region IV.

The permitting overlap will be eliminated when Kentucky assumes NPDES primacy. The 1978 General Assembly passed amendments to KRS 224 which provide the legal mechanism for Kentucky to accept NPDES responsibility. Both permitting programs contain identical effluent limitations, but are enforced by separate legal systems, one state and the other federal.

State enforcement action is initiated, informally, by the field inspector. If the field inspector cannot gain voluntary compliance, the violation is then referred to the field office chief and an informal conference is held. The case continues to the central office if resolution at the district level is not possible. The central office conducts an administrative conference to determine the nature and extent of the violation, and strives for resolution with an agreed order. Included is an assessed penalty which is usually less than the maximum fine allowed by KRS 224. Formal litigation is initiated if the informal process does not resolve the problem.

ACCIDENTAL SPILLS

Spills continue to be a major concern to Kentucky. During 1977 a total of 555 occurences were recorded of which 251 (45%) involved toxic substances. Drinking water, public health, wildlife, and livestock were affected by 64 (25%) of the toxic substance spills. Most of the thirty-nine industrial spills in the Big Sandy River Basin and the eight in the Upper Cumberland River Basin were directly related to coal mining operations, usually coal preparation plants. The upper reaches of the Kentucky River Basin experienced a few coal related spills, but most of the coal industry's spills occurred in the Big Sandy River and Upper Cumberland River Basins. The Ohio River Basin, consisting mostly of tributary drainage areas as well as the river itself, had a total of 173 (31%) occurrences of which 91 (53%) involved toxic substances. A ranking of the 10 basins by total occurrences is: (1) Ohio, 173 (31%); (2) Kentucky, 80 (14%); (3) Green, 74 (13%); (4) Big Sandy, 71 (12.9%); (5) Licking, 68 (12.25%); (6) Salt, 35 (6%); (7) Upper Cumberland, 32 (5.8%); (8) Tennessee, 17 (3.1%); (9) Mississippi, 4 (.72%); and (10) Lower Cumberland, 1 (.18%).

Common carriers accounted for 112 (20%) of the total spills, 99 of which (88%) involved toxic materials and 12 (12%) affecting drinking water, public health, wildlife and livestock. Trains accounted for 22 (19.6%) spills, trucks 34 (30.4%) and other common carriers (pipelines, barges, etc.) 56 (50%). Trains involved 20 (20.2%) toxic occurrences of which 7 (35%) had detrimental effects, trucks 32 (32.3%) with 3 (9.4%) detrimental, and other common carriers 47 (47.5%) with 2 (4.25%) detrimental.

Transportation of toxic materials and prevention of spills are of great concern to the Division of Water Quality. Several occurrences involving common carriers of toxic substances were of an extremely serious nature, causing citizens to be evacuated, water plants to be shut down, and farmlands to be altered. Tables 1 and 2 summarize the data on spills for each river basin in Kentucky.

Table 1

SPILL DATA

River Basin	Toxic	Non-Toxic	Drinking Water Effected	Public Health Effected	Livestock Effected	Wildlife Effected
Mississippi	1	3	9			1
Ohio	91	82		26	1	
Tennessee	10	7				
Lower Cumberland		1				
Upper Cumberland	8	24	2			
Salt	8	27				
Green	34	40	3	2		
Kentucky	41	39	5	4		
Licking	26	42	1	9	1	
Big Sandy	32	39				
TOTAL	251	304	20	41	2	1

Table 2

SPILL DATA

River Basin	Train	Truck	Other Carrier	Industrial	Sewage	Dumping	Other
Mississippi				2			2
Ohio	13	5	14	41	89	15	33
Tennessee		2	1	5	3	2	4
Lower Cumberland					1		
Upper Cumberland	1	2		8	15	4	4
Salt	1	3		3	25		3
Green	3	9	10	7	37	3	11
Kentucky	4	5	12	26	31	7	4
Licking	4	10	6	4	46	5	4
Big Sandy	3	1	15	39	2	4	7
TOTAL	29	37	58	135	249	40	72

PLAN REVIEW AND CONSTRUCTION GRANTS

The Division of Water Quality, Plan Review Section, reviews all non-municipal construction plans which have a sewage treatment facility to treat their wastes. The plans and specifications are reviewed to insure compliance with all applicable standards and regulations. The Construction Grants Section is responsible for reviewing grant applications under Section 201 of PL 92-500, municipal sewer extensions, and plans for municipal sewage treatment plants.

Table 3 is a summary by river basin of all wastewater dischargers currently permitted in Kentucky. Table 4 is a summary of the status of construction grants in Kentucky. Step 1 is the preliminary study (201 Facilities Plan) required before design of the facilities. Step 2 is the design phase, and Step 3 is the construction phase of facilities for the collection and treatment of wastewater.

STATEWIDE WATER QUALITY

The point source loads on streams which are predicted to deplete the dissolved oxygen below 5.0 mg/l are shown in Table 5. This table shows the effect of all treated effluents on streams in Kentucky in relation to the predicted dissolved oxygen content during design flow. The computer model on which these predictions were made was developed to determine waste load allocations for the 303(e) River Basin Water Quality Management Plan. The waste load is often a function of population. It is shown by this table that the municipalities in Kentucky contribute 35%, the industries contribute 7%, and small discharges contribute 58% of the organic point source loads which deplete oxygen in Kentucky streams.

Fecal coliform pollution is a statewide problem as shown in Figure 4. Fecal coliforms are directly related to sewage and are largely a function of population as is dissolved oxygen

Table 3

SUMMARY OF WASTEWATER DISCHARGERS

River Basin	Domestic	Industrial	Agricultural	Oil Field	Coal
Mississippi	35	11	15	0	0
Tennessee	77	9	10	0	0
Lower Cumberland	45	11	4	0	0
Upper Cumberland	200	8	0	0	8
Green	206	16	2	108	5
Salt	318	24	2	0	0
Kentucky	320	24	1	0	6
Licking	190	15	0	0	1
Big Sandy	163	10	0	0	11
Ohio (Minor tributary or direct)	395	54	1	3	2
--Tygarts Creek	10	0	0	0	0
--Tradewater	28	1	0	0	1
--Little Sandy	53	1	0	0	1
TOTAL	2040	184	35	111	35

Total Permitted Dischargers = 2,405

Table 4

SUMMARY OF GRANTS 1978

River Basin	Step I	Step 2	Step 3
Mississippi	8	1	0
Ohio	27	6	6
Tennessee	4	1	1
Lower Cumberland	10	1	0
Upper Cumberland	20	4	1
Green	27	8	5
Salt	12	4	3
Kentucky	27	5	4
Licking	13	3	5
Big Sandy	8	0	0
TOTAL	156	33	25

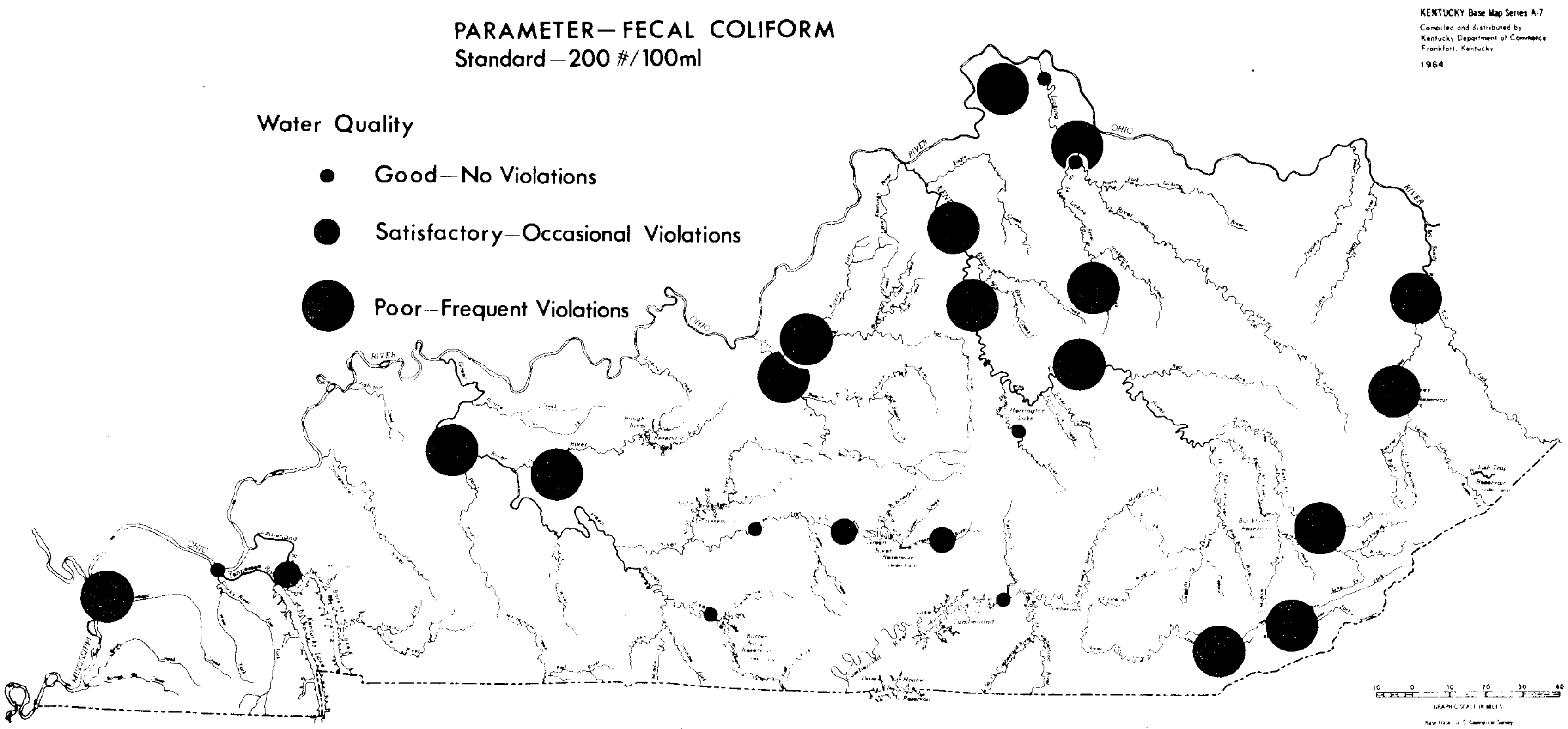
Table 5

POINT SOURCE LOADS* IN KENTUCKY STREAMS

River Basin	Stream Miles Studied	DISSOLVED OXYGEN PREDICTED LESS THAN 5.0 MG/L Total Miles	Municipal	Industrial	Other
Mississippi	275	84	13	26	45
Ohio	431	85	36	8	41
Tennessee	248	59	15	14	30
Lower Cumberland	360	62	40	0	22
Upper Cumberland	752	167	25	0	151
Green	1,670	214	173	6.8	34.5
Salt	596	160	61	8	91
Kentucky	868	145	119	0	26
Licking	1,000	384	89	46	249
Big Sandy	560	250	10	5	235
TOTAL	6,760	1,609	570	114	925

* 1975 Wasteload Allocation from 303(e) River Basin Plans. Facilities over 50,000 gpd.

Figure 4


PARAMETER— FECAL COLIFORM
Standard — 200 #/100ml
Water Quality
Good — No Violations
Satisfactory — Occasional Violations
Poor — Frequent Violations
KENTUCKY Base Map Series A-7
1964
OHIO
RIVER

demand. In addition, problems may occur where sewage is not collected and treated, or treatment is insufficient. The eastern part of the Commonwealth represents an area with limited collection of sewage and subsequent treatment. On-site systems have caused problems when they are not properly designed or managed.

Total dissolved solids (Figure 5) are not a severe problem. High values in the Tradewater and Pond Rivers indicate the intense level of strip mining in the Western Coal Field. Historically, the Green River and Licking River have had impacts from oil production and improper brine disposal. These have essentially been corrected by an intense reinjection program and depletion of the oil resource.

pH values (Figure 6) are in the normal range throughout most of the state. This is due to the buffering capacity of waters flowing over limestones. Acidic waters in the west, again, reflect the coal mining activities. Periodic low pH values in the eastern section are not reflected in Figure 6 but are discussed basin by basin in the following chapter.

Trace metals or "heavy metals" are summarized by lead (Figure 7), chromium (Figure 8), and arsenic (Figure 9). No area in the state has consistent violations of these elements. Periodic violations of lead have occurred and are discussed basin by basin in the next chapter.

Figure 5

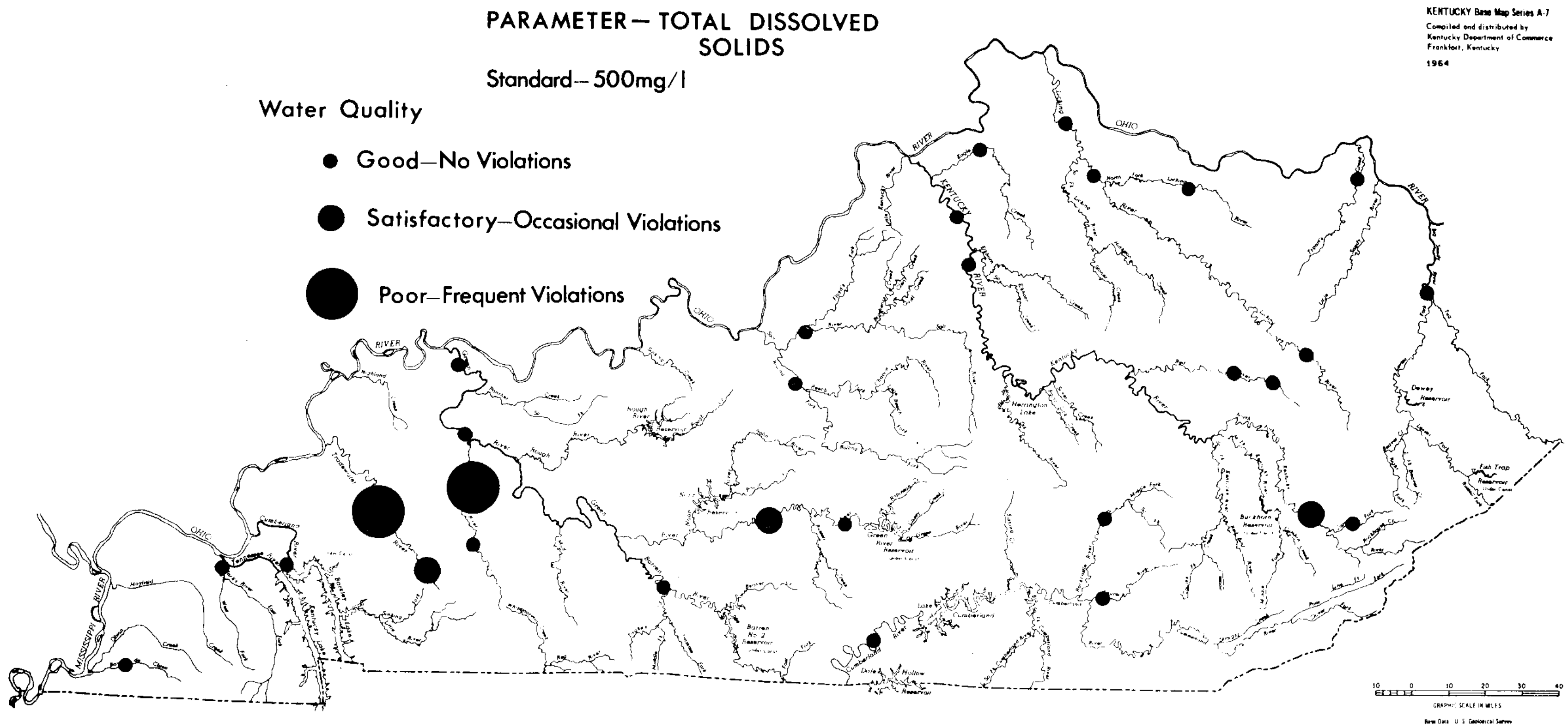

PARAMETER— TOTAL DISSOLVED SOLIDS
Standard—500mg/l
Water Quality
Good—No Violations
Satisfactory—Occasional Violations
Poor—Frequent Violations
KENTUCKY Base Map Series A-7
Compiled and distributed by Kentucky Department of Commerce Frankfort, Kentucky
1964
OHIO
RIVER
KENTUCKY
RIVER
MISSISSIPPI RIVER

Figure 6

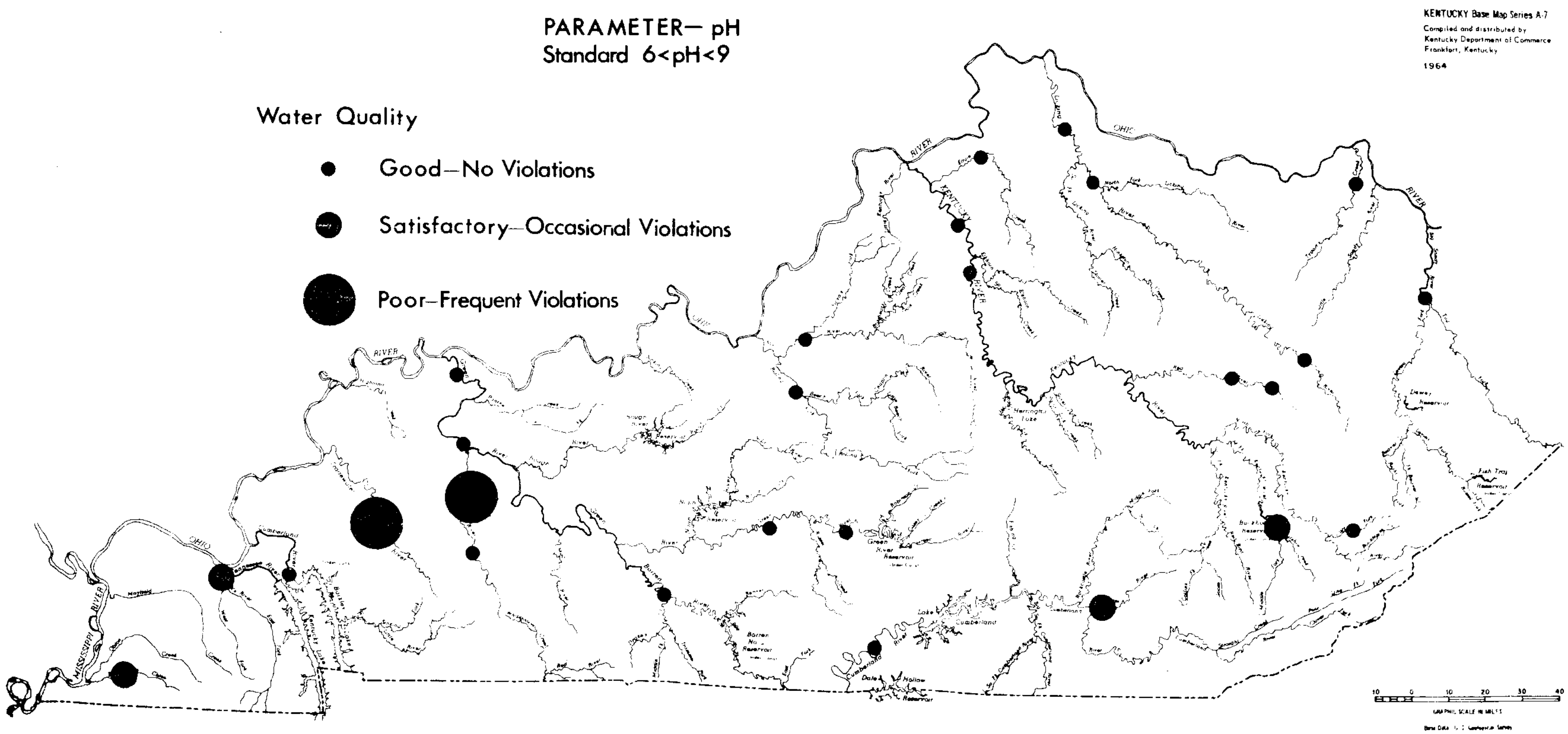

PARAMETER— pH
Standard 6<pH<9
Water Quality
Good—No Violations
Satisfactory—Occasional Violations
Poor—Frequent Violations
KENTUCKY Base Map Series A-7
Compiled and distributed by
Kentucky Department of Commerce
Frankfort, Kentucky
1964
OHIO RIVER
MISSISSIPPI RIVER
KENTUCKY RIVER

Figure 7

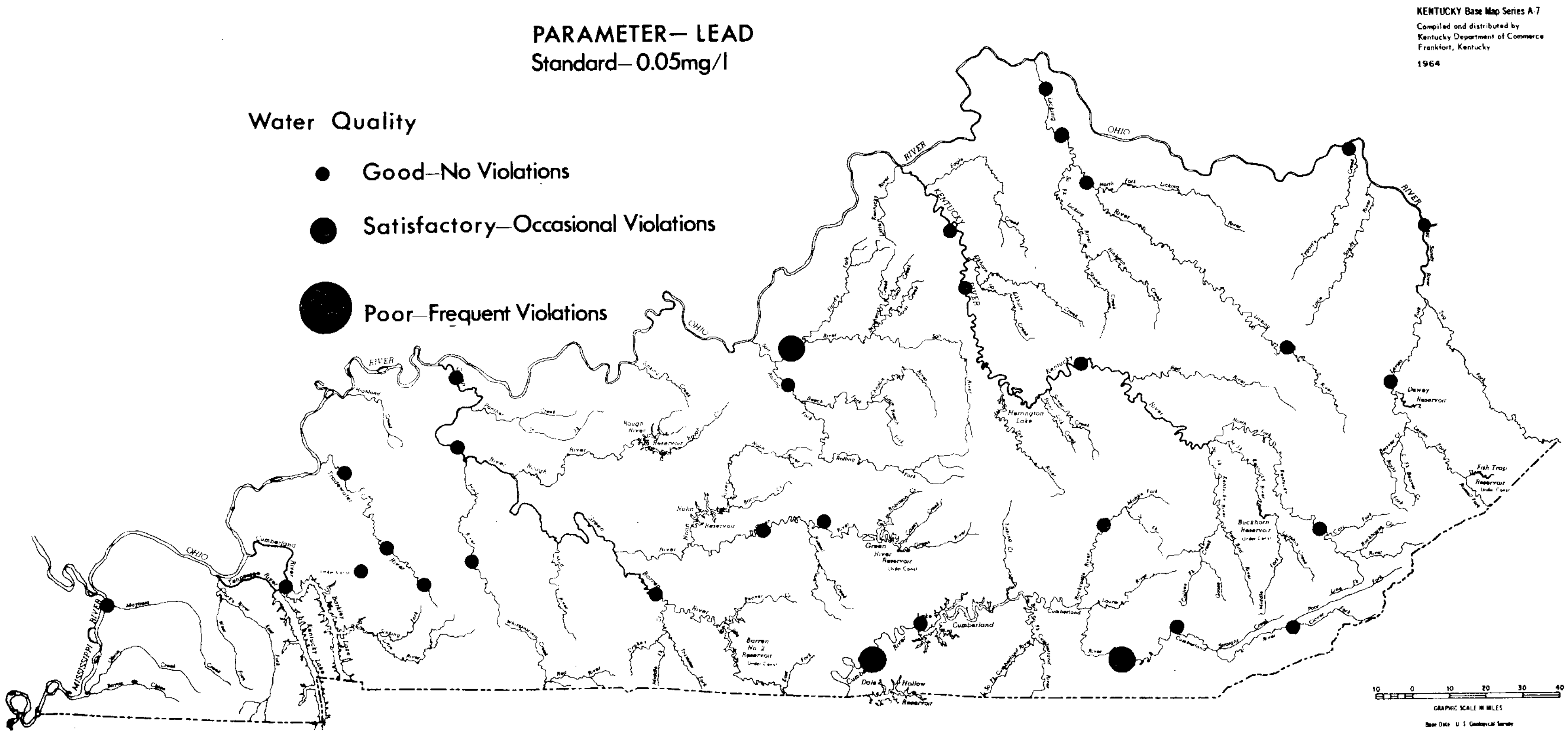
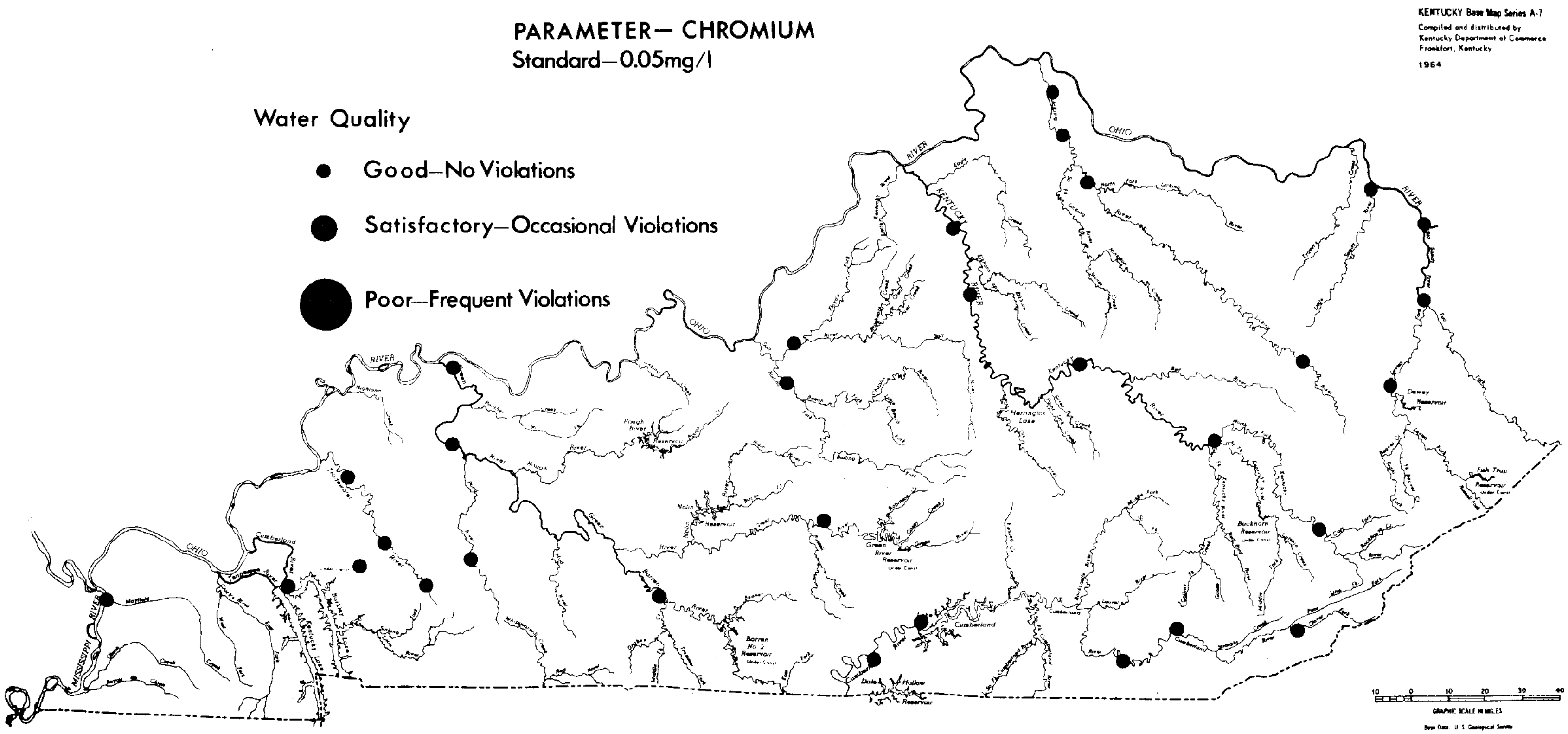
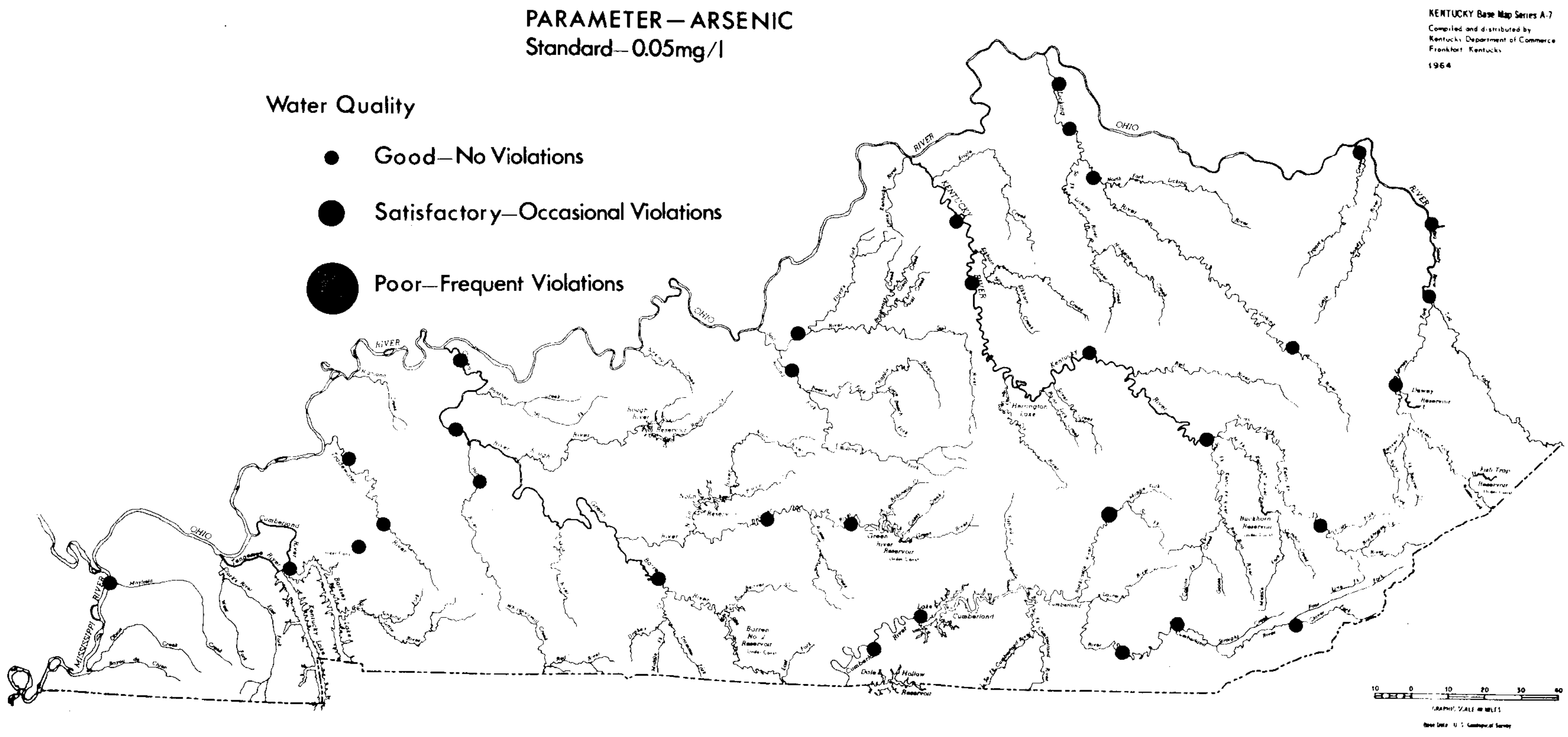

PARAMETER— LEAD
Standard— 0.05mg/l
Water Quality
Good—No Violations
Satisfactory—Occasional Violations
Poor—Frequent Violations
KENTUCKY Base Map Series A-7
Compiled and distributed by
Kentucky Department of Commerce
Frankfort, Kentucky
1964
OHIO
RIVER
KENTUCKY
MISSISSIPPI
Dewey Reservoir
Buckhorn Reservoir
Green River Reservoir
Barren No. 2 Reservoir
Dale Hollow Reservoir
Cumberland
GRAPHIC SCALE IN MILES

Figure 8



PARAMETER— CHROMIUM
Standard—0.05mg/l
Water Quality
Good—No Violations
Satisfactory—Occasional Violations
Poor—Frequent Violations
KENTUCKY Base Map Series A-7
Compiled and distributed by
Kentucky Department of Commerce
Frankfort, Kentucky
1964
OHIO
RIVER
MISSISSIPPI

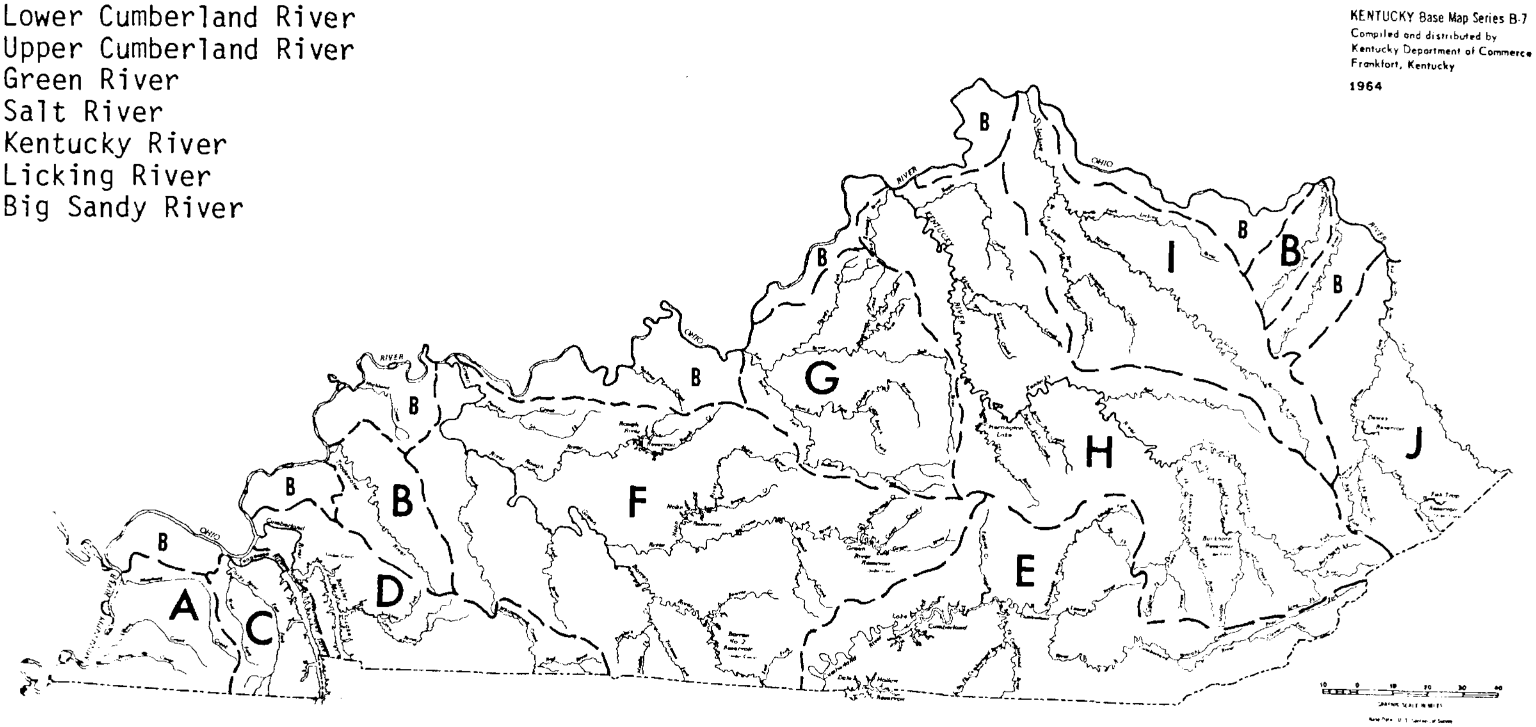
Figure 9


PARAMETER—ARSENIC
Standard—0.05mg/l
Water Quality
Good—No Violations
Satisfactory—Occasional Violations
Poor—Frequent Violations
KENTUCKY Base Map Series A-7
Compiled and distributed by
Kentucky Department of Commerce
Frankfort Kentucky
1964
OHIO
RIVER
KENTUCKY
MISSISSIPPI

CHAPTER THREE: BASIN BY BASIN ANALYSIS

A - Mississippi River
B - Ohio River
C - Tennessee River
D - Lower Cumberland River
E - Upper Cumberland River
F - Green River
G - Salt River
H - Kentucky River
I - Licking River
J - Big Sandy River

RIVER BASINS



This section analyzes the quality of water in Kentucky's ten major river basins. The primary watershed activities and characteristics are described for each basin. Special problems, potential and existing, are identified and an overall assessment of water quality is made.

The Mississippi River forms the western boundary of the state from its confluence with the Ohio River at Cairo, Illinois to the Tennessee border where it reverses direction and encloses a portion of Kentucky in a meander loop known as New Madrid Bend.

The headwater areas in the Mississippi River Basin are hilly and subject to erosion. Near the Mississippi River the land becomes gently rolling and ends abruptly in a level floodplain. The geology is unconsolidated sediments of sand, clay, gravel, and silt size on a carbonate bedrock.

The population of the Mississippi River Basin is 56,637 and is distributed over a land surface of 1,249 square miles (Rand McNally, 1970). Mayfield, Kentucky in Graves County is the largest city in the basin with 10,600 people. The rest of the populace is scattered among smaller communities and rural areas.

MISSISSIPPI RIVER BASIN

WATER QUALITY

The general water quality in the Mississippi River Basin is good with low dissolved solids and a slight bicarbonate hardness. The broadly dispersed and relatively intensive land use patterns in the basin account for the good rating. High levels of fecal coliform on the Mississippi at Wickliffe are attributed to point sources. Trace chemicals such as heavy metals are within Kentucky-Federal Water Quality Standards.

There are three major sources of nonpoint source pollution in the Mississippi River Basin:

(1) Soil erosion from 273 square miles (22% of the basin area) of farmland is considered excessive. Logging operations, burning and clearing in 56 square miles of forest land has resulted in severe soil erosion in that area.

(2) There are no animal feedlots in Kentucky large enough to require NPDES permits. Kentucky has developed a manure lagoon disposal system in cooperation with USDA-SCS. The system is operative in some parts of the state and is still being evaluated for its long term effectiveness. These lagoon systems have been employed in the Mississippi River Basin and when properly operated have minimized the waste load effect from feedlots.

(3) Of cities, Mayfield is the only city in this basin large enough to influence water quality because of urban runoff. A sanitary sewer overflow lagoon, which acts as a detention and treatment basin before discharging into the main sewage treatment plant, should substantially reduce the effect of urban runoff. Rather than eliminating stormwater access to the sanitary sewer system, the overflow lagoon was a more cost effective solution to a severe inflow/infiltration problem.

Groundwater is in abundant supply throughout the Mississippi River Basin and is used in many places as a public water supply. Industry also relies on groundwater for many uses. The quality of the groundwater is generally very good, although locally there may be high concentrations of iron requiring removal. The groundwater is susceptible to pollution from industrial spills, poor waste disposal practices, and malfunctioning septic tanks. The extent of this pollution is the subject of the planning efforts of this Division.

SUMMARY

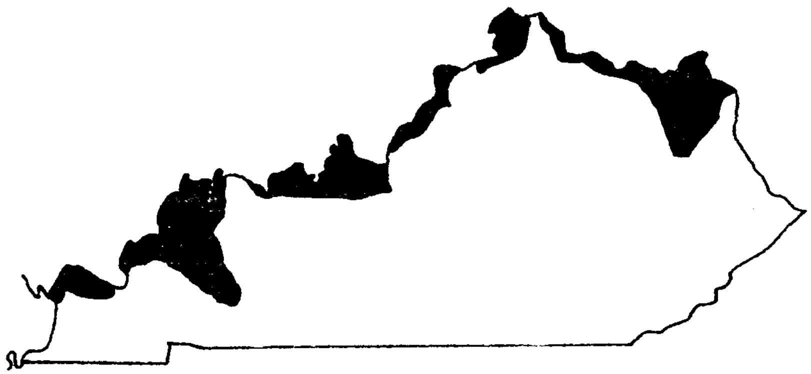
Soil erosion from both farmland and forest land presents a problem of sediment in the water. This problem is being addressed by the statewide 208 program.

Treated wastes discharged from municipal, independent, and industrial sources need to be continually upgraded. This is to be accomplished through Kentucky's program of permits and enforcement. Improved waste treatment operation will be achieved by Kentucky's educational program for plant operators.

This report will be concerned with Kentucky's tributaries to the Ohio: the Tradewater River, Little Sandy River, Tygarts Creek, and small drainage basins that flow directly into the Ohio River rather than to the major tributaries.

The Ohio River Valley Sanitation Commission has prepared the water quality report for the main stem of the Ohio River. That separate report is available on request from ORSANCO, 414 Walnut Street, Cincinnati, Ohio 45202.

The Ohio River forms the 610 mile northern border of Kentucky and is divided geographically into three sections. The eastern section, from Ashland to Northern Kentucky, contains the Little Sandy River and Tygarts Creek. It is relatively uninhabited with the exception of three towns each with over 1,000 population. The terrain is very hilly, stream slopes are steep, and crop farming is essentially restricted.



OHIO RIVER BASIN

The second section from Northern Kentucky to Louisville has a more rolling topography with flatter stream slopes. Harrods Creek is the largest drainage basin with 100 square miles. There is some farming in this section.

The third area, from Louisville to the mouth of the Ohio contains the Tradewater River, 940 square miles, and Highland and Sinking Creeks with areas over 100 square miles. The stream slopes in this section are moderately steep at the headwaters but become flat as they approach the Ohio and are subject to backwater influence.

The Ohio River is cutting down through thick deposits of alluvium composed of sands and gravels with silt and clay at the surface. This alluvium, where widespread, is an excellent aquifer, supplying, for example, the Louisville area with an excess of 50 mgd.

The Ohio River Basin's population in Kentucky in 1970 was 993,011 according to the U. S. Census Bureau. The largest city in the basin is Louisville. The Ohio River Valley is the site of much urbanization with large population centers such as Ashland, Newport, Covington, Owensboro, Henderson, and Paducah located along the river's south shore.

WATER QUALITY

Sampling stations in the east on Tygarts Creek at Greenup and the west on the Tradewater River were selected to measure water quality in their respective areas.

The water in Tygarts Creek is slightly alkaline (pH in excess of 7) and has a calcium bicarbonate hardness. Past data indicate no significant problems for dissolved solids, fecal coliform, arsenic, lead, chromium or iron. However, local problems of high sulfate and acid drainage may occur due to the coal mining activities in the area. Mining may also contribute to increased sediment loads along Tygarts Creek.

The water quality of the Tradewater River is typical of a stream affected by acid mine drainage resulting from strip mining. Historical data indicate that pH and dissolved solids standards are frequently violated in this basin. pH as low as 3.5 has been reported in the past. Excessive levels of manganese also have been reported on occasion. Often the sulfate content exceeds the bicarbonate concentration. Siltation during periods of heavy rainfall is severe.

Of the 430 miles of stream length modeled on the computer for the 303(e) River Basin Management Planning Process reflecting 1975 conditions, 85 miles (20%) were predicted to have less than 5.0 mg/l dissolved oxygen concentration during 10 year/7 day low flows. Most of the waste load (90%) comes from municipalities, schools, trailer parks, subdivisions, etc.

Aside from mining activities there is an estimated 452 square miles of cropland in the basin where average erosion rates exceed acceptable limits. Another important nonpoint source of sediment is the estimated 531 square miles of disturbed forest lands.

SUMMARY

In the Little Sandy and Tygarts Creek watersheds the main problems are sediment erosion and organic waste loads. The erosion is mainly due to improper agricultural and timbering methods. With the application of conservation farming practices this problem should decrease. The organic waste loads, due to lack of proper treatment facilities, can be alleviated by upgrading treatment methods.

The main problem with the Tradewater Basin is acid mine drainage and siltation from strip mining. With the promulgation of new federal strip mine regulations and the creation of a new bureau in Kentucky to deal with surface mining and reclamation, these problems should be reduced.

Great care and vigilance is necessary, however, as the increased demand for coal is a strong counterpressure to anti-pollution efforts.

The Kentucky portion of the Tennessee River comprises the eastern portion of the Jackson Purchase region and drains approximately 1,000 square miles of Kentucky. The one major tributary to the Tennessee is Clarks Run which has a drainage area of 530 square miles. The total population in the basin is 68,412 and Murray is the largest city with a population of 13,700.

Minor tributary headwaters begin in hilly land, which quickly becomes rolling and ends abruptly in a flat floodplain.

The main stem of the Tennessee River to mile point 22 is within the influence of Lock 52 on the Ohio River and has a pool elevation of 302 feet above mean sea level. At mile point 22 the Kentucky Dam forms Kentucky Lake which impounds the river back into Tennessee. The dam, which has hydroelectric production, has increased daily flow from 5,000 cfs to upwards of 20,000 cfs except during periods of turbine maintenance

TENNESSE RIVER BASIN

when flow goes to zero. Impounding provisions are used for waste discharges during the zero flow period which usually does not last longer than a week.

WATER QUALITY

There is one major monitoring station in the Tennessee River Basin. The USGS station is located on the main stem just downstream of the dam. The data for the last four years indicate the Tennessee River has excellent water quality except for occasional fecal coliform violations near Calvert City. Water quality data for Clarks

Run are scarce, but due to the presence of several municipal discharges and feedlots, high coliform counts are suspected.

Trace chemicals have not been a significant problem.

Two hundred forty eight miles of stream were modeled on the computer for the 303(e) River Basin Management Planning Process in 1975. Fifty nine miles (24%) were predicted to violate dissolved oxygen standards due to existing organic waste loads. Domestic wastewater discharge is the primary source of pollution along three-quarters of the stream's length.

Nonpoint source problems arise from 145 square miles of farmland where the USDA-SCS considers erosion excessive.

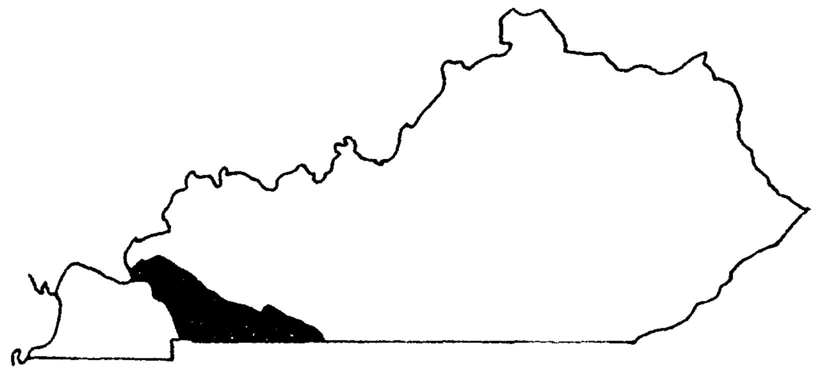
SUMMARY

Water is generally of high quality in the Tennessee River Basin. Alluvial groundwater supplies are abundant and good quality except for high iron from the deeper wells. Particular attention is paid to major dischargers including the Calvert City industrial complex to insure compliance with permit standards. Also, recreation areas must be closely monitored so that dissolved oxygen levels may be maintained above 5.0 mg/l.

The Cumberland River has its headwaters in Eastern Kentucky, flows south into Tennessee, and returns north to empty into the Ohio 20 miles upstream from the Tennessee River. For the sake of convenience the river will be discussed as two separate basins: the lower and upper.

The Lower Cumberland River Basin drains 1,900 square miles of a predominately rural area with a total population of 92,380. Hopkinsville, in Christian County, is the largest city with a population of 21,409. Princeton is the second largest with 6,292 people. The rest of the population is distributed throughout rural areas and in small towns.

Topographically, the basin is composed of gently rolling plains. Since the predominate parent rock type is limestone, there are also areas of karst topography characterized by streamless valleys, sink holes, and cavern



LOWER CUMBERLAND RIVER BASIN

development.

Thirty miles from the mouth of the river, Barkley Lock and Dam forms Lake Barkley which impounds the Cumberland for 118 miles, 44 of which are in Kentucky. There is a canal between Lake Barkley and Tennessee Lake to permit navigation and to regulate flow.

There are two major sub-basins, the Little River with 601 square miles of drainage area and the Red River with 1,460 square miles total, 688 of which are in Kentucky.

WATER QUALITY

The water quality in the Cumberland River main stem (below Lake Barkley) reflects that of the Tennessee River below Kentucky Dam since the canal permits free interchange of water between the two lakes. This is confirmed by the available water quality data at Cumberland River below Lake Barkley. High fecal coliform counts were reported on several occasions in the Red River and the north fork of Little River during the past year, presumably due to point source discharge of sewage.

Trace chemicals are of no significant problem. One lead violation (.07 mg/l as compared to the standard of .05 mg/l) and a total chromium value of .11 mg/l (hexavalent chromium limit is 0.5 mg/l) were noted but not deemed sufficient to warrant further investigation.

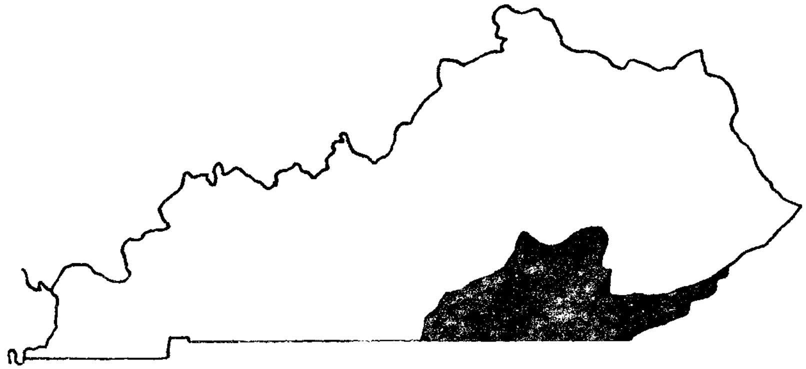
According to the River Basin Planning Process, 17.3% or 62 miles of the 360 miles studied in the basin were likely to violate D.O. standards in 1975.

The USDA-SCS estimates 122 square miles of cropland where erosion is excessive, and 44 square miles of forest land where logging and grazing are contributing to nonpoint stream load.

Groundwater is available only to supply small domestic uses and is easily polluted because the fractured limestone has little attenuating ability.

SUMMARY

Water quality overall is excellent because there are relatively few pollution sources. As recreational activities around the lake draw more people, care should be taken to regulate and treat wastewater discharges.



UPPER CUMBERLAND RIVER BASIN

The Upper Cumberland River Basin drains 5,077 square miles of Kentucky with eight sub-basins greater than 200 square miles. The head-water regions are very hilly to mountainous while the downstream portions are hilly with steep cliffs along the stream courses.

The upper portion of the basin consists of interbedded limestones, shales, and sandstones with abundant coal seams. The middle portion tends toward more limestone which contributes to the hardness of the water. There is some petroleum production from the deeper lying shales in the lower portion of the basin. Infrequent spills in this area cause short-term but severe degradation in water quality.

The total population in the Upper Cumberland River Basin is approximately 260,000 people widely scattered throughout the basin. Middlesboro with 11,700 and Somerset with 10,500 (1970 census) are the largest cities. Twenty five percent of the population resides in the headwater areas while 75% resides above Cumberland Lake.

There are three Corps of Engineers impoundment projects in the basin creating Cumberland, Laurel, and Dale Hollow Lakes. Lake Cumberland is the largest of the lakes with an area of 63,530 acres and is used for power, recreation, and flood control purposes.

WATER QUALITY

Water quality data for this report were collected from four sampling stations: (1) Harlan, (2) Barbourville, (3) Burkesville, below Lake

Cumberland, and (4) Yellow Creek at Middlesboro, which were selected to reflect the effects of industrial water discharge.

General water quality in the Upper Cumberland River Basin reflects the moderate mineralization and calcium bicarbonate hardness expected from its geological setting. High levels of fecal coliform, due to point sources, were noted in Poor Fork and the upper main stem of the Cumberland River during the past several years.

High concentrations of iron, presumably from coal mining activities, were detected in the upper portions of the Cumberland River.

Past year measurements of chromium and arsenic concentrations were normally well within the water quality standards. Occasional lead violations were detected in Cumberland and Rockcastle Rivers. Water quality generally improves downstream due to the filtering action of Lake Cumberland.

Yellow Creek, with high bacterial concentrations and excess chromium values, reflects the influence of a large tannery in Middlesboro.

Of the 752 miles of stream length carrying effluent from treated organic loads, 176 miles (23%) were predicted by computer model to violate D.O. standards in 1975.

The most significant contributor to nonpoint source pollution is the approximately 114 square miles of land area on which there are surface mining, mine haul roads, logging roads, and inadequately treated croplands.

SUMMARY

Water quality in the Upper Cumberland River Basin is generally good. Stringent monitoring of sewage treatment plants is necessary at the local level to prevent degradation of water quality.

The increase in coal mining with accompanying land clearance has a degrading effect. Proper construction and drainage controls are needed to

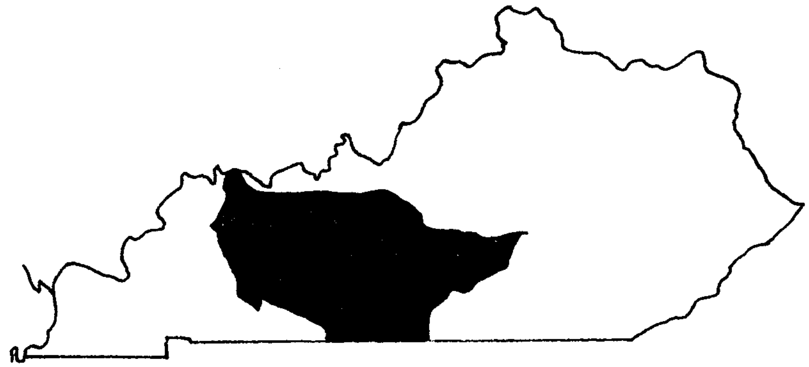
insure that under normal conditions coal solids are not discharged into the waters of the basin.

The Green River Basin occupies 9,229 square miles of West-Central Kentucky and Northern Tennessee. Its four major sub-basins are: (1) the Barren, (2) Nolin, (3) Pond, and (4) Rough Rivers.

Population is evenly distributed throughout the basin with five cities having populations greater than 10,000. The total population in the basin is 426,000 according to the 1970 census.

Most of the Green River Basin is in the Mississippian Plateau physiographic province which is characterized by gently rolling terrain and karst topography. The western portion of the basin is in the Western Coal Field region which has a more rugged terrain with steeper slopes.

Agriculture, tourism, and light industry make up the economy in the Mississippian Plateau region of the Green River Basin. There are four Army Corps of Engineers impoundment projects in the basin. Three of these, the Barren, Nolin, and Green River reservoirs, are in the Mississippian Plateau province.



GREEN RIVER BASIN

The fourth, Rough River Reservoir, is in the Western Coal Field region. Forty million tons of coal were mined out of this area in 1972, mostly from strip mines. In addition there is some secondary recovery of oil and gas.

WATER QUALITY

The water quality in the Green River Basin is generally good. There is a moderate bicarbonate hardness due to the limestone parent rock dominant in most of the basin.

In the past, due to improper disposal of oil field brines, high levels of total dissolved solids and chlorides were present in the upper Green River above Munfordville. Declining production and increased regulation of disposal practices have reduced surface contaminant levels to pre-development conditions. However, careless attitudes toward the construction and use of injection wells have caused severe groundwater problems locally. Because of the slow rate of movement of groundwater in some areas (5 feet per year) this problem may persist for decades even if further contamination is halted immediately.

The Barren River sub-basin has good water quality due to less human activites and the stabilizing effect of the Barren River Reservoir.

The hydrologically sensitive and complex Mammoth Cave area has had trouble in the past from improper discharges of wastes into sinkholes. There is presently a 201 facilities study with an accompanying Environmental Impact Statement being prepared for the area. These studies will propose actions that, if implemented, should alleviate some of the waste disposal problems.

Fecal coliform concentrations are generally found to be in the moderately good category in the Green River above Pond River for the past year. Several violations were detected in the Rough River and Green River below Pond River.

Lead, arsenic, and chromium concentrations were reported to be within standards throughout the basin except for the Mammoth Cave area where there were occasional violations due to a plating plant discharge.

The Pond River sub-basin reflects the water quality of land area subjected to extensive surface coal mining. High dissolved solids, hardness, and sulfates have been detected. Acid mine drainage is present as suggested by low bicarbonate concentration and low average pH (4.9 with a minimum value of 2.8). Hopefully, new federal strip mine regulations and the creation within the Kentucky Department for Natural Resources and Environmental Protection of a surface mining and reclamation bureau to implement them, will help alleviate some of this pollution.

SUMMARY

The water quality of the Green River Basin is generally good. Point sources of pollution such as municipal wastewater will be controlled more adequately through such programs as NPDES and 201 facilities grants.

Pollution from nonpoint sources such as agriculture and coal mining will be more difficult to abate. Sediment erosion and acid mine drainage are serious problems in the Pond River area.

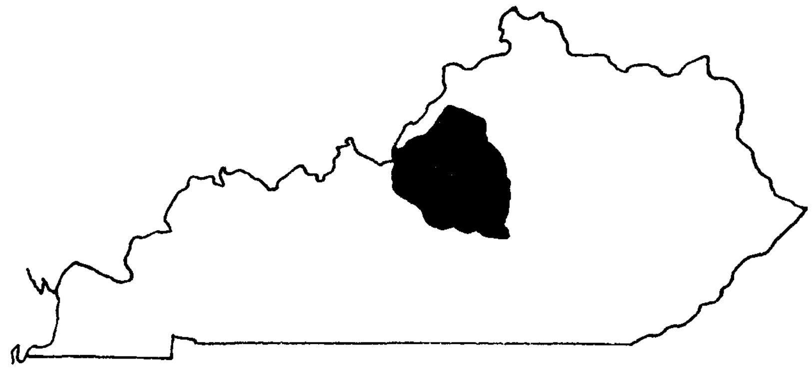
The Salt River Basin located in Central Kentucky drains 2,932 square miles of rolling farmland in the Bluegrass physiographic province.

There are 507,232 people in the basin of which Louisville accounts for 64%. Another 7% are located around the Ft. Knox area in Hardin County. The rest of the population is distributed throughout the basin in small towns and rural areas.

WATER QUALITY

The background water quality in the Salt River Basin is the calcium bicarbonate type due to the limestone-dolomite parent rock.

Frequent fecal coliform violations were noted in the basin presumably due to municipal wastewater discharges. High iron concentrations were frequently measured in the past few years. The sources, however, are unknown. The 1977 data for arsenic, lead, and chromium show no violations of the standards.



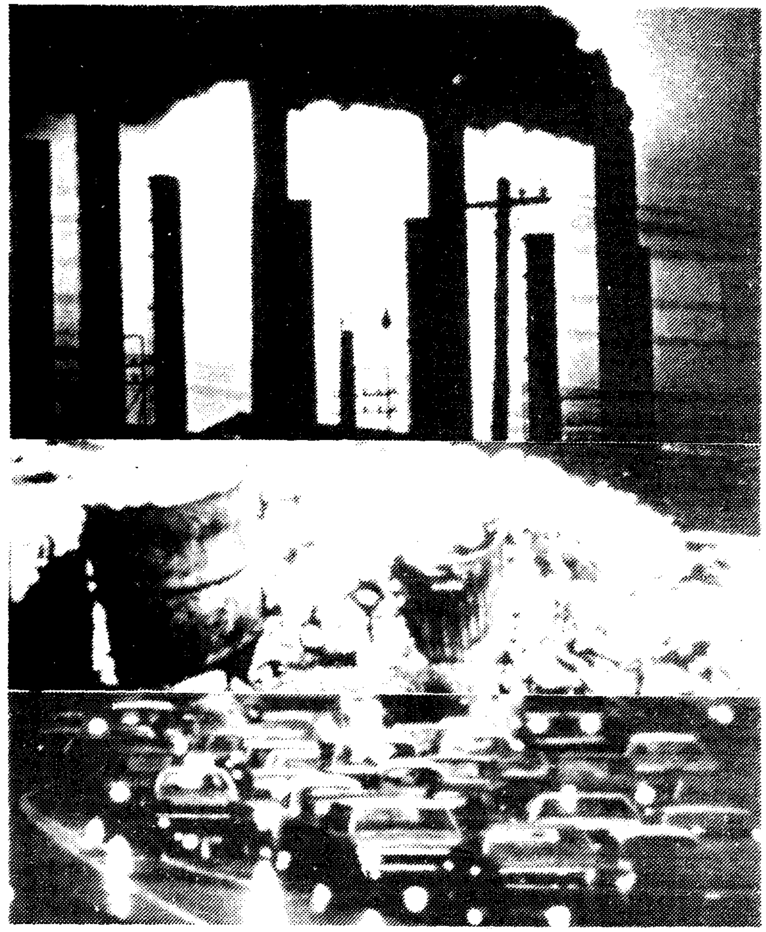
SALT RIVER BASIN

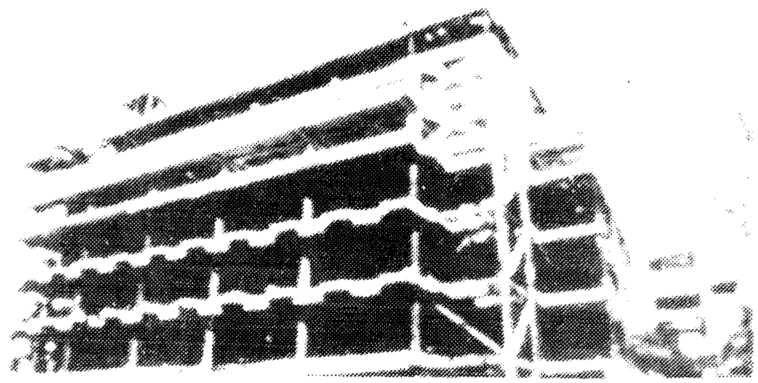
According to the River Basin Management Planning computer model, of the 596 miles of stream surveyed, 160 miles (28%) were predicted to violate D.O. standards due to waste discharge. 61 miles (11%) are affected by municipal discharge, 8 miles (1.7%) by industrial discharge, and 91 miles (15%) by other discharges such as subdivisions, schools, etc.

The nonpoint source pollutants are nutrients from fertilizers and sediment. According to the USDA-SCS, the Salt River Basin has the largest sediment load of any basin. The primary cause is improper agricultural practices and logging operations.

SUMMARY

Overall quality of the Salt River Basin was very good. Continued effort by the SCS to encourage proper soil utilization will result in reduced sediment loss. A 201 facilities study and a 208 areawide water quality management study have been made for the Louisville area. If recommendations from these reports are implemented, improvement in water quality will result.



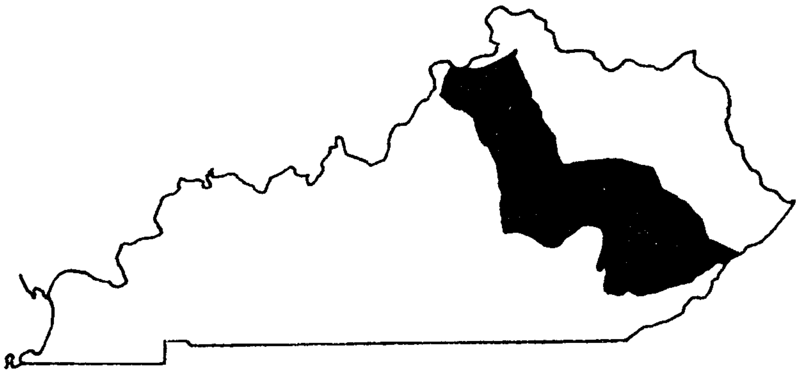


The Kentucky River Basin drains 7,033 square miles in the Eastern Coal Field and Bluegrass regions. The headwater section, in the Eastern Coal Field, is an area of rugged terrain and steep slopes. It is also relatively unpopulated.

The river flows across the outer Bluegrass which is an area of shales, siltstones, and bedded limestones with moderate slopes. The rest of the basin is contained in the inner Bluegrass region of thick limestones, rolling terrain and karst topography.

The total population of the basin is 534,000 (1970 census). Fifty-five percent of the population is clustered around Lexington-Fayette County and the surrounding counties of Franklin, Woodford, Scott, and Madison.

There are two federal impoundments in the basin: Buckhorn Lake and Carr Fork Lake. Their water quality is summarized in Chapter Four.



KENTUCKY RIVER BASIN

WATER QUALITY

Water quality in the headwater area of the Kentucky River Basin is influenced by extensive surface mining.

The North Fork Kentucky River, Carr Fork, and Eagle Creek all have high iron, sulfate, and dissolved solids concentration. pH runs low periodically. The North Fork has in the past been found to contain lead and manganese in excess of the water quality standards.

Fecal coliform violations were frequent throughout the entire basin primarily due to the large number of municipal discharges.

The Red River sub-basin in the headwater area reveals the drastic effect of coal mining on the other sub-basins. There is no mining activity presently taking place and the water quality in the Red River is superior in every parameter to the other sub-basins. However, some mining is scheduled and it is doubtful that the integrity of the watershed can be maintained, without rigorous supervision and prudent land use controls.

The water quality of the main stem of the Kentucky River through the Bluegrass region is stable, moderately hard, and of fairly good quality. This is due primarily to the dilution factor and the river's large drainage area.

Eight hundred sixty eight miles were modeled to estimate waste load allocations. 150 (17%) miles were predicted to have less than 5.0 mg/l dissolved oxygen concentration during the 10-year 7-day low flow. All these miles, however, are tributary. The D.O. in the main stem of the river is not projected to violate the standard.

Nonpoint source effects can be summarized in the three categories of agriculture, mining, and urban runoff. An estimated 1,070 square miles of disturbed forest land, cropland, and some 1,700 miles of streambank and roadbank erode excessively and contribute to sediment in the streams. Surface mine area contributing to excessive erosion is estimated at 54 square miles. There is also an unmeasured effect from urban centers such as Lexington, Richmond, and Danville which have surface runoff into streams with zero flow.

SUMMARY

Water quality in the headwater sub-basins is degradated by surface mining. The effect is most noticeable because the Red River, where no mining takes place, is of excellent quality.

The Kentucky River through the Bluegrass area is of fairly good quality and is used by several large municipalities as a drinking water source.

Groundwater is generally not a dependable source except for some domestic wells and large springs.

Water quality can be expected to improve where wastewater treatment facilities are being planned and upgraded. Much work needs to be done in the coal mining areas before quality will improve there.

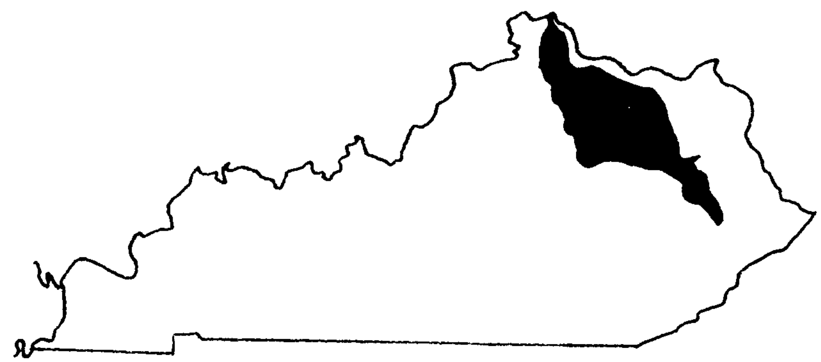
The Licking River drains 3,700 square miles of Eastern Kentucky. Beginning in the Eastern Coal Field region, it crosses the outer Bluegrass and empties into the Ohio River just opposite from Cincinnati. The headwater area has steep slopes but the outer Bluegrass is rather gently rolling except where streams are deeply entrenched.

The 1970 population of the Licking River Basin was 211,000 evenly distributed throughout the basin. There is a concentration of people around the Cincinnati area, but overall figures indicate a balanced urban and rural distribution.

WATER QUALITY

Due to the predominance of limestone as the parent rock the water in the Licking River Basin has a calcium-magnesium bicarbonate hardness.

On several occasions excessive iron concentrations were detected in the headwater areas. This is presumably caused by coal mining activities. There were no violations of chromium, arsenic, or lead detected and pH was within acceptable limits.



LICKING RIVER BASIN

Fecal coliform violations were localized, usually occurring below a major municipal point source.

One thousand miles of stream length were modeled on the computer for the 303(e) River Basin Management Planning Process in 1975. Three hundred eight four miles (38%) were found to be affected, the largest portion caused by municipal, subdivision, school, trailer park, and similar wastewater dischargers.

The USDA-SCS estimates that 78 square miles of cropland is contributing some 57% of the total annual sediment entering the stream. The rest of the sediment pollution comes from construction sites (24%), field gullies (10%), streambanks (7%), and roadbanks (2%).

SUMMARY

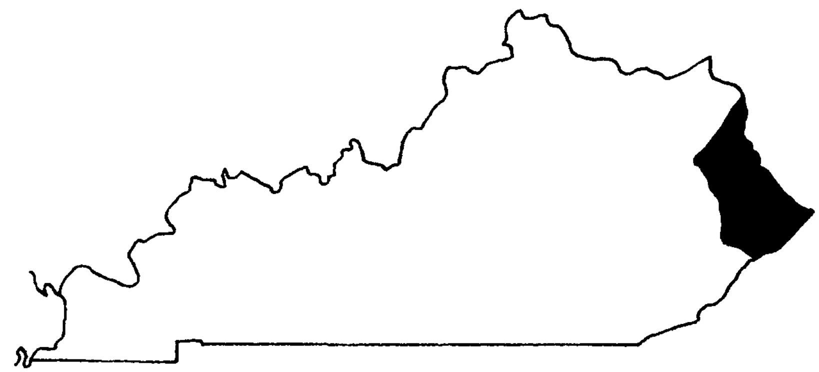
Overall quality of the Licking River Basin is good with some localized problems. The two problem areas that need the most attention are excessive erosion and possible stream degradation due to sewage treatment plant effluent. Better land use management and upgrading of facilities are the obvious solutions if they can be implemented.

The Big Sandy River Basin is the eastern most basin in Kentucky. It is formed by the junction of Levisa Fork and Tug Fork which have their headwaters in southwest Virginia and West Virginia respectively. The total drainage area is 4,280 square miles, 2,885 of which are in Kentucky.

The majority of the population resides near the headwaters with 61,000 in Pike County, 35,000 in Floyd County, and 17,000 in Johnson County. The main cities are Pikeville (Pike) 4,900, Prestonsburg (Floyd) 6,100 and Paintsville (Johnson) 7,300.

The terrain is rugged and mountainous, typical of the Eastern Coal Field region, except in the lowest reaches where it tends toward hilly.

The terrain essentially precludes agriculture except for timber production. The mainstay of the economy is coal mining which results in supportive small business and commerce.



BIG SANDY RIVER BASIN

WATER QUALITY

High iron concentrations are frequently reported in the Levisa Fork area. Sulfate content on the average is 30% higher than bicarbonate concentration. pH is in the acceptable range usually but may periodically run low. There was a recorded low of 4.3. All of these preceding conditions are indicative of the coal mining which takes place in the basin.

There are higher than expected average values for sodium and chlorides which is probably due to the oil field production in the area.

Frequent violations for fecal coliform indicate the lack of proper sewage treatment facilities.

Aside from the erosion from surface mined lands and logging operations, two major nonpoint sources of pollution are solid wastes and on-site sewage disposal facilities. Lack of proper sites and facilities causes much solid waste to be left on the streambanks while failing lateral lines lead to coliform contamination.

SUMMARY

If proper practices are followed in mining, logging, and waste disposal, much of the Big Sandy's water quality problem can be alleviated. Lack of public concern and a shortage of investigative personnel are the main reasons for the presistance of the problems.

CHAPTER FOUR: LAKES

This section contains a summary of the water quality in the sixteen major lakes which comprise 95% of the lake surface area in the Commonwealth of Kentucky. Information on major watershed activities, the impact of these activities on water quality, and specific pollution sources is given for each of these lakes.

Tables 6 and 7 present the data, which the U. S. Army Corps of Engineers submitted in 1977, included in the 305(b) report for 1977. The Corps has indicated that no revision is necessary as water quality has not changed appreciably in any of the fourteen projects in the three districts. Table 8 is a summary of data at Kentucky Lake and Herrington Lake contributed by the Tennessee Valley Authority and the Kentucky Department of Fish and Wildlife, respectively. Both agencies have indicated that the 1977 summary is not in need of revision.

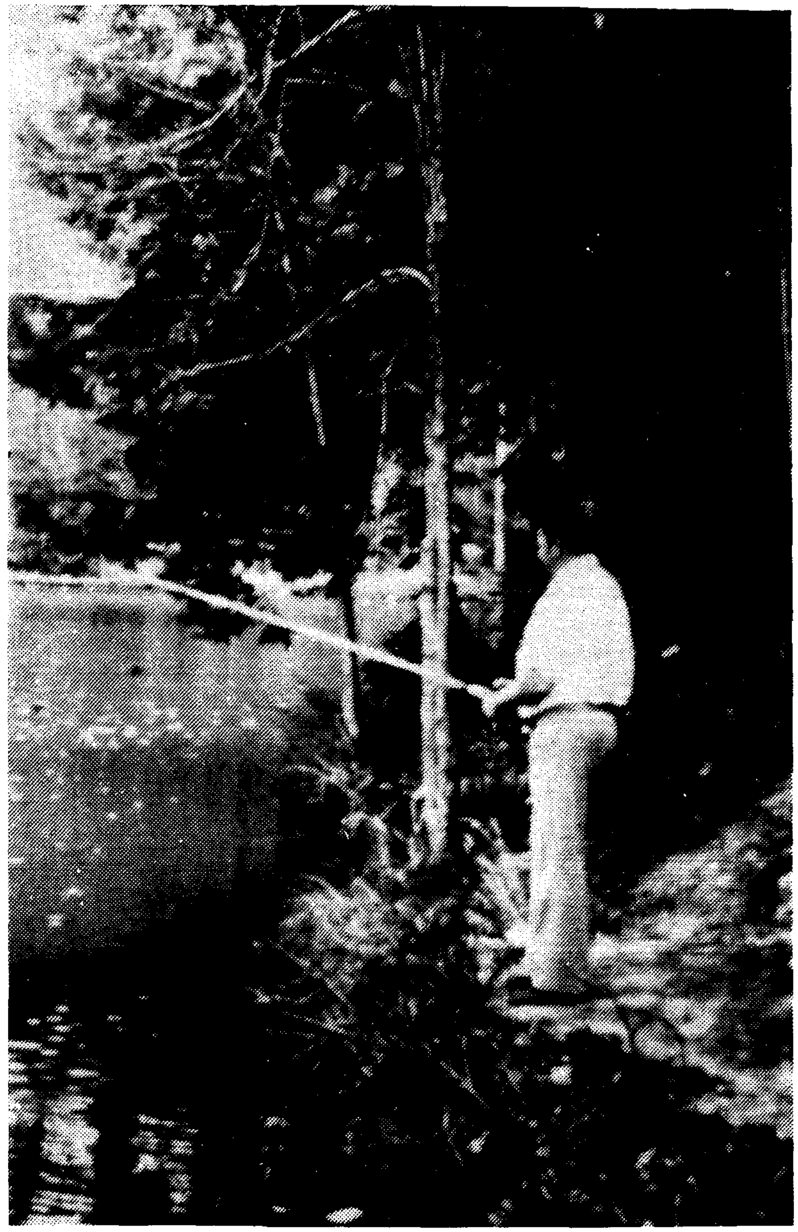


Table 6

WATER QUALITY SUMMARY OF THE MAJOR U. S. ARMY CORPS OF ENGINEERS PROJECTS IN KENTUCKY

PROJECT	CORPS DISTRICT	YEAR IMPOUNDED	THERMAL STRATIFICATION	DISSOLVED OXYGEN SUMMARY	MISCELLANEOUS PARAMETER SUMMARY
MARTINS FORK LAKE	NASHVILLE	Under Construction	Evaluation of water temperature data collected by U.S.G.S. will define the natural seasonal temperature regime.	Data base to be established after project completion.	Preimpoundment water quality data shows an increase in turbity levels and metals concentrations in Martins Fork.
LAUREL LAKE	NASHVILLE	1974	Typical of tributary type impoundment in the region.	Low hypolimnion dissolved oxygen, probably due to decay of organics in the recently impounded project. D.O. concentration of power releases consistently above state standards.	Elevated concentrations of phosphorus and nitrogen in upper portions of the lake.
LAKE CUMBERLAND	NASHVILLE	1950	Typical of tributary type impoundment in the region. However, all layers may not undergo complete mixing during winter.	Relatively low hypolimnion dissolved oxygen though not as severe as in similar projects.	Excessive turbidity in lower regions of lake.
DALE HOLLOW LAKE	NASHVILLE	1943	Typical of tributary type impoundment in the region.	Hypolimnion dissolved oxygen approaches zero near lake bottom in the fall.	None Listed
LAKE BARKLEY	NASHVILLE	1964	Does not stratify due to high current velocities in the upper reaches and low storage volume versus flow relationship.	Due to thermal stratification pattern, no significant dissolved oxygen problems exist, though isolated oxygen sags have been reported.	None Listed

Table 6
Continued

WATER QUALITY SUMMARY OF THE MAJOR U. S. ARMY CORPS OF ENGINEERS PROJECTS IN KENTUCKY

PROJECT	CORPS DISTRICT	YEAR IMPOUNDED	THERMAL STRATIFICATION	DISSOLVED OXYGEN SUMMARY	MISCELLANEOUS PARAMETER SUMMARY
CAVE RUN LAKE	LOUISVILLE	1973	Typical of tributary type impoundment in the region, having greatest impact on water quality in this lake.	Dissolved oxygen stratification develops with thermal stratification. Low hypolimnion dissolved oxygen near lake bottom.	Excessive dissolved iron and manganese concentrations produced in oxygen depleted hypolimnion. Low dissolved phosphorus concentration.
NOLIN RIVER LAKE	LOUISVILLE	1963	Typical of tributary type of impoundment in the region, having greatest impact on water quality in this lake.	Dissolved oxygen stratification develops with thermal stratification. Low hypolimnion dissolved oxygen near lake bottom.	Excessive dissolved iron and manganese concentrations produced in oxygen depleted hypolimnion. Moderated dissolved phosphorus concentration.
BARREN RIVER LAKE	LOUISVILLE	1964	Typical of tributary type of impoundment in the region.	Dissolved oxygen stratification develops with thermal stratification. Low hopolimnion dissolved oxygen near lake bottom.	Excessive dissolved iron and manganese concentrations produced in oxygen depleted hypolimnion. Low dissolved phosphorus concentration.
BUCKHORN LAKE	LOUISVILLE	1960	Typical of tributary type of impoundment in the region, having greatest impact on water quality in this lake.	Dissolved oxygen stratification develops with thermal stratification. Low hopolimnion dissolved oxygen near lake bottom.	Excessive dissolved iron and manganese concentrations produced in oxygen depleted hypolimnion. Low dissolved phosphorus concentration.
GREEN RIVER LAKE	LOUISVILLE	1969	Typical of tributary type impoundment in the region, having greatest impact on water quality in this lake.	Dissolved oxygen stratification develops with thermal stratification. Low hypolimnion dissolved oxygen near lake bottom.	Excessive dissolved iron and manganese concentrations produced in oxygen depleted hypolimnion. Low dissolved phosphorus concentration.

Table 6
Continued

WATER QUALITY SUMMARY OF THE MAJOR U. S. ARMY CORPS OF ENGINEERS PROJECTS IN KENTUCKY

PROJECT	CORPS DISTRICT	YEAR IMPOUNDED	THERMAL STRATIFICATION	DISSOLVED OXYGEN SUMMARY	MISCELLANEOUS PARAMETER SUMMARY
ROUGH RIVER LAKE	LOUISVILLE	1959	Typical of tributary type impoundment in the region, having greatest impact on water quality in this lake.	Dissolved oxygen stratification develops with thermal stratification. Low hypolimnion dissolved oxygen near lake bottom.	Excessive dissolved iron and manganese concentrations produced in oxygen depleted hypolimnion. Low dissolved phosphorus concentration.
CARR FORK LAKE	LOUISVILLE	1976	Typical of tributary type impoundment in this region, having greatest impact on water quality in this lake.	Dissolved oxygen stratification develops with thermal stratification, Low hypolimnion dissolved oxygen near lake bottom.	Excessive dissolved iron and manganese concentrations produced in oxygen depleted hypolimnion. Low dissolved phosphorus concentration.
DEWEY LAKE	HUNTINGTON	1950	Weak stratification during the summer.	Density layering effects cause the creation of secondary oxygen maxima in the dissolved oxygen distribution. Low hypolimnion dissolved oxygen at various levels.	Excessive levels of turbidity. High levels of iron and manganese correlating with high inflow levels. Occasional high mercury concentrations.
FISHTRAP LAKE	HUNTINGTON	1968	Weak stratification during the summer.	Density layering effects cause the creation of secondary oxygen maxima in the dissolved oxygen distribution. Low hypolimnion dissolved oxygen at various levels.	Excessive levels of turbidity. High levels of iron and manganese correlating with high inflow levels. Occasional high mercury levels in inflow and outflow.
GRAYSON LAKE	HUNTINGTON	1968	Typical of tributary type impoundment in the region.	Dissolved oxygen stratification develops with thermal stratification. Low hypolimnion dissolved oxygen near lake bottom. Outflow dissolved oxygen high due to high-level releases and stilling basin reaeration.	Excessive dissolved iron and manganese concentrations produced in oxygen depleted hypolimnion. Occasional high mercury levels.

Table 7

WATER QUALITY SUMMARY OF THE MAJOR U. S. ARMY CORPS OF ENGINEERS PROJECTS IN KENTUCKY

PROJECT	WATERSHED ACTIVITY	IMPACT OF WATERSHED ACTIVITY	PROJECT STATUS AND PLANS
MARTINS FORK LAKE	Coal Mining Project Related Relocation Work	Possible water quality degradation due to mining activities or project relocation work.	Future efforts include expanded sampling, installation of automatic monitoring system, and preparation of project operation manual.
LAUREL LAKE	Project Power Releases Corbin and London Sewage Treatment Plants	Algal blooms in upper end of the lake throughout the summer due to nutrient loading. Major impact may be temperature.	Efforts in CY 1978 include coordination with the Kentucky Division of Water Quality in an intensive survey of the lake and watershed to investigate the eutrophication potential, limiting nutrient, extent, and sources of loading.
LAKE CUMBERLAND	Project Power Releases Tailwater Trout Fishery Somerset Sewage Treatment Plant	Release of turbid water in lower regions of the lake causes water in the tailwater and downstream points to appear murky.	Future efforts include a complete evaluation of all available water quality data, a better definition of inflow quality, a definition of withdrawal zone produced by power releases, and a study of reaeration by turbulence in the tailrace.
DALE HOLLOW LAKE	Coal Mining Project Power Releases Tailwater Trout Fishery	Low dissolved oxygen hypolimnetic releases create concern for tailwater trout fishery. Water quality degredation due to mining activities in the watershed particularly in the East Fork, Obey River drainage.	Future efforts include a complete evaluation of all available water quality data, a better definition of inflow quality, a definition of the withdrawal zone produced by power releases, and a study of reaeration by turbulence in the tailrace.
LAKE BARKLEY	Project Power Releases	No significant adverse impacts with the exception of isolated oxygen sags.	Efforts during CY 1978 include upgrading and intensifying water quality sampling.

Table 7
Continued

PROJECT	WATERSHED ACTIVITY	IMPACT OF WATERSHED ACTIVITY	PROJECT STATUS AND PLANS
CAVE RUN LAKE	Strip Mining Oil & Gas Wells Salyersville & West Liberty Sewage Treatment Plants	Minor water quality degradation due to strip mining. No discernable effect from oil and gas wells in upper reaches. Negligible effect from sewage treatment plants. Problems created at Morehead Water Treatment Plant, 1 mile below dam due to poor quality releases.	Influent water quality rated as generally good, but showing some effects of strip mining. Future efforts include a study of feasible structural modifications to outlet works to eliminate releasing hypolimnetic waters.
NOLIN RIVER LAKE	Agriculture Elizabethtown & Hodgenville Sewage Treatment Plants Tailwater Trout Fishery	Minimal effect from sewage treatment plants. No nuisance algal blooms caused by relatively high nutrient levels produced by agricultural activity.	Influent water quality rated as relatively good.
BARREN RIVER LAKE	Oil Wells Glasgow Sewage Treatment Plant Tailwater Trout Fishery	No discernable effect from oil wells in upper reaches. Marked improvement in water quality of Beaver Creek Arm apparently due to the completion of the new Glasgow Sewage Treatment Plant.	Influent water quality rated as generally acceptable with the exception of Beaver Creek. Efforts in CY 1978 include an intensive survey of the Beaver Creek portion of the lake and watershed by the Kentucky Division of Water Quality to investigate the eutrophication potential, limiting nutrients, and extent and sources of nutrient loading.
BUCKHORN LAKE	Strip Mining Hyden Sewage Treatment Plant Tailwater Trout Fishery	Minor water quality degradation due to strip mining. Negligible effect from Hyden sewage treatment plant in 1976.	Influent water quality rated as acceptable, but altered somewhat from natural conditions by strip mining.
GREEN RIVER LAKE	Liberty Sewage Treatment Plant Tailwater Trout Fishery	Negligible effect from Liberty Sewage Treatment Plant.	Influent water quality rated as excellent, having been only slightly altered from natural conditions.

Table 7
Continued

PROJECT	WATERSHED ACTIVITY	IMPACT OF WATERSHED ACTIVITY	PROJECT STATUS AND PLANS
ROUGH RIVER LAKE	Agriculture Tailwater Trout Fishery Leitchfield Municipal Water Intake	No nuisance algal blooms caused by nutrients produced by agricultural activity.	Influent water quality rated as relatively good.
CARR FORK LAKE	Strip Mining	Sediment loads (attributed to strip mining) offer greatest degrading potential for water quality. No significant overall effect due to acid mine drainage during 1976.	Influent water quality rated as generally good, but showing some effects of mining activities. Sediment retention structure completed February 1976 on Defeated Creek, with others to be constructed later if studies warrant.
DEWEY LAKE	Coal Mining	Degradation of water quality due to coal mining, resulting in excessive sedimentation and metals concentrations with possibility of adverse effects on the pH regime in the near future. Severe hydrogen sulfide odors in stilling basin produced in the oxygen depleted hypolimnion.	Lake water quality rated as poor to degraded. Future efforts include an ongoing sampling program oriented toward issues pertinent to existing or potential effects of sediment movement into and through the lake.
FISHTRAP LAKE	Coal Mining Tailwater Trout Fishery	Degradation of water quality due to coal mining, resulting in excessive sedimentation and metals concentrations with possibility of adverse effects on the pH regime in the near future.	Lake water quality rated as degraded to severely degraded. Future efforts include an ongoing sampling program oriented toward issues pertinent to existing or potential effects of sediment movement into and through the lake.
GRAYSON LAKE	Coal Mining Tailwater Trout Fishery	No significant adverse impact on water quality by mining activities at this time.	Lake water quality rated as fair to good. Future efforts include monitoring programs focused at both inflow and lake stations, and cooperative studies and regulatory effort with the State of Kentucky and other appropriate agencies.

Table 8

WATER QUALITY OF OTHER MAJOR LAKES IN KENTUCKY

IMPOUNDMENT	GOVERNING AGENCY	YEAR IMPOUNDED	THERMAL STRATIFICATION	DISSOLVED OXYGEN SUMMARY	MISCELLANEOUS PARAMETER SUMMARY
KENTUCKY LAKE	TENNESSEE VALLEY AUTHORITY	1944	Pattern similar to Barkley Lake. Some period of weak stratification.	Due to thermal stratification pattern, no significant dissolved oxygen problems exist.	No excessive concentrations of trace elements with the exception of occasional high levels of manganese.
HERRINGTON LAKE	KENTUCKY UTILITIES	1925	Typical of tributary type impoundment in the region.	Density layering effects cause the creation of secondary oxygen maxima in the dissolved oxygen distribution. Low hypolimnion dissolved oxygen at various levels.	Ranges of pH and alkalinity indicative of high buffering capacity of watershed. Occasional hydrogen sulfide odors occurring in low dissolved oxygen level of primary oxycline.

Table 8

WATER QUALITY OF OTHER MAJOR LAKES IN KENTUCKY

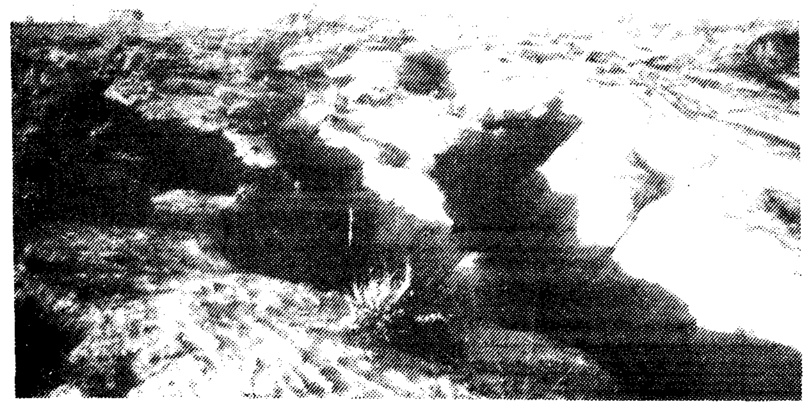
IMPOUNDMENT	WATERSHED ACTIVITY	IMPACT OF WATERSHED ACTIVITY	PROJECT STATUS AND PLANS
KENTUCKY LAKE	Project Power Generation Phosphate Mining on Duck River	No significant adverse impacts on water quality by phosphate mining on Duck River or other activities in upper reaches.	Lake water quality rated as excellent. Future efforts include continued monitoring by Tennessee Valley Authority and related agencies.
HERRINGTON LAKE	Project Power Generation.	No significant adverse impacts on water quality at this time.	Future efforts include expanded monitoring in order to broaden the data base.

CHAPTER FIVE: NON POINT SOURCES

This section describes the work of the Division of Water Quality, Department for Natural Resources and Environmental Protection, toward identifying, assessing, and controlling nonpoint sources of water pollution in Kentucky. The planning process for a statewide water quality management proram, which includes nonpoint sources, is described and reviewed.

Since the 1977 Report to Congress, 305(b), the Division of Water Quality has submitted and received approval of its Water Quality Management Planning Work Program. The Work Program establishes committees to address seven work elements. The committees are:

Surface Water Criteria
Groundwater
Agricultural Nonpoint Sources
Silvicultural Nonpoint Sources
Construction Nonpoint Sources
Mining Impacts
Public Participation



The Surface Water Criteria Committee is trying to establish the relationship of sediment load to aquatic biota effects. Existing data are being inventoried and a monitoring program will be designed to compare nonpoint source load effects on stream biota with unaffected stream segments. It is expected that stream biology will be the best indicator of nonpoint source loading and will serve to set statewide criteria standards. At present the committee is preparing the data inventory.

The Groundwater Committee's work outline is to inventory existing data, present maps and text summarizing groundwater conditions and aquifer characteristics, and develop a monitoring strategy. The existing data have been inventoried and a report on the Jackson Purchase region has been prepared in draft form.

AGRICULTURE, SILVICULTURE, CONSTRUCTION

The Agricultural Task Force outlined a four point program which calls for:

(1) Review of background information and problem assessment.

(2) Preparation of a statewide technical guide manual.

(3) Implementation of the practices in the technical guide manual.

(4) Development of a continuing program to evaluate the effectiveness of program implementation.

The Agriculture, Construction, and Silviculture Task Forces were combined since their efforts were often overlapping. An interim report providing background information and identifying problems has been produced together with a guide to best management practices.

According to Kentucky Conservation Districts, sediment from agricultural cropland is the most common nonpoint source pollutant. Sediment loss from forestry operations such as logging or woodland grazing was less significant. Fertilizer, nutrients, pesticides, organic wastes, and pathenogenic microorganisms were recognized as potential nonpoint pollutants in Kentucky. Pollution from malfunctioning septic tanks was the second most severe contaminant statewide.

Those regions ranked in Kentucky as most suitable for crop production are the same regions where sediment has the greatest potential to impact water quality:

(1) Jackson Purchase - 75% available land for crop use.

(2) Western Coal Field - 70%

(3) Pennroyal - 66%

(4) Bluegrass - 58%

(5) Eastern Coal Fields - 15%

There are seven general practices relating to agriculture which increase the sediment load in streams:

(1) Soil disturbance.

(2) Alternation of natural vegetation patterns.

(3) Increase in available nutrients - fertilization.

(4) Use of significant quantities of chemical compounds.

(5) The application of surface and ground-water through crop irrigation.

(6) Animal concentration (in feedlots).

(7) Overgrazing

It is estimated that wisely selected, adequately designed conservation practices can reduce sediment pollution 50 to 90% in a given area. These measures are often simple practices such as contour farming, excluding livestock from highly erodable soil, grassed waterways, filter strips of vegetation along waterways, and sediment retainers at construction sites.

District evaluation of water quality resulted in the following rating:

- 24 districts rated water quality in their county GOOD.
- 33 districts rated water quality in their county FAIR.
- 34 districts rated water quality in their county POOR.

Conservation districts have recommended that 370 technically trained people be added over the next five years, and conservation practices be put into effect at a total cost in excess of $1.3

billion. The cost breakdown is as follows:

SOURCE	ACREAGE	COST
Cropland	1,564,000	$ 229,446,000
Septic Tank Malfunctions		335,203,000
Mining Activities	248,600	440,293,000
Solid Waste/ Litter Disposal		675,000
Commercial, Residential, Highway, Construction	69,800 127 mi.	12,800,000 138,000
Streambanks	23,800 3,767 mi.	22,622,000 98,850,000
Grassland	873,000	74,840,000
Forestry	834,000	67,160,000
Roadbank	21,200 2,641 mi.	5,120,000 2,103,000
TOTAL	3,634,400 ac. 6,535 mi.	$ 1,300,000,000

The Silviculture and Construction Task Forces have issued their own best management practices guide manual. This guide identifies undesirable practices and suggests conservation measures which can minimize sediment runoff.

PUBLIC PARTICIPATION

The success of the 208 planning process will depend to a large extent on the degree of public response. If the recommendations and best management practices advocated by the technical committees are implemented, significant reductions in sediment loading can be expected. The Public Participation Task Force is the element responsible for generating public response. A cyclical type of response and feedback occurring through a series of public meetings and review sessions is envisioned. The program is designed to solicit questions and issues from the public for another round of comments. It remains to be seen whether voluntary compliance will be sufficient or if a regulatory program is needed to implement the best management practices.

The effort of the statewide 208 program in the future will be to establish a monitoring network to determine levels of nonpoint pollutants, primarily sediment, in the streams. Specifically, over the next five years, the areas where best management practices are being applied will be monitored so that an evaluation may be made of the overall effectiveness of the program in reducing nonpoint stream loads.

DESIGNATED AREAS

The two designated area 208 agencies, Kentuckiana Regional Planning and Development Agency (serving Louisville-Jefferson County area) and Ohio-Kentucky-Indiana Regional Council (Cincinnati area) have submitted final reports.*

KIPDA has discovered that all the streams and waterways in the planning area suffer from some degree of pollution, mainly suspended solids and coliform bacteria. The recommended controls for nonpoint sources are primarily land management techniques such as: retention of buffer zones, minimization of soil disturbance during construction, use of vegetative methods or retaining wall where necessary, retention basins, and best management practices for agricultural sites.

OKI has found that the main source of pollution is point source in their region but that the control of nonpoint runoff should be a long term goal. They recommend best management practices for agricultural lands and legislation to reduce soil loss. Urban areas should investigate the enforcement or development of local ordinances to control sediment erosion from construction sites, and improve street sweeping practices in communities with storm sewer systems.

*Copies of the final reports can be obtained by writing:

KIPDA
505 West Ormsby Ave.
Louisville, Kentucky 40203

OKI
426 East Fourth St.
Cincinnati, Ohio 45202

APPENDIX: WATER QUALITY DATA BY RIVER BASIN
WATER QUALITY INDEX PROCESS

This section contains in tabular form the water quality data by river basin for the Commonwealth. The data were contributed by U.S.G.S. and the Division of Water Quality, and retrieved from STORET. No attempt was made to differentiate the source in the tables.

Also in this section is the Water Quality Index for the Kentucky, Green, and Cumberland Rivers contributed by the U. S. Environmental Protection Agency.

WATER QUALITY DATA FOR MISSISSIPPI RIVER BASIN

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
pH (S.U.)	Bayou De Chien near Clinton 07024000	70/11/04	72/08/17	3	7.20	7.70	6.90	0.44	6 < pH < 9 (S.U.)
Conductivity (umhos)	Bayou De Chien near Clinton 07024000	70/11/04	72/08/17	3	105.3	122.0	95.0	14.60	800 (umhos)
Dissolved Solids (mg/l)	Bayou De Chien near Clinton 07024000	70/11/04	72/08/17	3	67.7	88.0	52.0	18.4	500 (mg/l)
Alkalinity (mg/l as $CaCo_3$)	Bayou De Chien near Clinton 07024000	70/11/04	72/08/17	3	42.0	43.0	41.0	1.0	
Hardness (mg/l as $CaCo_3$)	Bayou De Chien near Clinton 07024000	70/11/04	72/08/17	3	37.0	39.0	34.0	2.6	
Chloride (mg/l)	Bayou De Chien near Clinton 07024000	70/11/04	72/08/17	3	3.6	5.4	2.5	1.6	
Sulphate (mg/l)	Bayou De Chien near Clinton 07024000	70/11/04	72/08/17	3	5.3	6.9	3.6	1.7	

WATER QUALITY DATA FOR MISSISSIPPI RIVER BASIN
(Page 2)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Fluoride (mg/l)	Bayou De Chien near Clinton 07024000	70/11/04	72/08/17	3	0.07	0.1	0.0	0.06	1.0 (mg/l)
Nitrate (mg/l)	Bayou De Chien near Clinton 07024000	70/11/04	72/08/17	3	2.07	3.0	0.9	1.07	
Phosphate (mg/l)	Bayou De Chien near Clinton 07024000	70/11/04	72/08/17	3	0.34	0.6	0.05	0.28	
Total Iron (ug/l)	Mississippi R. at Wickliffe 07001950	77/02/15	77/09/23	7	1177	2610	343	874	
Total Manganese (ug/l)	Mississippi R. at Wickliffe 07001950	77/02/15	77/09/23	7	105	227	27	78	
Total Chromium (ug/l)	Mississippi R. at Wickliffe 07001950	77/02/15	77/09/23	7	2.86	60	1.0	1.95	0.05 (ug/l)
Total Lead (ug/l)	Mississippi R. at Wickliffe 07001950	77/02/15	77/09/23	7	12.4	20	8	4.3	0.05 (ug/l)

WATER QUALITY DATA FOR MISSISSIPPI RIVER BASIN
(Page 3)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Arsenic (ug/l)	Mississippi R. at Wickliffe 07001950	77/02/15	77/09/23	3	1	1	1	0.0	0.05 (ug/l)
Total Coliform/ 100 ml	Mississippi R. at Wickliffe 07001950	77/02/15	77/09/23	7	631	1567	73	591	1000/100 ml
Fecal Coliform/ 100 ml	Mississippi R. at Wickliffe 07001950	77/02/15	77/09/23	8	1507	6160	40	1982	200/100 ml

WATER QUALITY DATA FOR OHIO RIVER BASIN

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
pH (S.U.)	Tygarts Ck. near Greenup 03217000	60/04/28	72/09/06	6	7.4	8.3	7.0	0.5	$6 < pH < 9$ (S.U.)
	Tradewater R. at Olney 03383000	51/10/10	73/09/30	480	5.96	7.9	3.5	1.1	
Conductivity (umhos)	Tygarts Ck. near Greenup 03217000	60/04/28	75/06/24	13	210	300	103	60	800 (umhos)
	Tradewater R. at Olney 03383000	51/10/10	73/09/30	513	486	2480	50	333	
	Tradewater R. at Sullivan 03384180	75/08/27	77/05/18	8	863	2500	370	713	
Dissolved Solids (mg/l)	Tygarts Ck. near Greenup 03217000	60/04/28	72/09/06	5	136	180	71	45	500 (mg/l)
	Tradewater R. at Olney 03383000	51/10/10	73/09/30	514	363	2400	48	299	

WATER QUALITY DATA FOR OHIO RIVER BASIN
(Page 2)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Suspended Sediment (mg/l)	Tygarts Ck. near Greenup 03217000	56/12/14	73/05/20	34	804	2940	106	629	
	Tradewater R. at Olney 03383000	57/01/22	73/05/28	10	323	733	113	209	
Alkalinity (mg/l as $CaCo_3$)	Tygarts Ck. near Greenup 03217000	60/04/28	72/09/06	5	81	101	35	28	
	Tradewater R. at Olney 03383000	59/12/20	73/09/30	206	12	98	0	23	
Hardness (mg/l as $CaCo_3$)	Tygarts Ck. near Greenup 03217000	60/04/28	72/09/06	6	102	130	47	31	
	Tradewater R. at Olney 03383000	51/10/10	73/09/30	473	227	1380	15	178	

WATER QUALITY DATA FOR OHIO RIVER BASIN
(Page 3)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Chlorides (mg/l)	Tygarts Ck. near Greenup 03217000	60/04/28	72/09/06	6	6	13	1	4	
	Tradewater R. at Olney 03383000	51/10/10	73/09/30	359	4.2	21	0.2	2.5	
Sulphates (mg/l)	Tygarts Ck. near Greenup 03217000	60/04/28	72/09/06	6	24	31	14	6	
	Tradewater R. at Olney 03383000	51/10/10	73/09/30	358	243	1600	12	230	
Fluoride (mg/l)	Tygarts Ck. near Greenup 03217000	60/04/28	72/09/06	4	0.125	0.2	0.1	0.05	1.0 (mg/l)
	Tradewater R. at Olney 03383000	51/10/10	73/02/26	106	0.34	1.2	0.1	0.24	

WATER QUALITY DATA FOR OHIO RIVER BASIN
(Page 4)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Nitrate (mg/l)	Tygarts Ck. near Greenup 03217000	60/04/28	72/09/06	5	1.42	3.8	0.2	1.4	
	Tradewater R. at Olney 03383000	51/10/10	58/09/30	76	0.84	2.1	0.1	1	
Total Phosphates (mg/l)	Tygarts Ck. near Greenup 03217000	70/09/10	72/09/06	3	0.03	0.08	0	0.04	
	Tradewater R. at Olney 03383000	71/09/13		1	0.03	-	-	-	
Total Iron (ug/l)	Tradewater R. at Olney 08010950	77/02/15	77/09/20	6	548	1100	110	341	
	Tradewater R. at Highway 120 08225950	77/01/15	77/09/23	9	797	1740	202	553	

WATER QUALITY DATA FOR OHIO RIVER BASIN
(Page 5)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Manganese (ug/l)	Tradewater R. at Olney 03383000	77/02/15	77/09/20	6	3761	7100	1380	2312	
	Tradewater R. at Highway 120 08225950	77/01/15	77/09/23	9	139	222	32	56	
Total Chromium (ug/l)	Tradewater R. at Olney 03383000	77/02/15	77/09/20	6	1.8	2	1	0.4	0.05 (ug/l)
	Tradewater R. at Highway 120 08225950	77/01/15	77/09/23	9	1.9	4	1	1	
Total Lead (ug/l)	Tradewater R. at Olney 03383000	77/02/15	77/09/20	6	19.5	63	5	21.7	0.05 (ug/l)
	Tradewater R. at Highway 120 08225950	77/01/15	77/09/23	9	8.1	14	4	3.5	

WATER QUALITY DATA FOR OHIO RIVER BASIN
(Page 6)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Arsenic (ug/1)	Tradewater R. at Olney 03383000	77/02/15	77/09/20	3	1	-	-	-	0.05
	Tradewater R. at Highway 120 08225950	77/01/15	77/09/23	3	1	-	-	-	
Total Coliform/100 ml	Gunpowder Ck.	77/11/28	78/01/03	6	10,817	41,000	1700	14,928	1000/100 ml
	Mudlick Ck.	77/11/28	78/01/03	7	6683	40,000	75	14,748	
	Tradewater R. at Highway 120	77/01/27	77/12/08	3	2909	8000	333	4409	
Fecal Coliform/100 ml	Gunpowder Ck.	77/11/28	78/01/03	7	431	897	33	332	200/100 ml
	Mudlick Ck.	77/11/28	78/01/03	7	1725	11,500	4	4311	
	Tradewater R. at Highway 120	77/01/27	77/12/08	4	102	240	0	104	

WATER QUALITY DATA FOR TENNESSEE RIVER BASIN

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
pH (S.U.)	Tennessee R. at Highway 60 03609750	73/11/26	77/12/13	40	7.3	8.6	6.2	0.6	6 < pH < 9 (S.U.)
Conductivity (umhos)	Tennessee R. at Highway 60 03609750	73/11/26	77/12/13	49	157	195	120	17.3	800 (umhos)
Dissolved Solids (mg/l)	Tennessee R. at Highway 60 03609750	73/11/26	77/10/21	31	93	150	66	17.5	500 (mg/l)
Suspended Sediment (mg/l)	Tennessee R. at Highway 60 03609750	73/11/26	77/12/13	45	15.9	49	0	8.6	
Alkalinity (mg/l as $CaCo_3$)	Tennessee R. at Highway 60 03609750	73/11/26	77/10/21	31	51.6	62	40	5.9	
Hardness (mg/l as $CaCo_3$)	Tennessee R. at Highway 60 03609750	73/11/26	77/10/21	31	63	80	48	7.3	
Chlorides (mg/l)	Tennessee R. at Highway 60 03609750	73/11/26	77/10/21	31	5.6	8.5	1.3	1.8	
Sulphates (mg/l)	Tennessee R. at Highway 60 03609750	73/11/26	77/10/21	31	11.6	15	7.8	1.9	

WATER QUALITY DATA FOR TENNESSEE RIVER BASIN
(Page 2)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Fluoride (mg/l)	Tennessee R. at Highway 60 03609750	73/11/26	77/10/21	31	0.17	0.5	0	0.1	1.0 (mg/l)
Total Iron (ug/l)	Tennessee R. at Highway 60 03609750	73/12/18	77/10/21	18	795	1500	260	334	
Total Manganese (ug/l)	Tennessee R. at Highway 60 03609750	73/12/18	77/10/21	18	62.4	88	30	16.4	
Total Chromium (ug/l)	Tennessee R. at Highway 60 03609750	73/12/18	77/10/21	18	13	53	0	13.6	0.05 (ug/l)
Total Lead (ug/l)	Tennessee R. at Highway 60 03609750	73/12/18	77/10/21	18	21.8	52	2	13.7	0.05 (ug/l)
Total Arsenic (ug/l)	Tennessee R. at Highway 60 03609750	73/12/18	77/10/21	18	2	10	0	2.7	0.05 (ug/l)
Total Coliform/ 100 ml	Tennessee R. at Calvert City	76/06/29	77/12/07	8	2167	8000	14	2812	1000/100 ml
	Tennessee R. at Highway 60 03609750	73/11/26	74/07/16	9	182	490	60	124	
	Tennessee R. at Paducah	77/01/27	77/12/08	7	298	573	82	172	

WATER QUALITY DATA FOR TENNESSEE RIVER BASIN
(Page 3)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Fecal Coliform/ 100 ml	Tennessee R. at Calvert City	76/06/29	77/12/07	5	333	672	50	283	200/100 ml
	Tennessee R. at Highway 60 03609750	74/06/12	77/12/13	37	37.4	140	4	34.9	
	Tennessee R. at Paducah	77/01/27	77/12/08	5	181	613	24	245	

WATER QUALITY DATA FOR LOWER CUMBERLAND RIVER BASIN

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
pH (S.U.)	Cumberland R. at Grand Rivers 03438220	66/01/19	77/12/07	67	7.4	8.5	6.3	0.5	$6 < pH < 9$ (S.U.)
Conductivity (umhos)	Cumberland R. at Grand Rivers 03438220	66/01/19	77/12/07	86	192	239	138	21.8	800 (umhos)
Dissolved Solids (mg/l)	Cumberland R. at Grand Rivers 03438220	66/01/19	77/10/20	56	113	162	86	17.3	500 (mg/l)
Suspended Sediment (mg/l)	Cumberland R. at Grand Rivers 03438220	74/09/17	77/10/20	44	23.8	167	5	26.5	
Alkalinity (mg/l as $CaCo_3$)	Cumberland R. at Grand Rivers 03438220	67/11/30	77/10/20	53	68.8	96	53	9.6	
Hardness (mg/l as $CaCo_3$)	Cumberland R. at Grand Rivers 03438220	66/01/19	77/10/20	55	85.4	110	63	11.3	

WATER QUALITY DATA FOR LOWER CUMBERLAND RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Chlorides (mg/l)	Cumberland R. at Grand Rivers 03438220	66/01/19	77/10/20	56	4.6	13	1.7	2.4	
Sulphates (mg/l)	Cumberland R. at Grand Rivers 03438220	66/01/19	77/10/20	56	16.9	24	10	2.9	
Fluoride (mg/l)	Cumberland R. at Grand Rivers 03438220	66/01/19	77/10/20	41	0.18	1.2	0	0.19	1.0 (mg/l)
Nitrate (Dissolved) (mg/l)	Cumberland R. at Grand Rivers 03438220	66/01/19	72/08/09	25	2.9	6.5	0.9	1.3	
Phosphates (mg/l)	Cumberland R. at Grand Rivers 03438220	70/09/23	72/08/09	3	0.29	0.45	0.2	0.14	
Total Iron (ug/l)	Eddy Ck. at Princeton 20005950	77/01/15	77/09/15	9	473	1090	153	325.2	
	Cumberland R. at Grand Rivers 03438220	73/05/03	77/10/20	20	729	1700	180	380	

WATER QUALITY DATA FOR LOWER CUMBERLAND RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Manganese (ug/l)	Eddy Ck. at Princeton 20005950	77/01/15	77/09/15	9	134	278	39	85.1	
	Cumberland R. at Grand Rivers 03438220	66/08/08	77/10/20	26	522	12000	10	2341	
Total Chromium (ug/l)	Eddy Ck. at Princeton 20005950	77/01/15	77/09/15	9	1.9	4	1	1	0.05 (ug/l)
	Cumberland R. at Grand Rivers 03438220	73/05/03	77/10/20	20	20.4	230	0	49.8	
Total Lead (ug/l)	Eddy Ck. at Princeton 20005950	77/01/15	77/09/15	9	7.1	10	4	1.9	0.05 (ug/l)
	Cumberland R. at Grand Rivers 03438220	73/05/03	77/10/20	20	34	320	1	68.9	

WATER QUALITY DATA FOR LOWER CUMBERLAND RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Arsenic (ug/l)	Eddy Ck. at Princeton 20005950	77/01/15	77/09/15	3	1	1	1	0	0.05 (ug/l)
	Cumberland R. at Grand Rivers 03438220	73/05/03	77/10/20	18	3.2	14	0	4.2	
Total Coliform/ 100 ml	Red R. at Adairville	77/01/27	77/10/27	3	149	240	53	93.6	1000/100 ml
	N. Fork Little R. at Hopkinsville	77/01/27	77/12/08	4	491	1600	11	744	
	Lake Barkley at Eddyville	77/01/27	77/12/07	8	326	1100	9	402	
	Cumberland R. at Grand Rivers 03438220	73/11/27	74/06/10	8	1024	4500	80	1471	
Fecal Coliform/ 100 ml	Red R. at Adairville	77/01/27	77/10/27	3	1217	2800	250	1382	200/100 ml
	N. Fork Little R. at Hopkinsville	77/01/27	77/12/08	4	567	740	433	127.4	
	Lake Barkley at Eddyville	77/01/27	77/12/07	5	704	1613	60	825	
	Cumberland R. at Grand Rivers 03438220	74/06/10	77/12/07	34	89	1500	1	259	

WATER QUALITY DATA FOR UPPER CUMBERLAND RIVER BASIN

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
PH (S.U.)	Cumberland R. at Pineville 03403000	60/05/03	72/09/07	4	7.6	7.9	7.3	0.25	6 < pH < 9 (S.U.)
	Laurel R. at Corbin 03405000	65/10/20	72/09/08	4	7.4	8.2	6.7	0.6	
	Rockcastle R. at Billows 03406500	51/10/09	72/08/31	15	7.2	7.5	6.7	0.26	
	Cumberland R. at Burkesville 03414110	65/12/06	72/05/01	25	7.2	7.9	6.5	0.35	
Conductivity (umhos)	Cumberland R. at Pineville 03403000	60/05/03	72/09/07	4	382	495	294	91.3	800 (umhos)
	Laurel R. at Corbin 03405000	65/10/20	72/09/08	4	294	401	178	98.8	
	Rockcastle R. at Billows 03406500	51/10/09	77/05/02	24	151	223	90	43.2	
	Cumberland R. at Rowena 03414000	65/05/20	77/06/02	9	149	175	125	14.5	
	Cumberland R. at Burkesville 03414110	65/12/06	72/05/01	28	149	203	110	17.8	

WATER QUALITY DATA FOR UPPER CUMBERLAND RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Dissolved Solids (mg/l)	Cumberland R. at Pineville 03403000	60/05/03	72/09/07	3	230	316	180	74.8	500 (mg/l)
	Laurel R. at Corbin 03405000	71/11/16	72/09/08	2	180	220	140	56.5	
	Rockcastle R. at Billows 03406500	51/10/09	77/03/24	19	90	134	58	25.9	
	Cumberland R. at Burkesville 03414110	65/12/06	72/05/01	25	90.5	117	70	11.8	
Alkalinity (mg/l as $CaCo_3$)	Cumberland R. at Danville 03403000	60/05/03	72/09/07	4	98	125	72	26	
	Laurel R. at Corbin 03405000	65/10/20	72/09/08	3	77	107	49	29	
	Rockcastle R. at Billows 03406500	60/05/05	77/03/24	8	59	78	37	19	
	Cumberland R. at Burkesville 03414110	67/10/02	72/05/01	17	44	75	31	10.6	

WATER QUALITY DATA FOR UPPER CUMBERLAND RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Hardness (mg/l as $CaCo_3$)	Cumberland at Pineville 03403000	60/05/03	72/09/07	4	97	130	34	24	
	Laurel R. at Corbin 03405000	65/10/20	72/09/08	4	85.5	120	42	32.6	
	Rockcastle R. at Billows 03406500	61/10/09	77/03/24	19	66	100	42	19.3	
	Cumberland R. at Burkesville 03414110	65/12/06	72/05/01	25	61.5	92	53	8.2	
Chlorides (mg/l)	Cumberland R. at Pineville 03403000	60/05/03	72/09/07	4	11.7	20	4	6.7	
	Laurel R. at Corbin 03405000	65/10/20	72/09/08	4	22	34	17	8	
	Rockcastle R. at Billows 03406500	61/10/09	77/03/24	19	2.8	6	1.2	1.2	
	Cumberland R. at Burkull 03414110	65/12/06	72/05/01	25	3.7	5	2	0.7	

WATER QUALITY DATA FOR UPPER CUMBERLAND RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Sulphates (mg/l)	Cumberland R. at Pineville 03403000	60/05/03	72/09/07	4	76.5	96	68	13	
	Laurel R. at Corbin 03405000	05/10/20	75/09/08	4	39	61	15	19	
	Rockcastle R. at Billows 03406500	61/10/09	77/03/24	19	19.3	37	14	6.1	
	Cumberland R. at Burkesville 03414110	65/12/06	72/05/01	25	26	36	20	4	
Fluoride (mg/l)	Cumberland R. at Pineville 03403000	60/05/03	72/09/07	3	0.8	2	0.1	1	1.0 (mg/l)
	Laurel R. at Corbin 03405000	71/11/16	72/09/08	2	0.4	0.5	0.3	0.14	
	Rockcastle R. at Billows 03406500	51/10/09	77/03/24	19	0.1	0.3	0	0.08	
	Cumberland R. at Burkesville 03414110	66/12/02	75/05/01	7	0.1	0.3	0	0.1	

WATER QUALITY DATA FOR UPPER CUMBERLAND RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Nitrate (mg/l)	*Cumberland R. at Pineville 03403000	60/05/03	72/09/07	4	1.95	4.7	0.1	2.0	
	*Laurel R. at Corbin 03405000	71/11/16	72/09/08	2	6.35	8.3	4.4	2.8	
	*Rockcastle R. at Billows 03406500	60/05/05	77/05/02	9	1.1	2.4	0.2	0.8	
	*Cumberland R. at Rowena 03414000	65/05/20		1	0.7	-	-	-	
	*Cumberland R. at Burkesville 03414110	65/12/06	72/05/01	25	1.7	2.5	0.6	0.7	
*Dissolved									
Phosphate (mg/l)	Cumberland R. at Pineville 03403000	71/11/17	72/09/07	2	0.29	0.32	0.26	0.04	
	Laurel R. at Corbin 03405000	71/11/16	72/09/08	2	1.75	2.3	1.2	0.8	
	Rockcastle R. at Billows 03406500	71/11/11	72/08/31	2	0.14	0.18	0.1	0.06	
	Cumberland R. at Burkesville 03414110	70/09/08	72/05/01	4	0.05	0.09	0	0.04	

WATER QUALITY DATA FOR UPPER CUMBERLAND RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Iron (ug/l)	Cumberland R. at Harlan 02044950	77/01/15	77/09/23	9	1757	4100	427	1254	
	Cumberland R. at Barbourville 02032950	77/01/15	77/09/13	6	1297	2960	522	986	
	Cumberland R. at Williamsburg 02031950	77/01/15	77/09/26	9	2566	11600	539	3546	
	Rockcastle R. at Billows 03406500	51/10/09	52/09/19	11	72	160	10	54	
	Cumberland R. at Somerset 02011950	77/01/15	77/09/20	9	689	2290	204	710	
	Cumberland R. at Burkesville 02001900	77/01/15	77/09/15	9	731	1590	195	420	
Total Manganese (ug/l)	Cumberland R. at Harlan 02044950	77/01/15	77/09/23	9	336	1890	31	589	
	Cumberland R. at Barbourville 02032500	77/01/15	77/09/13	6	149.5	214	116	40.2	

WATER QUALITY DATA FOR UPPER CUMBERLAND RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Manganese (ug/l)	Cumberland R. at Williamsburg 02031950	77/01/15	77/09/26	9	263	734	134	219	
	Cumberland R. at Somerset 02011950	77/01/15	77/09/20	8	107	209	21	72.5	
	Cumberland R. at Burkesville 02001900	77/01/15	77/09/15	9	78	183	30	51.4	
Total Chromium (ug/l)	Cumberland R. at Harlan 02044950	77/01/15	77/09/23	9	2.7	7	1	2	0.05 (ug/l)
	Cumberland R. at Barbourville 02032500	77/01/15	77/09/13	6	2.5	4	1	1	
	Cumberland R. at Williamsburg 02031950	77/01/15	77/09/26	9	3.1	7	2	1.8	
	Rockcastle R. at Billows 03406500	75/07/31	77/05/02	9	16.7	40	0	12.2	
	Cumberland R. at Somerset 02011950	77/01/15	77/09/20	9	4.7	32	1	10.3	
	Cumberland R. at Burkesville 02001900	77/01/15	77/09/15	9	2.2	10	1	2.9	

WATER QUALITY DATA FOR UPPER CUMBERLAND RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Lead (ug/l)	Cumberland R. at Harlan 02044950	77/01/15	77/09/23	9	12.4	26	3	7.2	0.05 (ug/l)
	Cumberland R. at Barbourville 02032950	77/01/15	77/09/13	6	18	29	10	8.3	
	Cumberland R. at Williamsburg 02031950	77/01/15	77/09/26	9	20.4	61	3	18.2	
	Rockcastle R. at Billows 03406500	75/07/31	77/05/02	9	14	70	0	21.3	
	Cumberland R. at Somerset 02011950	77/01/15	77/09/20	9	4.3	9	1	2.7	
	Cumberland R. at Rowena 03414000	75/08/05	77/06/02	9	21	43	10	9.9	
	Cumberland R. at Burkesville 02001900	77/01/15	77/09/15	9	24.4	98	3	29.2	

WATER QUALITY DATA FOR UPPER CUMBERLAND RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Arsenic (ug/l)	Cumberland R. at Harlan 02044950	77/01/15	77/09/23	3	1	1	1	0	0.05 (ug/l)
	Cumberland R. at Barbourville 02032950	77/01/15	77/09/13	3	1	1	1	0	
	Cumberland R. at Williamsburg 02031950	77/01/15	77/09/26	3	1	1	1	0	
	Rockcastle R. at Billlows 03406500	75/07/31	77/05/02	9	0.33	2	0	0.7	
	Cumberland R. at Somerset 02011950	77/01/15	77/09/20	3	1	1	1	0	
	Cumberland R. at Rowena 03414000	75/08/05	77/06/02	9	0.44	4	0	1.3	
	Cumberland R. at Burkesville 02001900	77/01/15	77/09/15	3	1	1	1	0	

WATER QUALITY DATA FOR UPPER CUMBERLAND RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Coliform/ 100 ml	Poor Fork at Cumberland	75/02/26	75/11/17	9	14000	26826	800		1000/100 ml
	Cumberland R. at Harlan	75/02/13	75/11/11	11	12968	38000	1900		
	Cumberland R. at Pineville	75/02/15	75/11/11	11	5909	31000	1400		
	Laurel R. at Corbin	75/05/11	75/11/11	10	681	3400	80		
Fecal Coliform/ 100 ml	Poor Fork at Cumberland	75/02/12	75/10/30	7	9965	59000	20		200/100 ml
	Cumberland R. at Harlan	75/02/13	75/07/31	6	643	1200	300		
	Cumberland R. at Pineville	75/02/13	75/07/28	6	635	1700	160		
	Laurel R. at Corbin	75/02/11	75/05/22	4	90	300	0		

WATER QUALITY DATA FOR GREEN RIVER BASIN

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
pH (S.U.)	Green R. at Greensburg 03306090	59/10/14	72/08/24	114	7.2	8.1	6.4	0.32	6 < pH < 9 (S.U.)
	Green R. at Munfordville 03308500	51/10/10	73/09/12	563	7.58	9.6	6.5	0.39	
	Barren R. at Bowling Green 03314500	59/10/16	75/06/03	46	7.49	8.2	6.1	0.44	
	Pond R. nr. Apex 03320500	61/04/12	72/08/17	5	7.36	7.99	6.9	0.44	
	Pond R. nr. Sacramento 03321100	57/10/01	73/07/16	81	4.87	7.0	2.8	1.4	
	Green R. at Beech Grove 03321230	74/10/16	77/12/07	34	7.13	8.5	6.0	0.6	
	Green R. at Lock #1 03321500	56/10/10	72/08/16	106	7.34	8.1	6.8	0.24	

WATER QUALITY DATA FOR GREEN RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Conductivity (umhos)	Green R. at Greensburg 03306090	59/10/14	77/02/24	144	193	2570	72	225	800 (umhos)
	Green R. at Munfordville 03308500	51/10/10	73/09/12	595	466	9420	47	640	
	Barren R. at Bowling Green 03314500	59/10/16	77/05/12	79	249	380	116	43.4	
	Pond R. nr. Apex 03350500	61/04/12	77/05/13	14	310	483	170	103.4	
	Pond R. nr. Sacramento 03321100	57/10/01	73/07/16	90	1141	3230	143	795	
	Green R. at Beech Grove 03321230	74/10/16	77/12/07	39	301	500	10	80.3	
	Green R. at Lock #1 03321500	56/10/10	72/08/16	155	322	1080	132	148.7	

WATER QUALITY DATA FOR GREEN RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Dissolved Solids (mg/l)	Green R. near Greensburg 03306490	59/10/14	72/08/24	113	108	566	58	60.9	500 (mg/l)
	Green R. at Munfordville 03308500	51/10/10	73/09/12	585	263	5830	61	373.7	
	Barren R. at Bowling Green 03341500	59/10/16	77/04/07	53	153	397	82	41.9	
	Pond R. near Apex 03320500	70/09/25	72/08/17	3	230	278	138	79.7	
	Pond R. near Sacramento 03321100	57/10/01	73/07/16	80	838	2960	128	666	
	Green R. near Beech Grove 03321230	74/10/16	77/12/07	37	192	319	104	49.1	
	Green R. at Lock #1 03321500	56/10/10	72/08/16	140	190	572	88	73.7	

WATER QUALITY DATA FOR GREEN RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Suspended Sediment (mg/l)	Green R. at Munfordville 03308500	66/01/04	77/10/02	34	641	1640	0	33.8	
	Barren R. at Bowling Green 03314500	57/01/24	57/06/11	13	546	981	207	309.6	
	Green R. near Beech Grove 03321230	74/10/16	77/12/07	30	53.7	362	20	63.3	
Alkalinity (mg/l as $CaCo_3$)	Green R. at Greensburg 03306490	59/10/14	72/08/24	35	61	114	30	17	
	Green R. at Munfordville 03308500	59/10/09	73/09/12	220	95	153	40	25	
	Barren R. at Bowling Green 03314500	59/10/16	77/04/07	46	103	155	46	20	
	Pond R. near Apex 03320500	61/04/12	72/08/17	5	91	124	60	29	
	Pond R. near Sacramento 03321100	59/10/17	73/07/16	50	8.7	57	0	12.7	

WATER QUALITY DATA FOR GREEN RIVER BASIN
(Page 5)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Alkalinity (mg/l as $CaCo_3$)	Green R. near Beech Grove 03321230	74/10/16	77/12/07	37	81	107	50	18.7	
	Green R. at Lock #1 03321500	59/10/31	72/08/16	39	79	119	44	17.7	
Hardness (mg/l as $CaCo_3$)	Green R. at Greensburg 03306490	59/10/14	72/08/24	104	79	358	35	37	
	Green R. at Munfordville 03308500	51/10/10	73/09/12	558	137	1220	45	85	
	Barren R. at Bowling Green 03314500	59/10/16	77/04/07	54	123	190	52	23	
	Pond R. near Apex 03320500	61/04/12	72/08/17	5	116	170	80	40	
	Pond R. near Sacramento 03321100	57/10/01	73/07/16	75	476	1540	58	367	
	Green R. near Beech Grove 03321230	74/10/16	77/12/07	36	139	220	86	30.2	
	Green R. at Lock #1 03321500	56/10/10	72/08/16	143	124	225	58	32.6	

WATER QUALITY DATA FOR GREEN RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Chlorides (mg/l)	Green R. near Greensburg 03306090	59/10/14	72/08/24	115	15.4	750	1	75	
	Green R. at Munfordville 03308500	51/10/10	73/09/12	587	78	3250	0.5	210	
	Barren R. at Bowling Green 03314500	59/10/16	77/04/07	54	6.6	12	2.9	2.0	
	Pond R. near Apex 03320500	61/04/12	72/08/17	5	33.7	64	9.5	25.8	
	Pond R. near Sacramento 03321100	57/10/01	73/07/16	79	30.8	318	3	42.9	
	Green R. near Beech Grove 03321230	74/10/16	77/12/07	37	6.6	14	3	2.5	
	Green R. at Lock #1 03321500	56/10/10	72/08/16	143	24.2	254	2.5	39.5	

WATER QUALITY DATA FOR GREEN RIVER BASIN
(Page 7)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Sulphates (mg/l)	Green R. near Greensburg 03306090	59/10/14	72/08/24	114	15.5	46	9.6	4.6	
	Green R. at Munfordville 03308500	51/10/10	73/09/12	561	16.4	106	6.2	6.7	
	Barren R. at Bowling Green 03314500	59/10/16	77/04/07	54	17.5	36	8	4.8	
	Pond R. near Apex 03320500	61/04/12	72/08/17	5	20.2	32	16	6.6	
	Pond R. near Sacramento 03321100	57/10/01	73/07/16	80	555.7	1900	62	486.5	
	Green R. near Beech Grove 03321230	74/10/16	77/12/07	37	55	120	16	23	
	Green R. at Lock #1 03321500	56/10/10	72/08/16	143	40.6	107	10	19.8	

WATER QUALITY DATA FOR GREEN RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Fluoride (mg/l)	Green R. near Greensburg 03306490	59/10/14	72/08/24	56	0.15	0.5	0	0.11	1.0 (mg/l)
	Green R. at Munfordville 03308500	51/10/10	72/10/27	163	0.13	0.5	0	0.08	
	Barren R. at Bowling Green 03314500	59/10/10	77/04/07	32	0.13	0.3	0	0.08	
	Pond R. near Apex 03320500	61/04/12	72/08/17	5	0.12	0.2	0.1	0.04	
	Pond R. near Sacramento 03321100	57/10/01	73/07/16	52	0.96	3.3	0	0.9	
	Green R. near Beech Grove 03321230	74/10/16	77/12/07	37	0.14	0.4	0	0.07	
	Green R. at Lock #1 03321500	56/10/10	72/08/16	122	0.18	0.5	0	0.08	

WATER QUALITY DATA FOR GREEN RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Nitrate (mg/l)	Green R. near Greensburg 03306490	59/10/14	62/09/11	34	1.73	4.6	0.3	1.15	
	Green R. at Munfordville 03308500	59/10/15	73/09/12	163	2.65	7.2	0.1	1.4	
	Barren R. at Bowling Green 03314500	59/10/16	60/09/20	11	2.53	4.8	0.1	1.4	
	Pond R. near Apex (Dissolved) 03320500	61/04/12	72/08/17	5	2.3	3.9	1.2	1.2	
	Pond R. near Sacramento 03321100	57/10/01	60/09/22	19	0.54	1.1	0	0.3	
	Green R. near Beech Grove 03321230	74/10/16	77/12/07	39	5.0	10	2.5	1.5	
	Green R. at Lock #1 03321500	56/10/10	58/09/30	71	2.5	4	0.8	0.7	

WATER QUALITY DATA FOR GREEN RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Phosphates (mg/l)	Green R. near Greensburg 03306490	70/09/08	72/08/24	3	0.07	0.09	0.05	0.02	
	Green R. near Munfordville 03308500	70/09/09	72/08/28	3	0.4	0.8	0.15	0.34	
	Barren R. at Bowling Green 03314500	70/09/14	72/06/28	4	0.11	0.2	0.04	0.07	
	Pond R. near Apex 03320500	70/09/25	72/08/17	3	0.23	0.36	0.12	0.12	
	Pond R. near Sacramento 03321100	70/09/15	72/07/25	3	0.03	0.06	0	0.03	
	Green R. at Lock #1 03321500	70/09/15	72/08/16	5	0.09	0.18	0.0	0.08	

WATER QUALITY DATA FOR GREEN RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Iron (ug/l)	Green R. near Greensburg 03306490	59/10/14	62/09/11	34	242	1100	0	243	
	Green R. at Munfordville 03308500	51/10/10	58/04/14	128	44	1000	0	98	
	Barren R. at Bowling Green 03017901	77/01/15	77/09/22	7	348	1010	106	308	
	Pond R. near Sacramento 03321100	57/10/01	60/09/22	19	805	6800	40	1498	
	Green R. near Beech Grove 03321230	74/10/16	77/10/18	14	2872	12000	100	3426	
	Green R. near Spottsville 030019500	77/03/15	77/06/15	2	1235	1260	1210	35	

WATER QUALITY DATA FOR GREEN RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Manganese (ug/l)	Green R. near Greensburg 03306490	59/10/14	69/01/30	49	218	3200	0	452	
	Green R. at Munfordville 03308500	61/10/05	62/09/20	2	695	1300	90	856	
	Barren R. at Bowling Green 03017901	77/01/15	77/09/22	7	170	538	82	164	
	Pond R. near Sacramento 03321100	57/10/01	68/07/03	50	4935	18000	0	4755	
	Green R. near Beech Grove 03321230	74/10/16	77/10/18	14	318	840	70	181	
	Green R. near Spottsville 03001950	77/03/15	77/06/15	2	288	381	196	131	

WATER QUALITY DATA FOR GREEN RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Chromium (ug/l)	Green R. near Greensburg 03306490	60/11/07	77/05/18	54	2.2	30	0	5.4	0.05 (ug/l)
	Green R. at Munfordville 03308500	62/11/12	65/09/17	29	0	0	0	0	
	Barren R. at Bowling Green 03017901	77/01/15	77/09/22	7	1.1	2	1	0.4	
	Pond R. near Apex 03320500	75/08/28	77/05/13	9	14.4	20	10	5.3	
	Pond R. near Sacramento 03321100	62/10/31	64/08/05	4	0	0	0	0	
	Green R. near Beech Grove 03321230	74/10/16	77/10/18	14	14	30	0	8.4	
	green R. near Spottsville 03001950	77/03/15	77/06/15	2	2	2	2	0	

WATER QUALITY DATA FOR GREEN RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Lead (ug/l)	Green R. near Greensburg 03306490	75/07/18	77/05/18	10	31.3	200	3	61	0.05 (ug/l)
	Barren R. at Bowling Green 03017901	77/01/15	77/09/22	7	11.4	49	0	16.9	
	Pond R. near Apex 03320500	75/08/28	77/05/13	9	8	42	0	13.1	
	Green R. near Beech Grove 03321230	74/10/16	77/10/18	14	6.4	16	0	5.2	
	Green R. near Spottsville 03001950	77/03/15	77/06/15	2	8.5	12	5	4.9	

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Arsenic (ug/l)	Green R. near Greensburg 03306490	75/07/18	77/05/18	10	1	2	0	.7	0.05 (ug/l)
	Barren R. at Bowling Green 03017901	77/01/15	77/09/22	3	1	1	1	0	
	Pond R. near Apex 03320500	75/08/28	77/05/13	9	2.1	5	1	1.4	
	Green R. near Beech Grove 03321230	74/10/16	77/10/18	13	1.5	6	0	1.6	
	Green R. near Spottsville 03001950	77/03/15	77/06/15	2	1	1	1	0	

WATER QUALITY DATA FOR GREEN RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Coliform/ 100 ml	Drakes Ck. at Franklin	76/01/21	77/12/08	3	2996	8000	187		1000/100 ml
	Barren R. at Bowling Green	77/01/27	77/12/08	4	580.5	1600	82	697	
	Green R. at Morgantown	76/02/24	77/06/29	4	1662	2667	1140	720	
	Green R. at Central City	77/01/26	77/06/29	2	837	1133	540	419	
	Rough R. at Hartford	77/01/26	77/06/29	3	803	1600	337	693	
Fecal Coliform/ 100 ml	Drakes Ck. at Franklin	76/01/21	77/12/08	5	414	1200	6	498	200/100 ml
	Barren R. at Bowling Green	77/01/27	77/12/08	4	351	680	67	322	
	Green R. at Morgantown	76/02/24	77/06/29	3	74	193	0	104	
	Green R. at Central City	77/01/26	77/06/29	3	82	227	9	126	
	Rough R. at Hartford	77/01/26	77/06/29	2	230	440	20	297	
	Green R. near Beech Grove 03321230	75/02/11	77/12/07	35	291	2500	18	537	

WATER QUALITY DATA FOR SALT RIVER BASIN

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
pH (S.U.)	Salt R. at Shepherdsville 03298500	65/11/09	75/02/14	38	7.8	8.5	7.0	0.5	6 < pH < 9 (S.U.)
	Rolling Fk. at Boston 03301500	51/10/24	72/09/01	13	7.5	8.5	6.9	0.5	
	Rolling Fk. at Lebanon Jct. 03301630	74/10/08	78/02/08	41	7.3	8.1	6.1	0.4	
Conductivity (umhos)	Salt R. at Shepherdsville 03298500	65/11/09	75/06/25	54	409	537	176	70.1	800 (umhos)
	Rolling Fk. at Boston 03301500	51/10/24	72/09/01	13	283	421	149	71.3	
	Rolling Fk. at Lebanon Jct. 03301630	74/10/08	78/02/08	41	354	485	.40	73.6	

WATER QUALITY DATA FOR SALT RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Dissolved Solids (mg/l)	Salt R. at Shepherdsville 03298500	53/12/08	72/07/26	72	226	336	95	48.7	500 (mg/l)
	Rolling Fk. at Boston 03301500	51/10/24	72/09/01	13	168	226	94	37.4	
	Rolling Fk. at Lebanon Jct. 03301630	74/10/08	78/02/08	39	212	266	102	38.5	
Suspended Sediment (mg/l)	Salt R. at Shepherdsville 03298500	56/12/15	57/06/29	15	992	2020	204	527.6	
	Rolling Fk. at Lebanon Jct. 03301630	74/10/08	77/11/30	25	103	298	4	75.7	

WATER QUALITY DATA FOR SALT RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Alkalinity (mg/l as $CaCo_3$)	Salt R. at Shepherdsville 03298500	66/10/19	72/07/26	17	167	241	62	38.3	
	Rolling Fk. at Boston 03301500	70/10/05	72/09/01	3	162	192	130	31	
	Rolling Fk. at Lebanon Jct. 03301630	74/10/08	78/02/08	39	145	193	62	32.4	
Hardness (mg/l as $CaCo_3$)	Salt R. at Shepherdsville 03298500	65/11/09	72/07/26	37	206	280	80	44.3	
	Rolling Fk. at Boston 03301500	51/10/24	72/09/01	13	138	210	71	38.2	
	Rolling Fk. at Lebanon Jct. 03301630	74/10/08	78/02/08	39	179	240	78	39	

WATER QUALITY DATA FOR SALT RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Chlorides (mg/l)	Salt R. at Shepherdsville 03298500	65/11/09	72/07/26	37	8.8	19	3	2.9	
	Rolling Fk. at Boston 03301500	51/10/24	72/09/01	13	3.9	8.2	1.0	2.0	
	Rolling Fk. at Lebanon Jct. 03301630	74/10/08	78/02/08	39	5.5	10	2.3	1.8	
Sulphates (mg/l)	Salt R. at Shepherdsville 03298500	65/11/09	72/07/26	37	35	48	16	7.8	
	Rolling Fk. at Boston 03301500	51/10/24	72/09/01	13	21.7	33	13	6.2	
	Rolling Fk. at Lebanon Jct. 03301630	74/10/08	78/02/08	39	30	47	14	7	

WATER QUALITY DATA FOR SALT RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Fluoride (mg/l)	Rolling Fk. at Boston 03301500	51/10/24	72/09/01	13	0.12	0.2	0	0.07	1.0 (mg/l)
	Rolling Fk. at Lebanon Jct. 03301630	74/10/08	78/02/08	39	0.19	0.5	0	0.1	
	Salt R. at Shepherdsville 03298500	65/11/09	72/07/26	8	0.2	0.3	0.1	0.08	
Nitrate (mg/l)	Rolling Fk. at Boston 03301500	51/10/24	52/09/04	10	3	5.2	1.2	1.5	
Phosphates (mg/l)	Salt R. at Shepherdsville 03298500	70/10/05	72/07/26	3	0.7	0.75	0.52	0.13	
	Rolling Fk. at Boston 03301500	70/10/05	72/09/01	3	0.6	0.82	0.47	0.17	

WATER QUALITY DATA FOR SALT RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Iron (ug/l)	Salt R. at Shepherdsville 12002900	77/02/15	77/08/18	5	1102	3990	15	1722	
	Rolling Fk. at Boston 03301500	51/10/24	52/09/04	10	77	260	10	81.4	
	Rolling Fk. at Lebanon Jct. 03301630	74/10/08	77/10/04	13	2634	8000	730	1982	
Total Manganese (ug/l)	Salt R. at Shepherdsville 12002900	77/02/15	77/08/18	5	2410	733	5	297.7	
	Rolling Fk. at Lebanon Jct. 03301630	74/10/08	77/10/04	13	132	230	60	49.3	
Chromium (ug/l)	Salt R. at Shepherdsville 12002900	77/02/15	77/08/18	5	2.4	6	1	2.2	0.05 (ug/l)
	Rolling Fk. at Lebanon Jct. 03301630	74/10/08	77/10/04	13	13	30	10	6.3	

WATER QUALITY DATA FOR SALT RIVER BASIN
(Page 7)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Lead (ug/l)	Salt R. at Shepherdsville 12002900	77/02/15	77/08/18	5	26.8	74	6	28.2	0.05 (ug/l)
	Rolling Fk. at Lebanon Jct. 03301630	74/10/08	77/10/04	13	17.6	70	0	18.9	
Total Arsenic (ug/l)	Salt R. at Shepherdsville 12002900	77/02/15	77/08/18	2	2	2	2	0	0.05 (ug/l)
	Rolling Fk. at Lebanon Jct. 03301630	74/10/08	77/10/04	13	1.5	3	0	0.9	
Total Coliform/ 100 ml	Guist Ck. at Shelbyville	77/02/01	77/12/31	4	41	80	20	27.2	1000/100 ml
	Salt R. at Shepherdsville	77/02/01	77/12/31	4	2563	3900	950	1464	

WATER QUALITY DATA FOR SALT RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Fecal Coliform/ 100 ml	Guist Ck. at Shelbyville	77/02/01	77/12/31	6	517	2000	5	802.7	200/100 ml
	Salt R. at Shepherdsville	77/02/01	77/12/31	11	935	2600	120	798	
	Rolling Fk. at Lebanon Jct. 03301630	75/02/12	78/02/08	36	2515	25000	8	4890	

WATER QUALITY DATA FOR KENTUCKY RIVER BASIN

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
pH (S.U.)	Carr Fk. at Sassafras 03277450	70/07/07	74/07/16	33	7.14	8.0	6.4	0.3	6 < pH < 9 (S.U.)
	Red R. at Hazel Green 03282500	70/10/02	72/09/12	3	7.13	7.3	6.8	0.29	
	Red R. at Pine Ridge 03283100	69/03/20	74/10/01	51	7.2	7.8	6.7	0.27	
	Kentucky R. at Frankfort 03287500	51/10/20	73/09/26	441	7.38	8.4	6.2	0.35	
	Kentucky R. at Lock #2 03290500	73/02/07	78/01/11	54	7.24	8.1	6.1	0.48	
	Eagle Ck. at Glencoe 03291500	62/01/25	75/07/14	42	7.56	8.1	7.0	0.26	

WATER QUALITY DATA FOR KENTUCKY RIVER BASIN
(Page 2)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Conductivity (umhos)	Carr Fk. at Sassafras 03277450	70/07/07	76/09/02	56	294	554	84	100.4	800 (umhos)
	Red R. at Hazel Green 03282500	70/10/02	77/06/29	10	102	157	60	37.1	
	Red R. at Pine Ridge 03283100	68/11/21	76/08/17	72	97	160	58	27.5	
	Kentucky R. at Frankfort 03287500	51/10/20	75/03/14	534	240	675	76	87.5	
	Kentucky R. at Lock #2 03290500	73/02/07	78/01/11	58	259	375	123	44.8	
	Eagle Ck. at Glencoe 03291500	62/01/25	76/09/02	65	374	617	2.4	94	

WATER QUALITY DATA FOR KENTUCKY RIVER BASIN
(Page 3)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Dissolved Solids (mg/l)	Carr Fk. at Sassafras 03277450	70/07/07	76/09/02	56	187.4	326	48	63.4	500 (mg/l)
	Red R. at Hazel Green 03282500	70/10/02	72/09/12	3	90	100	74	14	
	Red R. at Pine Ridge 03283100	69/03/20	76/08/17	71	62	96	30	16.1	
	Kentucky R. at Frankfort 03287500	51/10/20	73/09/26	559	143.4	400	8.2	50.8	
	Kentucky R. at Lock #2 03290500	73/02/07	78/01/11	61	160	238	96	25.9	
	Eagle Ck. at Glencoe 03291500	62/01/25	76/09/02	63	235.6	386	136	60.3	
Suspended Sediment (mg/l)	Kentucky R. at Frankfort 03287500	56/12/14	73/04/30	32	732	1790	186	394	
	Kentucky R. at Lock #2 03290500	73/02/07	77/12/02	43	112	493	8	111.2	
	Eagle Ck. at Glencoe 03291500	64/12/11	67/05/08	9	1285	2590	507	710.6	

WATER QUALITY DATA FOR KENTUCKY RIVER BASIN
(Page 4)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Alkalinity (mg/l as $CaCo_3$)	Carr Fk. at Sassafras 03277450	70/07/07	76/09/02	56	54.7	201	11	38	
	Red R. at Hazel Green 03282500	70/10/02	72/09/12	3	43.7	54	34	10	
	Red R. at Pine Ridge 03283100	69/03/20	76/08/17	71	26.6	54	9	12.5	
	Kentucky R. at Frankfort 03287500	59/10/25	73/09/26	229	64.9	156	16	20	
	Kentucky R. at Lock #2 03290500	73/02/07	78/01/11	61	76.8	110	28	14.4	
	Eagle Ck. at Glencoe 03291500	70/08/06	76/09/02	63	144.7	232	78	33.9	

WATER QUALITY DATA FOR KENTUCKY RIVER BASIN
(Page 5)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Hardness (mg/l as $CaCo_3$)	Carr Fk. at Sassafras 03277450	70/07/07	76/09/02	56	120.6	233	36	40.6	
	Red R. at Hazel Green 03282500	70/10/02	72/09/12	3	59	71	48	11.5	
	Red R. at Pine Ridge 03283100	69/03/20	76/08/17	70	38.7	62	18	11.8	
	Kentucky R. at Frankfort 03287500	51/10/20	73/09/26	526	95.5	192	21	27.8	
	Kentucky R. at Lock #2 03290500	73/02/07	78/01/11	61	114.4	150	56	15.5	
	Eagle Ck. at Glencoe 03291500	62/01/25	76/09/02	65	188.9	320	94	52	

WATER QUALITY DATA FOR KENTUCKY RIVER BASIN
(Page 6)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Chlorides (mg/l)	Carr Fk. at Sassafras 03277450	70/07/07	76/09/02	56	4.3	13	1	2.7	
	Red R. at Hazel Green 03282500	70/10/02	72/09/12	3	6.3	6.7	5.7	0.5	
	Red R. at Pine Ridge 03283100	69/03/20	76/08/17	70	3.8	8	1.1	1.7	
	Kentucky R. at Frankfort 03287500	51/10/20	73/09/26	428	15.6	130	1.7	19.7	
	Kentucky R. at Lock #2 03290500	73/02/07	78/01/11	61	10.5	29	3.1	5.5	
	Eagle Ck. at Glencoe 03291500	62/01/25	76/09/02	64	7.5	80	1	9.6	

WATER QUALITY DATA FOR KENTUCKY RIVER BASIN
(Page 7)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Sulphates (mg/l)	Carr Fk. at Sassafras 03277450	70/07/07	76/09/02	56	80	186	23	25.5	
	Red R. at Hazel Green 03282500	70/10/02	72/09/12	3	16.7	19	13	3.2	
	Red R. at Pine Ridge 03283100	69/03/20	76/08/17	71	14	22	9.2	2.5	
	Kentucky R. at Frankfort 03287500	51/10/20	73/09/26	428	30.7	89	13	11.3	
	Kentucky R. at Lock #2 03290500	73/02/07	78/01/11	61	34.3	58	21	7.96	
	Eagle Ck. at Glencoe 03291500	62/01/25	76/09/02	64	45.2	100	19	18.4	

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Fluoride (mg/l)	Carr Fk. at Sassafras 03277450	70/07/07	76/09/02	56	0.17	0.7	0.0	0.1	1.0 (mg/l)
	Red R. at Hazel Green 03282500	70/10/02	72/09/12	3	0.1	0.1	0.1	0	
	Red R. at Pine Ridge 03283100	69/03/20	76/08/17	70	0.13	0.4	0	0.09	
	Kentucky R. at Frankfort 03287500	51/10/20	72/10/21	140	0.17	1.8	0	0.2	
	Kentucky R. at Lock #2 03290500	73/02/07	78/01/11	61	0.18	0.5	0	0.09	
	Eagle Ck. at Glencoe 03291500	62/01/25	76/09/02	65	0.3	1.1	0.1	0.03	

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Nitrate (mg/l)	Carr Fk. at Sassafras (Dissolved) 03277450	70/07/07	76/09/02	55	1.66	20	0	2.8	
	Red R. at Hazel Green (Dissolved) 03282500	70/10/02	72/09/12	3	2.8	5.0	1.4	1.9	
	Red R. at Pine Ridge (Dissolved) 03283100	69/03/20	76/08/17	69	0.9	5.0	0	0.9	
	Kentucky R. at Frankfort 03287500	51/10/20	58/09/30	145	2.97	10	0.7	1.52	
	Kentucky R. at Lock #2 03290500	73/02/07	73/10/25	9	3.08	4.9	1.6	0.9	
	Eagle Ck. at Glencoe 03291500	62/01/25	62/07/20	2	4.75	5.1	4.4	0.5	

WATER QUALITY DATA FOR KENTUCKY RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Phosphates (mg/l)	Carr Fk. at Sassafras 03277450	70/09/16	73/10/24	7	1.1	5.8	0.02	2.1	
	Red R. at Hazel Green 03282500	70/10/02	72/09/12	3	0.08	0.14	0.05	1.1	
	Red R. at Pine Ridge 03283100	70/09/25	73/10/02	6	0.025	0.07	0.01	0.02	
	Kentucky R. at Frankfort 03287500	71/09/10	72/08/22	2	0.34	0.52	0.16	0.25	
	Kentucky R. at Lock #2 03290500	73/02/07	73/10/25	10	0.76	2.0	0.29	0.52	
	Eagle Ck. at Glencoe 03291500	70/10/06	73/08/28	5	0.6	2.0	0.1	0.8	

WATER QUALITY DATA FOR KENTUCKY RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Iron (ug/l)	Carr Fk. at Sassafras 03277450	70/07/07	76/09/02	55	9417	130000	110	22723	
	North Fk. at Hazard 04055950	77/01/15	77/09/19	9	2342	13400	468	4189	
	North Fk. at Beattyville 04039950	77/01/15	77/09/19	9	849	1700	344	371	
	Red R. at Pine Ridge 03283100	69/03/20	76/08/17	67	560	3900	110	599	
	Kentucky R. at Lock #8 04012950	77/01/15	77/09/15	9	893	3100	116	1006	
	Kentucky R. at Lexington 04022900	77/01/15	77/09/23	8	920	2310	317	668	
	Kentucky R. at Frankfort 04013900	77/01/15	77/09/15	9	1543	3410	362	1138	
	Kentucky R. at Lock #2 03290500	73/04/17	78/01/11	21	3173	18000	500	3975	

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Manganese (ug/l)	Carr Fk. at Sassafras 03277450	70/07/07	76/09/02	56	605	3100	110	560	
	North Fk. at Hazard 04055950	77/01/15	77/09/19	9	198	616	69	178	
	North Fk. at Beattyville 04039950	77/01/15	77/09/19	9	165	269	88	69.5	
	Red R. at Pine Ridge 03283100	69/03/20	76/08/17	66	62.1	310	0	53.5	
	Kentucky R. at Lock #8 04012950	77/01/15	77/09/15	9	119	305	35	83.8	
	Kentucky R. at Lexington 04022900	77/01/15	77/09/23	8	94	141	52	30.5	
	Kentucky R. at Frankfort 04013900	77/01/15	77/09/15	9	189.6	688	67	195.2	
	Kentucky R. at Lock #2 03290500	73/04/17	78/01/11	21	161	740	40	163	

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Chromium (ug/l)	North Fk. at Hazard 04055950	77/01/15	77/09/19	9	2.4	9	1	2.5	0.05 (ug/l)
	North Fk. at Beattyville 04039950	77/01/15	77/09/19	9	1.1	2	1	0.3	
	Red R. at Hazel Green 03282500	75/07/08	77/06/29	8	17.5	40	0	13.9	
	Kentucky R. at Lock #8 04012950	77/01/15	77/09/15	9	2.8	7	1	1.8	
	Kentucky R. at Lexington 04022900	77/01/15	77/09/23	8	1.63	2	1	0.5	
	Kentucky R. at Frankfort 04013900	77/01/15	77/09/15	9	2	4	1	1	
	Kentucky R. at Lock #2 03290500	73/04/17	78/01/11	20	11	30	0	8.14	

WATER QUALITY DATA FOR KENTUCKY RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Lead (ug/l)	North Fk. at Hazard 04055950	77/01/15	77/09/19	9	11.1	27	3	6.8	0.05 (ug/l)
	North Fk. at Beattyville 04039950	77/01/15	77/09/19	9	8.2	30	3	8.3	
	Red R. at Hazel Green 03282500	75/07/08	77/06/29	8	15.5	33	6	8.99	
	Kentucky R. at Lock #8 04012950	77/01/15	77/09/15	9	16.4	31	6	6.6	
	Kentucky R. at Lexington 04022900	77/01/15	77/09/23	8	8.5	12	6	1.9	
	Kentucky R. at Frankfort 04013900	77/01/15	77/09/15	9	11.2	21	6	4.4	
	Kentucky R. at Lock #2 03290500	73/04/17	78/01/11	21	14.8	44	0	10.1	
	Eagle Ck. at Glencoe 03291500	74/03/16	75/06/06	7	4.86	18	0	6.4	

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Arsenic (ug/l)	North Fk. at Hazard 04055950	77/01/15	77/09/19	3	2	4	1	1.7	0.05 (ug/l)
	North Fk. at Beattyville 04039950	77/01/15	77/09/19	3	1	1	1	0	
	Red R. at Hazel Green 03282500	75/07/08	77/06/29	9	0.22	2	0	0.7	
	Kentucky R. at Lock #8 04012950	77/01/15	77/09/15	3	1	1	1	0	
	Kentucky R. at Lexington 04022900	77/01/15	77/09/23	3	1	1	1	0	
	Kentucky R. at Frankfort 04013900	77/01/15	77/09/15	3	1	1	1	0	
	Kentucky R. at Lock #2 03290500	73/04/17	78/01/11	21	2.14	9	0	1.96	
	Eagle Ck. at Glencoe 03291500	74/03/16	75/06/06	7	1.43	3	0	1.1	

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Coliform/ 100 ml	Kentucky R. at Lock #8	77/02/01	77/12/31	4	855	1600	20	692	1000/100 ml
	Kentucky R. at Danville	77/02/01	77/12/31	4	346	1100	65	503	
	Kentucky R. at Richmond	77/02/01	77/12/31	4	1195	1400	780	280	
	Kentucky R. at Lexington	77/02/01	77/12/31	3	1087	1600	750	451.7	
	Kentucky R. at Frankfort	77/02/01	77/12/31	4	2475	4400	1100	1468	
	Kentucky R. at Lock #2 03290500	73/02/07	74/06/17	18	3681	17000	430	4509	

WATER QUALITY DATA FOR KENTUCKY RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Fecal Coliform/ 100 ml	Kentucky R. at Lock #8	77/02/01	77/12/31	9	980	2800	10	1125	200/100 ml
	Kentucky R. at Danville	77/02/01	77/12/31	10	162	520	0	153	
	Kentucky R. at Richmond	77/02/01	77/12/31	9	780	2900	10	1078	
	Kentucky R. at Lexington	77/02/01	77/12/31	8	1341	3200	140	1194	
	Kentucky R. at Frankfort	77/02/01	77/12/31	11	1122	3200	200	1008	
	Kentucky R. at Lock #2 03290500	73/02/07	78/01/11	53	1510	26000	10	3724	

WATER QUALITY DATA FOR LICKING RIVER BASIN

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
pH (S.U.)	Licking R. at Salyersville 03248500	51/11/13	74/10/02	47	6.9	7.4	6.4	0.2	6 < pH < 9 (S.U.)
	North Fk. Licking R. at Lewisburg 03251000	70/09/23	72/08/15	3	7.8	8.2	7.4	0.4	
	Licking R. at Catawba 03253500	62/09/24	72/08/15	4	7.8	7.9	7.6	0.15	
	Licking R. at Butler 03254000	74/10/17	77/12/07	37	7.2	8.3	6.1	0.6	
Conductivity (umhos)	Licking R. at Salyersville 03248500	51/11/13	76/09/27	70	243.5	1170	52.1	175.2	800 (umhos)
	North Fk. Licking R. at Lewisburg 03251000	70/09/23	77/05/18	7	224	315	100	92.2	
	Licking R. at Catawba 03283500	62/09/24	74/08/23	7	243	286	212	28.3	
	Licking R. at Butler 03254000	74/10/17	77/12/07	38	256	405	165	58.2	

WATER QUALITY DATA FOR LICKING RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Dissolved Solids (mg/l)	Licking R. at Salyersville 03248500	51/11/13	76/09/27	69	143.2	722	41	104.9	500 (mg/l)
	North Fk. Licking R. at Lewisburg 03251000	70/09/23	72/08/15	3	190	200	174	14	
	Licking R. at Catawba 03253500	70/09/23	72/08/15	3	173	194	138	30.3	
	Licking R. at Butler 03254000	74/10/17	77/12/07	39	150	232	96	30.6	
Suspended Sediment (mg/l)	North Fk. Licking R. at Lewisburg 03248500	77/08/30		1	19				
	Licking R. at Butler 03254000	74/10/17	77/12/07	29	87.7	498	6	118.1	

WATER QUALITY DATA FOR LICKING RIVER BASIN
(Page 3)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Alkalinity (mg/l as $CaCo_3$)	Licking R. at Salyersville 03248500	70/07/29	76/09/27	60	36.4	86	13	19.7	
	North Fk. Licking R. at Lewisburg 03251000	70/09/23	72/08/15	3	116	126	98	15.9	
	Licking R. at Catawba 03253500	62/09/24	72/08/15	4	95.8	103	82	9.9	
	Licking R. at Butler 03254000	74/10/17	77/12/07	39	87.2	130	55	20	
Hardness (mg/l as $CaCo_3$)	Licking R. at Salyersville 03248500	51/11/13	76/09/27	70	66.6	200	20	33.1	
	North Fk. Licking R. at Lewisburg 03251000	70/09/23	72/08/15	3	140	160	120	20	
	Licking R. at Catawba 03253500	62/09/24	72/08/15	4	119.8	130	104	12.7	
	Licking R. at Butler 03254000	74/10/17	77/12/07	39	117	170	68	24.3	

WATER QUALITY DATA FOR LICKING RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Chlorides (mg/l)	Licking R. at Salyersville 03248500	51/11/13	76/09/27	70	37	330	1.5	48.7	
	North Fk. Licking R. at Lewisburg 03251000	70/09/23	72/08/15	3	3.7	4.4	3	0.7	
	Licking R. at Catawba 03253500	62/09/24	72/08/15	4	9.5	18	4	6.5	
	Licking R. at Butler 03254000	74/10/17	77/12/07	39	5.1	9.3	2.5	1.6	
Sulphates (mg/l)	Licking R. at Salyersville 03248500	51/11/13	76/09/27	70	23.2	54	7.7	8.5	
	North Fk. Licking R. at Lewisburg 03251000	70/09/23	72/08/15	3	25	31	19	6	
	Licking R. at Catawba 03253500	62/09/24	72/08/15	4	22.3	26	19	3.8	
	Licking R. at Butler 03254000	74/10/17	77/12/07	39	27.5	45	16	6.1	

WATER QUALITY DATA FOR LICKING RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Fluoride (mg/l)	Licking R. at Salyersville 03248500	51/11/13	76/09/27	68	0.15	0.6	0	0.1	1.0 (mg/l)
	North Fk. Licking R. at Lewisburg 03251000	70/09/23	72/08/15	3	0.2	0.3	0.1	0.1	
	Licking R. at Catawba 03253500	62/09/24	72/08/15	4	0.2	0.3	0.1	0.1	
	Licking R. at Butler 03254000	74/10/17	77/12/07	39	0.17	0.4	0	0.09	
Nitrate (mg/l)	Licking R. at Salyersville 03248500	51/11/13	52/09/18	9	1.03	2.3	0.3	0.6	
	*North Fk. Licking R. at Lewisburg 03251000	70/09/23	72/08/15	3	3.5	5	1.7	1.7	
	*Licking R. at Catawba 03254000	62/09/24	72/08/15	4	3.65	5.8	1.0	2.0	

*Dissolved

WATER QUALITY DATA FOR LICKING RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Phosphate (mg/l)	Licking R. at Salyersville 03248500	70/10/06	74/01/07	8	0.4	0.8	0.01	0.27	
	North Fk. Licking R. at Lewisburg 03251000	70/09/23	72/08/15	3	0.4	0.43	0.35	0.04	
	Licking R. at Catawba 03253500	70/09/23	72/08/15	3	0.6	0.96	0.24	0.36	
Total Iron (ug/l)	Licking R. at Salyersville 03248500	51/11/13	76/09/27	66	2435	48000	20	6587	
	Licking R. at Catawba 03253500	74/03/14	75/06/05	2	4270	7600	940	4709	
	Licking R. at Butler 03254000	74/10/17	77/10/06	13	1925	5300	280	1620	
	Licking R. at Kenton Co. Water District 05003950	77/01/15	77/09/15	8	897	3310	181	1473	

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Manganese (ug/l)	Licking R. at Salyersville 03248500	65/05/19	76/09/27	58	297	1000	39	279	
	Licking R. at Catawba 03253500	74/03/14	75/06/05	3	150	240	90	79.4	
	Licking R. at Butler 03254000	74/10/17	77/10/06	13	103	220	30	60	
	Licking R. at Kenton County Water District 05003950	77/01/15	77/09/15	8	160	328	27	121	
Total Chromium (ug/l)	Licking R. at Salyersville 03248500	74/04/01	75/03/24	8	6.25	20	0	7.4	0.05 (ug/l)
	North Fk. Licking R. at Lewisburg 03251000	75/07/10	77/05/18	8	11.3	30	0	8.3	
	Licking R. at Catawba 03253500	74/03/14	75/06/25	7	9.1	20	0	8.4	
	Licking R. at Butler 03254000	74/10/17	77/10/06	13	11.2	20	0	5.1	

WATER QUALITY DATA FOR LICKING RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Chromium (ug/l)	Licking R. at Kenton Co. Water District 05003950	77/01/15	77/04/15	8	6.25	20	0	7.4	0.05 (ug/l)
Total Lead (ug/l)	Licking R. at Salyersville 03248500	74/04/01	75/03/24	8	14.7	45	0	15.5	(ug/l)
	North Fk. Licking R. at Lewisburg 03251000	75/07/10	77/05/18	8	27.5	60	6	19.3	
	Licking R. at Catawba 03253500	74/03/14	75/06/25	7	9	26	3	7.7	
	Licking R. at Butler 03254000	74/10/17	77/10/06	13	4.2	14	0	4.3	
	Licking R. at Kenton Co. Water District 05003950	77/01/15	77/09/15	8	10	13	5	2.5	
Total Arsenic (ug/l)	Licking R. at Salyersville 03248500	74/04/01	75/03/24	8	6.25	39	0	13.4	0.05 (ug/l)
	North Fk. Licking R. at Lewisburg 03251000	77/07/10	77/05/18	8	1.5	3	0	1.07	

WATER QUALITY DATA FOR LICKING RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Arsenic (ug/l)	Licking R. at Catawba 03253500	74/03/14	75/06/25	8	1.4	3	0	1.06	0.05 (ug/l)
	Licking R. at Butler 03254000	74/10/17	77/10/06	13	0.8	2	0	0.8	
	Licking R. at Kenton Co. Water District 05003950	77/01/15	77/09/15	3	1.3	2	1	0.6	
Total Coliform/ 100 ml	Stoner Ck. at Paris	77/02/01	77/12/31	4	1330	2200	850	16	1000/100 ml
	Licking R. at Cynthiana	77/07/18	78/01/04	6	8179	26970	19	10224	
	Licking R. at Falmouth	77/07/18	78/02/07	7	8662	32500	112	12356	
	Licking R. at Kenton Co. Water District	77/07/18	78/02/07	7	2129	4100	94	1872	

WATER QUALITY DATA FOR LICKING RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Fecal Coliform/ 100 ml	Stoner Ck. at Paris	77/02/01	77/12/31	9	860	2300	60	990	200/100 ml
	Licking R. at Cynthiana	77/07/18	78/01/04	6	470.5	2125	0	833	
	Licking R. at Falmouth	77/07/18	78/02/07	7	415	2300	5	836	
	Licking R. at Kenton Co. Water District	77/07/18	78/02/07						

WATER QUALITY DATA FOR BIG SANDY RIVER BASIN

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
pH (S.U.)	Big Sandy R. at Louisa 03215000	65/05/22	78/01/25	67	7.3	8.4	6.2	0.5	6 < pH < 9 (S.U.)
Conductivity (umhos)	Big Sandy R. at Louisa 03215000	65/05/22	78/01/25	91	380	729	150	143.7	800 (umhos)
Dissolved Solids (mg/l)	Big Sandy R. at Louisa 03215000	65/11/14	78/01/25	66	226	447	97	87.8	500 (mg/l)
Suspended Sediment (mg/l)	Big Sandy R. at Louisa 03215000	74/10/23	71/11/23	27	301	1390	18	372.7	
Alkalinity (mg/l as $CaCo_3$)	Big Sandy R. at Louisa 03215000	65/05/22	78/01/25	61	59.9	123	16	28.9	
Hardness (mg/l as $CaCo_3$)	Big Sandy R. at Louisa 03215000	65/05/22	78/01/25	67	116.8	196	50	37.2	
Chlorides (mg/l)	Big Sandy R. at Louisa 03215000	65/05/22	78/01/25	67	153	52	3	11.4	

WATER QUALITY DATA FOR BIG SANDY RIVER BASIN
(Page 2)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Sulphates (mg/l)	Big Sandy R. at Louisa 03215000	65/05/22	78/01/25	67	94	169	37	32.2	
Fluoride (mg/l)	Big Sandy R. at Louisa 03215000	65/11/14	78/01/25	51	0.12	0.4	0.0	0.09	1.0 (mg/l)
Dissolved Nitrate (mg/l)	Big Sandy R. at Louisa 03215000	65/05/22	72/07/24	28	1.8	4	0.2	1.06	
Phosphate (mg/l)	Big Sandy R. at Louisa 03215000	70/09/09	72/07/24	3	0.17	0.28	0.06	0.11	
Total Iron (ug/l)	Levisa Fk. at Pikeville 01020951	77/02/15	77/05/15	3	2070	2910	460	1395	
	Levisa Fk. at Prestonsburg 01020950	77/01/15	77/09/15	8		2880	771		
	Levisa Fk. at Paintsville 01015950	77/01/15	77/09/20	9	1665	3390	495	1273	

WATER QUALITY DATA FOR BIG SANDY RIVER BASIN
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PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Iron (ug/l)	Big Sandy R. at Louisa 01013950	77/04/15	77/09/15	6	6581	21500	434	8627	
	Big Sandy R. at Catlettsburg 01001950	77/01/15	77/09/20	9	1189	2710	105	843	
Total Manganese (ug/l)	Levisa Fk. at Pikeville 01020951	77/02/15	77/05/15	3	211	274	122	79.2	
	Levisa Fk. at Prestonsburg 01020950	77/01/15	77/09/15	8	168.6	214	128	31.2	
	Levisa Fk. at Paintsville 01015950	77/01/15	77/09/20	9	503	3090	121	973	
	Big Sandy R. at Louisa 01013950	77/04/15	77/09/15	6	445	1350	97	466	
	Big Sandy R. at Catlettsburg 01001950	77/01/15	77/09/20	9	127	181	80	33	

WATER QUALITY DATA FOR BIG SANDY RIVER BASIN
(Page 4)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Chromium (ug/l)	Levisa Fk. at Pikeville 01020951	77/02/15	77/05/15	3	3	4	1	1.7	0.05 (ug/l)
	Levisa Fk. at Prestonsburg 01020950	77/01/15	77/09/15	8	2.25	4	1	1.2	
	Levisa Fk. at Paintsville 01015950	77/01/15	77/09/20	9	2.4	5	1	1.5	
	Big Sandy R. at Louisa 01013950	77/04/15	77/09/15	6	4.3	16	1	5.8	
	Big Sandy R. at Catlettsburg 01001950	77/01/15	77/09/20	9	2.4	4	1	1	
Total Lead (ug/l)	Levisa Fk. at Pikeville 01020951	77/02/15	77/05/15	3	7.3	10	5	2.5	0.05 (ug/l)
	Levisa Fk. at Prestonsburg 01020950	77/01/15	77/09/15	8	11.5	17	8	2.9	
	Levisa Fk. at Paintsville 01015950	77/01/15	77/09/20	9	9.7	18	3	4.7	

WATER QUALITY DATA FOR BIG SANDY RIVER BASIN
(Page 5)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Lead (ug/l)	Big Sandy R. at Louisa 01013950	77/04/15	77/09/15	6	16.5	43	5	14	0.05 (ug/l)
	Big Sandy R. at Catlettsburg 01001950	77/01/15	77/09/15	9	9.3	14	3	3.4	
Total Arsenic (ug/l)	Levisa Fk. at Pikeville 01020951	77/02/15	77/05/15	2	1.5	2	1	0.7	0.05 (ug/l)
	Levisa Fk. at Prestonsburg 01020950	77/01/15	77/09/15	3	1.3	2	1	0.6	
	Levisa Fk. at Paintsville 01015950	77/01/15	77/09/20	3	1	1	1	0	
	Big Sandy R. at Louisa 01013950	77/04/15	77/09/15	2	1	1	1	0	
	Big Sandy R. at Catlettsburg 01001950	77/01/15	77/09/20	3	1	1	1	0	

WATER QUALITY DATA FOR BIG SANDY RIVER BASIN
(Page 6)

PARAMETER	STATION	BEG DATE	END DATE	# OF OBS	MEAN	MAX	MIN	SD	KENTUCKY STANDARDS
Total Coliform/ 100 ml	Levisa Fk. at Pikeville	75/02/19	75/10/30	7	13681	65000	10		1000/100 ml
	Levisa Fk. at Paintsville	75/02/19	75/10/30	8	7387	15000	8		
Fecal Coliform/ 100 ml	Levisa Fk. at Pikeville	75/02/19	75/07/30	5	5256	2400	0		200/100 ml
	Levisa Fk. at Paintville	72/02/19	75/07/30	5	830	1220	450		
	Big Sandy R. at Louisa 03215000	75/02/19	78/01/25	32	3142	15000	55	3260.4	

WATER QUALITY INDEX

The Water Quality Index Process has been recommended by the Environmental Protection Agency as a representation of the overall water quality for a stream. This Index is arrived at by combining several water quality parameters of significance. Different weight is assigned to each water quality parameter, depending upon its importance with respect to water quality. Several graphical displays are produced by use of a computer program. Spatial and temporal variations of the water quality index at monitoring stations are indicated by these displays. Nine parameters are currently used for establishing the Water Quality Index.

This process is still in the developing stage. More parameter coverage is currently being considered, especially for pesticides and heavy metals, which are excluded in the present process. Attempts have been made for substitution of these missing data with historical data. However, a standardized procedure has yet to be developed for this problem.

It is felt that with further development, the Water Quality Index will be a valuable tool for general evaluation of water quality. At this stage, a preliminary analysis was performed for three rivers in Kentucky with the assistance of EPA. These streams are the Kentucky River, the Green River and the Cumberland River.

The overall water quality enumerated by the Water Quality Index appeared to be reasonably consistent with the analysis by individual parameters. Large data gaps existed for a few parameters for all of the above streams. The analysis, therefore, involved substitutions and assumptions for filling these gaps. Considering these factors and the further development of the Water Quality Index process, this analysis should be used with caution.

Hence, the detailed individual parameter analysis, at this stage, is felt to be a necessary process. Water Quality Index analysis for the three rivers is a useful supplement and is indicative of the trend to be followed in the future. A complete analysis for the Water Quality Index calculations is presented here. All graphs and tables of data are also included.

KENTUCKY RIVER - KENTUCKY.

THESE STREAM TABLE VALUES WERE USED IN THIS RUN.

*** INTERNAL MISSING DATA SUBSTITUTION VALUES 1975

MONTH>P#		1-JAN	2-FEB	3-MAR	4-APR	5-MAY	6-JUN	7-JUL	8-AUG	9-SEP	10OCT	11NOV	12DEC	ANN MN.	PARAM	UNITS
***	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
PMEAN>	1	8.9	8.9	8.9	8.9	10.1	8.9	7.8	8.9	8.9	8.9	8.9	8.9	8.9	<--DO	MG/L
#OBS.>		0	0	0	0	3	3	3	0	0	0	0	0	9		
PMEAN>	2	691.	770.	540.	570.	7200.	1500.	130.	160.	300.	300.	580.	6200.	691.	<--FCOLI	N/CML
#OBS.>		0	1	1	1	1	1	1	1	1	1	1	1	11		
PMEAN>	3	7.2	6.6	7.5	6.1	7.0	7.1	7.3	7.4	7.3	6.5	7.0	7.2	7.1	<--PH	VALUE
#OBS.>		1	1	1	1	4	4	4	1	1	1	1	1	21		
PMEAN>	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<--BOD5	MG/L
#OBS.>		0	0	0	0	0	0	0	0	0	0	0	0	0		
PMEAN>	5	0.70	0.60	0.90	0.60	0.50	0.60	0.40	0.60	0.20	0.90	0.90	0.90	0.65	<--NO2&3	MG/L
#OBS.>		1	1	1	1	1	1	1	1	1	1	1	1	12		
PMEAN>	6	0.11	0.19	0.13	0.19	0.37	0.14	0.11	0.16	0.11	0.15	0.14	0.18	0.16	<--TOT-P	MG/L
#OBS.>		1	1	1	1	1	1	1	1	1	1	1	1	12		
PMEAN>	7	11.0	4.8	6.5	11.0	13.1	21.1	21.1	27.0	26.0	17.0	16.5	8.0	16.2	<--TEMPC	C-DEG
#OBS.>		1	2	1	1	5	5	4	1	1	1	1	1	24		
PMEAN>	8	40.0	100.0	30.0	55.0	110.0	65.0	20.0	10.0	22.5	35.0	9.0	35.0	46.3	<--TURB	JTU
#OBS.>		1	1	1	1	1	1	1	1	0	1	1	1	11		
PMEAN>	9	136.0	118.0	162.0	130.0	137.0	128.0	161.0	165.0	215.0	128.0	161.0	145.0	148.8	<--TSOL	MG/L
#OBS.>		1	1	1	1	1	1	1	1	1	1	1	1	12		

TABLE FOR DO CALC.	MO 1.	11.0	11.1	MO 2.	4.8	12.9	MO 3.	6.5	12.3	MO 4.	11.0	11.1
(MON-EQ.TEMPC-DO SAT.)	MO 5.	13.1	10.6	MO 6.	21.1	9.0	MO 7.	21.1	9.0	MO 8.	27.0	8.1
	MO 9.	26.0	8.2	MO10.	17.0	9.7	MO11.	16.5	9.8	MO12.	8.0	11.9

*** INTERNAL MISSING DATA SUBSTITUTION VALUES 1976

MONTH>P#		1-JAN	2-FEB	3-MAR	4-APR	5-MAY	6-JUN	7-JUL	8-AUG	9-SEP	10OCT	11NOV	12DEC	ANN MN.	PARAM	UNITS
***	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
PMEAN>	1	11.0	10.5	10.4	9.3	8.8	7.2	7.8	9.7	9.7	9.3	10.9	11.6	9.7	<--DO	MG/L
#OBS.>		0	3	2	1	2	1	2	0	0	1	3	1	16		
PMEAN>	2	1300.	1000.	640.	720.	29.	2400.	840.	30.	10.	380.	690.	140.	292.	<--FCOLI	N/CML
#OBS.>		1	1	1	1	1	1	1	1	1	1	1	1	12		
PMEAN>	3	6.8	7.0	7.3	7.2	7.4	6.9	7.1	6.6	6.3	6.6	6.9	7.1	7.0	<--PH	VALUE
#OBS.>		1	4	3	2	3	2	3	1	1	2	4	1	27		
PMEAN>	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<--BOD5	MG/L
#OBS.>		0	0	0	0	0	0	0	0	0	0	0	0	0		
PMEAN>	5	0.90	0.80	0.80	0.50	0.60	0.40	0.70	0.90	0.40	0.60	0.60	0.80	0.67	<--NO2&3	MG/L
#OBS.>		1	1	1	1	1	1	1	1	1	1	1	1	12		
PMEAN>	6	0.22	0.11	0.10	0.09	0.08	0.22	0.10	0.24	0.07	0.10	0.22	0.15	0.14	<--TOT-P	MG/L
#OBS.>		1	1	1	1	1	1	1	1	1	1	1	1	12		
PMEAN>	7	6.0	7.8	9.6	14.3	17.8	22.4	23.9	26.0	26.0	14.0	8.0	3.6	13.7	<--TEMPC	C-DEG
#OBS.>		1	4	3	2	3	2	3	1	1	2	4	2	28		
PMEAN>	8	120.0	75.0	30.0	35.0	4.0	55.0	25.0	10.0	10.0	10.0	55.0	8.0	36.4	<--TURB	JTU
#OBS.>		1	1	1	1	1	1	1	1	1	1	1	1	12		
PMEAN>	9	134.0	128.0	136.0	138.0	144.0	160.0	166.0	158.0	152.0	163.0	169.0	168.0	151.3	<--TSOL	MG/L
#OBS.>		1	1	1	1	1	1	1	1	1	1	1	1	12		

TABLE FOR DO CALC.	MO 1.	6.0	12.5	MO 2.	7.8	12.0	MO 3.	9.6	11.4	MO 4.	14.3	10.3
(MON-EQ.TEMPC-DO SAT.)	MO 5.	17.8	9.5	MO 6.	22.4	8.8	MO 7.	23.9	8.5	MO 8.	26.0	8.2
	MO 9.	26.0	8.2	MO10.	14.0	10.4	MO11.	8.0	11.9	MO12.	3.6	13.2

*** INTERNAL MISSING DATA SUBSTITUTION VALUES 1977

MONTH>P#		1-JAN	2-FEB	3-MAR	4-APR	5-MAY	6-JUN	7-JUL	8-AUG	9-SEP	10OCT	11NOV	12DEC	ANN MN.	PARAM	UNITS
***	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
PMEAN>	1	10.7	10.7	11.4	10.0	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	<--DO	MG/L
#OBS.>		0	0	3	3	0	0	0	0	0	0	0	0	6		
PMEAN>	2	593.	593.	1230.	1400.	380.	593.	37.	149.	593.	4100.	1200.	26000.	593.	<--FCOLI	N/CML
#OBS.>		0	0	2	1	1	0	2	2	0	1	1	1	11		
PMEAN>	3	7.5	7.5	7.4	7.2	7.7	8.1	7.7	7.6	7.5	7.4	7.8	7.3	7.5	<--PH	VALUE
#OBS.>		0	0	5	4	1	1	2	2	0	1	1	1	18		
PMEAN>	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<--BOD5	MG/L
#OBS.>		0	0	0	0	0	0	0	0	0	0	0	0	0		
PMEAN>	5	0.66	0.66	0.75	0.60	0.60	0.40	0.50	0.55	0.62	0.70	1.00	1.00	0.66	<--NO2&3	MG/L
#OBS.>		0	0	2	1	1	1	2	2	0	1	1	1	12		
PMEAN>	6	0.20	0.20	0.14	0.17	0.20	0.14	0.07	0.27	0.29	0.31	0.21	0.40	0.20	<--TOT-P	MG/L
#OBS.>		0	0	2	1	1	1	2	2	0	1	1	1	12		
PMEAN>	7	17.0	17.0	10.2	16.0	16.0	25.0	27.8	26.0	22.5	19.0	14.5	9.5	17.0	<--TEMPC	C-DEG
#OBS.>		0	0	5	4	1	1	2	2	0	1	1	1	18		
PMEAN>	8	78.8	78.8	50.0	100.0	70.0	2.0	1.0	110.5	165.3	220.0	30.0	200.0	78.8	<--TURB	JTU
#OBS.>		0	0	2	1	1	1	2	2	0	1	1	1	12		
PMEAN>	9	181.2	181.2	162.5	163.0	157.0	169.0	220.5	200.5	181.2	158.0	203.0	157.0	181.2	<--TSOL	MG/L
#OBS.>		0	0	2	1	1	1	2	2	0	1	1	1	12		

TABLE FOR DO CALC.	MO 1.	17.0	9.7	MO 2.	17.0	9.7	MO 3.	10.2	11.3	MO 4.	16.0	10.0
(MON-EQ.TEMPC-DO SAT.)	MO 5.	16.0	10.0	MO 6.	25.0	8.4	MO 7.	27.8	8.0	MO 8.	26.0	8.2
	MO 9.	22.5	8.7	MO10.	19.0	9.4	MO11.	14.5	10.3	MO12.	9.5	11.4

*** INTERNAL MISSING DATA SUBSTITUTION VALUES 1977

MONTH>P#		1-JAN	2-FEB	3-MAR	4-APR	5-MAY	6-JUN	7-JUL	8-AUG	9-SEP	10OCT	11NOV	12DEC	ANN MN.	PARAM	UNITS
PMEAN>	1	10.7	10.7	11.4	10.0	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	<--DO	MG/L
#OBS.>		0	0	3	3	0	0	0	0	0	0	0	0	6		
PMEAN>	2	593.	593.	1230.	1400.	380.	593.	37.	149.	593.	4100.	1200.	26000.	593.	<--FCOLI	N/CML
#OBS.>		0	0	2	1	1	0	2	2	0	1	1	1	11		
PMEAN>	3	7.5	7.5	7.4	7.2	7.7	8.1	7.7	7.6	7.5	7.4	7.8	7.3	7.5	<--PH	VALUE
#OBS.>		0	0	5	4	1	1	2	2	0	1	1	1	18		
PMEAN>	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<--BOD5	MG/L
#OBS.>		0	0	0	0	0	0	0	0	0	0	0	0	0		
PMEAN>	5	0.66	0.66	0.75	0.60	0.60	0.40	0.50	0.55	0.62	0.70	1.00	1.00	0.66	<--NO2&3	MG/L
#OBS.>		0	0	2	1	1	1	2	2	0	1	1	1	12		
PMEAN>	6	0.20	0.20	0.14	0.17	0.20	0.14	0.07	0.27	0.29	0.31	0.21	0.40	0.20	<--TOT-P	MG/L
#OBS.>		0	0	2	1	1	1	2	2	0	1	1	1	12		
PMEAN>	7	17.0	17.0	10.2	16.0	16.0	25.0	27.8	26.0	22.5	19.0	14.5	9.5	17.0	<--TEMPC	C-DEG
#OBS.>		0	0	5	4	1	1	2	2	0	1	1	1	18		
PMEAN>	8	78.8	78.8	50.0	100.0	70.0	2.0	1.0	110.5	165.3	220.0	30.0	200.0	78.8	<--TURB	JTU
#OBS.>		0	0	2	1	1	1	2	2	0	1	1	1	12		
PMEAN>	9	181.2	181.2	162.5	163.0	157.0	169.0	220.5	200.5	181.2	158.0	203.0	157.0	181.2	<--TSOL	MG/L
#OBS.>		0	0	2	1	1	1	2	2	0	1	1	1	12		

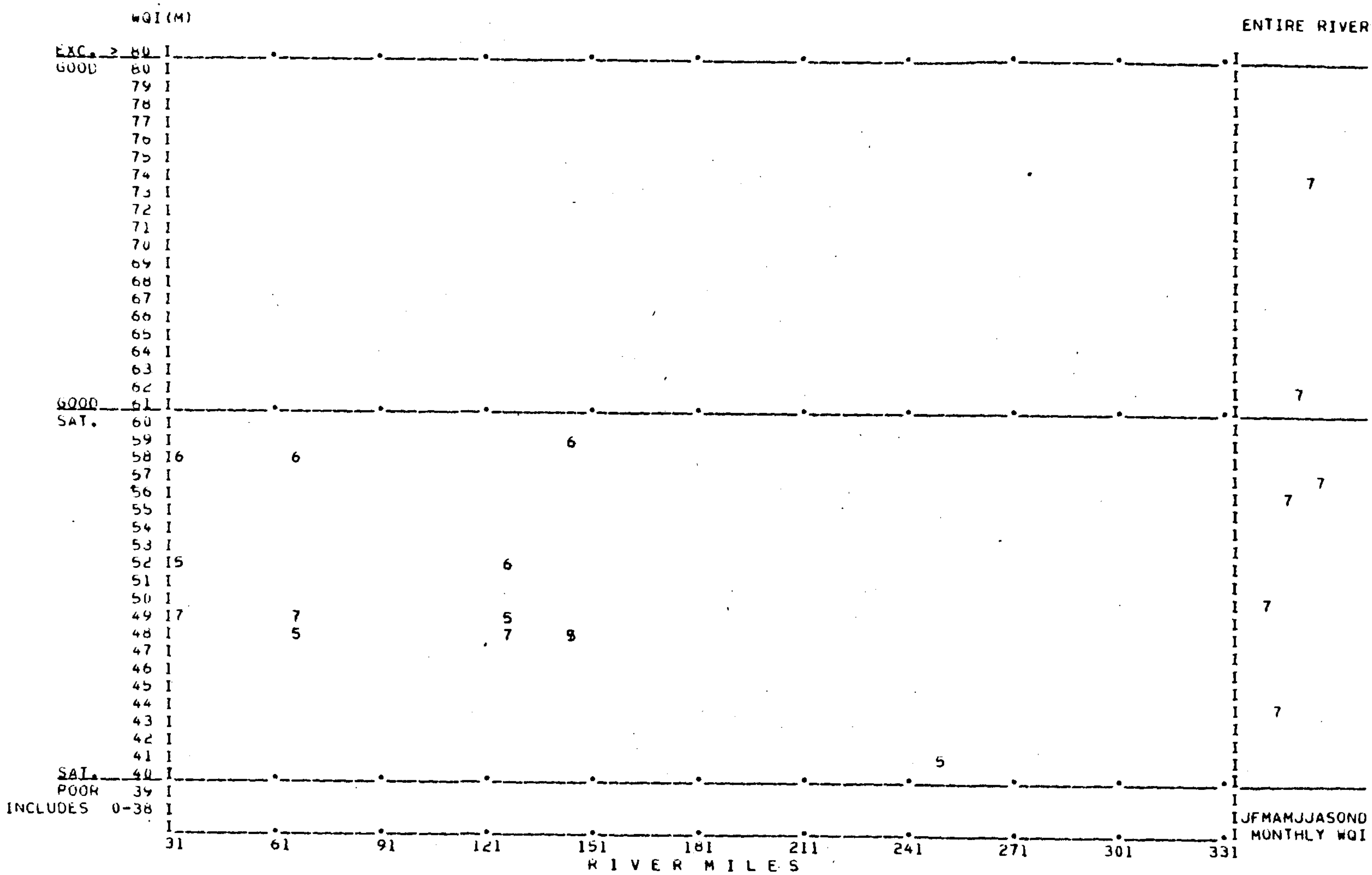
TABLE FOR DO CALC.	MO 1.	17.0	9.7	MO 2.	17.0	9.7	MO 3.	10.2	11.3	MO 4.	16.0	10.0
(MON-EQ.TEMPC-DO SAT.)	MO 5.	16.0	10.0	MO 6.	25.0	8.4	MO 7.	27.8	8.0	MO 8.	26.0	8.2
	MO 9.	22.5	8.7	MO10.	19.0	9.4	MO11.	14.5	10.3	MO12.	9.5	11.4

[illegible]	1220	31.0	03290500	-0.00	1200.	7.8	-0.00	1.00	0.21	14.5	30.0	203.0	3840.	35.	35.
12 2 77	1135	31.0	03290500	-0.00	26000.	7.3	-0.00	1.00	0.40	9.5	200.0	157.0	31100.	15.	15.
5 18 75	1430	65.8	04013901	9.50	-0.	7.0	-0.00	-0.00	-0.00	15.3	-0.0	-0.0	-0.	54.	32.
6 17 75	2500	65.8	04013901	9.70	-0.	7.2	-0.00	-0.00	-0.00	15.6	-0.0	-0.0	-0.	57.	46.
7 17 75	2500	65.8	04013901	7.40	-0.	7.2	-0.00	-0.00	-0.00	18.5	-0.0	-0.0	-0.	70.	86.
2 27 76	1200	65.8	04013901	9.60	-0.	7.5	-0.00	-0.00	-0.00	9.5	-0.0	-0.0	-0.	61.	50.
3 18 76	1400	65.8	04013901	10.50	-0.	7.2	-0.00	-0.00	-0.00	8.2	-0.0	-0.0	-0.	67.	58.
4 20 76	1200	65.8	04013901	9.30	-0.	7.2	-0.00	-0.00	-0.00	14.5	-0.0	-0.0	-0.	67.	57.
5 19 76	1400	65.8	04013901	9.20	-0.	7.4	-0.00	-0.00	-0.00	17.6	-0.0	-0.0	-0.	81.	78.
6 17 76	1400	65.8	04013901	7.20	-0.	7.2	-0.00	-0.00	-0.00	25.3	-0.0	-0.0	-0.	58.	46.
7 15 76	1330	65.8	04013901	7.50	-0.	7.0	-0.00	-0.00	-0.00	27.2	-0.0	-0.0	-0.	62.	54.
10 29 76	1500	65.8	04013901	9.30	-0.	7.1	-0.00	-0.00	-0.00	10.0	-0.0	-0.0	-0.	68.	61.
11 15 76	1500	65.8	04013901	10.60	-0.	7.1	-0.00	-0.00	-0.00	6.5	-0.0	-0.0	-0.	63.	54.
12 14 76	1600	65.8	04013901	11.60	-0.	-0.0	-0.00	-0.00	-0.00	2.3	-0.0	-0.0	-0.	73.	68.
3 14 77	1500	65.8	04013901	11.50	-0.	7.8	-0.00	-0.00	-0.00	10.3	-0.0	-0.0	-0.	63.	52.
4 14 77	1300	65.8	04013901	8.60	-0.	6.9	-0.00	-0.00	-0.00	14.0	-0.0	-0.0	-0.	59.	46.
5 22 75	1500	127.0	04020900	9.90	-0.	7.2	-0.00	-0.00	-0.00	7.3	-0.0	-0.0	-0.	51.	31.
6 18 75	1430	127.0	04020900	8.30	-0.	7.2	-0.00	-0.00	-0.00	20.3	-0.0	-0.0	-0.	62.	50.
7 17 75	2500	127.0	04020900	8.20	-0.	7.2	-0.00	-0.00	-0.00	19.3	-0.0	-0.0	-0.	71.	66.
2 25 76	2500	127.0	04020900	11.20	-0.	7.2	-0.00	-0.00	-0.00	9.4	-0.0	-0.0	-0.	61.	50.
11 17 76	1400	127.0	04020900	11.00	-0.	6.9	-0.00	-0.00	-0.00	7.0	-0.0	-0.0	-0.	63.	54.
3 29 77	1130	127.0	04020900	11.30	-0.	7.0	-0.00	-0.00	-0.00	12.8	-0.0	-0.0	-0.	61.	50.
4 21 77	1410	127.0	04020900	11.20	-0.	7.0	-0.00	-0.00	-0.00	17.0	-0.0	-0.0	-0.	60.	46.
5 21 75	2500	146.0	04021900	10.90	-0.	7.0	-0.00	-0.00	-0.00	6.8	-0.0	-0.0	-0.	50.	30.
6 20 75	2500	146.0	04021900	8.70	-0.	7.1	-0.00	-0.00	-0.00	21.2	-0.0	-0.0	-0.	62.	49.
7 17 75	2500	146.0	04021900	7.80	-0.	7.0	-0.00	-0.00	-0.00	19.2	-0.0	-0.0	-0.	71.	66.
2 25 76	2500	146.0	04021900	10.70	-0.	7.2	-0.00	-0.00	-0.00	8.3	-0.0	-0.0	-0.	63.	51.
3 18 76	1000	146.0	04021900	10.40	-0.	7.3	-0.00	-0.00	-0.00	8.5	-0.0	-0.0	-0.	67.	59.
5 20 76	1500	146.0	04021900	8.50	-0.	7.3	-0.00	-0.00	-0.00	18.7	-0.0	-0.0	-0.	80.	78.
7 14 76	1600	146.0	04021900	8.10	-0.	7.3	-0.00	-0.00	-0.00	27.5	-0.0	-0.0	-0.	61.	53.
11 18 76	1300	146.0	04021900	11.10	-0.	6.7	-0.00	-0.00	-0.00	7.5	-0.0	-0.0	-0.	62.	53.
3 30 77	1300	146.0	04021900	11.40	-0.	6.9	-0.00	-0.00	-0.00	13.3	-0.0	-0.0	-0.	59.	49.
4 21 77	1230	146.0	04021900	10.10	-0.	7.0	-0.00	-0.00	-0.00	16.6	-0.0	-0.0	-0.	60.	46.
2 11 75	1400	249.2	03282000	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	4.0	-0.0	-0.0	6260.	58.	48.
5 8 75	1315	249.2	03282000	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	18.5	-0.0	-0.0	3530.	48.	29.
6 20 75	1315	249.2	03282000	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	25.5	-0.0	-0.0	882.	55.	45.
COUNT OF OBS.				6	11	18	0	12	12	18	12	12			
MISSING VALUES				12	7	0	18	6	6	0	6	6			
TOTAL				18	18	18	18	18	18	18	18	18			

<-> INDICATES 61 MISSING DATA VALUES OF 162 TOTAL VALUES.

KENTUCKY RIVER - KENTUCKY.

GRM-1



PLOT CHAR. 1975(5),1976(6),1977(7),

KENTUCKY RIVER - KENTUCKY.

WQI MEANS BY RIVER MILE FOR 1977 RPTM-1

LEGEND * WQI=41-60 ** WQI=21-40 *** WQI= 1-20 ZERO WQI MEANS NO OBS.

PLOT R.M.	DO WQI	FCOLI WQI	PH WQI	BOD5 WQI	NO2&3 WQI	TOT-P WQI	TEMPC WQI	TURB WQI	TSOL WQI	WQI(A)	WQI(M)
34	0	28**	90	0	95	88	86	48*	77	51*	49*
67	94	0	88	0	0	0	88	0	0	61	49*
127	96	0	91	0	0	0	80	0	0	60*	48*
145	99	0	89	0	0	0	77	0	0	59*	47*

WQI ANALYSIS BY MONTH AND FOR ENTIRE YEAR

	DO	FCOLI	PH	BOD5	NO2&3	TOT-P	TEMPC	TURB	TSOL	WQI(A)	WQI(M)
JANUARY	0	0	0	0	0	0	0	0	0	0	0
FEBRUARY	0	0	0	0	0	0	0	0	0	0	0
MARCH	99	21**	90	0	95	92	79	43*	79	59*	50*
APRIL	92	19***	90	0	96	90	87	17***	79	56*	44*
MAY	0	29**	91	0	96	88	92	28**	80	64	56*
JUNE	0	0	83	0	97	92	92	95	79	70	62
JULY	0	50*	90	0	96	96	85	98	72	76	74
AUGUST	0	40**	91	0	96	84	86	51*	75	57*	57*
SEPTEMBER	0	0	0	0	0	0	0	0	0	0	0
OCTOBER	0	13***	94	0	95	82	92	5***	80	35**	35**
NOVEMBER	0	20***	89	0	93	88	92	52*	75	35**	35**
DECEMBER	0	6***	94	0	93	76	92	5***	80	15***	15***
ENTIRE YEAR	96	28**	90	0	95	88	85	49*	77	56*	49*
RATING	ISFD	ISFD	EXC.	ISFD	ISFD	ISFD	EXC.	ISFD	ISFD	SAT.	SAT.
COLOR CODE	'*'	'*'	BLUE	'*'	'*'	'*'	BLUE	'*'	'*'	YEL.	YEL.
TEST IN- LL	4.0	-0.0	6.0	-0.0	-0.0	-0.0	-5.0	-0.0	-0.0		
SIDE HL	30.0	1000.0	9.0	100.0	100.0	100.0	32.0	10000.0	50000.0		
REPL.--WQI	0.0	35.0	30.0	40.0	40.0	40.0	25.0	40.0	40.0		
TEST OUT- LL	3.0	-0.0	5.5	-0.0	-0.0	-0.0	-5.0	-0.0	-0.0		
SIDE HL	35.0	10000.0	9.0	100.0	100.0	100.0	35.0	10000.0	50000.0		
REPL.--WQI	0.0	15.0	10.0	20.0	20.0	20.0	10.0	20.0	20.0		

SELECTED LOW WQI MEAN WEEKLY PLOT - APPROX. RM   127. YEAR 1977 PLOT CHARACTER (7)

```
               WQI(M)

        EXC. > 80 I___.___.___.___.___.___.___.___.___.___.___.___.
        GOOD   80 I
               79 I
               78 I
               77 I
               76 I
               75 I
               74 I
               73 I
               72 I
               71 I
               70 I
               69 I
               68 I
               67 I
               66 I
               65 I
               64 I
               63 I
               62 I
        GOOD__ 61 I___.___.___.___.___.___.___.___.___.___.___.___.
        SAT.   60 I
               59 I
               58 I
               57 I
               56 I
               55 I
               54 I
               53 I
               52 I
               51 I
               50 I            7
               49 I
               48 I
               47 I
               46 I              7
               45 I
               44 I
               43 I
               42 I
               41 I
        SAT.__ 40 I___.___.___.___.___.___.___.___.___.___.___.___.
        POOR   39 I
     INCLUDES 0-38 I
                  I___.___.___.___.___.___.___.___.___.___.___.___.
             WEEK 123412341234123412341234123412341234123412341234
            MONTH JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
```

KENTUCKY RIVER - KENTUCKY.   GPT-1977

SELECTED LOW WQI MEAN WEEKLY PLOT - APPROX. RM   145. YEAR 1977 PLOT CHARACTER (7)

```
                 WQI(M)

        EXC. > 80 I___.___.___.___.___.___.___.___.___.___.___.___.
        GOOD    80 I
                79 I
                78 I
                77 I
                76 I
                75 I
                74 I
                73 I
                72 I
                71 I
                70 I
                69 I
                68 I
                67 I
                66 I
                65 I
                64 I
                63 I
                62 I
        GOOD___61_I___.___.___.___.___.___.___.___.___.___.___.___.
        SAT.    60 I
                59 I
                58 I
                57 I
                56 I
                55 I
                54 I
                53 I
                52 I
                51 I
                50 I
                49 I            7
                48 I
                47 I
                46 I              7
                45 I
                44 I
                43 I
                42 I
                41 I
        SAT.____40_I___.___.___.___.___.___.___.___.___.___.___.___.
        POOR    39 I
     INCLUDES 0-38 I
                   I___.___.___.___.___.___.___.___.___.___.___.___.
              WEEK 123412341234123412341234123412341234123412341234
             MONTH JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
```

SELECTED LOW WQI MEAN WEEKLY PLOT - APPROX. RM   34. YEAR 1977 PLOT CHARACTER (7)

```
               WQI(M)

     EXC. > 80 I___.___.___.___.___.___.___.___.___.___.___.___.
     GOOD   80 I
            79 I
            78 I                           7
            77 I
            76 I
            75 I                         7
            74 I
            73 I
            72 I                       7
            71 I
            70 I
            69 I
            68 I
            67 I
            66 I
            65 I
            64 I
            63 I
            62 I                   7
     GOOD   61 I___.___.___.___.___.___.___.___.___.___.___.___.
     SAT.   60 I
            59 I
            58 I
            57 I
            56 I       7       7
            55 I
            54 I
            53 I
            52 I
            51 I
            50 I
            49 I
            48 I
            47 I
            46 I
            45 I
            44 I
            43 I
            42 I
            41 I
     SAT.   40 I___.___.___.___.___.___.___.___.___.___.___.___.
     POOR   39 I
   INCLUDES  0-38 I
               I___.___.___.___.___.___.___.___.___.___.___.___.
          WEEK 123412341234123412341234123412341234123412341234
         MONTH JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
```

SELECTED LOW WQI MEAN WEEKLY PLOT - APPROX. RM   67. YEAR 1977 PLOT CHARACTER (7)

```
                 WQI(M)

      EXC. > 80 I___.___.___.___.___.___.___.___.___.___.___.___.
      GOOD   80 I
             79 I
             78 I
             77 I
             76 I
             75 I
             74 I
             73 I
             72 I
             71 I
             70 I
             69 I
             68 I
             67 I
             66 I
             65 I
             64 I
             63 I
             62 I
      GOOD__ 61 I___.___.___.___.___.___.___.___.___.___.___.___.
      SAT.   60 I
             59 I
             58 I
             57 I
             56 I
             55 I
             54 I
             53 I
             52 I         7
             51 I
             50 I
             49 I
             48 I
             47 I
             46 I             7
             45 I
             44 I
             43 I
             42 I
             41 I
      SAT.__ 40 I___.___.___.___.___.___.___.___.___.___.___.___.
      POOR   39 I
   INCLUDES 0-38 I
                I___.___.___.___.___.___.___.___.___.___.___.___.
           WEEK 123412341234123412341234123412341234123412341234
          MONTH JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
```

THESE STREAM TABLE VALUES WERE USED IN THIS RUN.

*** INTERNAL MISSING DATA SUBSTITUTION VALUES 1975

MONTH>P#		1-JAN	2-FEB	3-MAR	4-APR	5-MAY	6-JUN	7-JUL	8-AUG	9-SEP	10OCT	11NOV	12DEC	ANN MN.	PARAM-	UNITS
***	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
PMEAN>	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<--DO	MG/L
#OBS.>		0	0	0	0	0	0	0	0	0	0	0	0	0		
PMEAN>	2	279.	340.	150.	67.	230.	120.	42.	84.	250.	2200.	192.	1553.	279.	<--FCOLI	N/CML
#OBS.>		0	1	1	1	1	1	1	1	1	1	3	3	15		
PMEAN>	3	7.4	7.2	7.7	7.1	7.4	7.3	7.4	7.2	7.1	6.9	7.2	7.6	7.3	<--PH	VALUE
#OBS.>		1	3	2	2	2	2	2	2	2	2	2	2	24		
PMEAN>	4	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.0	2.7	1.8	<--BOD5	MG/L
#OBS.>		0	0	0	0	0	0	0	0	0	0	1	1	2		
PMEAN>	5	0.80	0.87	0.90	0.75	0.55	0.80	0.65	0.70	0.55	0.80	0.70	0.65	0.73	<--NO2&3	MG/L
#OBS.>		1	3	2	2	2	2	2	2	2	2	2	2	24		
PMEAN>	6	0.06	0.03	0.07	0.05	0.34	0.18	0.08	0.04	0.02	0.18	0.03	0.05	0.09	<--TOT-P	MG/L
#OBS.>		1	3	2	2	2	2	2	2	2	2	2	2	24		
PMEAN>	7	8.0	7.3	10.5	11.0	18.9	24.0	24.4	28.9	26.5	18.5	14.5	11.0	17.0	<--TEMPC	C-DEG
#OBS.>		1	3	4	2	2	2	3	2	3	2	3	2	29		
PMEAN>	8	20.0	42.0	38.5	34.0	18.5	14.0	14.0	3.5	5.5	72.0	9.5	23.0	25.5	<--TURB	JTU
#OBS.>		1	3	2	2	2	2	2	2	2	2	2	2	24		
PMEAN>	9	168.0	85.0	71.0	77.0	83.0	106.0	115.0	154.5	163.0	81.5	91.5	106.0	105.0	<--TSOL	MG/L
#OBS.>		1	3	2	2	2	2	2	2	2	2	2	2	24		

TABLE FOR DO CALC.	MO 1.	8.0	11.9	MO 2.	7.3	12.1	MO 3.	10.5	11.2	MO 4.	11.0	11.1
(MON-EQ.TEMPC-DO SAT.)	MO 5.	18.9	9.4	MO 6.	24.0	8.5	MO 7.	24.4	8.5	MO 8.	28.9	7.9
	MO 9.	26.5	8.2	MO10.	18.5	9.4	MO11.	14.5	10.3	MO12.	11.0	11.1

*** INTERNAL MISSING DATA SUBSTITUTION VALUES 1976

MONTH>P#		1-JAN	2-FEB	3-MAR	4-APR	5-MAY	6-JUN	7-JUL	8-AUG	9-SEP	10OCT	11NOV	12DEC	ANN MN.	PARAM-	UNITS
***	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
PMEAN>	1	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	8.0	10.1	13.0	10.7	<--DO	MG/L
#OBS.>		0	0	0	0	0	0	0	0	0	1	3	2	6		
PMEAN>	2	224.	273.	240.	36.	76.	140.	66.	96.	100.	74.	54.	62.	98.	<--FCOLI	N/CML
#OBS.>		4	4	2	4	3	3	4	1	1	1	4	3	34		
PMEAN>	3	8.1	7.2	7.5	6.5	6.9	6.8	7.7	6.7	6.6	7.3	7.4	7.7	7.3	<--PH	VALUE
#OBS.>		2	2	1	2	2	2	2	2	2	3	4	4	28		
PMEAN>	4	0.9	0.8	1.5	2.3	0.5	1.4	1.5	1.7	1.2	0.7	0.7	0.1	1.1	<--BOD5	MG/L
#OBS.>		1	1	0	2	1	1	0	1	1	1	1	1	11		
PMEAN>	5	1.10	1.05	0.75	0.70	0.80	0.90	0.95	0.70	0.95	0.53	0.46	0.50	0.72	<--NO2&3	MG/L
#OBS.>		2	2	2	2	2	2	2	2	2	3	5	4	30		
PMEAN>	6	0.06	0.04	0.06	0.05	0.02	0.03	0.05	0.05	0.04	0.03	0.09	0.03	0.05	<--TOT-P	MG/L
#OBS.>		2	2	2	2	2	2	2	2	2	3	5	4	30		
PMEAN>	7	4.7	7.8	13.6	17.0	19.5	23.9	25.6	23.5	23.8	18.0	9.2	7.7	14.9	<--TEMPC	C-DEG
#OBS.>		2	4	4	3	2	3	2	2	2	4	5	4	37		
PMEAN>	8	28.0	20.0	40.0	36.0	14.0	16.5	11.5	19.5	21.0	10.0	9.0	7.0	19.8	<--TURB	JTU
#OBS.>		2	2	2	2	2	2	2	2	2	1	2	2	23		
PMEAN>	9	88.5	101.5	125.0	89.0	151.0	95.5	118.5	144.5	136.5	148.0	162.6	167.5	134.2	<--TSOL	MG/L
#OBS.>		2	2	2	2	2	2	2	2	2	3	5	4	30		

TABLE FOR DO CALC.	MO 1.	4.7	12.9	MO 2.	7.8	12.0	MO 3.	13.6	10.5	MO 4.	17.0	9.7
(MON-EQ.TEMPC-DO SAT.)	MO 5.	19.5	9.3	MO 6.	23.9	8.5	MO 7.	25.6	8.3	MO 8.	23.5	8.6
	MO 9.	23.8	8.5	MO10.	18.0	9.5	MO11.	9.2	11.5	MO12.	7.7	12.0

*** INTERNAL MISSING DATA SUBSTITUTION VALUES 1977

MONTH>P#	1-JAN	2-FEB	3-MAR	4-APR	5-MAY	6-JUN	7-JUL	8-AUG	9-SEP	10OCT	11NOV	12DEC	ANN MN.	PARAM-	UNITS
PMEAN> 1	15.0	13.2	9.7	9.0	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	<--DO	MG/L
#OBS.>	2	2	3	3	0	0	0	0	0	0	0	0	10		
PMEAN> 2	145.	19.	388.	213.	184.	79.	220.	96.	140.	66.	60.	2500.	145.	<--FCOLI	N/CML
#OBS.>	0	3	4	3	2	1	1	1	1	1	1	1	19		
PMEAN> 3	8.1	7.5	7.1	7.4	7.6	8.0	7.8	7.3	7.8	7.8	7.6	7.5	7.6	<--PH	VALUE
#OBS.>	3	3	4	4	2	1	1	1	1	1	1	1	23		
PMEAN> 4	2.4	2.7	3.0	3.2	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	<--BOD5	MG/L
#OBS.>	1	0	1	1	0	0	0	0	0	0	0	0	3		
PMEAN> 5	0.57	0.63	0.77	0.72	0.50	0.90	1.00	0.80	0.60	0.60	0.70	1.10	0.71	<--NO2&3	MG/L
#OBS.>	3	3	4	4	2	1	1	1	1	1	1	1	23		
PMEAN> 6	0.04	0.20	0.20	0.11	0.08	0.04	0.08	0.07	0.14	0.03	0.06	0.15	0.12	<--TOT-P	MG/L
#OBS.>	3	3	4	4	2	1	1	1	1	1	1	1	23		
PMEAN> 7	2.0	5.1	11.0	15.8	19.2	26.0	27.0	24.0	26.0	17.3	16.0	8.0	13.6	<--TEMPC	C-DEG
#OBS.>	3	4	4	4	3	1	1	1	1	2	1	1	26		
PMEAN> 8	4.0	5.0	150.0	25.0	2.0	30.0	4.0	35.0	27.5	20.0	20.0	75.0	33.6	<--TURB	JTU
#OBS.>	1	1	1	1	1	1	1	1	0	1	1	1	11		
PMEAN> 9	144.0	219.7	148.0	171.5	203.0	238.0	206.0	168.0	175.0	161.0	190.0	139.0	175.0	<--TSOL	MG/L
#OBS.>	3	3	4	4	1	1	1	1	0	1	1	1	21		

TABLE FOR DO CALC. (MON-EQ.TEMPC-DO SAT.)

MO 1.	2.0	13.8	MO 2.	5.1	12.8	MO 3.	11.0	11.1	MO 4.	15.8	10.0
MO 5.	19.2	9.4	MO 6.	26.0	8.2	MO 7.	27.0	8.1	MO 8.	24.0	8.5
MO 9.	26.0	8.2	MO10.	17.3	9.6	MO11.	16.0	10.0	MO12.	8.0	11.9

WGT.FACTOR MO.DA.YR.	TIME	RM/STA.	STA.NO.	.17 DO MG/L 00300	.16 FCOLI N/CML 31613	.11 PH VALUE 00400	.11 BOD5 MG/L 00310	.10 NO2&3 MG/L 00630	.10 TOT-P MG/L 00665	.10 TEMPC C-DEG 00010	.08 TURB JTU 00075	.07 TSOL MG/L 00515	.0 FLOW CFS 00061	WQI(A)	WQI(M)
11 14 75	2500	41.3	GR41.3M	-0.00	400.	-0.0	1.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	50.	26.
11 25 75	2500	41.3	GR41.3M	-0.00	160.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	51.	27.
12 3 75	2500	41.3	GR41.3M	-0.00	1600.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	35.	22.
12 16 75	2500	41.3	GR41.3M	-0.00	3900.	-0.0	2.70	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	35.	21.
1 12 76	2500	41.3	GR41.3M	-0.00	300.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	68.	62.
1 22 76	2500	41.3	GR41.3M	-0.00	200.	-0.0	0.90	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	68.	63.
1 26 76	2500	41.3	GR41.3M	-0.00	100.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	70.	66.
2 3 76	2500	41.3	GR41.3M	-0.00	260.	-0.0	0.80	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	71.	64.
2 16 76	2500	41.3	GR41.3M	-0.00	640.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	69.	60.
2 24 76	2500	41.3	GR41.3M	-0.00	380.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	70.	63.
3 29 76	2500	41.3	GR41.3M	-0.00	240.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	67.	60.
4 7 76	2500	41.3	GR41.3M	-0.00	40.	-0.0	1.50	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	72.	69.
4 19 76	2500	41.3	GR41.3M	-0.00	20.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	73.	71.
4 28 76	2500	41.3	GR41.3M	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	71.	69.
5 10 76	2500	41.3	GR41.3M	-0.00	40.	-0.0	0.50	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	76.	74.
5 19 76	2500	41.3	GR41.3M	-0.00	620.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	69.	61.
6 1 76	2500	41.3	GR41.3M	-0.00	200.	-0.0	1.40	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	70.	65.
6 8 76	2500	41.3	GR41.3M	-0.00	180.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	70.	65.
6 28 76	2500	41.3	GR41.3M	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	71.	67.
7 8 76	2500	41.3	GR41.3M	-0.00	360.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	69.	63.
7 20 76	2500	41.3	GR41.3M	-0.00	20.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	77.	76.
7 28 76	2500	41.3	GR41.3M	-0.00	40.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	75.	73.
8 9 76	2500	41.3	GR41.3M	-0.00	-0.	-0.0	1.70	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	70.	66.
9 2 76	2500	41.3	GR41.3M	-0.00	-0.	-0.0	1.20	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	70.	66.
10 11 76	2500	41.3	GR41.3M	8.00	-0.	7.8	0.70	0.50	0.03	18.8	-0.0	217.0	-0.	74.	70.
11 4 76	2500	41.3	GR41.3M	10.70	30.	7.6	0.70	0.30	0.11	10.0	-0.0	258.0	-0.	76.	74.
11 16 76	2500	41.3	GR41.3M	11.10	70.	7.8	-0.00	0.50	0.09	8.0	-0.0	167.0	-0.	75.	71.
11 29 76	2500	41.3	GR41.3M	8.40	20.	7.6	-0.00	0.30	0.19	5.0	-0.0	193.0	-0.	73.	72.
12 8 76	2500	41.3	GR41.3M	13.40	60.	7.7	0.10	0.60	0.05	4.5	-0.0	213.0	-0.	74.	71.
12 20 76	2500	41.3	GR41.3M	12.60	40.	8.1	-0.00	0.50	0.05	5.0	-0.0	208.0	-0.	75.	73.
1 4 77	2500	41.3	GR41.3M	15.00	-0.	8.3	2.40	0.80	0.06	3.0	-0.0	209.0	-0.	69.	65.
1 31 77	2500	41.3	GR41.3M	15.00	-0.	8.0	-0.00	0.50	0.06	-0.0	-0.0	220.0	-0.	72.	67.
2 9 77	2500	41.3	GR41.3M	14.20	30.	8.0	-0.00	0.50	0.05	4.0	-0.0	215.0	-0.	76.	74.
2 21 77	2500	41.3	GR41.3M	12.30	10.	7.9	-0.00	0.90	0.51	6.0	-0.0	210.0	-0.	76.	76.
3 3 77	2500	41.3	GR41.3M	10.40	50.	7.3	3.00	0.90	0.05	9.0	-0.0	161.0	-0.	63.	47.
3 15 77	2500	41.3	GR41.3M	8.90	1300.	7.4	-0.00	0.30	0.26	13.0	-0.0	137.0	-0.	35.	35.
3 28 77	2500	41.3	GR41.3M	9.80	1030.	7.5	-0.00	0.80	0.28	13.0	-0.0	171.0	-0.	35.	35.
4 6 77	2500	41.3	GR41.3M	9.40	700.	7.1	3.20	0.70	0.13	13.0	-0.0	159.0	-0.	62.	55.
4 14 77	2500	41.3	GR41.3M	9.10	230.	7.4	-0.00	0.70	0.05	16.5	-0.0	178.0	-0.	66.	61.
4 26 77	2500	41.3	GR41.3M	8.50	-0.	7.7	-0.00	0.80	0.20	17.5	-0.0	185.0	-0.	64.	60.
1 7 75	1230	49.1	03321230	-0.00	-0.	7.4	-0.00	0.80	0.06	8.0	20.0	168.0	20700.	47.	25.
2 11 75	1300	49.1	03321230	-0.00	340.	6.8	-0.00	0.80	0.06	7.0	40.0	165.0	24600.	44.	24.
3 24 75	1230	49.1	03321230	-0.00	150.	7.6	-0.00	0.70	0.07	13.0	50.0	104.0	61300.	45.	25.
4 15 75	1300	49.1	03321230	-0.00	67.	6.6	-0.00	0.50	0.06	12.0	40.0	133.0	51600.	48.	26.
5 7 75	1200	49.1	03321230	-0.00	230.	7.4	-0.00	0.30	0.65	20.0	30.0	151.0	30900.	43.	24.
6 10 75	1400	49.1	03321230	-0.00	120.	7.1	-0.00	0.80	0.29	22.0	20.0	200.0	5950.	47.	26.
7 29 75	1030	49.1	03321230	-0.00	42.	7.2	-0.00	0.60	0.03	28.0	15.0	212.0	2140.	48.	27.
8 18 75	1230	49.1	03321230	-0.00	84.	7.4	-0.00	0.60	0.04	30.0	4.0	302.0	1930.	51.	28.
9 8 75	1100	49.1	03321230	-0.00	290.	6.6	-0.00	0.60	0.03	29.0	8.0	319.0	1640.	45.	25.
10 20 75	1300	49.1	03321230	-0.00	2200.	6.4	-0.00	1.00	0.31	16.0	120.0	130.0	31300.	35.	16.
11 17 75	1200	49.1	03321230	-0.00	110.	6.8	-0.00	0.70	0.05	14.0	9.0	163.0	11100.	51.	27.
12 8 75	1100	49.1	03321230	-0.00	600.	7.6	-0.00	0.70	0.06	11.0	30.0	178.0	21900.	44.	24.
1 19 76	1100	49.1	03321230	-0.00	420.	8.5	-0.00	1.00	0.08	5.0	35.0	146.0	25600.	63.	57.
2 10 76	1130	49.1	03321230	-0.00	88.	6.9	-0.00	1.00	0.06	5.0	20.0	186.0	13700.	70.	67.
3 16 76	1115	49.1	03321230	-0.00	240.	-0.0	-0.00	0.70	0.06	12.0	50.0	202.0	9030.	64.	58.
4 6 76	1200	49.1	03321230	-0.00	220.	6.2	-0.00	0.60	0.07	14.0	40.0	142.0	41400.	62.	57.

5 4 76	1300	49.1	03321230	-0.00	16.	6.8	-0.00	0.80	0.01	20.0	12.0	288.0	2490.	77.	75.
6 22 76	1200	49.1	03321230	-0.00	76.	6.0	-0.00	0.90	0.03	27.0	25.0	188.0	5990.	64.	62.
7 20 76	1200	49.1	03321230	-0.00	64.	7.3	-0.00	0.90	0.03	28.0	15.0	220.0	3020.	70.	68.
8 5 76	1140	49.1	03321230	-0.00	96.	6.2	-0.00	0.60	0.05	26.0	15.0	262.0	3930.	66.	63.
9 14 76	1130	49.1	03321230	-0.00	100.	6.3	-0.00	0.90	0.05	26.0	15.0	234.0	3990.	67.	64.
10 1 76	2500	49.1	03321230	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	75.	72.
10 15 76	1100	49.1	03321230	-0.00	74.	6.8	-0.00	0.60	0.02	21.0	10.0	214.0	2850.	70.	67.
11 9 76	1130	49.1	03321230	-0.00	200.	-0.0	-0.00	0.50	0.05	11.0	15.0	189.0	6950.	70.	65.
12 7 76	1145	49.1	03321230	-0.00	100.	7.1	-0.00	0.40	0.01	7.0	10.0	242.0	2030.	74.	70.
2 8 77	1300	49.1	03321230	-0.00	22.	6.7	-0.00	0.50	0.03	4.0	5.0	234.0	3970.	76.	74.
3 8 77	1330	49.1	03321230	-0.00	340.	6.2	-0.00	1.10	0.21	9.0	150.0	123.0	47500.	55.	41.
4 12 77	1130	49.1	03321230	-0.00	60.	7.6	-0.00	0.70	0.05	16.0	25.0	164.0	8820.	70.	67.
5 5 77	1120	49.1	03321230	-0.00	680.	7.7	-0.00	0.90	0.09	18.0	-0.0	-0.0	14000.	68.	60.
5 24 77	1125	49.1	03321230	-0.00	50.	7.5	-0.00	0.10	0.08	24.0	2.0	203.0	1900.	68.	65.
6 9 77	1100	49.1	03321230	-0.00	79.	8.0	-0.00	0.90	0.04	26.0	30.0	238.0	1440.	66.	63.
7 12 77	1050	49.1	03321230	-0.00	220.	7.8	-0.00	1.00	0.08	27.0	4.0	206.0	4930.	68.	63.
8 23 77	1200	49.1	03321230	-0.00	96.	7.3	-0.00	0.80	0.07	24.0	35.0	168.0	10600.	67.	63.
9 20 77	1130	49.1	03321230	-0.00	140.	7.8	-0.00	0.60	0.14	26.0	-0.0	-0.0	4820.	65.	62.
10 18 77	1115	49.1	03321230	-0.00	66.	7.8	-0.00	0.60	0.03	16.0	20.0	161.0	6080.	70.	67.
11 1 77	1100	49.1	03321230	-0.00	60.	7.6	-0.00	0.70	0.06	16.0	20.0	190.0	10100.	71.	68.
12 7 77	1115	49.1	03321230	-0.00	2500.	7.5	-0.00	1.10	0.15	8.0	75.0	139.0	44700.	35.	35.
2 3 75	1030	100.6	202856	-0.00	-0.	7.5	-0.00	0.90	0.01	7.5	48.0	57.0	17700.	45.	24.
2 3 75	1035	100.6	202856	-0.00	-0.	7.3	-0.00	0.90	0.01	7.5	38.0	33.0	17700.	46.	24.
3 10 75	830	100.6	202856	-0.00	-0.	7.9	-0.00	1.10	0.07	11.1	27.0	38.0	17400.	48.	26.
4 7 75	820	100.6	202856	-0.00	-0.	7.7	-0.00	1.00	0.05	10.0	28.0	21.0	54700.	50.	27.
5 12 75	830	100.6	202856	-0.00	-0.	7.5	-0.00	0.80	0.04	17.8	7.0	15.0	9220.	50.	26.
6 16 75	830	100.6	202856	-0.00	-0.	7.5	-0.00	0.60	0.07	26.1	8.0	12.0	3400.	51.	27.
7 14 75	800	100.6	202856	-0.00	-0.	7.7	-0.00	0.70	0.14	25.6	13.0	18.0	3000.	52.	28.
8 11 75	750	100.6	202856	-0.00	-0.	7.1	-0.00	0.80	0.04	27.8	3.0	7.0	1700.	53.	28.
9 8 75	1030	100.6	202856	-0.00	-0.	7.6	-0.00	0.50	0.02	28.9	3.0	7.0	1100.	49.	26.
10 14 75	815	100.6	202856	-0.00	-0.	7.4	-0.00	0.60	0.06	21.1	24.0	33.0	11000.	43.	22.
11 17 75	930	100.6	202856	-0.00	-0.	7.6	-0.00	0.70	0.02	15.0	10.0	20.0	11000.	50.	26.
12 9 75	805	100.6	202856	-0.00	-0.	7.6	-0.00	0.60	0.04	11.1	16.0	34.0	16600.	45.	23.
1 8 76	945	100.6	202856	-0.00	-0.	7.7	-0.00	1.20	0.04	4.4	21.0	31.0	-0.	70.	64.
2 10 76	820	100.6	202856	-0.00	-0.	7.6	-0.00	1.10	0.02	10.6	20.0	17.0	-0.	67.	61.
3 22 76	805	100.6	202856	-0.00	-0.	7.5	-0.00	0.80	0.06	14.4	30.0	48.0	-0.	68.	62.
4 12 76	905	100.6	202856	-0.00	-0.	6.9	-0.00	0.80	0.04	16.1	32.0	36.0	-0.	73.	70.
4 27 76	1510	100.6	202856	-0.00	10.	-0.0	3.10	-0.00	-0.00	21.0	-0.0	-0.0	-0.	68.	66.
5 11 76	750	100.6	202856	-0.00	-0.	7.0	-0.00	0.80	0.03	19.0	16.0	14.0	-0.	74.	70.
6 14 76	740	100.6	202856	-0.00	-0.	7.6	-0.00	0.90	0.04	25.6	8.0	3.0	-0.	71.	67.
7 12 76	800	100.6	202856	-0.00	-0.	8.1	-0.00	1.00	0.08	23.3	8.0	17.0	4720.	73.	70.
8 4 76	1000	100.6	202856	-0.00	-0.	7.2	-0.00	0.80	0.05	21.1	24.0	27.0	3560.	69.	66.
9 13 76	915	100.6	202856	-0.00	-0.	6.9	-0.00	1.00	0.04	21.7	27.0	39.0	3960.	70.	66.
10 12 76	830	100.6	202856	-0.00	-0.	7.2	-0.00	0.50	0.03	20.6	-0.0	13.0	2350.	73.	70.
11 8 76	820	100.6	202856	-0.00	-0.	6.8	-0.00	0.70	0.03	12.2	3.0	6.0	5410.	74.	71.
12 6 76	825	100.6	202856	-0.00	-0.	7.9	-0.00	0.50	0.03	14.4	4.0	7.0	1370.	68.	62.
1 10 77	900	100.6	202856	-0.00	-0.	7.9	-0.00	0.40	0.01	1.1	4.0	3.0	4980.	73.	68.
3 13 75	1700	225.9	03308500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	8.5	-0.0	-0.0	43300.	47.	26.
3 30 75	1300	225.9	03308500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	9.5	-0.0	-0.0	25500.	47.	26.
2 14 76	1700	225.9	03308500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	10.5	-0.0	-0.0	10300.	68.	62.
3 30 76	745	225.9	03308500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	13.0	-0.0	-0.0	17200.	67.	60.
3 13 77	610	225.9	03308500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	13930.	59.	43.
7 2 77	610	225.9	03308500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	8400.	68.	63.
10 2 77	1110	225.9	03308500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	18.5	-0.0	-0.0	10100.	70.	67.
7 18 75	745	279.8	03306490	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	19.5	-0.0	-0.0	119.	49.	27.
9 10 75	1550	279.8	03306490	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	21.5	-0.0	-0.0	121.	46.	25.
11 20 75	1135	279.8	03306490	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	14.5	-0.0	-0.0	3220.	51.	27.
2 25 76	1130	279.8	03306490	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	5.0	-0.0	-0.0	5570.	69.	63.
3 26 76	1100	279.8	03306490	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	15.0	-0.0	-0.0	2150.	66.	60.
6 22 76	1530	279.8	03306490	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	19.0	-0.0	-0.0	568.	66.	62.
10 22 76	930	279.8	03306490	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	11.5	-0.0	-0.0	899.	70.	66.
1 26 77	1240	279.8	03306490	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	2.0	-0.0	-0.0	239.	72.	67.
2 24 77	1230	279.8	03306490	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	6.5	-0.0	-0.0	499.	76.	75.
5 18 77	1040	279.8	03306490	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	15.5	-0.0	-0.0	160.	69.	64.
COUNT OF OBS.				10	19	23	3	23	23	26	11	21			
MISSING VALUES				19	10	6	26	6	6	3	18	8			
TOTAL				29	29	29	29	29	29	29	29	29			

<-> INDICATES 102 MISSING DATA VALUES OF 261 TOTAL VALUES.

GREEN RIVER - KENTUCKY. HIST-1

HISTORY RECORDS FOR NEXT YEARS PLOT

COL1-6 MODAYR	8-11 PLPS	13-17 RIVMI	67-72 WQI(A)	73-80 WQI(M)
133275	1	44.	43	24
133275	3	50.	46	25
133275	20	101.	49	26
133275	62	227.	47	26
133275	79	278.	49	26
133276	1	44.	72	67
133276	3	50.	69	65
133276	20	101.	71	67
133276	62	227.	68	61
133276	79	278.	68	63
133277	1	44.	62	58
133277	3	50.	65	61
133277	20	101.	73	68
133277	62	227.	66	58
133277	79	278.	72	69

GREEN RIVER - KENTUCKY.

WQI MEANS BY RIVER MILE FOR 1977 RPTM-1

LEGEND * WQI=41-60 ** WQI=21-40 *** WQI= 1-20 ZERO WQI MEANS NO OBS.

PLOT R.M.	DO WQI	FCOLI WQI	PH WQI	BOD5 WQI	NO2&3 WQI	TOT-P WQI	TEMPC WQI	TURB WQI	TSOL WQI	WQI(A)	WQI(M)
44	93	37**	89	73	95	90	85	0	76	61	57*
50	0	38**	88	0	94	94	86	58*	76	64	60*
101	0	0	88	0	97	99	90	91	80	73	68
227	0	0	0	0	0	0	87	0	0	65	57*
278	0	0	0	0	0	0	83	0	0	72	68

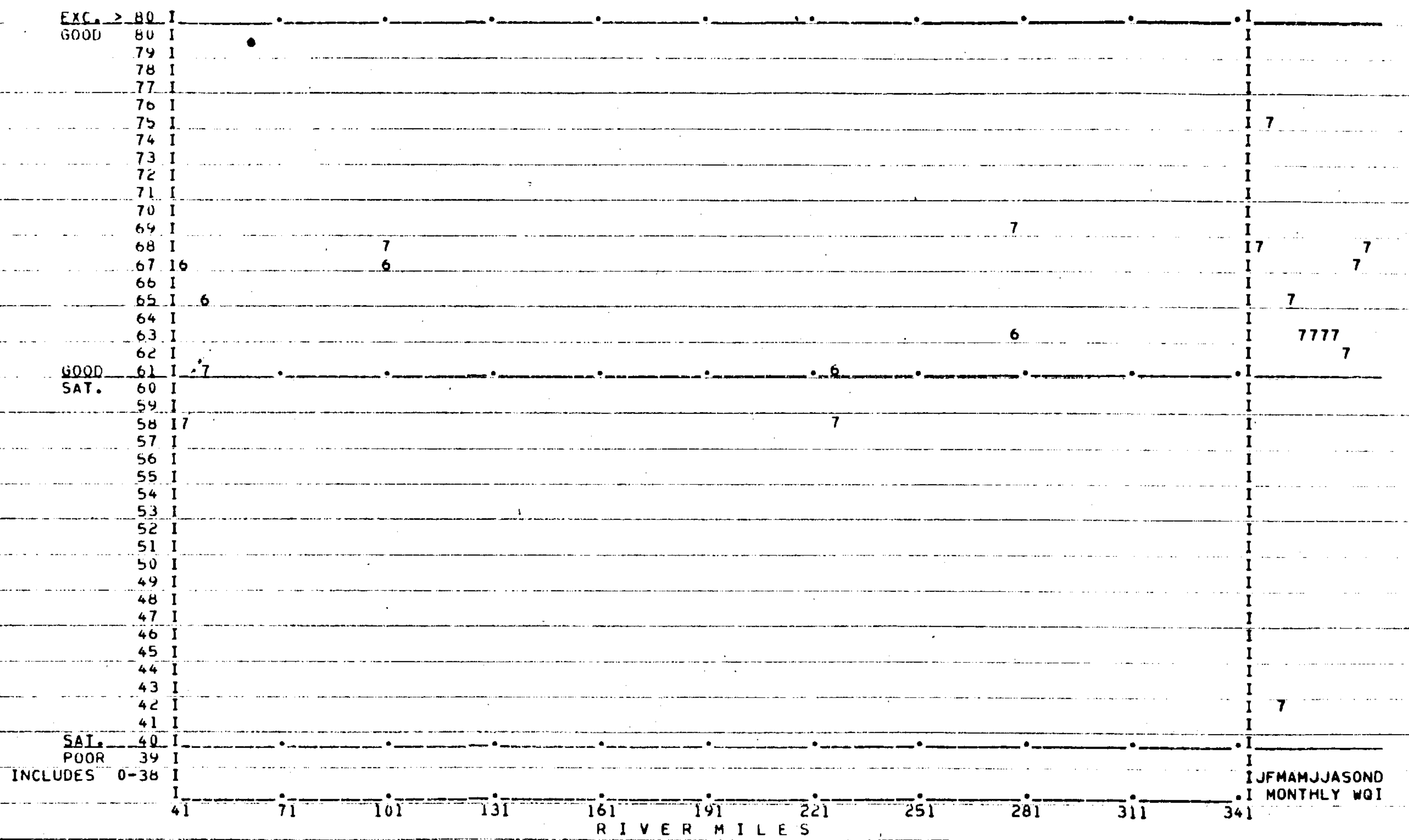
WQI ANALYSIS BY MONTH AND FOR ENTIRE YEAR

	DO WQI	FCOLI WQI	PH WQI	BOD5 WQI	NO2&3 WQI	TOT-P WQI	TEMPC WQI	TURB WQI	TSOL WQI	WQI(A)	WQI(M)
JANUARY	95	0	88	78	97	99	90	91	80	73	68
FEBRUARY	95	57*	83	0	96	96	68	89	71	76	75
MARCH	91	29**	74	72	93	88	84	5***	82	57*	42*
APRIL	93	42*	92	71	95	96	89	57*	79	69	65
MAY	0	36**	92	0	96	95	67	95	75	68	63
JUNE	0	42*	87	0	94	98	92	52*	70	66	63
JULY	0	32**	89	0	93	95	92	91	74	68	63
AUGUST	0	40**	94	0	94	96	92	48*	79	67	63
SEPTEMBER	0	37**	89	0	96	92	92	0	0	65	62
OCTOBER	0	44*	89	0	96	98	87	62	80	70	67
NOVEMBER	0	45*	92	0	95	96	92	62	76	71	68
DECEMBER	0	16***	93	0	92	91	92	26**	82	35**	35**
ENTIRE YEAR	93	38**	88	74	95	95	86	66	78	67	61
RATING	ISFD	ISFD	EXC.	ISFD	EXC.	EXC.	EXC.	ISFD	GOOD	GOOD	GOOD
COLOR CODE	***	***	BLUE	***	BLUE	BLUE	BLUE	***	GRN.	GRN.	GRN.

		DO	FCOLI	PH	BOD5	NO2&3	TOT-P	TEMPC	TURB	TSOL
TEST IN- SIDE	LL	4.0	-0.0	6.0	-0.0	-0.0	-0.0	-5.0	-0.0	-0.0
	HL	30.0	1000.0	9.0	100.0	100.0	100.0	32.0	10000.0	50000.0
	REPL.--WQI	0.0	35.0	30.0	40.0	40.0	40.0	25.0	40.0	40.0
TEST OUT- SIDE	LL	3.0	-0.0	5.5	-0.0	-0.0	-0.0	-5.0	-0.0	-0.0
	HL	35.0	10000.0	9.0	100.0	100.0	100.0	35.0	10000.0	50000.0
	REPL.--WQI	0.0	15.0	10.0	20.0	20.0	20.0	10.0	20.0	20.0

GREEN RIVER - KENTUCKY. GRM-1

WQI(M) ENTIRE RIVER



PLOT CHAR. 1975(5),1976(6),1977(7),

```
GREEN RIVER - KENTUCKY.                                              GPT-1977

SELECTED LOW WQI MEAN WEEKLY PLOT - APPROX. RM    44.  YEAR 1977 PLOT CHARACTER (7)

                WQI(M)

         EXC. > 80 I___.___.___.___.___.___.___.___.___.___.___.___.
         GOOD   80 I
                79 I
                78 I
                77 I
                76 I      7
                75 I
                74 I     7
                73 I
                72 I
                71 I
                70 I
                69 I
                68 I
                67 I    7
                66 I
                65 I7
                64 I
                63 I
                62 I
         GOOD   61 I___.___.___._7_.___.___.___.___.___.___.___.___.
         SAT.   60 I               7
                59 I
                58 I
                57 I
                56 I
                55 I            7
                54 I
                53 I
                52 I
                51 I
                50 I
                49 I
                48 I
                47 I        7
                46 I
                45 I
                44 I
                43 I
                42 I
                41 I
         SAT.   40 I___.___.___.___.___.___.___.___.___.___.___.___.
         POOR   39 I
     INCLUDES 0-38 I
                   I___.___.___.___.___.___.___.___.___.___.___.___.
              WEEK  123412341234123412341234123412341234123412341234
             MONTH  JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
```

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GREEN RIVER - KENTUCKY.                                                    GPT-1977

SELECTED LOW WQI MEAN WEEKLY PLOT - APPROX. RM   227.  YEAR 1977 PLOT CHARACTER (7)

              WQI(M)

     EXC. > 80 I---.---.---.---.---.---.---.---.---.---.---.---.
     GOOD   80 I
            79 I
            78 I
            77 I
            76 I
            75 I
            74 I
            73 I
            72 I
            71 I
            70 I
            69 I
            68 I
            67 I                                   7
            66 I
            65 I
            64 I
            63 I                       7
            62 I
     GOOD   61 I---.---.---.---.---.---.---.---.---.---.---.---.
     SAT.   60 I
            59 I
            58 I
            57 I
            56 I
            55 I
            54 I
            53 I
            52 I
            51 I
            50 I
            49 I
            48 I
            47 I
            46 I
            45 I
            44 I
            43 I         7
            42 I
            41 I
     SAT.   40 I---.---.---.---.---.---.---.---.---.---.---.---.
     POOR   39 I
 INCLUDES 0-38 I
               I---.---.---.---.---.---.---.---.---.---.---.---.
          WEEK 123412341234123412341234123412341234123412341234
         MONTH JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
```

GREEN RIVER - KENTUCKY. GPT-1977

SELECTED LOW WQI MEAN WEEKLY PLOT - APPROX. RM 50. YEAR 1977 PLOT CHARACTER (7)

```
           WQI(M)

EXC. >      80 I___.___.___.___.___.___.___.___.___.___.___.___.
GOOD        80 I
            79 I
            78 I
            77 I
            76 I
            75 I
            74 I     7
            73 I
            72 I
            71 I
            70 I
            69 I
            68 I                                        7
            67 I             7                        7
            66 I
            65 I                   7
            64 I
            63 I                     7   7     7
            62 I                                  7
GOOD        61 I___.___.___.___.___.___.___.___.___.___.___.___.
SAT.        60 I                7
            59 I
            58 I
            57 I
            56 I
            55 I
            54 I
            53 I
            52 I
            51 I
            50 I
            49 I
            48 I
            47 I
            46 I
            45 I
            44 I
            43 I
            42 I
            41 I         7
SAT.        40 I___.___.___.___.___.___.___.___.___.___.___.___.
POOR        39 I
INCLUDES  0-38 I
               I___.___.___.___.___.___.___.___.___.___.___.___.
           WEEK 123412341234123412341234123412341234123412341234
          MONTH  JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
```

GREEN RIVER - KENTUCKY. GPT-1977

SELECTED LOW WQI MEAN WEEKLY PLOT - APPROX. RM 101. YEAR 1977 PLOT CHARACTER (7)

```
                 WQI(M)
      EXC. > 80 I___.____.____.____.____.____.____.____.____.____.____.____.
      GOOD   80 I
             79 I
             78 I
             77 I
             76 I
             75 I
             74 I
             73 I
             72 I
             71 I
             70 I
             69 I
             68 I 7
             67 I
             66 I
             65 I
             64 I
             63 I
             62 I
      GOOD   61 I___.____.____.____.____.____.____.____.____.____.____.____.
      SAT.   60 I
             59 I
             58 I
             57 I
             56 I
             55 I
             54 I
             53 I
             52 I
             51 I
             50 I
             49 I
             48 I
             47 I
             46 I
             45 I
             44 I
             43 I
             42 I
             41 I
      SAT.   40 I___.____.____.____.____.____.____.____.____.____.____.____.
      POOR   39 I
  INCLUDES 0-38 I
                I___.____.____.____.____.____.____.____.____.____.____.____.
           WEEK 123412341234123412341234123412341234123412341234
           MONTH JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
```

GREEN RIVER - KENTUCKY.   GPT-1977

SELECTED LOW WQI MEAN WEEKLY PLOT - APPROX. RM 278. YEAR 1977 PLOT CHARACTER (7)

```
                      WQI(M)

          EXC. > 80 I___.___.___.___.___.___.___.___.___.___.___.___.
          GOOD   80 I
                 79 I
                 78 I
                 77 I
                 76 I
                 75 I       7
                 74 I
                 73 I
                 72 I
                 71 I
                 70 I
                 69 I
                 68 I
                 67 I   7
                 66 I
                 65 I
                 64 I                  7
                 63 I
                 62 I
          GOOD   61 I___.___.___.___.___.___.___.___.___.___.___.___.
          SAT.   60 I
                 59 I
                 58 I
                 57 I
                 56 I
                 55 I
                 54 I
                 53 I
                 52 I
                 51 I
                 50 I
                 49 I
                 48 I
                 47 I
                 46 I
                 45 I
                 44 I
                 43 I
                 42 I
                 41 I
          SAT.   40 I___.___.___.___.___.___.___.___.___.___.___.___.
          POOR   39 I
     INCLUDES  0-38 I
                    I___.___.___.___.___.___.___.___.___.___.___.___.
                WEEK 123412341234123412341234123412341234123412341234
               MONTH JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
```

CUMBERLAND RIVER - UPPER & LOWER KENTUCKY PORTIONS.

THESE STREAM TABLE VALUES WERE USED IN THIS RUN. A-1

*** INTERNAL MISSING DATA SUBSTITUTION VALUES 1975

MONTH>P#		1-JAN	2-FEB	3-MAR	4-APR	5-MAY	6-JUN	7-JUL	8-AUG	9-SEP	10OCT	11NOV	12DEC	ANN MN.	PARAM-	UNITS
***	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
PMEAN>	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<--DO	MG/L
#OBS.>		0	0	0	0	0	0	0	0	0	0	0	0	0		
PMEAN>	2	45.	340.	220.	120.	19.	10.	27.	12.	21.	120.	48.	30.	45.	<--FCOLI	N/CML
#OBS.>		0	1	1	1	1	1	1	1	1	1	1	2	12		
PMEAN>	3	7.4	7.2	7.2	6.7	7.1	6.6	7.4	6.4	6.9	6.5	6.8	7.7	7.0	<--PH	VALUE
#OBS.>		1	1	1	1	1	1	1	1	1	1	1	1	12		
PMEAN>	4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.5	1.4	<--BOD5	MG/L
#OBS.>		0	0	0	0	0	0	0	0	0	0	1	1	2		
PMEAN>	5	0.40	0.50	0.50	0.40	0.30	0.20	0.40	0.40	0.40	0.40	0.50	0.40	0.40	<--NO2&3	MG/L
#OBS.>		1	1	1	1	1	1	0	0	0	1	1	1	9		
PMEAN>	6	0.08	0.22	0.14	0.10	0.04	0.16	0.07	0.08	0.09	0.21	0.13	0.11	0.12	<--TOT-P	MG/L
#OBS.>		1	1	1	1	1	1	1	1	1	1	1	1	12		
PMEAN>	7	8.0	6.5	11.0	12.0	20.0	26.0	29.3	23.7	27.8	16.0	15.0	10.8	19.4	<--TEMPC	C-DEG
#OBS.>		1	1	1	1	1	1	2	3	3	1	1	2	18		
PMEAN>	8	8.0	20.0	40.0	25.0	15.0	10.0	5.5	1.0	15.5	30.0	18.6	18.6	18.6	<--TURB	JTU
#OBS.>		1	1	1	1	1	1	0	1	0	1	0	0	8		
PMEAN>	9	130.0	120.0	110.0	92.0	85.0	110.0	88.0	89.0	99.0	110.0	103.3	103.3	103.3	<--TSOL	MG/L
#OBS.>		1	1	1	1	1	1	1	1	1	1	0	0	10		

TABLE FOR DO CALC.	MO 1.	8.0	11.9	MO 2.	6.5	12.3	MO 3.	11.0	11.1	MO 4.	12.0	10.8
(MON-EQ.TEMPC-DO SAT.)	MO 5.	20.0	9.2	MO 6.	26.0	8.2	MO 7.	29.3	7.7	MO 8.	23.7	8.6
	MO 9.	27.8	8.0	MO10.	16.0	10.0	MO11.	15.0	10.2	MO12.	10.8	11.1

*** INTERNAL MISSING DATA SUBSTITUTION VALUES 1976

MONTH>P#		1-JAN	2-FEB	3-MAR	4-APR	5-MAY	6-JUN	7-JUL	8-AUG	9-SEP	10OCT	11NOV	12DEC	ANN MN.	PARAM-	UNITS
***	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
PMEAN>	1	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	8.0	10.9	12.7	10.9	<--DO	MG/L
#OBS.>		0	0	0	0	0	0	0	0	0	2	3	3	8		
PMEAN>	2	106.	40.	33.	26.	26.	4.	7.	5.	20.	2.	15.	20.	20.	<--FCOLI	N/CML
#OBS.>		3	2	3	3	1	2	1	1	0	1	3	1	21		
PMEAN>	3	6.7	7.4	7.6	7.9	7.4	6.7	7.4	6.3	6.6	6.9	7.7	8.1	7.5	<--PH	VALUE
#OBS.>		1	1	1	1	1	1	1	1	0	2	4	4	18		
PMEAN>	4	0.8	1.3	0.9	1.2	0.4	1.4	1.7	1.9	1.3	0.6	1.0	0.9	1.1	<--BOD5	MG/L
#OBS.>		1	1	1	1	1	1	0	2	0	1	1	1	11		
PMEAN>	5	0.60	0.60	0.50	0.50	0.10	0.20	0.15	0.10	0.10	0.50	0.30	0.22	0.33	<--NO2&3	MG/L
#OBS.>		1	1	1	1	1	1	0	1	1	3	4	4	19		
PMEAN>	6	0.10	0.10	0.09	0.13	0.07	0.07	0.08	0.10	0.09	0.12	0.10	0.06	0.09	<--TOT-P	MG/L
#OBS.>		1	1	1	1	1	1	0	1	1	3	4	4	19		
PMEAN>	7	4.3	5.0	9.7	12.8	14.5	22.6	26.0	22.8	26.0	18.3	10.3	4.8	13.7	<--TEMPC	C-DEG
#OBS.>		3	2	3	2	2	4	2	3	1	3	6	4	35		
PMEAN>	8	10.0	13.8	13.8	25.0	13.8	13.8	13.8	10.0	10.0	10.0	13.8	13.8	13.8	<--TURB	JTU
#OBS.>		1	0	0	1	0	0	0	1	0	1	0	0	4		
PMEAN>	9	126.0	105.1	105.1	105.0	97.0	100.0	120.0	92.0	92.0	106.5	105.3	105.3	105.1	<--TSOL	MG/L
#OBS.>		1	0	0	1	1	1	1	1	1	2	3	3	15		

TABLE FOR DO CALC.	MO 1.	4.3	13.0	MO 2.	5.0	12.8	MO 3.	9.7	11.4	MO 4.	12.8	10.6
(MON-EQ.TEMPC-DO SAT.)	MO 5.	14.5	10.3	MO 6.	22.6	8.7	MO 7.	26.0	8.2	MO 8.	22.8	8.7
	MO 9.	26.0	8.2	MO10.	18.3	9.5	MO11.	10.3	11.2	MO12.	4.8	12.9

*** INTERNAL MISSING DATA SUBSTITUTION VALUES 1977

MONTH>P#	1-JAN	2-FEB	3-MAR	4-APR	5-MAY	6-JUN	7-JUL	8-AUG	9-SEP	10OCT	11NOV	12DEC	ANN MN.	PARAM-	UNITS
*** ▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
PMEAN> 1	14.4	15.0	10.8	9.8	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	<--DO	MG/L
#OBS.>	2	2	4	2	0	0	0	0	0	0	0	0	10		
PMEAN> 2	2.	14.	30.	41.	30.	10.	7.	10.	25.	20.	33.	1500.	25.	<--FCOLI	N/CML
#OBS.>	1	1	2	3	2	1	1	1	0	1	1	1	15		
PMEAN> 3	8.0	8.3	7.9	7.6	7.6	7.5	8.0	7.3	7.7	7.3	7.9	7.7	7.8	<--PH	VALUE
#OBS.>	2	3	5	3	2	1	1	1	1	1	1	1	22		
PMEAN> 4	2.8	2.6	0.7	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	<--BOD5	MG/L
#OBS.>	1	1	1	1	0	0	0	0	0	0	0	0	4		
PMEAN> 5	0.25	0.20	0.48	0.33	0.60	0.35	0.10	0.10	0.20	0.30	0.50	0.90	0.37	<--NO2&3	MG/L
#OBS.>	2	3	5	3	2	0	1	1	1	1	1	1	21		
PMEAN> 6	0.05	0.06	0.13	0.13	0.06	0.08	0.10	0.08	0.18	0.07	0.08	0.21	0.10	<--TOT-P	MG/L
#OBS.>	2	3	5	3	2	1	1	1	1	1	1	1	22		
PMEAN> 7	1.0	3.8	11.6	14.6	18.7	20.8	30.0	28.0	24.0	17.0	18.0	7.0	15.0	<--TEMPC	C-DEG
#OBS.>	1	3	6	5	5	3	1	1	1	1	1	1	29		
PMEAN> 8	6.0	3.0	9.0	15.0	3.0	6.0	6.0	5.0	4.5	4.0	6.0	6.0	6.0	<--TURB	JTU
#OBS.>	0	1	0	1	1	0	0	1	0	1	0	0	5		
PMEAN> 9	129.0	120.7	124.5	118.0	100.0	118.9	118.9	102.0	118.9	120.0	118.9	118.9	118.9	<--TSOL	MG/L
#OBS.>	1	3	4	3	1	0	0	1	0	1	0	0	14		

TABLE FOR DO CALC.	MO 1.	1.0	14.2	MO 2.	3.8	13.2	MO 3.	11.6	10.9	MO 4.	14.6	10.3
(MON-EQ.TEMPC-DO SAT.)	MO 5.	18.7	9.4	MO 6.	20.8	9.0	MO 7.	30.0	7.6	MO 8.	28.0	8.0
	MO 9.	24.0	8.5	MO10.	17.0	9.7	MO11.	18.0	9.5	MO12.	7.0	12.2

MO.DA.YR.	TIME	RM/STA.	STA.NO.	DO MG/L 00300	FCOLI N/CML 31613	PH VALUE 00400	BOD5 MG/L 00310	NO2&3 MG/L 00630	TOT-P MG/L 00665	TEMPC C-DEG 00010	TURB JTU 00075	TSOL MG/L 00515	FLOW CFS 00061	WQI(A)	WQI(M)
WGT.FACTOR				.17	.16	.11	.11	.10	.10	.10	.08	.07	.0		
11 17 75	2500	30.6	CR30.6M	-0.00	-0.	-0.0	1.30	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	52.	28.
12 9 75	2500	30.6	CR30.6M	-0.00	20.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	55.	30.
12 18 75	2500	30.6	CR30.6M	-0.00	-0.	-0.0	1.50	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	53.	29.
1 19 76	2500	30.6	CR30.6M	-0.00	80.	-0.0	0.80	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	74.	70.
1 28 76	2500	30.6	CR30.6M	-0.00	100.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	73.	69.
2 9 76	2500	30.6	CR30.6M	-0.00	-0.	-0.0	1.30	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	76.	74.
2 18 76	2500	30.6	CR30.6M	-0.00	60.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	75.	72.
3 1 76	2500	30.6	CR30.6M	-0.00	20.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	79.	77.
3 22 76	2500	30.6	CR30.6M	-0.00	-0.	-0.0	0.90	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	77.	75.
3 31 76	2500	30.6	CR30.6M	-0.00	40.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	77.	74.
4 12 76	2500	30.6	CR30.6M	-0.00	20.	-0.0	1.20	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	76.	75.
4 21 76	2500	30.6	CR30.6M	-0.00	20.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	76.	75.
5 3 76	2500	30.6	CR30.6M	-0.00	-0.	-0.0	0.40	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	79.	77.
5 11 76	2500	30.6	CR30.6M	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	79.	77.
5 24 76	2500	30.6	CR30.6M	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	79.	77.
6 2 76	2500	30.6	CR30.6M	-0.00	-0.	-0.0	1.40	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	82.	82.
6 21 76	2500	30.6	CR30.6M	-0.00	10.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	79.	79.
6 30 76	2500	30.6	CR30.6M	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	82.	82.
7 13 76	2500	30.6	CR30.6M	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	80.	79.
7 22 76	2500	30.6	CR30.6M	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	80.	79.
8 2 76	2500	30.6	CR30.6M	-0.00	-0.	-0.0	1.50	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	81.	80.
8 11 76	2500	30.6	CR30.6M	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	80.	80.
8 31 76	2500	30.6	CR30.6M	-0.00	-0.	-0.0	2.40	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	80.	79.
9 16 76	2500	30.6	CR30.6M	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	-0.0	-0.0	-0.0	-0.	76.	75.
10 6 76	2500	30.6	CR30.6M	7.10	-0.	-0.0	-0.00	0.10	0.13	20.8	-0.0	113.0	-0.	83.	82.
10 18 76	2500	30.6	CR30.6M	9.00	-0.	7.3	0.60	0.20	0.05	17.0	-0.0	-0.0	-0.	89.	89.
11 2 76	2500	30.6	CR30.6M	9.10	10.	8.0	1.00	0.30	0.16	13.0	-0.0	98.0	-0.	78.	77.
11 11 76	2500	30.6	CR30.6M	10.50	-0.	7.6	-0.00	0.30	0.11	9.0	-0.0	111.0	-0.	79.	78.
11 23 76	2500	30.6	CR30.6M	13.10	73.	7.7	-0.00	0.30	0.05	8.0	-0.0	107.0	-0.	73.	70.
12 6 76	2500	30.6	CR30.6M	12.40	-0.	7.7	0.90	0.20	0.05	5.0	-0.0	111.0	-0.	79.	78.
12 15 76	2500	30.6	CR30.6M	12.70	20.	8.3	-0.00	0.20	0.05	5.0	-0.0	101.0	-0.	77.	75.
12 28 76	2500	30.6	CR30.6M	13.00	-0.	8.8	-0.00	0.20	0.08	5.0	-0.0	104.0	-0.	73.	71.
1 17 77	2500	30.6	CR30.6M	15.20	2.	7.9	2.80	0.20	0.06	-0.0	-0.0	129.0	-0.	86.	86.
1 26 77	2500	30.6	CR30.6M	13.70	-0.	8.1	-0.00	0.30	0.05	1.0	-0.0	-0.0	-0.	85.	85.
2 2 77	2500	30.6	CR30.6M	15.00	-0.	7.8	2.60	0.30	0.05	4.0	-0.0	123.0	-0.	80.	79.
2 16 77	2500	30.6	CR30.6M	15.00	-0.	8.7	-0.00	0.10	0.07	5.5	-0.0	115.0	-0.	75.	74.
3 1 77	2500	30.6	CR30.6M	13.60	-0.	8.6	0.70	0.10	0.07	8.0	-0.0	124.0	-0.	71.	70.
3 9 77	2500	30.6	CR30.6M	10.00	20.	7.7	-0.00	0.50	0.12	12.0	-0.0	121.0	-0.	80.	78.
3 21 77	2500	30.6	CR30.6M	9.70	-0.	7.5	-0.00	0.70	0.15	13.5	-0.0	123.0	-0.	77.	76.
3 31 77	2500	30.6	CR30.6M	9.80	-0.	8.2	-0.00	0.60	0.11	15.0	-0.0	130.0	-0.	72.	70.
4 11 77	2500	30.6	CR30.6M	9.50	50.	7.5	2.20	0.40	0.05	16.0	-0.0	115.0	-0.	74.	71.
4 20 77	2500	30.6	CR30.6M	10.00	100.	7.7	-0.00	0.30	0.26	18.8	-0.0	109.0	-0.	64.	60.
1 6 75	1100	30.6	03438220	-0.00	-0.	7.4	-0.00	0.40	0.08	8.0	8.0	130.0	54700.	54.	29.
2 12 75	1130	30.6	03438220	-0.00	340.	7.2	-0.00	0.50	0.22	6.5	20.0	120.0	89000.	47.	25.
3 25 75	1130	30.6	03438220	-0.00	220.	7.2	-0.00	0.50	0.14	11.0	40.0	110.0	119000.	46.	25.
4 16 75	1130	30.6	03438220	-0.00	120.	6.7	-0.00	0.40	0.10	12.0	25.0	92.0	71100.	49.	27.
5 12 75	1110	30.6	03438220	-0.00	19.	7.1	-0.00	0.30	0.04	20.0	15.0	85.0	53300.	56.	30.
6 17 75	1145	30.6	03438220	-0.00	10.	6.6	-0.00	0.20	0.16	26.0	10.0	110.0	44400.	57.	31.
7 30 75	1000	30.6	03438220	-0.00	27.	7.4	-0.00	-0.00	0.07	29.0	-0.0	88.0	9700.	57.	30.
8 19 75	900	30.6	03438220	-0.00	12.	6.4	-0.00	-0.00	0.08	28.0	1.0	89.0	10000.	52.	29.
9 11 75	1015	30.6	03438220	-0.00	21.	6.9	-0.00	-0.00	0.09	27.0	-0.0	99.0	21500.	55.	30.
10 21 75	1330	30.6	03438220	-0.00	120.	6.5	-0.00	0.40	0.21	16.0	30.0	110.0	68100.	47.	26.
11 18 75	1300	30.6	03438220	-0.00	48.	6.8	-0.00	0.50	0.13	15.0	-0.0	-0.0	59800.	52.	28.
12 9 75	1140	30.6	03438220	-0.00	46.	7.7	-0.00	0.40	0.11	10.0	-0.0	-0.0	49200.	52.	28.
1 13 76	1300	30.6	03438220	-0.00	150.	6.7	-0.00	0.60	0.10	7.0	10.0	126.0	53400.	69.	65.
[illegible]	[illegible]	[illegible]	[illegible]	-0.00	27.	[illegible]	[illegible]	0.60	0.10	[illegible]	[illegible]	[illegible]	[illegible]	77.	[illegible]

3 17 75	1100	30.6	03438220	-0.00	44.	7.6	-0.00	0.50	0.09	11.5	-0.0	-0.0	57800.	75.	72.
4 9 76	1100	30.6	03438220	-0.00	46.	7.9	-0.00	0.50	0.13	15.0	25.0	105.0	53800.	72.	69.
5 5 76	1200	30.6	03438220	-0.00	26.	7.4	-0.00	0.10	0.07	18.0	-0.0	97.0	6130.	74.	72.
6 25 76	1130	30.6	03438220	-0.00	2.	6.7	-0.00	0.20	0.07	25.0	-0.0	100.0	45400.	83.	82.
7 21 76	1130	30.6	03438220	-0.00	7.	7.4	-0.00	-0.00	-0.00	27.0	-0.0	120.0	21000.	80.	79.
8 6 76	1230	30.6	03438220	-0.00	5.	6.3	-0.00	0.10	0.10	27.0	10.0	92.0	40500.	73.	71.
9 15 76	1130	30.6	03438220	-0.00	-0.	-0.0	-0.00	0.10	0.09	26.0	-0.0	92.0	22200.	76.	75.
10 18 76	1215	30.6	03438220	-0.00	2.	6.5	-0.00	1.20	0.18	17.0	10.0	100.0	18200.	85.	84.
11 2 76	1100	30.6	03438220	-0.00	5.	7.4	-0.00	0.30	0.09	13.0	-0.0	-0.0	65000.	82.	81.
12 8 76	1030	30.6	03438220	-0.00	-0.	7.7	-0.00	0.30	0.06	4.0	-0.0	-0.0	51100.	79.	77.
2 10 77	1015	30.6	03438220	-0.00	14.	8.5	-0.00	0.20	0.07	2.0	3.0	124.0	10100.	76.	75.
3 10 77	1030	30.6	03438220	-0.00	44.	7.6	-0.00	0.50	0.20	10.0	-0.0	-0.0	51300.	76.	73.
4 20 77	1130	30.6	03438220	-0.00	14.	7.7	-0.00	0.30	0.09	17.0	15.0	130.0	50100.	76.	76.
5 4 77	1020	30.6	03438220	-0.00	21.	7.3	-0.00	0.30	0.08	18.0	-0.0	-0.0	40500.	79.	77.
5 27 77	1130	30.6	03438220	-0.00	44.	8.0	-0.00	0.90	0.05	24.0	3.0	100.0	43800.	68.	65.
6 10 77	900	30.6	03438220	-0.00	10.	7.5	-0.00	-0.00	0.08	24.0	-0.0	-0.0	6270.	76.	75.
7 15 77	1000	30.6	03438220	-0.00	7.	8.0	-0.00	0.10	0.10	30.0	-0.0	-0.0	22400.	72.	71.
8 24 77	1130	30.6	03438220	-0.00	10.	7.3	-0.00	0.10	0.08	28.0	5.0	102.0	7810.	72.	70.
9 21 77	1130	30.6	03438220	-0.00	-0.	7.7	-0.00	0.20	0.18	24.0	-0.0	-0.0	49400.	69.	67.
10 20 77	1230	30.6	03438220	-0.00	20.	7.8	-0.00	0.30	0.07	17.0	4.0	120.0	2600.	79.	77.
11 4 77	1100	30.6	03438220	-0.00	33.	7.9	-0.00	0.50	0.08	18.0	-0.0	-0.0	49600.	76.	75.
12 7 77	1100	30.6	03438220	-0.00	1500.	7.7	-0.00	0.90	0.21	7.0	-0.0	-0.0	78700.	35.	35.
8 5 75	1045	459.4	03414000	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	15.0	-0.0	-0.0	146.	53.	29.
12 1 75	1300	459.4	03414000	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	11.5	-0.0	-0.0	7650.	53.	29.
2 4 76	1030	459.4	03414000	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	4.0	-0.0	-0.0	14800.	76.	74.
4 1 76	1000	459.4	03414000	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	10.5	-0.0	-0.0	28600.	74.	72.
5 5 76	1130	459.4	03414000	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	11.0	-0.0	-0.0	8250.	76.	75.
8 3 76	1200	459.4	03414000	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	16.0	-0.0	-0.0	4150.	74.	73.
11 5 76	1230	459.4	03414000	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	13.5	-0.0	-0.0	8500.	76.	74.
4 11 77	1145	459.4	03414000	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	10.0	-0.0	-0.0	29700.	70.	68.
6 2 77	945	459.4	03414000	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	13.5	-0.0	-0.0	105.	74.	73.
7 23 75	1630	562.4	03404500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	29.5	-0.0	-0.0	376.	57.	30.
9 2 75	1700	562.4	03404500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	29.5	-0.0	-0.0	156.	54.	30.
1 5 76	1430	562.4	03404500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	4.5	-0.0	-0.0	9800.	73.	69.
3 15 76	1300	562.4	03404500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	9.0	-0.0	-0.0	3420.	77.	75.
6 4 76	1630	562.4	03404500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	19.0	-0.0	-0.0	9820.	80.	80.
8 2 76	1530	562.4	03404500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	25.5	-0.0	-0.0	532.	78.	78.
11 17 76	1530	562.4	03404500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	5.5	-0.0	-0.0	502.	74.	73.
3 14 77	1515	562.4	03404500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	11.0	-0.0	-0.0	10700.	78.	76.
4 6 77	1100	562.4	03404500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	11.0	-0.0	-0.0	40500.	72.	70.
5 2 77	1045	562.4	03404500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	15.5	-0.0	-0.0	5340.	75.	74.
8 4 75	1500	635.2	03403500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	28.0	-0.0	-0.0	183.	52.	29.
9 4 75	1600	635.2	03403500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	27.0	-0.0	-0.0	108.	55.	30.
1 6 76	1245	635.2	03403500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	1.5	-0.0	-0.0	3320.	71.	68.
3 15 76	1330	635.2	03403500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	8.5	-0.0	-0.0	1660.	77.	75.
6 18 76	1155	635.2	03403500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	25.5	-0.0	-0.0	207.	79.	79.
6 21 76	1500	635.2	03403500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	21.0	-0.0	-0.0	900.	82.	82.
7 19 76	1500	635.2	03403500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	25.0	-0.0	-0.0	230.	80.	79.
5 4 77	1330	635.2	03403500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	14.5	-0.0	-0.0	1470.	74.	72.
5 16 77	1500	635.2	03403500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	21.5	-0.0	-0.0	460.	75.	73.
6 16 77	1515	635.2	03403500	-0.00	-0.	-0.0	-0.00	-0.00	-0.00	25.0	-0.0	-0.0	334.	73.	71.
COUNT OF OBS.				10	15	22	4	21	22	29	5	14			
MISSING VALUES				20	15	8	26	9	8	1	25	16			
TOTAL				30	30	30	30	30	30	30	30	30			

<-> INDICATES 128 MISSING DATA VALUES OF 270 TOTAL VALUES.

CUMBERLAND RIVER - UPPER & LOWER KENTUCKY PORTIONS. HIST-1

HISTORY RECORDS FOR NEXT YEARS PLOT

COL1-6 MODAYR	8-11 PLPS	13-17 RIVMI	67-72 WQI(A)	73-80 WQI(M)
133275	1	37.	52	28
133275	61	457.	53	29
133275	76	562.	56	30
133275	86	632.	54	30
133276	1	37.	78	76
133276	61	457.	75	74
133276	76	562.	76	75
133276	86	632.	78	77
133277	1	37.	74	72
133277	61	457.	72	71
133277	76	562.	75	73
133277	86	632.	74	72

CUMBERLAND RIVER - UPPER & LOWER KENTUCKY PORTIONS.

WQI MEANS BY RIVER MILE FOR 1977 RPTM-1

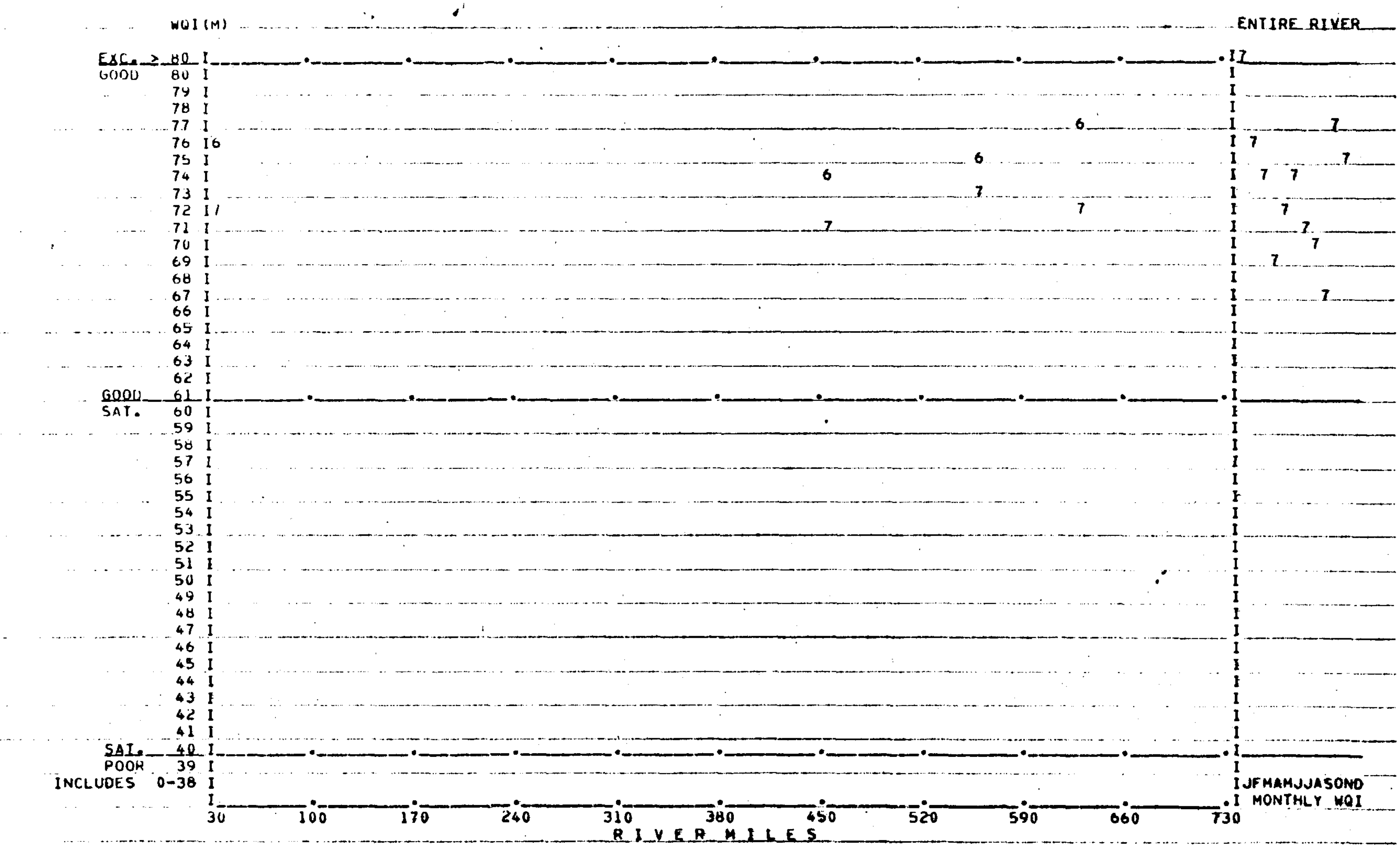
LEGEND * WQI=41-60 ** WQI=21-40 *** WQI= 1-20 ZERO WQI MEANS NO OBS.

PLOT R.M.	DO WQI	FCOLI WQI	PH WQI	BOD5 WQI	NO2&3 WQI	TOT-P WQI	TEMPC WQI	TURB WQI	TSOL WQI	WQI(A)	WQI(M)
37	93	56*	85	81	97	93	80	87	83	73	72
457	0	0	0	0	0	0	55*	0	0	72	70
562	0	0	0	0	0	0	79	0	0	75	73
632	0	0	0	0	0	0	59*	0	0	74	72

WQI ANALYSIS BY MONTH AND FOR ENTIRE YEAR

	DO	FCOLI	PH	BOD5	NO2&3	TOT-P	TEMPC	TURB	TSOL	WQI(A)	WQI(M)
JANUARY	97	88	85	74	98	97	92	0	83	86	86
FEBRUARY	92	63	71	76	99	96	87	93	84	77	76
MARCH	91	53*	83	94	97	92	79	0	83	75	74
APRIL	96	50*	91	80	98	92	66	70	84	71	69
MAY	0	53*	91	0	96	96	66	93	86	74	72
JUNE	0	67	93	0	0	95	56*	0	0	75	74
JULY	0	71	87	0	99	94	92	0	0	72	71
AUGUST	0	67	94	0	99	95	92	89	86	72	70
SEPTEMBER	0	0	91	0	99	89	92	0	0	69	67
OCTOBER	0	58*	89	0	98	96	92	91	84	79	77
NOVEMBER	0	52*	88	0	97	95	92	0	0	76	75
DECEMBER	0	19***	91	0	94	88	92	0	0	35**	35**
ENTIRE YEAR	94	56*	86	81	97	94	78	87	84	73	72
RATING	ISFD	ISFD	ISFD	ISFD	ISFD	ISFD	GOOD	ISFD	ISFD	GOOD	GOOD
COLOR CODE	***	***	***	***	***	***	GRN.	***	***	GRN.	GRN.
TEST IN- LL	4.0	-0.0	6.0	-0.0	-0.0	-0.0	-5.0	-0.0	-0.0		
SIDE HL	30.0	1000.0	9.0	100.0	100.0	100.0	32.0	10000.0	50000.0		
REPL.--WQI	0.0	35.0	30.0	40.0	40.0	40.0	25.0	40.0	40.0		
TEST OUT- LL	3.0	-0.0	5.5	-0.0	-0.0	-0.0	-5.0	-0.0	-0.0		
SIDE HL	35.0	10000.0	9.0	100.0	100.0	100.0	35.0	10000.0	50000.0		
REPL.--WQI	0.0	15.0	10.0	20.0	20.0	20.0	10.0	20.0	20.0		

CUMBERLAND RIVER - UPPER & LOWER KENTUCKY PORTIONS. GRM-1



PLOT CHAR. 1975(5),1976(6),1977(7).

CUMBERLAND RIVER - UPPER & LOWER KENTUCKY PORTIONS. GPT-1977

SELECTED LOW WQI MEAN WEEKLY PLOT - APPROX. RM 458. YEAR 1977 PLOT CHARACTER (7)

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                 WQI(M)

EXC. > 80  I___.____.____.____.____.____.____.____.____.____.____.____.
GOOD   80  I
       79  I
       78  I
       77  I
       76  I
       75  I
       74  I
       73  I                         7
       72  I
       71  I
       70  I
       69  I
       68  I                 7
       67  I
       66  I
       65  I
       64  I
       63  I
       62  I
GOOD   61  I___.____.____.____.____.____.____.____.____.____.____.____.
SAT.   60  I
       59  I
       58  I
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       41  I
SAT.   40  I___.____.____.____.____.____.____.____.____.____.____.____.
POOR   39  I
INCLUDES 0-38 I
           I___.____.____.____.____.____.____.____.____.____.____.____.
      WEEK 123412341234123412341234123412341234123412341234
     MONTH JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
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