

LAND USE

Historical Land Cover/Land Use

The Spring River Tributaries Watershed in Missouri essentially occupied the transition area between two contrasting areas of land cover. Nigh (1988) indicates that numerous written accounts of the Eleven Point Watershed describe it as being primarily forested while lacking the barrens country typical of the Northern and Western Ozarks. An independent account of Western Howell County by William monks as discussed by Ryan and Smith (1991) states that

"The table-lands... had very little timber growing on them, but were not prairie. They were what were known as post oak runners and other brush growing on the table lands, but the grass turf was very heavy and in the spring of the year the grass would soon cover the sprouts and the stranger would have taken all of the table-lands, except where it was interspersed with groves, to have been prairie."

Unlike a large portion of the Eleven Point Watershed, the Spring River Tributaries Watershed did not have large tracts of continuous pine (MDC and Schroeder 1993). Open woodlands and oak savannas with occasional to common prairie and savanna openings was the principal vegetation type within the Spring River Tributaries Watershed. Post oak and black oak were the principal woodland tree species with scattered shortleaf pine in the northern portion of the watershed (MDC 1997). Fire likely played an important role in maintaining the open woodland and savanna flora. The more dissected lands within the watershed probably contained mixed oak woodland and forest. Unique sinkhole ponds, wet prairies and seeps were scattered throughout the watershed. A small portion (<250 acres) of presettlement prairie is believed to have existed in the watershed (MDC and Schroeder 1993).

The earliest inhabitants of the Ozarks, the Native American Indian, are thought to have existed in the Ozarks as semi-nomadic tribes living in small, transient camps and subsisting on hunting and foraging during much of the Archaic period (7000-1000 B.C.)(Jacobson and Primm 1994). Late in the Archaic period, tribes on the fringes of the Ozarks became less nomadic; existing in larger villages and increasingly depending on plants for food, while tribes in the interior retained their hunter-gatherer characteristics. Tribes within the interior began to construct more elaborate villages as well as incorporate more agriculture into their subsistence during the early Mississippian Period (A.D. 900-1200). By A.D. 1500 this culture had disappeared as large agricultural base villages began to grow along the eastern fringe of the Ozarks and the Mississippi River. During this period the interior of the Ozarks was used as a seasonal hunting ground as well as a source for flint and chalcedony for making tools. It is believed that a climatic shift to cooler, drier summers and the subsequent failure of maize crops on which early agriculture was based, may have caused an abrupt abandonment of these larger villages such as Cahokia Mounds in Illinois. Remanents of these villages and tribes reassembled to form the Osage Tribe which existed throughout much of the Ozarks and was present as European settlement of the area began to occur in the late 1700s and early 1800s (Jacobson and Primm 1994). Native American use of fire is believed to have been a large factor in the types of vegetation found by Schoolcraft and others as exploration of the Ozarks interior began to occur after the Louisiana Purchase of 1803. Fires, occurring naturally from lightning strikes or set for many reasons from harassment of enemies to aiding in hunting, also stimulated warm-season grasses such as bluestem and eliminated woody undergrowth thus creating open woodlands or savannas.

European settlement of the Ozark fringe began in the early 1700,s under French and, later, Spanish

political control (Jacobson and Primm 1994). After the Louisiana Purchase of 1803 American Settlers began settling the same areas earlier occupied by the Spanish and French. Settlement of the Ozarks Interior increased after the war of 1812. Many of the early settlers came from the Appalachian States such as Tennessee, Kentucky, and Virginia where they had learned the skills necessary for survival in land similar to the rugged Ozark wilderness (Nigh 1988). In addition to hunting and fishing, early settlers survived by using the valley bottom land for gardens and row crops, and the wooded side slopes and native grass of the uplands for grazing cattle, hogs, horses, and other livestock. This region remained isolated and only sparsely settled until the late 1800's (Nigh 1988). As the timber resource of the eastern states dwindled and an increasing number of settlers migrated onto the western plains, the demand for the timber of the Ozarks increased (Cunningham and Hauser 1989). Undoubtedly, the cheap price of land having uncut timber was also very attractive to eastern speculators. Uncut timber land often sold for a \$1.00 an acre (Cunningham and Hauser 1989). The coming of the railroad to the Ozarks interior during this time not only provided a means of transportation for lumber products, but also was a great consumer of this resource for railroad ties. With the extension of the railroads into the Ozarks came the large scale exploitation of the timber resource (Rafferty 1983).

The Spring River Tributaries Watershed was an area lacking extensive tracts of shortleaf pine (MDC and Schroeder 1993). Instead much of the timber resource consisted of oak species; primarily post oak and black oak in open woodlands (MDC 1997). In areas such as this, hardwoods were used for a variety of products, primarily railroad ties, flooring, barrel staves, tool handles and fuel including the manufacture of charcoal (Rafferty 1983; Jacobson and Primm 1994). These products used a wide range of timber sizes.

As native timber within the Spring River Tributaries Watershed was being depleted, it was replaced by agriculture and horticulture. Approximately 153,000 of the 580,000 acres in Howell County were "under plow" in 1904 (Williams 1904). Estimates of 1902 cropland within Howell County indicate a total 47,686 acres planted in corn alone with Oregon County having 31,382 acres planted in corn (Table Lu01)(Williams 1904). This land use would have undoubtedly contributed significantly to erosion and thus sedimentation and an increase in gravel load in the streams of the watershed. In addition to cropland within the watershed, several large orchards existed. Williams (1904) proclaimed Howell County Missouri as "The largest peach growing county in Missouri. He also stated that the largest peach orchard in Missouri was in Oregon County with 102,400 trees. The orchard district in Oregon County was located along the Frisco Railroad in the southwest portion of the county (Williams 1904). These estimates paint a much different landscape than what exists within the watershed today.

Land Type Associations

Land Type Associations (LTAs) are units of land which are relatively similar in landform and in patterns of geologic parent material, aspect, soils and potential natural vegetation. Within the Spring River Tributaries Watershed, two LTAs have been identified (Figure Lu01 and Table Lu02). Each has a characteristic pattern of landform geology, soil and vegetation. These LTAs are the Howell/Oregon Oak Woodland Dissected Plain and West Plains Oak Savanna Woodland Plain. LTAs could prove to be a useful tool for planning and implementing management activities (ie. water quality and aquatic biodiversity).

Current Land Use

The Missouri Resource Assessment Partnership (MoRAP) Phase 1 Land Cover Classification (1997) (see

page 12a) is currently the most recent compiled land cover/land use data available. This data, as analyzed by Caldwell (1998), indicates estimated forest/woodland cover within the watershed at 48.3% while grassland/cropland comprises 49.1% of the total land cover (Table Lu03, Figures Lu02, Lu03, and Lu04). Unlike its larger "sister" watershed, the Eleven Point, which has a land cover comprised of 65% forest/woodland, the Spring River Tributaries Watershed has a land cover comprised of slightly more grassland/cropland than forest/woodland. Reasons for this probably include, but are not limited to the following:

1. Local topographic relief is relatively less within the Spring River Tributaries Watershed than in the Eleven Point, thus the topography is generally more conducive to land clearing for pasture. Local relief data obtained for fish community sample sites within the Missouri Department of Conservation Fish Collection Database (1998) indicate mean local relief of sites within the Spring River Tributaries Watershed at 160 feet while mean local relief of sites within the Eleven Point is 256 feet.
2. The Spring River Tributaries Watershed is more densely populated than the Eleven Point. Estimates based on 1990 census data analysis using the MABLE/Geocorr Geographic Correspondence Engine Version 3.01 (Blodgett J. and CIESIN 1996) indicate that mean population density within the Spring River Tributaries Watershed is 43 persons per square mile as opposed to 14 persons per square mile within the Eleven Point Watershed.
3. Less public land exists within the Spring River Tributaries Watershed than in the Eleven Point. Public land within the Spring River Tributaries Watershed accounts for approximately 2% of the total area while it accounts for 22% within the Eleven Point.

Little cropland exists within the watershed today as compared to the turn of the century (1904). Nearly all of the non-forested areas are pasture or hay fields primarily composed of fescue and/or alfalfa and clover. Howell County ranks 2nd in Missouri (1997) in number of cattle and 18th in haycrop acres in the state (Table Lu01)(NASS 1997). Oregon County ranks 28th in Missouri in number of cattle and 64th in hay crop acres.

It should be noted that, at the time of this writing (1999), the MORAP Phase 1 Land Cover Data is currently considered a work in progress. A more accurate and detailed Phase 2 data compilation is planned.

The Natural Resource Conservation Service (NRCS) rates sheet erosion within the Spring River Tributaries Watershed as low at 2.5-5 tons per acre annually, which is considered an acceptable rate of soil loss. Gully erosion is only a slight problem at 0-0.16 tons per acre annually (MDNR 1994).

Soil Conservation Projects

The Spring River Tributaries Watershed has no completed, ongoing or planned Public Law 566 (PL-566) watershed projects. There is one Special Area Land Treatment (SALT) project within the watershed. This project occupies 3,541 acres of the Elkhorn Branch Drainage (Figure Lu05). The purpose of the project is to reduce soil loss and improve water quality by improving forest and grassland conditions within the drainage. At the beginning of the project, 2,782 acres within the project area were defined as needing treatment. Completion date for the project is July of 1999 (Cash, personal communication and Robbins, personal communication).

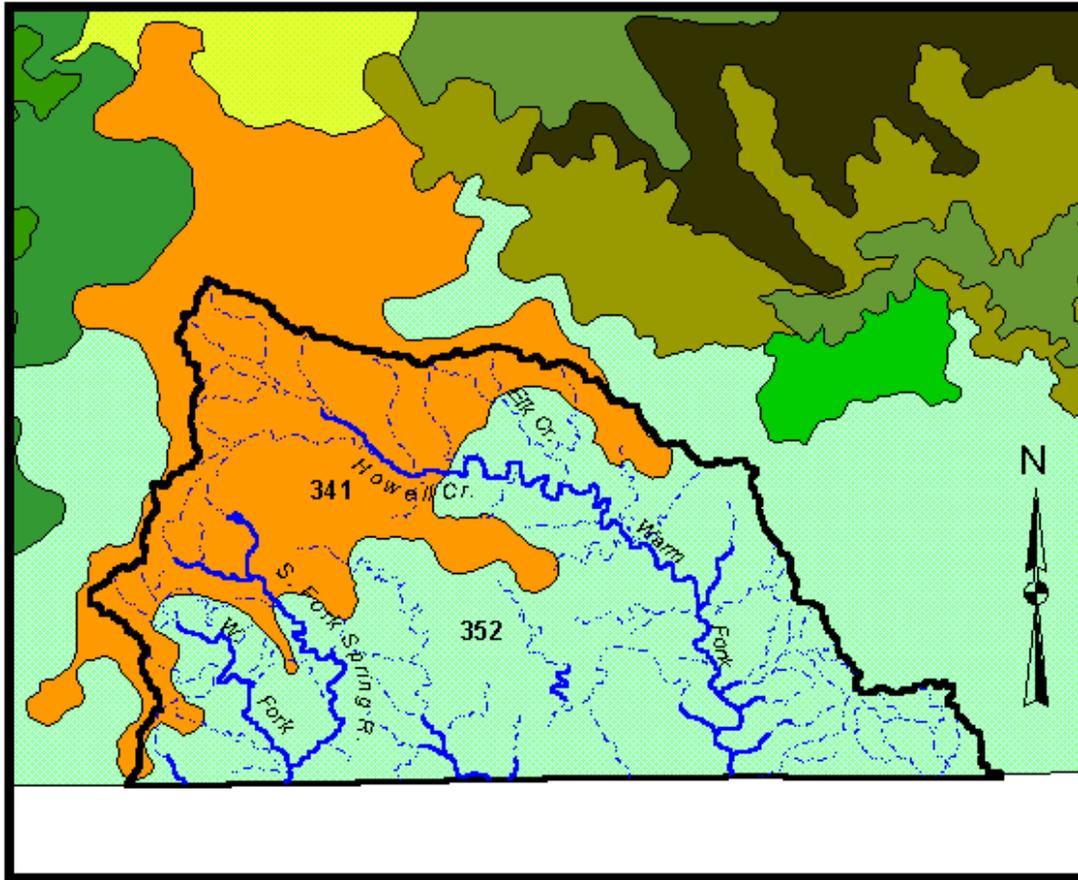
Public Areas

Approximately 7,405 acres, or 2 % of the Spring River Tributaries Watershed is in public ownership. The largest public area is the 6,579 acre White Ranch Conservation Area owned by the Missouri Department of Conservation. Approximately 3.8 miles of stream frontage exist on public lands within the watershed (Table Lu04 and Figure Lu06)(MDC 1995).

One public fishing area is located on the Warm Fork of the Spring River at Thayer, Missouri. This area is owned by the city of Thayer (Mayers, personal communication). An additional stream frontage area, known as Martin Access has been recently acquired however no development of facilities has occurred as of this writing(1999)(McPherson, personal communication and Mayers, personal communication).

Figure Lu01.

Spring River Tributaries Watershed Land Type Associations



Legend

 Watershed Boundary

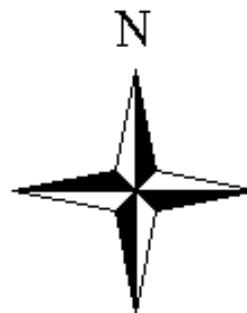
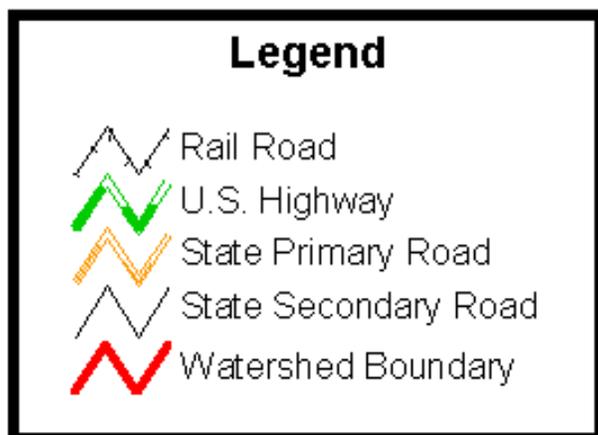
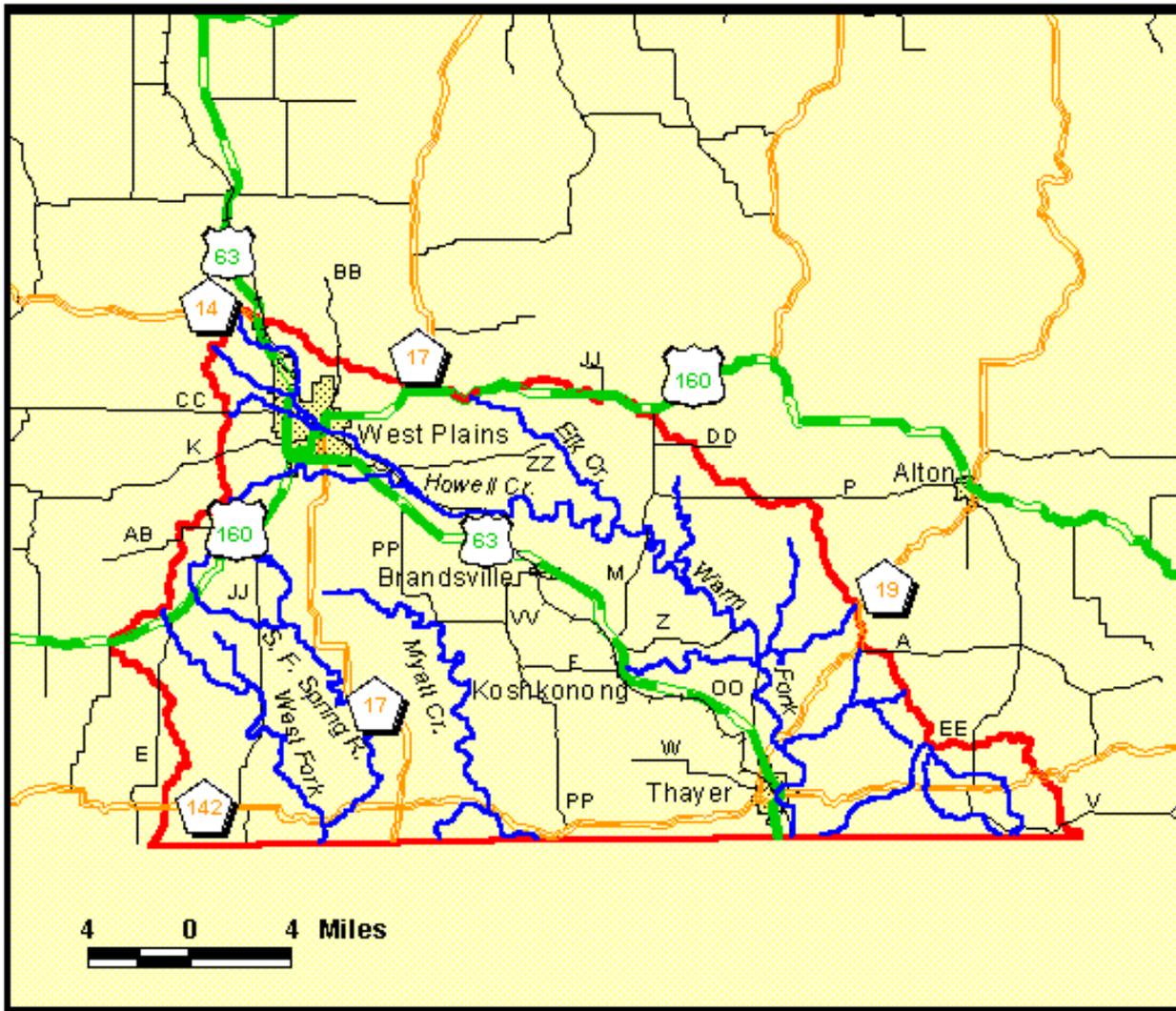
Land Type Association

-  Alton Oak Savanna/Woodland Plain
-  Current-Eleven Point Pine- Oak Woodland Dissected Plain
-  Eleven Point Oak-Pine Forest Breaks
-  Eleven Point River Oak-Pine Woodland/Forest Hills
-  Howell-Oregon Counties Oak Woodland Dissected Plain **352**
-  Mt. View Oak Savanna/Woodland Plain
-  North Fork Pine-Oak Woodland Dissected Plain
-  Upper Gasconade Oak Woodland Dissected Plain
-  West Plains Oak Savanna/Woodland Plain **341**

MDC 3/1999

Figure Bk02.

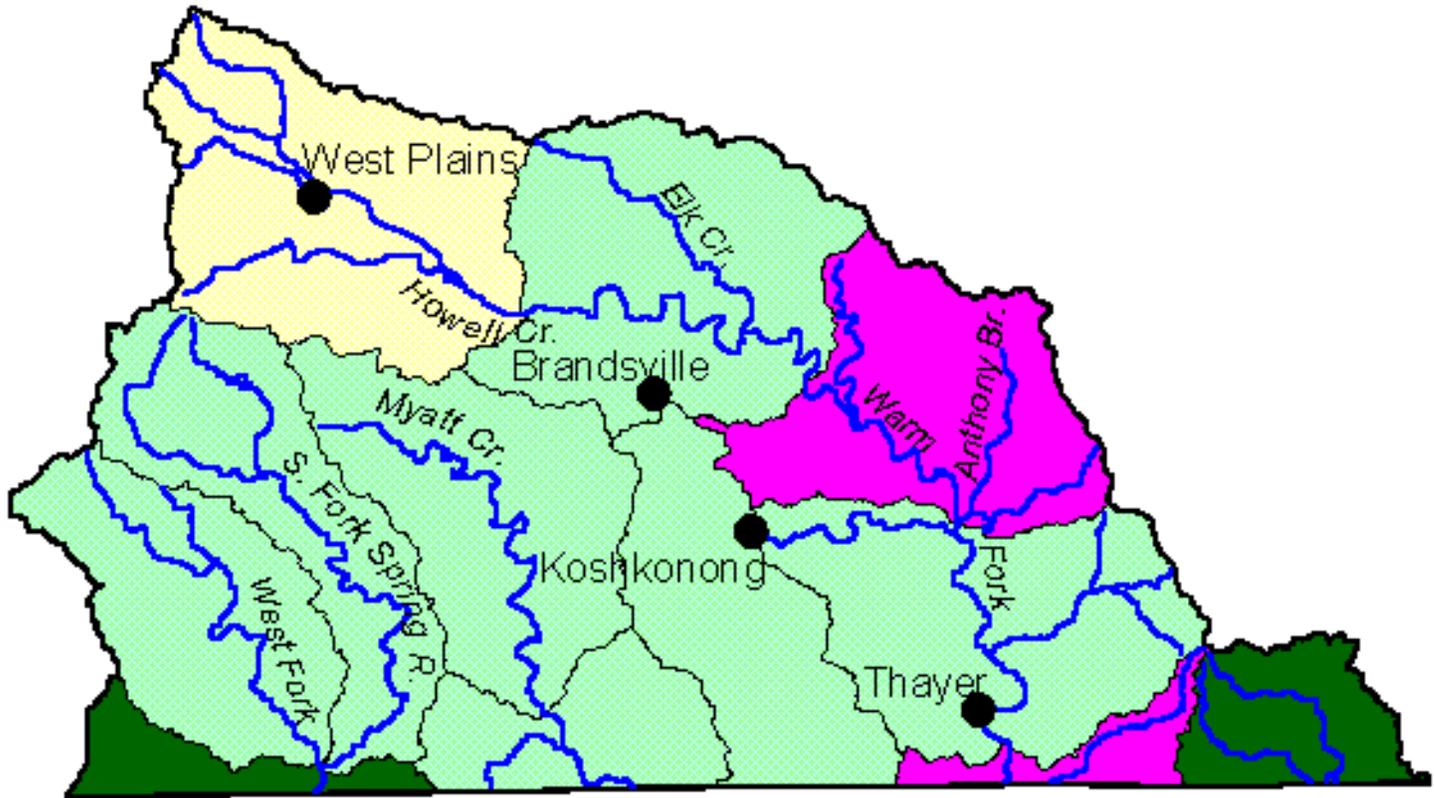
Spring River Tributaries Watershed Infrastructure



MDC 3/1999

Figure Lu03.

Spring River Tributaries Watershed Forest/Woodland Cover



Legend

**Fourteen Digit Hydro Unit
Forest/Woodland Cover**

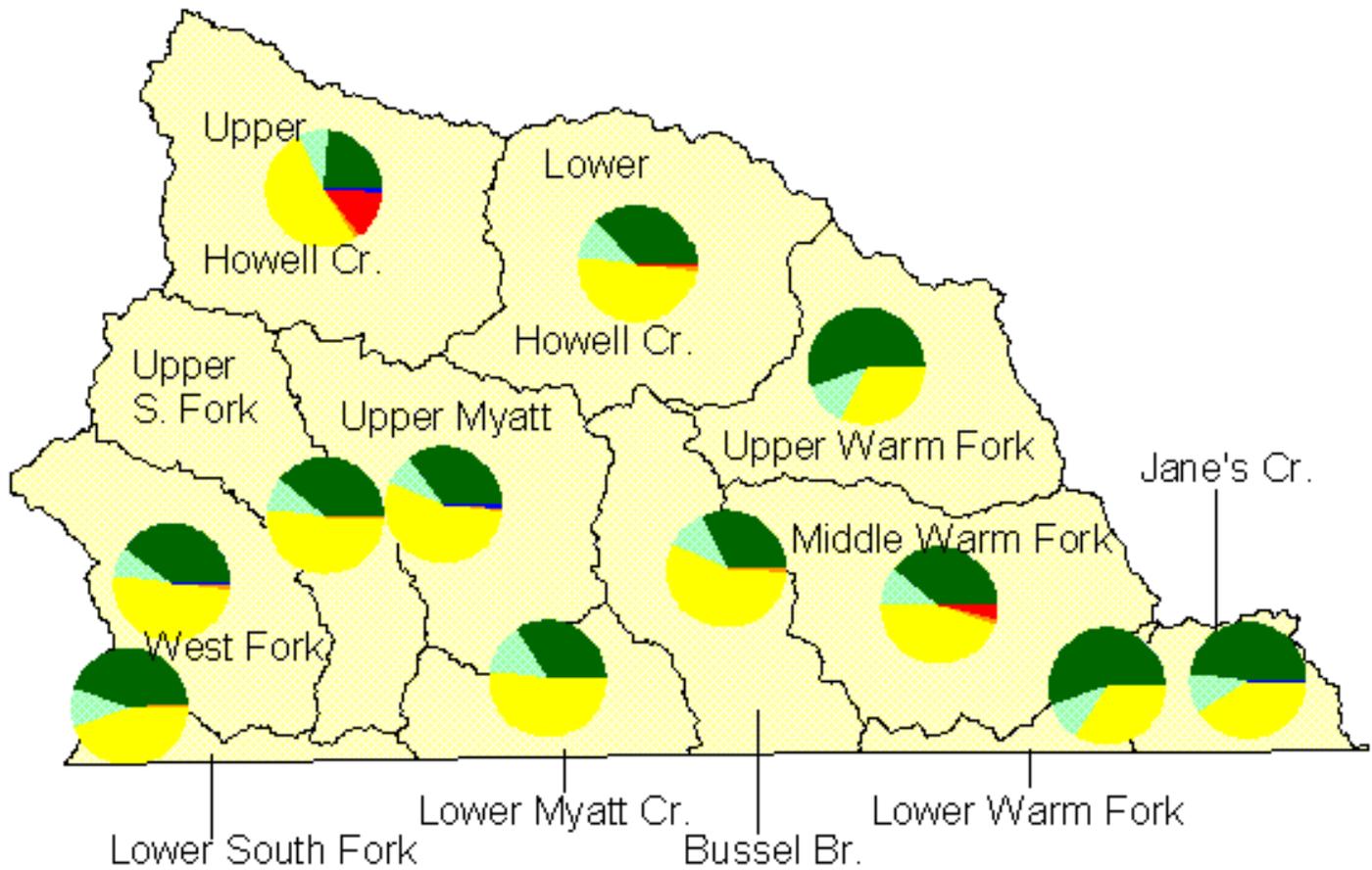
Yellow	30 - 39%
Light Green	40 - 49%
Dark Green	50 - 59%
Magenta	60 - 69%

Based on Missouri Resource Assessment Partnership (MoRAP) Phase I Land Cover Map December, 1997



Figure Lu04.

Spring River Tributaries Watershed 14 Digit Hydrologic Unit Land Cover/Land Use



Legend

Percent Land Use

Forest	Cropland
Woodland	Urban
Grassland	Water

Based on Missouri Resource Assessment Partnership (MoRAP) Phase I Land Cover Map December, 1997 as analyzed by Caldwell (1998)

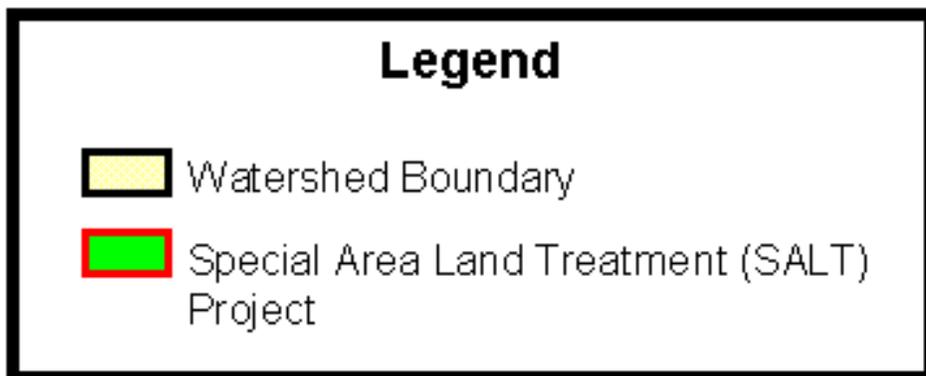
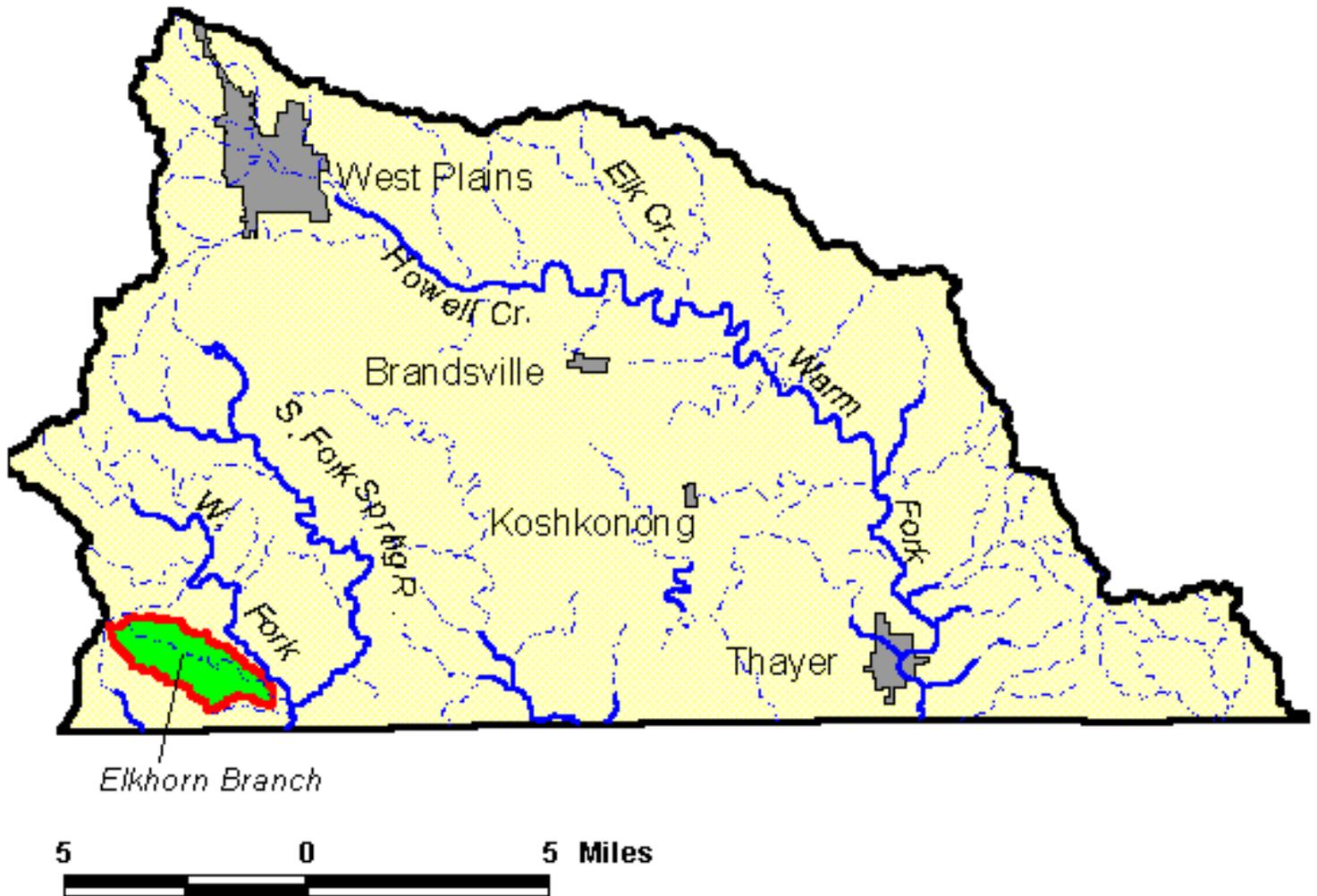


MDC 3/1999

Figure Lu05.

Spring River Tributaries Watershed

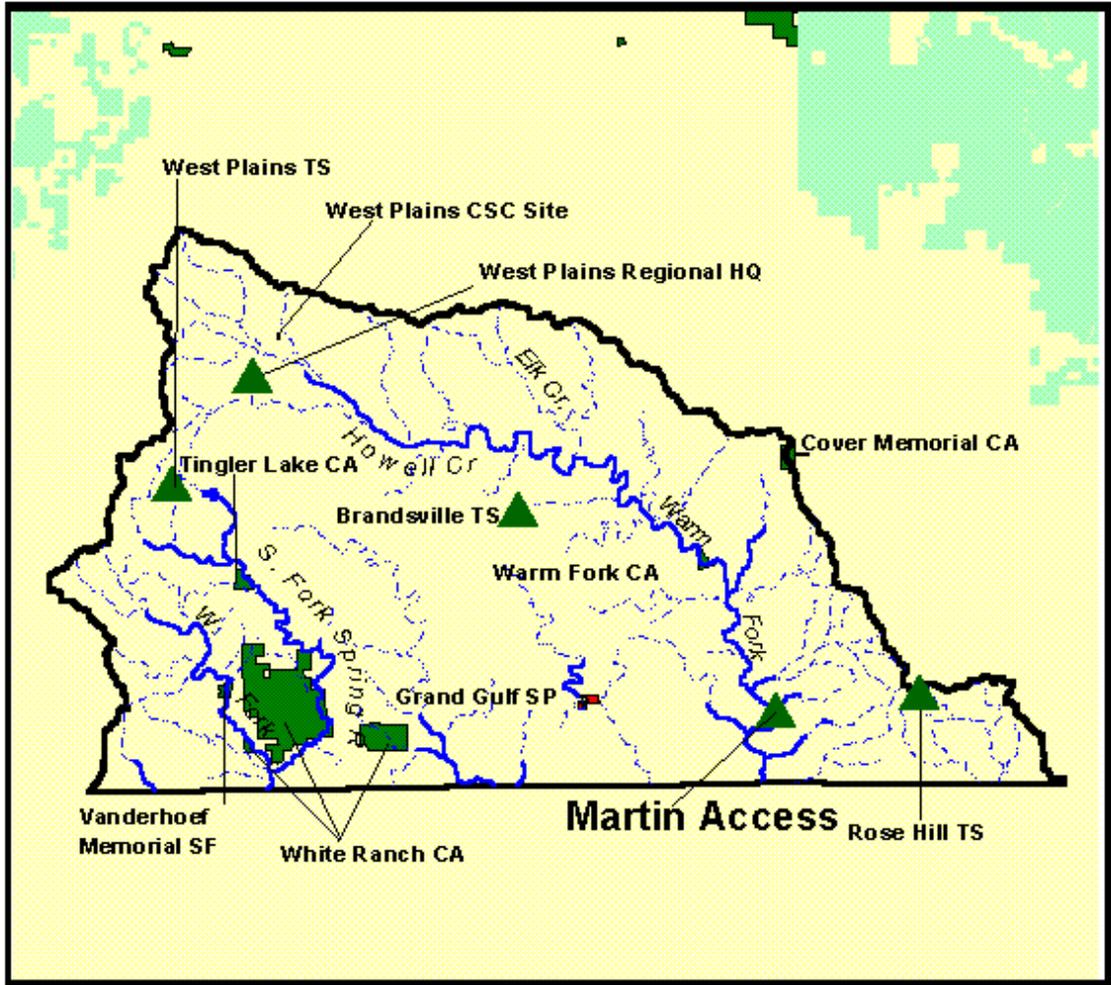
Watershed and Stream Projects



MDC 3/1999

Figure Lu06.

Spring River Tributaries Watershed Public Land



Legend

- Watershed Boundary
- Missouri Department of Conservation (MDC)*
- MDC Areas Less Than 10 Acres*
- Missouri Department of Natural Resources*
- United States Forest Service*

Labels: CA=Conservation Area, SF=State Forest, TS=Tower Site
*Note: Map is not a final authority. Data subject to change.



MDC 3/1999

Table Lu01. Estimated acres of selected cultivated crops in Howell and Oregon Counties in 1902 versus 1997 (Williams 1904 and MASS 1999).

Crop	Howell County		Oregon County	
	1902 Acres	1997 Acres	1902 Acres	1997 Acres
Corn	47,686	IA	31,382	IA
Wheat	36,605	700	15,821	800
Oats	4,322	NO DATA	3,287	NO DATA
Hay	11,822	47,800	6,485	22,900
Forage	1,125	NO DATA	845	NO DATA
Broom Corn	26	NO DATA	5	NO DATA
Cotton	520	IA	895	IA
Tobacco	102	IA	50	IA
Potatoes	733	NO DATA	307	NO DATA
Vegetables	855	NO DATA	785	NO DATA

IA= insignificant amount

Table Lu02. Descriptions of land type association (LTAs) groups as well as a condensed description of the two LTAs within the Spring River Tributaries Watershed, Missouri. Descriptions are quoted in part or whole from MDC (1997).

Oak Woodland Dissected Plains and Hills Group

Landform: Distinguished by rolling to moderately dissected topography. Local relief is 75-150 feet. Very broad, flat ridges give way to gentle sideslopes and broad stream valleys. Karst plains with frequent shallow sinkhole depressions are common. Broad stream valleys most often occupied by losing streams, however occasional seeps do occur and can spread across substantial portions of a valley.

Geology: Commonly underlain by Jefferson City-Cotter dolomites with a common loess cap. Some minor areas underlain by Roubidoux sandstones.

Soils: Soils are variable, ranging from shallow to bedrock and fragipan soils, to deep, cherty and well-drained loams. Tree root growth is often restricted by bedrock, pans or clay mineralogy, especially high in the landscape.

Historic Vegetation: Open woodlands with occasional prairie and savanna openings was the principal vegetation type. Post oak and black oak were the principal woodland tree species. Historic fire likely played an important role in maintaining an open canopy, sparse understory and a dense herbaceous ground flora. More dissected lands likely contained mixed oak woodland and forest. Unique sinkhole ponds, wet prairies and seeps were scattered in the broad valleys and depressions.

Current Conditions: Currently a mosaic of fescue pasture (35-65% cover) and dense, often grazed oak forest. The transition from open grassland to closed forest is abrupt and the patch work blocky. Very few native grasslands or savannas are known, and the dense second growth woodlands have very little ground flora. Most sinkholes, wet prairies and seeps have been drained and heavily grazed. Many roads, towns, cities and businesses are located in these LTAs.

Howell-Oregon Oak Woodland Dissected Plain: Dissected Plain in southern Howell and Oregon Counties. More dissection, better soils, and more existing timber than most other LTAs in this group.

Oak Savanna/Woodland Plains Group

Landform: Very broad flat uplands slope gently to very broad flat drains or solution (karst) depressions. Local relief is less than 75 feet.

Geology: Underlain mainly by Jefferson City-Cotter dolomites with a common loess cap. Minor areas of the Roubidoux formation occur. Headwater streams are nearly all losing.

Soils: Fragipan soils or soils with shallow restrictive clays or bedrock are common, inhibiting tree root growth.

HistoricVegetation: Oak savannas and woodlands with common prairie openings were the predominant historic vegetation. While few prairies were named by original land surveyors, early descriptions portray an open, "oak prairie" landscape. Fire likely played a principal role in maintaining a grassland-open woodland structure. Some sinkhole depressions would have had unique ponds and seeps.

Current Conditions: The largest blocks and greatest acres of grassland (45-65% cover) are currently associated with these LTAs; grasslands are mainly fescue pasture. Less than 40% of these LTAs are timbered, mainly in dense, second growth oak forest (post and black oaks) with common grazing pressure. Very few quality native prairies, savannas, woodlands, sinkhole ponds or seeps are known. Many of the regions roads, towns, and businesses are associated with these LTAs.

West Plains Oak Savanna/Woodland Plain: Very extensive, flat upland in the center of Howell County.

Table Lu03. Percent land use for 14 digit hydrologic units within the Spring River Tributaries Watershed. Data is based on MORAP Phase 1 Land Cover (1997) as analyzed by Caldwell (1998).

Subwatershed	FOR	WDL	GRS	CRP	URB	WAT
Upper Howell	24.4	8.2	52.1	1.8	13.3	0.1
Lower Howell	37.4	10.7	50.3	0.8	0.8	<0.1
Upper Warm Fork	55.9	12.0	31.7	0.3	0	<0.1
Middle Warm Fork	38.7	11.1	45.5	0.7	3.9	<0.1
Lower Warm Fork	54.9	11.0	33.7	0.3	0	0.2
Upper Myatt	35.1	9.1	54.4	1.2	0	<0.1
Lower Myatt	33.9	13.6	52.1	0.4	0	<0.1
Bussel Branch	31.7	11.4	55.8	0.7	0.3	<0.1
West Fork	40.0	8.3	50.3	1.3	0	<0.1
Upper South Fork	39.1	8.6	51.0	0.7	0	0.5
Lower South Fork	44.8	10.7	43.6	0.8	0	<0.1
Jane's Creek	48.2	11.0	40.4	0.3	0	<0.1
Spring River Tribs (total)	38.1	10.2	48.2	0.9	2.4	0.1

FOR =Forest, WDL=Woodland, GRS=Grassland, CRP=Cropland, URB=Urban, WAT=Water

Table Lu04. Public lands within the Spring River Tributaries Watershed, Missouri. For areas only partially within the watershed, total acreage is given in parenthesis. (MDC 1995; McPherson, personal correspondence).

Name	Owner¹	Acres²	Stream Frontage (miles)²
Brandsville Towersite	MDC	5.7	-
Cover Memorial Wildlife Area	MDC	144(282)	-
Grand Gulf State Park	MDNR	108	-
Martin Access	MDC	8	.33
Rose Hill Towersite	MDC	8	-
Tingler Lake Conservation Area	MDC	240	.3*
Vanderhoef Memorial State Forest	MDC	140	.5
Warm Fork Conservation Area	MDC	159	.9
West Plains Service Center Site	MDC	18	-
West Plains Regional Headquarters	MDC	1	-
West Plains Towersite	MDC	1.9	-
White Ranch Conservation Area	MDC	6579	2.1
TOTAL	-	7412.6	3.8

Note: Table is not a final authority. Data subject to change.

¹Owner: MDC=Missouri Department of Conservation,

MDNR=Missouri Department of Natural Resources.

²Estimates are approximate.

***Probably no flow however permanent pools.**