

# Water-Resource Development: A Strategic Plan

*Summary of Water Systems*

*Purchase Area Development District*

*Water Resource Development Commission*

*October, 1999*

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# Purchase Area Development District

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## REGIONAL OVERVIEW

### (Purchase ADD Existing & Proposed Water Lines Map)

- Estimated 1999 population of 186,000--78% on public water
- Estimated 2020 population of 188,000--85% on public water
- 1,640 miles of water lines, with plans for 650 additional miles
- Estimated funding needs for public water 2000-2005--\$17,400,000
- Estimated funding needs for public water 2006-2020-- \$8,700,000

The Purchase Area Development District region had an estimated population of 185,600 (80,164 households) in 1999 with a projected population of 187,500 (85,200 households) in 2020. There are 1,640 miles of water lines in the region serving 143,300 people, or 78% of the region's population. 650 miles of proposed water line extensions for the period 2000-2020 would provide service to an additional 6,320 households. About 42,000 people in the region rely on private domestic water systems: 39,000 on wells and 2,800 on hauled water and other sources.

Estimated populations and public water service for the eight counties in the region are given below:

<b>County</b>	<b>1999 Pop</b>	<b>On Public</b>	<b>2020 Pop</b>	<b>On Public</b>
Ballard	8,400	4,500 (53%)	9,100	5,200 (57%)
Calloway	29,400	20,300 (69%)	28,100	23,900 (85%)
Carlisle	5,400	2,400 (45%)	5,300	2,100 (49%)
Fulton	7,500	7,000 (94%)	7,200	7,100 (98%)
Graves	35,700	25,000 (70%)	38,400	30,000 (78%)
Hickman	4,900	2,100 (43%)	3,700	2,200 (60%)
McCracken	64,200	59,100 (92%)	63,800	60,600 (95%)
Marshall	30,000	24,000 (80%)	32,000	28,500 (89%)
<i>Region</i>	186,000	144,000 (78%)	188,000	160,000 (85%)

# EXISTING & PROPOSED WATER LINES

**PUADD  
Kentucky**

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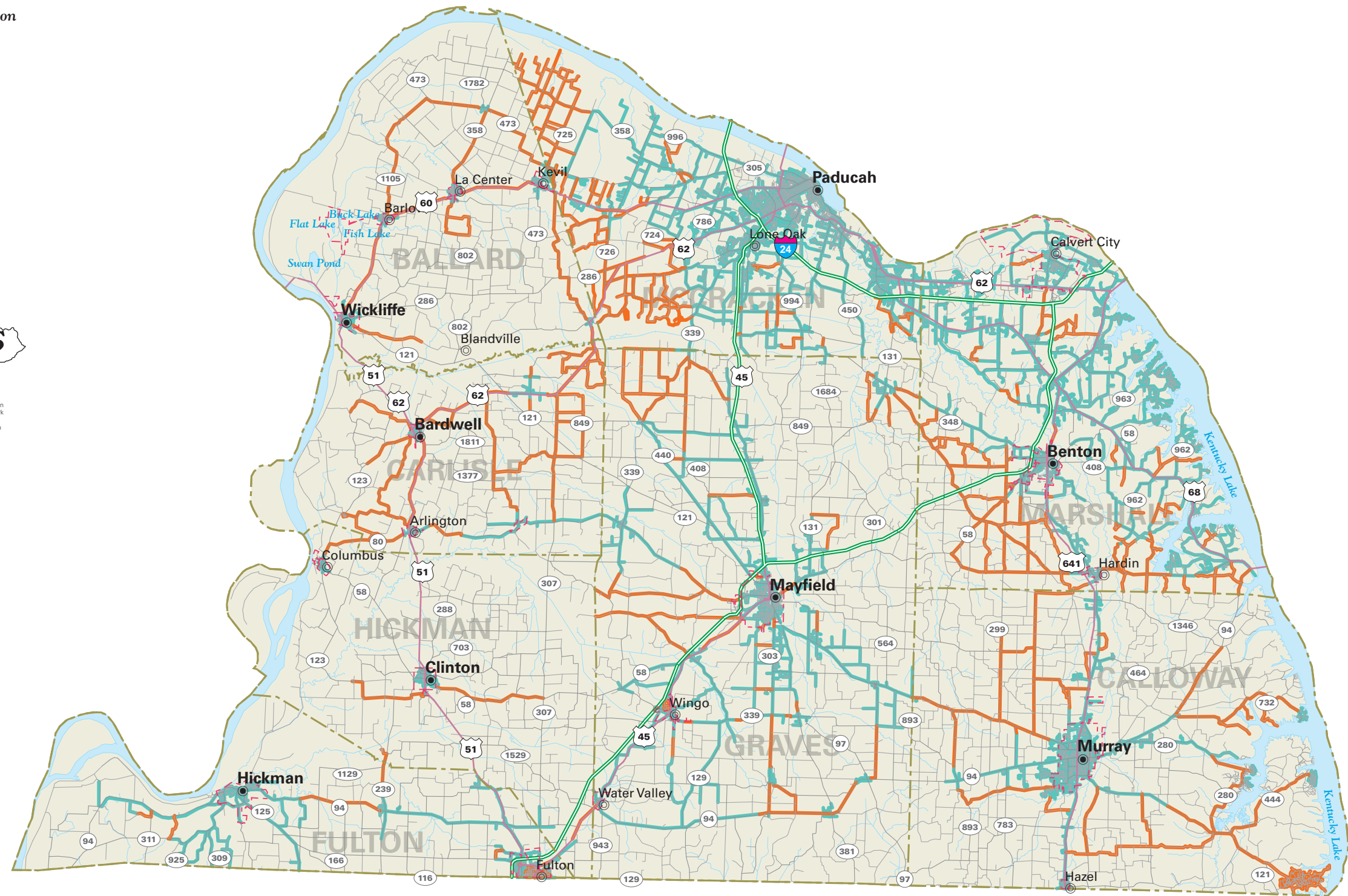
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**WATER LINES**

- Existing Water Lines
- Proposed Water Lines

72 public water systems serve the region: 51 community systems-- 19 municipal, 19 water districts, 3 water associations, 10 private, and 21 non-community systems. There are 18 small (501 to 3,300 people served) and 18 very small (less than 500 served) systems.

Estimated costs for public water expansions and associated system upgrades are:

***Estimated Costs - Proposed Projects, 2000-2005***

COUNTY/System		New Customers		Rehab	Source	Treatment	Tanks/ Pumps	Total
	Miles	Number	Cost in \$1000	in \$1000	in \$1000	in \$1000	in \$1000	in \$1000
<b>BALLARD</b>								
LACENTER WATER SYSTEM				201				201
WICKLIFFE WATER SYSTEM	5.2	20	136					136
KEVIL WATER SYSTEM	5.5	40	142					142
<b>TOTAL</b>	<b>10.7</b>	<b>60</b>	<b>278</b>	<b>201</b>				<b>479</b>
<b>CALLOWAY</b>								
MURRAY WATER SYSTEM	90.6	947	2,356				1,275	3,631
<b>TOTAL</b>	<b>90.6</b>	<b>947</b>	<b>2,356</b>				<b>1,275</b>	<b>3,631</b>
<b>CARLISLE</b>								
ARLINGTON WATER DEPARTMENT	2.2	15	56				425	481
BARDWELL CITY UTILITIES	5.3	30	139			1,000	425	1,564
CUNNINGHAM W/D	5.3	53	138					138
<b>TOTAL</b>	<b>12.8</b>	<b>98</b>	<b>334</b>			<b>1,000</b>	<b>850</b>	<b>2,184</b>
<b>FULTON</b>								
HICKMAN WATER DEPARTMENT	4.8	30	125					125
FULTON MUNICIPAL WATER SYSTEM	2.5	31	65			2,000	1,275	3,340
<b>TOTAL</b>	<b>7.3</b>	<b>61</b>	<b>190</b>			<b>2,000</b>	<b>1,275</b>	<b>3,465</b>
<b>GRAVES</b>								
WINGO WATER & SEWER DEPARTMENT	3.5	30	92					92
CONSUMER W/D	16.6	201	431	78				509
MAYFIELD ELECTRIC & WATER	0.8	40	21				1,275	1,296
HICKORY W/D	33.7	350	877					877
SYMSONIA W/D	10.0	168	260					260
HARDEMON W/D				122			425	547
<b>TOTAL</b>	<b>64.6</b>	<b>789</b>	<b>1,681</b>	<b>200</b>			<b>1,700</b>	<b>3,581</b>
<b>MCCRACKEN</b>								
REIDLAND W/D				32				32
HENDRON W/D	8.5	125	222					222
WEST MCCRACKEN W/D	30.2	408	784				850	1,634
<b>TOTAL</b>	<b>38.7</b>	<b>533</b>	<b>1,006</b>	<b>32</b>			<b>850</b>	<b>1,888</b>
<b>MARSHALL</b>								
CALVERT CITY MUNICIPAL WATER DEPARTMENT	2.0	18	51					51
NORTH MARSHALL W/D	14.7	197	381					381
JONATHAN CREEK W/D	18.3	118	476					476
BENTON WATER AND SEWER	64.5	813	1,267					1,267

TOTAL	99.4	1146	2,175					2,175
PENNYRILE	324	3,634	8,020	434	-	3,000	5,950	17,404

**Estimated Costs - Proposed Projects, 2006-2020**

COUNTY/System		New Customers		Rehab	Source	Treatment	Tanks/ Pumps	Total
	Miles	Number	Cost in \$1000	in \$1000	in \$1000	in \$1000	in \$1000	in \$1000
<b>BALLARD</b>								
BARLOW WATER & SEWER	11.3	30	293					293
LACENTER WATER SYSTEM	4.3	53	111					111
KEVIL WATER SYSTEM	8.9	80	232					232
LACENTER WATER SYSTEM	5.7	45	149					149
WICKLIFFE WATER SYSTEM	4.3	25	111					111
<b>TOTAL</b>	<b>34.4</b>	<b>233</b>	<b>895</b>					<b>895</b>
<b>CALLOWAY</b>								
MURRAY WATER SYSTEM	45.6	624	1,186					1,186
BARDWELL CITY UTILITIES	24.3	162	632					632
CUNNINGHAM W/D	26.8	209	698					698
BARDWELL CITY UTILITIES	13.8	102	358					358
ARLINGTON WATER DEPARTMENT	13.3	113	345					345
<b>TOTAL</b>	<b>123.8</b>	<b>1210</b>	<b>3,218</b>					<b>3,218</b>
<b>FULTON</b>								
FULTON MUNICIPAL WATER SYSTEM	2.5	25	66					66
HICKMAN WATER DEPARTMENT				75				75
FULTON MUNICIPAL WATER SYSTEM			0	263				263
<b>TOTAL</b>	<b>2.5</b>	<b>25</b>	<b>66</b>	<b>338</b>				<b>404</b>
<b>GRAVES</b>								
CONSUMER W/D	2.2	50	57					57
MAYFIELD ELECTRIC & WATER	29.8	527	775					775
<b>TOTAL</b>	<b>32.0</b>	<b>577</b>	<b>831</b>					<b>831</b>
<b>HICKMAN</b>								
U.S. UTILITIES	11.9	70	310					310
<b>TOTAL</b>	<b>11.9</b>	<b>70</b>	<b>310</b>					<b>310</b>
<b>MCCRACKEN</b>								
REIDLAND W/D	4.5	67	117					117
WEST MCCRACKEN W/D	94.4	317	2,454					2,454
<b>TOTAL</b>	<b>98.9</b>	<b>384</b>	<b>2,571</b>					<b>2,571</b>
<b>MARSHALL</b>								
JONATHAN CREEK W/D	19.7	188	512					512
<b>TOTAL</b>	<b>19.7</b>	<b>188</b>	<b>512</b>					<b>512</b>
<b>PURCHASE</b>	<b>323</b>	<b>2,687</b>	<b>8,403</b>	<b>338</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>8,741</b>



## BALLARD COUNTY

### (Ballard County Water Service Area Map)

- Estimated 1999 population of 8,400--over 50% on public water
- Estimated 2020 population of 9,100--57% on public water
- 40 miles of water lines, with plans for 45 additional miles
- Estimated funding needs for public water 2000-2005--\$479,000
- Estimated funding needs for public water 2006-2020--\$895,000

Ballard County had an estimated population of 8,428 (3,667 households) in 1999, with a projected population of 9,116 (4,169 households) in the year 2020. Public water is provided to 1,900 customers, or over 50 percent of the county's residents. The western portion of Ballard County is a Wildlife Management Area (WMA); this WMA stops all growth into Far Western Ballard County, thus eliminating the need for potable water in the area. Areas of the county not served by public water rely on private domestic wells. About 295 new households will be placed on public water through line extensions in 2000-2020.

#### *Estimated Costs - Proposed Projects, 2000-2005*

COUNTY/System		New Customers		Rehab	Source	Treatment	Tanks/ Pumps	Total
	Miles	Number	Cost in \$1000	in \$1000	in \$1000	in \$1000	in \$1000	in \$1000
<b>BALLARD</b>								
LACENTER WATER SYSTEM				201				201
WICKLIFFE WATER SYSTEM	5.2	20	136					136
KEVIL WATER SYSTEM	5.5	40	142					142
<b>TOTAL</b>	<b>10.7</b>	<b>60</b>	<b>278</b>	<b>201</b>				<b>479</b>

#### *Estimated Costs - Proposed Projects, 2006-2020*

COUNTY/System		New Customers		Rehab	Source	Treatment	Tanks/ Pumps	Total
	Miles	Number	Cost in \$1000	in \$1000	in \$1000	in \$1000	in \$1000	in \$1000
<b>BALLARD</b>								
BARLOW WATER & SEWER	11.3	30	293					293
LACENTER WATER SYSTEM	4.3	53	111					111
KEVIL WATER SYSTEM	8.9	80	232					232
LACENTER WATER SYSTEM	5.7	45	149					149
WICKLIFFE WATER SYSTEM	4.3	25	111					111
<b>TOTAL</b>	<b>34.4</b>	<b>233</b>	<b>895</b>					<b>895</b>

# WATER SERVICE AREAS BALLARD COUNTY Kentucky



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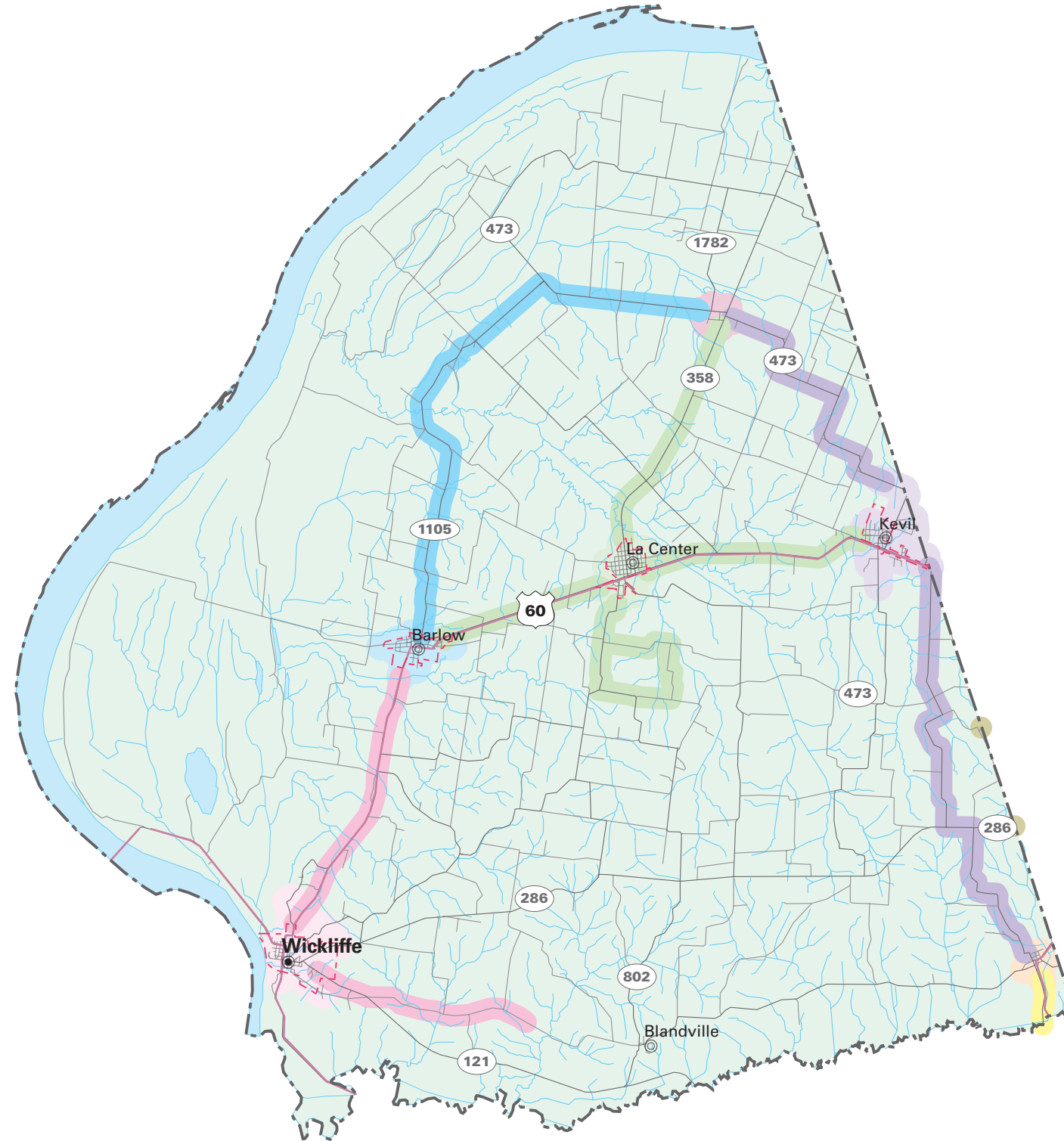
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Kentucky Area Development Districts



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**WATER SERVICE STATUS BY OWNER**

EXISTING SERVICE AREA	PROPOSED SERVICE AREA	OWNER
		WICKLIFFE MUNICIPAL WATER SYSTEM
		WEST MCCRACKEN COUNTY WATER DISTRICT
		LOVELACEVILLE WATER COMPANY
		LACENTER MUNICIPAL WATER COMPANY
		KEVIL WATER DEPARTMENT
		CUNNINGHAM WATER DISTRICT
		BARLOW WATER SYSTEM
		BANDANA WATER DISTRICT

**PUBLIC WATER SYSTEMS**

Ballard County is served by 7 community water systems--4 municipal, 2 private, 1 water district--and 4 non-community water systems.

**BANDANA WATER DISTRICT**

PWSID: ..... 0040015  
 System Type:..... COMMUNITY  
 Owner Type: ..... WATER DISTRICT  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.03  
 Percent Daily Average Production: ..... 56.00  
 Total Tank Storage Capacity (gallons):..... 1,000.00  
 Total Service Connections: ..... 97.00  
 Number of Employees:..... 0.00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 2BD  
 Customer Rate for 1,000 Gallons:..... 3.51  
 O/M costs 1997:..... 11,909.62  
 O/M costs per Service Connection: ..... 11,909.62  
 Net Revenue 1997: ..... 1,006.03  
 Total Water Produced 1997 (gallons):..... 4,568,592.00  
 Water Sold 1997 (gallons):..... 4,568,592.00  
 Unaccounted-for Water 1997 (%): ..... 0.00

The Bandana Water District has 97 customers and has no fulltime employees. The water system withdraws about 5,000 gallons per day from two wells. The water treatment plant can treat 30,000 gallons per day and processes about 17,000 gallons per day (56% of its capacity).

**BARLOW WATER SYSTEM**

PWSID: ..... 0040020  
 System Type:..... COMMUNITY  
 Owner Type: ..... MUNICIPAL  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.43  
 Percent Daily Average Production: ..... 18.00  
 Total Tank Storage Capacity (gallons):..... 100,000.00  
 Total Service Connections: ..... 360.00  
 Number of Employees:..... 2.00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 2BD  
 Customer Rate for 1,000 Gallons:..... Not available  
 O/M costs 1997:..... Not available

O/M costs per Service Connection: ..... Not available  
 Net Revenue 1997: ..... Not available  
 Total Water Produced 1997 (gallons): ..... Not available  
 Water Sold 1997 (gallons): ..... Not available  
 Unaccounted-for Water 1997 (%): ..... Not available

Barlow Water and Sewer, a municipal water system, serves 360 customers and has two employees. It obtains the water from a ground source from two wells. The system has a permitted withdrawal of 85,000 gallons per day, but they draw on the average of only 70,000 gallons per day. Barlow Water & Sewer has a storage capacity of 113,000 gallons. The plant requires an operator to be certified to operate at least a class IIBD. The plant operator is also the distribution operator. The system spends 58% of its revenues on operation and maintenance.

**KEVIL WATER DEPARTMENT**

PWSID: ..... 0040223  
 System Type: ..... COMMUNITY  
 Owner Type: ..... MUNICIPAL  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD): ..... 0.07  
 Percent Daily Average Production: ..... 23.00  
 Total Tank Storage Capacity (gallons): ..... 50,000.00  
 Total Service Connections: ..... 418.00  
 Number of Employees: ..... 2.00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 2BD  
 Customer Rate for 1,000 Gallons: ..... Not available  
 O/M costs 1997: ..... Not available  
 O/M costs per Service Connection: ..... Not available  
 Net Revenue 1997: ..... Not available  
 Total Water Produced 1997 (gallons): ..... Not available  
 Water Sold 1997 (gallons): ..... Not available  
 Unaccounted-for Water 1997 (%): ..... Not available

The Kevil municipal water system serves 390 customers and employs 2 fulltime employees. The system withdraws water from two wells. The permitted withdrawal is 125,000 gallons per day and they withdraw an average 88,000 gallons per day. The treatment plant has a 24-hour rated capacity of 72,000 gallons per day. The plant requires an operator be licensed at class II.

**LACENTER MUNICIPAL WATER COMPANY**

PWSID: ..... 0040228  
 System Type:..... COMMUNITY  
 Owner Type:..... MUNICIPAL  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.08  
 Percent Daily Average Production: ..... 35.00  
 Total Tank Storage Capacity (gallons):..... 75,000.00  
 Total Service Connections: ..... 480.00  
 Number of Employees:..... 6.00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 2BD  
 Customer Rate for 1,000 Gallons:..... Not available  
 O/M costs 1997:..... Not available  
 O/M costs per Service Connection: ..... Not available  
 Net Revenue 1997: ..... Not available  
 Total Water Produced 1997 (gallons):..... Not available  
 Water Sold 1997 (gallons):..... Not available  
 Unaccounted-for Water 1997 (%): ..... Not available

LaCenter Water Department is a municipal water system that employs 4 full time and 2 part time individuals and serves 480 customers. The system has a permitted withdrawal of 187,000 gallons per day. Average withdrawal is 165,000 gallons per day. System treatment capacity is 300,000 gallons per day. The system has storage capacity of 75,000 gallons. The water department spends about 73% of its revenue on operation and maintenance. The plant requires a class IIBD licensed operator.

**LOVELACEVILLE WATER COMPANY**

PWSID: ..... 0040259  
 System Type:..... COMMUNITY  
 Owner Type:..... MUNICIPAL  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.01  
 Percent Daily Average Production: ..... 4.00  
 Total Tank Storage Capacity (gallons):..... 1,000.00  
 Total Service Connections: ..... 62.00  
 Number of Employees:..... 0.00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 2BD  
 Customer Rate for 1,000 Gallons:..... 11,673.00  
 O/M costs 1997:..... 11,673.00  
 O/M costs per Service Connection: ..... 194.55

Net Revenue 1997: .....	3,635.00
Total Water Produced 1997 (gallons):.....	2,668,496.00
Water Sold 1997 (gallons):.....	2,597,866.00
Unaccounted-for Water 1997 (%): .....	2.65

The Lovelaceville water company serves 62 customers and employs 1 fulltime employee. The system is individually owned. The system obtains its water from a well that has a permitted withdrawal of 9,999 gallons per day, and on the average the system withdraws 6,500 per day. The system has one tank that hold 1,000 gallons of water. At present the plant spends 110% of revenue on operation and maintenance.

**WICKLIFFE MUNICIPAL WATER SYSTEM**

PWSID: .....	0040469
System Type:.....	COMMUNITY
Owner Type: .....	MUNICIPAL
Surface Source:	
Purchase Source:	
Well Source: .....	Yes
Sells Water to:	
Treatment Plant Capacity (MGD):.....	0.50
Percent Daily Average Production: .....	34.00
Total Tank Storage Capacity (gallons):.....	200,000.00
Total Service Connections: .....	526.00
Number of Employees:.....	4.00
Treatment Operator Class:.....	2D
Distribution Operator Class: .....	3B
Customer Rate for 1,000 Gallons:.....	Not available
O/M costs 1997:.....	Not available
O/M costs per Service Connection: .....	Not available
Net Revenue 1997: .....	Not available
Total Water Produced 1997 (gallons):.....	Not available
Water Sold 1997 (gallons):.....	Not available
Unaccounted-for Water 1997 (%): .....	Not available

The City of Wickliffe water system serves 526 customers and employs 4 fulltime employees. The system on the average withdraws 110,000 gallons per day from two wells. The treatment plant has a 24-hour rated capacity of 500,000 gallons. The plant processes 225,000 gallons per day, operating at 45%. The city has a storage capacity of 354,000 gallons. The city spends 74% of the systems revenues on operation and maintenance. The system requires a class IIIB licensed operator.

## OTHER SYSTEMS

### **ALDERSON TRAILER COURTS**

Alderson Trailer Courts is located in Ballard County. The system serves a population of 20 and has 7 service connections. The private, community system water source is ground water from wells.

### **ROBERT NEWTON TRAILER PARK**

Robert Newton Trailer Park is located in Ballard County. The system serves a population of 20 and has 8 service connections. The private, transient, non-community system has treatment capacity of 10,000 gallons per day. The water source is ground water from wells.

### **WESTVACO TIMBERLANDS**

Westvaco Timberlands is located in Ballard County. The system serves a population of 24 and has 1 service connection. The private, transient, non-community system water source is ground water from wells.

### **BALLARD WILDLIFE AREA**

Ballard Wildlife Area is located in Ballard County. The system serves a population of 21 and has 1 service connection. The private, transient, non-community system has treatment capacity of 850,000 gallons per day. The water source is ground water from wells.

### **TRAILS END RANCH**

Trails End Ranch is located in Ballard County. The system serves a population of 90 and has 1 service connection. The private, transient, non-community system water source is ground water from wells.

## PRIVATE DOMESTIC SYSTEMS

About 4,100 people in Ballard County rely on private domestic wells for their source of water.

Abundant quantities of ground water is available for domestic, irrigation, and industrial uses in Ballard County from depths of a few feet down to 600 feet. In general, the chemical quality of the water is good, but water from some aquifers contains objectionable amounts of

iron and manganese. Water from alluvium is generally hard to very hard. Generally, depths to ground-water is under 100 feet except in the uplands of southern Ballard County where sufficient ground water is obtained at depths greater than 100 feet.

Water quality generally is good except in areas where downward percolation of surface water and fluids from domestic sewage-disposal systems, and other sources of domestic or industrial pollution have contaminated the aquifer. Ground water sometimes contains iron naturally in objectionable amounts from the deeper zones. In some formations with slightly acidic ground-water, a chemical reaction between the acidic ground-water and steel well casing and pump equipment will produce a high iron content in the water which is not naturally occurring.



## CALLOWAY COUNTY

### (Calloway County Water Service Area Map)

- Estimated 1999 population of 29,400-- 69% on public water
- Estimated 2020 population of 28,100--85% on public water
- 200 miles of water lines, with plans for 215 additional miles
- Estimated funding needs for public water 2000-2005--\$3,631,000
- Estimated funding needs for public water 2006-2020--\$3,218,000

Calloway County had an estimated population of 29,427 (13,214 households) in 1999 with a projected population of 28,100 (13,600 households) in 2020. Public water is provided to nearly 9,000 customers, or almost 70% of the county residents. In the remainder of the county, about 2/3 were served by wells and 1/3 by other sources. The population of the county is projected to decline by the year 2020. About 2,160 new households will be placed on public water through line extensions in 2000-2020.

#### *Estimated Costs - Proposed Projects, 2000-2005*

COUNTY/System		New Customers		Rehab	Source	Treatment	Tanks/ Pumps	Total
	Miles	Number	Cost in \$1000	in \$1000	in \$1000	in \$1000	in \$1000	in \$1000
<b>CALLOWAY</b>								
MURRAY WATER SYSTEM	90.6	947	2,356				1,275	3,631
<b>TOTAL</b>	<b>90.6</b>	<b>947</b>	<b>2,356</b>				<b>1,275</b>	<b>3,631</b>

#### *Estimated Costs - Proposed Projects, 2006-2020*

COUNTY/System		New Customers		Rehab	Source	Treatment	Tanks/ Pumps	Total
	Miles	Number	Cost in \$1000	in \$1000	in \$1000	in \$1000	in \$1000	in \$1000
<b>CALLOWAY</b>								
MURRAY WATER SYSTEM	45.6	624	1,186					1,186
BARDWELL CITY UTILITIES	24.3	162	632					632
CUNNINGHAM W/D	26.8	209	698					698
BARDWELL CITY UTILITIES	13.8	102	358					358
ARLINGTON WATER DEPARTMENT	13.3	113	345					345
<b>TOTAL</b>	<b>123.8</b>	<b>1210</b>	<b>3,218</b>					<b>3,218</b>

### PUBLIC WATER SYSTEMS

Calloway County is served by 23 water systems: 15 community systems--6 private, 4 water districts, 3 water associations, 2 municipalities--and 9 non-community systems. The Murray Water System is the primary water provider, serving about 3/4 of the households in the county and providing water to other systems.

# WATER SERVICE AREAS CALLOWAY COUNTY Kentucky

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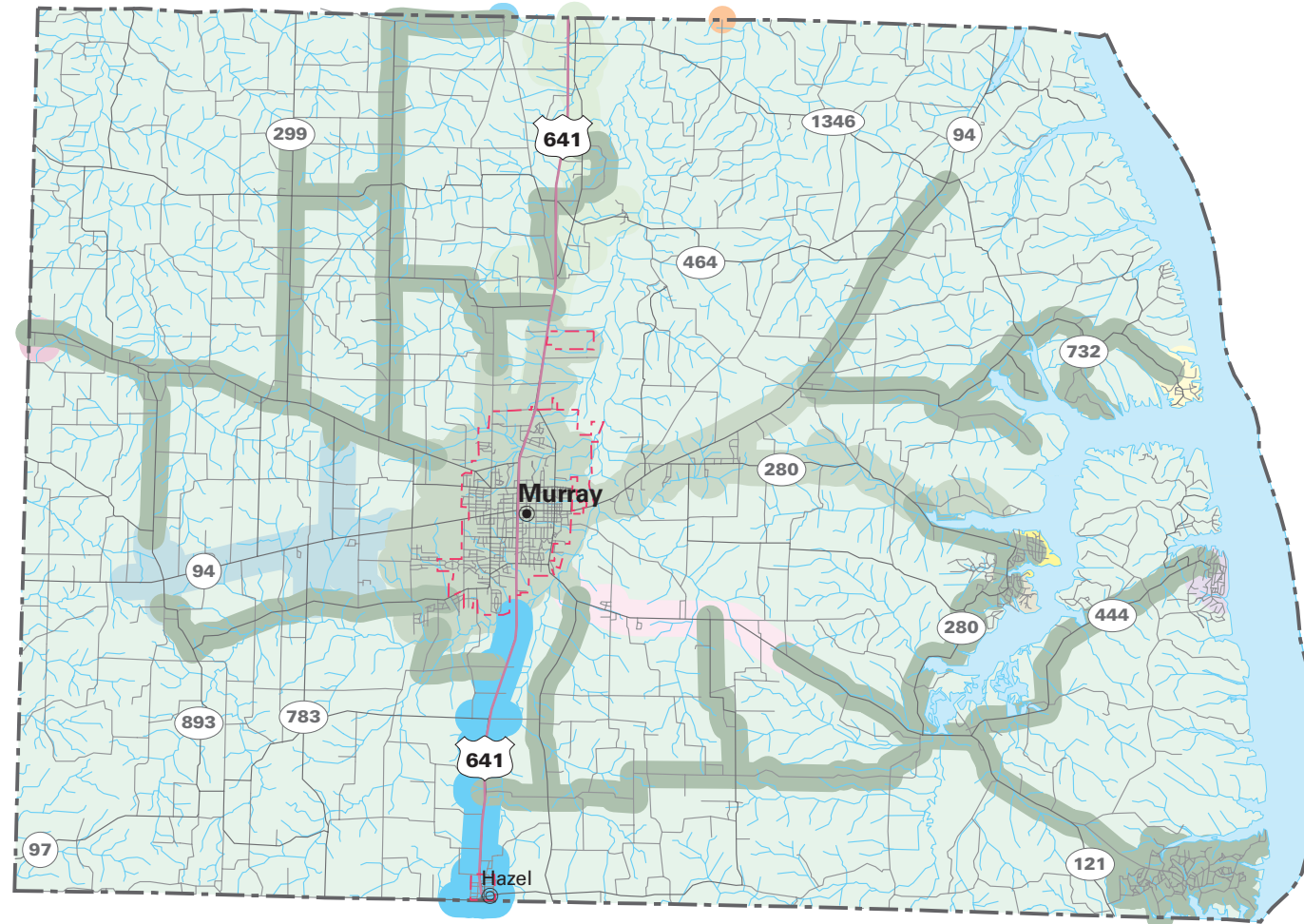
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### WATER SERVICE STATUS BY OWNER

EXISTING SERVICE AREA	PROPOSED SERVICE AREA	OWNER
		SOUTH 641 WATER DISTRICT
		PANORAMA SHORES WATER ASSOCIATION
		MURRAY WATER SYSTEM
		MURRAY WATER DISTRICT #3
		MURRAY WATER DISTRICT #2
		LAKEWAY SHORES WATER ASSOCIATION INCORPORATED
		JONATHAN CREEK WATER DISTRICT
		DEXTER ALMO HEIGHTS WATER DISTRICT
		COOL WATER WORKS INCORPORATED
		CENTER RIDGE WATER SYSTEM
		BENTON WATER AND SEWER SYSTEM
		BENDEFIELD WATER ASSOCIATION

**DEXTER ALMO HEIGHTS WATER DISTRICT**

PWSID: .....	0180102
System Type:.....	COMMUNITY
Owner Type:.....	WATER DISTRICT
Surface Source:	
Purchase Source: .....	CITY OF MURRAY
Well Source:	
Sells Water to:	
Treatment Plant Capacity (MGD):.....	0.00
Percent Daily Average Production: .....	0.00
Total Tank Storage Capacity (gallons):.....	0.00
Total Service Connections: .....	415.00
Number of Employees:.....	0.00
Treatment Operator Class:.....	1D
Distribution Operator Class:	
Customer Rate for 1,000 Gallons:.....	4.14
O/M costs 1997:.....	84,589.18
O/M costs per Service Connection: .....	180.36
Net Revenue 1997: .....	19,002.65
Total Water Produced 1997 (gallons):.....	0.00
Water Sold 1997 (gallons):.....	28,505,367.00
Unaccounted-for Water 1997 (%): .....	16.50

The Dexter-Almo Heights Water District currently serves 415 customers. The system purchases its water from the Murray Water System. The system spends 45% of its revenues on operation and maintenance.

**SOUTH 641 WATER DISTRICT**

PWSID: .....	0180185
System Type:.....	COMMUNITY
Owner Type:.....	WATER DISTRICT
Surface Source:	
Purchase Source: .....	CITY OF MURRAY
Well Source:	
Sells Water to:	
Treatment Plant Capacity (MGD):.....	0.00
Percent Daily Average Production: .....	0.00
Total Tank Storage Capacity (gallons):.....	50,000.00
Total Service Connections: .....	353.00
Number of Employees:.....	1.00
Treatment Operator Class:.....	1D
Distribution Operator Class:	
Customer Rate for 1,000 Gallons:.....	5.69
O/M costs 1997:.....	54,461.00
O/M costs per Service Connection: .....	162.57
Net Revenue 1997: .....	15,716.00
Total Water Produced 1997 (gallons):.....	0.00
Water Sold 1997 (gallons):.....	17,778,730.00
Unaccounted-for Water 1997 (%): .....	14.46

The South 641 Water District currently serves 353 customers through water purchased from the Murray Water System. The system currently purchases 58,000 gallons per day, and has a storage capacity of 125,000 gallons in two tanks. The system currently spends approximately 69% of its revenue on operation and maintenance.

**MURRAY WATER DISTRICT #2**

PWSID: ..... 0180308  
 System Type:..... COMMUNITY  
 Owner Type: ..... WATER DISTRICT  
 Surface Source:  
 Purchase Source: ..... CITY OF MURRAY  
 Well Source:  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.00  
 Percent Daily Average Production: ..... 0.00  
 Total Tank Storage Capacity (gallons):..... 0.00  
 Total Service Connections: ..... 200.00  
 Number of Employees:..... 0.00  
 Treatment Operator Class:..... 1D  
 Distribution Operator Class:  
 Customer Rate for 1,000 Gallons:..... 3.25  
 O/M costs 1997:..... 33,349.69  
 O/M costs per Service Connection: ..... 165.10  
 Net Revenue 1997: ..... 7,014.59  
 Total Water Produced 1997 (gallons):..... 0.00  
 Water Sold 1997 (gallons):..... 13,612,900.00  
 Unaccounted-for Water 1997 (%): ..... 3.48

The system currently serves 200 customers and employs no fulltime employees. The system purchases 40,000 gallons a day from Murray Water System. The system spends 85% of its revenue on operation and maintenance.

**MURRAY WATER DISTRICT #3**

PWSID: ..... 0180309  
 System Type:..... COMMUNITY  
 Owner Type: ..... WATER DISTRICT  
 Surface Source:  
 Purchase Source: ..... CITY OF MURRAY  
 Well Source:  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.00  
 Percent Daily Average Production: ..... 0.00  
 Total Tank Storage Capacity (gallons):..... 0.00  
 Total Service Connections: ..... 291.00  
 Number of Employees:..... 2.00  
 Treatment Operator Class:..... 1D  
 Distribution Operator Class:

Customer Rate for 1,000 Gallons:.....	3.21
O/M costs 1997:.....	57,621.80
O/M costs per Service Connection:.....	196.66
Net Revenue 1997:.....	2,224.64
Total Water Produced 1997 (gallons):.....	0.00
Water Sold 1997 (gallons):.....	20,625,700.00
Unaccounted-for Water 1997 (%):.....	0.00

The system currently serves 291 customers. The system purchases approximately 55,000 gallons per day from the Murray Water System. The system spends 91% of revenue on operation and maintenance.

**MURRAY WATER SYSTEM**

PWSID:.....	0180306
System Type:.....	COMMUNITY
Owner Type:.....	MUNICIPAL
Surface Source:	
Purchase Source:.....	CITY OF MURRAY
Well Source:.....	Yes
Sells Water to:.....	SOUTH 641 WATER DISTRICT
Treatment Plant Capacity (MGD):.....	7.00
Percent Daily Average Production:.....	46.00
Total Tank Storage Capacity (gallons):.....	1,250,000.00
Total Service Connections:.....	6,453.00
Number of Employees:.....	30.00
Treatment Operator Class:.....	3D
Distribution Operator Class:.....	4B
Customer Rate for 1,000 Gallons:.....	Not available
O/M costs 1997:.....	Not available
O/M costs per Service Connection:.....	Not available
Net Revenue 1997:.....	Not available
Total Water Produced 1997 (gallons):.....	Not available
Water Sold 1997 (gallons):.....	Not available
Unaccounted-for Water 1997 (%):.....	Not available

The Murray Water System currently serves 6,929 customers and sells water to four water systems. The system provides its customers from six wells. The treatment plant is rated to treat 7 million gallons per day. The average daily production is 3.1 million gallons per day. The system has 5 water tanks with a combined capacity of 4.75 million gallons. The system is a class IV.

**CENTER RIDGE WATER SYSTEM**

PWSID:.....	0180549
System Type:.....	COMMUNITY
Owner Type:.....	WATER ASSOCIATION
Surface Source:	

Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.09  
 Percent Daily Average Production: ..... 40.00  
 Total Tank Storage Capacity (gallons):..... 1,000.00  
 Total Service Connections: ..... 77.00  
 Number of Employees:..... 0.00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 1BD  
 Customer Rate for 1,000 Gallons:..... 1.61  
 O/M costs 1997:..... 8,585.00  
 O/M costs per Service Connection: ..... 111.49  
 Net Revenue 1997: ..... 3,043.00  
 Total Water Produced 1997 (gallons):..... 7,366,000.00  
 Water Sold 1997 (gallons):..... 7,218,680.00  
 Unaccounted-for Water 1997 (%): ..... 2.00

Center Ridge currently has 77 customers, and has a daily withdrawal of 24,000 from its one well. The treatment plant treats on the average of 21,000 gallons per day, but has a capacity of 87,000. The system has a storage capacity of 1,000 gallons. The system spends 73% of its revenue on operation and maintenance.

**BENDEFIELD WATER ASSOCIATION**

PWSID: ..... 0180103  
 System Type:..... COMMUNITY  
 Owner Type: ..... WATER DISTRICT  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.03  
 Percent Daily Average Production: ..... 40.00  
 Total Tank Storage Capacity (gallons):..... 750.00  
 Total Service Connections: ..... 19.00  
 Number of Employees:..... 1.50  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 1BD  
 Customer Rate for 1,000 Gallons:..... Not available  
 O/M costs 1997:..... Not available  
 O/M costs per Service Connection: ..... Not available  
 Net Revenue 1997: ..... Not available  
 Total Water Produced 1997 (gallons):..... Not available  
 Water Sold 1997 (gallons):..... Not available  
 Unaccounted-for Water 1997 (%): ..... Not available

The Association currently has 19 customers. The association withdraws approximately 4000 gallons per day and the same amount is treated at the treatment plant. The System has a storage capacity of 750 gallons. It is rated as an IBD, and employs one fulltime employee.

**PANORAMA SHORES WATER ASSOCIATION**

PWSID: ..... 0180506  
System Type:..... COMMUNITY  
Owner Type: ..... WATER ASSOCIATION  
Surface Source:  
Purchase Source:  
Well Source: ..... Yes  
Sells Water to:  
Treatment Plant Capacity (MGD):..... 0.05  
Percent Daily Average Production: ..... 43.00  
Total Tank Storage Capacity (gallons):..... 4,000.00  
Total Service Connections: ..... 125.00  
Number of Employees:..... 2.00  
Treatment Operator Class:  
Distribution Operator Class: ..... 1BD  
Customer Rate for 1,000 Gallons:..... Not available  
O/M costs 1997:..... Not available  
O/M costs per Service Connection: ..... Not available  
Net Revenue 1997: ..... Not available  
Total Water Produced 1997 (gallons):..... Not available  
Water Sold 1997 (gallons):..... Not available  
Unaccounted-for Water 1997 (%): ..... Not available

The association currently has 125 members that are provided water from two wells. The wells have an average daily withdrawal of 20,000 gallons per day. The treatment plant treats 24,000 gallons per day. The system has a 4,000 gallon water tank for storage. The system spends 84% of its revenues on operation and maintenance. The system is a class IID system, and has 2 fulltime employees.

**LAKEWAY SHORES WATER ASSOCIATION INCORPORATED**

PWSID: ..... 0180508  
System Type:..... COMMUNITY  
Owner Type: ..... WATER ASSOCIATION  
Surface Source:  
Purchase Source:  
Well Source: ..... Yes  
Sells Water to:  
Treatment Plant Capacity (MGD):..... 0.00  
Percent Daily Average Production: ..... 24.00  
Total Tank Storage Capacity (gallons):..... 1,800.00  
Total Service Connections: ..... 64.00  
Number of Employees:..... 0.00

Treatment Operator Class:  
 Distribution Operator Class: ..... 1BD  
 Customer Rate for 1,000 Gallons:..... Not available  
 O/M costs 1997:..... Not available  
 O/M costs per Service Connection: ..... Not available  
 Net Revenue 1997: ..... Not available  
 Total Water Produced 1997 (gallons):..... Not available  
 Water Sold 1997 (gallons):..... Not available  
 Unaccounted-for Water 1997 (%): ..... Not available

The association has 64 members. The association currently withdraws 9,000 gallons per day from its well. The association has another well for emergency purposes. The association's treatment plant is rated to treat only 2,000 gallons per day, but has an average daily treatment of 6,800 gallons per day. The system has on storage tank that holds 1,800 gallons. The system spends 11% of revenue on operation and maintenance. .

**COOL WATER WORKS INCORPORATED**

PWSID: ..... 0180509  
 System Type:..... COMMUNITY  
 Owner Type: ..... PRIVATE  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.07  
 Percent Daily Average Production: ..... 15.00  
 Total Tank Storage Capacity (gallons):..... 2,500.00  
 Total Service Connections: ..... 109.00  
 Number of Employees:..... 0.00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 2BD  
 Customer Rate for 1,000 Gallons:..... 0.00  
 O/M costs 1997:..... 13,166.03  
 O/M costs per Service Connection: ..... 105.33  
 Net Revenue 1997: ..... 1,599.47  
 Total Water Produced 1997 (gallons):..... 0.00  
 Water Sold 1997 (gallons):..... 0.00  
 Unaccounted-for Water 1997 (%): ..... 0.00

Cool Water Works currently has 109 customers and has no fulltime employees. The system currently withdraws 9,600 gallons per day from its two wells. The system has a treatment plant, which currently treats all the water the system uses. The private, community system has treatment capacity of 69,000 gallons per day and storage capacity of 2,500 gallons.



## OTHER SYSTEMS

### **SHADY OAK TRAILER PARK**

Shady Oak Trailer Park is located in Calloway County. The system serves a population of 277 and has 84 service connections. The private, community system has treatment capacity of 48,000 gallons per day. The water source is ground water from wells.

### **STELLA TRAILER PARK**

Stella Trailer Park is located in Calloway County. The system serves a population of 92 and has 28 service connections. The private, community system has treatment capacity of 7,000 gallons per day. The water source is ground water from wells.

### **KENIANA HOMOWNERS ASSOC**

Keniana Homowners Assoc is located in Calloway County. The system serves a population of 132 and has 40 service connections. The private, community system has treatment capacity of 29,000 gallons. The water source is ground water from wells.

### **IRVIN COBB RESORT**

Irvin Cobb Resort is located in Calloway County. The system serves a population of 49 and has 30 service connections. The private, community system has treatment capacity of 10,800 gallons per day. The water source is ground water from wells.

### **PARADISE RESORT**

Paradise Resort is located in Calloway County. The system serves a population of 40 and has 1 service connection. The transient, non-community system water source is ground water from wells.

### **DOGWOOD RESORT**

Dogwood Resort is located in Calloway County. The system serves a population of 130 and has 38 service connections. The private, transient, non-community system has treatment capacity of 28,800 gallons per day. The water source is ground water from wells.

**CYPRESS SPRINGS RESORT**

Cypress Springs Resort is located in Calloway County. The system serves a population of 200 and has 2 service connections. The private, transient, non-community system has treatment capacity of 15,000 gallons per day. The water source is ground water from wells.

**LYNHURST RESORT**

Lynhurst Resort is located in Calloway County. The system serves a population of 85 and has 1 service connection. The private, transient, non-community system has treatment capacity of 6,000 gallons per day. The water source is ground water from wells.

**BLOOD RIVER TRAILER PARK**

Blood River Trailer Park is located in Calloway County. The system serves a population of 100 and has 30 service connections. The private, transient, non-community system has treatment capacity of 20,000 gallons per day. The water source is ground water from wells.

**LAKEVIEW RV PARK**

Lakeview Rv Park is located in Calloway County. The system serves a population of 200 and has 65 service connections. The private, transient, non-community system has treatment capacity of 15,000 gallons per day. The water source is ground water from wells.

**L H & M WATER ASSOCIATION**

L H & M Water Association is located in Calloway County. The system serves a population of 96 and has 29 service connections. The association, transient, non-community system has treatment capacity of 7,000 gallons per day. The water source is ground water from wells.

**MISSING HILL RESORT**

Missing Hill Resort is located in Calloway County. The system serves a population of 25 and has 6 service connections. The private, transient, non-community system has treatment capacity of 5,000 gallons per day. The water source is ground water from wells.

**IRVIN COBB MARINIA**

Irvin Cobb Marinia is located in Calloway County. The system serves a population of 39 and has 1 service connection. The private, transient, non-community system has treatment capacity of 2,000 gallons per day. The water source is ground water from wells.

**MSU HANDCOCK BID**

Msu Handcock Bid Station is located in Calloway County. The system serves a population of 30 and has 1 service connection. The state, transient, non-community system has treatment capacity of 7,000 gallons per day. The water source is ground water from wells.

**PRIVATE DOMESTIC SYSTEMS**

About 8,500 people in Calloway County rely on private domestic water supplies: 5,700 on wells, and 2,800 on other sources.

Abundant quantities of ground-water is available for domestic, irrigation, and industrial uses in Calloway County from depths of a few feet to below 700 feet with most wells less than 100 foot. A few wells obtain shallow perched water from gravel or alluvial deposits but these zones often will not yield sufficient water for an adequate domestic supply during periods of low rainfall, which is common in late summer and fall. In general, the chemical quality of the water is good, but water from some aquifers contains objectionable amounts of iron and manganese. Water from alluvium and limestone in this county is generally hard to very hard with moderate to high levels of dissolved solids. Water from the unconsolidated sand and/or gravel, non-alluvium aquifers are considered soft and slightly acidic with low dissolved solids. Water quality generally is good except in areas where downward percolation of surface water and fluids from domestic sewage-disposal systems, and other sources of domestic or industrial pollution have contaminated the aquifer. In a few wells harmful amounts of nitrate have been detected. Ground water sometimes contains iron naturally in objectionable amounts from the deeper zones. In some formations with slightly acidic ground-water, a chemical reaction between the acidic ground-water and steel well casing and pump equipment will produce a high iron content in the water which is not naturally occurring.

## CARLISLE COUNTY

### (Carlisle County Water Service Area Map)

- Estimated 1999 population of 5,400--45% on public water
- Estimated 2020 population of 5,300--49% on public water
- 33 miles of water lines, with plans for 13 additional miles
- Estimated funding needs for public water 2000-2005--\$2,180,000
- Estimated funding needs for public water 2006-2020--\$0

Carlisle County had an estimated population of 5,409 (2,334 households) in 1999 with a projected population of 5,266 (2,409 households) in 2020. Public water is provided to nearly 1,000 customers, or about 45% of the county residents. The remainder of the county is served by private domestic wells. The population of the county is projected to decline by the year 2020. About 100 new households will be placed on public water through line extensions in 2000-2020.

### Estimated Costs - Proposed Projects, 2000-2005

COUNTY/System		New Customers		Rehab	Source	Treatment	Tanks/ Pumps	Total
	Miles	Number	Cost in \$1000	in \$1000	in \$1000	in \$1000	in \$1000	in \$1000
<b>CARLISLE</b>								
ARLINGTON WATER DEPARTMENT	2.2	15	56				425	481
BARDWELL CITY UTILITIES	5.3	30	139			1,000	425	1,564
CUNNINGHAM W/D	5.3	53	138					138
<b>TOTAL</b>	<b>12.8</b>	<b>98</b>	<b>334</b>			<b>1,000</b>	<b>850</b>	<b>2,184</b>

### PUBLIC WATER SYSTEMS

Carlisle County is served by 5 water systems: 4 community systems--2 municipal: Arlington Water Department, Bardwell City Utilities; 2 water districts: Cunningham, Milburn--and 1 non-community system. All systems rely on water wells.

#### **ARLINGTON WATER DEPARTMENT**

PWSID: ..... 0200009  
 System Type:..... COMMUNITY  
 Owner Type: ..... MUNICIPAL  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:

# WATER SERVICE AREAS CARLISLE COUNTY Kentucky



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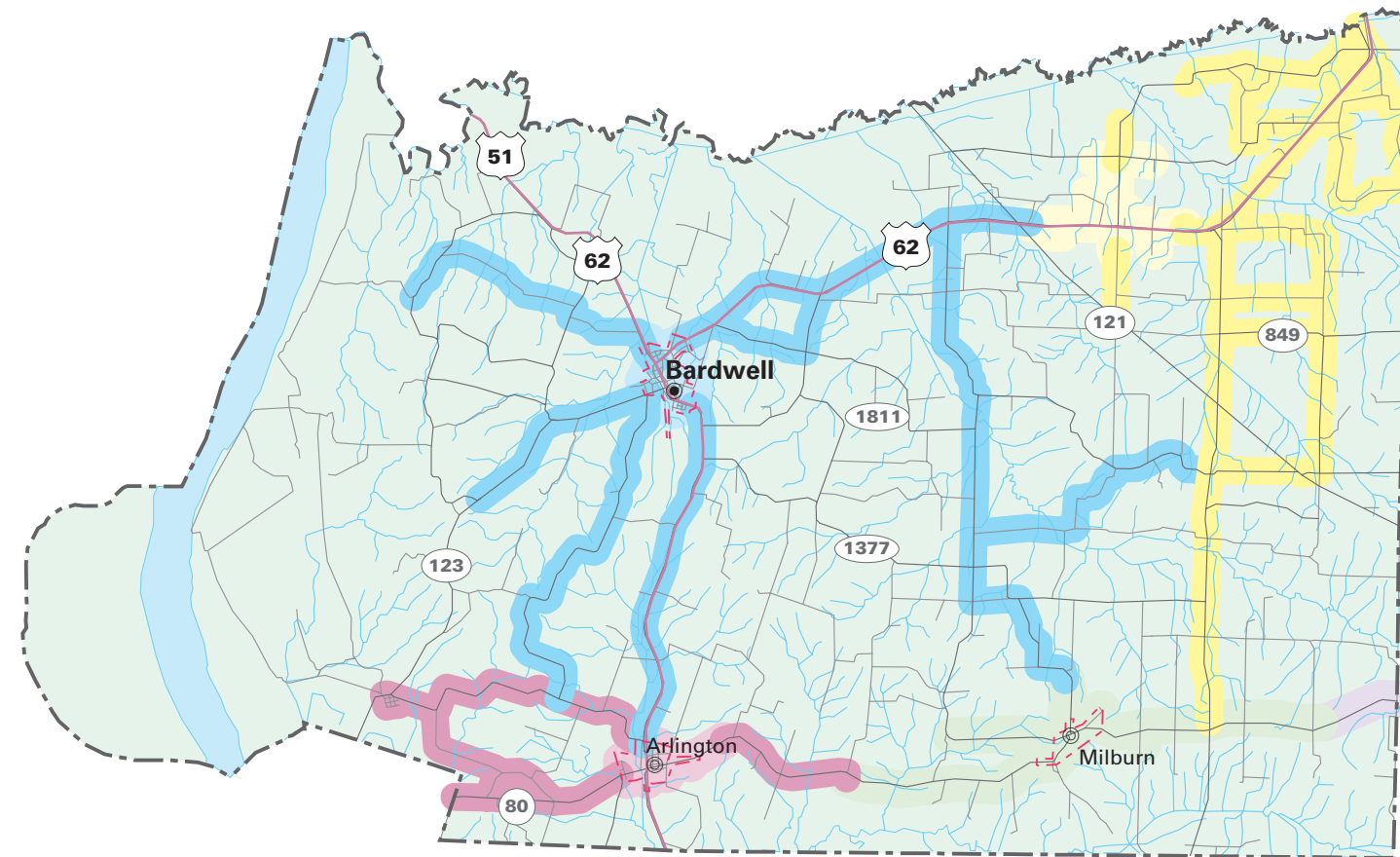
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### WATER SERVICE STATUS BY OWNER

EXISTING SERVICE AREA	PROPOSED SERVICE AREA	OWNER
		MILBURN WATER DISTRICT
		FANCY FARM WATER DISTRICT
		CUNNINGHAM WATER DISTRICT
		BARDWELL CITY UTILITIES
		ARLINGTON WATER DEPARTMENT

Treatment Plant Capacity (MGD):.....	0.28
Percent Daily Average Production: .....	16.00
Total Tank Storage Capacity (gallons):.....	125,000.00
Total Service Connections: .....	200.00
Number of Employees:.....	3.00
Treatment Operator Class:	
Distribution Operator Class: .....	2BD
Customer Rate for 1,000 Gallons:.....	Not available
O/M costs 1997:.....	Not available
O/M costs per Service Connection: .....	Not available
Net Revenue 1997: .....	Not available
Total Water Produced 1997 (gallons):.....	Not available
Water Sold 1997 (gallons):.....	Not available
Unaccounted-for Water 1997 (%): .....	Not available

The Arlington Water Department currently serves 200 customers, and has three fulltime employees. The municipal system draws its water from 2 wells. The system is allowed to withdraw 750,000 gallons a day. The systems water treatment plant has a 24-hour rated capacity of 288,000 gallons a day. The system has one tank that can hold 125,000 gallons of water.

**BARDWELL CITY UTILITIES**

PWSID: .....	0200018
System Type:.....	COMMUNITY
Owner Type: .....	MUNICIPAL
Surface Source:	
Purchase Source:	
Well Source: .....	Yes
Sells Water to:	
Treatment Plant Capacity (MGD):.....	0.32
Percent Daily Average Production: .....	37.00
Total Tank Storage Capacity (gallons):.....	100,000.00
Total Service Connections: .....	460.00
Number of Employees:.....	0.00
Treatment Operator Class:	
Distribution Operator Class: .....	2BD
Customer Rate for 1,000 Gallons:.....	Not available
O/M costs 1997:.....	Not available
O/M costs per Service Connection: .....	Not available
Net Revenue 1997: .....	Not available
Total Water Produced 1997 (gallons):.....	Not available
Water Sold 1997 (gallons):.....	Not available
Unaccounted-for Water 1997 (%): .....	Not available

Bardwell City Utilities currently serves 460 customers. The municipal water system currently withdraws on the average of 116,000 gallons per day from its two wells. The treatment plant is rated for 325,000 gallons per day, but only treats approximately 100,000 per day. The

system has a storage capacity of 100,000 gallons. The system currently spends 66% of its revenue on operation and maintenance. The current required classification of the plant is IIBD.

**CUNNINGHAM WATER DISTRICT**

PWSID: ..... 0200095  
 System Type:..... COMMUNITY  
 Owner Type:..... WATER DISTRICT  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.18  
 Percent Daily Average Production: ..... 16.00  
 Total Tank Storage Capacity (gallons):..... 150,000.00  
 Total Service Connections: ..... 135.00  
 Number of Employees:..... 1.00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 2BD  
 Customer Rate for 1,000 Gallons:..... 2.66  
 O/M costs 1997:..... 13,379.00  
 O/M costs per Service Connection: ..... 98.38  
 Net Revenue 1997: ..... 1,195.00  
 Total Water Produced 1997 (gallons):..... 7,248,000.00  
 Water Sold 1997 (gallons):..... 6,432,000.00  
 Unaccounted-for Water 1997 (%): ..... 8.97

The Cunningham Water District currently serves 135 customers. The system is allowed to withdraw 50,000 gallons per day from two wells, but only withdraws 26,000 gallons per day on the average. The treatment plant currently has an average daily production of 19,857 gallons per day, but the plant is rated for 180,000 gallons per day. The system spends 78% of its revenue on operation and maintenance.

**MILBURN WATER DISTRICT**

PWSID: ..... 0200284  
 System Type:..... COMMUNITY  
 Owner Type:..... WATER DISTRICT  
 Surface Source:  
 Purchase Source: ..... FANCY FARM WATER DISTRICT  
 Well Source:  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.00  
 Percent Daily Average Production: ..... 0.00  
 Total Tank Storage Capacity (gallons):..... 75,000.00  
 Total Service Connections: ..... 166.00  
 Number of Employees:..... 2.00

Treatment Operator Class:.....	1D
Distribution Operator Class:	
Customer Rate for 1,000 Gallons:.....	5.14
O/M costs 1997:.....	31,407.00
O/M costs per Service Connection:.....	206.63
Net Revenue 1997:.....	4,096.00
Total Water Produced 1997 (gallons):.....	0.00
Water Sold 1997 (gallons):.....	8,039,000.00
Unaccounted-for Water 1997 (%):.....	15.07

The Milburn Water District currently serves 166 customers. The system purchases its water from the Fancy Farm Water District in Graves County. The district has a storage capacity of 75,000 gallons. The system is a class A system. The system spends 74% of it revenue on operation and maintenance.

**OTHER SYSTEMS**

Carlisle County Board of Education system serves a population of 900 and has 6 service connections. The local, non-transient, non-community system has treatment capacity of 42,000gallons per day. The water source is ground water from wells.

**PRIVATE DOMESTIC SYSTEMS**

About 3,000 people in Carlisle County rely on private domestic wells for their water supply.

Abundant quantities of ground water is available for domestic, irrigation, and industrial uses in Carlisle County from depths of a few feet down to 600 feet. In general, the chemical quality of the water is good, but water from some aquifers contains objectionable amounts of iron and manganese. Water from the thick Mississippi River alluvium is generally hard to very hard. Water from the non-alluvium aquifers are considered soft and slightly acidic with low dissolved solids. Generally, depths to ground-water is under 100 feet except in the uplands of Carlisle County where sufficient ground-water is obtained at depths greater than 100 feet. Yields in some of the deeper wells are greater than 1,000 gallons per minute which is sufficient for a community or industrial supply.

Water quality generally is good except in areas where downward percolation of surface water and fluids from domestic sewage-disposal systems, and other sources of domestic or industrial pollution have contaminated the aquifer. Ground water sometimes contains iron naturally in objectionable amounts from the deeper zones. In some formations with slightly acidic



ground-water, a chemical reaction between the acidic ground-water and steel well casing and pump equipment will produce a high iron content in the water which is not naturally occurring.

## FULTON COUNTY

### (Fulton County Water Service Area Map)

- Estimated 1999 population of 7,500--94% on public water
- Estimated 2020 population of 7,200--98% on public water
- 130 miles of water lines, with plans for 10 additional miles
- Estimated funding needs for public water 2000-2005--\$3,465,000
- Estimated funding needs for public water 2006-2020--\$404,000

Fulton County had an estimated population of 7,514 (3,152 households) in 1999 with a projected population of 7,155 (3,104 households) in 2020. Public water is provided to about 3,200 customers, about 94 percent of the county's residents. The remainder of the county is served primarily by private domestic water wells. About 85 new households will be placed on public water through line extensions in 2000-2020.

#### *Estimated Costs - Proposed Projects, 2000-2005*

COUNTY/System		New Customers		Rehab	Source	Treatment	Tanks/ Pumps	Total
	Miles	Number	Cost in \$1000	in \$1000	in \$1000	in \$1000	in \$1000	in \$1000
<b>FULTON</b>								
HICKMAN WATER DEPARTMENT	4.8	30	125					125
FULTON MUNICIPAL WATER SYSTEM	2.5	31	65			2,000	1,275	3,340
<b>TOTAL</b>	<b>7.3</b>	<b>61</b>	<b>190</b>			<b>2,000</b>	<b>1,275</b>	<b>3,465</b>

#### *Estimated Costs - Proposed Projects, 2006-2020*

COUNTY/System		New Customers		Rehab	Source	Treatment	Tanks/ Pumps	Total
	Miles	Number	Cost in \$1000	in \$1000	in \$1000	in \$1000	in \$1000	in \$1000
<b>FULTON</b>								
FULTON MUNICIPAL WATER SYSTEM	2.5	25	66					66
HICKMAN WATER DEPARTMENT				75				75
FULTON MUNICIPAL WATER SYSTEM			0	263				263
<b>TOTAL</b>	<b>2.5</b>	<b>25</b>	<b>66</b>	<b>338</b>				<b>404</b>

### PUBLIC WATER SYSTEMS

Fulton County is served by two municipal water systems: the Fulton Municipal Water System, serving about 1,800 customers, and the Hickman Water Department, serving nearly 1,400 customers. Both systems rely on wells as their source of water.

# WATER SERVICE AREAS FULTON COUNTY Kentucky



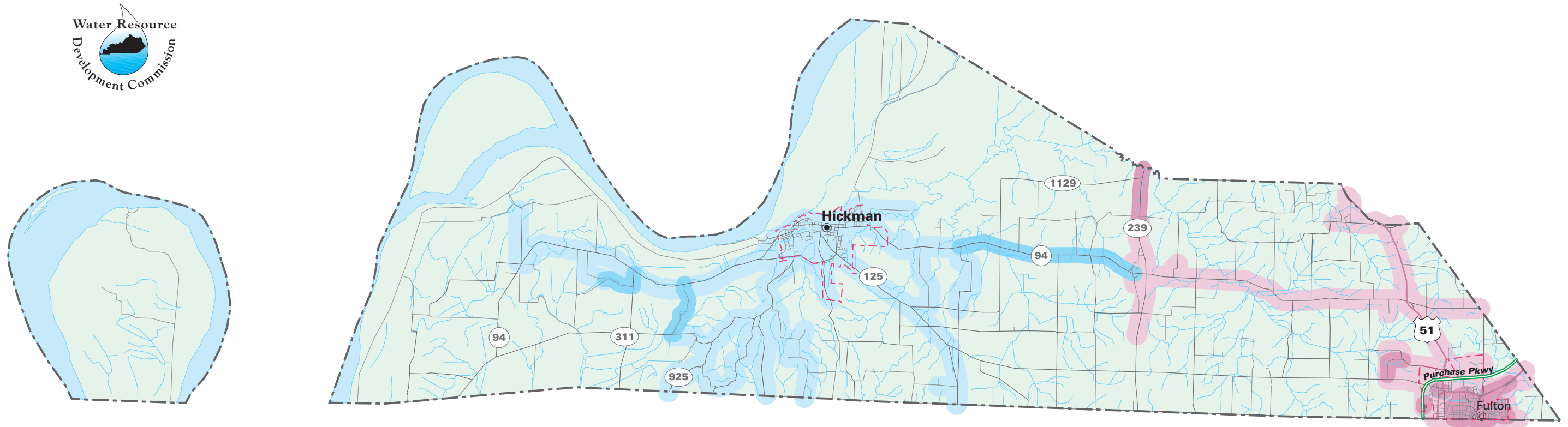
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**WATER SERVICE STATUS BY OWNER**

EXISTING SERVICE AREA	PROPOSED SERVICE AREA	
		HICKMAN WATER DEPARTMENT
		FULTON MUNICIPAL WATER SYSTEM

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**FULTON MUNICIPAL WATER SYSTEM**

PWSID: ..... 0380149  
 System Type:..... COMMUNITY  
 Owner Type:..... MUNICIPAL  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 2.80  
 Percent Daily Average Production: ..... 62.00  
 Total Tank Storage Capacity (gallons):..... 1,000,000.00  
 Total Service Connections: ..... 1,783.00  
 Number of Employees:..... 5.00  
 Treatment Operator Class:.....2D  
 Distribution Operator Class: ..... 3B  
 Customer Rate for 1,000 Gallons:..... Not available  
 O/M costs 1997:..... Not available  
 O/M costs per Service Connection: ..... Not available  
 Net Revenue 1997: ..... Not available  
 Total Water Produced 1997 (gallons):..... Not available  
 Water Sold 1997 (gallons):..... Not available  
 Unaccounted-for Water 1997 (%): ..... Not available

The system serves 1,783 customers and employs 5 full-time individuals. The Fulton Municipal Water System also serves the communities of Cayce and Crutchfield. The system has two wells that withdraw 750,000 gallons a day. The treatment plant is rated for 2.8 million gallons per day and is processing 705,000 gallons per day. The system has four water tanks that have a combined storage capacity of 1 million gallons.

**HICKMAN WATER DEPARTMENT**

PWSID: ..... 0380193  
 System Type:..... COMMUNITY  
 Owner Type:..... MUNICIPAL  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 1.80  
 Percent Daily Average Production: ..... 35.00  
 Total Tank Storage Capacity (gallons):..... 500,000.00  
 Total Service Connections: ..... 1,374.00  
 Number of Employees:..... 34.00  
 Treatment Operator Class:.....2D  
 Distribution Operator Class: ..... 3A  
 Customer Rate for 1,000 Gallons:..... Not available  
 O/M costs 1997:..... Not available  
 O/M costs per Service Connection: ..... Not available  
 Net Revenue 1997: ..... Not available  
 Total Water Produced 1997 (gallons):..... Not available

Water Sold 1997 (gallons):.....Not available  
Unaccounted-for Water 1997 (%): .....Not available

The City of Hickman Water Department serves 1,374 customers. The city has three wells from which they withdraw 550,000 gallons per day. The treatment plant has a 24-hour rated capacity of 1.8 million gallons per day. Average daily treatment is 540,000 gallons. The treatment plant is operating at 30% capacity. The city maintains three tanks for a total storage of 1,050,000. The Department spends 78% of revenue on operation and maintenance.

**PRIVATE DOMESTIC SYSTEMS**

About 700 people in Fulton County rely on private wells for their water supply.

Abundant quantities of ground-water is available for domestic, irrigation, and industrial uses in Fulton County from depths of a few feet down to 1,500 feet. In general, the chemical quality of the water is good, but water from some aquifers contains objectionable amounts of iron and manganese. Water from alluvium is generally hard to very hard with moderate to high levels of dissolved solids. Water from the sand and/or gravel, non alluvium aquifers are considered soft and slightly acidic with low dissolved solids. Yields in some of the deeper wells (250-1,500 feet) are greater than 1,000 gallons per minute which is sufficient for a community or industrial supply.

Water quality generally is good except in areas where downward percolation of surface water and fluids from domestic sewage-disposal systems, and other sources of domestic or industrial pollution have contaminated the aquifer. Ground-water sometimes contains iron naturally in objectionable amounts from the deeper zones. In some formations with slightly acidic ground-water, a chemical reaction between the acidic ground-water and steel well casing and pump equipment will produce a high iron content in the water which is not naturally occurring.

## GRAVES COUNTY

### (Graves County Water Service Area Map)

- Estimated 1999 population of 35,700--70% on public water
- Estimated 2020 population of 38,400--78% on public water
- 130 miles of water lines, with plans for 100 additional miles
- Estimated funding needs for public water 2000-2005--\$3,581,000
- Estimated funding needs for public water 2006-2020--\$830,100

Graves County had an estimated population of 35,718 (15,257 households) in 1999 with a projected population of 38,371 (16,787 households) in 2020. Nearly 70 percent of the county is served by public water. The remainder of the county relies primarily on private domestic water wells. 1,370 households will be added to public water by line extensions during 2000-2020.

#### *Estimated Costs - Proposed Projects, 2000-2005*

COUNTY/System		New Customers		Rehab	Source	Treatment	Tanks/ Pumps	Total
	Miles	Number	Cost in \$1000	in \$1000	in \$1000	in \$1000	in \$1000	in \$1000
<b>GRAVES</b>								
WINGO WATER & SEWER DEPARTMENT	3.5	30	92					92
CONSUMER W/D	16.6	201	431	78				509
MAYFIELD ELECTRIC & WATER	0.8	40	21				1,275	1,296
HICKORY W/D	33.7	350	877					877
SYMSONIA W/D	10.0	168	260					260
HARDEMON W/D				122			425	547
<b>TOTAL</b>	<b>64.6</b>	<b>789</b>	<b>1,681</b>	<b>200</b>			<b>1,700</b>	<b>3,581</b>

#### *Estimated Costs - Proposed Projects, 2006-2020*

COUNTY/System		New Customers		Rehab	Source	Treatment	Tanks/ Pumps	Total
	Miles	Number	Cost in \$1000	in \$1000	in \$1000	in \$1000	in \$1000	in \$1000
<b>GRAVES</b>								
CONSUMER W/D	2.2	50	57					57
MAYFIELD ELECTRIC & WATER	29.8	527	775					775
<b>TOTAL</b>	<b>32.0</b>	<b>577</b>	<b>831</b>					<b>831</b>

### PUBLIC WATER SYSTEMS

Graves County is served by 12 community water systems--7 water districts: Fancy Farm, Consumer, Hardeman, Hickory, South Graves, Symsonia, Sedalia; 5 municipal: Mayfield

# WATER SERVICE AREAS GRAVES COUNTY Kentucky

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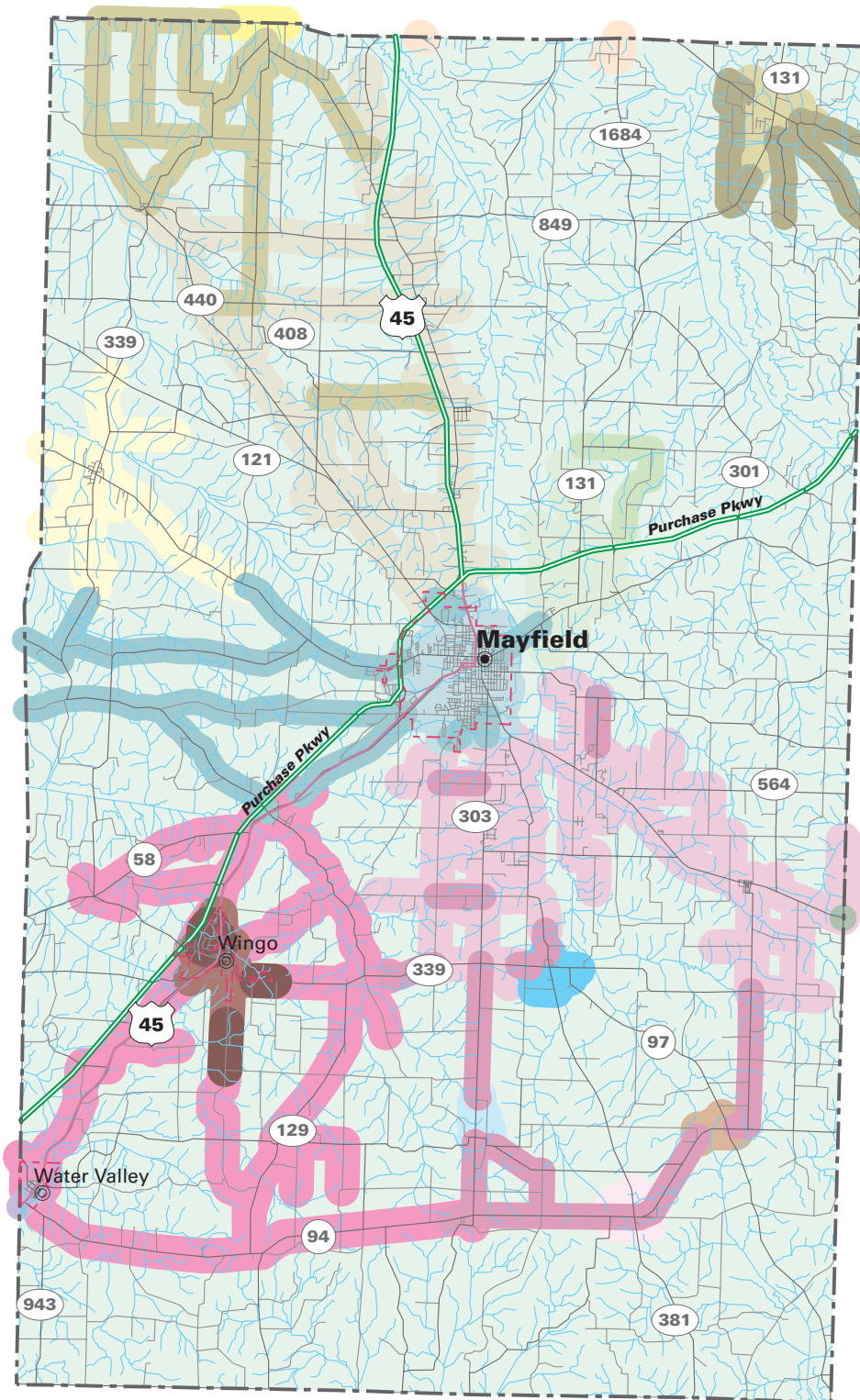
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Final GIS & Cartographic Operations By:  
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## WATER SERVICE STATUS BY OWNER

EXISTING SERVICE AREA	PROPOSED SERVICE AREA	OWNER
		WINGO WATER AND SEWER DEPARTMENT
		TRI CITY WATER WORKS
		SYMSONIA WATER DISTRICT
		SOUTH GRAVES COUNTY WATER DISTRICT
		SEDALIA WATER DISTRICT
		PADUCAH WATER WORKS
		MURRAY WATER SYSTEM
		MAYFIELD ELECTRIC AND WATER SYSTEM
		LYNNVILLE WATER SYSTEM
		HICKORY WATER DISTRICT
		HENDRON WATER DISTRICT
		HARDEMAN WATER DISTRICT
		FULTON MUNICIPAL WATER SYSTEM
		FANCY FARM WATER DISTRICT
		CUBA WATER WORKS
		CONSUMERS WATER DISTRICT



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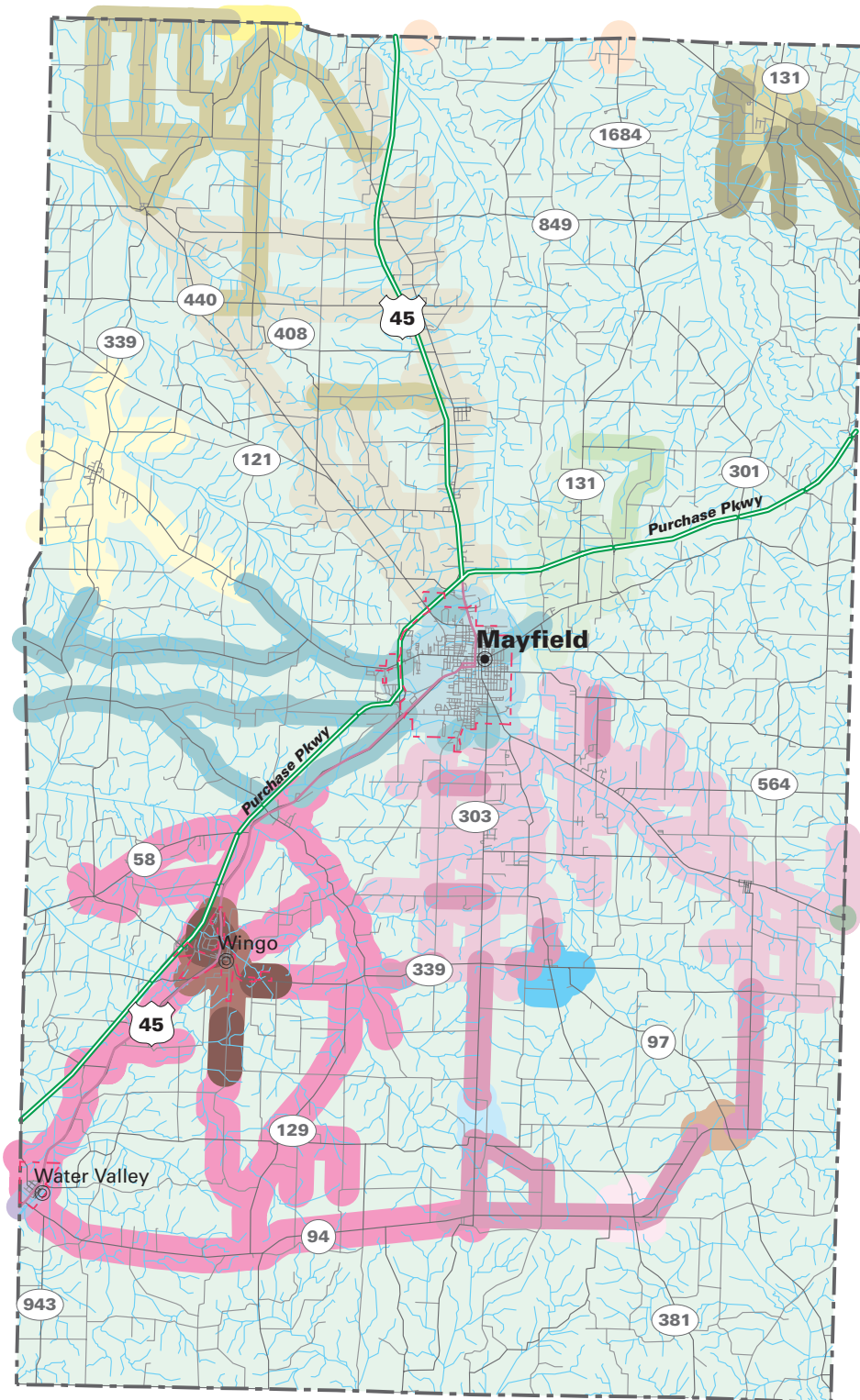
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## WATER SERVICE STATUS BY OWNER

EXISTING SERVICE AREA	PROPOSED SERVICE AREA	OWNER
		WINGO WATER AND SEWER DEPARTMENT
		TRI CITY WATER WORKS
		SYMSONIA WATER DISTRICT
		SOUTH GRAVES COUNTY WATER DISTRICT
		SEDALIA WATER DISTRICT
		PADUCAH WATER WORKS
		MURRAY WATER SYSTEM
		MAYFIELD ELECTRIC AND WATER SYSTEM
		LYNNVILLE WATER SYSTEM
		HICKORY WATER DISTRICT
		HENDRON WATER DISTRICT
		HARDEMAN WATER DISTRICT
		FULTON MUNICIPAL WATER SYSTEM
		FANCY FARM WATER DISTRICT
		CUBA WATER WORKS
		CONSUMERS WATER DISTRICT



Electric & Water System, Wingo Water & Sewer, Cuba Water Works, Lynville Water System, Tri-City Water Works--and 2 non-community systems.

**FANCY FARM WATER DISTRICT**

PWSID: ..... 0420027  
 System Type:..... COMMUNITY  
 Owner Type:..... WATER DISTRICT  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:..... MILBURN WATER DISTRICT  
 Treatment Plant Capacity (MGD):..... 0.43  
 Percent Daily Average Production: ..... 33.00  
 Total Tank Storage Capacity (gallons):..... 100,000.00  
 Total Service Connections: ..... 430.00  
 Number of Employees:.....?? 00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 2BD  
 Customer Rate for 1,000 Gallons:..... 4.79  
 O/M costs 1997:..... 99,670.00  
 O/M costs per Service Connection: ..... 201.35  
 Net Revenue 1997: ..... 19,710.00  
 Total Water Produced 1997 (gallons):..... 58,134,000.00  
 Water Sold 1997 (gallons):..... 37,190,000.00  
 Unaccounted-for Water 1997 (%): ..... 36.03

The district currently has 430 customers and withdraws 121,000 gallons per day from two wells. The district sells water to the Milburn Water District. The treatment plant has a 24-hour rated capacity of 432,000 gallons. The plant treats about 100,000 gallons a day. The system has a storage capacity of 400,000 from two tanks.

**CONSUMERS WATER DISTRICT**

PWSID: ..... 0420084  
 System Type:..... COMMUNITY  
 Owner Type:..... WATER DISTRICT  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.56  
 Percent Daily Average Production: ..... 27.00  
 Total Tank Storage Capacity (gallons):..... 250,000.00  
 Total Service Connections: ..... 1,436.00  
 Number of Employees:..... 1.00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 3B  
 Customer Rate for 1,000 Gallons:..... 2.22  
 O/M costs 1997:..... 158,684.00

O/M costs per Service Connection: ..... 110.27  
 Net Revenue 1997: ..... 3,812.00  
 Total Water Produced 1997 (gallons): ..... 0.00  
 Water Sold 1997 (gallons): ..... 88,298,000.00  
 Unaccounted-for Water 1997 (%): ..... 11.53

The district employs one-fulltime employee and serves 1,436 customers. The district withdraws and treats approximately 258,978 gallons per day from its two wells. The two treatment facilities have a combined capacity of 560,000 gallons per day. The district has a storage capacity of 250,000 gallons.

**HARDEMAN WATER DISTRICT**

PWSID: ..... 0420172  
 System Type: ..... COMMUNITY  
 Owner Type: ..... WATER DISTRICT  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD): ..... 0.43  
 Percent Daily Average Production: ..... 20.00  
 Total Tank Storage Capacity (gallons): ..... 50,000.00  
 Total Service Connections: ..... 363.00  
 Number of Employees: ..... ?? .00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 2BD  
 Customer Rate for 1,000 Gallons: ..... 3.09  
 O/M costs 1997: ..... 60,711.00  
 O/M costs per Service Connection: ..... 182.86  
 Net Revenue 1997: ..... 2,231.00  
 Total Water Produced 1997 (gallons): ..... 27,633,000.00  
 Water Sold 1997 (gallons): ..... 25,992,000.00  
 Unaccounted-for Water 1997 (%): ..... 5.94

The Hardeman Water District serves 363 customers. The district has two wells from which they withdraw 86,000 gallons per day. The treatment plant is designed for 432,000 gallons per day. The district also has a 50,000-gallon water tower.

**HICKORY WATER DISTRICT**

PWSID: ..... 0420194  
 System Type: ..... COMMUNITY  
 Owner Type: ..... WATER DISTRICT  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD): ..... 1.00

Percent Daily Average Production: .....	36.00
Total Tank Storage Capacity (gallons):.....	325,000.00
Total Service Connections: .....	1,165.00
Number of Employees:.....	??
Treatment Operator Class: .....	2D
Distribution Operator Class: .....	3B
Customer Rate for 1,000 Gallons:.....	2.30
O/M costs 1997:.....	147,176.00
O/M costs per Service Connection: .....	121.73
Net Revenue 1997: .....	19,474.00
Total Water Produced 1997 (gallons):.....	142,916,000.00
Water Sold 1997 (gallons):.....	125,378,400.00
Unaccounted-for Water 1997 (%): .....	12.27

The district currently serves 1,165 customers. 304,000 gallons per day are withdrawn from three wells. The treatment plant is rated for 1 million gallons a day. The district has a 325,000 gallons. storage capacity. The district spends 83% of revenue on operation and maintenance.

**MAYFIELD ELECTRIC AND WATER SYSTEM**

PWSID: .....	0420274
System Type:.....	COMMUNITY
Owner Type: .....	MUNICIPAL
Surface Source:	
Purchase Source:	
Well Source: .....	Yes
Sells Water to:	
Treatment Plant Capacity (MGD):.....	8.00
Percent Daily Average Production: .....	47.00
Total Tank Storage Capacity (gallons):.....	1,750,000.00
Total Service Connections: .....	4,976.00
Number of Employees:.....	10.00
Treatment Operator Class: .....	2D
Distribution Operator Class: .....	4B
Customer Rate for 1,000 Gallons:.....	Not available
O/M costs 1997:.....	Not available
O/M costs per Service Connection: .....	Not available
Net Revenue 1997: .....	Not available
Total Water Produced 1997 (gallons):.....	Not available
Water Sold 1997 (gallons):.....	Not available
Unaccounted-for Water 1997 (%): .....	Not available

The MEWS currently has 4,976 customers and 10 fulltime employees. The MEWS has three wells from which it withdraws approximately 2,250,000 gallons per day. The treatment plant has a 24-hour rated capacity of 8 million gallons, but only processes 1.35 million gallons per day. The MEWS has a storage capacity of 1.75 million gallons from three tanks.

**SOUTH GRAVES COUNTY WATER DISTRICT**

PWSID: ..... 0420405  
 System Type:..... COMMUNITY  
 Owner Type:..... WATER DISTRICT  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.43  
 Percent Daily Average Production: ..... 43.00  
 Total Tank Storage Capacity (gallons):..... 0.00  
 Total Service Connections: ..... 730.00  
 Number of Employees:..... 1.00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 2BD  
 Customer Rate for 1,000 Gallons:..... 8.01  
 O/M costs 1997:..... 124,300.00  
 O/M costs per Service Connection: ..... 169.12  
 Net Revenue 1997: ..... 1,745.00  
 Total Water Produced 1997 (gallons):..... 33,547,000.00  
 Water Sold 1997 (gallons):..... 29,582,000.00  
 Unaccounted-for Water 1997 (%): ..... 11.82

The district serves 730 customers and employs 1 fulltime employee. The district has 4 wells in which it withdraws 143,000 daily. The treatment plant is rated for 430,000 gallons per day, and the district has a storage capacity of 250,000 gallons. The system currently spends 56% of revenue on operation and maintenance.

**WINGO WATER AND SEWER DEPARTMENT**

PWSID: ..... 0420475  
 System Type:..... COMMUNITY  
 Owner Type:..... MUNICIPAL  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.72  
 Percent Daily Average Production: ..... 20.00  
 Total Tank Storage Capacity (gallons):..... 175,000.00  
 Total Service Connections: ..... 320.00  
 Number of Employees:..... 4.00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 2BD  
 Customer Rate for 1,000 Gallons:..... Not available  
 O/M costs 1997:..... Not available  
 O/M costs per Service Connection: ..... Not available  
 Net Revenue 1997: ..... Not available  
 Total Water Produced 1997 (gallons):..... Not available  
 Water Sold 1997 (gallons):..... Not available  
 Unaccounted-for Water 1997 (%): ..... Not available

The Wingo Water and Sewer currently has 320 customers. It has an average daily withdrawal of 37,500 gallons from three wells. The treatment plant currently treats 150,000 gallons per day. The plant has a rated capacity of 720,000 gallons per day. The water system has a storage capacity of 175,000 from two tanks. The system currently spends 64% of its revenue on operation and maintenance.

**SYMSONIA WATER DISTRICT**

PWSID: ..... 0420423  
 System Type:..... COMMUNITY  
 Owner Type:..... WATER DISTRICT  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.15  
 Percent Daily Average Production: ..... 4.00  
 Total Tank Storage Capacity (gallons):..... 75,000.00  
 Total Service Connections: ..... 273.00  
 Number of Employees:..... 1.00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 2BD  
 Customer Rate for 1,000 Gallons:..... 3.66  
 O/M costs 1997:..... 48,817.00  
 O/M costs per Service Connection: ..... 178.82  
 Net Revenue 1997: ..... 5,881.00  
 Total Water Produced 1997 (gallons):..... 20,640,000.00  
 Water Sold 1997 (gallons):..... 16,698,000.00  
 Unaccounted-for Water 1997 (%): ..... 5.29

The district has 273 customers and has 1 fulltime employee. The district has two wells from which they withdraw 54,000 per day. The treatment plant is rated for 150,000 gallons and operates at 70% capacity. The district has one water tower with a capacity of 75,000 gallons. The district spends 80% of revenue on operation and maintenance.

**SEDALIA WATER DISTRICT**

PWSID: ..... 0420534  
 System Type:..... COMMUNITY  
 Owner Type:..... WATER DISTRICT  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.21  
 Percent Daily Average Production: ..... 24.00  
 Total Tank Storage Capacity (gallons):..... 100,000.00

Total Service Connections: .....	150.00
Number of Employees:.....	1.00
Treatment Operator Class:	
Distribution Operator Class: .....	2BD
Customer Rate for 1,000 Gallons:.....	3.10
O/M costs 1997:.....	21,454.00
O/M costs per Service Connection: .....	143.03
Net Revenue 1997: .....	4,221.00
Total Water Produced 1997 (gallons):.....	12,596,000.00
Water Sold 1997 (gallons):.....	8,866,100.00
Unaccounted-for Water 1997 (%): .....	28.91

The Sedalia Water District currently serves 150 customers. It has one fulltime employee. The system withdraws 30,000 gallons per day from its well, and treats 30,000 gallons at its treatment plant. The storage capacity is 100,000 gallons. The system spends 68% on operation and maintenance.

**CUBA WATER WORKS**

PWSID:.....	0420540
System Type:.....	COMMUNITY
Owner Type:.....	MUNICIPAL
Surface Source:	
Purchase Source:	
Well Source: .....	Yes
Sells Water to:	
Treatment Plant Capacity (MGD):.....	0.040
Percent Daily Average Production: .....	38.00
Total Tank Storage Capacity (gallons):.....	4,000.00
Total Service Connections: .....	47.00
Number of Employees:.....	0.00
Treatment Operator Class:	
Distribution Operator Class: .....	1BD
Customer Rate for 1,000 Gallons:.....	Not available
O/M costs 1997:.....	Not available
O/M costs per Service Connection: .....	Not available
Net Revenue 1997: .....	Not available
Total Water Produced 1997 (gallons):.....	Not available
Water Sold 1997 (gallons):.....	Not available
Unaccounted-for Water 1997 (%): .....	Not available

The Cuba Water Works currently has 47 customers, and employs one fulltime employee. The system has two wells and has an average daily withdrawal of 7,500 gallons from each. The treatment plant has a 24-hour design capacity of 40,000 gallons and the plant currently treats 15,000 gallons per day. The system currently spends 132% of its revenues for operation and maintenance costs. The system is rated as a Class IB.

**LYNNVILLE WATER SYSTEM**

PWSID: ..... 0420541  
 System Type:..... COMMUNITY  
 Owner Type: ..... MUNICIPAL  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.02  
 Percent Daily Average Production: ..... 12.00  
 Total Tank Storage Capacity (gallons):..... 400.00  
 Total Service Connections: ..... 20.00  
 Number of Employees:..... 1.00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 1BD  
 Customer Rate for 1,000 Gallons:..... Not available  
 O/M costs 1997:..... Not available  
 O/M costs per Service Connection: ..... Not available  
 Net Revenue 1997: ..... Not available  
 Total Water Produced 1997 (gallons):..... Not available  
 Water Sold 1997 (gallons):..... Not available  
 Unaccounted-for Water 1997 (%): ..... Not available

The system has 20 customers and treats 1,800 gallons a day. The municipal system has treatment capacity of 15,000 gallons per day and storage capacity of 400 gallons from two tanks. The system currently spends 62% of its revenue on operation and maintenance.

**TRI CITY WATER WORKS**

PWSID: ..... 0420904  
 System Type:..... COMMUNITY  
 Owner Type: ..... MUNICIPAL  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.02  
 Percent Daily Average Production: ..... 20.00  
 Total Tank Storage Capacity (gallons):..... 700.00  
 Total Service Connections: ..... 30.00  
 Number of Employees:..... 0.00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 1BD  
 Customer Rate for 1,000 Gallons:..... Not available  
 O/M costs 1997:..... Not available  
 O/M costs per Service Connection: ..... Not available  
 Net Revenue 1997: ..... Not available  
 Total Water Produced 1997 (gallons):..... Not available  
 Water Sold 1997 (gallons):..... Not available  
 Unaccounted-for Water 1997 (%): ..... Not available

The Tri-City Water Works currently serves 30 customers. The system withdraws 4,250 gallons per day and treats 4,250 gallons per day. The municipal system has treatment capacity of 20,000 gallons per day has a combined storage capacity of 700 gallons.

## OTHER SYSTEMS

### **CUBA GRADE SCHOOL**

Cuba Grade School is located in Graves County. The system serves a population of 159 and has 1 service connection. The local, non-transient, non-community system has treatment capacity of 25,000 gallons per day. The water source is wells.

### **SEABOARD FARMS OF KY, INC.**

Seaboard Farms Of Ky, Inc. is located in Graves County. The system serves a population of 800 and has 1 service connection. The private, non-transient, non-community system has treatment capacity of 1,500,000. The water source is wells.

## PRIVATE DOMESTIC SYSTEMS

About 10,500 people in Graves County rely on private domestic wells for their water supply.

Abundant quantities of ground-water is available for domestic, irrigation, and industrial uses in Graves County from depths of a few feet to below 700 feet with most wells set at the 100 foot range. A few wells obtain shallow perched water from gravel or alluvial deposits but these zones often will not yield sufficient water for an adequate domestic supply due to periods of low rainfall, which is common in late summer and fall. In general, the chemical quality of the water is good, but water from some aquifers contains objectionable amounts of iron and manganese. Water from alluvium is generally hard to very hard with moderate to high levels of dissolved solids. Water from the sand and/or gravel, non-alluvium aquifers are considered soft and slightly acidic with low dissolved solids. Yields in some of the deeper wells (250-1,500 feet) are greater than 1,000 gallons per minute which is sufficient for a community or industrial supply.

Water quality generally is good except in areas where downward percolation of surface water and fluids from domestic sewage-disposal systems, and other sources of domestic or industrial pollution have contaminated the aquifer. In a few wells harmful amounts of nitrate have



been detected. Ground water sometimes contains iron naturally in objectionable amounts from the deeper zones. In some formations with slightly acidic ground-water, a chemical reaction between the acidic ground-water and steel well casing and pump equipment will produce a high iron content in the water which is not naturally occurring.

## HICKMAN COUNTY

### (Hickman County Water Service Area Map)

- Estimated 1999 population of 4,900--43% on public water
- Estimated 2020 population of 3,700--60% on public water
- 26 miles of water lines, with plans for 12 additional miles
- Estimated funding needs for public water 2000-2005--\$0
- Estimated funding needs for public water 2006-2020--\$310,000

Hickman County had an estimated population of 4,858 (2,114 households) in 1999 with a projected population of 3,739 (1,704 households) in 2020. About 43 percent of the county's residents are on public water, the majority rely on private domestic wells. About 70 households will be added to public water service by line extensions during 2000-2020.

#### *Estimated Costs - Proposed Projects, 2006-2020*

COUNTY/System		New Customers		Rehab	Source	Treatment	Tanks/Pumps	Total
	Miles	Number	Cost in \$1000	in \$1000	in \$1000	in \$1000	in \$1000	in \$1000
<b>HICKMAN</b>								
U.S. UTILITIES	11.9	70	310					310
<b>TOTAL</b>	<b>11.9</b>	<b>70</b>	<b>310</b>					<b>310</b>

### PUBLIC WATER SYSTEMS

Hickman County is served by two community water systems--1 private, US Utilities Inc., 1 municipal, Columbus Water Works--and two non-community water systems.

#### **US UTILITIES INCORPORATED**

PWSID: ..... 0530077  
 System Type:..... COMMUNITY  
 Owner Type:..... INVESTOR-OWNED UTILITY  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 1.40  
 Percent Daily Average Production: ..... 27.00  
 Total Tank Storage Capacity (gallons):..... 388,500.00  
 Total Service Connections: ..... 710.00  
 Number of Employees:..... 4.00  
 Treatment Operator Class:.....2D  
 Distribution Operator Class: ..... 3B  
 Customer Rate for 1,000 Gallons:..... Not available  
 O/M costs 1997:..... Not available

# WATER SERVICE AREAS HICKMAN COUNTY Kentucky

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**Water Resource Development Commission**

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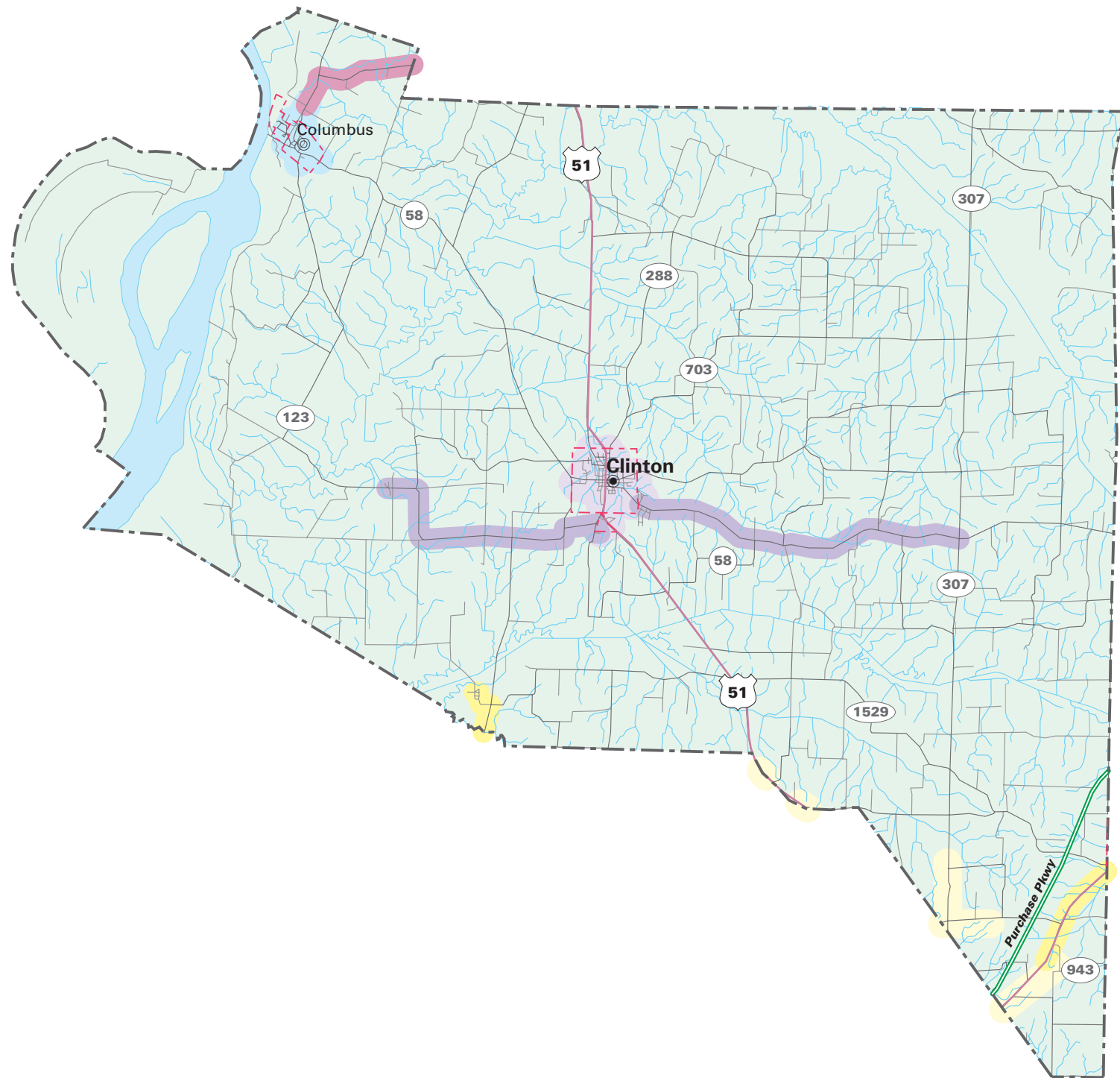
Bob Arnold, Chairman  
Lawrence Wetherby, Executive Director

Final GIS & Cartographic Operations By:  
Kent Anness & Kim Prough

Data Collection & GIS Input By:  
Kentucky Area Development Districts



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### WATER SERVICE STATUS BY OWNER

EXISTING SERVICE AREA	PROPOSED SERVICE AREA	OWNER
		US UTILITIES INCORPORATED
		FULTON MUNICIPAL WATER SYSTEM
		COLUMBUS WATER WORKS
		ARLINGTON WATER DEPARTMENT

O/M costs per Service Connection: ..... Not available  
 Net Revenue 1997: ..... Not available  
 Total Water Produced 1997 (gallons): ..... Not available  
 Water Sold 1997 (gallons): ..... Not available  
 Unaccounted-for Water 1997 (%): ..... Not available

US Utilities is a corporation that provides water for the city of Clinton. US Utilities has 710 customers and employs four fulltime employees. US Utilities has two wells from each of which it withdraws 145,000 gallons per day. The treatment plant is operating at 20% of capacity (1.4 million gallons per day). There are two storage tanks for a combined capacity of 388,500 gallons.

**COLUMBUS WATER WORKS**

PWSID: ..... 0530083  
 System Type: ..... COMMUNITY  
 Owner Type: ..... MUNICIPAL  
 Surface Source:  
 Purchase Source:  
 Well Source:  
 Sells Water to:  
 Treatment Plant Capacity (MGD): ..... 1.44  
 Percent Daily Average Production: ..... 21.00  
 Total Tank Storage Capacity (gallons): ..... 120,000.00  
 Total Service Connections: ..... 120.00  
 Number of Employees: ..... 1.00  
 Treatment Operator Class:  
 Distribution Operator Class: ..... 2BD  
 Customer Rate for 1,000 Gallons: ..... Not available  
 O/M costs 1997: ..... Not available  
 O/M costs per Service Connection: ..... Not available  
 Net Revenue 1997: ..... Not available  
 Total Water Produced 1997 (gallons): ..... Not available  
 Water Sold 1997 (gallons): ..... Not available  
 Unaccounted-for Water 1997 (%): ..... Not available

The city currently has 120 customers and employs one fulltime person. The city has two wells from each of which it withdraws 23,000 gallons a day from. The municipal system has treatment capacity of 144,000 gallons per day The city has one tank with a capacity of 120,000 gallons.

## OTHER SYSTEMS

### **HARPER'S COUNTRY HAMS**

Harper's Country Hams is located in Hickman County. The system serves a population of 65 and has 2 service connections. The private, non-transient, non-community system has treatment capacity of 20,000 gallons per day. The water source is wells.

### **NICKYS BAR B QUE**

Nickys Bar B Que is located in Hickman County. The system serves a population of 50 and has 1 service connection. The private, transient, non-community system has treatment capacity of 8,000 gallons per day. The water source is wells

## PRIVATE DOMESTIC SYSTEMS

About 2,800 people in Hickman County rely on private domestic wells for their water supply.

Abundant quantities of ground water is available for domestic, irrigation, and industrial uses in Hickman County from depths of a few feet down to 750 feet. In general, the chemical quality of the water is good, but water from some aquifers contains objectionable amounts of iron. Water from alluvium is generally hard to very hard. Water from the sand and/or gravel, non-alluvium aquifers are considered soft and slightly acidic with low dissolved solids. Generally, depths to ground water is under 100 feet except in the uplands and in the western part of the county where water is found in the 100 to 250 foot range. Yields in some of the deeper wells (250-750 feet) are greater than 1,000 gallons per minute which is sufficient for a community or industrial supply.

Ground water sometimes contains iron naturally in objectionable amounts from the deeper zones. In some formations with slightly acidic ground-water, a chemical reaction between the acidic ground-water and steel well casing and pump equipment will produce a high iron content in the water which is not naturally occurring.

## MCCRACKEN COUNTY

### (McCracken County Water Service Area Map)

- Estimated 1999 population of 64,200--92% on public water
- Estimated 2020 population of 63,800--95% on public water
- 480 miles of water lines, with plans for 140 additional miles
- Estimated funding needs for public water 2000-2005--\$1,888,000
- Estimated funding needs for public water 2006-2020--\$2,571,000

McCracken County had an estimated population of 64,200 (27,679 households) in 1999 with a projected population of 63,802 (28,890 households) in 2020. Over 90 percent of the county is served by public water, the remainder relying primarily on private domestic wells. About 920 new households will be placed on public water through line extensions in 2000-2020.

#### *Estimated Costs - Proposed Projects, 2000-2005*

COUNTY/System		New Customers		Rehab	Source	Treatment	Tanks/ Pumps	Total
	Miles	Number	Cost in \$1000	in \$1000	in \$1000	in \$1000	in \$1000	in \$1000
<b>MCCRACKEN</b>								
REIDLAND W/D				32				32
HENDRON W/D	8.5	125	222					222
WEST MCCRACKEN W/D	30.2	408	784				850	1,634
<b>TOTAL</b>	<b>38.7</b>	<b>533</b>	<b>1,006</b>	<b>32</b>			<b>850</b>	<b>1,888</b>

#### *Estimated Costs - Proposed Projects, 2006-2020*

COUNTY/System		New Customers		Rehab	Source	Treatment	Tanks/ Pumps	Total
	Miles	Number	Cost in \$1000	in \$1000	in \$1000	in \$1000	in \$1000	in \$1000
<b>MCCRACKEN</b>								
REIDLAND W/D	4.5	67	117					117
WEST MCCRACKEN W/D	94.4	317	2,454					2,454
<b>TOTAL</b>	<b>98.9</b>	<b>384</b>	<b>2,571</b>					<b>2,571</b>

### PUBLIC WATER SYSTEMS

McCracken County is served by four community water systems--3 water districts, 1 municipal--and 1 non-community water system.

#### **HENDRON WATER DISTRICT**

PWSID: ..... 0730190  
 System Type:..... COMMUNITY  
 Owner Type:..... WATER DISTRICT  
 Surface Source:

# WATER SERVICE AREAS MCCRACKEN COUNTY Kentucky



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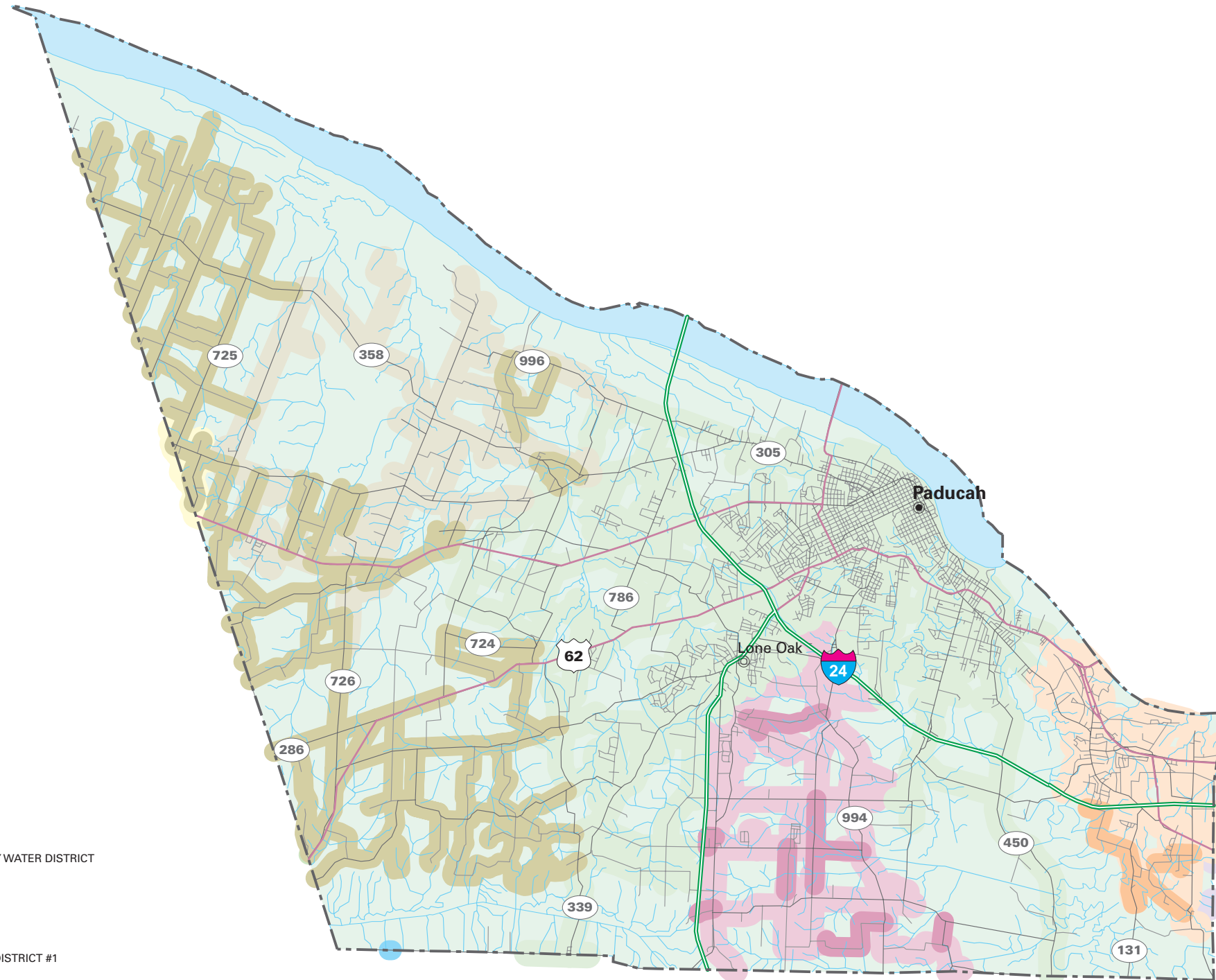
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**WATER SERVICE STATUS BY OWNER**

EXISTING SERVICE AREA	PROPOSED SERVICE AREA	OWNER
		WEST MCCRACKEN COUNTY WATER DISTRICT
		REIDLAND WATER DISTRICT
		PADUCAH WATER WORKS
		NORTH MARSHALL WATER DISTRICT #1
		KEVIL WATER DEPARTMENT
		HICKORY WATER DISTRICT
		HENDRON WATER DISTRICT

Purchase Source: .....PADUCAH WATER WORKS  
 Well Source:  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.00  
 Percent Daily Average Production: ..... 0.00  
 Total Tank Storage Capacity (gallons):..... 550,000.00  
 Total Service Connections: ..... 2,209.00  
 Number of Employees:..... 7.00  
 Treatment Operator Class: .....2D  
 Distribution Operator Class:  
 Customer Rate for 1,000 Gallons:..... 3.56  
 O/M costs 1997:..... 485,811.00  
 O/M costs per Service Connection: ..... 210.31  
 Net Revenue 1997: ..... 14,567.00  
 Total Water Produced 1997 (gallons):..... 0.00  
 Water Sold 1997 (gallons):..... 154,137,000.00  
 Unaccounted-for Water 1997 (%): ..... 6.15

The district serves 2,209 customers and employs 7 fulltime employees. The district currently purchases an average of 660,000 gallons per day from the Paducah Water Works. The district has 4 towers that have and combined storage capacity of 550,000. The district currently spends 80% of revenue on operation and maintenance.

**REIDLAND WATER DISTRICT**

PWSID: ..... 0730368  
 System Type:..... COMMUNITY  
 Owner Type: ..... WATER DISTRICT  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 2.00  
 Percent Daily Average Production: ..... 42.00  
 Total Tank Storage Capacity (gallons):..... 115,000.00  
 Total Service Connections: ..... 2,603.00  
 Number of Employees:..... 0.00  
 Treatment Operator Class: .....2D  
 Distribution Operator Class: .....3A  
 Customer Rate for 1,000 Gallons:..... 1.95  
 O/M costs 1997:..... 254,443.00  
 O/M costs per Service Connection: ..... 87.98  
 Net Revenue 1997: ..... 77,935.00  
 Total Water Produced 1997 (gallons):..... 279,468,700.00  
 Water Sold 1997 (gallons):..... 231,054,841.00  
 Unaccounted-for Water 1997 (%): ..... 5.78

The district currently has 2,603 customers. The district has five wells from which it withdraws 786,000 gallons per day. The treatment plant is rated for 2,000,000. The district



has a combined storage capacity of 615,000 gallons. The district spends 81% of revenue on operation and maintenance.

**PADUCAH WATER WORKS**

PWSID: ..... 0730533  
 System Type:..... COMMUNITY  
 Owner Type:..... MUNICIPAL  
 Surface Source:..... OH\TN RIVERS  
 Purchase Source:  
 Well Source:  
 Sells Water to:.....HENDRON WATER DISTRICT  
 Treatment Plant Capacity (MGD):..... 12.00  
 Percent Daily Average Production: ..... 58.00  
 Total Tank Storage Capacity (gallons):..... 5,000,000.00  
 Total Service Connections: ..... 18,722.00  
 Number of Employees:..... 50.00  
 Treatment Operator Class:.....3D  
 Distribution Operator Class: .....4A  
 Customer Rate for 1,000 Gallons:..... Not available  
 O/M costs 1997:..... Not available  
 O/M costs per Service Connection: ..... Not available  
 Net Revenue 1997: ..... Not available  
 Total Water Produced 1997 (gallons):..... Not available  
 Water Sold 1997 (gallons):..... Not available  
 Unaccounted-for Water 1997 (%): ..... Not available

The Paducah Water Works currently has 18,722 customers and employs 50 fulltime employees. PW\W withdraws its water from the Ohio River and has an average daily withdrawal of 6.5-7.0 million gallons. PW\W's treatment plant has a capacity of 12 million gallons per day. PW\W currently has a total storage capacity of 7,575,000 gallons. PW\W currently sells water to the West McCracken County Water District and Hendron Water District. PW\W currently spends 63% of revenue on operation and maintenance.

**WEST MCCRACKEN COUNTY WATER DISTRICT**

PWSID: ..... 0730454  
 System Type:..... COMMUNITY  
 Owner Type:..... WATER DISTRICT  
 Surface Source:  
 Purchase Source: .....PADUCAH WATER WORKS  
 Well Source:  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.00  
 Percent Daily Average Production: ..... 0.00  
 Total Tank Storage Capacity (gallons):..... 250,000.00  
 Total Service Connections: ..... 1,115.00  
 Number of Employees:..... 3.00

Treatment Operator Class:.....	2D
Distribution Operator Class:	
Customer Rate for 1,000 Gallons:.....	4.73
O/M costs 1997:.....	320,911.00
O/M costs per Service Connection:.....	292.54
Net Revenue 1997:.....	18,670.00
Total Water Produced 1997 (gallons):.....	0.00
Water Sold 1997 (gallons):.....	115,872,000.00
Unaccounted-for Water 1997 (%):.....	7.69

The district currently serves 1,115 customers and has 3 fulltime employees. The district currently purchases about 400,000 gallons a day from Paducah Water Works. The district has a total storage capacity of 750,000 gallons from two tanks. The district uses 75% of revenue for operation and maintenance

## OTHER SYSTEMS

### **US ENRICHMENT CORP**

US Enrichment Corp. is located in McCracken County. The system serves a population of 2,000 and has 2 service connections. The private, non-transient, non-community system has treatment capacity of 5,500,000 gallons per day. The water source is the Ohio River.

## PRIVATE DOMESTIC SYSTEMS

About 6,400 people in McCracken County rely on private domestic wells for their source of water.

GroundWater Resource in McCracken County are abundant with fair to good water quality. All areas of the county have the ability to produce water from drilled wells at reasonable depths in quantities sufficient for domestic use. Multiple zones of production are common throughout the county. Depths to upper most production is between 30 and 200 feet.

Generally, depths to ground-water is under 100 feet except in the uplands of south-western McCracken County where sufficient ground-water is obtained at depths greater than 100 feet.

Water quality generally is good except in areas where downward percolation of surface water and fluids from domestic sewage-disposal systems, and other sources of domestic or industrial pollution have contaminated the aquifer. Ground water sometimes contains iron naturally in objectionable amounts from the deeper zones. In some formations with slightly acidic

ground-water, a chemical reaction between the acidic ground-water and steel well casing and pump equipment will produce a high iron content in the water which is not naturally occurring.

## MARSHALL COUNTY

### (Marshall County Water Service Area Map)

- Estimated 1999 population of 30,000--80% on public water
- Estimated 2020 population of 32,000--89% on public water
- 430 miles of water lines, with plans for 120 additional miles
- Estimated funding needs for public water 2000-2005--\$2,175,000
- Estimated funding needs for public water 2006-2020--\$512,000

Marshall County had an estimated population of 30,045 (12,747 households) in 1999 with a projected population of 32,007 (14,568 households) in 2020. Over 80 percent of the county is served by public water, the remainder relying primarily on private domestic wells. About 1,330 new households will be placed on public water through line extensions in 2000-2020.

#### Estimated Costs - Proposed Projects, 2000-2005

COUNTY/System		New Customers		Rehab	Source	Treatment	Tanks/ Pumps	Total
	Miles	Number	Cost in \$1000	in \$1000	in \$1000	in \$1000	in \$1000	in \$1000
<b>MARSHALL</b>								
CALVERT CITY MUNICIPAL WATER DEPARTMENT	2.0	18	51					51
NORTH MARSHALL W/D	14.7	197	381					381
JONATHAN CREEK W/D	18.3	118	476					476
BENTON WATER AND SEWER	64.5	813	1,267					1,267
<b>TOTAL</b>	<b>99.4</b>	<b>1,146</b>	<b>2,175</b>					<b>2,175</b>

#### Estimated Costs - Proposed Projects, 2006-2020

COUNTY/System		New Customers		Rehab	Source	Treatment	Tanks/ Pumps	Total
	Miles	Number	Cost in \$1000	in \$1000	in \$1000	in \$1000	in \$1000	in \$1000
<b>MARSHALL</b>								
JONATHAN CREEK W/D	19.7	188	512					512
<b>TOTAL</b>	<b>19.7</b>	<b>188</b>	<b>512</b>					<b>512</b>

### PUBLIC WATER SYSTEMS

Marshall County is served by five community water systems--3 water districts, 2 municipal-- and three non-community systems.

#### **BENTON WATER AND SEWER SYSTEM**

PWSID: ..... 0790029  
 System Type:..... COMMUNITY  
 Owner Type:..... MUNICIPAL  
 Surface Source:

# WATER SERVICE AREAS MARSHALL COUNTY Kentucky

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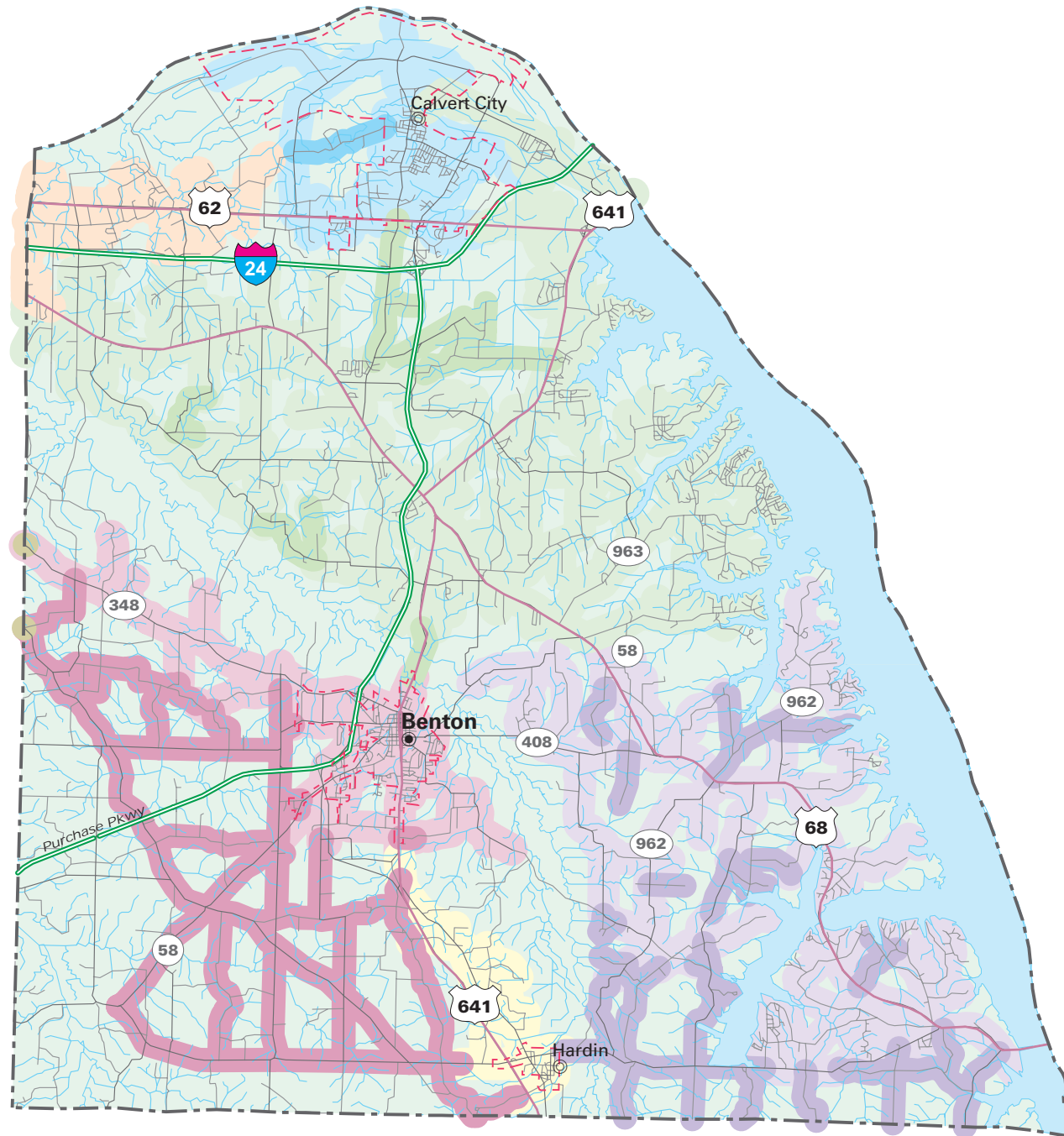
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### WATER SERVICE STATUS BY OWNER

EXISTING SERVICE AREA	PROPOSED SERVICE AREA	
		SYMSONIA WATER DISTRICT
		REIDLAND WATER DISTRICT
		NORTH MARSHALL WATER DISTRICT #1
		JONATHAN CREEK WATER DISTRICT
		HARDIN WATER
		CALVERT CITY MUNICIPAL WATER DEPARTMENT
		BENTON WATER AND SEWER SYSTEM

Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to: ..... HARDIN WATER  
 Treatment Plant Capacity (MGD): ..... 2.00  
 Percent Daily Average Production: ..... 40.00  
 Total Tank Storage Capacity (gallons): ..... 1,000,000.00  
 Total Service Connections: ..... 2,737.00  
 Number of Employees: ..... 4.00  
 Treatment Operator Class: ..... 2D  
 Distribution Operator Class: ..... 3B  
 Customer Rate for 1,000 Gallons: ..... Not available  
 O/M costs 1997: ..... Not available  
 O/M costs per Service Connection: ..... Not available  
 Net Revenue 1997: ..... Not available  
 Total Water Produced 1997 (gallons): ..... Not available  
 Water Sold 1997 (gallons): ..... Not available  
 Unaccounted-for Water 1997 (%): ..... Not available

The Benton Water and Sewer System currently has 2,737 customers and employs 4 fulltime employees. The system has three wells from which it withdraws 516,000 gallons. The treatment plant is rated for 2 million gallons a day. The city sells water to Hardin Water District. The city has two towers with a combined total storage capacity of 1 million gallons.

**CALVERT CITY MUNICIPAL WATER DEPARTMENT**

PWSID: ..... 0790056  
 System Type: ..... COMMUNITY  
 Owner Type: ..... MUNICIPAL  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD): ..... 2.00  
 Percent Daily Average Production: ..... 51.00  
 Total Tank Storage Capacity (gallons): ..... 750,000.00  
 Total Service Connections: ..... 1,260.00  
 Number of Employees: ..... 4.00  
 Treatment Operator Class: ..... 2D  
 Distribution Operator Class: ..... 3A  
 Customer Rate for 1,000 Gallons: ..... Not available  
 O/M costs 1997: ..... Not available  
 O/M costs per Service Connection: ..... Not available  
 Net Revenue 1997: ..... Not available  
 Total Water Produced 1997 (gallons): ..... Not available  
 Water Sold 1997 (gallons): ..... Not available  
 Unaccounted-for Water 1997 (%): ..... Not available

The department has 1,260 customers and has 4 fulltime employees. The department draws 1,250,000 gallons a day from three wells; it is treated at the plant which is rated for 2 million

gallons a day, operating at 51%. The department spends 50% on operation and maintenance.

**HARDIN WATER**

PWSID: ..... 0790173  
 System Type:..... COMMUNITY  
 Owner Type:..... MUNICIPAL  
 Surface Source:  
 Purchase Source: ..... CITY OF BENTON  
 Well Source:  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 0.00  
 Percent Daily Average Production: ..... 0.00  
 Total Tank Storage Capacity (gallons):..... 80,000.00  
 Total Service Connections: ..... 500.00  
 Number of Employees:..... 4.00  
 Treatment Operator Class: .....2D  
 Distribution Operator Class:  
 Customer Rate for 1,000 Gallons:..... Not available  
 O/M costs 1997:..... Not available  
 O/M costs per Service Connection: ..... Not available  
 Net Revenue 1997: ..... Not available  
 Total Water Produced 1997 (gallons):..... Not available  
 Water Sold 1997 (gallons):..... Not available  
 Unaccounted-for Water 1997 (%): ..... Not available

The district has 500 customers and employs 4 fulltime individuals. The district currently purchases 100,000 gallons per day from Benton. The district has 80,000 gallons combined storage capacity from its two tanks. The district currently spends 56% of revenue on operation and maintenance.

**NORTH MARSHALL WATER DISTRICT #1**

PWSID: ..... 0790319  
 System Type:..... COMMUNITY  
 Owner Type:..... WATER DISTRICT  
 Surface Source:  
 Purchase Source:  
 Well Source: ..... Yes  
 Sells Water to:  
 Treatment Plant Capacity (MGD):..... 1.73  
 Percent Daily Average Production: ..... 61.00  
 Total Tank Storage Capacity (gallons):..... 1,400,000.00  
 Total Service Connections: ..... 4,499.00  
 Number of Employees:..... 7.00  
 Treatment Operator Class: .....2D  
 Distribution Operator Class: ..... 3B  
 Customer Rate for 1,000 Gallons:..... 2.93  
 O/M costs 1997:..... 535,770.00

O/M costs per Service Connection: .....	119.09
Net Revenue 1997: .....	149,303.00
Total Water Produced 1997 (gallons):.....	458,770,000.00
Water Sold 1997 (gallons):.....	364,727,000.00
Unaccounted-for Water 1997 (%): .....	15.76

The district has 4,499 customers and employs 7 individuals fulltime. The district has 7 wells from which 1,256,000 gallons a day is drawn and treated at one of the two treatment plants. The district has eight tanks for a combined storage capacity of 1,410,000 gallons. The district currently spends 54% of revenue on operation and maintenance.

**JONATHAN CREEK WATER DISTRICT**

PWSID: .....	0790216
System Type:.....	COMMUNITY
Owner Type: .....	WATER DISTRICT
Surface Source:.....	KENTUCKY LAKE
Purchase Source:	
Well Source: .....	Yes
Sells Water to:	
Treatment Plant Capacity (MGD):.....	2.00
Percent Daily Average Production: .....	40.00
Total Tank Storage Capacity (gallons):.....	150,000.00
Total Service Connections: .....	1,944.00
Number of Employees:.....	6.00
Treatment Operator Class: .....	2D
Distribution Operator Class: .....	3A
Customer Rate for 1,000 Gallons:.....	6.42
O/M costs 1997:.....	375,419.00
O/M costs per Service Connection: .....	193.91
Net Revenue 1997: .....	9,913.00
Total Water Produced 1997 (gallons):.....	166,177,000.00
Water Sold 1997 (gallons):.....	115,975,000.00
Unaccounted-for Water 1997 (%): .....	22.66

The district currently serves 1,944 customers and employs 6 people. The district withdraws 473,000 gallons from each of its two wells daily. The 2 million gallons treatment plant treats the water. The plant is operating at about 40% capacity. The district has a combined storage capacity of 350,000 gallons from its three towers. The district spends 62% of revenue on operation and maintenance.



## OTHER SYSTEMS

### **SHAWNEE BAY RESORT**

Shawnee Bay Resort is located in Marshall County. The system serves a population of 25 and has 1 service connection. The private, transient, non-community system has treatment capacity of 8,000 gallons per day. The water source is wells.

### **BEE SPRING LODGE**

Bee Spring Lodge is located in Marshall County. The system serves a population of 25 and has 1 service connection. The private, transient, non-community system has treatment capacity of 8,000 gallons per day. The water source is wells.

### **SOUTHERN KOMFORT**

Southern Komfort is located in Marshall County. The system serves a population of 400 and has 85 service connections. The private, transient, non-community system water source is wells.

## PRIVATE DOMESTIC SYSTEMS

Almost 6,000 people in Marshall County rely on private domestic wells for their water supply.

GroundWater Resource in Marshall County are abundant with fair to good water quality. All areas of the county have the ability to produce water from drilled wells at reasonable depths in quantities sufficient for domestic use. Multiple zones of production are common throughout the county. Depths to upper most production is between 30 and 150 feet. A few wells obtain shallow perched water from gravel or alluvial deposits but these zones often will not yield sufficient water for an adequate domestic supply during periods of low rainfall, which is common in late summer and fall. In general, the chemical quality of the water is good, but water from some aquifers contains objectionable amounts of iron and manganese. Water from alluvium and limestone in this county is generally hard to very hard with moderate to high levels of dissolved solids with some limestone wells in the eastern part of the county containing minor amounts of hydrogen sulfide. Water from the unconsolidated sand and/or gravel aquifers are considered soft and slightly acidic with low dissolved solids.

Water quality generally is good except in areas where downward percolation of surface water and fluids from domestic sewage-disposal systems, and other sources of domestic or industrial pollution have contaminated the aquifer. In a few wells harmful amounts of nitrate have been detected. Ground water sometimes contains iron naturally in objectionable amounts from the deeper zones. In some formations with slightly acidic ground-water, a chemical reaction between the acidic ground-water and steel well casing and pump equipment will produce a high iron content in the water which is not naturally occurring.