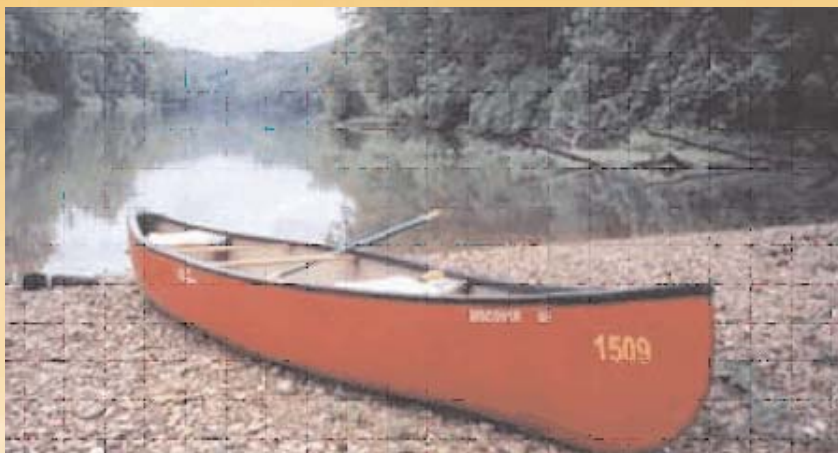


M^{the}eramec River Basin *Almanac*



Prepared by:

East-West Gateway Council of Governments



EAST-WEST GATEWAY
Council of Governments

Creating Solutions Across Jurisdictional Boundaries

September 2007

Table of Contents

<i>Section</i>	<i>Page</i>
Foreword	iii
Meramec River Basin	
Background Information	1
Physical Characteristics	3
Aquatic Biodiversity	6
Meramec History	6
Meramec River Basin Subwatersheds	
Upper Meramec Section	
Huzzah Creek	11
Courtois Creek	13
Dry Fork	15
Upper Meramec River Watershed	17
Middle Meramec Section	
Middle Meramec River	20
Indian Creek	24
Lower Meramec Section	
Franklin County	25
Calvey Creek	28
Jefferson County	29
LaBarque Creek	30
St. Louis County	32
Demographic Information	37
Information Sources	41
Meramec River Basin Organizations	46

List of Figures

<i>Figure</i>	<i>Page</i>
1. Meramec River Basin Watersheds	2
2. Fish Diversity in Meramec River Streams	7

List of Tables

<i>Tables</i>	<i>Page</i>
1. Meramec River Basin Watersheds	3
2. Outstanding State Resource Waters in the Meramec River Basin	4

Meramec River Basin

Foreword

Meramec River Initiatives

A Covenant

Meramec Spring* in the Ozark Highlands gives birth to the waters of the Meramec River. The River flows 220 miles, un-dammed and un-channelized, through rural and increasingly urbanized topography to the Mississippi River south of St. Louis. The entire Meramec River Basin with its tributaries comprises an outstanding natural legacy that has miraculously avoided multiple dam proposals beginning as far back as 1830 with the idea of building a series of locks and dams for keel boats hauling iron. In the late 1930s and 1940s Congress authorized building a plethora of dams throughout the Meramec Basin and other tributaries. Then in 1966 along came Congressional approval to build dams on the



Bridge view at Route 66 State Park

Meramec, the Bourbeuse and the Big Rivers. These impounded waters would have flooded over 23,000 acres of farmland, habitat and river life. A groundswell of public skepticism and intense opposition began to overwhelm the project proponents. An informed and engaged public along with the now legendary effort by citizen activists and elected officials from St. Louis and east central Missouri turned the tide for what many observers said was a hopeless cause, reversing momentum in a U.S. Army Corps of Engineers' water project. Support for the opposition also came in the form of an unprecedented policy reversal at the national level because both President Jimmy Carter and the newly elected U.S. Senator from Missouri, John Danforth, were opposed to federal dam projects. Senator Thomas Eagleton called for a referendum by area residents for and against the project. An election was held on August 8, 1978 with 64 percent of area voters opposed to the project. The Meramec Dam project went down to defeat and later in 1981 President Ronald Reagan officially signed the de-authorization paper.

All the years and attempts to build dams along the Meramec, notwithstanding, this great river resource was once a paradise lost. The green hearted Meramec River had suffered from abuse, pollution, overuse and then was all but abandoned. Recovery and renaissance of the Meramec have taken a half century of hard work, public investment and personal commitment.

* *Historic spelling is Maramec Spring*

It is a history of loss, labor, love, deliverance and redemption.

The Meramec River Valley is home to many voices, some are quiet some are bold. Farmers, landowners, fishermen, hunters, birders, hikers, canoeists and kayakers, outfitters, community leaders and citizens all have a stake in the Meramec River Basin. The quiet voices are the other interests as well those that cannot speak on their own behalf, wildlife and riparian forests, the rare aquatic diversity, 125 species of fish, 45 species of mussels, and eight species of crayfish and the rich habitat for deer, fox and smaller mammals as well as the Great Blue Heron, American Bald Eagle, Osprey, songbirds and shore birds. Just like all of us, these beautiful creatures need clean water and a healthy environment in which to thrive and prosper. The future of the Meramec River Basin, all of its tributaries and the land, this unique gift that runs through an urbanizing environment, will depend solely on our vigilance and common care.



Steve Nagle, an Operation Clean Stream volunteer

New warning signs hover on the River's horizon, its demise could easily come again gradually or precipitously, swallowing the goodness that has been done to preserve it. Poorly planned development, storm water pollution and runoff in the watershed, habitat fragmentation and yes, even future dam proposals, could easily reverse the progress that has been made.

The Meramec Summit and subsequent initiatives afford all of us who enjoy and respect the rarity of one of America's longest un-dammed rivers a lifelong opportunity to join in common pursuit, united in a mutual covenant to act as protectors and everlasting stewards of the Meramec River watershed and its natural legacy. Written on our hearts, we and the river shall be renewed in our common labor to build this sustainable community and someday when the annals of river conservation are written, the Meramec River will still run free and stand as a shining example for generations to come.

Not only do you hold in your hands the future of the Meramec River but also this [Official Almanac of the Meramec River Basin Summit](#) which has been prepared for you to serve as a keepsake souvenir and factual resource for those who have worked so many years to restore the River, for those who have planned the Meramec Summit, for current and future citizens of the Meramec River Basin Alliance, and anyone wanting to read the story.

Finally a word about *The Meramec River Initiatives*. In a sense it began 40 years ago with the creation of Operation Clean Stream, St. Louis Regional Open Space Council and years of toil and tribulation, clean-up projects, land acquisition and public education. If not for the loyal foot soldiers in this all volunteer army, we would have lost the battle to save the Meramec and would not be celebrating its renaissance today. *The Initiatives* is simply an ongoing effort that will help guide us in the future to enhance our collaborative work on behalf of the Meramec River and its tributaries. What are your dream projects, concerns and ideas for the future? All stakeholders are invited to participate in the Meramec Basin Alliance through ongoing opportunities for public input and discussion via the website, annual meetings, workshops and conferences.

All voices quiet and bold will have a place at the table and from that we shall realize a unified vision that preserves the health, environment, and vitality of our Meramec Basin communities.

In appreciation: There are many people, organizations and volunteers over the years to whom we owe a debt of gratitude for their courage and perseverance in the restoration and protection of the Meramec. It would take a phone book to list everyone. But at the very least we have tried to acknowledge individuals and groups currently active. In back pages of this Almanac, please refer to what amounts to a partial list of supporters, sponsors, and committee members. Up front we must thank the army of volunteers for 40 years of Operation Clean Stream and Ron Coleman and the St. Louis Regional Open Space Council for their tireless efforts in park land and open space acquisition. We wish to acknowledge Ron's partnership and extensive network that made it all possible; St. Louis, Franklin and Jefferson counties, for their wise efforts in watershed planning and a special salute to the legendary Jerry Sugerman, the boy general who led the magnificent struggle against the Meramec Dam in the 1970s and who continues to work on behalf of those voices not easily heard. We also pay tribute to the Missouri



Meramec River at Expedition, 2004

Department of Conservation and specifically to Tracy Boaz and Kevin Meneau, et al. for their dauntless conservation work, technical advice, and people skills. East-West Gateway Council of Governments was enabled to work on the Meramec Summit project through the auspices of a water quality 604(b) grant provided by the Missouri Department of Natural Resources. Thanks to Richard Cavender, Executive Director of the Meramec Regional Planning Commission and Tammy Snodgrass for their special assistance and advice in organizing the Summit. The job of coordinating the working committees and establishing the website would not have been accomplished without the indispensable services of Karla Wilson. Thanks to Jim McHugh, Sr. for his vision and leadership in the Pacific Ring.

Meramec River Basin *Background Information*

General Location

The headwaters of the Meramec River are in the northeast corner of the Ozark highlands in east central Missouri. (Figure 1) It flows eastward some 220 miles from the eastern portion of the Ozark Mountains to where it enters the Mississippi River at the city of Arnold. The Meramec River is one of the longest free-flowing and unchannelized rivers in the United States. After the Gasconade River (271 miles), the Meramec is the second longest unimpounded river in the state of Missouri.



Meramec River at Pacific Palisades

The Meramec Basin incorporates a watershed that drains 3,980 square miles. In the Lower Meramec section of the Basin, the Bourbeuse River and Big River flow into the Meramec River at river mile 64 and river mile 35.7, respectively. These rivers are major tributaries of the Meramec River, with their own distinct and unique watersheds, and are not addressed in this document.

The main stem Meramec River and its tributaries form a watershed that drains 2,152 square miles (1,377,639 acres). The watershed includes portions of Crawford, Dent, Iron, Phelps, Washington, Franklin, Jefferson and St. Louis Counties. There are 27 municipalities and eight unincorporated areas within the watershed including the Interstate 44 and Bourbeuse/Meramec ridge line. The majority of these municipalities are found in the Lower Meramec portion of the Basin (Franklin, Jefferson, and St. Louis counties.) Eight incorporated units are located within the other five counties in the Basin. Additional population information can be found at the end of this almanac.

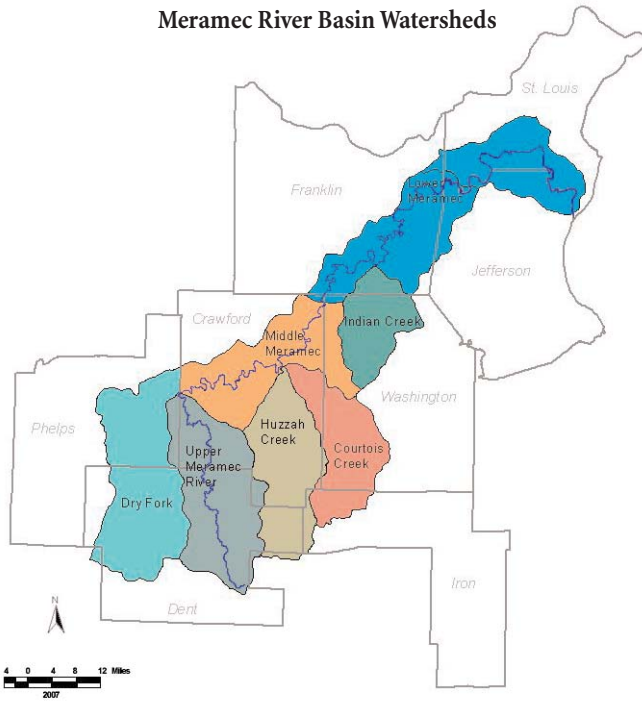
Land Use/Land Cover

Basin land cover includes forest, prairie, cropland, pasture and urban development. Major resources include farming, grazing, mining and sand and gravel operations. The Mark Twain National Forest covers a large area in the upper portion of the Basin (Washington, Crawford, Iron, Dent) with the remaining forested land privately owned.



Meramec Spring Branch and Meramec River

Figure 1
Meramec River Basin Watersheds



Grazing, logging and extraction (lead, iron, sand and gravel) occur in the Basin. Urbanized development is found in the eastern counties of St. Louis and Jefferson which includes dense residential, commercial and industrial activity. In adjacent Franklin County and northwestern Jefferson County, there is residential and commercial development dispersed among forested and agricultural land but this area has recently experienced increased growth.

The Meramec River Watershed con-

tains many scenic areas including limestone bluff outcroppings, dispersed glades and unique flora and fauna habitats. Due to its proximity to the urbanized areas of St. Louis County and northern Jefferson County and its aesthetic features, the Meramec River Basin is a valuable recreational and natural resource area.

About the Name

The name Meramec is of Miami-Illinois Indian origin and means “River of Ugly Fish” or “River of Catfish.” The river was first noted by Europeans during the journey of Father Gravier, a French priest, down the Mississippi River in 1699-1700. In Father Gravier’s journal, the river’s name was spelled as Miaramigoua (transliterating the sounds of Indian syllables into French). Over time there have been many spelling and pronunciation variations by settlers in the area and map makers from Miaramigoua to Maramec with the end result being Meramec. In 1823, the word Merrimac was used in a journal and associated map by a surveyor for the U.S. General Land Survey. The pronunciation is now similar to that for the Merrimack River found in the northeastern U.S.



Rafting on the Meramec River

Physical Characteristics

Watersheds

The Meramec Basin can be divided into three sections: Upper; Middle; and Lower. The Upper Meramec section is made up of the Dry Fork, Upper Meramec River, Huzzah Creek and Courtois Creek watersheds. The headwaters of the Meramec River begin south of Salem in Dent County in the Upper Meramec River watershed.

Contributors to the Upper section are the Maramec Spring branch just east of the Dry Fork watershed, as well as Courtois and Huzzah creeks. According to the Missouri Department of Conservation (MDC), the drainage area of the Dry Fork watershed is as large as that of the Upper Meramec River but loses much of its water underground and recharging the Maramec Spring system. Maramec Spring has average daily flows of more than 90 million gallons.

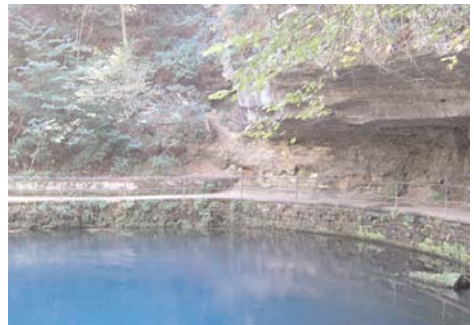
Contributing to the flow of the Meramec are a number of creeks and springs which are characterized by fractured limestone and Karst topography. These watersheds feed into the Middle Meramec River portion of the basin. Some of them are: Lick Creek; Blue Springs Creek; Yadkin Creek, Hazel Creek; and Crows Creek. The Indian Creek watershed enters the Lower Meramec watershed north of the city of Sullivan.

Starting at Sullivan, the Lower Meramec River watershed covers 550 square miles (352,197 acres) and contains 33 sub-watersheds draining directly to the river. In the Lower Meramec, the Bourbeuse River drains 808 square miles and enters the Meramec at river mile 64. The Big River drains 955 square miles and flows into the Meramec River at mile 35.7.

Flow

The average flow of the Meramec River is about 3,110 cubic feet per second (cfs), but rates have varied from a low of 196 cfs set in August 1936, to 175,000 cfs in August 1915.

Watersheds	Square Miles	% Share of Basin
<i>Upper Meramec Section</i>		
Dry Fork	380	18
Upper Meramec River	347	16
Huzzah Creek	266	10
Courtois Creek	222	12
Subtotal	1215	
<i>Middle Meramec Section</i>		
Middle Meramec River	291	14
Indian Creek	160	7
Subtotal	451	
<i>Lower Meramec Section</i>		
Lower Meramec	486	21
Subtotal	486	
Total	2152	100



Maramec Spring

Table 2
Outstanding State Resource Waters in the Meramec River Basin

<i>Water Body</i>	<i>Length in Miles</i>	<i>Location</i>	<i>County</i>
Blue Springs Creek	4	Blue Spring Creek Conservation Area	Crawford
Cathedral Cave Branch	5	Onondaga Cave State Park	Crawford
Courtois Creek	12	Mouth to Hwy 8	Crawford
Huzzah Creek	6	Mouth to Hwy 8	Crawford
Meramec River	8	Adjacent to Meramec State Park	Crawford/ Franklin
Meramec River	3	Adjacent to Onondaga and Huzzah State Forest	Crawford
Onondaga Cave Branch	0.6	Onondaga Cave State Park	Crawford

Source: Rules of Missouri Department of Natural Resources, 10CSR 20-7

Outstanding State Resource Waters

Within the basin there are a number of streams and stream segments identified by the Missouri Clean Water Commission as being Outstanding State Resource Waters in 10CSR 20-7. These streams are considered to have a high level of aesthetic or scientific value, have an undeveloped and/or near natural watershed, and be located on, or pass through, state or federally owned lands or land which is leased or held in a perpetual conservation easement.

Losing Streams

The Missouri Department of Natural Resources has developed a losing stream definition. As a losing stream flows downstream, it discharges 30 percent or more of its flow through permeable geologic materials into a bedrock aquifer. The losing stream recharges the groundwater. In the Meramec River Basin losing streams are associated with the Karst topography.



Bluffs along the Lower Meramec

Topography/Geology

The majority of the Meramec River Basin is within the Ozark Plateau. The St. Louis County and Jefferson County portion of the Basin is part of the Central Lowlands. Topography varies from wide ridges and gentle slopes to narrow irregular ridges, steep slopes and limestone bluffs. Land elevations range from 1,400 feet in the south central portion of the basin to 400 feet at the mouth. There is gently rolling topography to the north and west. The plateau has been dissected by stream erosion.

Major rock types are dolomite, limestone, chert and sandstone. Features of Karst topography present in the Basin include caves, sinkholes, filled sinkholes, losing streams and many springs. Maramec Spring is the fifth largest spring in Missouri. In the Pacific area there is a transition from dolomite to sandstone/limestone bedrock and in the far eastern part of the Basin limestone bedrock is present in St. Louis and Jefferson counties.

Lower Meramec

From Sullivan, the Lower Meramec River flows 109 miles through the southern part of the St. Louis Metropolitan area. The Meramec River watershed drains the lightly populated, predominantly forested and agricultural areas in Franklin County and the densely populated and urbanized areas of St. Louis and Jefferson counties. The Lower Meramec covers 486 square miles and contains 33 sub-watersheds draining directly to the river. Twenty cities are located within this watershed with a population of approximately 174,000. Approximately 2.5 million people live within a half hour drive of the river.



Meramec River at Robertsville

The western part of the Lower Meramec watershed is within the Ozark Plateau and the eastern part is in the Central Lowlands. Topography varies from wide ridges and gentle slopes to narrow ridges, steep slopes and bluffs. Major rock types are dolomite, limestone, chert and sandstone. Watershed land cover includes forest, prairie, cropland, pasture and urban development. Urbanized development is found in the south and southwestern portions of St. Louis County and the northern row of watersheds of Jefferson County which includes a mix of residential, commercial and industrial activity. In adjacent Franklin County and northwestern Jefferson County, residential and commercial development is dispersed but growing rapidly. Losing streams in this watershed, as classified by the Missouri Department of Natural Resources (MoDNR), are Romaine, Little Antire, Antire, Williams, Keifer, Fishpot, Hamilton and a tributary to Fox Creek.

Aquatic Biodiversity

The Meramec River is an outstanding example of the unique aquatic biodiversity emblematic of certain river systems in the interior highlands of the Ozark Mountains. The Meramec River's rich mussel and crayfish fauna includes several species not found in any other watershed on earth, and equals or exceeds that of any other Ozark river. Indeed, the Meramec River's mussel fauna is one of the most diverse and unique in North America. The river supports one of the highest levels of biodiversity of any river in the United States, being home to more than 125 species of fish, 45 species of mussels, and eight species of crayfish. The pink mucket mussel (*Lampsilis abrupta*) which is on the federal endangered species list is found in the area. Population monitoring indicates that reproduction in some mussel species is not occurring to maintain that diversity over time.



Presentation on mussels in the Meramec

Fish population studies conducted on the Lower Meramec River (109 miles from Sullivan to mouth) by MDC have revealed an unexpected finding. While the Meramec River itself has recovered in the last 30 years and currently supports 125 species of fish, its tributaries are in decline. None of the smaller tributaries between the mouth at the Mississippi River and Mile 41.9 near Eureka supports a broad diversity of fish species. LaBarque Creek in Jefferson County with 42 fish species and Fox Creek in St. Louis County with 44 fish species, at Miles 41.9 and 44.4 respectively, are considered healthy streams, while none of 15 comparably sized tributaries to their east has more than 13 species and most have fewer than 10 (See Figure 2). While more research is needed to understand changing habitat and population declines, it appears likely that the declining fish species is a direct result of the suburban development patterns in the lower Meramec River watershed.

Meramec History

The watershed was affected in the 19th century by mining, timber cutting and grazing practices and subsequent erosion and sedimentation. At the turn of the 20th century, Missouri was a leading lumber producing state. The oak/pine forest was harvested by commercial operations and local residents. Trees were processed into such wood products as lumber, railroad ties, molding and fuel. These products were used in the area or sold locally and regionally but by 1920, the supply was exhausted. Many of the cut-over areas were used for (subsistence) farming and cattle grazing. To keep the land free of trees, settlers conducted seasonal burns. Erosion of these cut-over areas was severe, reducing the topsoil and filling streams with sediment and gravel.

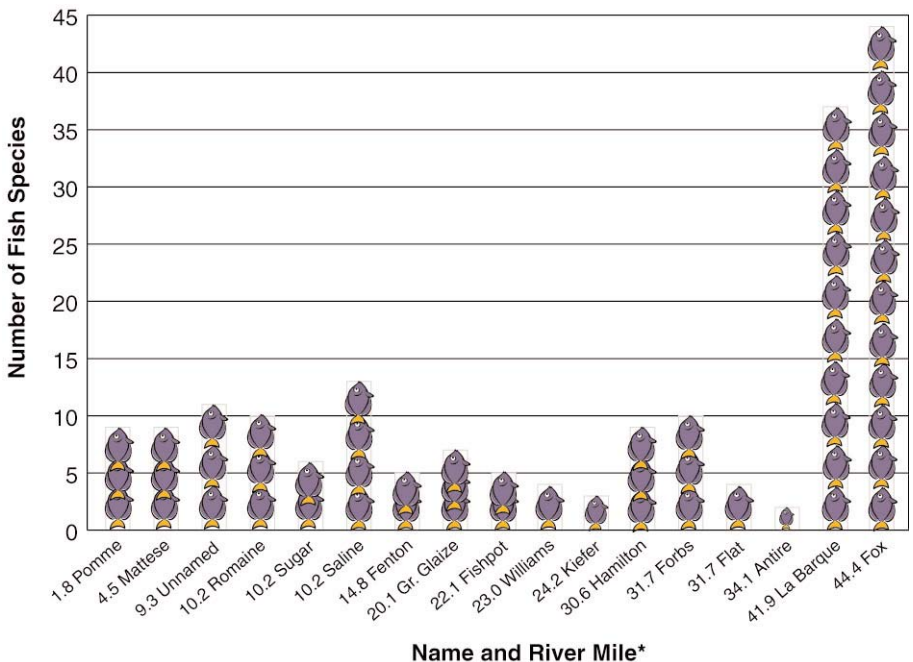
During the 1920s efforts at the state level to bring back forests in Missouri began with particular emphasis on fire prevention. In the 1930s legislation passed in Missouri to permit the federal government to purchase land for a national forest. This effort would help to reestablish forest and protect waterways. Acquisition of depleted forest land began in 1934 and in 1939 the Mark Twain National Forest was established by Presidential Proclamation. In 1936 the Missouri Conservation Commission was created. The Commission formed a Forestry Division which was to address fire prevention and forest restoration.



Exploring LaBarque Creek

In 1933 at the height of the Great Depression, the Civilian Conservation Corps (CCC) was mobilized nationally. The purpose of the CCC was to provide employment to young men by having them work on conservation projects. Within the Meramec River Basin area the CCC built roads, constructed recreational facilities and planted pine trees.

Figure 2
Fish Diversity in Meramec River Tributary Streams



*Tributary and distance (in miles) from Meramec River/Mississippi River confluence

Source: Missouri Department of Conservation

The Mark Twain National Forest consists of 1.5 million acres in 29 counties and is divided into six ranger districts. Land in the Salem and Potosi districts are part of the Meramec River Basin. Approximately half of the land within the Forest's administrative boundaries is privately owned.



On the Lower Meramec River

Since the 1930s, Missouri forest, waterways and wildlife have come back. MDC, U.S. Forestry Service, private landowners and forest logging and processing industry

continue to work to improve forest conditions through forest fire prevention, forest restoration and management. Wood products and by-products from the Meramec River Basin forest cover include: flooring; lumber; pallets; railroad ties; charcoal; mulch and bark; and sawdust. The Meramec River rebounded in the early 20th century and became a recreation destination for residents of the St. Louis region throughout the first half of the century. By the end of World War II, however, pollution both from the uncontrolled discharge of waste from clubhouses along the river and from sewage discharge from municipal facilities had degraded water quality to the point where the recreational use of the river declined. In addition, there were more opportunities for travel and recreation beyond the Meramec River. In 1967, the St. Louis Open Space Council organized the first Operation Clean Stream on the Meramec River. This volunteer clean-up effort has become an annual tradition in the basin, involving thousands of volunteers who have pulled tons of trash from the river, tributaries and floodplains. Following the passage of the Clean Water Act in 1972, and subsequent clean-up efforts, the Meramec River has made a remarkable recovery.

Overall water quality in the Basin has improved over the last 20 years. However, problems and challenges still exist. Stream habitat is impacted by land clearing and runoff associated with urban development as well as grazing practices. Gravel mining contributes to the accelerated transport of sediments within the watershed. Impacts can include streambank instability and erosion, nutrient loading and poor riparian corridor conditions.

Today, concerted efforts of many agencies and organizations have restored recreational activity along the river. Activities are centered primarily in a series of parks that border the river in St. Louis County, and along trails that are being constructed to link the parks and create a Meramec Greenway. Conceptual plans for the Greenway were formed after establishment of the Meramec River Recreation Area in 1975 by the Governor of Missouri and the completion of the Lower Meramec Greenway Studies by the East-West Gateway Council of Governments. Following a major flood in 1982, the Greenway effort was enhanced by the efforts of cities located along the Meramec River to use Federal Emergency Management Agency (FEMA) funds to purchase flood prone properties and return these properties to passive, natural use. Once again the Meramec River is a popular outdoor recreation destination for residents of the region and those who enjoy the Ozarks landscape and waterways.

Watershed Planning

What happens on the surface of the land has a tremendous impact on stream health and function.

Watershed planning is the most effective means of addressing water quality problems that result from non-point (dispersed) pollution because it can address a specific geographic area that feeds a particular stream or tributary. Watershed planning requires good science and the involvement of key stakeholders—landowners, citizens, local government, business and non-profit organizations—to identify problems and find solutions to issues affecting water quality and quantity. Because political boundaries do not typically follow watersheds, the planning process is challenging, but the more we understand the nature of the watershed, the more we can address broader problems even from a smaller jurisdictional level. Ultimately, by working together we can better identify which practices will protect stream health and encourage the use of those best practices.

Land owners and the care they provide to their land will help to determine the health of a watershed and the quality of the water in the streams of any watershed. Development that drastically changes the land surface has a significant impact on stream quality. Impervious surfaces—roofs, parking lots, roads and compacted soil—disrupt the ability of rainwater to penetrate the soil, increase runoff volume and alter the stream dynamics. A future booklet on Low Impact Development will address ways to reduce the impact of development in order to protect stream health.

Almanac Design

The remainder of the Almanac contains information about historical events, current activities and the natural environment in the Meramec River Basin. The information has been organized by the major watersheds in the Upper, Middle and Lower Meramec sections of the basin. Due to the extent of the Lower Meramec watershed, data for it has been organized by county.

Meramec River Basin *subwatersheds*

Upper Meramec Section
Middle Meramec Section
Lower Meramec Section

Upper Meramec Section

Huzzah Creek Watershed

The three creeks making up the headwaters of the Huzzah (HOO-za) Creek watershed begin in Dent and Iron counties and flow into Crawford County. Huzzah Creek is a fifth order stream and flows north through Crawford County until it enters the Meramec River on the right at river mile 65.9. The watershed covers 266 square miles or 170,250 acres. Courtois (CODE-away) Creek joins Huzzah Creek approximately 1.5 miles above where the Huzzah flows into the Meramec River. It is within 100 miles of the St. Louis metropolitan area and about 30 miles from Rolla. According to the 1976 MDC guidebook, approximately 23.4 miles of the creek is floatable.



The only incorporated unit within this watershed is the city of Viburnum, with a year 2000 population of 825. It is located in Iron County on the Huzzah Creek/Courtois Creek drainage divide along State Route 49 and State Highway Y.

Huzzah Creek is a prototype Ozark stream with a sand and gravel bottom bordered with limestone bluff outcroppings and stands of native Missouri pine, oak and hickory trees. It is a clear flowing stream interrupted with class I and II riffles and rapids. The Missouri Clean Water Commission has identified Huzzah Creek as an Outstanding State Resources Water—with a high level of aesthetic or scientific value, a relatively undisturbed watershed, and located on lands which are state or federally owned, or which are leased or held in perpetual easement for conservation purposes by a state, federal, or private conservation agency.

A large proportion of the land in the watershed is part of the Mark Twain National Forest. In the upper reaches of the Creek is the **Red Bluff** recreation area. The recreation area is located in a horseshoe bend of Huzzah Creek about one mile from Davisville. The dolomite cliff contains iron compounds which have oxidized giving the bluff its red color. This area was called “Painted Bluff” by the Osage Indians. Besides the Red Bluff, there is a natural bridge near Davisville.

Davisville was not the first name for this community. Before 1886, the area was known as “Pucky Huddle,” a term of derision referring to people huddled around sucking sour persimmons (puckery shortened to pucky). In 1886 the Postal System ordered that place names for postal addresses be unique. Areas had the opportunity to rename themselves if they chose. The residents chose to rename the area Davisville at this time.

Also near Davisville off of State Route 49 is the **Dillard Mill State Historic Site** owned by the Missouri Department of Natural Resources. The 130-acre site contains a restored 1908 water-powered grist mill. This mill was in operation from 1908 until 1956.

The western portion of the 6,225-acre **Huzzah Conservation Area** is in the Huzzah Creek watershed with the majority of it in the Courtois Creek watershed. The Missouri Department of Conservation property is located where Courtois Creek enters Huzzah Creek. Also in the lower reach of the watershed is the Richter Conservation Area.



Huzzah Conservation Area to left

Primary land cover is hardwood, oak and pine forest with agricultural uses, primarily as pasture, in the creek valleys. In the southeast portion of the Huzzah Creek watershed south of the Boss community on State Highway KK is the Buick Mine and Mill. This underground lead mine is operated by the Doe Run Company. This site is located on the drainage divide between the Meramec River and the Upper Black River. This portion of the watershed is in the geologic feature known as the Viburnum Trend where lead and other metals are 1,000 feet below the surface. The Viburnum Trend was identified in the 1950s and mining began shortly thereafter.

Located next to the **Buick Mine and Mill** site is a recycling (secondary) lead smelter. The Resource Recycling Division of the Doe Run Company operates this facility where lead is removed from lead-acid batteries, spent ammunition, lead-lined picture tubes and computer monitors and other lead-bearing materials. The lead is recycled to be used again as raw material.

In the 1800s the creeks and the Meramec River were a means of transportation and a source of power for iron furnaces and grist mills. However, the unpredictable water level of the Meramec River with its gravel bottom limited commercial transportation opportunities. The hardwood forests were a source of lumber, hacked into railroad ties or converted into charcoal for use in local iron furnaces. Surface deposits of hematite were found in the northern part of this watershed and in other locations in the upper Meramec River basin. From 1870-1880 the Scotia Iron Works in the northern tip of the Huzzah Creek watershed operated a charcoal iron furnace and produced pig iron. Limestone was used to construct the furnace and serve as flux in the smelting process. The remains of this facility can be found in the Huzzah Conservation Area. In 1880 the machinery from the Scotia Iron Works in Crawford County was disassembled and moved to southeastern Dent County where the Nova Scotia Ironworks (1881-1884) was established.

Upper Meramec Section

Courtois Creek Watershed

The headwaters of the fifth order Courtois (CODE-away) Creek watershed are located in Iron County.

Courtois Creek flows northwest through Washington County and Crawford County until it enters Huzzah Creek at creek mile 22.1. The watershed occupies 141,954 acres or 222 square miles. It is within 100 miles of the St. Louis metropolitan area and about 35 miles from the city of Rolla.

The only incorporated unit within this watershed is the city of **Viburnum**, with a 2000 population of 825. It is located in Iron County on the Huzzah Creek/Courtois Creek drainage divide along State Route 49 and State Highway Y. A portion of Viburnum is located in the Huzzah Creek watershed, but the majority is in the Courtois Creek watershed. The current city on this site was laid out by the St. Joe Lead Company in the 1950s. Within the city limits is a lead mine and mill operated by the Doe Run Company.

In the southern part of the watershed, State Route 32/49 follows the drainage divide. State Highway Y is on the ridge line between Courtois Creek and Huzzah Creek watersheds. To the east, State Highway DD runs along the ridge line between the Meramec River basin and the Big River Basin. State Route 8 runs east-west from Steelville to Potosi in the northern part of the watershed.

The Courtois Creek is a prototype Ozark stream, narrow channel with tight turns, with a sand and gravel bottom bordered with limestone outcroppings and stands of native Missouri pine, oak and hickory trees. It is a clear flowing stream interrupted with class I and II riffles and rapids. The Missouri Clean Water Commission has identified Courtois Creek as an Outstanding State Resources Water—with a high level of aesthetic or scientific value, a relatively undisturbed watershed, and located on lands which are state or federally owned, or which are leased or held in perpetual easement for conservation purposes by a state, federal, or private conservation agency.

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The majority of the land in the watershed is part of the Mark Twain National Forest. Located in the lower reaches of the watershed is the 6,225-acre Huzzah Conservation Area owned and leased by the Missouri Department of Conservation. Land in the Huzzah Creek watershed and the Middle Meramec watershed is also part of this Conservation Area.

Primary land cover is forest consisting of oak, hickory and pine forest and agricultural land consists primarily of pasture in the creek valleys. Within the city limits of Viburnum, the Doe Run Company operates an underground lead mine and a processing mill. This portion of the watershed is in the geologic feature known as the **Viburnum Trend** where lead and other metals are 1,000 feet below the surface. The Viburnum Trend was identified in the 1950s and mining began shortly thereafter. This area is about 50 miles from the Old Lead Belt centered



around Park Hills, Missouri. Activities associated with forestry such as saw mill and pallet manufacturing are also active in this watershed.

In the 1800s the creeks and the Meramec River were a means of transportation and a source of power. However, commercial transportation was not viable due to variations in the water level and the snags and gravel in the streams. The hardwood forests were a source of lumber, fashioned into railroad ties or converted in to charcoal for use in local iron furnaces. Wood products were either used in the area or sold. Now these waterways are used for recreational activities such as fishing and canoeing.



Meramec Basin Uplands

White River Trace Conservation Area is nine miles west of Salem and is located on County Road 253. The Missouri Department of Conservation purchased the 2,044-acre property in 1988. The majority of this area is in open grasslands and savanna. The southeast portion of the Conservation Area contains approximately one mile of the White River trace or trail. This is an Osage Indian trail that was used by Schoolcraft and Pettibone in their 1818-1819 exploration of the geography, geology and minerals in Missouri from Potosi to the Springfield area. The Hildebrand Detachment, consisting of almost 1,700 Cherokee, is believed to have traveled through this area as part of the 1838-1839 Indian Relocation (Trail of Tears). It is believed that the Detachment came this way to avoid settlers and to have more opportunities for hunting. The Trace served as a route for settlers into the Ozarks.

Upper Meramec Section

Upper Meramec River Watershed

The headwaters of the **Meramec River** are found about 15 miles southeast of Salem. This portion of the river is called the Upper Meramec and flows to the north through Dent and Crawford counties.

In the northern part of the watershed off of State Highway 8 is **Maramec Spring**, located in the Maramec Spring Park, which is owned and operated by The James Foundation. The Maramec Spring Park is open to the public for a small parking fee. Maramec Spring is the fifth largest spring in Missouri with an average daily flow of one million gallons. The spring is recharged from a 310 square mile area (three watersheds with a predominance of losing streams). From 1826-1876 the spring provided power for the ore crushing machinery of the Maramec Iron Works.

Maramec Spring Park is in the northern part of the watershed. It is owned and operated by The James Foundation of St. James, Missouri. The 1,800-acre park contains Maramec Spring, the remains of the Maramec Iron Works (1826-1876) and associated outbuildings, a fish hatchery, forests and fields. Three hundred acres are open to the public for outdoor recreation, sight-seeing and fishing. The park contains a natural and cultural history museum, an agricultural equipment museum and a driving tour highlighting the iron works and iron mine. The Missouri Department of Conservation operates the fish hatchery and stocks trout on a 0.6 mile portion of the Spring Branch. Trout fishing takes place from March 1 through October 31 with a fishing permit and a daily trout tag.

The **Maramec Iron Works** was the first sustaining iron works west of the Mississippi River. In the 1820s Thomas James of Ohio learned about the iron deposits near a large spring in Missouri from a group of Indians traveling east. In 1825 James and an associate Samuel Massey came to Maramec Spring to investigate the suitability of the area for an iron works. They found all the elements needed for iron production: surface hematite deposits; timber to convert to charcoal; limestone for use as flux; sandstone for the furnace; and water from Maramec Spring to power mills and trip hammer. Equipment was brought from Ohio and construction started in 1826. Iron production began in 1829. Skilled workers from the east were brought in to operate the charcoal-fueled furnaces and the foundry. In 1847 Samuel Massey sold his interest in the company to Thomas James. One of Thomas James' sons, William, managed



Maramec Spring

the company and eventually became the sole owner. Through the years the processing techniques continued to be refined. The company continued to look for ways to economically transport the finished pig iron to larger markets overland by wagon and later the railroad and by water (Meramec and Gasconade Rivers).

During the Civil War the company provided iron and cannon balls to the Union Army. In the 1870s technological, economic and transportation difficulties occurred. Timber from the 10,000 acres owned by the company was depleted, leading to a charcoal shortage and the high cost of transportation to and from the iron works were contributing factors in the iron works shutdown and subsequent sale in 1877. In 1920, Mrs. Lucy Wortham

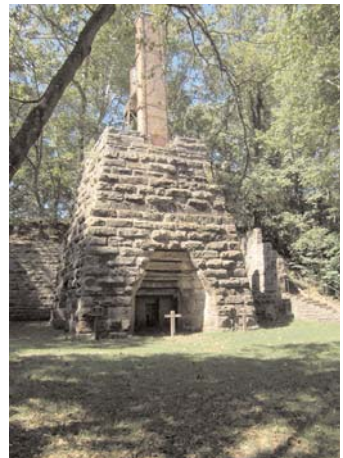


Foundry stacks from Maramec Iron Works

James, great granddaughter of Thomas James, purchased the Maramec Spring property including the site of the former Maramec Iron Works. When Mrs. James died in 1938, she placed her property in a trust and her will called for the property to remain in private ownership and be made open to the public. The James Foundation was created in 1941 to manage property in the town of St. James and Maramec Spring Park.

The **Sligo Furnace Company** was in northeastern Dent County and the company town of Sligo. The charcoal fueled iron smelter was in operation from 1880-1921 which was the longest tenure of any iron furnace in the Upper Meramec. The site contained brick furnaces, machine shops, laboratories, mule barns and charcoal kilns. Iron ore from Missouri and Michigan was processed at this site. The company could produce 60-80 tons of pig iron a day. A major part of the operation was the production of charcoal. When this facility closed, there were 72 charcoal kilns on the site and the Sligo & Eastern Railroad. The railroad was used to transport wood from areas as far as 30 miles away in Iron County to the Sligo charcoal kilns. The buildings and railroad were dismantled and the land is now part of the Indian Trail Conservation Area. Ongoing charcoal manufacturing in the Upper Meramec is another legacy of the Sligo Furnace Company and the other iron furnaces found in this area.

The 13,500-acre **Indian Trail Conservation Area** is located in northeastern Dent County. It is so named because one route of the Cherokee Trail of Tears is in this area. The Sligo Furnace Company is also on this site (1880-1921). Wood for the associated charcoal kilns was harvested here. The state of Missouri began acquiring property from 1924-1927. In the 1930s the Civilian Conservation Corps (CCC) established a camp in the Conservation Area. The CCC constructed access roads and a warm-water fish hatchery and planted pine trees. Approximately 90 percent of



Maramec Iron Works furnace

the Conservation Area is in forest with the remainder of the land cover being savanna, cropland (wildlife food plots), glades and the fish hatchery. A dolomite glade (hilltop with grasses and wildflowers) and a chert savanna have been identified as Conservation Natural Areas which are high quality examples of natural features which were present in pre-settlement Missouri.

Charcoal was the primary fuel source for the iron furnaces established in the Meramec River basin in the 19th century. The source of this charcoal was the extensive forested areas adjacent to iron ore sites. Often the largest number of workers at an iron furnace were those engaged in the making of charcoal. Charcoal could be produced in pits (or kilns) at temporary sites or in later years at established kiln structures. It could also be produced on a small scale and supplement the income of residents of these watersheds. Whatever the size of the operation, the main tasks were the same. They included harvesting and preparation of wood (dry, cut into four foot lengths); preparing the charcoal pit and dirt or leaves to cover the wood; managing the burn which could last several weeks; and transporting the charcoal to the furnace. In Missouri, charcoal continued to be used as a fuel source at iron furnaces until the late 19th century. After the Civil War, in order to operate the furnace at the Meramec Iron Works over 600,000 bushels of charcoal were needed annually (from 16,000 cords of wood). The Sligo Furnace Company continued to use charcoal until it closed in 1921. Charcoal could not compete economically with coking coal (because of the cost to produce, labor, and timber needs). Remnants of the charcoal process can be found in the various conservation areas and the Mark Twain National Forest.

Today southeast Missouri is a major producer of barbecue **charcoal**. North of Salem on Route 19 is the Royal Oak Enterprises charcoal briquette plant. It is one of three Royal Oak facilities in Missouri that use sawdust and sawmill scraps to produce charcoal. By the end of 2005 all functioning charcoal kilns in Missouri were required to have installed afterburners on their kilns to control smoke and volatile gases released during combustion.

Wurdack Farm is the Agricultural Experiment Station for the University of Missouri-Columbia. It is the research facility for the College of Agriculture, Food and Natural Resources. The 1,200-acre farm is southeast of Cook Station, Crawford County and adjacent to the Meramec River. Pasture and open forage fields make up about 300 acres and the remainder consists mainly of upland hardwood forest. The property was donated to the University of Missouri in 1962 by Hugo Wurdack.

Middle Meramec Section

Middle Meramec River Watershed

The Missouri Department of Conservation and agency partners have identified part of the Middle Meramec in Crawford and Washington counties as a Conservation Opportunity Area (COA). Rich habitat and a large amount of public land make this area a significant focus for habitat and species protection and restoration.

Today in the Meramec River Basin, residents and visitors can experience a number of outdoor recreation activities both public and private.

Throughout the Basin there are state parks, conser-

vation areas and Meramec River boat/canoe access points with camping, picnic areas and hiking trails. Onondaga Cave State Park and Meramec State Park are both on the Meramec River. Canoe and float trip outfitters are primarily based in the Middle Meramec River, Huzzah Creek and Courtois Creek watersheds. In addition to offering single day or several day trips, services these outfitters may also provide are camping, cabins, food services, meeting spaces and other outdoor activities including fishing or horseback riding.

Steelville is bounded on the northern side by the Meramec River. James Steel was one of the first settlers in the area. In 1835 the trading post operator sold 40 acres to the Crawford County Court (government). The future town-site was to be the county seat. The deed was recorded on December 18, 1835 and the lots laid out. The County Court named the town Steelville after James Steel and designated it as the county seat. The town was incorporated in 1885. Yadkin and Whittenburg creeks which drain into the Meramec River, also go through the town. Steelville is sometimes referred to as the “The Floating Capital of Missouri.”

The state acquired many properties in this area in the 1980s as one outcome of the decommissioning of the **Meramec Dam project**. Land had been acquired by U.S. Army Corps of Engineers and Missouri was given first opportunity to retain areas considered to have unique natural characteristics. Twenty percent of the lands with unique natural values were donated to the state of Missouri and are now public areas. Parts of the Huzzah Conservation Area, Onondaga State Park, and areas of Meramec State Park were acquired by these gifts. The portions of Meramec State Park containing Hamilton Valley and Greens Cave were acquired in this manner.

The **Huzzah Conservation Area** overlaps the Middle Meramec River, Huzzah Creek and Courtois Creek watersheds. It is located where the Courtois enters the Huzzah and the Huzzah enters the Meramec River. The 6,225 acres in the Conservation Area are owned and leased by the Missouri Department of Conservation. Seven miles of the Ozark Trail transverse this property. The remains of the original Scotia Iron Furnace and Iron Works can be found here.



There was an opening in the ground adjacent to the Davis Spring (now Onondaga Spring) south of Bourbon and in 1886, **Onondaga Cave** was located and explored. The owners first considered mining the onyx found in the cave for use as a building material. However, this cave onyx was too soft. In 1897, the first organized tour of the cave by flat-bottom boat was given and in 1902 the cave was opened for commercial tours. The cave was promoted as a place tourists attending the World's Fair in St. Louis could visit by train. A contest was held in 1904 to name the cave and the winning entry was "Onondaga" after a tribe of the Iroquois. From the 1900s through the 1930s there were many legal disputes and disagreements over property rights for Onondaga Cave. In the 1930s it was determined that the cave was under two different properties. One set of owners dug a new



Onondaga Cave

entrance, ran barbed wire down the middle of the cave, electrified its portion and renamed the cave "Missouri Caverns." In 1945 Missouri Caverns and Onondaga Cave properties as well as nearby Cathedral Cave were acquired by one person and improvements were made. In 1953, the properties were acquired by Lester Dill and Lyman Riley, owners of Meramec Caverns in Stanton, Missouri. They also improved the cave facilities and extensively promoted the entire Onondaga Cave. In the 1960s and 1970s it appeared that the lake associated with the proposed Meramec Dam would have flooded much of Onondaga Cave. With the assistance of The Nature Conservancy and the Lester Dill estate, the Missouri Department of Natural Resources was able to acquire the Onondaga Cave property and the adjoining Cathedral Cave. In 1982 the **Onondaga Cave State Park** was opened and Onondaga Cave was named as a National Natural Landmark. The park contains 1,317 acres. Walking tours (no boats are used) of a one mile section of Onodaga cave are available. Within the park the Onondaga Cave Branch and the Cathedral Cave Branch have both been identified as Outstanding State Resource Waters by Missouri Department of Natural Resources (MoDNR).

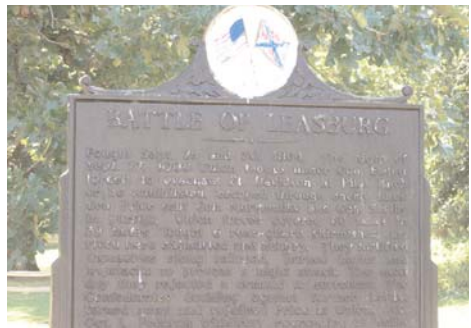
Cathedral Cave is 15,639 feet long and opens onto the Meramec River (entrance is gated and locked). The main feature of the cave is the 25 foot high Cathedral column which is 15 feet wide and 10 feet thick. This cave was first entered in modern times in 1919. The current commercial (public) entrance was dug in the 1930s and tours of Cathedral Cave were given. It was in competition with Onondaga Cave and Missouri Caverns. During World War II the cave closed. In 1945 Cathedral Cave as well as Missouri Caverns and Onondaga Cave properties were acquired by one person. In 1953, the properties were acquired by Lester Dill and Lyman Riley. The cave remained closed to the public. Improvements (lights, handrails) were made to Cathedral Cave in the mid 1970s when it was thought that the cave would eventually be flooded by the lake associated with the proposed Meramec Dam. The cave closed in 1975. The Missouri Department of Natural Resources acquired this property in 1981 and it is part of Onondaga Cave State Park. MoDNR is working to restore Cathedral Cave to its natural appearance but still remain accessible to the public. Lantern tours of Cathedral Cave occur on the weekend. The cave contains earthquake monitoring equipment which is operated by St. Louis University.

The 206-acre **Vilander Bluff Natural Area** is part of the Onondaga Cave State Park. This area is seven miles from the main park and has been part of the state park system for 25 years. Vilander Bluff consists of limestone/dolomite dry cliffs (bluffs), savannas and forests with one mile of the Meramec River running through it. Eastern red cedars which are more than 300 years old are growing out of the 200 foot high cliff face. Across the Meramec from the cliff is a blue heron rookery. There is limited access to this area. This area was named for the nearby settlement of Vilander.



Vilander Bluff
Missouri Department of Natural Resources

The **Battle of Leasburg** took place on September 29-30, 1864. In the Fall of 1864 Confederate General Sterling Price led a 12,000 manned cavalry raid on Missouri. The raid was designed to divert Union troops, gather and train Confederate recruits, destroy war materials and secure Missouri for the Confederacy. The raid started in southeast Arkansas and the first battle was at Fort Davidson (Pilot Knob in Iron County) on September 26-27. General Price lost 1,200 men to 200 Union soldiers (out of 1,000 stationed at the fort). Union troops led by General Thomas Ewing evacuated the fort undetected and then destroyed it. The Union troops marched 67 miles to Leasburg, the nearest point on the Southwest Branch of the Pacific Railroad, with the Confederates in close pursuit. On September 29-30, the Union soldiers made a stand by the railroad at Leasburg. Confederate Army units surrounded them and General Price demanded the surrender of General Ewing. The Confederate troops retreated before Union reinforcements could arrive. The Union troops went to Rolla.



Leasburg Civil War Monument

Bourbon, Missouri is believed to be the only town in the U.S. named for bourbon whiskey. In the 1850s the railroad was being built from Pacific to Rolla and railroad workers would stay in a particular area for months. Richard Turner set up a general store on his property to serve both workers and settlers. He brought in barrels of bourbon whiskey. A barrel sat on the store's porch and barrels were hauled to the railroad construction site. The store became known as the Bourbon store and the area around it as Bourbon. The town of Bourbon developed adjacent to the railroad tracks and the Old Wire Road.

Two miles south of Bourbon, Missouri is the **Blue Springs Conservation Area**. This land was acquired from the U.S. Army Corps of Engineers in 1983. There are upland and lowland forests, grassland and old agricultural fields. Blue Springs Creek flows through the Conservation Area to where it flows into the Meramec River. The four mile long creek is classified by Missouri Department of Natural Resources as an Outstanding State Resource Waters and is also classified as a Blue Ribbon Trout area.



On the Meramec River near Leasburg

Middle Meramec Section

Indian Creek Watershed

Indian Creek is located in Washington and Franklin counties. The **Pea Ridge iron ore mine** is located in northwest Washington County about 12 miles from the city of Sullivan. The underground mine was in operation from 1964-2001 and was the last of its kind in North America. The site contained the mine, a crushing mill and a roasting furnace to create hematite pellets. In the early years, product from this mine was used in steel production but in later years this material was used in the production of speciality electronics and magnets. In 2001, underground mining to extract iron ore was no longer economically viable and the mine closed. Mining had reached the 2,700 foot level and the bottom of the deposit had not been determined. As of 1998, 50.7 million metric tons of ore had been removed and the remaining reserves of high grade magnetite were estimated at 100 million tons.



In late 2001, the Pea Ridge mine and associated property and mineral rights were purchased by Upland Wings, Inc. This company operates a state licensed hunting preserve on the property. In 2005 Wings Enterprise and Wings Iron Mining Company were established to work with and reclaim the remaining mineral resources.

The 8,389-acre **Pea Ridge Conservation Area** is owned by the Missouri Department of Conservation. Four tracts in Washington County make up this conservation area. The land cover is primarily in oak, hickory and pine forests. The largest tract contains a dolomite cliff, a fen (low land covered with water) and dolomite glades as well as approximately three miles of Indian Creek (a contributing stream to the Meramec River).

The **Little Indian Creek Conservation Area** contains approximately 3,000 acres and is located along the Franklin County/Washington County border. The majority of the land cover is primarily second growth oak and hickory forests with some open areas. Before it became a conservation area in 1978, the land had been in pasture and timber production.

Lower Meramec Section

Lower Meramec River Watershed Franklin County

In the 1850s the land around present-day **Sullivan** was purchased by Stephen Sullivan. Mr. Sullivan donated land for the railroad right-of-way through the settlement and the railroad depot building. In 1860, officials of the Southwest Branch of the Pacific Railroad named the community Sullivan in honor of Stephen Sullivan.

The summer home of **General William Selby Harney**, a veteran of the Mexican-American and Civil wars, is in Sullivan. The William S. Harney Foundation is working to preserve and restore this circa 1870s structure.

George Hearst, the father of William Randolph Hearst, was born in 1820 near Sullivan. He lived in the area until 1850.

Meramec State Park is three miles south of the city of Sullivan. In 1926 the state of Missouri began purchasing land along the Meramec River. The park opened in 1927 and now consists of 6,896 acres. Natural features in the park include the river, more than 40 caves, bluffs and forested areas. There is a visitors center along with camping and picnic facilities and other recreational activities. Naturalist-led tours of Fisher's Cave are available. Fisher's Cave is a natural cave found in a bluff along the Meramec River. In the Hamilton Valley are the remains of the Hamilton Iron Works and iron ore mining pits can be found.

The **Meramec Conservation Area** contains 3,879 acres to the east of Meramec State Park. The core of the property was acquired in the 1920s and additional acres were obtained through donations. Meramec River bluffs, forests and woodland can be found here. It is a wildlife refuge with numerous hiking trails crisscrossing the area. The site of the first state tree nursery and the remains of a Civilian Conservation Corps camp are here.

Three miles south of Stanton is **Meramec Caverns**, a privately owned show cave. This limestone cave has 26 miles of natural passages on seven levels. There are a number of large formations, rooms and streams. The "Stage Curtain" is a calcite dripstone formation which is 70 feet high, 60 feet wide and 35 feet thick. In Meramec Caverns there is an onyx formation which is 33 feet high and has a circumference of 500 feet. The entrance to the cave has been used as a ballroom and a meeting site.



Onetime Shamrock Court Motel along Historic Route 66 in Sullivan

Indian guides led a French miner to this cave in 1720. The natural saltpeter deposits found here gave the cave its first name “Saltpeter Cave.” For the next 20 years saltpeter was mined from here and was used in the production of gunpowder. Later the Spanish used the cave as a base for lead mining activities in the area. During the Civil War, saltpeter mining began again and there was a powder mill on site. The powder mill was destroyed by Quantrill’s Irregulars. After the Civil War, primary uses of the cave were for saltpeter mining and renting the space for dances. In 1933, the cave and property were leased and eventually purchased by Lester Dill and his business partners. They built the entrance to the cave, and explored it. Saltpeter Cave was renamed Meramec Caverns. Lighting, pathways and handrails were installed. Meramec Caverns has been open for tours for a fee since the 1930s.

The owners of **Meramec Caverns** marketed it as a Route 66 destination. They were the first in the Midwest to paint signs on barn roofs (and paint the barn for free). Signs were tied onto the bumpers of parked cars at Meramec Caverns leading to the creation of the bumper sticker. Meramec Caverns is still open for tours and a number of other tourist features have been constructed around it.

The unincorporated area of **Gray Summit** came from Daniel Gray who opened a hotel in this area in 1845 This area is the highest point between St. Louis and Kansas City on the main line of the Pacific Railroad. A railroad tunnel runs underneath this community.

One mile southeast of Gray Summit and two miles west of Pacific is the **Shaw Nature Reserve**. The Reserve is a division of the Missouri Botanical Garden in the city of St. Louis. The 2,500-acre site along the Meramec River contains native flora and fauna found in different Ozarks landscapes, glades, forests, prairies, as well as various plant collections. The Botanical Garden sold land between Alfred Avenue and Vandeventer



Meramec Cavern advertisement

Avenue in the city in order to purchase five farms in this area in 1925 because their plant collections were threatened by the coal smoke in the city of St. Louis. Facilities were built at the Shaw Arboretum and the orchid collection was moved there in 1926. Pinetum and wildflower gardens were also developed. The Arboretum was opened to the public in 1940 with the Gate House on Route 66. Because of improvements to the air quality, the other plant collections did not have to be relocated. In 2000 the name became the Shaw Nature Reserve. The focus is now on outdoor education, ecological research and passive recreation.

In 1852 the Pacific Railroad platted the town of Franklin in eastern Franklin County. Franklin was the western terminus of the first railroad division west of the Mississippi River. In 1853 the first train arrived in Franklin. Railroad construction continued to the west toward Kansas City and to the southwest toward Rolla and Springfield with the Southwest Branch (later the St. Louis and San Francisco). In 1859 when the town was incorporated the name was changed to **Pacific** in honor of the railroad.

A Civil War skirmish took place in Pacific in October 1864. In September 1864 Confederate General Sterling Price began a 12,000-manned cavalry raid on Missouri. After defeats at Fort Davidson and Leasburg, Confederate troops followed the railroad to the northeast destroying stations, bridges and tracks along the way. In early October, General Price captured Pacific and burned the train depot. Union troops from St. Louis engaged the Confederates in the hills between Pacific and Allenton. The Union soldiers were successful in driving General Price out of Pacific and keeping his forces away from St. Louis.

In the late 1800s silica sand mining began in the sandstone bluffs east of **Pacific**. At that time silica sand was used in glass making and today has various industrial uses. Route 66 came through the town in the 1930s and Interstate 44 can be found on the north side of town.



Meramec River Valley from Jensen's Point east of Pacific

Lower Meramec Section

Lower Meramec River Watershed Calvey Creek Subwatershed Franklin County

The **Calvey Creek** watershed lies in the east-central portion of Franklin County, and the eastern edge of the watershed extends into Jefferson County. Calvey Creek is a fourth order stream, 14.5 miles long and its watershed includes 26,790 acres or 42 square miles. The watershed includes 590 acres of public open space in Robertsville State Park, and at least five undeveloped tracts that total more than 200 acres (two in Jefferson County and four in Franklin County). The Calvey Creek watershed is a priority watershed for Franklin County. It is considered to be healthy, hosts a rich diversity of flora and fauna and retains most of its natural features.

Robertsville community was named for Edward James Roberts who was one of the largest landowners in Franklin County in the 1800s. His family farmed along the Meramec River and Calvey Creek valley. In 1979, **Robertsville State Park** was established from a portion of Roberts' 3,000-acre farm. The park is bordered by the Meramec River and Calvey Creek.

In the early 1900s through the 1930s, the Meramec Terrace resort and cottages were used by tourists who took the train from the St. Louis area out to Franklin County.

The Calvey Creek headwaters begin in Jefferson County and Calvey Creek flows to the northwest to where it enters the Meramec River.



Calvey Creek



Low water bridge over Calvey Creek

Lower Meramec Section

Lower Meramec River Watershed Jefferson County

For a short time in the late 1700s the first European settler in the **Arnold** area operated a ferry on the Meramec River. The ferry was located on the King's Trace from St. Louis to Ste. Genevieve (now known as Telegraph Road).

On March 6, 1866 William Cody (later known as Buffalo Bill) married Louise Frederici of Arnold in St. Louis. They met when Buffalo Bill was stationed at Jefferson Barracks during the Civil War.

In 1972 several small communities in northeast Jefferson County came together and incorporated as the city of Arnold. The city was named after George Arnold, a local landholder and the first postmaster.

The 90-acre Tszars Wood Conservation Area is located in the southeast portion of the city of Arnold. It is primarily wooded with forested wetlands along the Meramec River. Adjacent to this conservation area are the Flamm City boat access and a city park.

The **Pacific Palisades Conservation Area** is primarily in northwestern Jefferson County with a boat access point across the Meramec River in St. Louis County. Three miles of the Meramec River are the northern boundary of the conservation area. It is named for the row of bluffs directly across from this site. About half of the 695 acres are forested with the remainder in crops and grasses.



Pacific Palisades Conservation Area

Lower Meramec Section

Lower Meramec River Watershed LaBarque Creek Subwatershed Jefferson County

The LaBarque Creek watershed lies in northwestern Jefferson County and consists of 8,392 acres, or 13 square miles. **LaBarque Creek** is only 6.4 miles in length and enters the Meramec River approximately 42 miles upstream from its mouth at the Mississippi River. The Meramec River forms the border between Jefferson and St. Louis counties in both western and eastern portions of the counties. The LaBarque Creek watershed had an estimated 1,150 to 1,400 residents in the year 2000, for a density of 90 people per square mile. The watershed includes 1,261 acres of public open space and four large undeveloped tracts, each of which is more than 370 acres.

A critical watershed is defined as one that still retains most of its natural and pristine features but is threatened with urban and suburban development pressures. Therefore, LaBarque Creek has been identified as a critical and priority stream by MDC. It is considered to be healthy, hosts a rich diversity of flora and fauna and registers low levels of pollutants in studies recently completed by various stream teams.



LaBarque Creek

State Highway FF runs from southwest to northeast, following the creek valley. The headwaters are in northwest Jefferson County and the creek flows northeast to where it joins the Meramec River. A sand and gravel type stream, LaBarque Creek retains much of its natural character with high bluffs and forested streambanks. The LaBarque Creek watershed is unique in the area with overlapping sandstone and limestone outcroppings. In a healthy and functioning Ozark-type landscape at the western edge of the St. Louis metropolitan area, MDC biologists found 42 fish species in the creek. Creeks to the east of LaBarque had no more than 13 species and some had fewer than 10.

Hilda Young Conservation Area (970 acres owned by MDC), is located near where LaBarque Creek enters the Meramec River. MDC has a demonstration plot on which stream protection, restoration and rehabilitation techniques are tested. The conservation area has a pine forest on the uplands as well as meadows and grasslands. In 2006, with the purchase of land from the Nature Conservancy, MDC established the 540-acre LaBarque Creek Conservation Area. It is in the headwaters of the watershed and is ecologically diverse with clear water, sandstone glades and rare plants and one mile of LaBarque Creek.

The **Wild Canid Survival and Research Center** has begun to relocate from the Tyson Research Center in St. Louis County to a site in the LaBarque Creek watershed. It is a private not-for-profit organization dedicated to preservation of the wolf. The captive breeding program includes American Red wolves and Mexican gray wolves. The facility also houses maned wolves from South America. More Mexican gray wolves have been born in the center than any other facility in the U.S. The Mexican gray wolf is the most endangered wolf species in the world. The long-term goal of the center is to breed and return endangered wolves to the wild.

A cooperative effort to protect the watershed is underway by a group of landowners and conservation organizations and the Jefferson County Planning Department. Jefferson County is hoping to use the Labarque Creek watershed planning effort as a model process to be applied in all Jefferson County watersheds.

The LaBarque Creek watershed has been designated by the MDC as a Conservation Opportunity Area for all wildlife conservation. In such an area, MDC and other partners provide assistance to stakeholders so they can develop a profile of the conservation area, set goals and delineate actions. It is one of two Conservation Opportunity Areas in the Meramec River Basin; the other consists of a seven-mile area around Middle Meramec River and the Huzzah Creek watersheds.

Lower Meramec Section

Lower Meramec River Watershed

St. Louis County

During the 1850s when civil engineers for the Pacific Railroad were surveying possible routes, they determined that land in the Meramec River valley near Flat Creek would not require many cuts and grades. Reportedly the survey crew searching for a suitable route cried out “Eureka” (Greek for “I have found it”) and called the construction camp **Eureka**. The local post office kept the name and in 1858 the area adjacent to the railroad was platted as Eureka. The community served the surrounding agricultural areas. In 1900 a summer camp for poor and orphaned city children was established. This camp operates today as Camp Wyman. The city of Eureka was incorporated in 1954 and in 1985 annexed Allenton, another railroad community to the west. In 1970 the Six Flags Over Mid America amusement park opened.



The **Route 66 State Park** opened in 1999. The 419-acre park is located between Eureka and the Meramec River and contains part of the original Route 66 and a bridge from that era. The visitor center at the park contains displays and Route 66 memorabilia. The center is housed in a 1935 roadhouse across the Meramec from the main portion of the park. The park contains walking, bicycling and equestrian trails and picnic grounds.

Route 66 State Park is the former site of the river community of **Times Beach**. It began in 1926 as a summer resort for people from the city of St. Louis. As part of a newspaper subscription promotion, lots were offered to the public. Over the years the community of weekend cottages turned into a year-round town. In the early 1980s the residents of the town learned that waste oil sprayed on the streets to control dust contained high levels of dioxin. The U.S. government relocated the residents and began the buyout of residential and commercial property. The structures were demolished and an extensive hazardous waste clean-up took place. When the clean-up was completed in 1997, the former Times Beach property was turned over to the state of Missouri.



Route 66 State Park Visitor Center

Transportation in the Meramec River basin began with the Osage Trail and progressed to the State Road and from the Old Wire Road to Route 66. In 1837 and 1838 state laws authorized the construction of a state road between Springfield and St. Louis. In the upper Meramec River Basin this road would generally follow the route of the Osage Trail along the drainage divide between the Meramec River and the Bourbeuse and Gasconade rivers. The Southwest Branch of the Pacific Railroad was also built in the vicinity of the Osage Trail. From the late 1840s through the Civil War period, telegraph wires were strung along the state road and it became known as the Wire Road. When the wires were removed, the road was called the Old Wire Road. In the 1800s, roads were for local transportation (bringing products to nearby towns or shipping points) and the railroad for long distance travel. In the early part of the 20th century, the increased use and presence of the automobile and trucks to transport products and interest in recreational travel, improvements were needed for the road system in Missouri. In 1922 State Route 14 was identified as the primary road between Joplin and St. Louis.

In 1926 the federal-level Joint Board on Interstate Highways established the alignment and route number of the interstate highway U.S. Highway 66 (Route 66). This road was to be the nation's first all-weather highway from Chicago to Los Angeles. In Missouri, the Route 66 number was assigned to the existing State Route 14. By 1931 the Missouri portion of **Route 66** between St. Louis and Joplin was fully paved. It opened up rural Missouri beyond the railroad. The road was marketed as a travel opportunity. Along the road entrepreneurs developed auto-related services and destinations for tourists. Destinations ranged from resorts and campgrounds on the Meramec River to show caves like Onondaga and Meramec caverns. In St. Louis County, over time, several different routes were designated as Route 66. One route was along Watson Road and went through or near Fenton, Eureka, Allenton and Pacific.

In 1956 President Dwight Eisenhower signed the Federal-Aid Highway Act into law. This act provided funding for the construction nationwide of a modern interstate highway system. Interstate 44 parallels and bypasses Route 66 across Missouri. As a portion of Interstate 44 was completed, a section of Route 66 was decommissioned. Nationally, Route 66 was decommissioned in 1985.

In 1990 Old U.S. Highway 66 in Missouri was designated as a historic highway and historic route signs were installed. Some portions of Route 66 are still in use as I-44 service roads.

In the 1930s and 1940s the focus of the **Henry Shaw Garden-Way Association** was to beautify the Route 66 roadside, encourage business and recreation facilities and promote tourism. From the city of St. Louis out to the Shaw Arboretum (Shaw Nature Reserve) native flowers, shrubs and trees were planted. East of Pacific a structure was built on the bluffs overlooking the Meramec River valley. It was named for Lars Peter Jensen the manager of the Arboretum and the first president of the Association. The Jensen Point Overlook is now on private property.



Historic Route 66 sign

In 1994, the Henry Shaw Ozark Corridor Foundation was established to preserve and enhance the natural environment surrounding Interstate 44 (the successor to Route 66).

Castlewood State Park contains 1,802 acres and covers five miles on both sides of the Meramec River between Glencoe and Valley Park in St. Louis County. The park is made up of bluffs, forested uplands and floodplains and Kiefer Creek which joins the Meramec here. In the first half of the 20th century Castlewood was a resort area. Hotels, clubhouses, clubs and Lincoln Beach were weekend destinations for city residents. These attractions were in walking distance of train stations and a staircase went from the station near the river up to the bluff-top hotels. Remnants of this staircase can be found in the park. After World War II, Castlewood was a residential area with some fishing and hunting camps. Property for the park was acquired in 1974. The park contains 15 miles of trails to hike, bike or ride horseback. The Al Foster Trail links Castlewood State Park with Sherman Beach Park.

Lone Elk Park in St. Louis County was once part of the Tyson Valley Army Powder Storage Farm. In 1941, 2,622 acres were obtained by the U.S. Army and were used as a munitions storage and testing facility during World War II. After the war, St. Louis County took ownership of the property and turned it into Tyson Valley Park with concessions, a miniature railroad and a corral with bison.

In 1951, a group of elk was released into the Park. Later that year, ownership of the property reverted back to the federal government and the site was again used for ammunition and gunpowder storage through 1953. In 1955, 200 acres in the western part of the Powder Farm was released to St. Louis County to become West Tyson Park. By 1958, as a result of the overpopulation of elk on the fenced property, the decision was made to shoot and remove almost all of the herd. One male elk remained. The remainder of the land was used for general storage by the Army until 1961. In 1963, Washington University obtained 1,966 acres for the Tyson Research Center, an ecological and environmental field research facility. The last part of the Powder Farm was acquired by St. Louis County for a park. Before the fence between the Research Center and the new park was completed, the last elk was found to be on the county land. Hence, the park became Lone Elk Park. This park is operated as a wildlife management park with bison, turkey, deer, elk and waterfowl. Also in this area is the World Bird Sanctuary.



Overlooking the Meramec Valley at Jensen's Point



Enjoying the Meramec near Glencoe

In the late 1800s the Meramec River was a **recreation destination** for urban residents to get away from the heat and humidity in the summer. Residents could take a train out from the city and walk to the various resorts and parks along the river. Some of these resort areas were Sylvan Beach in Fenton, Valley Park, Castle Park and Meramec Highlands in Kirkwood. The Meramec Highlands Inn and recreation complex was west of downtown Kirkwood on bluffs overlooking the Meramec River. In 1891 the Meramec Highlands Company built a train station on this property. The deed to the station was given to the St. Louis and San Francisco Railroad for \$1. In turn, Meramec Highlands became a scheduled stop. The Meramec Highlands Inn opened in 1894. In addition to the guest rooms at the Inn there were cottages, a spa, tennis courts, stables, a boathouse and a swimming beach. The target audience was wealthy St. Louisans and tourists coming to the 1904 World's Fair. In 1896, streetcar service to the Highlands began and the resort became more accessible to the general public, and therefore of less interest to its target audience. The Meramec Highlands Inn experienced financial difficulties and closed in 1905. In 1925 the Inn and cottages were sold to private individuals. The Meramec Highlands Inn was destroyed by fire in 1926. Some of the cottages still stand today and are part of the Meramec Highlands Historic District in Kirkwood. The Meramec Highlands train station has been converted to residential use and is the centerpiece of a recently opened 12 lot development.

During the Depression and World War II, use of the Meramec River as a recreation opportunity declined. After World War II, cars and gasoline were available and people were interested in travel destinations beyond the St. Louis area. Availability of home air conditioning also reduced interest in the Meramec as a place to seek relief from the heat.

2007 marks the 40th anniversary of **Operation Clean Stream** in the Meramec River Basin. Each August cleanup activities are scheduled throughout the Meramec River basin. Volunteers participate as individuals or with a group. Workers boat, float in canoes or work in shore parties on an assigned river section near a check-in site on the Meramec, Huzzah, Courtois, Bourbeuse or Big rivers. To float, individuals must provide their own canoe or boat. Volunteers are provided trash bags, gloves and a free bumper sticker. Founded in 1967, Operation Clean Stream remains one of America's largest and most successful ongoing river restoration efforts. The annual event attracts nearly 2,000 volunteers from various age groups and backgrounds to the Meramec River and its tributaries. Agencies and organizations at the local, state and national levels have recognized the Meramec River Clean Stream effort as a key environmental event in the St. Louis region.



Operation Clean Stream

Lower Meramec Section

Lower Meramec River Watershed

Fox Creek Subwatershed

St. Louis County

The Fox Creek watershed lies in southwestern St. Louis County and covers 12,570 acres or 20 square miles. The headwaters of the watershed extends westward into Franklin County and includes a small part of the city of Pacific. The lower watershed includes part of the city of Eureka. **Fox Creek** is nearly 10 miles in length and flows southerly and enters the Meramec River at river mile 44.4. The Fox Creek watershed had an estimated 2,400 residents in 2000, for a density of approximately 120 people per square mile. The watershed includes 1,593 acres of public open space and two undeveloped tracts of more than 200 acres. One of these tracts is the site of a stream bank mitigation project in the flood plain and a major planned development on adjacent land just upstream from where the creek enters the Meramec River.

Fox Creek has been identified as a priority stream by MDC. It is considered to be healthy, hosts a rich diversity of flora and fauna and registers low levels of pollutants in studies recently completed by various stream teams.

MDC biologists found 44 fish species in Fox Creek. Creeks feeding into the lower Meramec River east of Fox Creek had no more than 13 species and some had fewer than 10.

The majority of this watershed is part of the city of Wildwood. State Route 100 follows the northern ridge line of the Fox Creek watershed. Interstate 44 bisects the middle of the watershed. To the north of the interstate the land cover is predominantly forest and woodland. The 1,388-acre Rockwoods Reservation Range, owned by MDC, is in the north central portion of the watershed. Agricultural areas can be found adjacent to the creek in the southern part of the watershed.

Along three miles of the creek from I-44 south to where Fox Creek enters the Meramec River is the **Fox Creek Stream Mitigation Bank**. The mitigation bank is designed to mitigate the impact of development on Fox Creek by restoring or enhancing it. A number of partners were involved in the establishment of the mitigation bank in 2000. Frontage property along Fox Creek and adjacent land was purchased. Streambank stabilization is taking place and trees are being planted on both sides of the creek. Upland waterways are being planted with grasses. Acre sections are to be sold to developers with projects primarily in the St. Louis area (Meramec River and Big River watersheds) who need to mitigate for stream damages. Each section is still part of the bank and is deed restricted for conservation uses only.

Meramec River Basin *Demographic Information*

Table 1
2000 Population of Counties
which are part of the Meramec River Basin*

County	2000 Population
Crawford	22,804
Dent	14,927
Franklin	93,807
Iron	10,697
Jefferson	198,099
Phelps	39,825
St. Louis	1,016,315
Washington	23,344

Source: 2000 Census, American Fact Finder

**The Meramec River Basin is located within these eight counties in east central Missouri. The portions of these counties that make up the Meramec River Basin contain forests, pastures and cropland as well as suburban and urban areas. Though most of the area's residents do not reside directly within the boundaries of the basin, they do benefit from its recreational and ecological opportunities. The ongoing and ever changing relationships among the geographical, economic and social environments in the Meramec River Basin have a direct impact on the more than 1.4 million people who live in these eight counties.*

Table 2
Population of Incorporated Units in the Meramec River Basin

<i>Incorporated Unit</i>	<i>2000 Population</i>	<i>Location</i>
<i>Crawford County</i>		
Bourbon	1,348	On Basin Divide
Cuba	3,230	On Basin Divide
Leasburg	323	On Basin Divide
Steelville	1,429	Within
<i>Dent County</i>		
Salem	4,854	Within
<i>Franklin County</i>		
Pacific	5,482	Within
Parkway	280	Within
St. Clair	4,390	On Basin Divide
Sullivan	6,351	On Basin Divide
<i>Iron County</i>		
Viburnum	825	Within
<i>Jefferson County</i>		
Arnold	19,965	Within
Parkdale	205	Within
<i>Phelps County</i>		
Rolla	16,367	On Basin Divide
St. James	3,704	On Basin Divide
<i>St. Louis County</i>		
Ballwin	31,283	
Des Peres	8,592	On Basin Divide
Ellisville	9,104	On Basin Divide
Eureka	7,676	
Fenton	4,360	
Kirkwood	27,324	On Basin Divide
Manchester	19,161	
Sunset Hills	8,267	On Basin Divide
Town & Country	10,894	On Basin Divide
Twin Oaks	362	
Valley Park	6,518	
Wildwood	32,884	On Basin Divide
Winchester	1,651	

Washington County

No incorporated units are within basin

Source: 2000 Census, American Fact Finder

Table 3
Population of Census Designated Places* in the Meramec River Basin

<i>Census Designated Place</i>	<i>2000 Population</i>	<i>Location</i>
<i>Franklin County</i>		
Gray Summit	2,640	On Basin Divide
<i>Jefferson County</i>		
High Ridge	4,236	Within
Murphy	9,048	Within
<i>St. Louis County</i>		
Concord	16,689	Within
Mehlville	28,882	On Basin Divide
Oakville	35,309	On Basin Divide
Sappington	7,287	On Basin Divide

Source: 2000 Census, American Fact Finder

**Over its 220-mile length the Meramec River passes through a variety of communities, ranging from rural free-standing communities in the Upper and Middle Meramec watersheds to densely populated suburban communities near its confluence with the Mississippi River at Arnold. The Meramec River Basin, therefore, is a microcosm of the socio-economic and land use characteristics of the St. Louis region in general since it contains urban, suburban, urbanizing and rural land use activities. Of these activities, the urbanized and developing portions of the Meramec River Basin pose the greatest challenge of preserving in-stream water quality while sustaining healthy economic growth.*

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