United States Department of Agriculture
Natural Resources Conservation Service

Eleven Point Sub-basin

HUC # 11010011

R A P I D W A T E R S H E D A S S E S S M E N T

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Eleven Point River Sub-basin

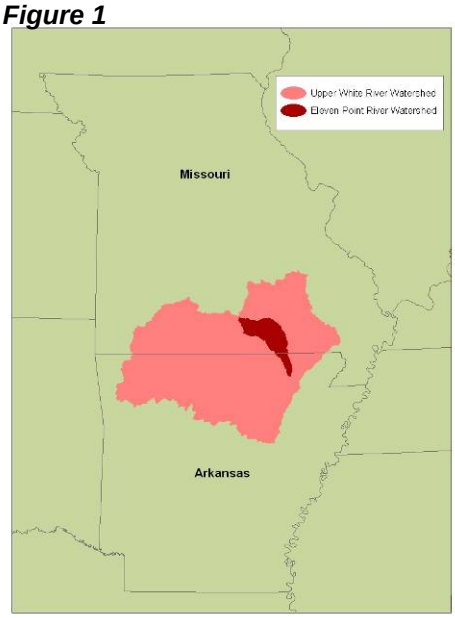
HUC #10290107

A rapid watershed assessment (RWA) evaluates resource conditions and needs on an 8-digit hydrologic unit (HU) basis. The assessment identifies the primary resource concerns for the watershed being profiled and provides estimate as to where conservation investments would best address the concerns of landowners, conservation districts, stakeholders, and others. The RWA provides information on which to base decisions about conservation priorities, allocation of resources, and funding for implementation.

Introduction[1]

The Eleven Point River Sub-basin, located in the south-central region of Missouri, conveys drainage from its headwaters in the Ozark Highlands southward through Mark Twain National Forest, to its confluence with the Spring River near Black Rock, Arkansas. This sub-basin encompasses 1,207 square miles and covers portions of 5 Missouri counties as well as Randolph County in Arkansas.

Figure 1



The sub-basin is laden with dolomite parent material that is soluble. Losing streams, sinkholes, caves, and springs are characteristic karst features. The Eleven Point River, the largest receiving stream in this watershed, originates in northern Howell County as a small stream and increases in stature as springs feed the river. Greer Spring, the second largest spring in Missouri, more than doubles the flow of the Eleven Point River. Major tributaries of the Eleven Point River include Middle Fork, Spring Creek, Hurricane Creek, and Fredrick Creek. Dye tracing experiments have demonstrated the underground connectivity of these streams to Big Springs in the Current River Watershed.

In 1968, Congress established the National Wild and Scenic River System. Forty four miles of the Eleven Point River, from Thomasville to State Highway 142, met the criteria and this stream reach became one of the 8 initial waterways in the system. This watershed exists in some of the most rural areas of Missouri. Forestland and grasslands comprise most of the land cover in the basin. Generally, forestland occupies more of the rugged upland landscape positions while grasslands are found along the depositional areas of narrow floodplains.

Scope and Purpose

Rapid watershed assessments (RWA) provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help landowners and local leaders set priorities and determine the best actions to achieve their goals. The information contained in this RWA summarizes readily available data and provide a snapshot of natural resources, concerns, and conservation opportunities.

Major Realizations

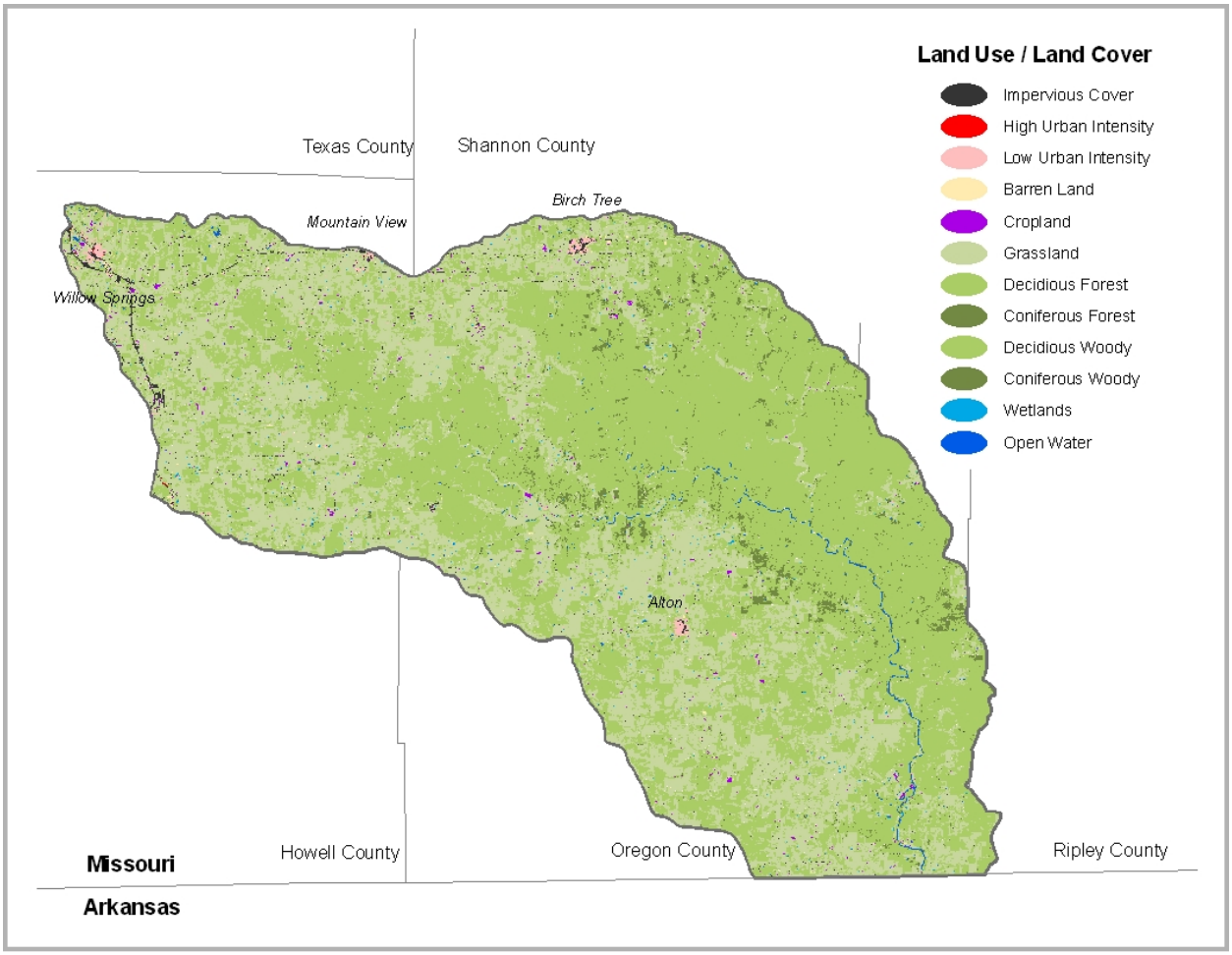
The Eleven Point River watershed faces the unique management challenges associated with the porous bedrock and karst features that offer little opportunity to filter pollution. Karst geology also permits the rapid exchange between surface and groundwater. Following established construction procedures for new wells or proper decommissioning practices of abandon wells is important to protect water resources. The Eleven Point River has been classified by the state as impaired due to mercury levels found in fish tissue. It is thought that the origin of mercury is from atmospheric deposition and thus, will be difficult to control and manage.

Many of the non-point source concerns present statewide are also present in this watershed, but are less intense because of a relatively lower population density. However, the median income of watershed stakeholders ranks among the lowest statewide and presents an obstacle for the adoption of needed conservation practices.

Physical Description

A. Land Use/ Land Cover[2]

Figure 2



Land Use/Land Cover	Acres	Percent of Area
Developed Land	262,700	8%
Cultivated Cropland	0	18%
Non Cultivated Cropland	24,000	7%
Pastureland	192,300	42%
Forestland	262,700	16%
Rangeland	0	0%
Total	741,700	100%

Land Cover / Land Use Definitions

- Urban – This map category corresponds to the tabled category called Developed Land. Developed Land is a combination of the NRI land cover/use categories large urban and built-up areas, small lbuilt-up areas and rural transportation land. Rural transportation land consists of all highways, roads, railroads and associated right-of-ways outside urban and built-up areas and also includes private roads to farmsteads, logging roads and other private roads.

- Barren – This map category is typically, the surface of sand, rock or exposed soil with less than 5 percent vegetative cover. Barren land acreage is included in the tabled NRI Minor Land category. Minor land is a miscellaneous grouping of land covers and uses that includes farmsteads and farm structures, field windbreaks, and barren land.

- Cropland – This map category most closely corresponds to the tabled category called Cultivated Cropland. Cultivated Cropland comprises land in row crops, close-grown crops and hayland or pastureland in rotation with row or close-grown crops.

- Grassland – This map category includes 4 tabled NRI land cover/use categories:
  Non-cultivated cropland; Conservation Reserve Program (CRP) lands; Pastureland; Rangland. on-cultivated cropland includes permanent hayland and horticultural cropland. The CRP is a federal program established under the 1985 Food Security Act to convert highly erodible cropland to vegetative cover (primarily grass) under 10 year contracts. Pastureland is land managed primarily for the production of introduced forage plants for livestock grazing. Rangeland is land on which the climax or potential plant cover is composed principally of native grasses, grass-like plants, forbs or shrubs suitable for grazing and browsing and introduced forage species that are managed like rangeland.

- Forestland and Woodland – A majority of the acreage for these map categories is captured by the tabled NRI Forestland category, defined as land that is at least 10 percent stocked by single-stemmed woody species of any size that will be at least 4 meters tall a maturity. Ten percent stocked, equates to an areal canopy cover of 25 percent or greater.

- Wetlands – Acreage for this mapped category is not reflected in any of the NRI tabled acreage estimates. The wetland map category is a combination of satellite derived wetland classes, National Wetland Inventory (NWI) acres and Wetland Reserve Program (WRP) acres. (See Wetlands Section for NWI acreage estimates)

- Water – This map category closely corresponds to the NRI table acreage estimate representing water bodies and streams that are permanent open water.

B. Public Land[3]

Approximately 11% of the Eleven Point watershed is comprised of public lands. The majority of these public lands are managed by the United States Forest Service under the Mark Twain National Forest. The Missouri Department of Conservation manages smaller areas namely conservation areas.

Figure 3

Public Land Ownership (acres)		
	Missouri Department of Conservation	**U.S. Forest Service**
Total Acres	6,518	384,081
Pecent of Public Lands	1.7	98.3
Percent of Sub-basin	0.19	10.92

C. Soil Capability

Land Capability[2]

Land Capability is a classification system used to identify the erosion potential of farmland. For over forty years the USDA has used land capability classification as a planning tool in laying out conservation measures and practices to farms without serious deterioration from erosion or other causes. The current system includes eight land classes designated by Roman numerals I through VIII. The first four classes are arable land suitable for cropland in which the limitations and the need for conservation measures and management increase from I through IV. The remaining four classes, V through VIII, are not to be used for cropland, but may have uses for pasture, range, woodland, grazing, wildlife, recreation, and aesthetic purposes.

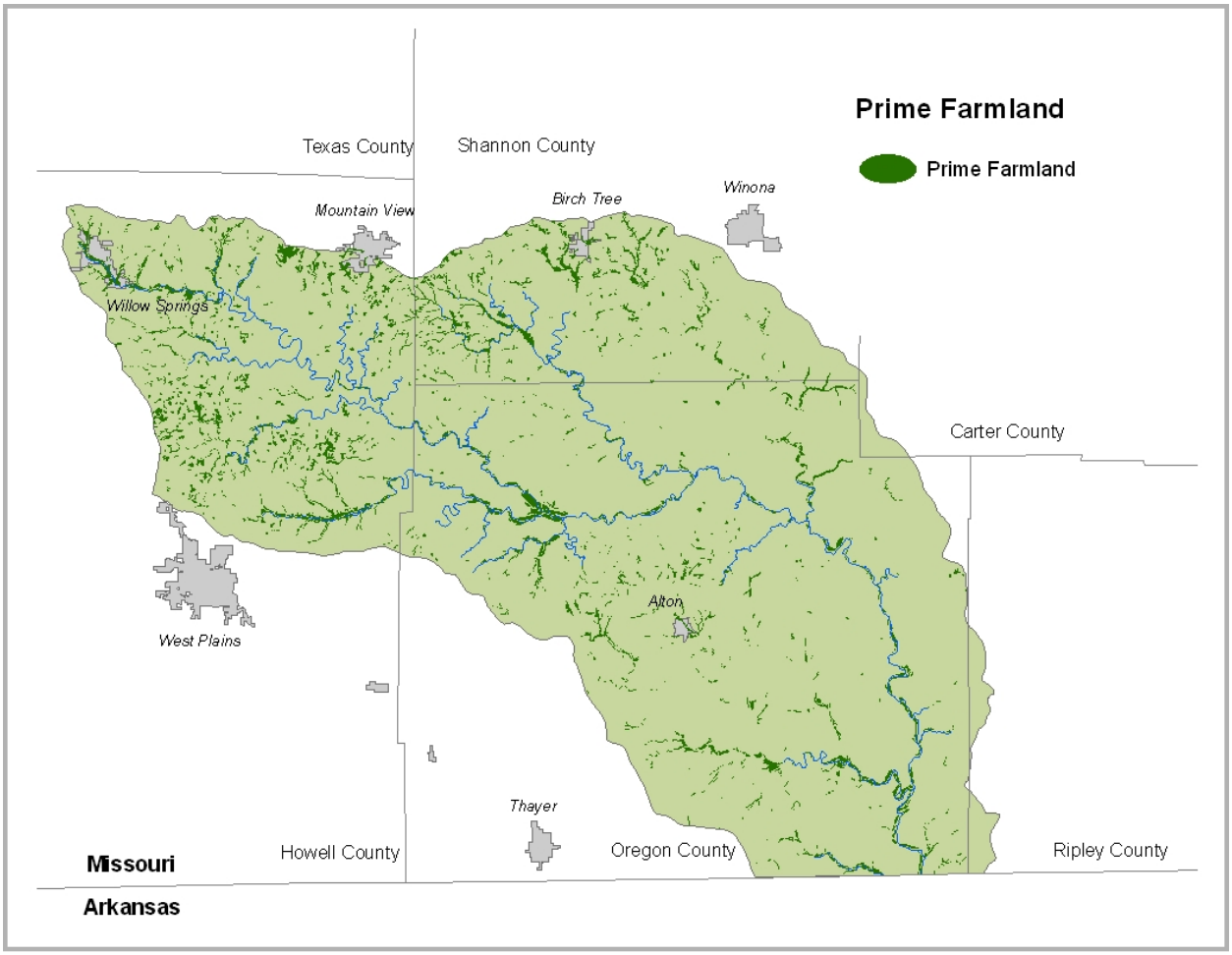
Figure 4

Land Capability Class	Cultivated cropland (acres)	Non-cultivated cropland (acres)	Pastureland (acres)
I - slight limitations	-	-	-
II - moderate limitations	4,500	49,700	61,100
III - severe limitations	4,700	19,600	38,800
IV - very severe limitations	-	16,800	33,400
V - no erosion hazard, but other limitations	-	-	2,100
VI - severe limitations, unsuited for cultivation, limited to pasture, range, forest	-	2,400	12,400
VII - very severe limitations, unsuited for cultivation, limited to grazing, forest, wildlife	-	-	12,000
VIII - misc. areas have limitations, limited to recreation, wildlife and water supply	-	-	-
Total	**9,200 acres**	**88,500 acres**	**159,800 acres**

Prime Farmland[4,5]

Prime Farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses. It has the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding.

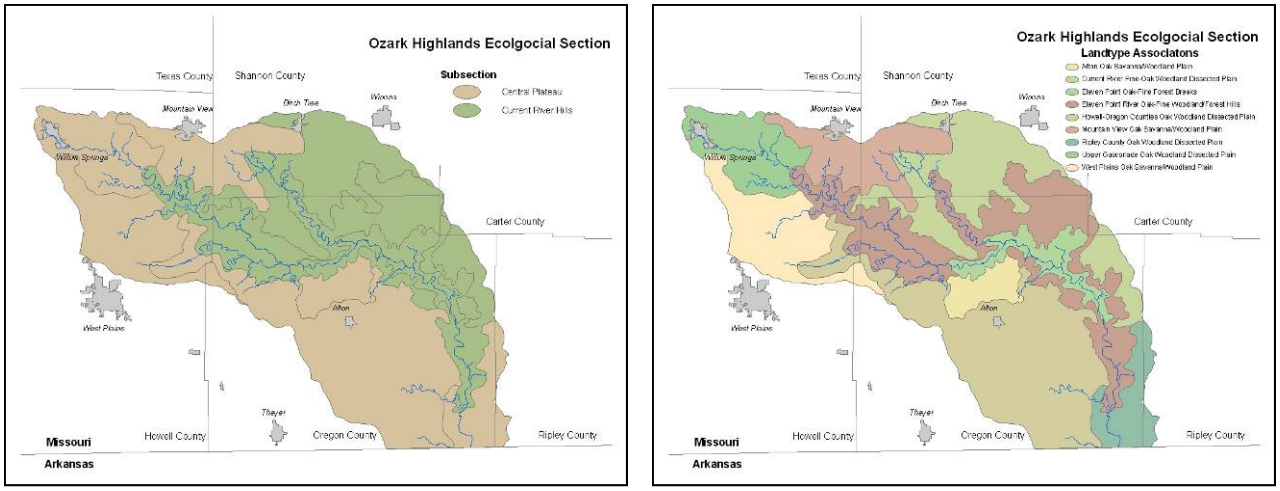
Figure 5



D. Common Resource Areas[6]

NRCS has divided the Nation into ecological type land regions called Major Land Resource Areas (MLRA). MLRAs are defined by their agricultural potential and soils capabilities and provide a spatial framework for addressing national and regional agricultural issues. A Common Resource Area (CRA) is a geographic and ecologic subdivision of an MLRA within which there are similar resource concerns and treatment requirements. Each Missouri CRA is a grouping of Land Type Associations (LTA) taken directly from the state's ecological classification system (ECS). Missouri's LTAs are primarily differentiated on the basis of local climate, landforms and topography, geologic parent materials, soil types and potential vegetation.

Figure 6.



Central Plateau Description

The Central Plateau consists of some the least dissected portions of the Ozark Highlands and therefore a portion that retains the semblance of a true plateau surface. Dominated by carbonate lithology, it is strongly karstic in many portions and is mantled by very thick solution residuum. Lack of surface water and droughty soils are characteristics. Pre-settlement vegetation was mostly savanna or grassy woodland, and prairie, especially western portions. Much of the land has been cleared for pasture although trees and brush dominate locally.

Current River Hills Description

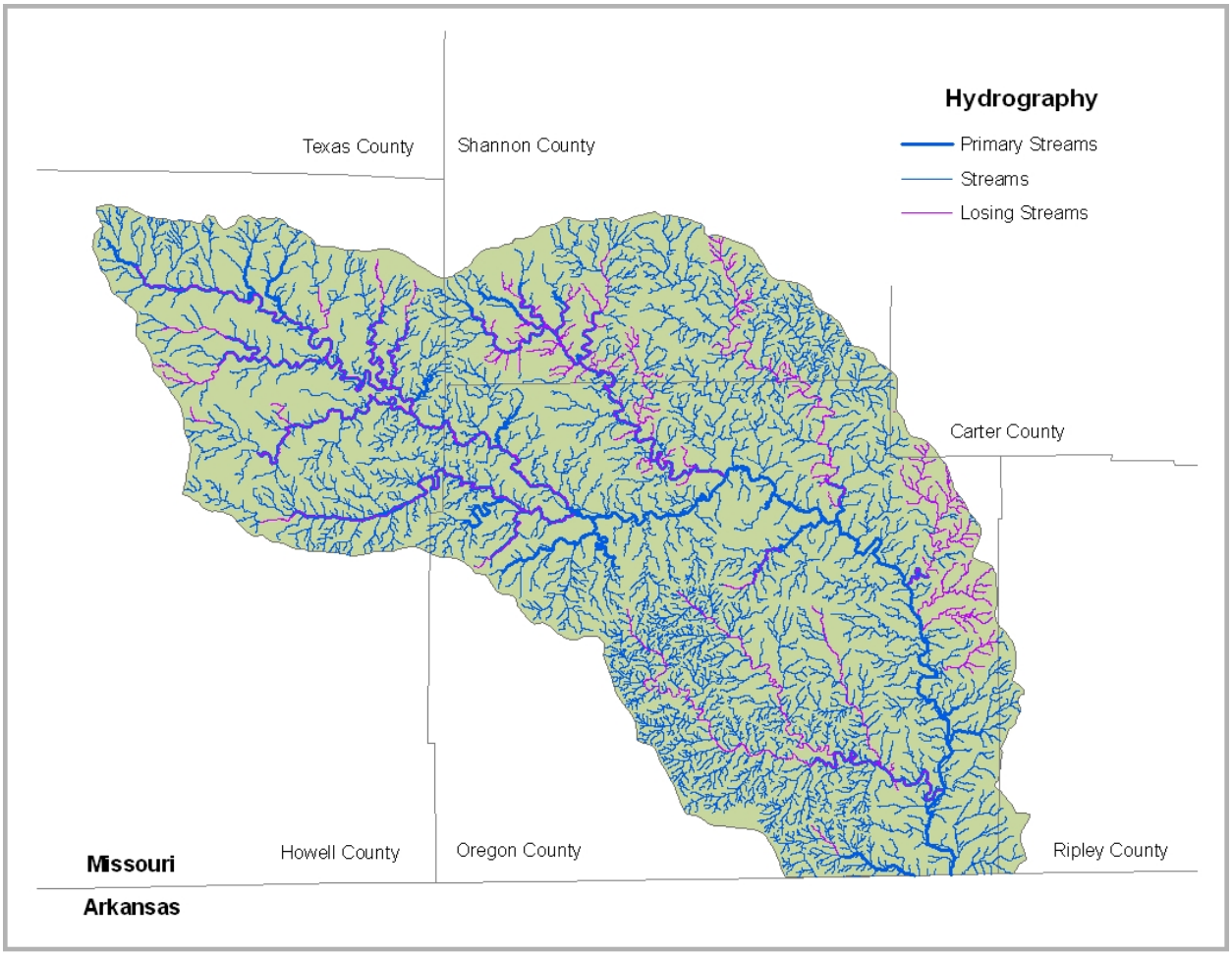
The Current River Hills consists of the hilly to deeply dissected portion of the Current, Black and Eleven Point drainage basins. Gently rolling interfluves give way to steep slopes, narrow ridges, and narrow valley bottoms. Soils are rock and formed mainly from carbonate and sandstone bedrock. Local karst, losing streams, and large springs are characteristic. Pre-settlement vegetation was mainly woodlands and forests of oak and shortleaf pine. Second-growth forests now dominate the landscape with cleared land in valley bottoms. Much of the area is in public lands.

E. Streams

National Hydrography Dataset (NHD) with Gaining Streams and Biological Reference Streams [7 & 13]

High-resolution (1:24,000-scale) streams from the National Hydrography Dataset total 2,736 miles of intermittent and perennial streams in this sub-basin. One hundred eighteen miles (118) are designated as losing streams by the Missouri Department of Natural Resources. Losing streams are streams whose water re-enters the subsurface groundwater system. They are typically found in karst areas such as the Eleven Point River sub-basin. No biological reference streams are located in this sub-basin.

Figure 7

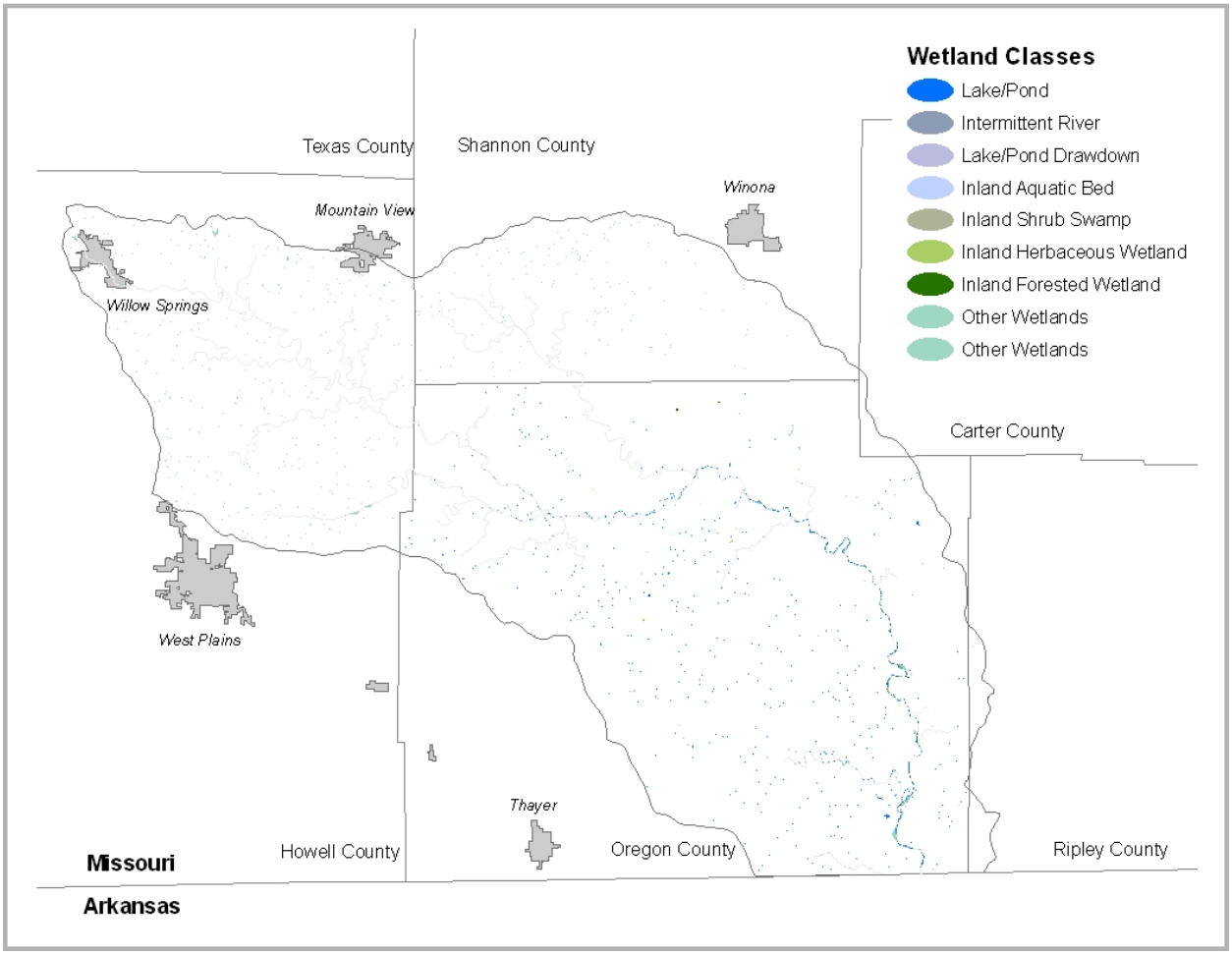


F. Wetlands[8,9]

The National Wetland Inventory delineates and records wetland information through the U.S. Fish and Wildlife Service. The largest number and acreage of wetlands in the Eleven Point River watershed is ponds used for agricultural purposes. Ponds and lakes account for approximately 69% of all wetlands in this watershed.

Figure 8

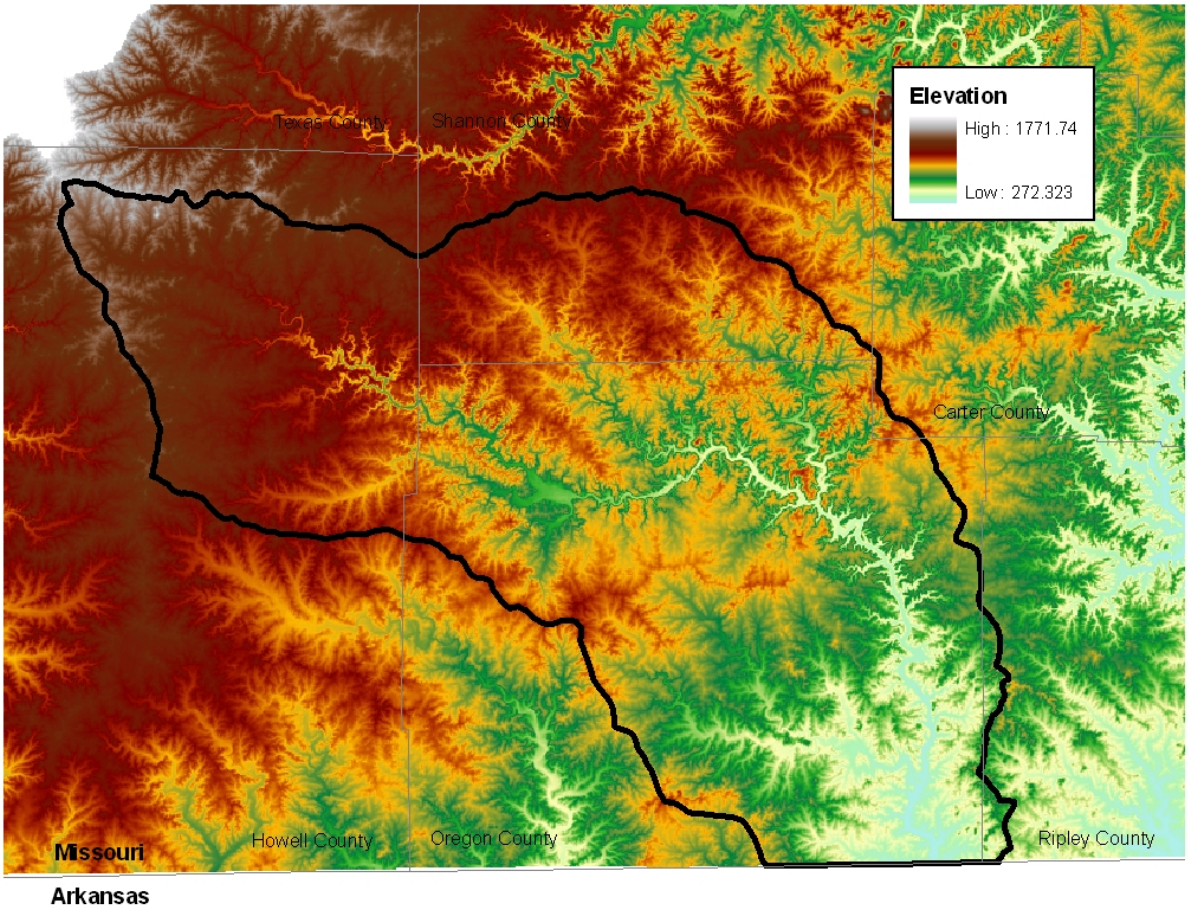
General Wetland Type	Number	Acres
Lakes and Ponds	3,920	1,737
Intermittent River	80	95
Lake/Pond Drawdown	151	106
Inland Aquatic Bed	63	35
Inland Shrub Swamp	63	56
Inland Herbaceous Wetland	171	75
Inland Forest Wetlands	87	79
Other Wetlands	160	496
Total	**4,695**	**2,679**



G. Relief Map[10]

The shaded relief and elevation values of the Eleven Point River sub-basin are derived from digital elevation models generated from the United States Geological Survey 7.5 minute elevation contours. The relief of the Eleven Point River watershed is nearly 1,500 feet ranging from 1,772 feet to 272 feet as the river enters Arkansas.

Figure 9



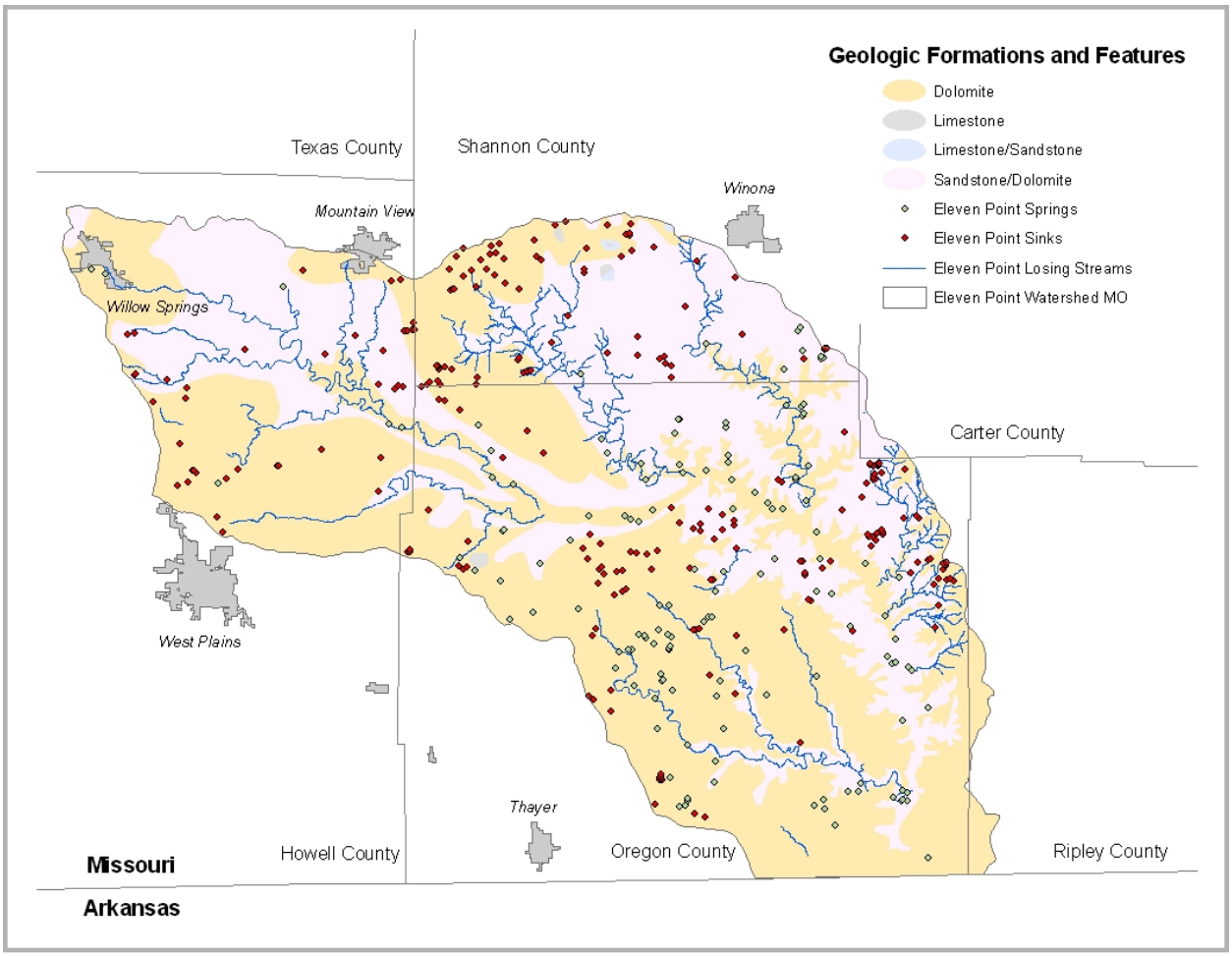
H. Geology[11,12]

Geologic and Karst Features

The Eleven Point watershed has a karst landscape indicative of caves, sinkholes and losing streams. These features are found in limestone and dolomitic formations which dominate the Ozark geologic regime. Since limestone and dolomite formations are soluble, the interaction between surface and groundwater resources is great.

Discharge and flow conditions of the Eleven Point River are sustained due to the number of large springs located in this watershed. Because of this the Eleven Point River is known as an excellent recreational waterbody that supports the local economy. For more information regarding the importance of these karst features in this watershed, see http://www.dnr.mo.gov/env/springsandcaves.htm

Figure 10



Resource Concerns

A. Water Quality

303d Listed Waters[14]

Section 303(d) of the federal Clean Water Act requires that each state identify waters that are not meeting water quality standards and for which adequate water pollution controls have not been required. Water quality standards protect such beneficial uses as whole body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock and wildlife. The 303(d) list helps state and federal agencies keep track of waters that are impaired but not addressed by normal water pollution control programs.

Figure 11

Water Body, ID Number, County	Size	Pollutant	Source	Impaired Use(s)	Beneficial Use(s)*	Priority
Eleven Point River, 2604, Howell	0.4 miles	Chlorine	Willow Springs WWTP	Protection of Cool Water Aquatic Life	1, 2, 3	Low
Piney Creek, 2514, Oregon	0.1 miles	Chlorine	Alton WWTP	Protection of Warm Water Aquatic Life	1,2,3	Medium
Eleven Point River, 2593, Oregon	21 miles	Mercury	Atmospheric Deposition	Human Health Fish Consumption	1,2,3,4,5	Medium

*** Beneficial Uses:**

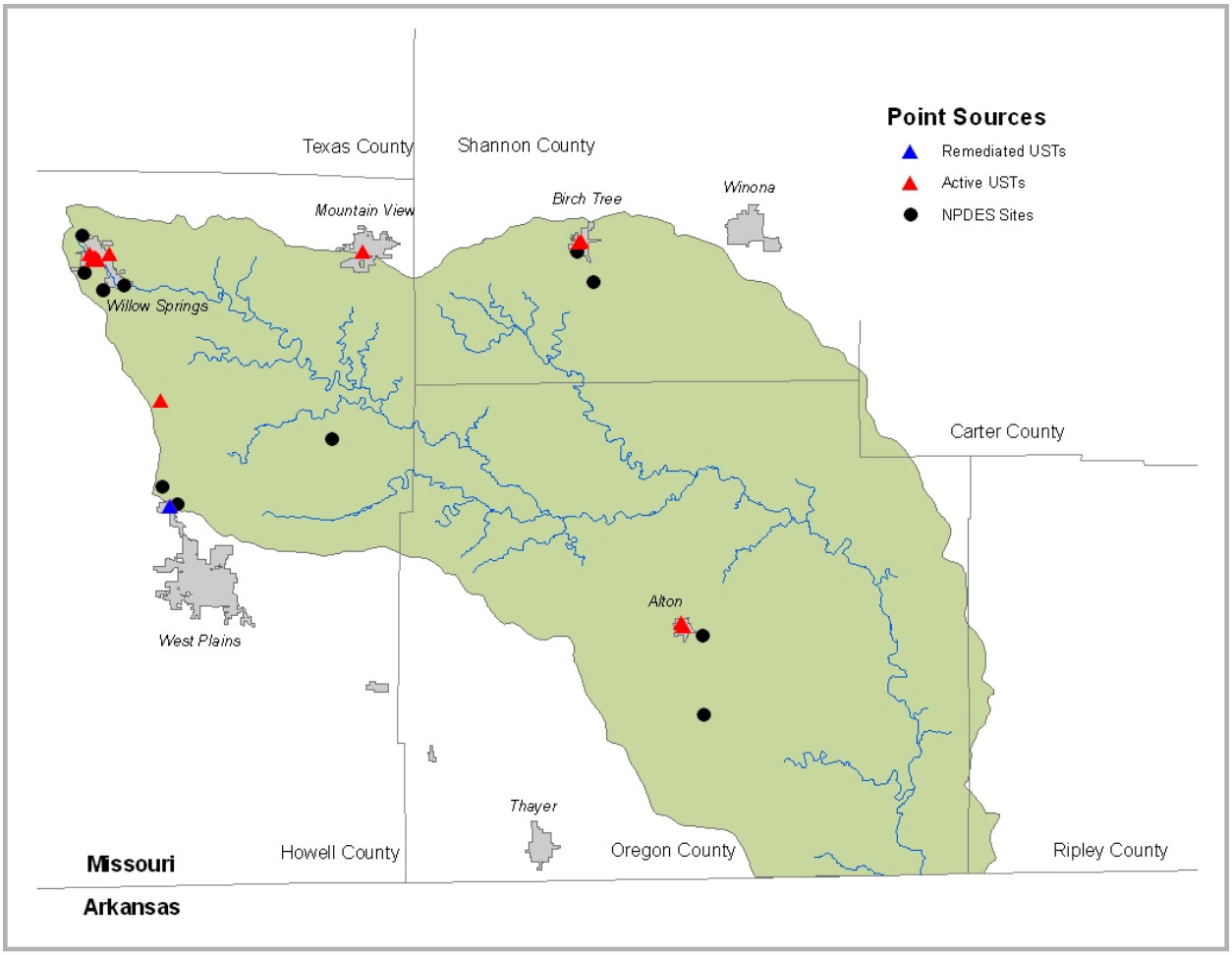
1 Livestock and Wildlife Watering
2 Protection of Warm Water Aquatic Life
3 Human Health associated with Fish Consumption
4 Boating and Canoeing
5 Whole Body Contact (swimming)
6 Secondary Contact Reaction
7 Irrigation
8 Drinking Water Supply
9 Industrial

Point Sources[15]

Point sources of water pollution are regulated discharges permitted by state or federal agencies. Underground storage tanks (USTs) typically holding fuel for gas stations are permitted by the Missouri Department of Natural Resources. Thirteen such USTs are located in the Eleven Point watershed sub-basin with one site having been remediated.

The National Pollutant Discharge Elimination System (NPDES) permits commercial and industrial facilities that discharge treated waste water into local streams or waterways. Fourteen such facilities exist which include a mixture of waste water treatment plants to quarries or gravel mining operations.

Figure 12

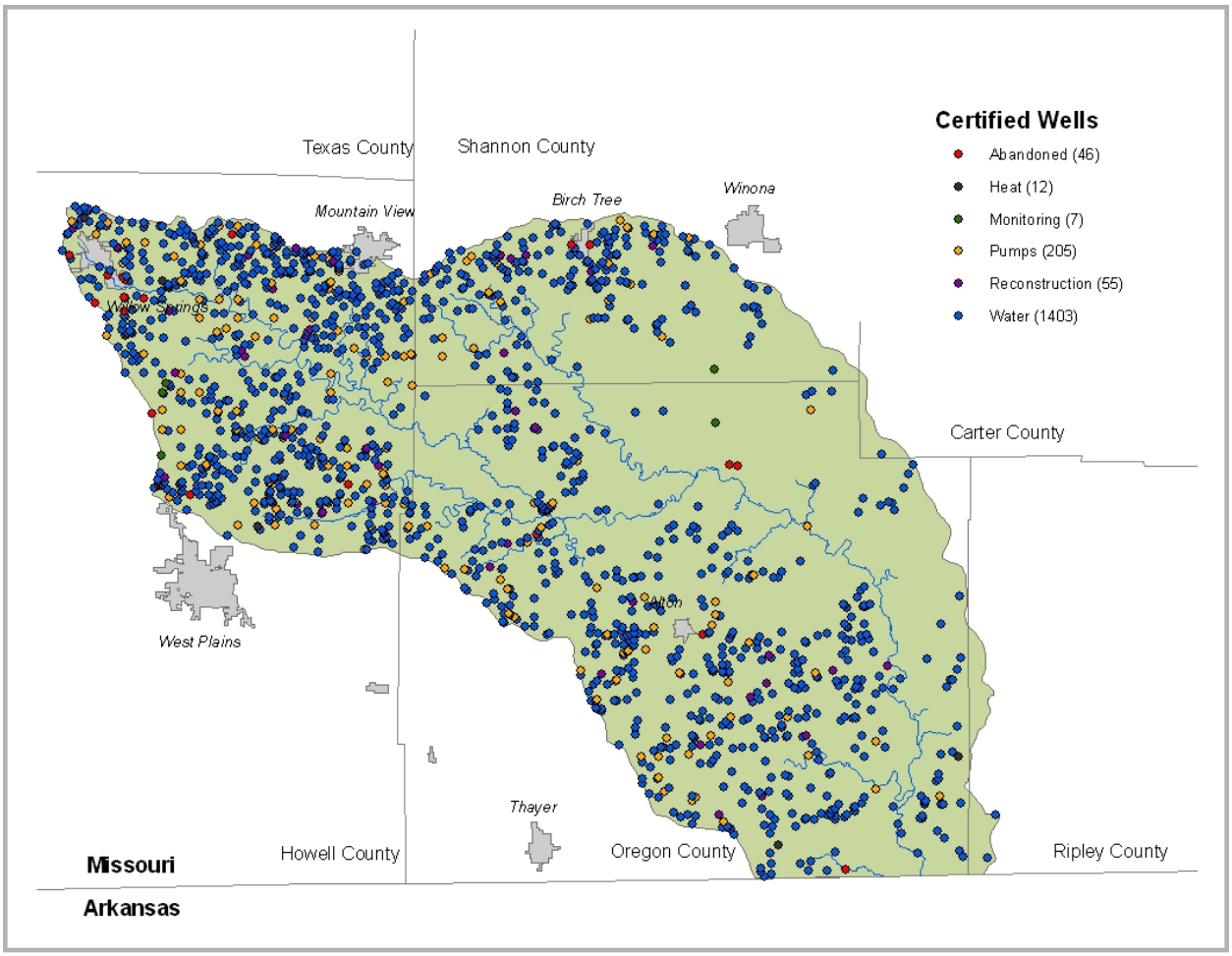


Wells[19]

The Missouri Well Driller's Law (Section 256.600-256.640 RSMo.) established minimum construction standards and state certification requirements of wells constructed after October, 1987. The law as created to protect Missouri groundwater from contamination due to improperly constructed wells. Contaminated groundwater exposes Missourians of all ages to serious health risks that can result from waterborne diseases. This law is administered through the Department of Natural Resources

In the Eleven Point watershed sub-basin, the majority of wells are for residential and drinking water purposes. This includes residences and businesses located outside of a water district. The second highest uses for wells are for domestic or irrigation pumps. Abandoned wells are those wells which are no longer in use and have been correctly remediated as to pose on threat of contamination or health hazards.

Figure 13



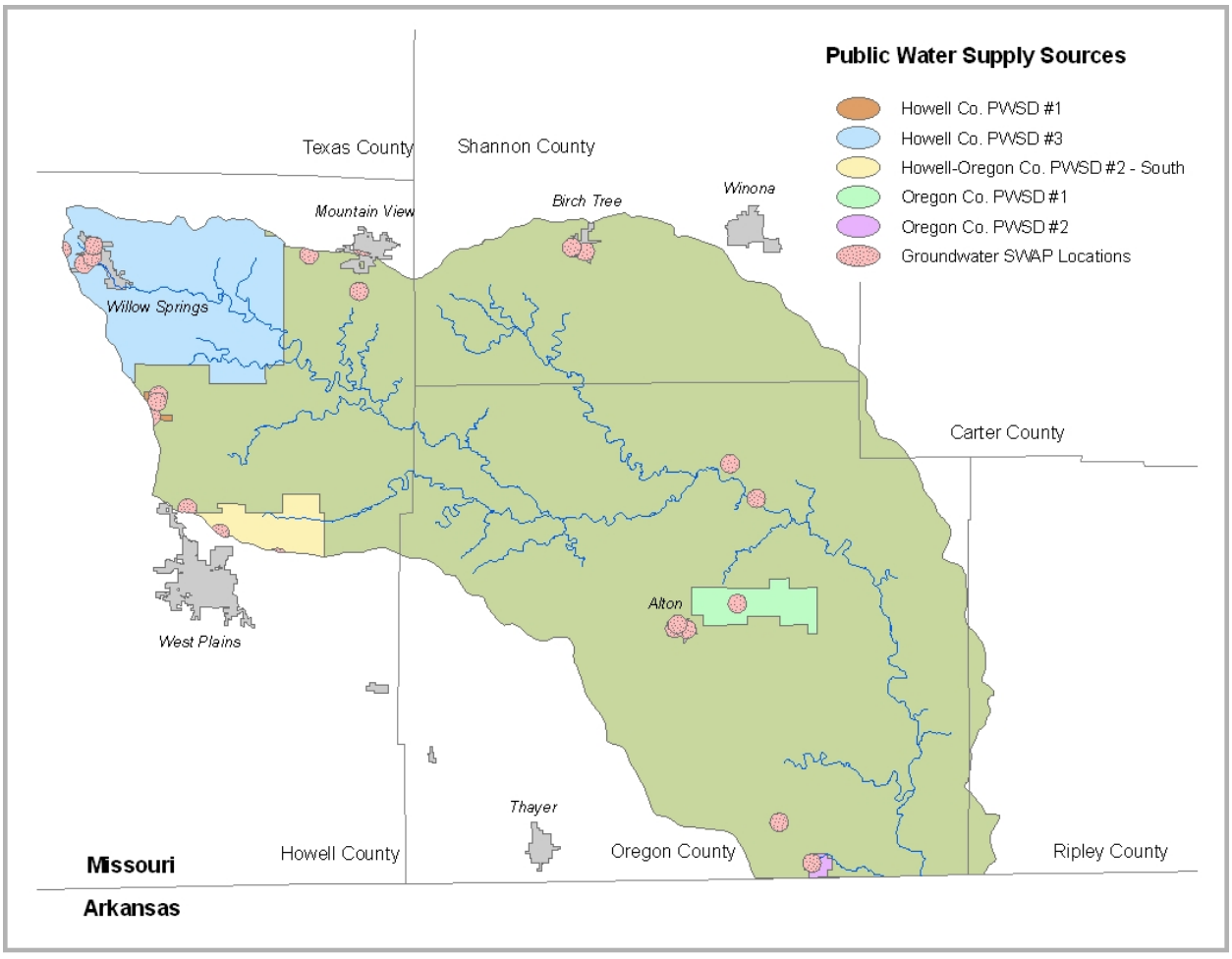
B. Water Quantity

Drinking Water Resources[16]

Drinking water resources are an important factor in watershed management. In the Eleven Point River watershed, all drinking water resources are generated from groundwater. There are sixty-four public wells in this watershed servicing various municipalities, water districts, schools, campgrounds and federal park facilities.

All public drinking water sources are regulated by the Missouri Department of Natural Resources Public Drinking Water Program through the federal Safe Drinking Water Act. These facilities are responsible for providing a Source Water Assessment Plan (SWAP) that includes an inventory of potential contamination sites located within a delineated one-mile wellhead zone. This plan also entails measures utilized to deter potential contamination problems as well as an annual consumer confidence report sent to facility consumers detailing water quality conditions.

Figure 14



C. Threatened and Endangered Species[17]

The Missouri Natural Heritage databases store locations, population status and habitat information about species and communities of conservation concern. The table below is a subset of the Heritage records that occur in the Eleven Point sub-basin, restricted to federally threatened, endangered or candidate and state threatened or endangered species. While Heritage data can not prove the absence of a species in an area, it is the best collection available of known locations of sensitive species and is used to assess potential impacts of various land management activities in the region.

Figure 15

Species Common Name	Scientific Name	Threatened Endangered Candidate	Listing: Federal State
Amphibians & Reptiles			
Hines Emerald	Somatochlora hineana	Endangered/Endangered	Federal/State
Ozark Hellbender	Cryptobranchus alleganiensis bishopi	Candidate/Endangered	Federal/State
Western Chicken Turtle	Deirochelys reticularia miaria	Endangered	State
Bats			
Gray Bat	Myotis grisescens	Endangered/Endangered	Federal/State
Indiana Bat	Myotis sodalis	Endangered/Endangered	Federal/State
Birds			
Bachman's Sparrow	Aimophila aestivilas	Endangered	State
Bald Eagle	Haliaeetus leucocephalus	Threatened/Endangered	Federal/State
Barn Owl	Tyto alba	Endangered	State
Swainson's Warbler	Limnothlypis swainsonii	Endangered	State
Fish, Crustaceans, and Mollusks			
Curtis Pearlymussel	Epioblasma florentina curtisii	Endangered/Endangered	Federal/State
Ebonyshell	Fusconaia ebena	Endangered	State
Elephantear	Elliptio crassidens	Endangered	State
Harlequin Darter	Etheostoma histrio	Endangered	State
Pink Mucket	Lampsilis abrupta	Endangered/Endangered	Federal/State
Snuffbox	Epioblasma triquetra	Endangered	State
Taillight Shiner	Notropis maculatus	Endangered	State
Mammals			
Plains Spotted Skunk	Spilogale putorius interrupta	Endangered	State
Plants			
Pondberry	Lindera melissifolium	Endangered/Endangered	Federal/State
Virginia Sneezeweed	Helenium virginicum	Threatened/Endangered	Federal/State

Census and Social Data

A. Census Bureau[18]

Block group-level GIS data files from the 2000 Census were used to illustrate population, population change, income, and the agricultural cohort for the sub-basin. County block group spatial files were merged and clipped by the subbasin boundary. The percent of the block group falling in the watershed was calculated, and population figures were prorated by this value. Although this technique erroneously assumes even distribution of the population, it is a more accurate population count for the sub-basin than including the entire block group population.

Figure 16a. 1990 Population—The 1990 estimated population of the sub-basin was 20,998.

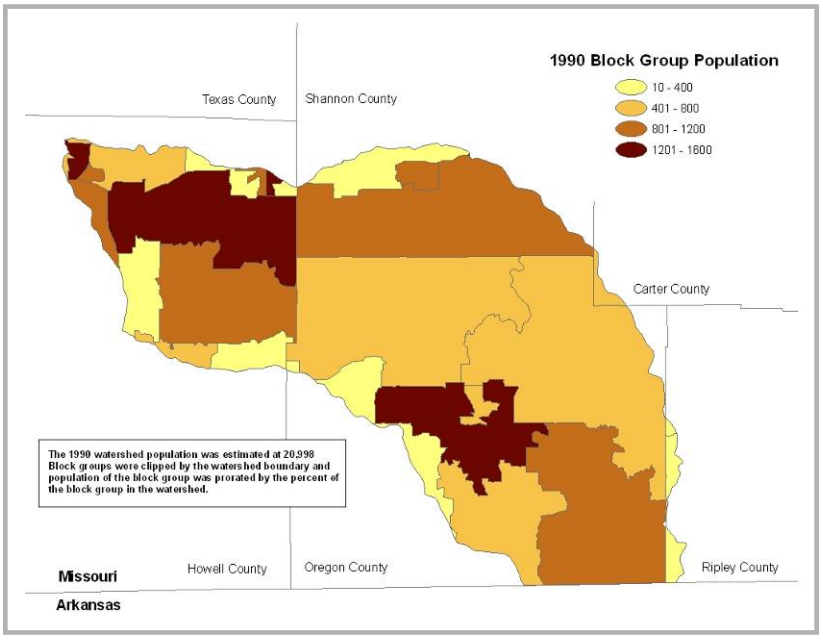
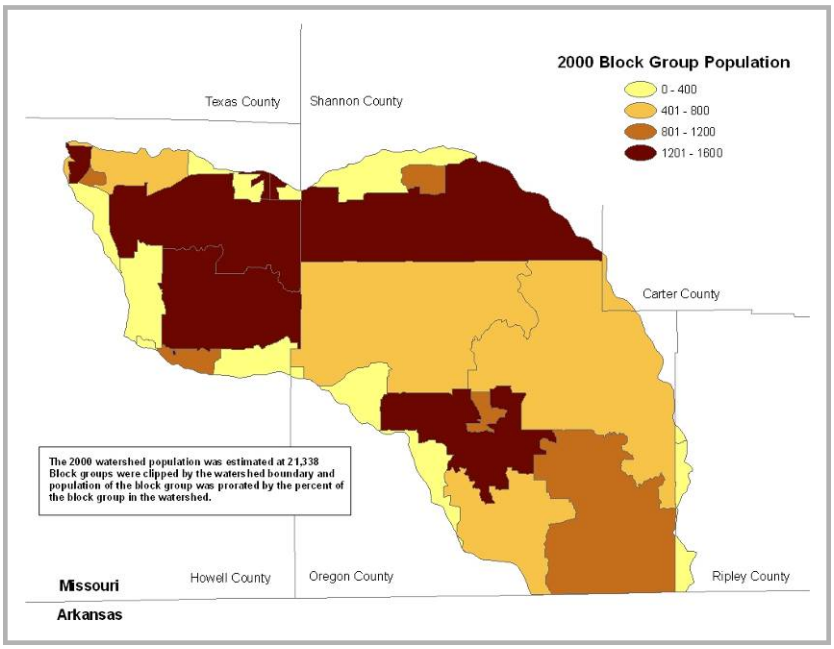
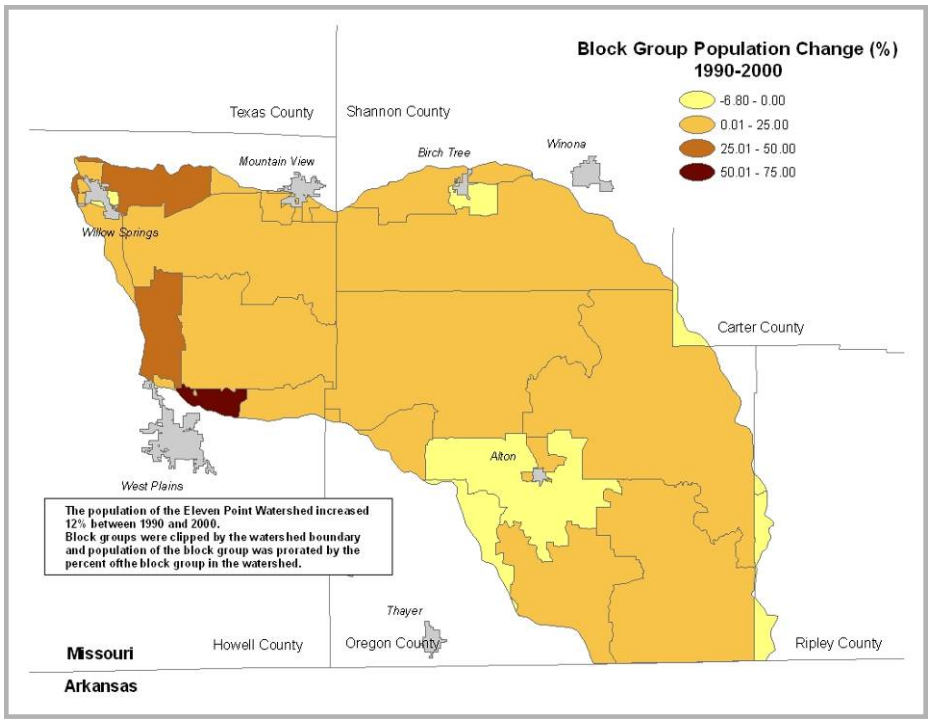


Figure 16b. 2000 Population—The 2000 estimated population of the sub-basin was 21,338.



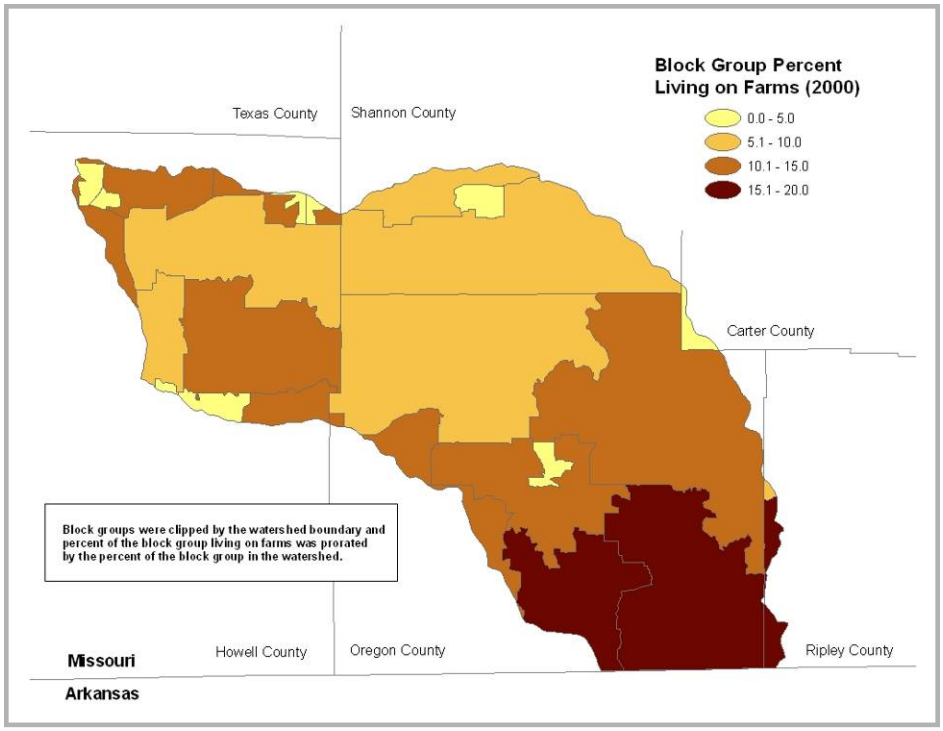
Change in Population

Figure 16c—The estimated population of the sub-basin increase 12% between 1990 and 2000.



Farms

Figure 16d



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