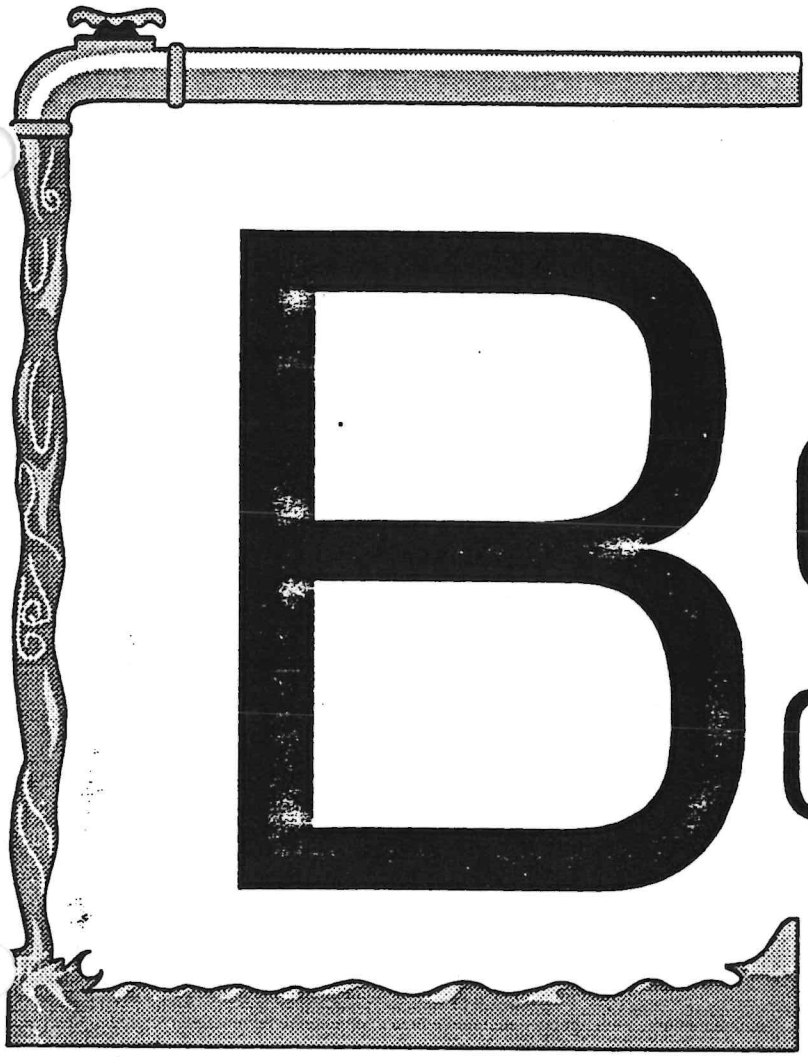

BOONE COUNTY

WATER SUPPLY PLAN

FINAL PLAN DOCUMENT

Prepared by the Northern Kentucky Area Development District

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CHAPTER 1
DESCRIPTION OF THE PLANNING UNIT

I. INTRODUCTION

Boone County, the planning unit, is located in the northernmost portion of Kentucky (Map 1) and is a part of the Greater Cincinnati metropolitan area. The county seat is Burlington and incorporated areas in the county include: Florence, Union, and Walton.

Boone County is one of the fastest-growing counties in Kentucky and has experienced explosive population and economic growth in the last decade. Figure 1 shows actual and projected population growth in the county from 1970 to 2020. Boone County has also become a major employment center in the region with approximately 41,000 people working in the county. This growth has impacted and will continue to impact demand for water.

II. PHYSIOGRAPHY

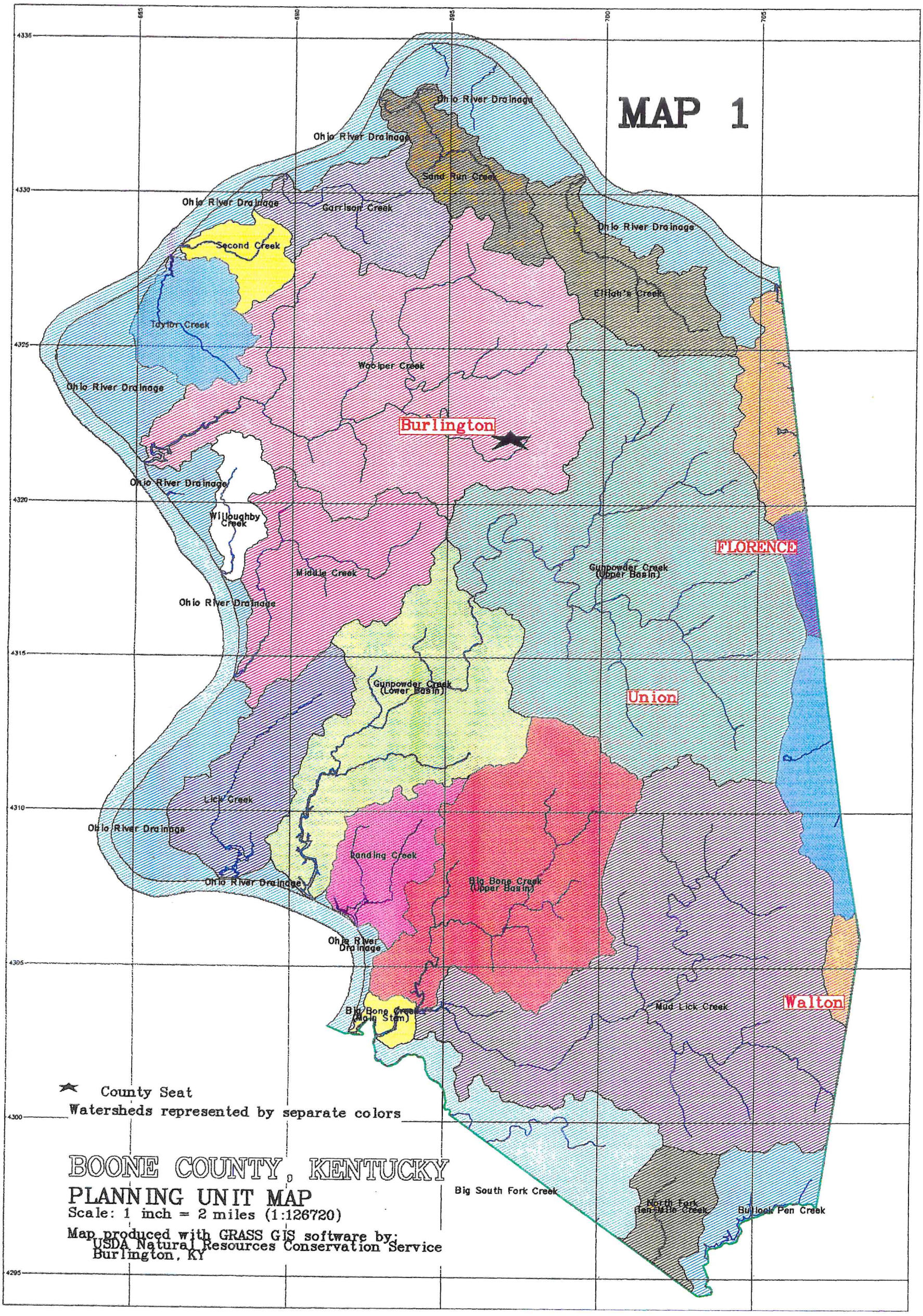
Boone County is a part of the Kentucky Bluegrass region with roughly half of the county classified as Hills of the Bluegrass and the other half as Outer Bluegrass. The geology of Boone County is primarily Upper Ordovician and formations found in the county include: the Bull Fork Formation, Garrard Siltstone and Kope, and Clays Ferry Formations. Along the Ohio River, alluvial and glacial deposits can be found.

The topography of the Northern Kentucky area, including Boone County, extends over a low plateau of about 900 feet Mean Sea Level (MSL). The floors of the larger valleys vary from 200 to 400 feet MSL below the general level of the plateau. The area is characterized by numerous ridges and sharp narrow valleys.

Boone County is covered with a network of streams. As the land descends to the Ohio River, several major tributaries are formed including: Mud Lick, Big Bone, Gunpowder Lick, Middle, and Woolper Creeks. There are also many intermittent streams. Flood zones in the county are primarily bottom lands along the Ohio River and its major tributaries.

Major concentrations of extremely shallow bedrock depths are located in the northeastern part of the county on steep slopes, in some stream beds, and along the Ohio River. Moderate bedrock depth occurs mainly in the southeastern part of the county (Boone County Comprehensive Plan, p. 34).

MAP 1



BOONE COUNTY, KENTUCKY

PLANNING UNIT MAP

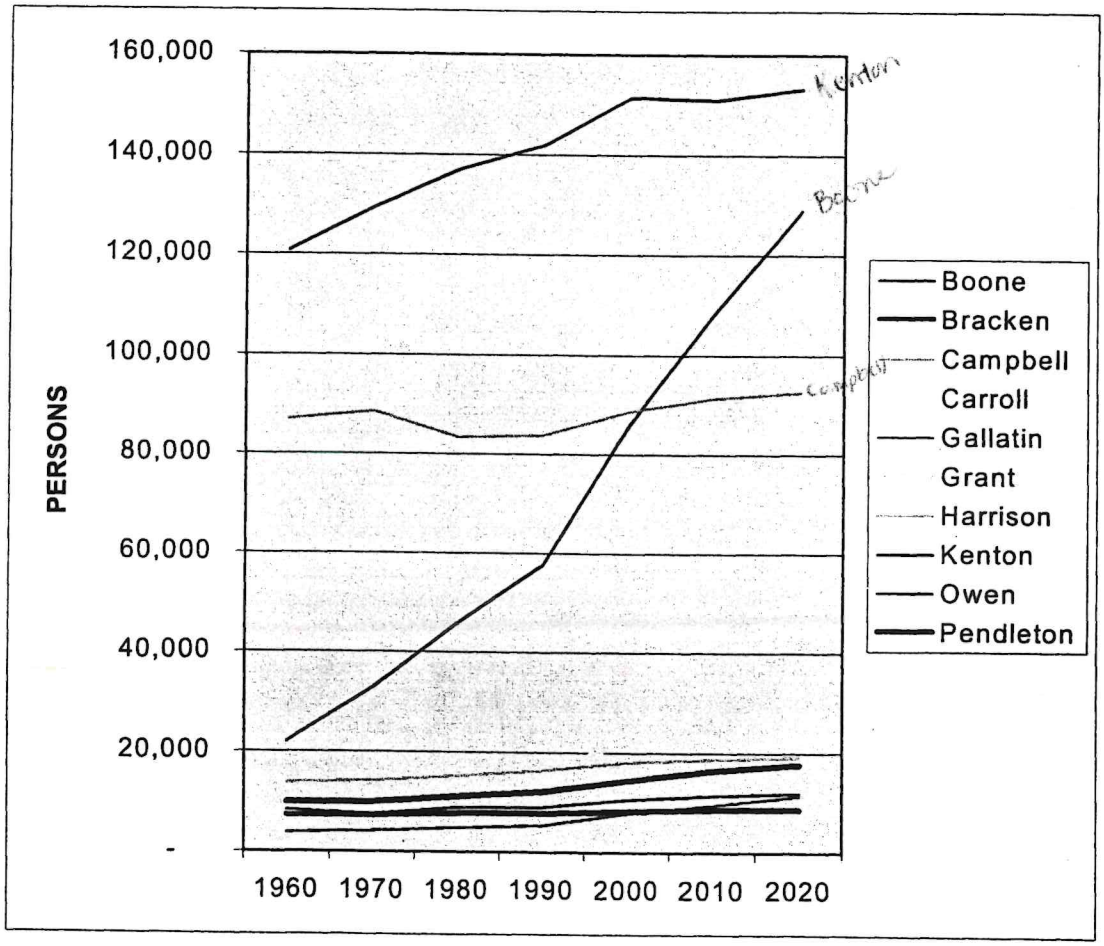
Scale: 1 inch = 2 miles (1:126720)

Map produced with GRASS GIS software by:
USDA Natural Resources Conservation Service
Burlington, KY

new census data

TOTAL POPULATION FIGURES

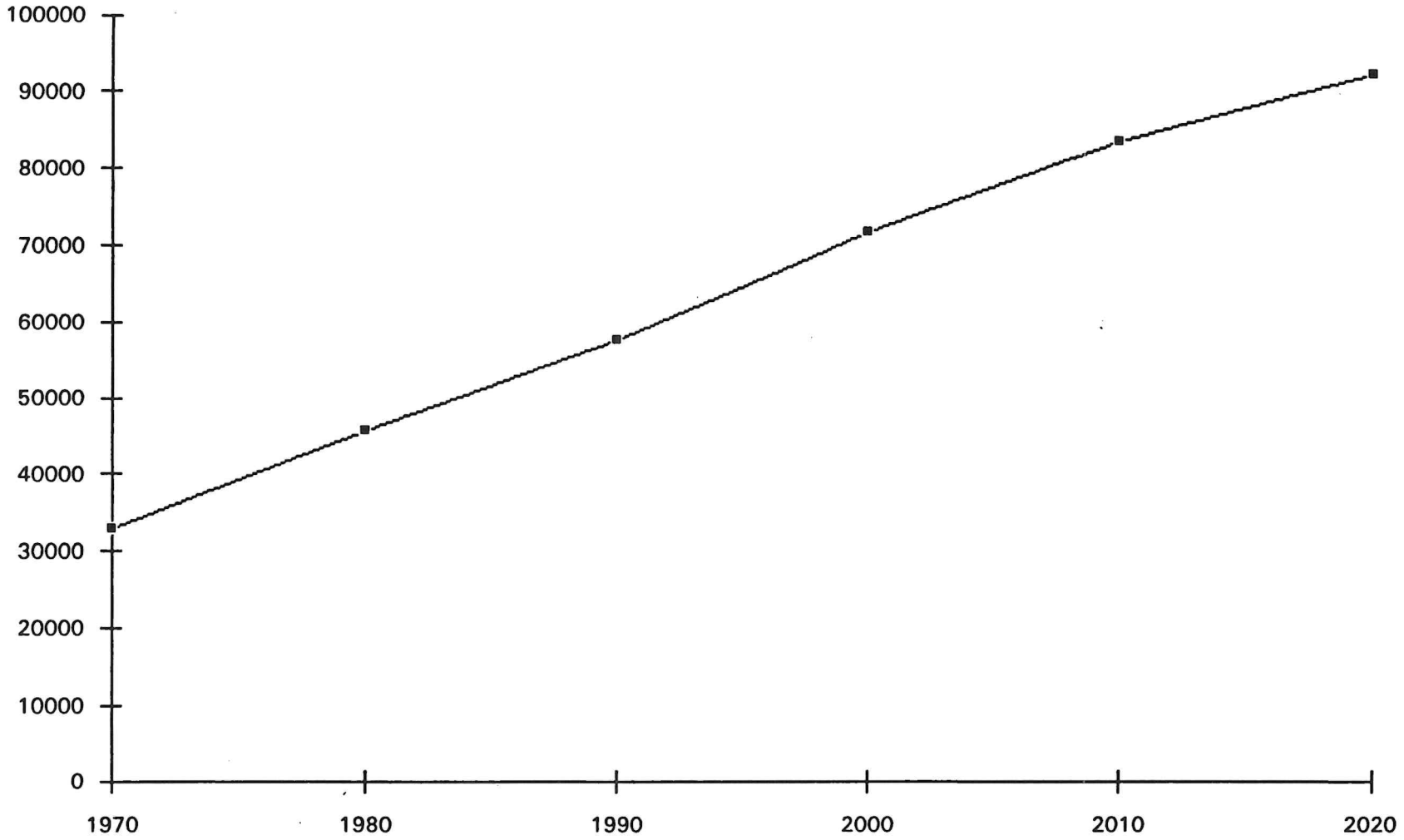
	[1]1960	[2]1970	[3]1980	[4]1990	[4]2000	[5]2010	[5]2020
KY	3,038,156	3,218,706	3,660,324	3,686,892	4,041,769	4,179,649	4,294,724
Boone	21,940	32,812	45,842	57,589	85,991	108,473	128,865
Bracken	7,422	7,227	7,738	7,766	8,279	8,585	8,630
Campbell	86,803	88,501	83,317	83,866	88,616	91,280	92,513
Carroll	7,978	8,523	9,270	9,292	10,155	9,796	9,850
Gallatin	3,867	4,134	4,842	5,393	7,870	9,474	11,321
Grant	9,489	9,999	13,308	15,737	22,384	27,036	31,615
Harrison	13,704	14,158	15,166	16,248	17,983	18,625	19,145
Kenton	120,700	129,440	137,058	142,005	151,464	151,026	153,221
Owen	8,237	7,470	8,924	9,035	10,547	11,429	11,985
Pendleton	9,968	9,949	10,989	12,062	14,390	16,365	17,675



[1] US Department of Commerce, Bureau of the Census. County and City Data Book: 1967. Washington, DC: Government Printing Office, Apr. 1967. (Table 2 Item 1)
[2] US Department of Commerce, Bureau of the Census. County and City Data Book: 1972. Washington, DC: Government Printing Office, Mar. 1973. (Table 2 Item 3)
[3] US Department of Commerce, Bureau of the Census. County and City Data Book: 1994. Washington, DC: Government Printing Office, Aug. 1994. (Table B Item 6)
[4] US Department of Commerce, Bureau of the Census. County and City Data Book: 2000. 13th Ed., Washington, DC: Government Printing Office, 2001. (Table B-1)
[5] University of Louisville's Kentucky State Data Center. 1999 Edition Population Projections. 3 June 2002 <http://cbpa.louisville.edu/ksdc/kpr/pro/pro1999.txt>.

FIGURE 1

BOONE COUNTY POPULATION GROWTH: 1970-2020



CHAPTER 2
PLANNING COUNCIL

I. FORMATION OF THE PLANNING UNIT

Boone County Judge-Executive Kenneth Lucas initiated the water supply planning process in 1992 at the recommendation of the County of Boone Water Enhancement Board (COBWEB). COBWEB, a group composed of water district professionals and representatives of local government, meets quarterly to discuss issues relating to water supply and delivery.

Judge Lucas called a meeting of the parties required to vote on the composition of the planning unit on March 17, 1992 at the Boone County Courthouse. The following parties voted unanimously to approve Boone County as the planning unit:

Phil Trzop - City of Walton
Bill Rauh - Rauh Water Service
Bill Heltemes - City of Union
Mick Noll - Kenton County Water District No. 1
Patty Birkle - Birkle Water Supply
Kenneth R. Lucas - Boone County Fiscal Court

Judge Exec.-Gary Moore
-change opening?
- planning council

Also in attendance were:

Dwight Bray - Boone County Water District
Hal Hedges - Florence Water & Sewer Commission
Dennis Willaman - Kenton County Water District No. 1
Richard Bragg - Northern Kentucky Area Development District
Heidi Van Keuren - Northern Kentucky Area Development District
Harvey Pelley - Boone County Public Works
Paul Kroger - Boone County Water & Sewer District

II. PLANNING COUNCIL AND PLANNING REPRESENTATIVE

Planning Council

The following is a list of current(?) members of the Boone Cou their affiliations:

Ralph Baker - Bullock Pen Water District
Patty Birkle - Birkle Water Supply
Dwight Bray - Boone County Water & Sewer
Jim Collins - COBWEB
William Ferguson - Walton Water Works
Hal Hedges - Florence Water & Sewer Comm

Judge Moore - Boone Co. Fiscal Court
Patty Birkle - Birkle Water Supply
Charlie Cain - Boone Co. H_2O District
William Catlett - Bullock Pen H_2O District
Kevin Costello - Boone Co. Planning Com.
Mary Kathryn Dickerson - Boone/Kenton Conservation District
Bob McCardis - N. Ky Ind. Health Dept
John Rittenhouse - Florence H_2O & Sewer
Phil Trzop - Boone Co. H_2O & Sewer District
Roger Williams - Walton Water Works
Jim Parsons - Boone Co. Fiscal Court

Bill Heltemes - City of Union
Paul Kroger - Boone County Water & Sewer District
Harvey Pelley - Boone County Fiscal Court
Dennis Willaman - Kenton County Water District No. 1

Every attempt was made to notify designated members as defined by 401 KAR 4:220, subsection 4.2, about the planning process and to ask for their participation. The following is a list of non-participants:

Northern Kentucky District Health Department
Trapp Water Company
Hillside Trailer Park
Arlinghaus Properties
Rauh Water Supply (elected to be represented by Paul Kroger)

Minutes of Planning Council meetings can be found in Appendix A.

Planning Representative

The Northern Kentucky Area Development District was selected as the planning representative at the first meeting of the Planning Council on April 1, 1992. Primary NKADD staff members responsible for the project were Richard Bragg and Heidi Van Keuren.

NKADD was selected, in part, because staff had assisted the Boone County Fiscal Court and COBWEB with interpretation of 401 KAR 4:220 and the steps necessary to undertake the water supply planning process. No other potential candidates for planning representative were considered by the Planning Council.

III. NOTIFICATIONS

401 KAR 4:220 subsection 5.3(a) requires extensive notifications regarding the water supply planning process including mayors, county judge-executives, and water suppliers in adjacent counties, area water watch groups, and the public. Samples of public notices, notification letters, and a list of recipients can be found in Appendix B. Appendix B also contains a summary of information received as a result of the notification process.

CHAPTER 3
PLANNING OBJECTIVES AND PLANNING CONFLICTS

I. PLANNING OBJECTIVES

Description of Process

A public hearing was held Friday, June 5, 1992 to consider the goals and objectives as stated in subsection 5.4 and to obtain the input of citizens. The meeting was advertised in the Boone County Recorder and letters were mailed to local Water Watch groups. The only people in attendance at the public hearing were Planning Council members and NKADD staff.

The statement of goals and objectives was amended slightly and adopted at the September 17, 1992 meeting of the Planning Council. The Planning Council decided to encourage conservation "where possible" rather than to the "maximum extent practical" as this seemed more realistic for the planning unit. It was decided to provide for a continuous level of supply regardless of conditions. Finally, the Planning Council chose to include a timeframe for the plan as an objective.

Goals and Objectives

Goals and objectives for the planning process are as follows:

1. Encourage conservation where possible.

2. Provide a continuous level of supply under all conditions.

3. The timeframe of the plan will address source availability and demand for the next five, ten, fifteen, and twenty years as per 401 KAR 4:220.

4. Compatibility with existing plans, and to offer recommendations to alter those plans.

5. Preservation and use of natural water storage and retention systems, whenever cost and data constraints permit.

6. Protection and enhancement of the overall qualities of the environment.

7. Cost effectiveness.

8. Social and political acceptability, and community cohesion.

II. WATER SUPPLY PLANNING CONFLICTS

Review of Existing Plans

There are two existing plans which were very useful in the planning process. The Boone County Comprehensive Plan update, completed in 1990 outlines projected growth patterns for residential, commercial, and industrial land uses. The Licking River Basin Study is a comprehensive water supply study completed in 1990 by the U.S. Army Corps of Engineers. This document has been used extensively in the compilation of the plan as water supply planning regulations dictate. The conclusions of the Licking River Basin Study will be summarized as a part of the water use assessment.

As per water supply planning regulations, local governments and water suppliers were asked to provide any water-related plans; however, very little significant information was acquired. As mentioned previously, a summary of information received can be found in Appendix B.

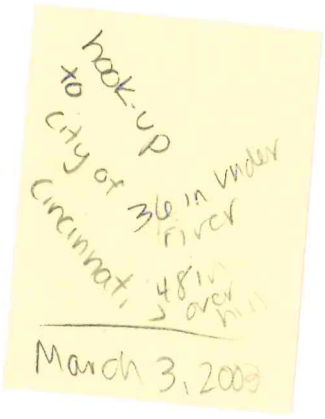
Water Supply Planning Conflicts

The term "conflict" is more appropriately described as an "issue" in the Phase I planning process. Several issues have been identified.

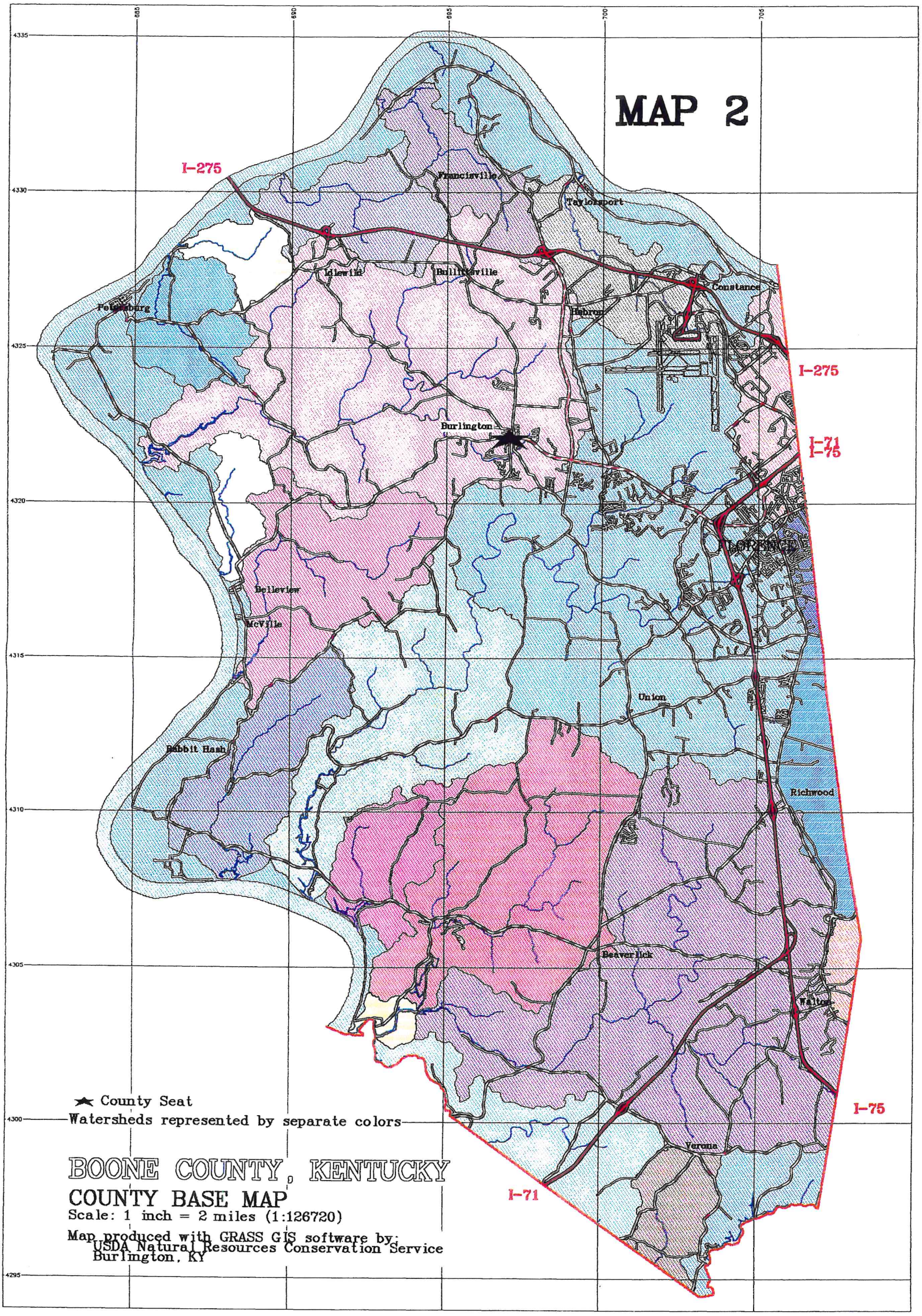
The first is water availability. Boone County distributors expressed concern regarding the ability of the Kenton County Water District to provide an adequate supply to meet ever increasing residential, industrial, and commercial demand. However, with Kenton County's plans for increased treatment capacity, this issue seems to have been resolved for the present time.

Another issue, while not identified as a result of water supply planning efforts, should be mentioned. Quest and CH2M Hill are currently working on a consolidation study which will address the financial, political, and engineering feasibility of consolidation of water districts in Boone, Campbell, and Kenton Counties.

During the planning process, the Planning Council reached consensus on all decisions.



MAP 2



BOONE COUNTY, KENTUCKY

COUNTY BASE MAP

Scale: 1 inch = 2 miles (1:126720)

Map produced with GRASS GIS software by:
USDA Natural Resources Conservation Service
Burlington, KY

CHAPTER 5
WATER USE AND WATER USE FORECAST

A. Water Use Assessment

Boone County has two major suppliers, three major distributors, and five small suppliers. In addition to the suppliers and distributors, there are also agricultural water users, permitted water users, and a permit-exempt water user. The following pages contain an informational profile of the suppliers and distributors and a description of the various types of water users.

Several small water suppliers and distributors were not considered during the planning process because they were omitted from the list supplied to the Planning Council in 1992 by the Division of Water. A summary of these suppliers and distributors follows the informational profiles.

Water Supplier

KENTON COUNTY WATER DISTRICT NO. 1

Address: 3049 Dixie Highway
P.O. Box 17010
Covington, KY 41017

Richard Harvison
NKWD?

Phone: (606)331-3066

Population Served: 180,000

Raw Water Source(s): Ohio River
Licking River

Treatment Plant(s):

Location:	Ft. Thomas	Taylor Mill
Capacity (mgd):	33	10
Date Built:	1936	1954
Condition:	Good	Good
Type Treatment:	Flocculation	Flocculation
	Sedimentation	Sedimentation
	Filtration	Filtration
	CL2 Disinfection	CL2 Disinfection

Treated Water Storage:

Location	Type	Capacity (mg)
Bromley	Standpipe	3
Devou Park	Standpipe	.475
Ida Spence	Elevated Tank	.5
Dudley Pike	Standpipe	10
Kenton Lands	Elevated Tank	.5
Industrial Park	Elevated Tank	.5
Nicholson	Elevated Tank	1
Barrington	Elevated Tank	1
Devon	Elevated Tank	2

Major Users (1991 Avg gpd):

<u>Industrial</u>
Newport Steel (567,000)

International Permalite (108,600)
Blue Grass Provisions (59,800)
Van Leer Containers (51,300)
USS Chemical (48,300)

Commercial
Cincinnati/Northern Kentucky Airport (276,300)
Florence Water & Sewer (2,751,500)
Boone County Water District (2,572,200)
Taylor Mill Utilities (552,500)

Institutional
St. Elizabeth Hospital, North and South (346,100)
Kenton County Board of Education (71,100)
Donal Corporation - St. Johns (52,400)
St. Charles (28,900)
Covington Board of Education (39,600)

Residential
Parker Smith Trailer Court (67,200)
Fath Management - Apts. (65,800)
A.O. Smith Trailer Court (57,800)
A+K Enterprise - Apts. (57,600)
Stetter Trailer Park (55,200)

Recreational
Kenton County Golf Course (147,900)
Twin Oaks (20,800)
Summit Hills (21,000)
Ft. Mitchell (23,300)
Pleasure Isle (11,000)

Leak Detection Methods: Walk cross-country lines during dry weather. Investigate all reports of possible main breaks.

Conservation Measures: Pamphlets in lobby. Phone messages while on hold.

Planned Improvements: Increase capacity of Ft. Thomas treatment plant by 11 mg. Additional sedimentation basin at Ft. Thomas treatment plant.

Water Supplier

BULLOCK PEN WATER DISTRICT

Address: Farrell Drive
Crittenden, KY

Phone: (606)824-2112

Population Served: DND

Raw Water Source: Bullock Pen Lake

Treatment Plant:
Location: Bullock Pen Lake
Capacity (gpd): 750,000
Date Built: 1960
Condition: Fair
Type Treatment: Coagulation
Filtration
Sedimentation
Chlorination

Treated Water Storage:

Location	Type	Capacity (gal)
Porter Rd. - Verona	Elevated Tank	100,000
Farrell Dr. - Crittenden	Elevated Tank	200,000
Russell Dr. - Crittenden	Standpipe	147,000
Sherman-Mt. Zion Rd.	Elevated	150,000
Old Lexington Pike	Standpipe	147,000

Customers:
Residential - 2528
Commercial - 52
Industrial - 1
Institutional - 3

Major Water Users: DND

Planned Expansions: There are currently no plans to increase capacity of treatment plant; however, Bullock Pen does plan on purchasing more water.

Other: Bullock Pen purchases water from the City of Walton with a maximum delivery of 100,000 gpd.

Water Distributor

FLORENCE WATER & SEWER COMMISSION

Address: P.O. Box 485
Florence, KY 41022-0485

Phone: (606)371-5714

Source of Treated Water: ~~Kenton County Water District No. 1~~ NKWD
March 2003 - City of Cincinnati: emergency connections

Treated Water Storage

Location	Type	Capacity (gal)
Center St.	Elevated Tank	500,000
Mall Road	Elevated Tank	1,200,000
US 25	Elevated Tank	2 mil

Major Users (1991 avg gpd)

Commercial
Car washes (166,259)
Laundries (85,010)

Institutional
St. Luke West (178,359)
Schools (54,054)
Nursing Homes (212,408)

Residential
Apartment Complexes (1,743,236)

Leak Detection Methods: Aqua-Scope detector

Conservation Measures: None
Mail outs

Stacey Dietrich
fax 283-8178

Water Distributor

BOONE COUNTY WATER DISTRICT

Address: P.O. Box 18
Burlington, KY 41005

Phone: ~~(606)~~ 859 586-6155

Source of Treated Water: ~~Kenton County Water District No. 1~~ Ohio River Cincy Water Works

Treated Water Storage:

Location	Type	Capacity (gal)
Hebron	Elevated Tank 15,800,000	300,000
Union	Elevated Tank 13,000,000	300,000

> eliminated by March

3 new facilities
2 mil - dbl eagle drive
1 mil - grames rd
2 mil - us 25
Boone/Florence boundary
by Spring 2003

Major Users (1991 avg gpd)

Industrial
Manufacturing (16,000) 100,000,000
Concrete Supply (92,000) 1,100,000

Commercial
Truck Stops/Gas Stations (38,000) 1,500,000

Institutional
Schools/Public Facilities (3,333) 1,300,000

Residential
Mobile Home Parks (174,800) 16,590,000

Recreational
Parks and Recreation (41,900) 1,000,000

Leak Detection Methods: Visual--Analysis of route and district consumption levels.

Planned Improvements: Storage. Expansion of system to serve growth of service area. Expansion of transmission system as well as distribution.

Stacey Dietrich
fax 283-8178

Water Distributor

BOONE COUNTY WATER DISTRICT

Address: P.O. Box 18
Burlington, KY 41005

Phone: ~~(606)~~859-6155

Source of Treated Water: ~~Kenton County Water District No. 1~~ Ohio River Cincy Water Works

Treated Water Storage:

Location	Type	Capacity (gal)
Hebron	Elevated Tank	300,000
Union	Elevated Tank	300,000

> eliminated by Moran

3 new facilities
2 mil - dbl eagle drive
1 mil - graves rd
2 mil - us 25
Boone/Florence boundaries
by Spring 2003

Major Users (1991 avg gpd)

Industrial
Manufacturing (16,000)
Concrete Supply (92,000)

Commercial
Truck Stops/Gas Stations (38,000)

Institutional
Schools/Public Facilities (3,333)

Residential
Mobile Home Parks (174,800)

Recreational
Parks and Recreation (41,900)

Leak Detection Methods: Visual--Analysis of route and district consumption levels.

Planned Improvements: Storage. Expansion of system to serve growth of service area. Expansion of transmission system as well as distribution.

Water Distributor

WALTON WATER WORKS

Address: P.O. Box 95
~~Main & Church Streets~~ 40 N. MAIN STREET
Walton, KY 41094

Phone: ~~(606)~~859 485-4383

Source of Treated Water: ~~Kenton County Water District No. 1.~~ NKWD Maximum delivery is 1,000,000 gallons per day.

Treated Water Storage:

Location	Type	Capacity (gal)
Walton Nicholson Road	Elevated Tank	200,000
~~Richland Court~~	~~Elevated Tank~~	~~100,000~~
Beaver Road	Elevated Tank	300,000

Major Users (1991 avg gpd)

Industrial
Clarion ~~(5,000)~~ 2,000
Precision Bar (500)

Commercial
Flying S Truck Plaza (12,000)
Magnum Truck Wash (5,000)
Walton Concrete (5,000)
Atlas Concrete (5,000)
Safari Campgrounds (3,000)

Walton
Roger Williams
fax 485-9710

Institutional
Walton Verona High School ~~(2,000)~~ 3500

Recreational
Walton Park (200)

Water Supplier

ARLINGHAUS PROPERTY

Address: 3126 Madonna Lane
Edgewood, KY 41017

Phone: (606)331-1187

Population Served: 25

Water Source: Groundwater

Water Use Type: Residential

Comments: Arlinghaus Property owns an apartment complex, Belleview Bottoms, in Boone County. This water supplier has been exempted from water use forecast requirements as it is a no-growth system.

Water Supplier

RAUH WATER SUPPLY

Address: 5514 River Road
Hebron, KY 41048

Phone: (606)689-4447

Population Served: 330

Water Source: Groundwater

Water Use Type: Water Hauler - primarily residential customers

Comments: This water supplier has been exempted from water use forecast requirements as it is a no-growth system.

Water Supplier

BIRKLE WATER SUPPLY

Address: P.O. Box 6
c/o Theodore Birkle
Petersburg, KY 41080

Phone: (606)586-8282

Population Served: 260

Water Source: Groundwater

Water Use Type: Water hauler - primarily residential users

Comments: This water supplier has been exempted from water use forecast requirements as it is a no-growth system.

Water Supplier

TRAPP WATER COMPANY

Address: 6697 Second Street
Burlington, KY 41005

Phone: (606)586-6096

Population Served: 450

Water Source: Groundwater

Water Use Type: Water hauler - primarily residential users

Comments: This water supplier has been exempted from water use forecast requirements as it is a no-growth system.

Water Supplier

HILLSIDE TRAILER PARK

Address: Rt. 1, Box 212A
Morningview, KY 41063

Phone: (606)384-3571

Population Served: 150

Water Source: Surface Water - Ponds

Water Use Type: Residential

Comments: This water supplier has been exempted from water use forecast requirements as it is a no-growth system.

OTHER WATER SUPPLIERS AND DISTRIBUTORS

Bullittsburg Baptist Assembly
Population Served: 25
Water Source: Groundwater

Camp Turnabout
Population Served: 429
Water Source: Groundwater

River Ridge Park
Population Served: 150
Water Source: Groundwater

Riverland Park
Population Served: 50
Water Source: Groundwater

Powderhorn Reservation
Population Served: 50
Water Source: Purchase surface water

Bob's Family Restaurant
Population Served: 150
Water Source: Purchase surface water

Katmandu Country Cafe
Population Served: 50
Water Source: Purchase surface water

Petersburg Community Center
Population Served: 50
Water Source: Groundwater

Kelley Elementary School
Population Served: 355
Water Source: Groundwater

Big Bone Lick State Park
Population Served: 257
Water Source: Surface water

Note: These suppliers and distributors were not considered by the Planning Council because they were not identified on lists provided by the Division of Water in 1992.

Permitted Withdrawals

A water withdrawal permit is required for any user who withdraws an average of more than 10,000 gallons of water per day. According to the Division of Water, there are two such users in Boone County (Map 3). The first is Traditions Golf Club on Williams Road. The source is a surface water intake of a golf club lake which is an impoundment of an unnamed tributary of Garrison Creek. The average 1992 monthly usage was .045 mgd and the maximum 1992 monthly usage was .232 mgd. Historical data is not available because the permit was obtained in 1990.

The second permitted withdrawal is Watson Gravel in western Boone County. The source is groundwater and the average 1992 monthly usage was .226 mgd. Maximum 1992 usage was .343 mgd. Historical data is not available because the permit was obtained in 1990.

Permit-Exempt Withdrawals

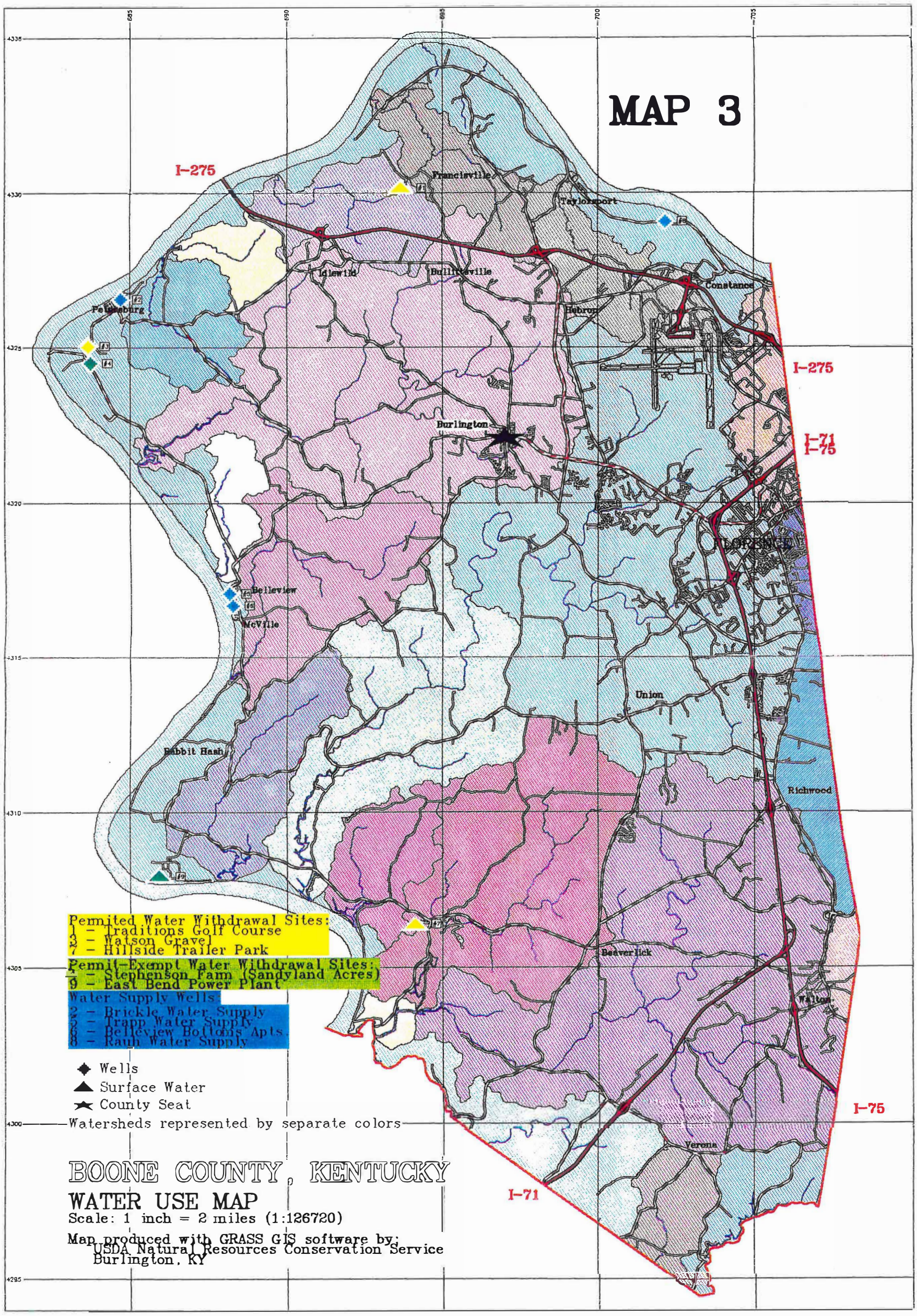
There are a number of users which are classified as exempt including power plants governed by the Public Service Commission and agricultural users. The East Bend Power Plant, a coal-powered plant operated by Cincinnati Gas & Electric, uses water from the Ohio River for cooling. According to a phone interview with the plant manager, maximum usage capability is 19 to 20 million gallons per day; however, usage varies from day to day. Historic usage could not be obtained.

There are a number of agricultural water users identified in rural Boone County who are not served by a public water system (Map 3). These agricultural concerns use water to sustain nurseries, produce, and livestock. Agricultural water users in the county rely on a variety of different sources including wells and cisterns. Most agricultural users were unable to estimate their water usage. However, several did. Two dairy farmers, one with a cistern and the other with a well, reported using upwards of 1000 gallons per day. A fruit and vegetable farm with a well used approximately 1000 gallons per day in dry times.

Permitted H_2O Withdrawal - Boone

* Traditions Golf Club? on site lake
- Martin Marietta Materials
- Northern Kentucky Aggregates (2 #s)
- Trapps Water Co.(?)
- Birkle Water(?)

MAP 3



BOONE COUNTY, KENTUCKY

WATER USE MAP

Scale: 1 inch = 2 miles (1:126720)

Map produced with GRASS GIS software by:
USDA Natural Resources Conservation Service
Burlington, KY

B. Water Use Forecast

Two major sources were utilized to determine base year and future water use including: the Licking River Basin Study, a US Army Corps of Engineers study completed in September 1990, and a survey completed by water suppliers and distributors in the study area.

The Licking River Basin Study is a comprehensive water supply study completed in the last five years and therefore, water supply regulations require that the water use assessment information developed in the study be used.

The survey completed by water suppliers and distributors requested information about water use, customers, expansion plans, conservation measures, water source, treatment capacity, and rates. Figure 2 is a copy of the survey.

Please note that the small water suppliers in Boone County (Hillside Trailer Park, Arlinghaus Properties, Trapp Water Supply, Birkle Water Supply, and Rauh Water Supply) were exempted from water use forecast requirements because they withdraw less than 10,000 gpd and serve small populations. Furthermore, land use management policies in Boone County encourage growth and development to occur in areas served by adequate infrastructure. Therefore, those suppliers that conduct a water hauling business or sell to water haulers are unlikely to experience any increase in demand beyond their existing customer base.

LICKING RIVER STUDY SUMMARY: BOONE - KENTON WATER SERVICE AREA

Boone County, with the exception of a very small area in the southern portion of the county which is served by the Bullock Pen Water District, is in the Boone-Kenton water service area. The decision to view the counties as one service area was made because there is only one supplier, the Kenton County Water District No. 1 (KCWD). In Boone County, KCWD serves the Northern Kentucky/Greater Cincinnati International Airport and the Northern Kentucky Industrial Park and also wholesales water to the Boone County Water & Sewer District, the Florence Water & Sewer Commission, and the City of Walton. As a point of reference, in 1990, Boone County used approximately 30 percent of the water produced by KCWD.

Assumptions

Using the IWR-MAIN model, developed by the U.S. Army Corps of Engineers, to forecast future demand for water, the following assumptions were made:

1. All occupied housing units in incorporated areas are water-served.

2. All apartment units are located in water-served areas.

3. Of the remaining units in the unincorporated areas, it was assumed that one-half of the mobile homes were water-served and that the remaining dwellings located

in unincorporated areas were single-family units.

4. Using the 1980 census, housing unit value ranges were aggregated to create 10 value ranges from $0 - $300,000. Census counts per value range and census rent counts converted to equivalent home values yielded totals for each value range. Then the percentage in each value range was determined and applied to the total number of occupied housing units on public water in the water service area.

5. All units within structures of five or more units were assigned to Screen 5.1, Master Metered Apartments. All units within structures of two to four units and all mobile homes were assigned to Screen 2.1, Flat Rate Sewered. The units were allocated to value ranges according to the census percentage in each value range.

6. Density values were assigned based on local judgement about the average lot size (including the area occupied by the dwelling unit itself) actually maintained by single family, multi-family, and mobile home dwellers, respectively.

7. Marginal price and bill difference were calculated according to the IWR-MAIN manual's instructions based on the 1980 water rates of the largest utility providers in the water service area.

8. The only conservation measure in place, effective as of 1989, is a moderate plumbing code.

9. Future residential, commercial, industrial, and institutional growth will occur in water-served areas.

FIGURE 2

SURVEY

NORTHERN KENTUCKY AREA DEVELOPMENT DISTRICT

BOONE COUNTY WATER SUPPLY PLAN

WATER SOURCE, TREATMENT AND DISTRIBUTION QUESTIONNAIRE

WATER SOURCE & TREATMENT INFORMATION

RAW WATER SOURCE (SOURCES)

LOCATION	TYPE*	PERMIT WITHDRAWAL (MGPD)
Ohio River	R	33
Licking River	R	11

*R (River), L (Lake), W (Well), S (Spring), O (Other)

TREATMENT PLANT

LOCATION	Ft. Thomas	Taylor Mill
CAPACITY (MGPD)	33	10
DATE BUILT	1936	1954
CONDITION	Good	Good
TYPE TREATMENT	Flocculation Coagulation Sedimentation Filtration Cl2 Disinfection	Flocculation Coagulation Sedimentation Filtration Cl2 Disinfection

ON-SITE TREATED WATER STORAGE (CLEAR WELL, ETC.) MG

Ft. Thomas 6.5 MG Taylor Mill 1 MG

SOURCE OR TREATMENT COMMENTS

TREATED WATER SOURCE(S)

IF YOUR UTILITY PURCHASES TREATED WATER FROM ANOTHER UTILITY, PLEASE LIST THE SOURCE UTILITY, THE CONTRACT PRICE, AND THE MAXIMUM AMOUNT OF WATER THAT CAN BE DELIVERED TO YOU.

SOURCE UTILITY	CONTRACT PRICE	MAXIMUM DELIVERY

TREATED WATER STORAGE

LOCATION	TYPE*	CAPACITY (MG)
Bromley	S	3
Dean Park	S	.475
Ida Spence	E	.5
Dudley Pike	S	10
Kenton Lands	E	.5
Industrial Park	E	.5
Nicholson	E	1
Barrington	E	1
Dean	E	2

*S (standpipe), E (Elevated Tank), G (Tank at Grade)

STORAGE SYSTEM COMMENTS (CONDITION, ETC.) Good condition

DISTRIBUTION SYSTEM

GENERAL CONDITION OF WATER LINES Satisfactory

BEST ESTIMATE OF SYSTEM EFFICIENCY (GALLONS TREATED AS COMPARED TO GALLONS SOLD)

1981	5,570/6,872	MGPD	81 %
1986	6,275/7,593	MGPD	83 %
1991	7,485/8651	MGPD	87 %

RECENT MONTH _____ MGPD _____ %

LEAK DETECTION METHODS Walk cross-country lines during dry months. Investigate all reports of possible main breaks.

NON-REVENUE SYSTEM USAGE

	ANNUAL AVG. (GAL./DAY)	MAX DAILY (GAL./DAY)
FIRE PROTECTION	38,356	
PLANT OPERATIONS (BACK FLUSH, ETC.)	446,575	
OTHER		

Retail Only

PLEASE ATTACH CURRENT RATE SCHEDULE AND EFFECTIVE DATE (INCLUDING AVERAGE YEARLY PRICE OF WATER IN DOLLARS PER 1,000 GALLONS).
$6,559,103 ÷ 4,779,978,100 gallons = $1.37/1000 Gallons
HAS THE PRICE OF WATER FLUCTUATED SEASONALLY IN THE PAST (E.G., IS IT MORE EXPENSIVE IN SUMMER AS OPPOSED TO WINTER)?

YES _____ NO X IF YES, EXPLAIN: _____

TOTAL WATER USAGE (GALLONS PER DAY)

MAXIMUM DAILY	ANNUAL AVERAGE
38.4 MGPD	23.8 MGPD

TOTAL ANNUAL GALLONS TREATED (OR PURCHASED)		TOTAL ANNUAL GALLONS SOLD	
1981	5,570 MG	1981	6,872
1986	6,275	1986	7,593
1991	7,485	1991	8,651

CUSTOMERS (TOTAL BY CATEGORY)

	1981	1986	1991
RESIDENTIAL	27,346	28,022	31,562
COMMERCIAL	1,614	2,762	1,976
INDUSTRIAL	111	102	92
INSTITUTIONAL			

MAJOR WATER USERS BY CATEGORY:

INDUSTRIAL	AVERAGE ~~(MGPD)~~ GALLONS/DAY	PEAK (MGPD)
Marmont Steel	567,000	
International Permalite	108,600	
Blue Grass Provisions	59,800	
Van Leer Containers	51,300	
USS Chemical	48,300	

COMMERCIAL (RETAIL, WHOLESALE, CAR WASHES, LAUNDRIES)		
Cin/Inter Airport	276,300	
Florence Water + Sewer	2,751,500	
Boone County Water	2,572,200	
Taylor Mill Utilities	738,100	
City of Ludlow	552,500	

INSTITUTIONAL (SCHOOLS, HOSPITALS, NURSING HOMES, ETC.)		
St Elizabeth Hospital N+S	346,100	
* Kenton County Board of Ed	71,100	
Domal Corp - St Johns	52,400	
St Charles	28,900	
* Cov Board of Education	39,600	

* Total of all schools

	AVERAGE (MGPD)	PEAK (MGPD)
RESIDENTIAL (APARTMENTS, TRAILER PARKS, ETC.)		
Parker Smith TRLR CT	67,200	
Faith Management - Apts	65,800	
A.O. Smith TRLR CT	57,800	
A+K Enterprise - Apts	57,600	
Stetler Trailer Park	55,200	
OTHER (PARKS, GOLF COURSES, SWIMMING POOLS, ETC.)		
Kenton Cnty. Golf Course	149,700	
Twin Oaks	20,800	
Summit Hills	21,000	
Ft. Mitchell	23,300	
Pleasure Isle	11,000	

DOES YOUR SYSTEM SELL TREATED WATER TO OTHER UTILITIES OR WATER DISTRICTS? YES X NO ____

IF "YES", LIST CUSTOMERS AND CONTRACT PRICE.

CUSTOMER	CONTRACT PRICE
see rate schedule	

WHAT CURRENT CONSERVATION MEASURES, IF ANY, DO YOU FOLLOW?

Pamphlets in lobby. Phone messages while on hold.

WHAT ABOUT CONSERVATION IN THE FUTURE?

Response will be in accordance with the need.

DO YOU HAVE PLANS TO INCREASE CAPACITY WITHIN THE NEXT 10 YEARS? 15 YEARS?

YES 11 MG at Ft. Thomas Treatment Plant

WHAT IMPROVEMENTS ARE PLANNED FOR YOUR FACILITIES?

Additional sedimentation basin at the Ft. Thomas Treatment Plant

IN THE NEXT 10 YEARS DO YOU ANTICIPATE AN INCREASE IN CUSTOMERS? WHY? WHY NOT?

Yes. Northern Kentucky is growing in population.

Data Sources

The Licking River Basin Study used the following sources:

1. 1980 Census of Population and Housing.

2. The population projections were prepared specifically for the study by the University of Louisville's Urban Research Institute.

3. BEA data was used to estimate employment in the construction, transportation/public utilities, wholesale/retail trade, finance/insurance/real estate, services, and government sectors. County Business Patterns (CBP) was also used, but only for obtaining proportional data. For example, BEA data combines employment in wholesale and retail trade, while CBP breaks out the employment into two separate sectors. Therefore, the percentages of people employed in wholesale and retail trade from CBP would be applied to the BEA data.

4. Manufacturing data was obtained from the Kentucky Directory of Manufacturing.

Methodology

The Licking River Basin Study used 1980 as the base year and 1985 as a projection year. Actual 1985 data was then compared to projected 1985 data and appropriate calibrations were made. The major calibration was made by adjusting average annual per household consumption rates calculated from utility rates. A reasonable summer-to-winter water use ratio was then applied to produce a more reasonable and acceptable total for residential usage. With these calibrations, residential water usage totals that were only one percent greater than locally generated estimates were produced. It was difficult to make a verifiable calibration of the commercial/industrial sector because of a lack of useful billing records by sector.

Verification of IWR-MAIN Estimates

Estimates of consumption totals were felt to be reasonably accurate given the magnitude of the total consumption for the water service area. Figure 3 compares actual and projected water usage data through 1990. Actual and projected annual averages through 1990 are quite close. There is somewhat more of a discrepancy between actual and projected maximum day data, particularly in 1990.

Conclusions - Licking River Basin Study

With Kenton County Water District No. 1's dual sources of water (the Ohio River and the Licking River Main Stem near that river's mouth), it would appear that future water availability problems in the water service area would be more closely associated with treatment capacity and

transmission/distribution problems than with water availability.

Currently, KCWD has a treatment capacity of 43 MGD and plans to expand capacity to 54 MGD. According to the Licking River Study, maximum day usage could exceed existing capacity by 2010. However, projections prepared by KCWD's engineers show maximum day usage reaching existing capacity by 1995 and reaching the expanded capacity by 2005.

Figures 4 through 16 are disaggregated usage diagrams which show usage by sector for the base year and projection years including usage when moderate plumbing codes are used as a conservation method. Please note that Figure 8 shows actual usage in disaggregated form. This diagram differs somewhat because more sectors are depicted such as wholesale. IWR-MAIN includes wholesale as a part of commercial usage.

IWR-MAIN Update

Using 1990 census data and updated employment data as projection data in IWR-MAIN Screens 9.1 and 9.2 dramatically altered results, making them extremely unrealistic for the study area. The results of the Licking River Basin Study were quite close to estimates of actual usage, both in the base year and projected years, and therefore, should be used for water supply planning purposes.

FIGURE 3

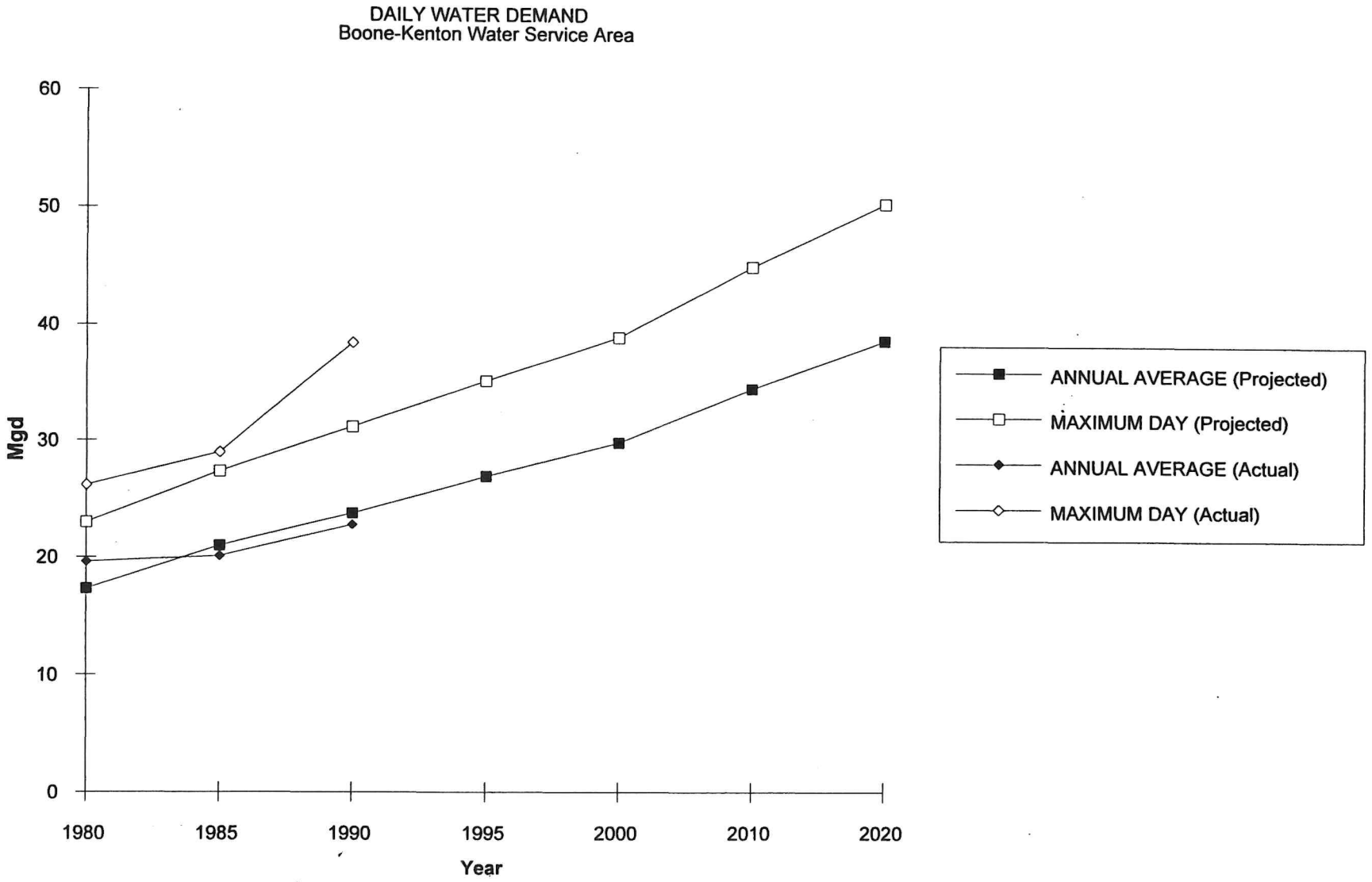

DAILY WATER DEMAND
Boone-Kenton Water Service Area
60
50
40
30
20
10
0
Mgd
1980
1985
1990
1995
2000
2010
2020
Year
ANNUAL AVERAGE (Projected)
MAXIMUM DAY (Projected)
ANNUAL AVERAGE (Actual)
MAXIMUM DAY (Actual)

FIGURE 4

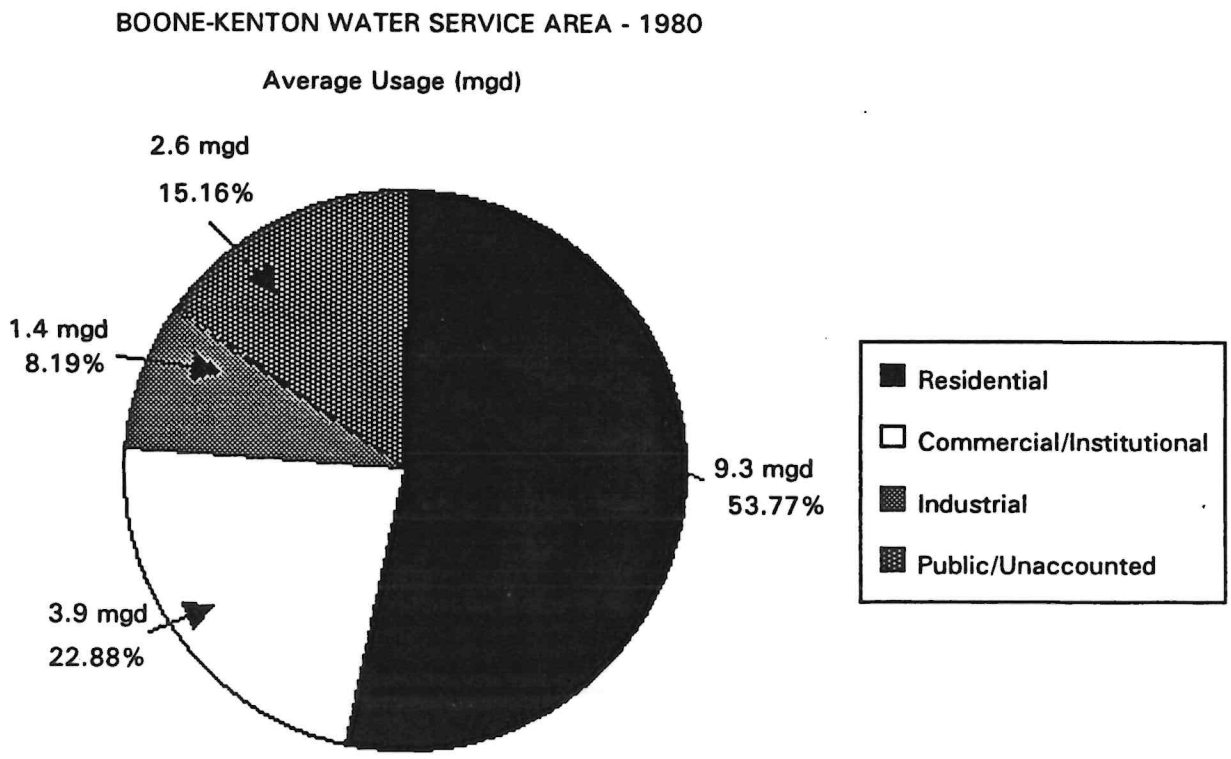

BOONE-KENTON WATER SERVICE AREA - 1980
Average Usage (mgd)
2.6 mgd
15.16%
1.4 mgd
8.19%
9.3 mgd
53.77%
3.9 mgd
22.88%
Residential
Commercial/Institutional
Industrial
Public/Unaccounted

FIGURE 5

BOONE-KENTON WATER SERVICE AREA - 1985

Average Usage (mgd)

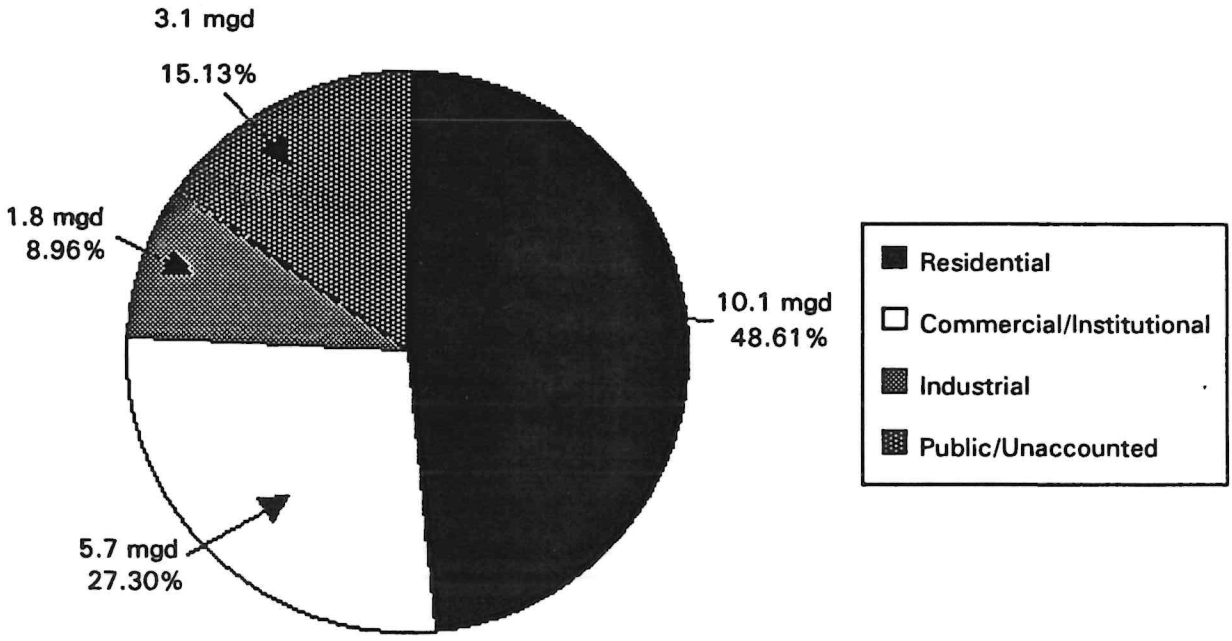


FIGURE 6

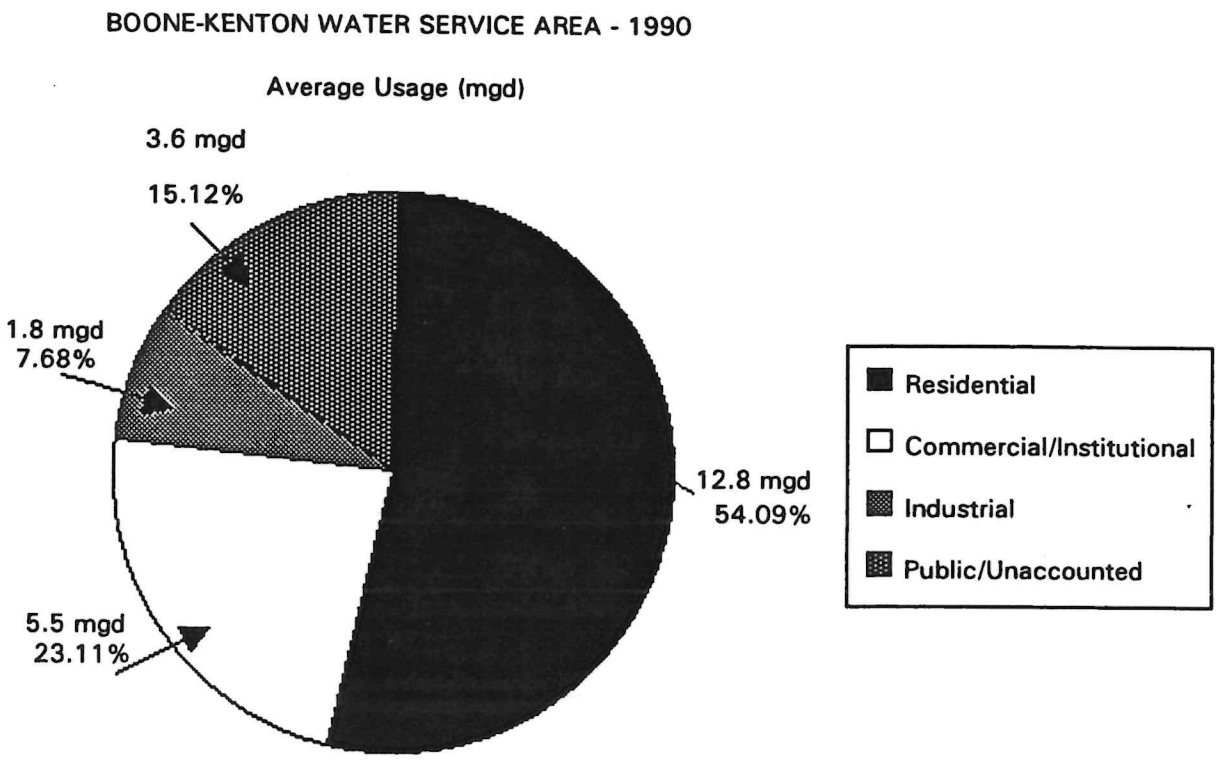
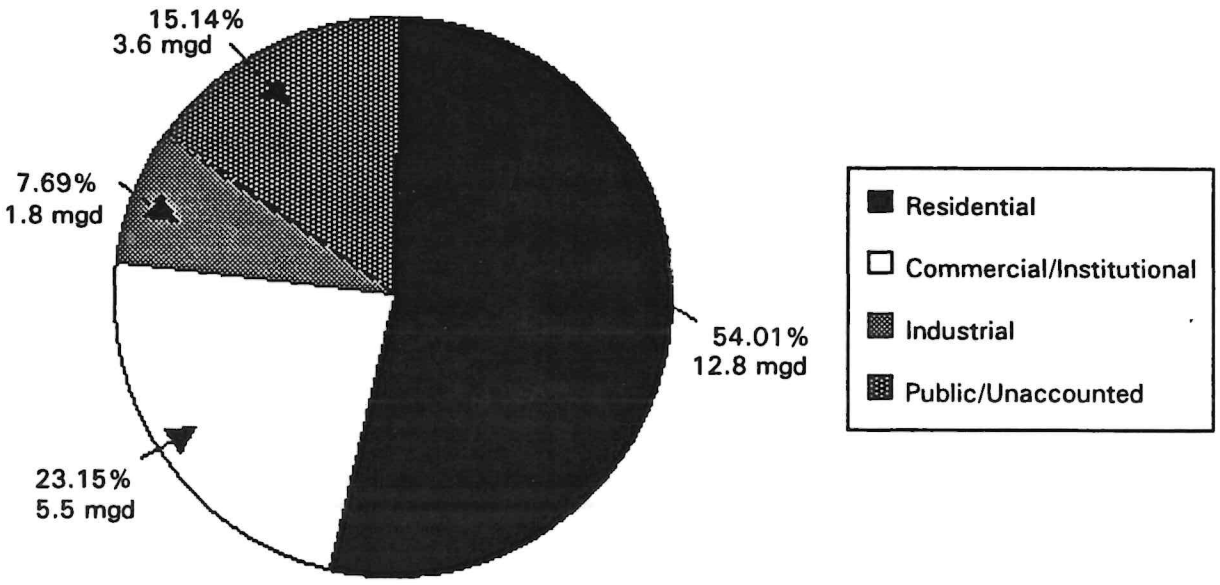

BOONE-KENTON WATER SERVICE AREA - 1990
Average Usage (mgd)
3.6 mgd
15.12%
1.8 mgd
7.68%
12.8 mgd
54.09%
5.5 mgd
23.11%
Residential
Commercial/Institutional
Industrial
Public/Unaccounted

FIGURE 7

BOONE-KENTON WATER SERVICE AREA: 1990

Average Usage with Moderate Plumbing Code (mgd)



Comments: Moderate Plumbing Code results in a .2% reduction in total usage.

FIGURE 8

BOONE-KENTON WATER SERVICE AREA: ACTUAL BASE YEAR USAGE
Average Usage (mgd)

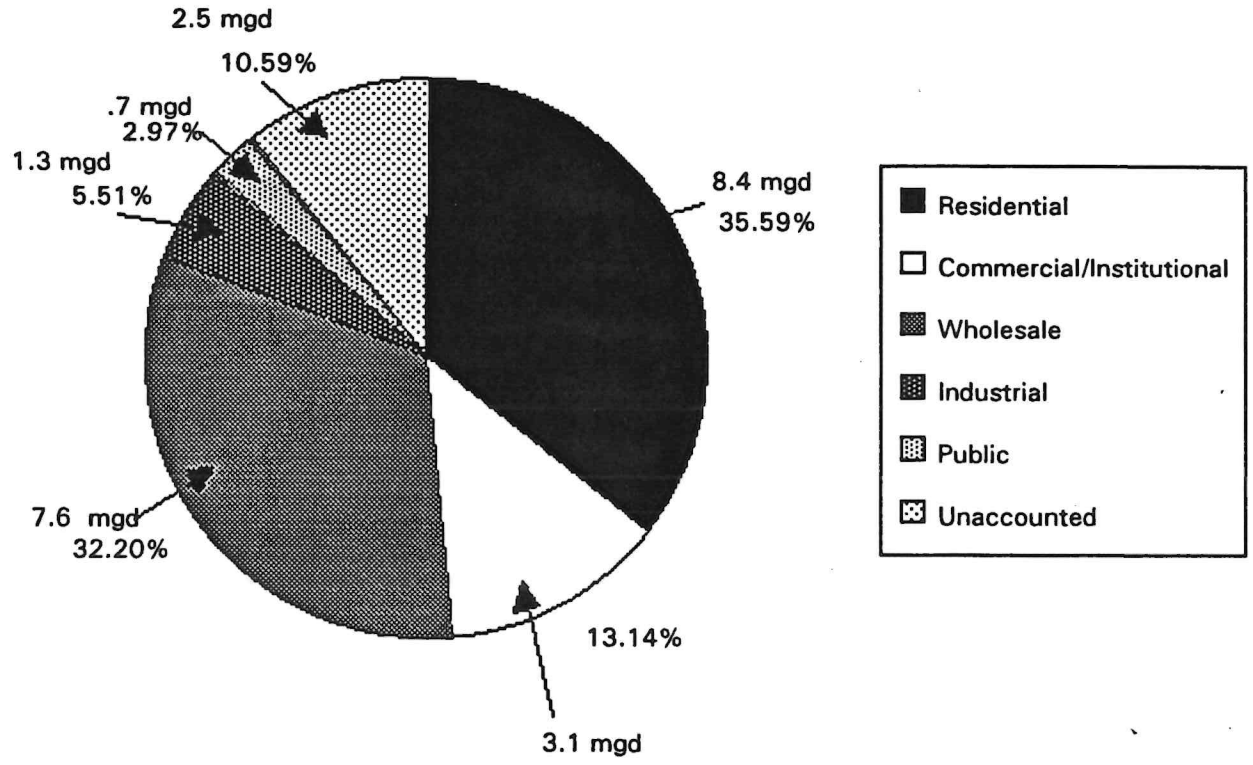


FIGURE 9

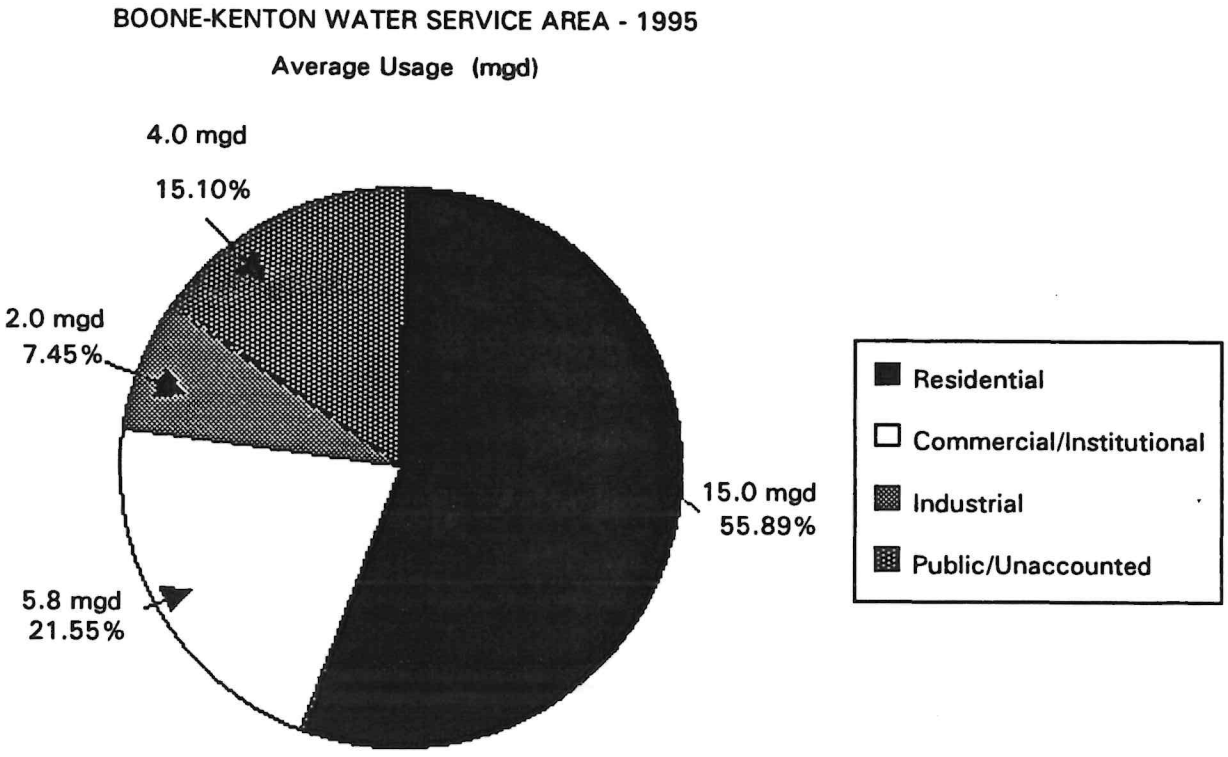
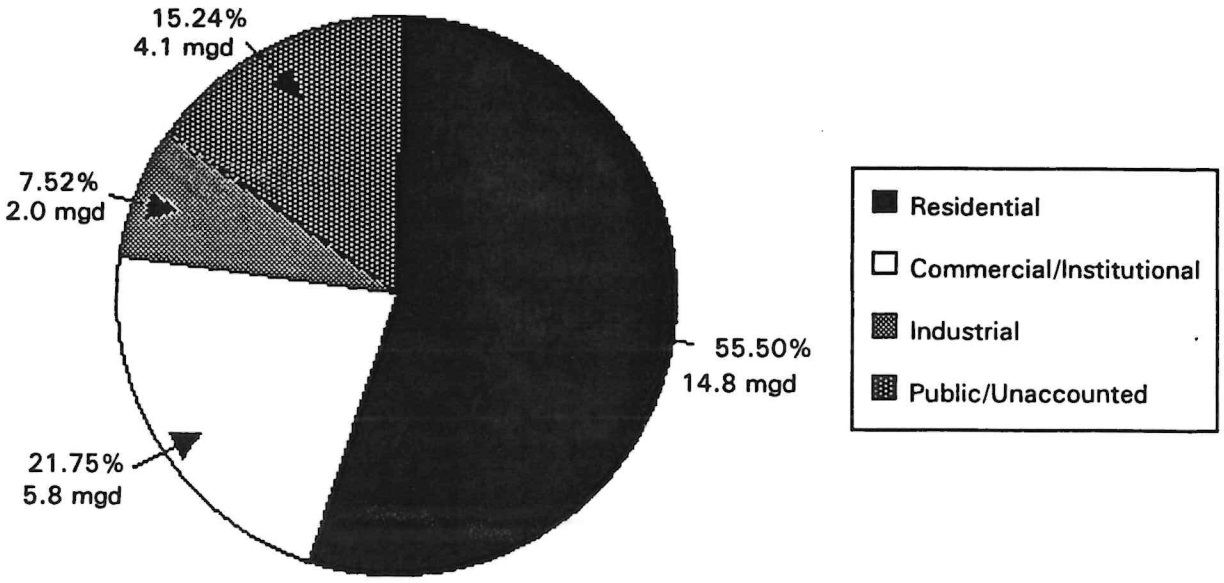

BOONE-KENTON WATER SERVICE AREA - 1995
Average Usage (mgd)
4.0 mgd
15.10%
2.0 mgd
7.45%
15.0 mgd
55.89%
5.8 mgd
21.55%
Residential
Commercial/Institutional
Industrial
Public/Unaccounted

FIGURE 10

BOONE-KENTON WATER SERVICE AREA: 1995

Average Usage with Moderate Plumbing Code (mgd)



Comments: Moderate Plumbing Code results in a .9 % reduction in total usage.

FIGURE 11

BOONE-KENTON WATER SERVICE AREA - 2000
Average Usage (mgd)

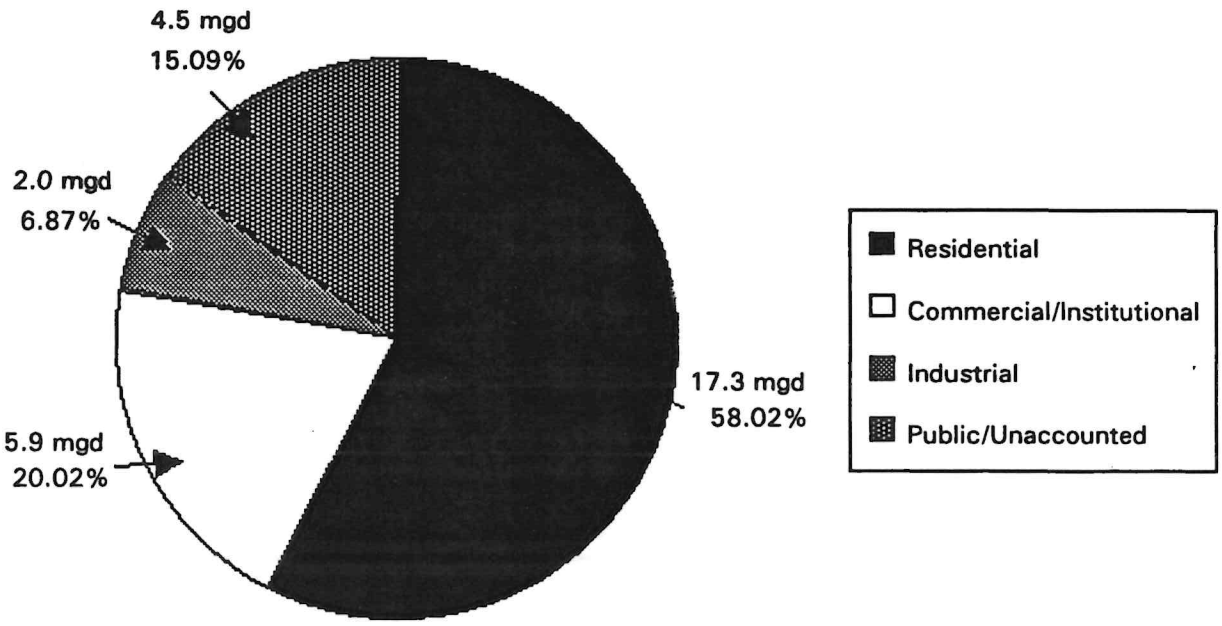
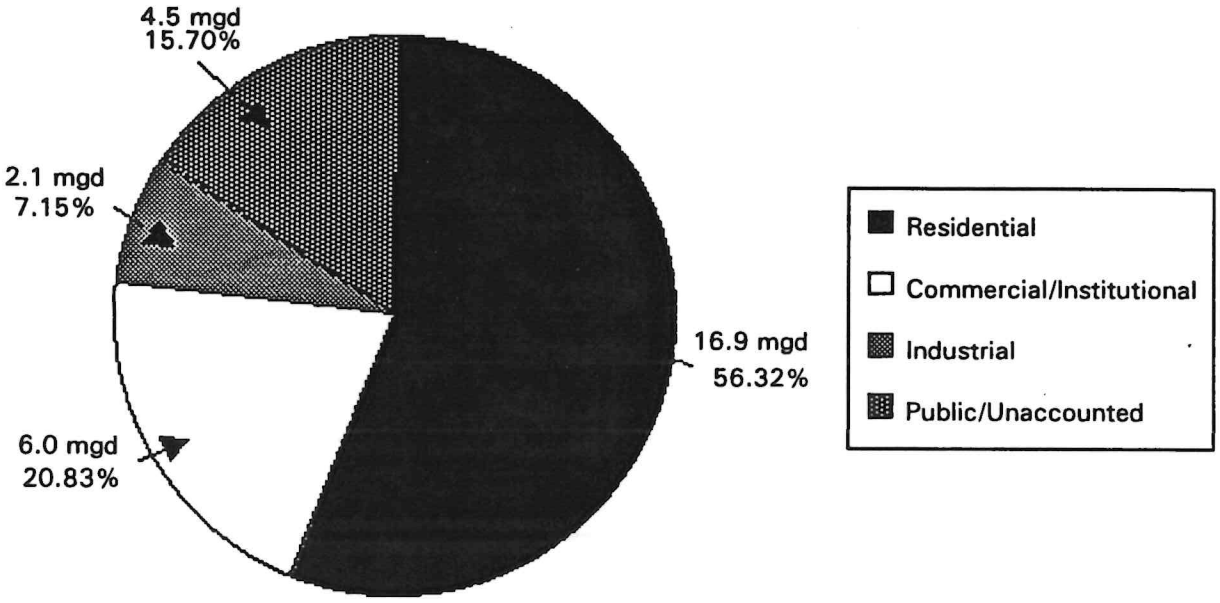


FIGURE 12

BOONE-KENTON WATER SERVICE AREA: 2000
Average Usage with Moderate Plumbing Code (mgd)



Comments: Moderate Plumbing Code results in a 1.5% reduction in total usage.

FIGURE 13

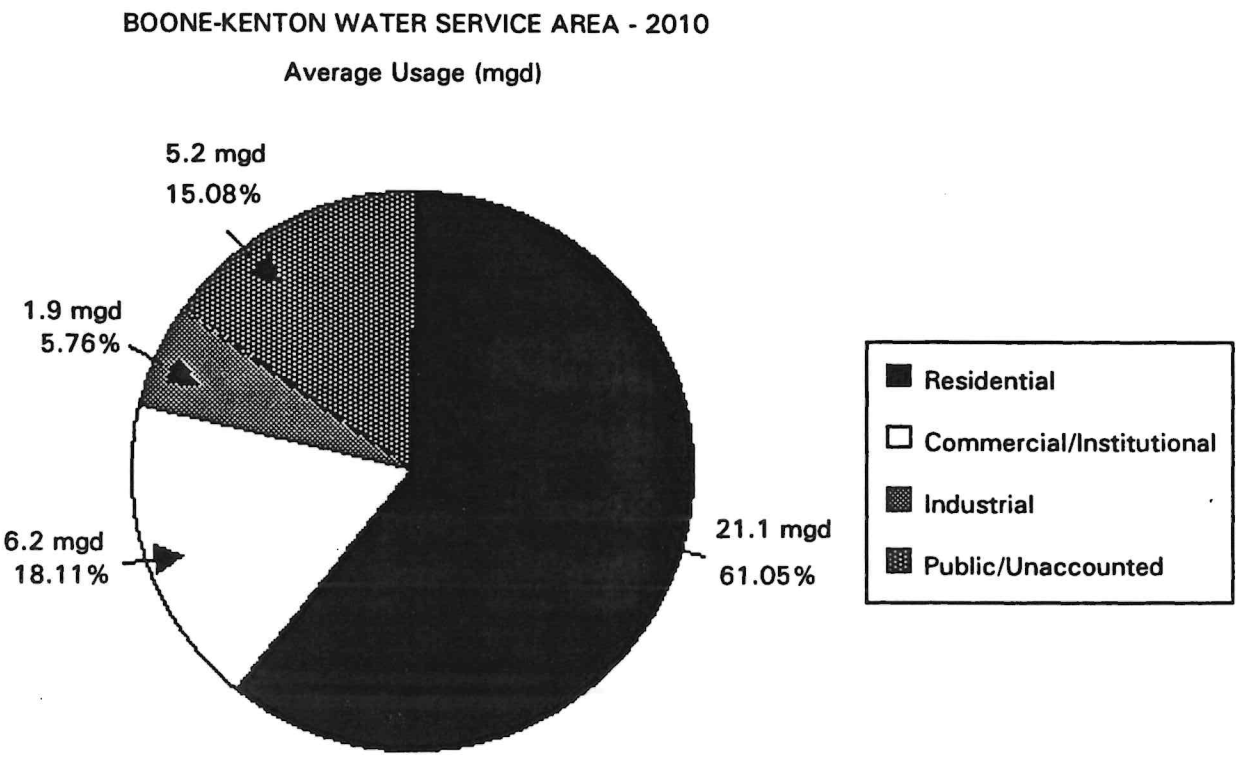
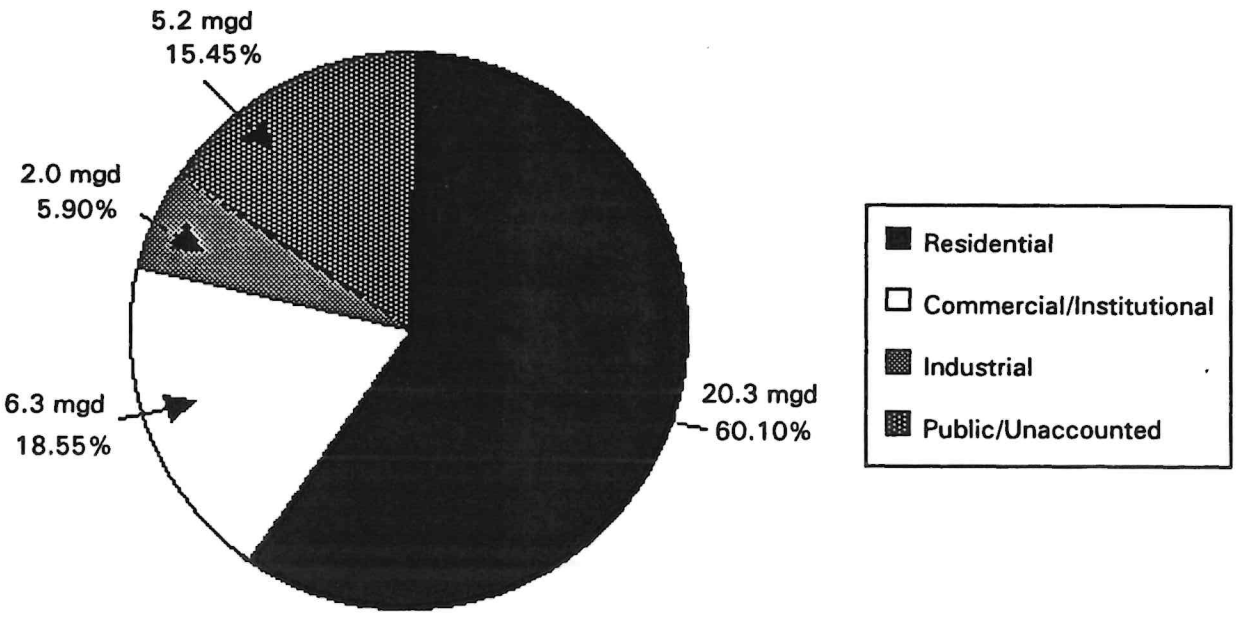

BOONE-KENTON WATER SERVICE AREA - 2010
Average Usage (mgd)
5.2 mgd
15.08%
1.9 mgd
5.76%
6.2 mgd
18.11%
21.1 mgd
61.05%
Residential
Commercial/Institutional
Industrial
Public/Unaccounted

FIGURE 14

BOONE-KENTON WATER SERVICE AREA: 2010

Average Usage with Moderate Plumbing Code (mgd)



Comments: Moderate Plumbing Code results in a 2.4% reduction in total usage.

FIGURE 15

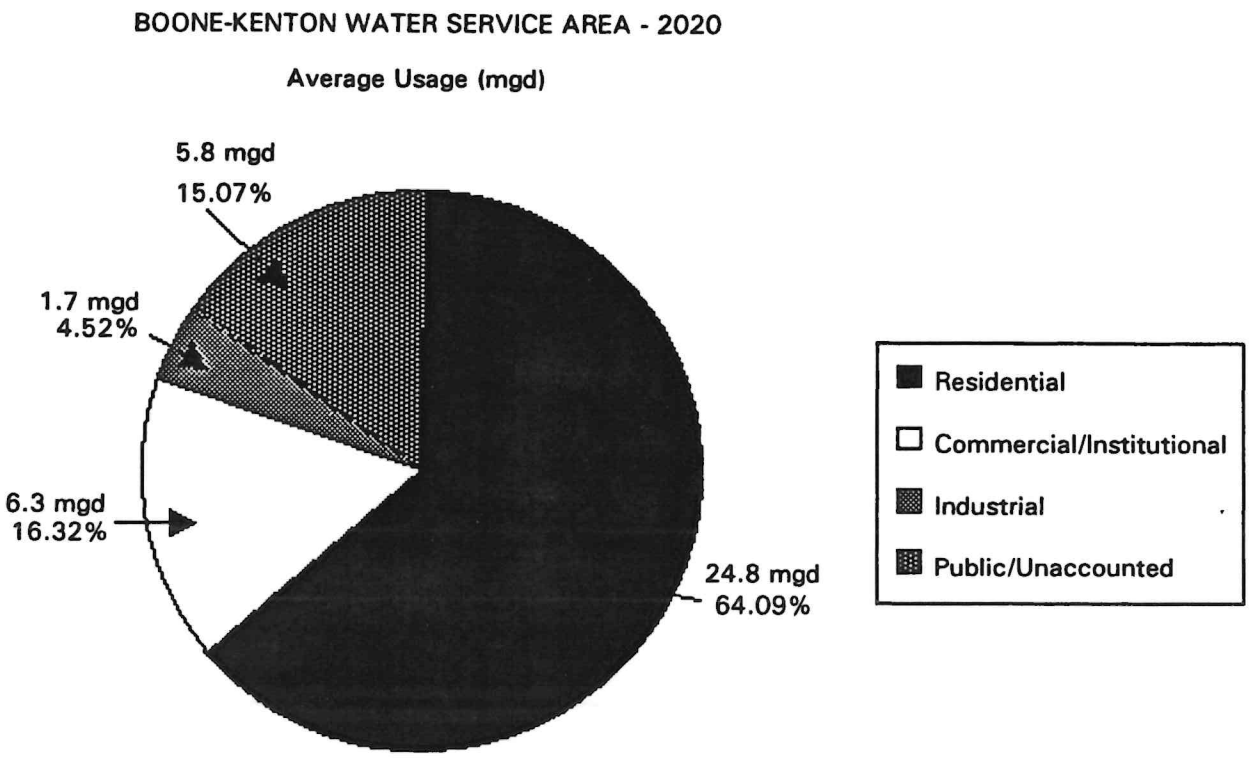
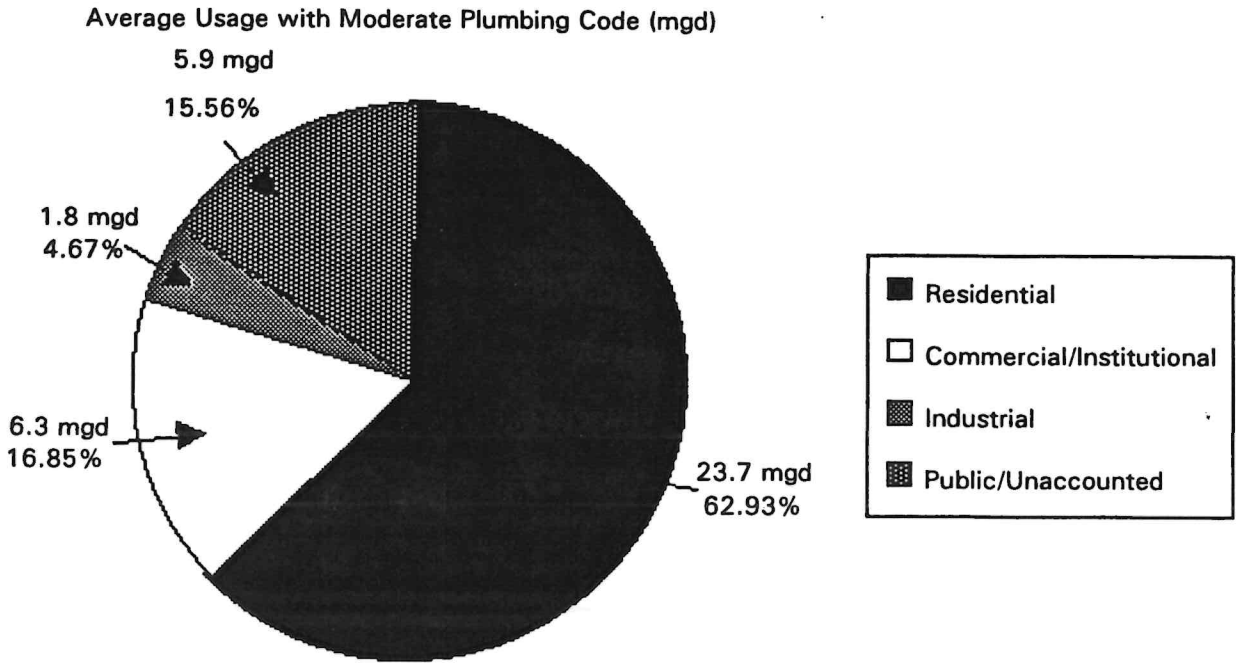

BOONE-KENTON WATER SERVICE AREA - 2020
Average Usage (mgd)
5.8 mgd
15.07%
1.7 mgd
4.52%
6.3 mgd
16.32%
24.8 mgd
64.09%
Residential
Commercial/Institutional
Industrial
Public/Unaccounted

FIGURE 16

BOONE-KENTON WATER SERVICE AREA: 2020



Comments: Moderate Plumbing Code results in a 3.1% reduction in total usage.

LICKING RIVER STUDY SUMMARY - BULLOCK PEN WATER SERVICE AREA

The Bullock Pen Water District serves a small area of southern Boone county as well as the northern third of Grant County including the City of Crittenden, the northwestern corner of Pendleton County, and the extreme southern tier of Kenton County. Bullock Pen Water District's source of water is Bullock Pen Lake, an impoundment of Ten Mile Creek. Bullock Pen Water District also purchases water from the City of Walton and the City of Williamstown.

Assumptions:

1. In 1990, only 69 percent of the population was estimated to be water-served which reflects the rural nature of the service area. By 2040, 83 percent of the population is projected to be water-served. These projections assume an aggressive water extension policy on the part of the water district, availability of an adequate and dependable water supply, and a revamping of the Bullock Pen Water District's distribution components as needed.

2. Median household income and income distribution were based on census data for Crittenden, which was considered to be socioeconomically representative of the entire area.

3. There were no structures with five or more units. Density values were assigned based on local judgement about the average lot size, including the area occupied by the dwelling unit itself, actually maintained by single family, multi-family, and mobile home dwellers, respectively.

4. Of the total number of households served by Bullock Pen Water District, it was assumed that all households in the City of Crittenden were served. The remaining units, in the unincorporated areas, were assumed to be either single-family or mobile home dwelling units. Because utility records did not indicate housing type, these rural units were assigned to single-family or mobile home categories based on the ratio of single-family to mobile home units.

Data Sources

Data sources mentioned above were also used for the Bullock Pen Water Service Area. In addition, phone books were also used to help identify commercial uses in the area.

Methodology

Again, 1980 was used as the base year and 1985 as a projection year for calibration purposes. Initial runs of the model yielded unreasonable water consumption rates for the residential sector. Since billing records by housing type were not available, total residential consumption was divided by total number of households served to obtain an average household consumption rate

of 143 gpd/u in 1980 and 131 gpd/u in 1985. This reduction in per household water consumption, while running counter to the assumptions of IWR-MAIN, was considered to be a more accurate reflection of housing and income trends in the area. Therefore, a compromise was developed by calibrating 1980 consumption at 131 gpd/u annual average (the 1985 level), and allowing the model to increase this consumption rate slightly in 1985. As a result IWR-MAIN underestimated 1980 water consumption and slightly overestimated 1985 consumption. Because housing trends in the Bullock Pen Water District have begun to moderate in recent years (away from a preponderance of lower income units), consumption rates were allowed to rise after 1985.

Water consumption for the commercial sector was obtained from sample billing records from 1979 as well as local employment estimates. This was necessary because the local utility sector categorizations did not coincide with IWR-MAIN definitions. For example, a food wholesale operation was assigned to the industrial category by the utility, and a treatment facility for delinquent boys was designated as residential.

There was no industrial employment in the area in 1980 or 1985; however, industrial activity is projected for the future. Therefore, a minimal employment factor was assigned to this sector in 1980 to permit IWR-MAIN to assign a portion of future employment growth to miscellaneous manufacturing.

Several user-added categories were supplied to IWR-MAIN. Three farms accounted for 3,900 gallons per day and a campground accounted for 2,100 gallons per day. Bulk sales accounted 27,400 gallons per day.

Reported line loss in 1980 and 1985 was approximately 30 percent; however, there was no explanation of this relatively large percentage. The line loss default value was changed to reflect this.

Verification

Estimates of consumption totals were considered to be reasonable. Commercial sector usage estimates were very accurate. Residential sector usage estimates were reasonable. The most questionable sector was public/unaccounted which comprised nearly 40 percent of total usage.

Figure 17 compares projected and actual water usage data. Projected annual average data for 1990 is quite close to actual data. Actual maximum day data was incomplete and is not shown. In 1991, maximum day usage was approximately 700,000 gallons compared to the projected 593,000 gallons. Again, the model does not seem to project maximum day usage as accurately as average usage.

Conclusions - Licking River Study

The water utility's condition, with respect to production, treatment, and distribution, is good. The outlook for Bullock Pen Water District and the water service area is dependent upon the amount of water available from Bullock Pen Lake. During drought, water availability does become a concern locally. As the area continues to grow, alternative sources of supply may need to be assessed.

Figures 18 through 30 show disaggregated usage for the base year and projection years including usage when a moderate plumbing code is used as a conservation method. Please note Figure 21 is actual usage.

Water Use Conclusions

The conclusions of the Licking River Study regarding future water use and potential usage issues for Boone County's major supplier and distributors are considered to be accurate by the Planning Council.

It is anticipated that the small suppliers will face increasing regulatory pressures which may drive them out of operation. Additionally, as mentioned previously, land use management policies encourage growth only in areas that can be served by infrastructure. Therefore, these suppliers are unlikely to expand in the future.

The future usage of permitted water users is unknown. Future usage by the permit-exempt East Bend Power Plant is unknown. Agricultural water use is likely to decline as the county continues to develop. However, Boone County is committed to protecting appropriate land for agriculture and agricultural-related uses as cited in the Boone County Comprehensive Plan. Therefore, it is anticipated that there will always be some agricultural water usage in the county.

FIGURE 17

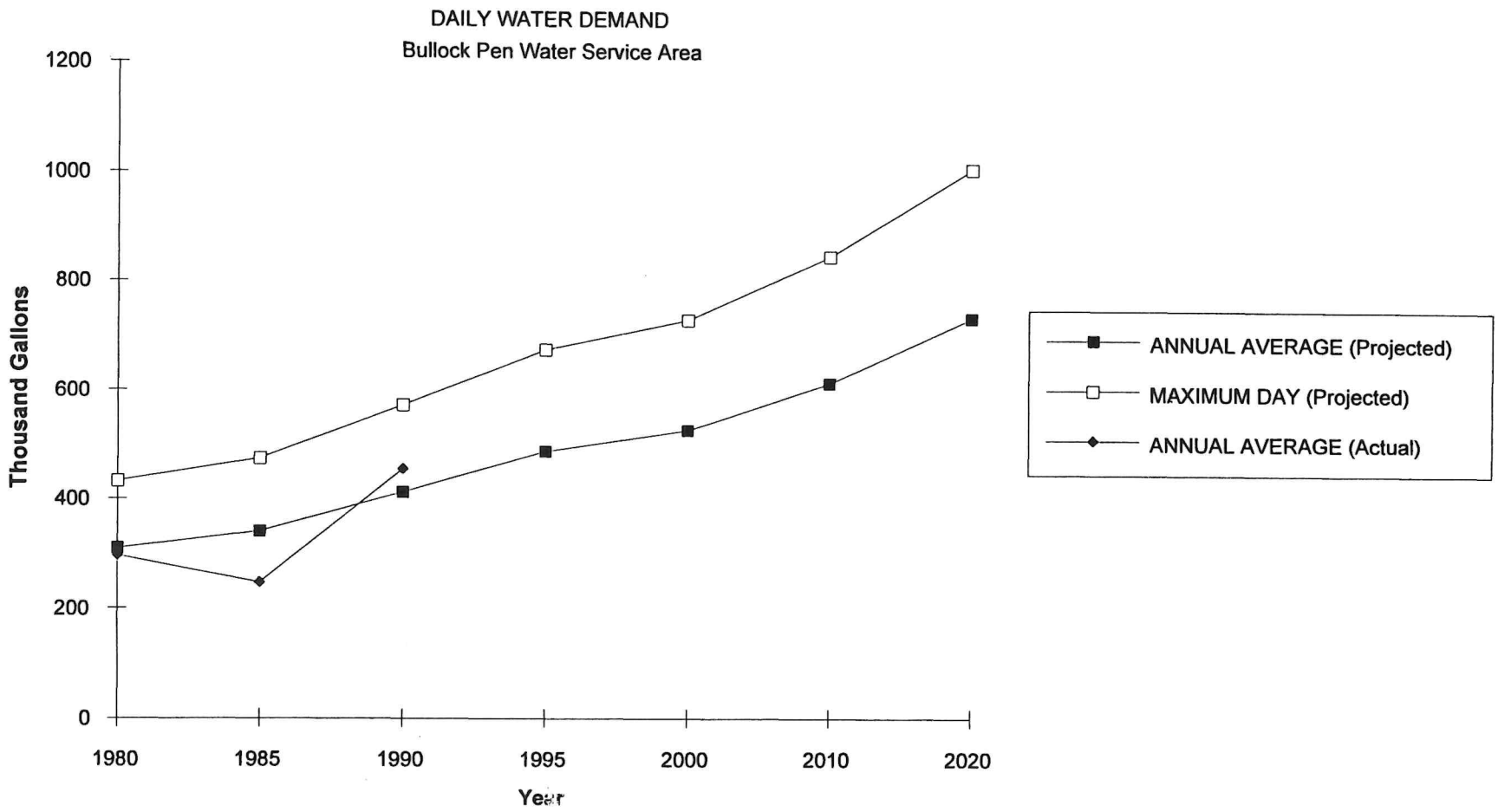

DAILY WATER DEMAND
Bullock Pen Water Service Area
Thousand Gallons
1200
1000
800
600
400
200
0
1980
1985
1990
1995
2000
2010
2020
Year
ANNUAL AVERAGE (Projected)
MAXIMUM DAY (Projected)
ANNUAL AVERAGE (Actual)

FIGURE 18

BULLOCK PEN WATER SERVICE AREA - 1980
Average Usage (gpd)

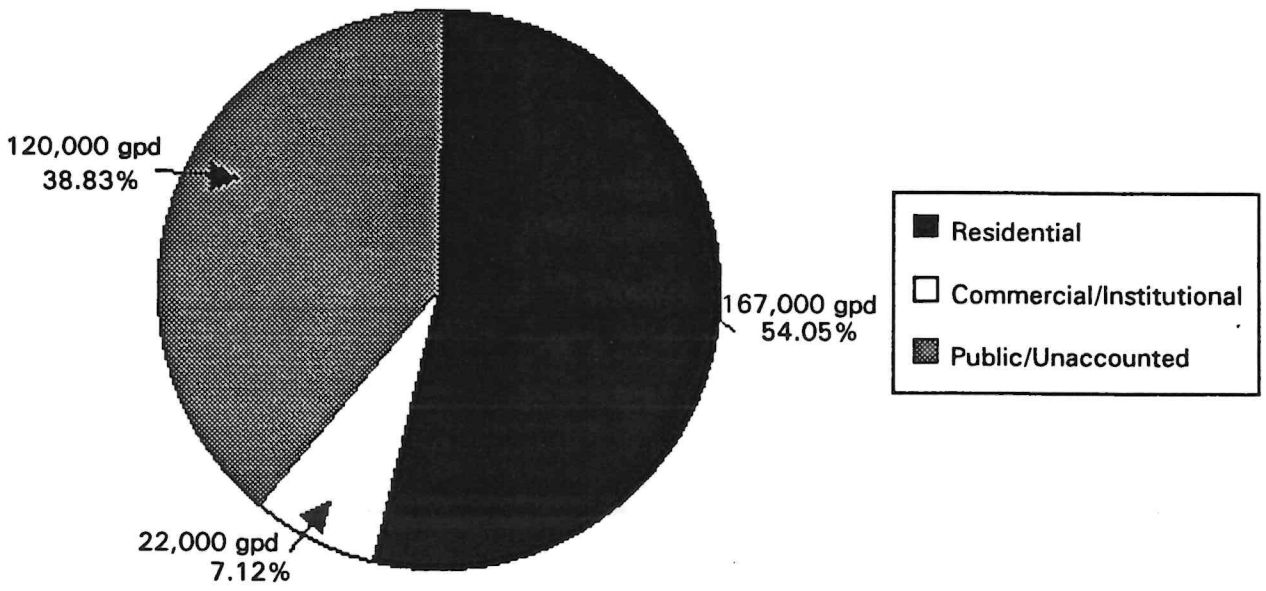


FIGURE 19

BULLOCK PEN WATER SERVICE AREA - 1985

Average Usage (gpd)

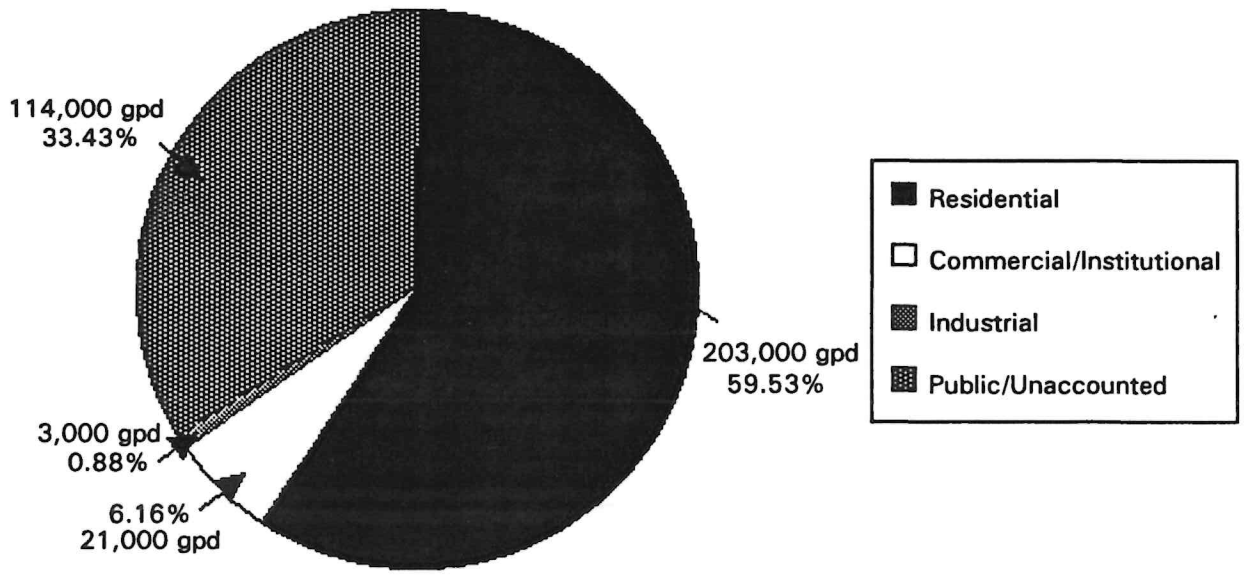


FIGURE 20

BULLOCK PEN WATER SERVICE AREA - 1990

Annual Average Usage (gpd)

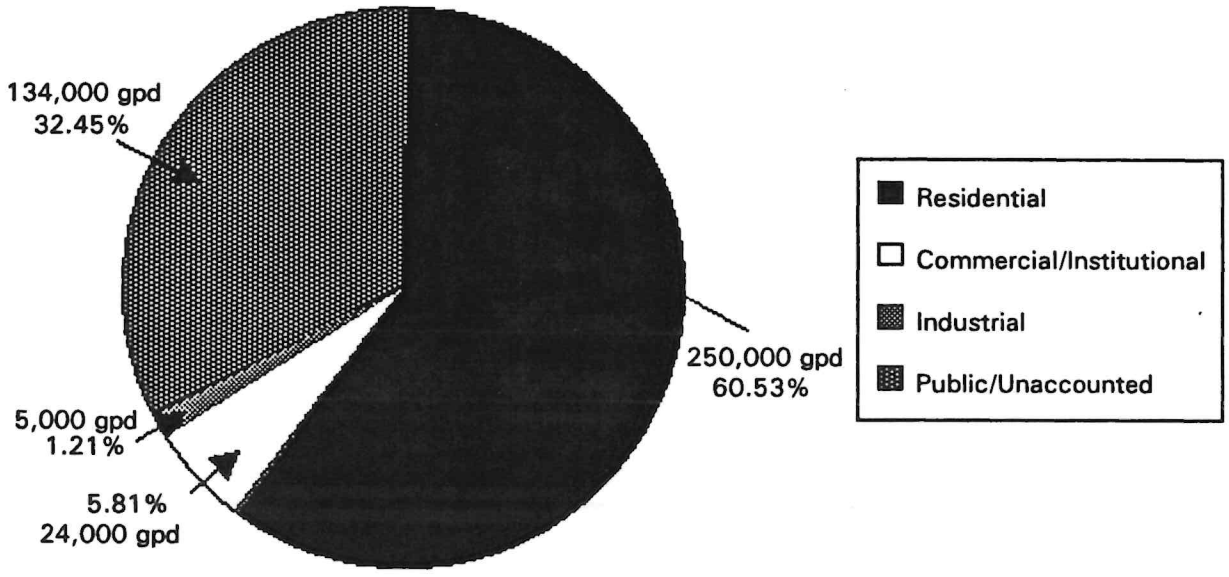
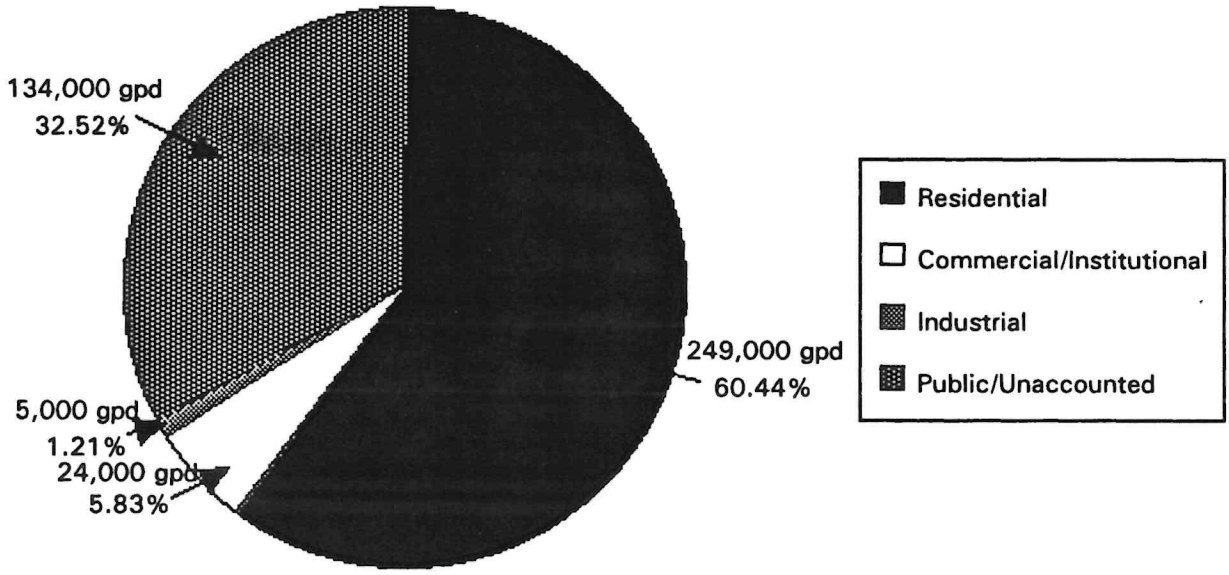


FIGURE 21

BULLOCK PEN WATER SERVICE AREA: 1990

Average Usage with Moderate Plumbing Code (gpd)



Comments: Moderate Plumbing Code results in a .2% reduction in total usage.

FIGURE 22

BULLOCK PEN WATER SERVICE AREA: ACTUAL 1990 USAGE
Average Usage (gpd)

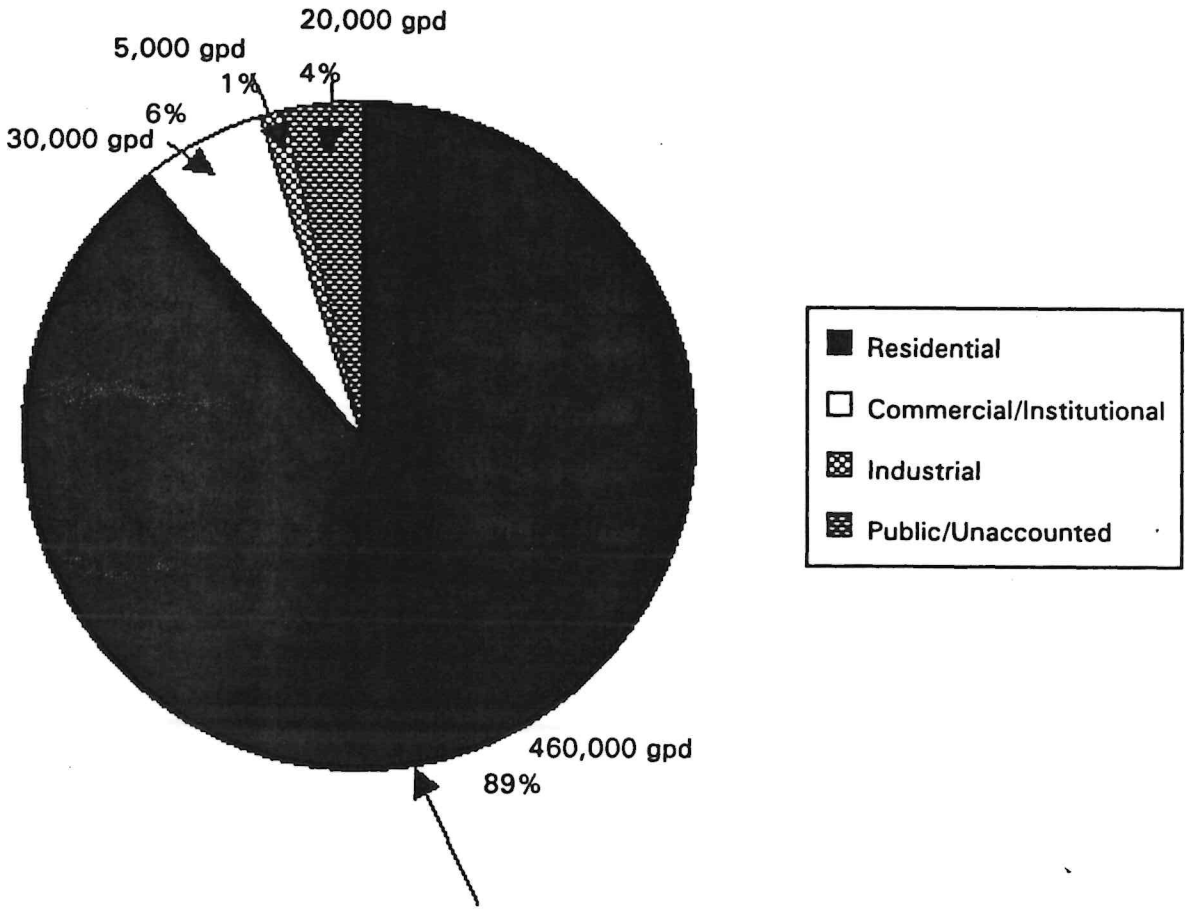


FIGURE 23

BULLOCK PEN WATER SERVICE AREA - 1995
Annual Average Usage (gpd)

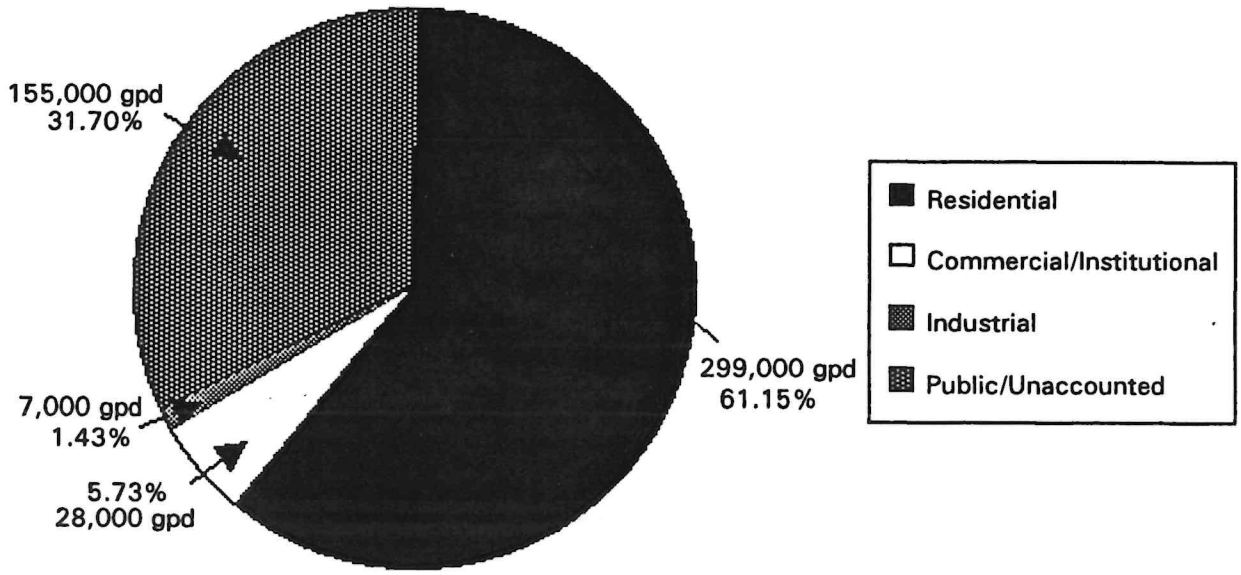
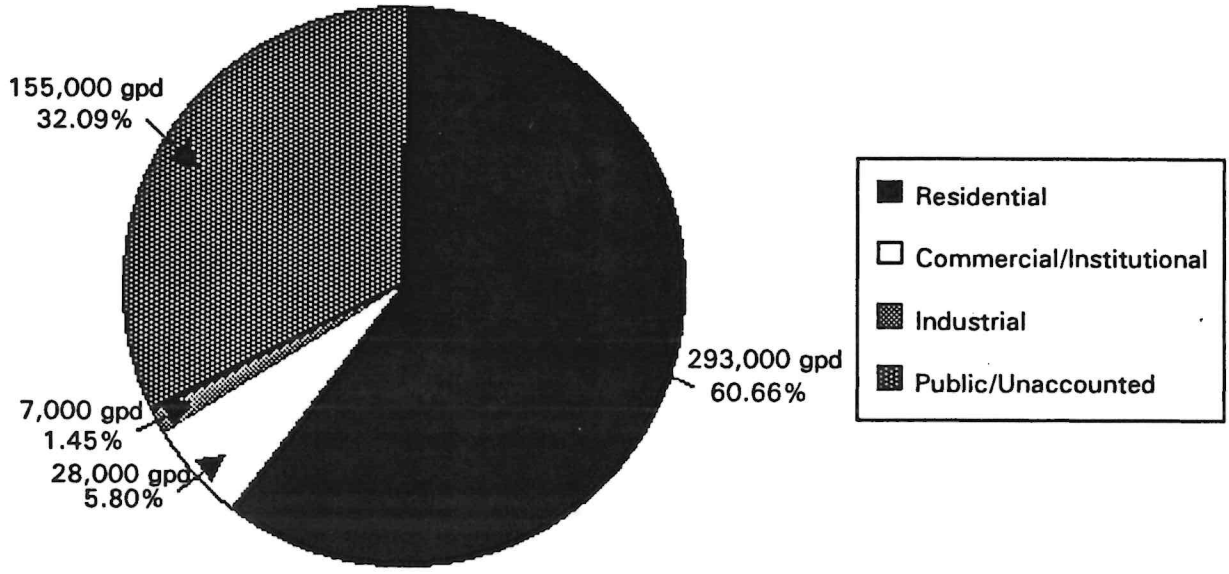


FIGURE 24

BULLOCK PEN WATER SERVICE AREA: 1995

Average Usage with Moderate Plumbing Code (gpd)



Comments: Moderate Plumbing Code results in a 1.2% reduction in total usage.

FIGURE 25

BULLOCK PEN WATER SERVICE AREA - 2000

Average Usage (gpd)

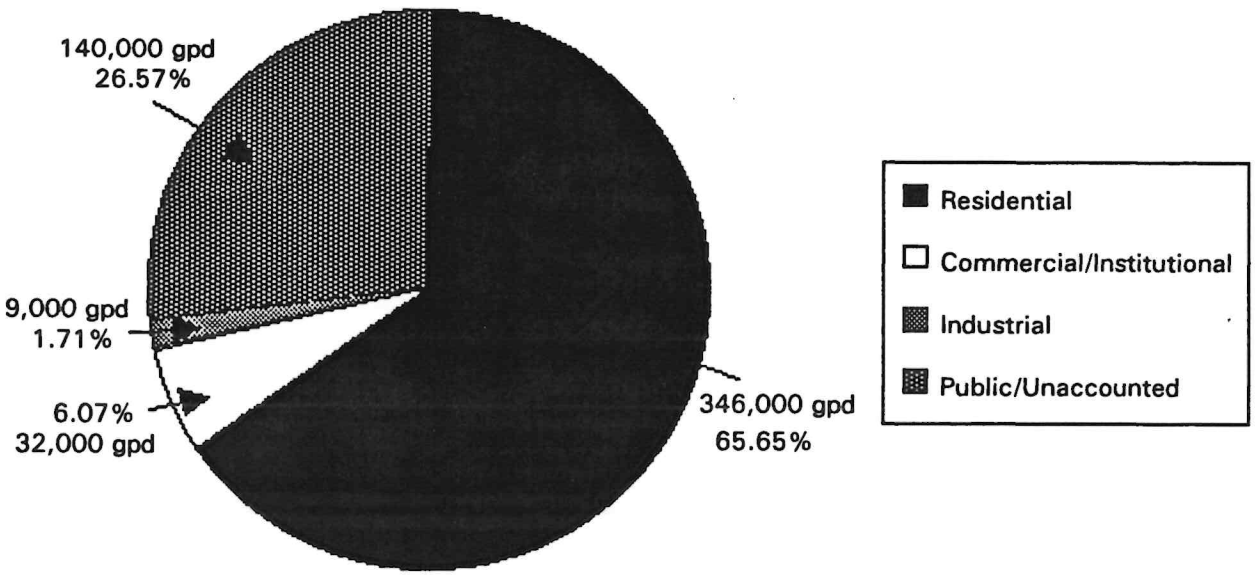
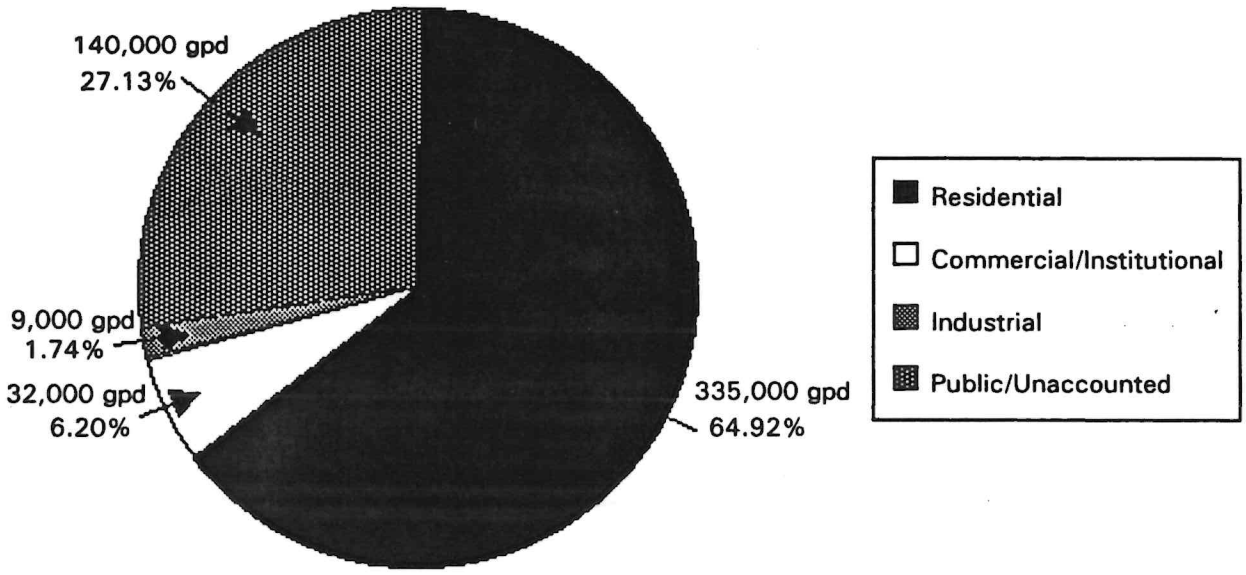


FIGURE 26

BULLOCK PEN WATER SERVICE AREA: 2000

Average Usage with Moderate Plumbing Code (gpd)



Comments: Moderate Plumbing Code results in a 2.1% reduction in total usage.

FIGURE 27

BULLOCK PEN WATER SERVICE AREA - 2010
Annual Average Usage (gpd)

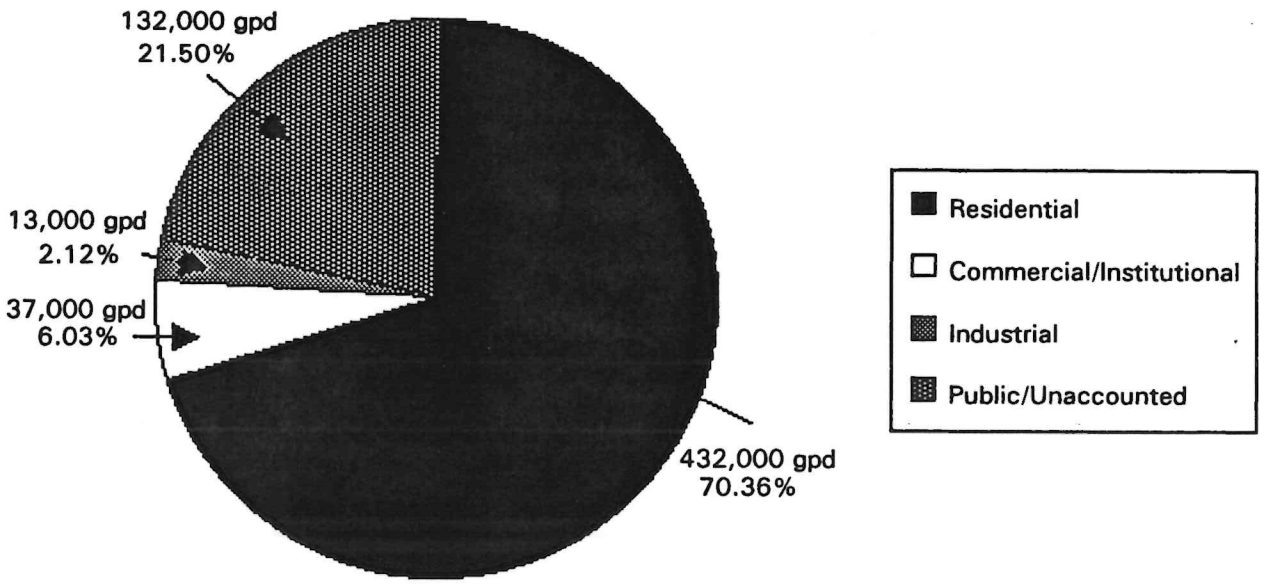
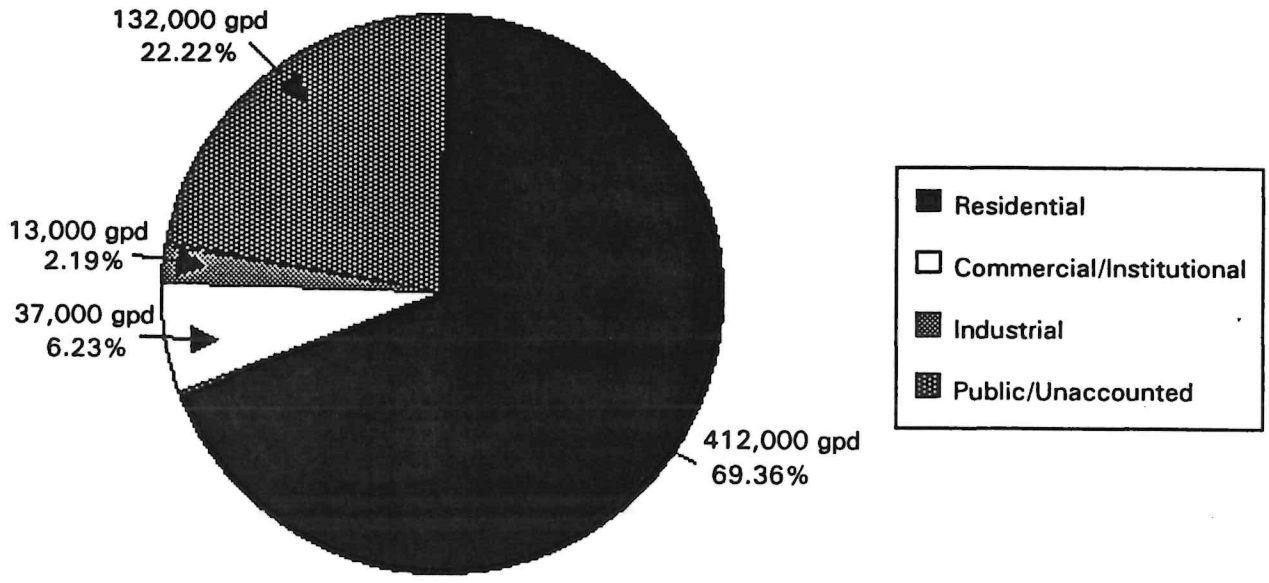


FIGURE 28

BULLOCK PEN WATER SERVICE AREA: 2010

Average Usage with Moderate Plumbing Code (gpd)



Comments: Moderate Plumbing Code results in a 3.4% reduction in total usage.

FIGURE 29

BULLOCK PEN WATER SERVICE AREA - 2020
Average Usage (gpd)

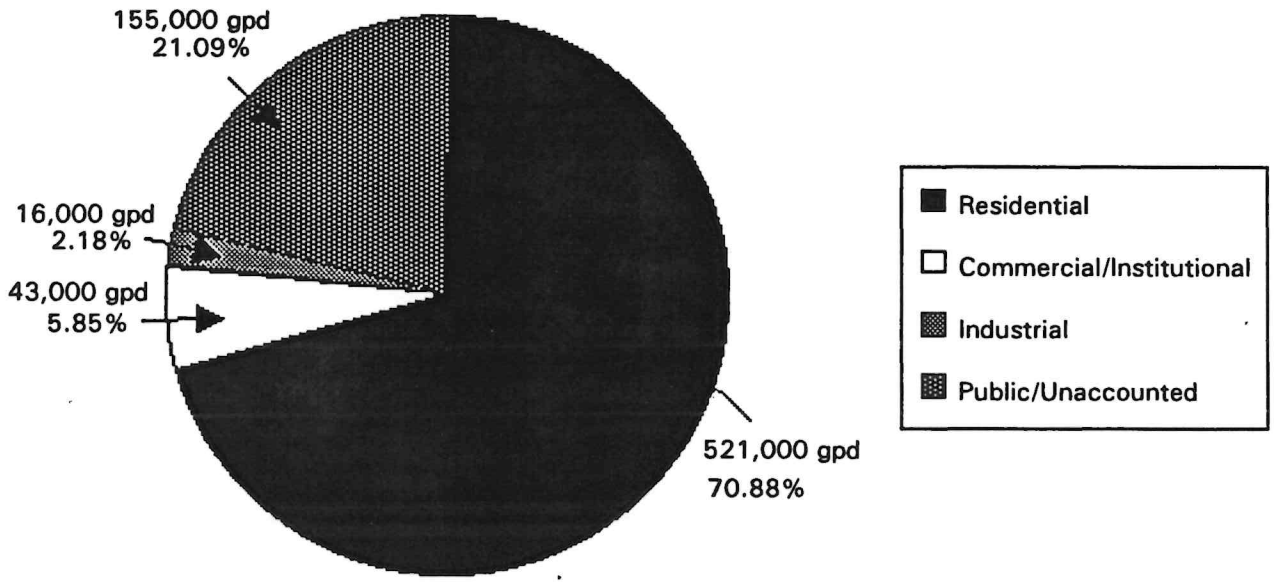
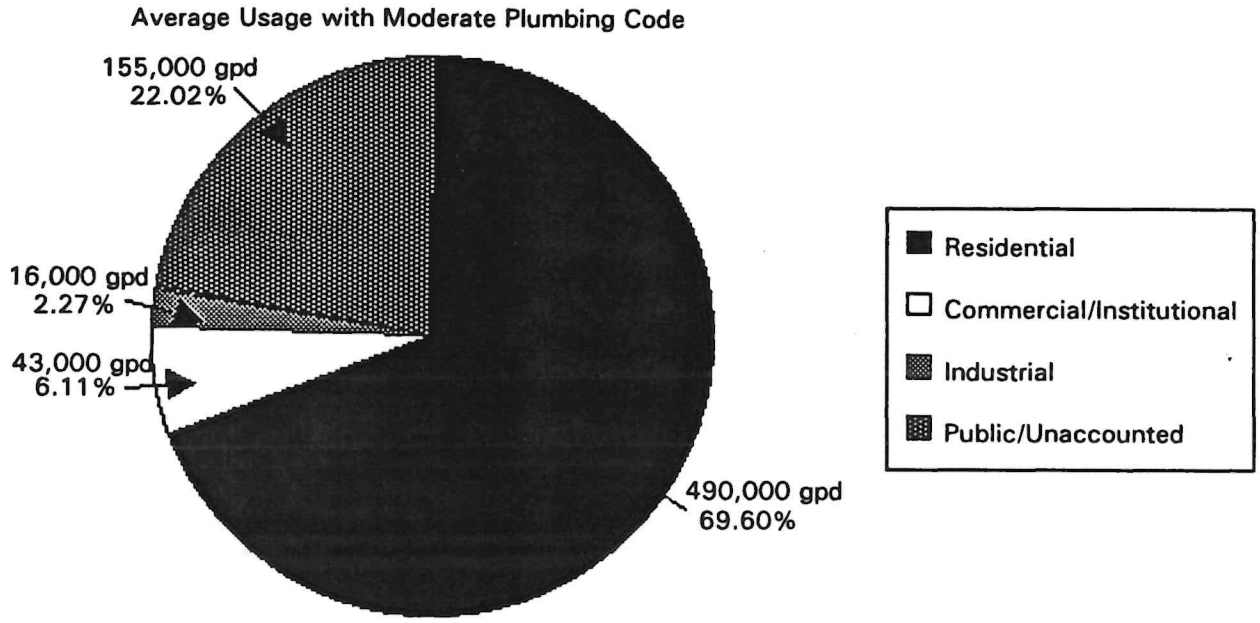


FIGURE 30

BULLOCK PEN WATER SERVICE AREA: 2020



Comments: Moderate Plumbing Code results in a 4.2% reduction in total usage.

C. Infrastructure Assessment

This section provides a general assessment of the infrastructure and treatment capacity, if applicable, of the major water suppliers and distributors in Boone County. Map 4 shows the areas served by the major supplier and distributors as well as planned expansions. No information is available about the infrastructure of the small suppliers (Arlinghaus, Birkle, Trapp, Rauh, and Hillside Trailer Park).

Kenton Water District No. 1 (KCWD)

Kenton County currently has a treatment capacity of 43 MGD, with a capacity of 10 MGD at the Licking River water treatment plant, and 33 MGD at the Fort Thomas Ohio River water treatment plant. However, a planned expansion will result in a treatment capacity of 54 MGD. Figure 31 compares the current and planned treatment capacity with the demand for water as forecast by IWR-MAIN. While it would appear that 54 MGD would be adequate during the planning period, KCWD's engineers estimate that demand will exceed treatment capacity by 2005. Please note, as mentioned previously, IWR-MAIN has proved to be very accurate in the Boone-Kenton water service area with regard to average usage; however, projected maximum day usage was quite a bit below actual maximum day usage. Therefore, it would be advisable to use KCWD's own projections regarding the exceeding of planned treatment capacity.

KCWD has a storage capacity of 26.5 MG at locations noted previously and system storage is considered adequate. The Water District has 60 miles of transmission mains and 399 miles of distribution mains. Water losses are currently estimated at less than 10 percent. The system is metered. According to the survey completed by KCWD, there is no single user that purchases 20 percent or more of the water produced.

There are no accessibility problems related to intake elevation or pump capacity.

Bullock Pen Water District

Bullock Pen Water District currently has a treatment capacity of 750,000 GPD which is also the permit limit for withdrawal from Bullock Pen Lake. The Water District currently purchases 100,000 GPD from the City of Walton and can purchase up to 500,000 GPD from the City of Williamstown. Figure 32 compares treatment capacity and forecasted water demand. Obviously, treatment capacity is inadequate for the planning period, and as noted previously, IWR-MAIN estimates are somewhat low for this water service area. Currently, average demand is 500,000 to 600,000 GPD. Keeping this in mind, it is probably best to use the maximum day forecasted usage. However, a combination of treated and purchased water appear adequate to meet future demand during the planning period. It should be noted that draft portions of the consolidation study state that demand will exceed available supply from all sources by 1998.

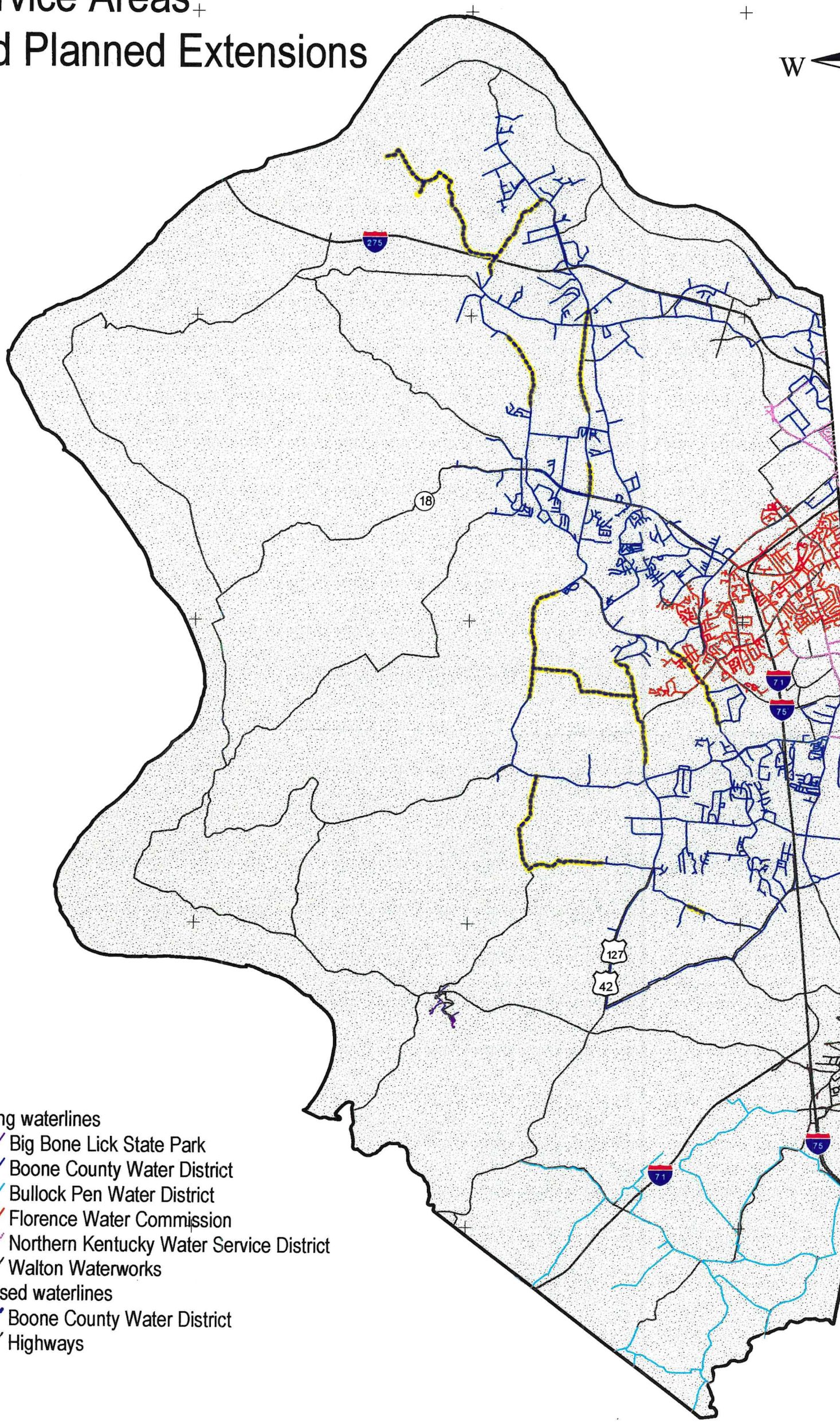
Bullock Pen Water District has a storage capacity of 744,000 gallons with locations noted previously. This would appear to be adequate at the current time. The Water District has 150

MAP 4:
Service Areas and Planned Extensions

1470000 1500000 1530000

600000 570000 540000 510000 480000 450000

N W E S



Existing waterlines
- Big Bone Lick State Park
- Boone County Water District
- Bullock Pen Water District
- Florence Water Commission
- Northern Kentucky Water Service District
- Walton Waterworks

Proposed waterlines
- Boone County Water District

Highways

2 0 2 4 Miles

scale 1:126720
1 inch = 2 miles
This map is intended for planning purposes only.
NKADD
Jeffrey Burt
1/00

FIGURE 31

Boone-Kenton Water Service Area: Treatment Capacity Vs. Forecast Water Use

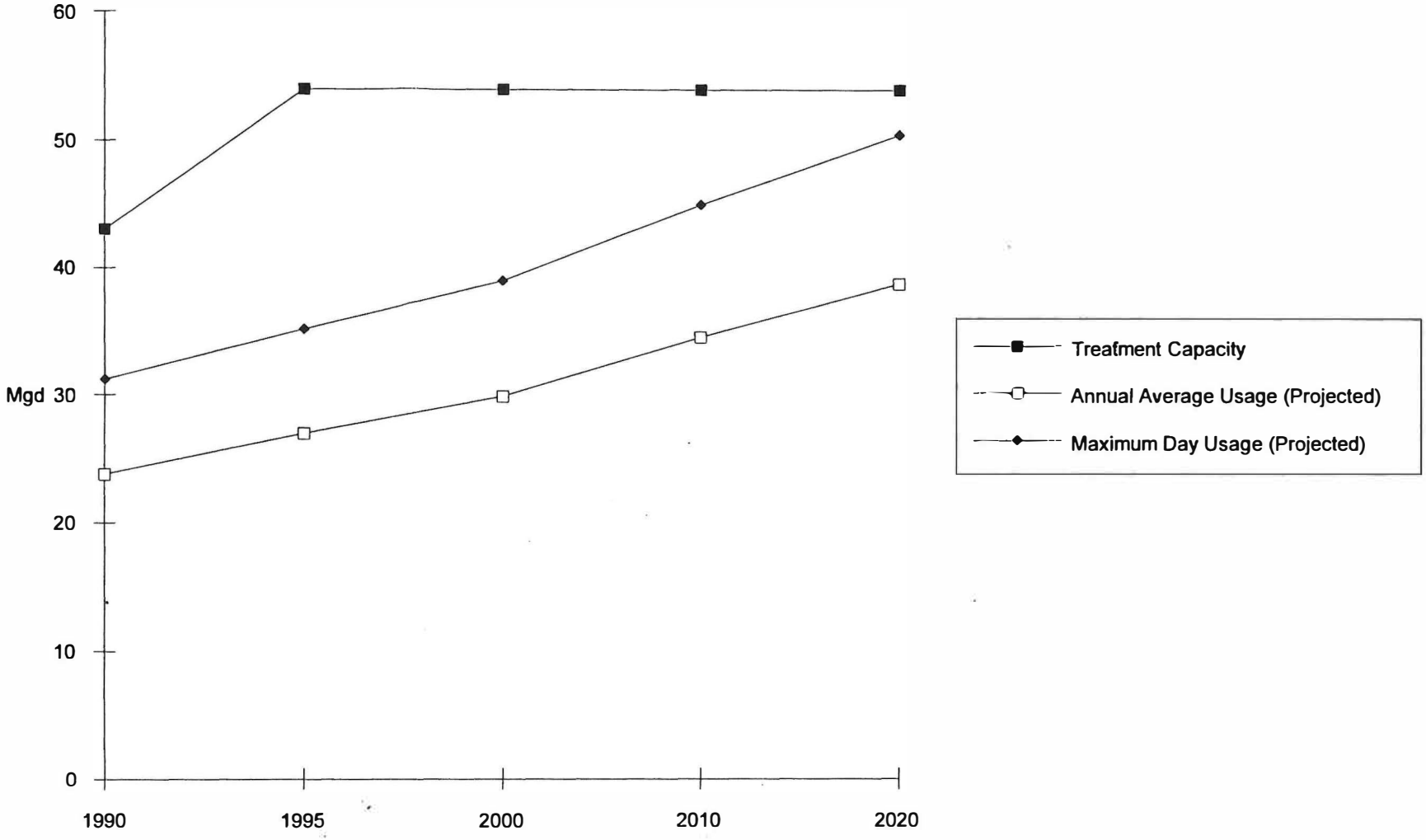
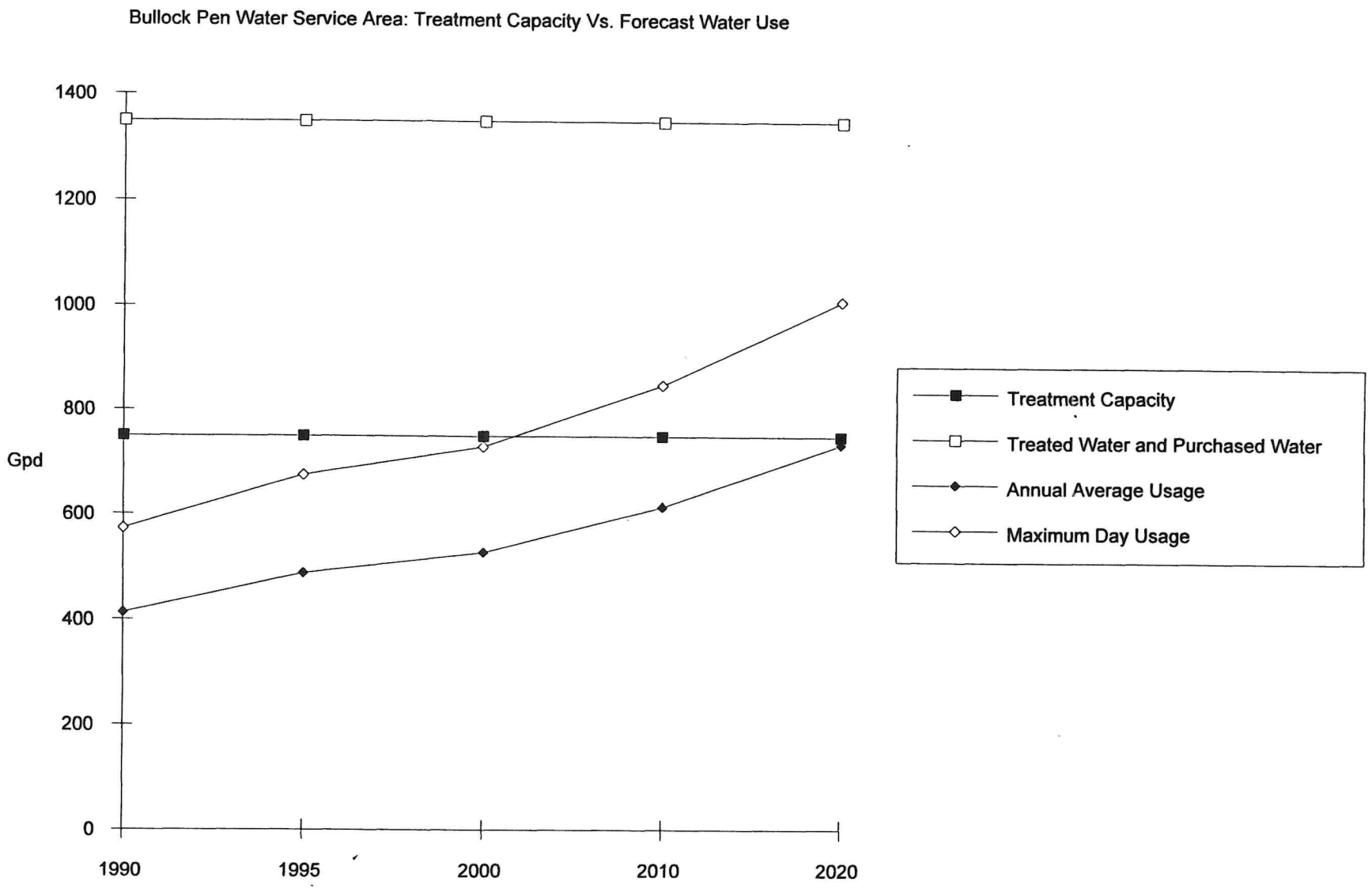


FIGURE 32


Bullock Pen Water Service Area: Treatment Capacity Vs. Forecast Water Use
1400
1200
1000
800
600
400
200
0
Gpd
1990
1995
2000
2010
2020
Treatment Capacity
Treated Water and Purchased Water
Annual Average Usage
Maximum Day Usage

miles of distribution mains. Water losses are estimated at 10 percent. The system is metered. The Water District did not identify any single user that purchases 20 percent or more of the water produced.

There are no identified accessibility problems related to intake elevation or pump capacity.

Boone County Water District

The Water District has 95 miles of transmission mains and ~~121~~ miles of distribution mains. Storage capacity is 600,000 gallons at locations noted previously. This would provide less than one day of average demand (2.6 MGD in 1991 or a five-year average of 2.3 MGD). There are plans to increase storage capacity by 2 to 3 million gallons. Unaccounted-for water is approximately ~~12~~ percent. The system is metered. Expansion of transmission and distribution mains is also planned as major growth is expected in the service area.

Florence Water & Sewer Commission

The Florence Water & Sewer Commission has ~~5~~ miles of transmission mains and ~~41~~ miles of distribution mains. Storage capacity is ~~1.7 MG~~ at locations noted previously. ~~This is less than the average 2.3 MGD usage.~~ Unaccounted-for water averages ~~8~~ percent. The system is metered.

Walton Water Works

Walton has 600,000 gallons of storage at locations noted previously, which is more than adequate to meet the base year average usage of ~~242,000~~ GPD. The mileage of mains and the percentage of unaccounted-for water were not available. The system is metered.

CHAPTER 6
WATER SUPPLIER SOURCE ASSESSMENT

I. INTRODUCTION

Water suppliers in Boone County obtain water from a variety of sources including rivers, lakes, ponds, and groundwater. This chapter is an assessment of the amount of water available to suppliers under normal and drought conditions.

Soils and Geologic Characteristics

It is important to summarize the soils and geologic characteristics of Boone County as these affect infiltration rates and groundwater flow. According to the Soil Survey of Boone, Campbell, and Kenton Counties, there are four major soil associations in Boone County: Eden-Cynthiana (31% of acreage), Faywood-Nicholson (22% of acreage), Rossmoyne-Jessup (40 % of acreage), and Wheeling-Huntington-Alluvial (7% of acreage). Appendix C has a general soils map of the county.

The Eden-Cynthiana association is characterized by dominantly steep to very steep soils that have a clayey subsoil. This association is generally found on limestone and shale uplands. Faywood-Nicholson soils are dominantly gently sloping to moderately steep with a loamy to clayey subsoil and are found on ridgetops and side slopes of limestone and shale uplands. The Rossmoyne-Jessup association is characterized by nearly level to moderately steep soils that have a loamy to clayey subsoil and are found on ridgetops and side slopes of glaciated uplands. Finally, Wheeling-Huntington-Alluvial soils are dominantly nearly level and gently sloping with a loamy subsoil. These soils are found in stream terraces, first bottoms, and moderately steep to steep areas of variable textured alluvium.

Groundwater in Boone County comes from two aquifers, an alluvial aquifer and an ordovician limestone aquifer according to the report State of Kentucky's Environment: A Report of Progress and Problems.

II. SOURCE ASSESSMENT

Kenton County Water District No. 1

Kenton County's sources include the Ohio River and the Licking River. Permitted withdrawal from the Ohio River is 33 MGD. Permitted withdrawal from the Licking River is 11 MGD. As a result of water sales to Boone County distributors, these sources supply approximately 79 percent of Boone County's housing units and virtually all commercial and industrial users as well.

These sources are assumed to be more than adequate to meet current and future demand. Table 1 summarizes source availability for the county. According to Division of Water staff, 7Q10 and 7Q20 data is not available for any locations near source intakes on the Ohio and Licking Rivers; however, these sources are automatically assumed to be adequate.

BCWD
Permitted water withdraw #Boone Co + Florence
up to 30 mil v til 2025
per day

Boone Co.
Source assessment

TABLE 1: SOURCE AVAILABILITY

PUBLIC WATER SUPPLIER	SOURCE	SOURCE TYPE	NORMAL/1	MINIMUM/2	DROUGHT/3
Kenton Co. Water Dist. No. 1	Ohio River	Stream	Adequate	Adequate	Adequate
	Licking River	Stream	Adequate	Adequate	Adequate
	Mainstem				
Bullock Pen Water District	Bullock Pen Lake	Reservoir	803,264,000 gal	Not Available	Not Available
Arlinghaus Properties	Well	Groundwater	Unknown	Unknown	Unknown
Birkle Water Supply	Well	Groundwater	Unknown	Unknown	Unknown
Rauh Water Supply	Well	Groundwater	Unknown	Unknown	Unknown
Trapp Water Company	Well	Groundwater	Unknown	Unknown	Unknown
Hillside Trailer Park	Ponds	Reservoir	Unknown	Unknown	Unknown
Notes	Streams	Reservoirs	Groundwater Wells		
/1	Lowest Flow Month	Full Reservoir	Specific Capacity		
/2	7Q10	7Q10 Inflow	Specific Capacity		
/3	7Q 20	7Q20 Inflow	Safe Yield		

Bullock Pen Water District

Bullock Pen Water District's source is Bullock Pen Lake which is an impoundment of Ten Mile Creek. Bullock Pen Lake has a eight square mile watershed and a normal pool volume of 2,464 acre feet or 803,264,000 gallons. Bullock Pen has a withdrawal permit of 750,000 gallons per day and an average usage of 600,000 gallons per day. In the drought of 1988-1989, the level of water in the lake did drop to only 24 inches which was a source of concern. However, Bullock Pen Water District is not listed as one of Kentucky's drought vulnerable public water systems, undoubtedly as it has access to other sources as described in the next chapter.

According to minimum standards set forth in water supply planning regulations, Bullock Pen Lake will be an adequate source until somewhere between 2010 and 2020 using annual average unrestricted use as forecast by IWR-MAIN. Calculations for minimum adequacy are shown below.

Bullock Pen is a reservoir with a small contributing watershed of less than ten square miles. Such a reservoir would be considered an inadequate source of supply if the available volume at normal pool provides less than two hundred (200) days of supply at the average rate of water use.

Bullock Pen Lake Normal Pool Volume: 803,264,000 gallons
Bullock Pen Water District Average Usage: 600,000 gallons per day
Number of Days to Deplete Source: 1,338
Number of Days to Deplete Source Using Maximum Permitted Withdrawal: 1071

While Bullock Pen Lake meets minimum adequacy standards, the Water District has contracted with the City of Walton for 100,000 gallons per day and the City of Williamstown for up to 500,000 gallons per day. Additional water sources are needed to meet actual peak demand and also to provide a buffer. Currently, the Water District plans to meet future needs by purchasing more water.

Table 1 summarizes source availability. 7Q10 and 7Q20 inflow data was not available.

Small Water Suppliers

Birkle Water Supply, Rauh Water Supply, Trapp Water Company, and Arlinghaus Properties (Belleview Bottoms Apts.) all rely on groundwater. Each of these suppliers is located in the alluvial aquifer. Each of these suppliers uses very small quantities of water, less than 10,000 gpd. These suppliers, as mentioned earlier, are small non-growth systems that sell water to water haulers and/or deliver water themselves. The amount of water used is expected to decline for two reasons. First, anticipated growth in the county will occur in areas served by the large suppliers and distributors. These growth patterns are encouraged and shaped by both the Boone County Comprehensive Plan and the Boone County Zoning Ordinance. For example, the Comprehensive Plan encourages development only in areas served by adequate infrastructure. Second, Boone County has been working towards extending waterlines and other infrastructure where possible.

Because of the small size of these suppliers, there is no existing data regarding safe yield, specific capacity, zone of contribution, or zone of influence. No pump tests or hydrologic studies have been completed nor are anticipated. Given the small quantity of water used by these suppliers, it is not considered financially feasible to conduct such tests or studies at this time.

The alluvial aquifer that these suppliers rely on is considered to be more than adequate to meet anticipated demand. Generally, well yields from this aquifer are quite high.

Hillside Trailer Park relies on two surface water ponds. Reservoir size, 7Q10 and 7Q20 inflow are unknown (Table 1). Water quality has been an issue with this supplier and is discussed further in Chapter 8.

Map 5 shows the water supply sources with contributing watersheds.

MAP 5

685 690 695 700 705

4335 4330 4325 4320 4315 4310 4305 4300 4295

I-275

Francisville

Taylorsport

Idlewild

Bullittsville

Petersburg

Hebron

Constance

I-275

Burlington

I-71
I-75

Belleview

McVille

Union

Rabbit Hash

Richwood

Beaverlick

Verona

I-75

I-71

2 — Birckle Water Supply
5 — Trapp Water Supply
6 — Belleview Bottoms Apts.
8 — Rauh Water Supply
★ County Seat
Watersheds represented by separate colors

BOONE COUNTY, KENTUCKY

WATER SUPPLIER SOURCE MAP

Scale: 1 inch = 2 miles (1:126720)

Map produced with GRASS GIS software by:
USDA Natural Resources Conservation Service
Burlington, KY

CHAPTER 7
WATER SUPPLY ADEQUACY

I. Adequacy Standards

The Boone County Water Supply Planning Council chose to plan for provision of a continuous level of supply under all conditions and to encourage conservation where possible as a part of the goals and objectives. The rationale behind this decision was based on the fact that roughly 90 percent of the county's public water users are served by suppliers and distributors that rely on the Ohio River and the mainstem of the Licking River. These sources are more than adequate and are not considered drought-vulnerable.

II. Application of Adequacy Standards

Kenton County Water District No. 1

The Kenton County Water District No. 1, which wholesales water to all the county's distributors, relies on the Ohio River and the mainstem of the Licking River. These sources are considered to be more than adequate to meet current and future demand and are not drought-vulnerable. The magnitude of these sources is such that permitted withdrawals do not impact other users or aquatic life.

As mentioned previously (refer to Infrastructure Assessment), treatment capacity is the primary concern rather than supply adequacy. Supply will meet demand through the duration of the planning period.

Bullock Pen Water District

The Bullock Pen Water District withdraws water from Bullock Pen Lake and purchases water from the Cities of Walton and Williamstown. These multiple sources impact the application of adequacy standards. While forecast demand would reach permitted withdrawal allowances by 2020, the combination of purchased and treated water is more than adequate to meet future demand (refer to Infrastructure Assessment, Figure 32).

Small Water Suppliers

Supply is considered to be more than adequate to meet future demand. However, the Water Supply Planning Council has concluded that small water suppliers may not remain economically feasible given their minimal usage and increasing regulatory requirements.

Other Concerns

Regionalization of the public water suppliers in Boone, Campbell, Kenton, northern Grant, and northern Pendleton Counties is currently being considered in a concurrent study. This study is

considering the feasibility of merging the multitude of water suppliers and distributors in the area and the mechanisms for doing so.

Another concern raised throughout the planning process is the continued growth and development in Boone County. Boone County distributors want assurances that treatment capacity will keep pace with demand.

CHAPTER 8
SUPPLY PROTECTION

This chapter evaluates the risk of contamination and degradation from both point and non-point sources of pollution for each water supply source. The impact of soil and geologic characteristics on supply protection are also considered. After evaluating risks, local supply protection measures are described and additional supply protection recommendations are made.

A. RISKS

Contamination of the water supply can come from both point and non-point sources. Point source pollution comes from a specific location such as a single pipe. An example would be a wastewater treatment plant. In contrast, non-point source pollution, which contributes 50 percent or more of the nation's water pollution, is diffuse, resulting from a range of human activities over a wide geographic area. Non-point source pollution can be generated by agriculture, urban development, aging and poorly maintained septic systems, construction sites, roads and parking lots, lawns treated with pesticides and fertilizers, mining, and a variety of other sources. Unlike point source pollutants which enter the environment at well-defined locations and in relatively even discharges, nonpoint source pollutants usually enter surface water and groundwater through surges associated with rainfall, thunderstorms, or snowmelt.

Ohio and Licking Rivers

The Ohio and Licking Rivers are the water supply sources for the Kenton County Water District No. 1. As mentioned previously, primarily as a result of wholesaling to Boone County distributors, these sources account for most of the water consumed in the planning unit.

When evaluating the risk of contamination for these sources, it is necessary to be rather general because the Ohio River runs through a very large geographic area. There are many urban concentrations, industrial activities, and other potential sources of contamination located upstream of the Kenton County Water District's intakes. Table 2 summarizes the potential sources of point and non-point pollution for the Ohio River and the Licking River Mainstem.

Point Sources

Municipal wastewater treatment plants represent a long-term hazard with a fairly high risk of contaminant release; however, the contaminants are relatively easy to treat. The water quality standards most often exceeded by wastewater treatment plants are processing less than 1 mgd) are usually those with the greatest percentage of water quality violations. While federal grants to upgrade wastewater treatment plants have steadily declined, Kentucky has a wastewater revolving loan fund which will help local governments address and improve their

OHIO AND LICKING RIVERS: POTENTIAL SOURCES OF CONTAMINATION						
TABLE 2						
SOURCES OF POLLUTION		**Short-Term Vs. Long-Term Hazard**		**Chance of Contaminant Release**		**Contaminant Hazard**
Point						
Wastewater Treatment Plants		Long-Term		High		Low to Moderate
Combined Sewer Overflows		Short-Term		Moderate to High		Low to Moderate
Industrial/Toxics		Long-Term		Low to Moderate		Moderate to High
Non-Point						
Agriculture		Long-Term		High		Moderate to High
Urban Activities		Long-Term		High		High
Mining		Long-Term		Moderate to High		Moderate to High
Septic Tanks		Long-Term		Low to Moderate		Low
Construction		Short-Term		Low to Moderate		Low

wastewater infrastructure. An additional threat from wastewater treatment plants comes from the processing of industrial wastes. Although many municipal wastewater treatment plants have instituted pretreatment programs requiring industries to pretreat waste prior to discharge into the sewer system, these programs are only effective if properly implemented and enforced.

Combined sewer overflows, found in many older cities, are another potential source of pollution. In periods of heavy rain, such systems may overflow discharging raw sewage. According to the Ohio River Valley Sanitation Commission (ORSANCO), more than 10 percent of all combined sewer overflows in the U.S. are located in the Ohio River Valley. There is a state strategy, recently approved by the U.S. EPA, to bring these discharges into compliance with water quality standards which should help minimize pollution impacts.

Industrial discharges represent another point source of pollution. However, risk is relatively low as Division of Water (DOW) permits help control discharges. It is estimated that industrial discharges across the state contribute only 3 percent of the water pollution problems, down from 25 percent in 1982.

Non-Point Sources

There are many non-point sources of pollution which contribute to the degradation of water quality of the Ohio River. Agricultural activities are a long-term hazard with a high chance of contaminant release; however, the degree of hazard varies. Agricultural activities, through the erosion of topsoil, animal waste, and chemical residues, contribute a variety of pollutants including, but not limited to: sediment, nitrates, phosphorus, pesticides, and bacteria.

Perhaps the biggest threat to the water quality of the Ohio River in the planning area is urban activities. With the large urban concentrations of Cincinnati, Covington, and Newport, urban run-off from streets, parking lots, and storm sewers contributes oil and grease, arsenic, solid waste, gasoline, and many other substances. Urban run-off is a long-term hazard with a high chance of contaminant release. The contamination hazard may also be high depending on the pollutant. Urban run-off is suspected of being responsible for fish consumption advisories in effect since 1990 along the Ohio River for the entire length of Kentucky. Catfish and White Bass have been found to contain high levels of PCBs and chlordane.

Although there are extremely limited mining activities in or adjacent to the planning area, mining upstream, including mineral extraction and oil and gas, contributes to the degradation of water quality of the Ohio River.

Aging septic tanks, improper sewage disposal, and open dumps in non-urban areas also pose a threat to water quality. Improper sewage disposal and aging septic tanks can contribute bacterial pollution to the water supply. However, state regulations adopted in 1985 to ensure proper installation and operation of sewage disposal systems should help to minimize this problem in the future. Open dumps can contribute a variety of pollutants. State and local efforts, including the formation of the Northern Kentucky Solid Waste Management District, have encouraged the

clean-up of such sites.

Finally, construction activities can produce run-off that contributes to the degradation of water resources, although the extent of the impact is difficult to determine. Many communities have addressed this problem through erosion control ordinances, regulations and agreements to reduce run-off including Boone and Kenton Counties. However, given the size of the Ohio River Basin, construction activities undoubtedly impact the quality of water to some extent.

The soils and geologic characteristics of the Ohio River Basin as they relate to possible contamination risks will not be considered because of the large geographic area.

Bullock Pen Lake

Bullock Pen Lake, the water source for the Bullock Pen Water District, is a 134 acre man-made reservoir owned and managed by the Kentucky Department of Fish and Wildlife Resources. There are no public recreational facilities and the area is a nature preserve. The only recreational use is fishing. Motorboats are limited to 10 HP or less. A 1991 assessment of 102 public lakes in Kentucky conducted by the Division of Water found that Bullock Pen Lake fully supported all its uses and was not impaired.

Point Sources

There are no known point source discharges to the lake.

Non-Point Sources

There is little development in the watershed surrounding the lake; however, the limited residential and agricultural uses may pose a slight threat. Another potential source of non-point pollution is Interstate 75 which is located in the watershed. Run-off from the Interstate could possibly be polluted with motor oil, gasoline, road salt, or herbicides (from roadside spraying). Tankers traveling the highway carrying hazardous waste are also a potential threat if an accident occurred. Table 3 shows potential sources of non-point source pollution. Residential development refers to potential sources of pollution that may be associated with residential land use such as lawn care chemicals and improper disposal of household chemicals.

BULLOCK PEN LAKE : POTENTIAL SOURCES OF CONTAMINATION						
TABLE 3						
SOURCES OF POLLUTION		**Short-Term Vs. Long-Term Hazard**		**Chance of Contaminant Release**		**Contaminant Hazard**
Septic Tanks		Long-Term		Low to Moderate		Low
Residential Development		Long-Term		Low		Low to Moderate
Agriculture		Long-Term		Low		Low to Moderate

Soils

A review of the soil survey shows the primary soil in the watershed is Eden silty clay loam (EdE2) which is well-drained with a loamy to clayey surface layer and a clayey lower subsoil. Permeability of the soil is categorized as moderately slow to slow with a permeability of less than two inches per hour. Generally, therefore, it is assumed that potential contaminants would not be transferred very quickly from the site of initial pollution. A general soils map can be found in Appendix C.

Hillside Trailer Park

The Hillside Trailer Park has a pond that serves as a water source for residents. The park is served by an aging package treatment plant.

Point Sources

There are no known point sources of pollution.

Non-Point Sources

Potential sources of contamination include residential development, agriculture, and the package treatment plant (Table 4). Fecal coliform contamination has been a serious problem in the past.

Soils

The dominant soil is Licking silty clay loam (LIC) which has a very slow permeability of between .20 and .63 inches per hour and therefore, potential contaminants would not move very quickly through the soil.

Birkle and Rauh Water Suppliers, Trapp Water Company and Arlinghaus Properties (Belleview Bottoms)

Each of these suppliers relies on groundwater and all are located along the Ohio River.

Point Sources

There are no know point sources of pollution.

Non-Point Sources

Potential sources of contamination include septic tanks, residential development, and agriculture (Table 5). None of the wells are located in areas served by a sewer system. Residential land use is the most likely source of contamination; however, the density of development is low. Rauh Water Supply has more agricultural and less residential land use in the vicinity than the rest.

HILLSIDE TRAILER PARK : POTENTIAL SOURCES OF CONTAMINATION						
TABLE 4						
SOURCES OF POLLUTION		**Short-Term Vs. Long-Term Hazard**		**Chance of Contaminant Release**		**Contaminant Hazard**
[illegible]						
Residential Development		Long-Term		Low		Low to Moderate
Agriculture		Long-Term		Low		Low to Moderate
Package Treatment Plant		Long-Term		Moderate to High		Low to Moderate

BIRKLE AND RAUH WATER SUPPLY, TRAPP WATER CO. , AND BELLEVIEW BOTTOMS : POTENTIAL SOURCE						
TABLE 5						
SOURCES OF POLLUTION		Short-Term Vs. Long-Term Hazard		Chance of Contaminant Release		Contaminant Hazard
Non-Point						
Septic Tanks		Long-Term		Low to Moderate		Low
Residential Development		Long-Term		Low		Low to Moderate
Agriculture		Long-Term		Low		Low to Moderate

Soils

The predominant soil in the vicinity of Birkle Water Supply is Ashton silt loam (AsA) which is a nearly level soil found along stream terraces. Permeability is moderately slow to slow with a permeability of .63 to 2.00 inches per hour.

For both Trapp Water Company and Arlinghaus Properties (Belleview Bottoms Apartments), the predominant soil is Lakin loamy fine sand (LaC) which is typically found along stream terraces. Permeability is classified as high with a permeability of greater than 6.30 inches per hour. Therefore, potential contaminants could be transported quite quickly from the site of initial pollution.

Wheeling silt loam (WhB), a soil typically found along stream terraces, is the predominant soil in the vicinity of Rauh Water Supply. Permeability is moderately slow to slow at .63 to 2.00 inches per hour.

Map of Potential Sources of Contamination

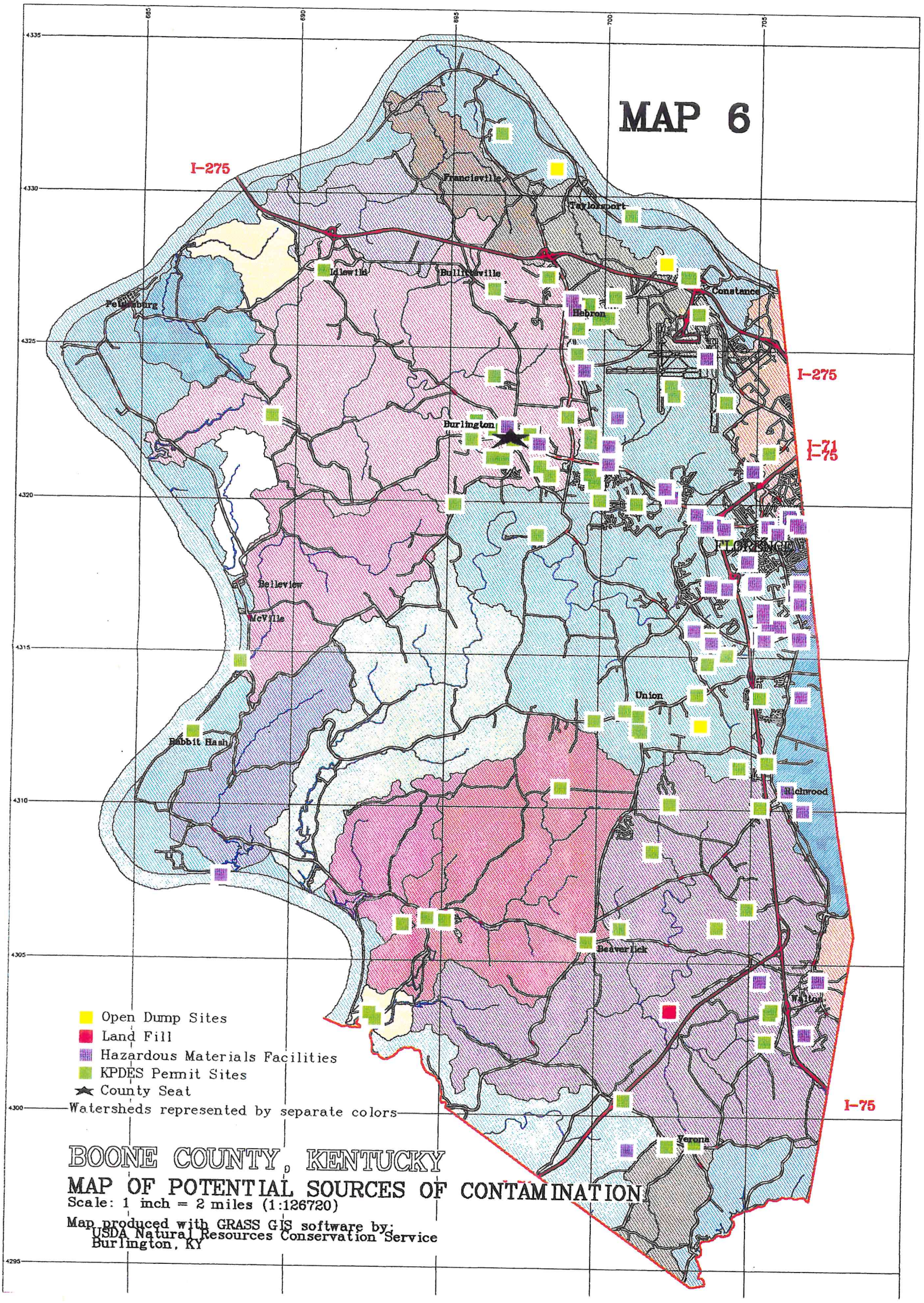
Map 6 shows the potential sources of contamination to the water supply in Boone County. Fortunately, none of the potential contaminants are located near water supplier wells. Hillside Trailer Park does have a package plant for sewage disposal located down gradient from its water source. However, this should not represent a problem and in fact, is preferable to aging individual septic systems.

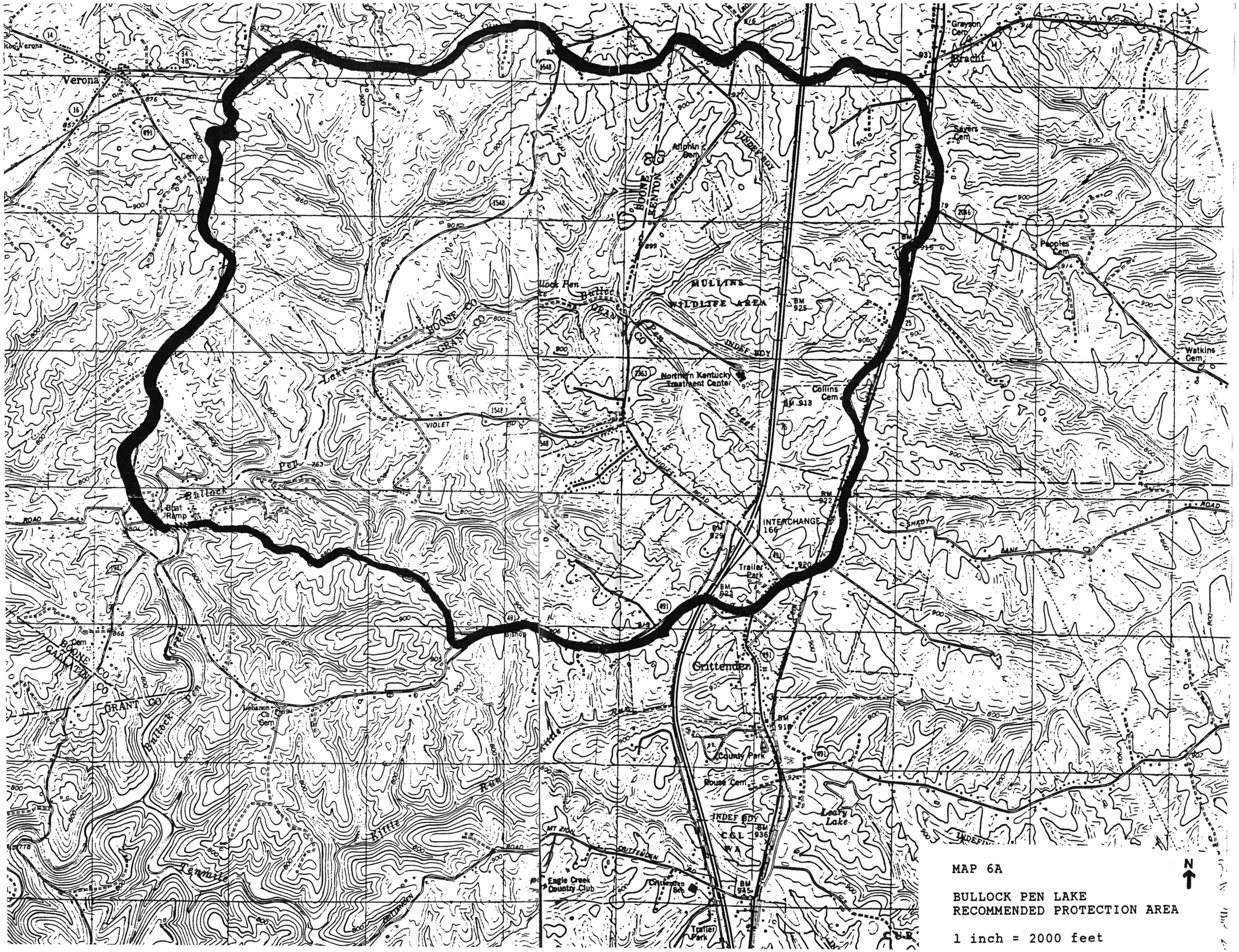
Boone County has considerable industrial development and many firms that use hazardous materials in their manufacturing processes. However, all of them are located in areas served by public water systems.

There is one landfill in the County and two open dumps. None of them impact water supply sources. According to the Northern Kentucky Solid Waste Management District, the open dumps are scheduled for clean-up.

Please note that underground storage tanks (USTs) are not noted on the map of potential contaminants. As per a conversation with Division of Water staff, it was agreed that the addition of all USTs would make the map illegible. Therefore, only those USTs located in the vicinity of Boone County water suppliers would be mapped. Fortunately, there are no known USTs adjacent to or in the vicinity of area water suppliers.

Maps 6A through 6F show the recommended protection areas for Boone County water suppliers at topographic map scale. For surface water sources, the recommended protection area is the watershed. Please note that there is no map showing the recommended protection area for the Ohio River as the area is simply too large.


MAP 6
I-275
Francisville
Taylorsport
Idlewild
Bullittsville
Petersburg
Hebron
Constance
I-275
I-71
I-75
Burlington
FLORENCE
Bellevlew
McVille
Rabbit Hash
Union
Richwood
Beaverlick
Walton
Verona
I-75
685
690
695
700
705
4335
4330
4325
4320
4315
4310
4305
4300
4295
Open Dump Sites
Land Fill
Hazardous Materials Facilities
KPDES Permit Sites
County Seat
Watersheds represented by separate colors
BOONE COUNTY, KENTUCKY
MAP OF POTENTIAL SOURCES OF CONTAMINATION
Scale: 1 inch = 2 miles (1:126720)
Map produced with GRASS GIS software by:
USDA Natural Resources Conservation Service
Burlington, KY



MAP 6A

BULLOCK PEN LAKE
RECOMMENDED PROTECTION AREA

1 inch = 2000 feet

N

MAP 6B

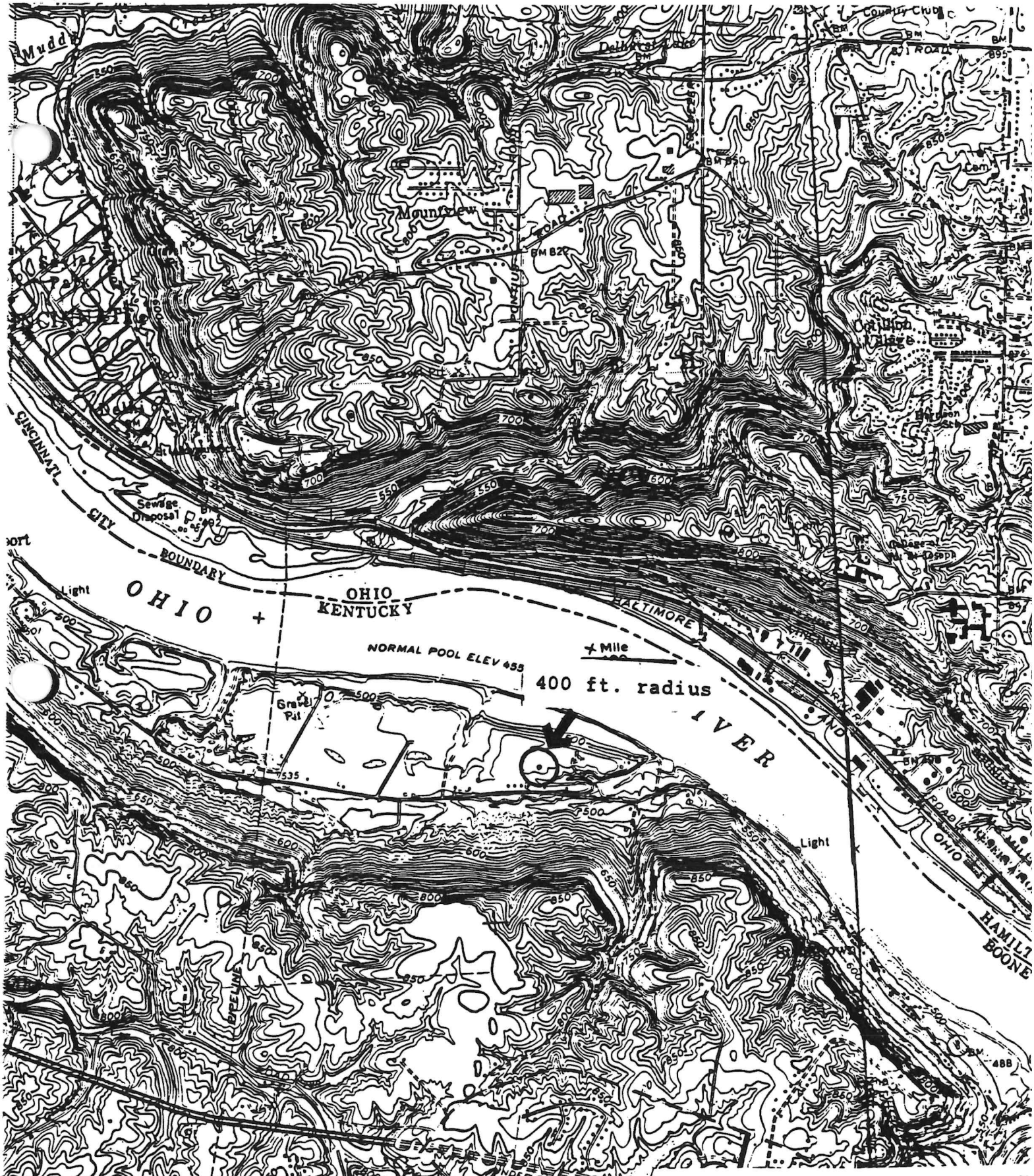
HILLSIDE TRAILER PARK
RECOMMENDED PROTECTION AREA

1 inch = 2000 feet

N

T
OF 1929

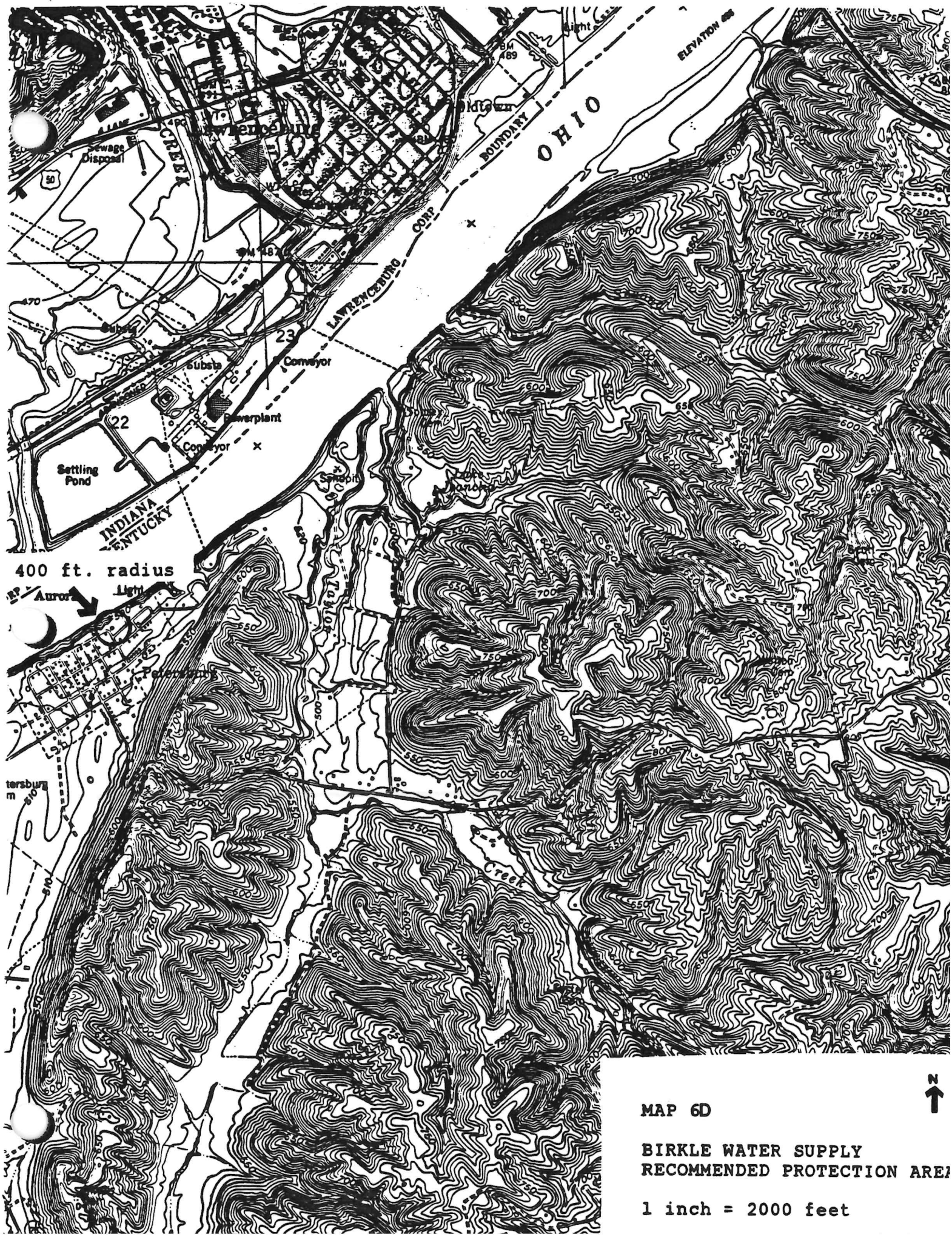
8-12



MAP 6C

RAUH WATER SUPPLY
RECOMMENDED PROTECTION ARE

1 inch = 2000 feet



MAP 6D

BIRKLE WATER SUPPLY
RECOMMENDED PROTECTION AREA

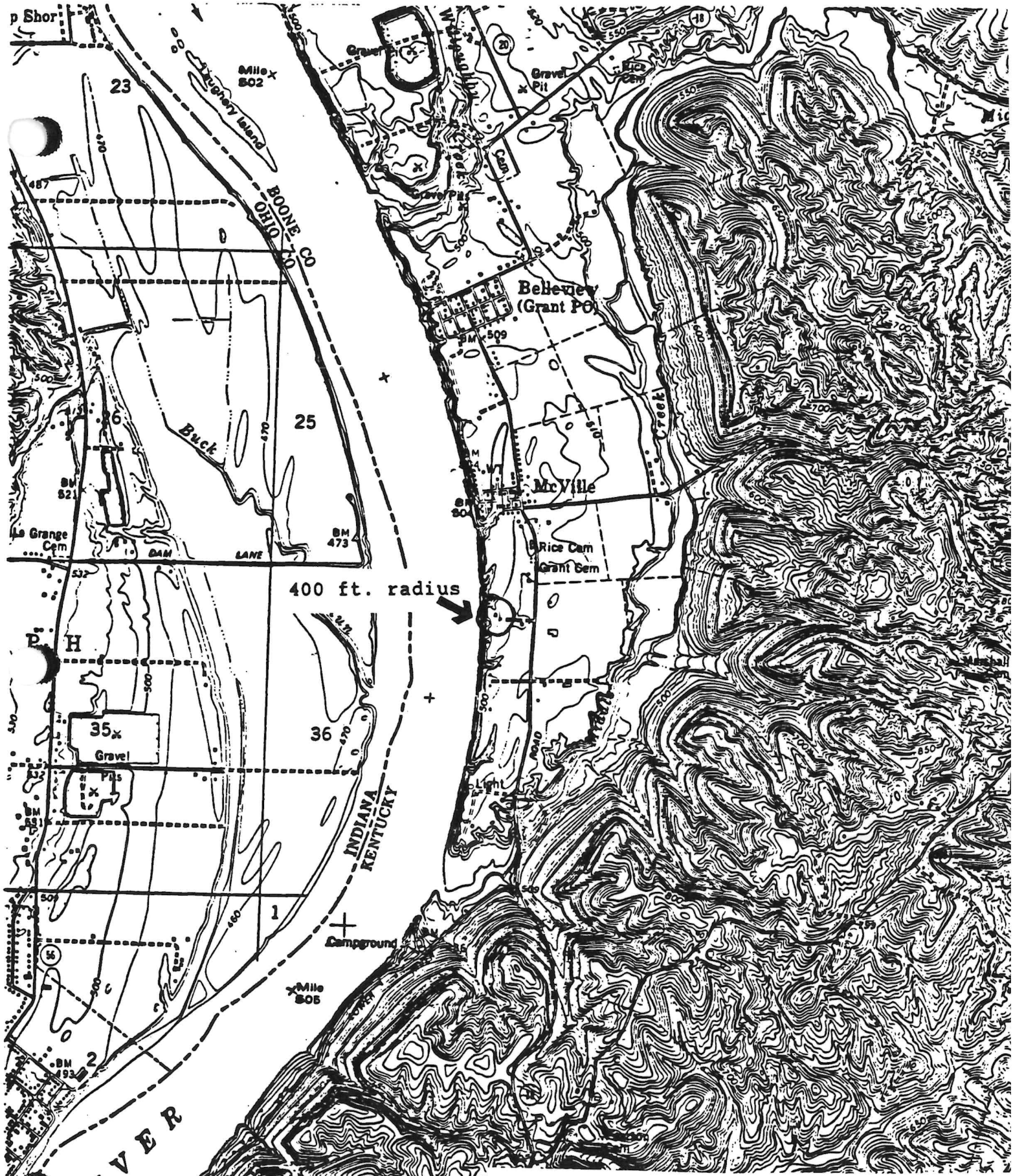
1 inch = 2000 feet

N

MAP 6E

TRAPP WATER SUPPLY
RECOMMENDED PROTECTION ARE

1 inch = 2000 ft.



MAP 6F

ARLINGHAUS PROPERTIES (Belleview Botton
RECOMMENDED PROTECTION AREA

Conclusions

While Boone County's small water suppliers are not currently facing severe threats from potential contaminants, the Water Supply Council feels that regulatory requirements are likely to force these suppliers out of business. As mentioned previously, these suppliers are using less than 10,000 gpd.

B. PROTECTION

The primary focus of this section is on local, rather than state and federal, regulatory and nonregulatory measures to protect Boone County's water supply. However, as most of Boone County relies on the Ohio River as its water supply source, it is appropriate to highlight the Ohio River Valley Sanitation Commission (ORSANCO) and its role in supply protection.

ORSANCO

ORSANCO is an interstate water pollution control commission created jointly in 1948 by the State of Illinois, the State of Indiana, the Commonwealth of Kentucky, the State of New York, the State of Ohio, the Commonwealth of Pennsylvania, the Commonwealth of Virginia, and the State of West Virginia. It is dedicated to improving the water quality of the Ohio River and its tributaries in order to support expanding activities within the basin. ORSANCO works with other federal, state, and local agencies to achieve its goals.

In January of 1993, ORSANCO began an initiative to address non-point source pollution with the formation of a Non-Point Source Pollution Task Force. The Task Force was charged with developing a strategy to coordinate state and federal non-point source programs.

ORSANCO conducts bimonthly water quality sampling to help evaluate possible sources and types of pollution needing further attention. Samples are analyzed for specific physical and chemical characteristics and for other pollutants such as heavy metals, phenolics, and cyanide. ORSANCO also conducts biological assessments of fish and macroinvertebrates and monitors dissolved oxygen levels and bacteria.

ORSANCO plays a very important role in emergency response. The Ohio River is used for industrial processing, transportation, and power generation which creates potential for accidental spills and discharges. ORSANCO has a pivotal role in facilitating communication and coordination among local, state, and federal response agencies. Of critical importance is the notification of downstream water users if a potentially hazardous spill occurs. ORSANCO also maintains a 24 hour telephone service to receive spill reports and operates an electronic bulletin board to disseminate information.

Regulatory Protection Measures

Boone County's Zoning Ordinance and Sub-Division Regulations address control of erosion and sedimentation as a part of Site Plan Review for proposed development (See Appendix D). The Zoning Ordinance also designates certain sensitive areas as Environmental Quality Districts (EQDs) and outlines requirements for development such as retaining natural drainage and controlling erosion (See Appendix D). These measures help prevent sediment from entering local water supplies.

County and city ordinances prohibit tampering with fire hydrants and appurtenances which helps

protect the quantity of water available.

Nonregulatory Protection Measures

In Boone County, nonregulatory protection measures include: public education, voluntary "best management practices", household hazardous waste collection, waste recycling, and water conservation.

The Northern Kentucky Solid Waste Management District, covering Boone, Campbell, and Kenton Counties, is actively working to clean up open dump sites. The Solid Waste Management District also promotes recycling and the proper disposal of household hazardous waste.

The Boone County Soil Conservation District and the Cooperative Extension Office promote voluntary "best management practices". A number of publications are available through their offices including:

The Homeowner's Conservation Guide
Best Management Practices for Construction Activities
Best Management Practices for Agriculture

Boone County water districts promote voluntary conservation of water through public education efforts.

Conclusions

At this time, the Boone County Water Supply Planning Council is not interested in pursuing any additional regulatory measures. Therefore, supply protection recommendations focus on supporting existing nonregulatory measures. Council members agreed that any significant conservation of water was unlikely to occur without a change in rate structures that penalized higher water usage instead of making it cheaper.

Supply Protection Recommendations

After a July 20, 1994 public hearing, the following supply protection recommendations were formulated.

1. Continue to encourage land use controls that protect existing water sources.

2. Provide assistance to the Northern Kentucky Solid Waste Management District in its efforts to clean dumpsites, promote proper disposal, and further public awareness.

3. Work with the Soil Conservation District and the Cooperative Extension Office to promote "best management practices".

4. Encourage and assist local water suppliers and distributors in their efforts to promote water conservation practices to customers.

5. Post signs along Interstate 75 denoting a Bullock Pen watershed protection area.

CHAPTER 9
WATER RESOURCES INVENTORY

As detailed in Phase I, Chapter 7 of the plan, Boone County's water sources have been determined to be adequate. Therefore, an inventory was not conducted.

Security of Access

The major sources, as outlined previously, are the Ohio River and Bullock Pen Lake. It would be impossible to limit access to the Ohio River. Bullock Pen Lake also has recreational uses, so access is not totally secure. The small suppliers control access to their groundwater wells and surface water impoundments.

CHAPTER 10
WATER SUPPLY ALTERNATIVES

Existing water sources have been determined to be adequate and therefore, research into alternatives was unnecessary.

CHAPTER 11
PRIMARY WATER SUPPLY ALTERNATIVE

Existing water sources have been determined to be adequate and therefore, research into alternatives was unnecessary.

I. SITUATION AND ASSUMPTIONS

A. Clean water is necessary to sustain human life, agricultural and industrial production.

B. Potable water may not be available due to drought, hazardous material spills, severe weather, or mechanical failure.

C. Water is supplied to the citizens of Boone County via the Boone County Water District, Florence Water and Sewer Commission, Walton Water Works, Northern Kentucky Water District, private wells and cisterns.

D. These water companies all receive their water from the Northern Kentucky Water District, which obtains water from the Ohio and Licking Rivers. (NOTE: beginning in the Spring of 2003 Boone County Water District and Florence Water and Sewer Commission will begin to receive their water from the City of Cincinnati Water Works with the Ohio River as the source.)

E. Water in the county after being used for human or industrial consumption is usually treated before being returned to the ground water supply.

F. The return of untreated consumed water to the ground water supply can so contaminate this supply as to make converting it back to potable water uneconomical.

G. A major attack on the United States could seriously cripple the county making potable water extremely scarce. Rationing to conserve the county's water would have to be undertaken.

H. The county at present has sufficient water resources to meet its needs if supplies are conserved and redistributed where needed.

II. MISSION

To ensure adequate potable drinking water to all citizens of the county, sufficient raw water for industrial and agricultural purposes, and to decrease as far as possible animal and plant kills in the county's streams due to pollution.

III. DIRECTION AND CONTROL

A. The County Judge/Executive or Mayor may, under provisions of KRS 39 declare an emergency and regulate the use of potable and raw water.

B. Actual EOC operations are the same as for any other disaster or emergency.

C. The Natural Resources and Environmental Protection Cabinet and the Cabinet for Health Services have the responsibilities of ensuring potable water is available for the citizens of the Commonwealth.

D. Natural Resources and Environmental Protection Cabinet is responsible for overseeing the withdrawing and discharging of all water used in private and public water systems.

E. The Cabinet for Health Services is responsible for overseeing the withdrawing and discharging of water confined to an individual on private property.

F. In the event of multi-county water quality problems, an Emergency Water Management Board may be formed to coordinate the Commonwealth's water policy.

G. The Emergency Water Management Board, by the power vested in the Secretary of the Natural Resources and Environmental Protection Cabinet by KRS 151.110 and KRS 151.200, can monitor and allocate water resources at the local level.

IV. CONCEPT OF OPERATIONS

A. Federal Government

1. The Department of Health and Human Services has the primary responsibility in the federal government to develop emergency plans and preparedness programs to assure the provision of water supplies for essential community uses in an emergency. The department is also responsible for assuring the purity of water designated for human consumption. The federal government is also responsible for the direct management of federal water resources in the state.

2. The federal government is responsible for arranging for the releases of water from primary sources of water supply under their control, and for the release of water from primary sources under their control in other states to meet essential needs in the Commonwealth of Kentucky when possible. The federal government may also release water under its control in Kentucky to meet the needs of other states.

B. State Government

1. The Natural Resources and Environmental Protection Cabinet has the responsibility of:

   a. Developing policies and guidance covering the distribution, conservation, and use of water within the state.

   b. Arranging with private, local, state, and federal water sources to release water to meet essential needs.

   c. Assisting local governments and essential users in correcting shortages in water supply or pollution of streams.

   d. Arranging for redistribution of water supplies, sanitation equipment, or water and sewage utilities to correct deficiencies in areas experiencing shortages.

   e. Arranging for supporting resources for any construction and repair necessary for the continued operation of water and sewage facilities.

   f. The state must be prepared to carry out federal responsibilities within the state, should federal authority be temporarily interrupted due to war and major natural disaster until such time as federal authority can be reestablished.

C. Local Government

1. Local Government has the responsibility of:

   a. Developing policies and guidance covering the distribution, conservation and use of water within its jurisdiction.

   b. Assisting individuals and essential users in correcting shortages in water supply or sewage discharge points.

   c. Arranging for redistribution of water supply by encouraging voluntary conservation or enacting mandatory conservation and rationing.

   d. Arranging for supporting resources for any construction and repair necessary for the continued operation of water and sewage facilities.

   e. Request for state assistance in a water shortage should be preceded by:

      1) A local declaration of an emergency.

      2) By issuing instructions to consumers to conserve water along with regulations mandating the cessation of non-essential use of water such

as car washing, lawn and garden watering or swimming pool filling.

D. The supply of fresh water to disaster areas may be provided by a variety of methods. These variations are necessary due to the absence of water hauling facilities owned by the state. The only potable water producing equipment controlled by the state are those assigned to the Kentucky Army National Guard and can only be utilized when authorized by the Governor and when it does not conflict with the unit's military mission.

E. Any one or a combination of the following methods may be utilized by KyEM or local government as deemed appropriate:

1. Use of commercial water supplies.

2. Use of commercial bottling companies to bottle or carton water for distribution in the affected area.

V. APPENDICES

CC-1 Organizational Chart

CC-2 Major Water Consumers

CC-3 Essential Water Consumers

CHAPTER 12
EMERGENCY PLANS

A. CONTAMINATION RESPONSE

The Kenton County Water District No. 1 works with ORSANCO to respond to potential contamination threats. ORSANCO maintains a 24-hour telephone service to receive spill reports and operates an electronic bulletin board to disseminate information. If a spill or discharge is reported, the Water District will close its intakes and rely on stored water until the pollutants have passed by. Generally, there is ample notice of spills.

Bullock Pen Water District does not have a written emergency response plan. The District would coordinate with DES in the event of a possible spill or hazardous situation.

The small water suppliers, Trapp, Birkle, Arlinghaus, Rauh, and Hillside Trailer Park, do not have formal contamination response plans. These suppliers indicated that their plan simply consists of shutting down the pump or intake and resolving the problem.

B. WATER SHORTAGE RESPONSE

As water supply sources are adequate, water shortage response plans were not prepared.

Boone Co. - Emergency Plan
Emergen.
EOC Book
approved by fiscal Court

Bullock Pen -
Check Pendleton
Co. Plan
for update.

Boone Co.
Emergency
Plan ?

CHAPTER 13
IMPLEMENTATION

With an adequate supply of water to meet future demand, implementation will consist of annual meetings of the Water Supply Planning Council to evaluate and update the Boone County Water Supply Plan as needed. The County of Boone Water Enhancement Board (COBWEB) will continue to meet quarterly to discuss water-related issues including quantity and quality. It is anticipated that COBWEB will continue to hold training sessions as necessary.

NKADD will continue to provide staffing assistance to both the Boone County Water Supply Planning Council and COBWEB. NKADD will coordinate the functions and activities of these two groups.

The next meeting of the Boone County Water Supply Planning Council is tentatively scheduled for May 1996 at the offices of the Northern Kentucky Area Development District.

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Boone County Comprehensive Plan, Boone County Planning Commission, 1991.

Licking River Basin Study: Interim Reconnaisance Report, Volume 5, Appendix J, U.S. Army Corps of Engineers, Louisville District, September 1990.

Soil Survey of Boone, Campbell, and Kenton Counties, Kentucky, U.S. Department of Agriculture Soil Conservation Service, August, 1973.

State of Kentucky's Environment: A Report of Progress and Problems, The Kentucky Environmental Quality Commission, 1992.

Appendix A: Minutes

BOONE COUNTY WATER SUPPLY PLANNING COUNCIL
APRIL 1, 1992

MINUTES

Members Present:

Jim Collins	Phil Trzop
Paul Kroger	Harvey Pelley
Dennis Willaman	Dwight Bray
Ralph Baker	Bill Heltemes
Patty Birkle	

Guests Present:
Roger Rolfes

NKADD Staff Present:
Richard Bragg
Heidi Van Keuren

Richard Bragg opened the meeting at 9:05 a.m.

As outlined by regulation, required members in attendance voted unanimously to add the following members to the council:

Dwight Bray - Boone County Water District
Jim Collins - COBWEB
Ed Shaeffer - Florence Water

Dwight Bray was elected Chairman and Paul Kroger, Vice-Chair.

The quorum was determined to be a simple majority.

The planning council decided not to add any more additional members at this time as it would become increasingly difficult to schedule meetings. However, the addition of optional members will be considered as the planning process progresses.

NKADD was selected as the planning representative. A grant application will be prepared for the May 1, 1992 deadline.

The cities and the county will each donate 15 free hours to the project each fiscal year (FY92 and FY93). Monetary costs will be divided among the Boone County Water District (45%), Florence Water (45%), Bullock Pen Water District (5%), and Walton Water (5%). Phil Trzop asked that separate contracts be prepared for each fiscal year.

Council gave Chairman Bray authority to approve the final grant application.

The next meeting was scheduled for Thursday, May 14, 1992 at 9:00 a.m. The quarterly meeting of COBWEB was scheduled immediately afterwards.

The meeting adjourned at 9:55 a.m.

BOONE COUNTY WATER SUPPLY PLANNING COUNCIL
MAY 14, 1992

MINUTES

Members Present:

Dwight Bray
Bill Heltemes
Patty Birkle
Paul Kroger
Harvey Pelley
Dennis Willaman
Phil Trzop
Jim Collins
Hal Hedges

NKADD Staff Present:

Heidi Van Keuren

Dwight Bray opened the meeting at 9:05 a.m. Minutes of the April 1, 1992 meeting were approved.

The grant application was submitted to the Division of Water on April 30,1992. NKADD expects to receive a letter of confirmation acknowledging receipt and also a list of all other applicants with their priority ratings.

Two contracts will be prepared, one for each fiscal year (FY93, FY94). Contract amounts are as follows: Boone Co. Water District (FY93 - $3,375, FY94 - $3,375), Florence Water (FY93 - $3,375, FY94 - $3,375), Bullock Pen Water District (FY93 - $375, FY94 - $375) and Walton Water (FY93 - $375, FY94 - $375). Walton's contract will state that the City is also contributing 15 free hours each fiscal year.

Local print and broadcast media will be informed of the water supply planning council's activities and progress. Water Watch groups including Citizens for Woolper Creek, the Northern Kentucky Sierra Club, and the Boone-Kenton Conservation District will be encouraged to attend planning council meetings.

A public hearing will be held on June 5, 1992 at 10:00 a.m. in the conference room of the Northern Kentucky Area Development District, 7505 Sussex Drive, Florence, KY. The enclosed goals and objectives will be discussed and citizens' input will be encouraged. The hearing will be advertised in the Boone County Recorder. Paul Kroger noted that it was important to phrase the public notice in such a way as to indicate that the meeting will not address line extensions. Jim Collins agreed to proof the notice prior to publication.

The meeting adjourned at 9:45 a.m.

BOONE CO. WATER SUPPLY PLANNING COUNCIL
SEPTEMBER 17, 1992

MINUTES

Members Present:

Paul Kroger
Dennis Willaman
Hal Hedges
Phil Trzop
Jim Collins
Harvey Pelley
Dwight Bray

NKADD Staff Present:

Heidi Van Keuren
Richard Bragg

Mr. Bray opened the meeting at 10:05 a.m.

The planning goals and objectives presented in 401 KAR 4:220 were considered by the Planning Council.

Regarding supply dependability, council decided to plan for a continuous supply under all conditions. Mr. Kroger stressed that the issue was not source dependability, but rather that the problem may be getting the water to customers. Larger lines or expansions may be necessary.

Mr. Willaman brought the issue of conservation to the attention of the Council. Members decided to change wording to "encourage conservation where possible" because this more accurately reflected current and expected operations.

Mr. Kroger stated that the goals and objectives needed to address the time-frame of the plan. This objective was added by members.

The amended goals and objectives were adopted unanimously. (See attached).

Ms. Van Keuren reported progress made on the plan. Surveys were mailed to the water districts asking for data necessary to run the IWR-MAIN computer model required by DNR. Boone County Water District, Kenton County Water District No. 1, Bullock Pen Water District, and Walton Water had returned the completed surveys.

Ms. Van Keuren reported on potential or expected problems using IWR-MAIN. The computer program most accurately projects future demand for water in urban areas where virtually all housing units are served by public water systems. In Boone County, only 78 percent of the housing units were served by public water in 1990. Also, projections of population growth in Boone County are probably too low. Undoubtedly, the model will have to be run numerous times using different assumptions.

Richard Bragg reported on the status of the merger study. He is in the process of arranging an organizational meeting with the three Judge/Executives and the Boone, Campbell, and Kenton County Water Districts, and the City of Newport.

The next meeting of the Boone County Water Supply Planning Council was scheduled for October 29, 1992. The meeting adjourned at 10:55 p.m.

BOONE COUNTY WATER SUPPLY PLANNING COUNCIL
OCTOBER 29, 1992

MINUTES

Members present:

Jim Collins	Hal Hedges
Dwight Bray	Dennis Willaman
Paul Kroger	Phil Trzop
Harvey Pelley	

Guests Present:
Mayor Norman Ferguson, City of Dry Ridge
Bill Viox

NKADD Staff Present:
Heidi Van Keuren

Mr. Bray opened the meeting at 10:20 a.m.

Ms. Van Keuren updated the council on her progress using IWR-MAIN, a software package developed by the U.S. Army Corps of Engineers to forecast future demand for water by the following categories: residential, commercial, industrial, and public. The program is very complex with large data requirements. The Division of Water is currently developing a program using Lotus 1-2-3; however, it is not available at this time. Consequently, as required by Statute, IWR-MAIN must be used.

Ms. Van Keuren is currently working to complete the Plan Formulation Document (PFD), one of two documents required for completion of Phase I of the planning process. The PFD provides details of the planning process, data collection, and data analysis. A draft copy of the PFD will be mailed to members for review prior to the next meeting. A date for the next meeting will be set once the draft PFD has been completed.

Mayor Ferguson of Dry Ridge spoke of his concern regarding future water supply for the city. Dry Ridge and Grant County have experienced considerable growth and development. Currently, Dry Ridge gets most of its water form Williamstown and relies on Bullock Pen mainly during periods of shortages. Council members agreed that it is important to plan for the future in a regional way. A suggestion was made that COBWEB invite representatives of Dry Ridge, Williamstown, and Grant County to a meeting. Ralph Baker of Bullock Pen Water District is a member of both COBWEB and the Boone County Water Supply Planning Council.

The meeting adjourned at 10:45 a.m.

BOONE COUNTY WATER SUPPLY PLANNING COUNCIL
June 24, 1993

MINUTES

Members Present

Paul Kroger
Dennis Willaman
Jim Collins
Dwight Bray
Harvey Pelley

NKADD Staff Present

Heidi Van Keuren

Mr. Kroger opened the meeting at 9:10 a.m. The Council did not have a quorum; however, members present agreed to discuss agenda items informally and not to take any action.

Paul Kroger asked if Mayor King had been contacted regarding a replacement for Phil Trzop on the Council. Ms. Van Keuren responded that meeting notices were being sent to the Mayor, but that she had not made a formal request for a new representative. Ms. Van Keuren agreed to contact the Mayor.

Ms. Van Keuren reported on grant awards from the Division of Water (DOW). DOW funded Phase I planning activities in the amount of $4,200. While official announcements of Phase II funding had not been made at the time of the meeting, DOW expected to award $7,500 to Boone County.

Ms. Van Keuren reported that DOW would like the base maps required for the plan in a digital format, so they could be used in a GIS system. Current water supply regulations do not require that maps be in a digital format and a discussion of the feasibility and cost of doing so ensued. Ms. Van Keuren will report at the next meeting.

Ms. Van Keuren reported that grant awards would change the FY94 contribution for the water supply plan, reducing the FY94 contribution to $0.00 for the Boone Co. Water District, Florence Water & Sewer, Bullock Pen Water District, and Walton Water.

The mail-outs, which were a part of the Plan Formulation Document, were reviewed. Concerns about Kenton County's ability to supply water to Boone County, in amounts necessary to meet future demand, were raised by Mr. Kroger. Dennis Willaman stated that Kenton Co. Water District had been working to expand their treatment plant for a number of years, but had experienced regulatory delays. Council

members agreed that these issues should be discussed in the plan. During discussion of mail-outs, the loss of industrial users in the Kenton Co. Water District between 1981 and 1991 was questioned. Possible explanations include the loss of industrial users to the Northern Kentucky Industrial Park.

The next meeting was scheduled for August 12; however, has since been re-scheduled for August 29, due to a conflict with the water consolidation study.

The meeting adjourned at 10:20 a.m.

BOONE COUNTY WATER SUPPLY PLANNING COUNCIL
August 26, 1993

MINUTES

Members Present

Dennis Willaman
Hal Hedges
Jim Collins
Harvey Pelley

NKADD Staff Present

Heidi Van Keuren

Guests Present

Mary Kathryn Schwanholt - Boone County Soil Conservation District
Paul Kahman - Boone County Soil Conservation District

The Council did not have a quorum; however, members present agreed to discuss agenda items informally and not to take any action.

Ms. Van Keuren reported that Mayor King of Walton had been contacted via a letter regarding a replacement for Phil Trzop; however, no response has been received. Another attempt will be made.

The Division of Water has officially funded Phase II planning activities in the amount of $7,500.00.

Mapping requirements were discussed. The Division of Water prefers maps in a digital format. Several options for completing maps are available. One is to contract with the Northern Kentucky Area Planning Commission. Another is to work with the Soil Conservation District. The preferred alternative is to work with the Soil Conservation District as they already have much of the information.

A draft copy of the Phase I Final Plan Document is being completed and will be mailed out the first week of October.

The next meeting was scheduled for Thursday, October 14, 1993 at 9:00 a.m. at NKADD.

The meeting adjourned at 10:00 a.m.

HVK/mw

MINUTES

BOONE COUNTY WATER SUPPLY PLANNING COUNCIL
June 16, 1994

In Attendance: Mary Kathryn Schwanholt, Boone Co. Conservation Dist.
Paul Gardner, NKADD
Hal Hedges, Florence Water & Sewer Commission
Heidi Van Keuren, NKADD
Paul Kroger, Boone Co. Water District
Dwight Bray, Boone Co. Water District
Bill Ferguson, City of Walton

The meeting opened at 9:05 a.m.

Paul Gardner, a recent graduate of U.C.'s Master of Community Planning program was introduced. He will be completing the Boone County Water Supply Plan while Heidi Van Keuren is on maternity leave.

Phase I planning activities are basically complete; however, final approval by the Division of Water is needed. The maps for both Phase I and Phase II produced by the Boone County Conservation District, were reviewed and discussed.

Phase II planning activities were discussed and the Risks Section of the Final Plan Document was reviewed. There was some discussion of the Hillside Trailer Park. Apparently, there have been legal disputes in the past regarding the quality of the water source. Fecal coliform contamination has been a problem.

Supply protection was discussed. Existing regulatory measures include the Boone County Zoning Ordinance and Sub-Division Regulations. There are also city and county ordinances that prohibit tampering with fire hydrants. Existing non-regulatory measures include public education efforts by the Northern Kentucky Solid Waste Management District, the Boone County Conservation District, and the County Cooperative Extension Office. Proposed supply protection recommendations were reviewed. The Council does not want to formulate any regulatory measures of protection other than to encourage the continuation of existing land management controls. The proposed non-regulatory measures, which focus on supporting existing efforts, will be considered at a July 20, 9:00 a.m., public meeting at NKADD.

There was also discussion of membership on the council. Council members agreed that a representative of the Boone County Conservation District should serve on the planning council. It was also noted that representatives of Bullock Pen Water District, although invited, have not chosen to attend.

The meeting adjourned at 9:55 a.m.

MINUTES
Boone County Water Supply Planning Council
July 20, 1994

In Attendance: Harvey Pelley, Boone County Public Works
Hal Hedges, Florence Water & Sewer Commission
Paul Kroger, Boone County Water District
Dennis Willaman, Kenton Co. Water Dist. #1
Jim Collins, City of Florence
Paul Gardner, NKADD

The public hearing to consider supply protection measures opened at 9:00 a.m. and as no members of the public were in attendance, the hearing closed at 9:10 a.m.

The Council meeting opened at 9:10 a.m. Paul Gardner reported that the completed sections of Phase II were currently being reviewed by the Division of Water.

Consideration was given to Demand Side Management techniques in relation to supply protection and/or conservation measures. It was decided by consensus that Demand Side Management does not apply to the concerns of the Boone County Water Supply Plan and should, therefore, be omitted.

Supply protection measures were discussed.

Section 12, Emergency Plans, was discussed at length. It was concluded that the shortage component was not directly applicable to Boone County because the primary source, the Ohio River, has never been inadequate.

In terms of contamination response, the guidelines and procedures of ORSANCO will provide the necessary material.

The meeting adjourned at 9:55 a.m.

Appendix B: Notifications

NOTIFICATIONS

Notification to Adjacent Counties

A notification letter was sent to mayors, county judge-executives, and water suppliers in adjacent counties as required by 401 KAR 4:220 subsection 5.3 (a) (see sample). Please note a different letter was sent to mayors, county judge-executives, and water suppliers in adjacent counties that shared the same water sources (see sample).

The following is a list of recipients of this letter:

Mayor Ralph Baker - City of Glencoe
Mayor Sidney Gullion - City of Sparta
Mayor Richard Wood - City of Warsaw
Mayor Winfred Colson - City of Corinth
Mayor Norman Ferguson - City of Dry Ridge
Mayor Frances Simpson - City of Williamstown
Mayor Fred Wilson - City of Fairview
Mayor Jeff Glaza - City of Visalia
Hillside Trailer Park - Morningview, KY
Arlinghaus Property - Edgewood, KY
Warsaw Water Works
Craig's Creek Campground - Gallatin Co., KY
Alexander Water Hauling - Warsaw, KY
Williamstown Municipal Water Department
Judge/Executive Clarence Davis, Gallatin Co., KY

update lists

Notification to Local Governments and Water Suppliers

A letter was also sent to local units of government in Boone County, water suppliers that provide water for use in Boone County, and all local governments that share the same water sources (the Ohio River and Bullock Pen Lake) (see sample).

This letter notified recipients of Boone County's intent to prepare a water supply plan and also requested any pertinent information. Permission was obtained from the Division of Water to limit contacts to those units of government that were within ten river miles of Boone County and were located in Kentucky.

The following is a list of recipients of this letter:

Ralph Baker - Bullock Pen Water District
Dennis Willaman - Kenton County Water District No. 1
Patty Birkle - Birkle Water Supply
Glen Moore - Trapp Water Company

Bill Rauh - Rauh Water Supply
Judge/Executive Ken Lucas - Boone County
Mayor Evelyn Kalb - City of Florence
Mayor Warren Moore - City of Union
Mayor William King - City of Walton
Judge/Executive Clyde Middleton - Kenton County
Mayor Gerard Smith - City of Bromley
Mayor Denny Bowman - City of Covington
Mayor Robert Taylor - City of Crescent Park
Mayor George Stewart - City of Crescent Springs
Mayor Harold Ries - City of Crestview Hills
Mayor Robert Rademacher - City of Edgewood
Mayor Al Wermeling - City of Elsmere
Mayor Fred Thomas - City of Erlanger
Mayor William Goetz - City of Fort Mitchell
Mayor Don Martin - City of Fort Wright
Mayor James Ellison - City of Independence
Mayor George Lang - City of Kenton Vale
Mayor William Schutte - City of Lakeside Park
Mayor Clifford Coyle - City of Latonia Lakes
Mayor Gerald Holloway - City of Ludlow
Mayor Melissa Worstell - City of Park Hills
Mayor Mark Kreimborg - City of Taylor Mill
Mayor Dennis Stein - City of Villa Hills
Judge/Executive Carol Woodyard - Grant County
Mayor Terry Case - City of Crittenden
Judge/Executive Ken Paul - Campbell County
Mayor Raymond Hildebrand - City of Alexandria
Mayor Thomas Wiethorn - City of Bellevue
Mayor Walter Govan - City of California
Mayor Paul Weghorn - City of Cold Spring
Mayor John Strassel - City of Crestview
Mayor Bobby Crittenden - City of Dayton
Mayor Steven Pendery - City of Fort Thomas
Mayor Herb Kenter - City of Highland Heights
Mayor Maurice Hehman - City of Melbourne
Mayor Steve Goetz - City of Newport
Mayor Katherine Wright - City of Silver Grove
Mayor Ronald Blanchet - City of Southgate
Mayor Jerry Williams - City of Wilder
Mayor Robert Cooney - City of Woodlawn

Public Notifications

A notice of intent to plan was placed in the legal section of the Boone County Recorder on

Wednesday, April 8, 1992.

The following representatives of local water watch groups were notified of intent to plan and also receive all meeting notices and minutes (see sample). This letter was sent to the following:

Carolyn Nixon - Citizens for Woolpert Creek
Larry Patton - Northern Kentucky Sierra Club
Mary Kathryn Schwanholt - Boone-Kenton Conservation District

Public hearing notices were also placed in the Boone County Recorder for the June 2, 1992 meeting to consider goals and objectives and the July 20, 1994 meeting to consider supply protection recommendations.

Information Review

Very limited information was received in response to notification letters. Information received included:

1. **Kenton County Water District No. 1**
   The water district sent a map of its distribution system. A five-year plan is currently in progress and a copy will be obtained when it becomes available.

2. **City of Dayton**
   The City of Dayton responded by letter and and stated that no pertinent plans existed.

3. **City of Alexandria**
   The City Manager forwarded pages from the Alexandria Comprehensive Plan that were related to water supply and future development.

Administrators from Campbell County, the City of Ft. Wright, and the City of Ft. Mitchell responded by telephone and indicated that they did not have any pertinent information. Planning Council members were also solicited regarding any potentially useful information or plans.

While very little information was obtained from the notification process, there are several existing documents that were useful. The Boone County Comprehensive Plan update, completed in 1990, outlines projected growth patterns for residential, commercial, and industrial land uses. The Licking River Basin Study was also an excellent source.

April 9, 1992

Mayor E. Richard Wood
City Building
101 West Market St.
Warsaw, KY 41095-0785

Dear Mayor Wood:

Boone County has begun the process of preparing a water supply plan in accordance with state law, KRS 151.110 through 116. The purpose of the plan is to assess the long-range water supply availability for the county. If the water resources appear adequate to supply the county's residential, commercial, municipal, and industrial needs for the next 20 years, then the water supply planning council will develop water supply protection recommendations for the county and cities. If the current water supply appears inadequate to meet the county's long-term needs, then the council will also prepare a water shortage response plan and select alternatives.

The Water Supply Planning council for Boone County consists of:

Ralph Baker	Bullock Pen Water District
Patty Birkle	Birkle Water Supply
Dwight Bray	Boone Co. Water District
Jim Collins	County of Boone Water Enhancement Board
Hal Hedges	Florence Water and Sewer Commission
Bill Heltemes	City of Union
Paul Kroger	Boone Co. Water District
Glen Moore	Trapp Water Company
Harvey Pelley	Boone County Fiscal Court
Ed Shaeffer	Florence Water & Sewer Commission
Phil Trzop	Walton Water Works
Bert Turner	Northern KY District Health Department
Dennis Willaman	Kenton Co. Water District

The planning council is interested in your input. If you or your representative would like to attend planning council meetings, receive minutes from the meetings, or submit written comments involving the plan or planning process, please contact:

Heidi Van Keuren
NKADD
7505 Sussex Drive
Florence, KY 41042
(606) 283-1885

Sincerely,

Dwight Bray
Planning Council Chair

April 9, 1992

Ralph Baker
Bullock Pen Water District
P.O. Box 185
Crittenden, KY 41030

Dear Mr. Baker:

Boone County has begun the process of preparing a water supply plan in accordance with state law, KRS 151.110 through 116. The purpose of the plan is to assess the long-range water supply availability for the county. If the water resources appear adequate to supply the county's residential, commercial, municipal, and industrial needs for the next 20 years, then the water supply planning council will develop water supply protection recommendations for the county and cities. If the current water supply appears inadequate to meet the county's long-term needs, then the council will also prepare a water shortage response plan and select alternatives.

The Water Supply Planning council for Boone County consists of:

Ralph Baker	Bullock Pen Water District
Patty Birkle	Birkle Water Supply
Dwight Bray	Boone Co. Water District
Jim Collins	County of Boone Water Enhancement Board
Hal Hedges	Florence Water and Sewer Commission
Bill Heltemes	City of Union
Paul Kroger	Boone Co. Water District
Glen Moore	Trapp Water Company
Harvey Pelley	Boone County Fiscal Court
Ed Shaeffer	Florence Water & Sewer Commission
Phil Trzop	Walton Water Works
Bert Turner	Northern KY District Health Department
Dennis Willaman	Kenton Co. Water District

In compliance with the planning requirements and in the interests of cooperation, please submit the following information to the address below by April 30, 1992.

(1) A copy of any existing water or related plans;

(2) A statement of any current or potential conflicts, problems or opportunities that you want the planning process to examine or address, including water use rights, access and conservation; and

(3) A description of expected changes in or around your area that may alter current growth trends, including existing ordinances and planning goals.

If you would like to attend planning council meetings, receive minutes from the meetings, or submit written comments involving the plan or planning process, please contact:

Heidi Van Keuren
NKADD
7505 Sussex Drive
Florence, KY 41042
(606) 283-1885

Sincerely,

Dwight Bray
Planning Council Chair

May 21, 1992

Larry Patton
Northern Kentucky Sierra Club
3 Grand Ave.
Taylor Mill, KY 41015

Dear Mr. Patton:

Boone County has begun the process of preparing a water supply plan in accordance with State Law KRS 151.110 through 116. The purpose of the plan is to assess the long-range water supply availability for the county. If water resources appear adequate to supply the county's residential, commercial, municipal, and industrial needs for the next 20 years, then the water supply planning council will develop supply protection recommendations for the county and cities. If the current water supply appears inadequate to meet the county's long-term needs, then the council will also prepare a water shortage response plan and select alternatives.

The Boone County Water Supply Planning Council consists of:

Ralph Baker	Bullock Pen Water District
Patty Birkle	Birkle Water Supply
Dwight Bray	Boone Co. Water District
Jim Collins	County of Boone Water Enhancement Board
Hal Hedges	Florence Water and Sewer Commission
Bill Heltemes	City of Union
Paul Kroger	Boone Co. Water District
Glen Moore	Trapp Water Company
Harvey Pelley	Boone Co. Fiscal Court
Ed Shaeffer	Florence Water & Sewer Commission
Phil Trzop	Walton Water Works
Bert Turner	No. KY District Health Department
Dennis Willaman	Kenton County Water District

The planning council is interested in your input and would like to invite you or a representative of your organization to attend planning council meetings.

A public hearing to obtain citizen input concerning goals and objectives for the planning process is scheduled on June 5, 1992 at 10:00 a.m. at the Northern Kentucky Area Development District, 7505 Sussex Drive, Florence, KY.

If you would like more information, please contact: Heidi Van Keuren, NKADD, 7505 Sussex Drive, Florence, KY 41042, (606) 283-1885.

Sincerely,

D C Bray

Dwight Bray
Planning Council Chair

1975 Olds	3J57KSM262444	#V-91-12-2554	
1976 Chev	CGL166U168015	#V-91-12-2492	
1978 Ford	8E93T131295	#V-91-08-1612	
1984 Dodge	1B3BZ18A5ED290707	#V-91-07-1530	
1977 Merc	7A93H536463		

BIKES

Huffy Expert/Free style	HC3797817	Black
Rally Dragon	No Ser#	Red/White
Roadmaster AMF 10 spd	AB70606132	Red
Kent Trail Bike	P70411905	White
Huffy Trail Bike	7D0510663	Blue/painted Blk
Murray Rock Canyon 10 spd	M00098	Green
Huffy Standard Girls	HC4878484	Blue
Roadmaster AMF Girls 10 spd	No Ser#	Purple
Huffy Girls 10 spd	HC9312714	Blue
Raleigh Capri 10 spd	6E01075	Black

subdivision. The Public Hearing is to be he
p.m., in the third floor auditorium of the Bo
Burlington, Kentucky.

The real estate for which the Zoning Ma
at 7402 Camp Ernst Road, Boone County, Kentuc
property is represented as a part of or the
BOOK 3, 49 PAGE 394, 422, 424 and 398
as supplied by the applicant for this appli
serve as a due process, trial type hearin
regarding this map amendment.

The Boone County Comprehensive Plan, i
be reviewed to determine whether the map
consistent with the Comprehensive Plan.
inconsistent with the Comprehensive Plan, th
Plan to make it consistent with the request
be reviewed. All interested persons are en
(BCR4/8/92)

ALL OTHER MISCELLANEOUS ITEMS

PUBLIC NOTICE OF INTENT TO CREATE A WATER SUPPLY PLAN

Boone County announces its intent to participate in the water supply planning process as mandated by KRS Chapter 151. The purpose of the plan is to assess the water resources available to the county. The planning process consists of two phases, the first of which will include planning initiation and data collection. Phase two includes planning for emergencies, supply protection, and, if necessary, selecting an alternative water source. The process will be accomplished through a series of planning council meetings. The proposed planning unit is Boone County.

The planning process will be guided by a planning council consisting of the following members:

Ralph Baker	Bullock Pen Water District
Patty Birkle	Birkle Water Supply
Dwight Bray	Boone Co. Water District
Jim Collins	County of Boone Water Enhancement Board
Hal Hedges	Florence Water and Sewer Commission
Bill Heltemes	City of Union
Paul Kroger	Boone Co. Water District
Glen Moore	Trapp Water Company
Harvey Pelley	Boone County Fiscal Court
Ed Shaeffer	Florence Water & Sewer Commission
Phil Trzop	Walton Water Works
Bert Turner	Northern KY District Health Department
Dennis Willaman	Kenton Co. Water District

The public is invited to attend and comment at all meetings of the planning council. Additionally, two meetings will be held specifically to solicit public input concerning objectives for the planning process.

The next planning council meeting will be held May 14, 1992 at 9:00 a.m. at the Northern Kentucky Area Development District Offices, 7505 Sussex Drive, Florence, KY 41042.

For more information contact: Heidi Van Keuren
NKADD
7505 Sussex Drive
Florence, KY 41042
(606) 283-1885

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	12,[illegible]
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	1,200.00
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	1,800.00
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	600.00
	300.00
	150.00
	900.00
	900.00
	21,000.00
	600.00
	300.00
	300.00
	1,500.00
	15,600.00
	37,800.00
	48,580.79
	15,000.00
	9,000.00
	268.00
	17,000.00
	1,250.00
	1,500.00
	586,364.79

d expenditure accounts in
ease the county budget to

iance has been written in
of same. A copy of said
itive and may be reviewed
y through Friday, at the

TH R. LUCAS
Y JUDGE/EXECUTIVE

CRIGLER
Y ATTORNEY

Attention to prospective bidders is called to the prequalification requirements and necessity for securing Certification of Eligibility and Certification of Bid Proposal.

Ted Wetekamp

Dr. Ted Wetekamp, Board Secretary
Boone County Board of Education

PUBLIC HEARING NOTICE

To all interested citizens, The Boone County Water Supply Planning Council will hold a public hearing to solicit input concerning goals and objectives for the Boone County Water Supply Plan as mandated by KRS Chapter 151. The purpose of the plan is to assess the water resources available to the county including planning for emergencies, supply protection, and if necessary, selecting an alternative water source.

NOTE: The plan's scope is limited to water sources and does not address the construction or extension of any infrastructure.

The hearing will be held Friday June 5, 1992 at 10:00 a.m. at the Northern Kentucky Area Development District, 7505 Sussex Drive, Florence, KY.

For more information contact: Heidi Van Keuren
NKADD
7505 Sussex Drive
Florence, KY 41042
(606)283-1885

NOTICE

(OF FILING OF SETTLEMENT)

COMMONWEALTH OF KENTUCKY
COUNTY OF BOONE } SCT.

I, PAT GUTZEIT, CLERK OF THE BOONE DISTRICT COURT IN AND FOR THE COUNTY AND STATE AFORESAID, DO HEREBY CERTIFY THAT THE FOLLOWING SETTLEMENT OF ESTATES HAVE BEEN FILED IN THE BOONE DISTRICT COURT, AND ANYONE DESIRING TO TAKE EXCEPTION TO SAID SETTLEMENT MUST DO SO ON OR BEFORE THURSDAY, JUNE 11TH, 19 92, AT 9:00A.M.

SETTLEMENT	ESTATE	FIDUCIARY
FINAL	WILLIAM HAY	JOAN HAY 317 HONEYSUCKLE FLORENCE
FINAL	MARY BRUCE BUSBY	SUE ANN HUSSONG 5080 CHANTILLY CINCINNATI, OH
PERIODIC	JASON ERIC COSHNITZKE	JAMES & BRENDA COSHNITZKE 8204 N. DILCREST FLORENCE
FINAL	LORETTA JOHNSON	LORETTA MORROW 155 RAINTREE FLORENCE
FINAL	ELIZABETH WATKINS	DEBORAH WATKINS 3892 BURLINGTON PIKE BURLINGTON
FINAL	RAYMOND DANZINGER	REED DAVIS 4267 ASHGROVE CT INDEPENDENCE
PERIODIC	DEREK BUCKLER	DALE BUCKLER 113 PINEHURST FLORENCE JOANN GULLION 863 BRISTOW INDEPENDENCE
FINAL	EVELYN WISCHER	JACQUELINE CAUDELL 7757 REDBANK DAYTON OH

GIVEN UNDER MY HAND THIS THE 20TH DAY OF MAY 1992.

ON, KENTUCKY
E NO. 1994-9

RDINANCE 1991-27, AN ORDINANCE
0-7, 1991-20, AND ADOPTING RULES,
TES, METER INSTALLATION FEES, AND
CABLE TO THE COMBINED AND
SYSTEM OF THE CITY OF WALTON,

ON ONE

ecember 12, 1991, an ordinance repealing
d adopting rules and regulations, tap-on
and conditions of service applicable to the
wer system of the City of Walton, Kentucky,
llows:

service shall be based insofar as possible
he respective buildings or premises. The
onth, based upon the water usage of 4,000

dly sewer rate specified above, the following
number of gallons of water consumption per
ize connections:

R MONTH	MONTHLY CHARGE Per 1,000 Gallons
	$13.79
	$ 4.80
	$ 2.25
	$ 1.80

minimum bill maintenance fee shall be four
onth.

ION TWO

991-27 remain unchanged.

994
994

APPROVED:

MAYOR PHILLIP W. TRZOP

ALTON, KENTUCKY
E NO. 1994-10

ATING THE PERSONNEL POLICIES AND
MPLOYEES OF THE CITY OF WALTON BY
CATION CHART.

the City of Walton, Kentucky recognizes that a
t maintains a quality, motivated work force is
ent; and

ave a current classification plan, compensation
g delineating all aspects of a plan within the City
by the classification plan, compensation plan,
policies and procedures; and

WHEREAS, the City adopted the current personnel policies and position descriptions in Ordinance Number 1994-3.

THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF WALTON, KENTUCKY AS FOLLOWS:

SECTION ONE

SECTION TWO

This Amending Ordinance shall take effect from and after its adoption, approval, and publication as required by law.

PASSED AND APPROVED UPON FIRST READING THIS THE 13TH DAY OF JUNE, 1994, BY 4 MEMBERS OF CITY COUNCIL.

PASSED AND APPROVED UPON SECOND READING THIS THE 30TH DAY OF JUNE, 1994, BY 3 MEMBERS OF CITY COUNCIL.

APPROVED:

MAYOR PHILLIP W. TRZOP

ATTEST:

Ruth Glenn
RUTH GLENN, CITY CLERK

PUBLIC HEARING NOTICE

To all interested citizens. The Boone County Water Supply Planning Council will hold a public hearing to solicit input concerning Chapter VIII of the Final Plan Document for the Boone County Water Supply Plan. The plan follows the planning process as mandated by KRS Chapter 151 designed to assess the water resources of the county.

There are two components to this section.
(1) Summarize the risk of water supply contamination, degradation or depletion, and the impact of soils and geologic characteristics on supply protection. (2) Describe any local supply protection measure which may exist, and develop recommendations for supply protection.

NOTE: The scope of this section covers risks to the supply and protection of the supply, and does not address the construction or extension of any infrastructure.

The hearing will be held Wednesday July 20, 1994 at 9:00 a.m. at the Northern Kentucky Area Development District, 16 Spiral Drive, Florence Ky.

For more information contact: Paul Gardner
NKADD
16 Spiral Drive
Florence, KY 41042

NOTICE TO BID

The Boone County Fiscal Court will receive sealed bids in the Office of the Judge/Executive, Second Floor, Administration Building, Burlington, Kentucky, until 10:00 a.m., July 20, 1994 for one (1) Diesel Powered, 15 Passenger Van for the Maplewood Home. Bids will be opened and publicly read aloud at that time in the Fiscal Courtroom, Second Floor, Administration Building.

BID ENVELOPE MUST BE LABELED: "SEALED BID: DIESEL POWERED VAN FOR MAPLEWOOD HOME."

Specifications may be obtained in the office of the Contracts Administrator, Second Floor, Administration Building, Burlington, Kentucky, 606-334-2200.

Boone County reserves the right to reject any and all bids, to waive any informalities and to negotiate for the modifications of any bid or to accept that bid which is deemed the most desirable and advantageous from the standpoint of customer value and service and concept of operations, even though such bid may not, on its face, appear to be the lowest and best price. No bid may be withdrawn for a period of thirty (30) days after scheduled time of receipt of bids.

Kenneth R. Lucas
Boone County Judge/Executive

Appendix C: Workplan

Appendix D: Survey

Source: Boone County Zoning Regulations, August 1986

ARTICLE 14

SITE PLAN REVIEW

Section 1400
Intent
The purpose of this article is to provide a procedure for review of site plans on major development actions with the potential to significantly influence adjacent lands. Furthermore, this procedure is designed to permit site plan flexibility within the constraints and standards of this zoning order.

Section 1401
Procedure
No building shall be erected or structurally altered nor shall any grading take place on any lot or parcel for uses or in zones where site plan review is required, except in accordance with the regulations of this article and an approved site plan as hereinafter required. All such site plans shall be reviewed by the Boone County Planning Commission and a determination approving or rejecting such plans shall be made in accordance with the requirements of this and other applicable articles of this order. The Planning Commission shall not be given the power to impose any additional regulations not included in this order, nor shall the Planning Commission reject any site plan which is in full conformance with the terms and conditions of this article and order. All approved site plans shall be binding upon the applicants, their successors and assigns and shall limit the development to those actions described in the site plan and to all conditions and limitations for such plans agreed to by the applicant. The Planning Commission shall render a determination within forty (40) days. Amendments to approved plans shall be subject to review and approval by the Planning Commission, which shall keep a record of all approved site plans. Site Plan Review is required in the following underlying zones: MHP, R, PF, I-1, I-2, C-1, C-2, C-3, C-4, O-1, O-2, SR-2 (townhouses), UR-1*, UR-2*, UR-3* (*multi-family housing and townhouses).

Section 1402
Site Plan Requirements
All site plans submitted to the Planning commission in accordance with this article shall contain the following information unless specifically waived by the Planning Commission:

1. Plan(s) of the subject property drawn to a scale not smaller than one (1) inch equals one hundred (100) feet, prepared by, and bearing the seal, of an Architect or Engineer and Land Surveyor registered in the Commonwealth of Kentucky, showing;

    a. The total area in the project.
    b. The present zoning of the subject property and all adjacent properties.
    c. All public and private rights-of-way and easements located on or adjacent to the subject property which are proposed to be continued, created, enlarged, relocated or abandoned.
    d. Existing and proposed finished topography of the subject property shown by contours with intervals not to exceed five (5) feet.
    e. Existing structures on the property.

f. Proposed housing units on the property depicting location, arrangements, height, number of units in each building, and where applicable, location and dimensions of all lots.

g. Location, height, arrangement and identification of use of all nonresidential buildings and uses on the property, and where applicable, location, arrangement, and dimensions of all lots.

h. Location and arrangement of all common open space areas and recreational facilities.

i. Landscaping features and walls or fences. (See Article 17)

j. Location, orientation, size, and height of signs. (See Article 19)

k. All utility lines and easements:

1. Water distribution systems, including line size, width of easements, type of pipe, location of hydrants and valves, and other appurtenances;

2. Sanitary sewer system, including pipe sizes, width of easements, gradients, types of pipes, invert elevations, location and type of manholes, the location, type, size of all lift or pumping stations, capacity, and process of any necessary treatment facilities, and other appurtenances;

3. Storm sewer and natural drainage system, including pipe and culvert sizes, gradients, location of open drainage courses, width of easements, location and size of inlets and catch basins, location and size of retention and/or sedimentation basins, and data indicating the quantity of storm water entering the subject property naturally from areas outside the property, the quantity of flow at each pickup point (inlet), the quantity of storm water generated by development of the subject area, and the quantity of storm water to be discharged at various points to areas outside the subject property.

4. Other utilities (e.g., electric, telephone, etc.) including the type of service and the width of easements, if information is available.

l. Location of all off-street parking, loading and/or unloading, and driveway areas, the type of surfacing, dimensions, and the number and arrangement of off-street parking, and loading and/or unloading spaces. (See Article 18)

m. Circulation System:

1. Pedestrian walkways, including alignment, grades, type of surfacing and width;
2. Streets, including alignment, grades, type of surfacing, width of pavement and right-of-way.
3. Provisions for access management, which may include, but are not limited to:

i. a frontage road, (public or private),
ii. coordination of curb cuts,
iii. curb cut connections accessible to adjoining properties.

(See Boone County Subdivision Regulations for sidewalks in office, commercial and industrial zones.)

n. Provisions for control of erosion, hillside slippage and sedimentation, indicating the temporary and permanent control practices and measures which will be implemented during all phases of clearing, grading, and construction. Show all affected or disturbed areas during construction on or within close proximity of the site. (i.e., excavation, fill or storage).

o. If the proposed site was part of a zone change request, submit a copy of approved concept development plan or show the relationship of the location of the proposed structure(s) to the approved zone change request.

p. Each applicant shall be required to submit traffic information estimating at a minimum the peak hour traffic entering and exiting the site under review. This information shall be used by the Planning Commission in determining the location of curb cuts or any additional traffic management controls on each site.

q. Architectural drawings or renderings and building plans showing the external features of proposed structures and the site (including elevations), which are subject to public view or from a public street. This requirement is limited only to newly constructed office, industrial, and commercial buildings in the area as defined and recommended in the 'Houston-Donaldson Study'. The specific procedure requirements, criteria, and standards used in Design Review can be found in the 'Houston-Donaldson Study'. (*See Status of Amendments)

The aforementioned information required may be combined in any suitable and convenient manner so long as the data required is clearly indicated. Five (5) copies of all site plans shall be submitted to the Planning commission. One copy shall be retained by the Planning Commission and one copy may be directed to the Building Inspector.

For property to be developed in sections or phases, detailed site plans containing the above information need not be submitted for the entire property. Plans conforming to these criteria should be submitted for the section or phase to be developed along with conceptual or schematic plans for the entire property in order to show the relationship of the relevant section to the entire development plan.

Section 1403
Expiration and Extension of Approval Period
The approval of a site plan shall be for a period not to exceed two (2) years. If no construction has begun within two (2) years after approval is granted, the approved site plan will be void. A one (1) year extension of an approved site plan may be granted upon request to the Planning Commission.

Section 1404

Completion of Site Plan Terms and Requirements

All requirements of the approved site plan must be completed within six months of building occupancy unless an extension is granted by the Technical Committee upon request.

ARTICLE 16b

ENVIRONMENTAL QUALITY DISTRICTS (EQD)

Section 1650
Definition
Environmental Quality District (EQD) - is defined as a geographic area of the county exhibiting extraordinary and distinctive environmental characteristics. These environmental characteristics are of significant value to the public and include natural or unique phenomena such as certain geological formations, soil types, slopes, vegetation, water flow, significant scenic views, and other similar natural features.

Section 1651
Purpose
The purpose of the EQD is to assist or advise in the development of land and structures to be compatible with the environment and to protect those characteristics of the environment that have significant public value and which are vulnerable to damage by development permitted under conventional zoning and building regulations. The EQD is a useful tool to help define engineering issues, which a developer should consider in the course of designing and building a development. The end result is to protect and advise the public and property owners from unsafe buildings or unstable land which would be caused by uncontrolled development; from significant damage or destruction of prominent hillsides and/or valleys caused by improper development; from significant damage to the economic value and efficiency of operation of existing properties and/or new developments due to the interdependence of their visual and functional relationships; from soil erosion and stream siltation; and from the destruction of mature and/or valuable trees and other vegetation. The general location of the EQD areas in Boone County would be based upon the Developmentally Sensitive land use classification of the Boone County Land Use map.

Location
The general location of all EQDs shall be identified on the Boone County Future Land Use Map. These areas have the following characteristics:

1. Slopes of 20 percent or greater;

2. Areas where soil severely limit development;

3. Prominent hillsides which are readily viewable from a public thoroughfare located in a valley below a hillside;

4. Hillsides which provide views of a major stream or valley;

5. Existence of geologic formations which severely limit development;

6. Hillsides which function as community separators, or boundaries by their physical nature;

7. Hillsides which support a substantial natural wooded cover; and

8. Hillsides with natural drainage patterns.

Applicability

The Boone County Planning Commission and prospective developers should utilize the following development guidelines for the construction of any type of structure in developmentally sensitive areas. The Planning Commission shall use these guidelines as general parameters for receiving development proposals. The guidelines are intended to be advisory to the developer in subdivision review and site plan review.

Environmental Quality District Development Guidelines

1. Use irregular architectural edges to inter-lock buildings with hillside vegetation. Emphasize attachment with planting which overlaps building edges, especially at the foundation.

2. Cluster new development, retaining surrounding tree cover and minimizing changes in topography.

3. Match scale of buildings to scale of terrain.

4. Retain the natural slope lines as seen in profile. Restore the vegetation lines which convey the slope lines.

5. Plan buildings to fit into hillside rather than altering the hillside to fit the buildings.

6. Maintain a clear sense of the hillside brow by sitting buildings back from it.

7. Maintain the natural appearance of the brow by tree planting and other landscape measures.

8. Stagger or step building units according to the topography.

9. Use narrow lanes, one-way streets and split-level roads to avoid excessive earth moving.

10. Site buildings not only to provide views, but also to provide a variety of community and private viewing places.

11. Plan buildings, drives and parking areas to acknowledge the natural contour line of the site.

12. Meet large parking requirements with multiple small parking areas, and screen with planting, beams, and terraces.

13. Respect the site's conditions of steepness, soil, bedrock, and hydrology so as to insure hillside stability both during and after development.

14. Replant all cuts, fills and any other earth modification.

15. Respect and retain natural site features such as streams, slopes, ridge lines, wildlife habitat, plant communities, and trees.

Appendix E: Soil Map

SOIL ASSOCIATIONS

- Eden-Cynthiana association: Dominantly steep to very steep soils that have a clayey subsoil; on limestone and shale uplands
- Faywood-Nicholson association: Dominantly gently sloping to moderately steep soils that have a loamy to clayey subsoil; on ridgetops and side slopes of the limestone and shale uplands
- 3 Rossmoyne-Jessup association: Nearly level to moderately steep soils that have a loamy to clayey subsoil; on ridgetops and side slopes of the glaciated uplands
- 4 Licking-Captina association: Dominantly gently sloping to moderately steep soils that have a clayey to loamy subsoil; on stream terraces
- 5 Wheeling-Huntington-Alluvial land, steep association: Dominantly nearly level and gently sloping soils that have a loamy subsoil; on stream terraces, first bottoms, and moderately steep to steep areas of variable textured alluvium

Compiled 1971

Appendix F: Obstacles to the Planning Process

OBSTACLES TO THE PLANNING PROCESS

In Boone County, the primary obstacles to the planning process were lack of data and non-participation. Data for small systems such as pump tests and other hydrologic information was not available which made it very difficult to fulfill the requirements of the regulation such as delineating the zone of contribution and the zone of influence. The small suppliers were not very active in the planning process. Several attended initial meetings, but lost interest as the process progressed.

Non-participation was also a problem. Some participants lost interest and others who were appointed to the council never attended. It was also difficult to obtain a quorum for council meetings. Often, an informational, non-official meeting was held rather than delaying progress on the plan any further.

Finally, the Division of Water provided a list of suppliers and distributors to the planning council at the beginning of the planning process. However, when the planning process was essentially finished, DOW provided a revised list which identified seven additional small suppliers and three additional small distributors. Therefore, the process was not as inclusive as it might have been.

Appendix G: Paying for the Planning Process

PAYING FOR THE PLANNING PROCESS

FUNDING

Division of Water Phase I Grant	$ 4,200.00
Division of Water Phase II Grant	$ 7,500.00
Boone County Water District	$ 3,375.00
Florence Water & Sewer Commission	$ 3,375.00
Bullock Pen Water District	$ 375.00
City of Walton	$ 375.00
TOTAL	**$ 19,200.00**

EXPENDITURES

Salaries	$ 8,654.19
Benefits	$ 3,368.20
Shared (Overhead)	$ 5,274.42
Travel	$ 204.83
Copies	$ 193.08
Mapping Services	$ 1,256.00
Advertising	$ 37.50
Miscellaneous	$ 208.26
TOTAL	**$ 19,210.48**

Computerized mapping services were provided by the Boone County Soil Conservation Service using GRASS software. The excess expenditures were paid by the Northern Kentucky ADD using local funds.