

Atlas of Missouri Amphibians and Reptiles for 2025



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Introduction

Since 1988, members of the Missouri Herpetological Association have compiled new county distribution records for amphibians and reptiles native to the state (Daniel *et al.* 2025 and previous updates). Cumulative accounts of these new records were presented in Powell *et al.* (1993), Powell and Daniel (1997), and Daniel and Edmond (2002). Johnson (2000) presented revised distribution maps based on a combination of these cumulative accounts and more recent annual compilations. The publication of Johnson (1987, 2000) renewed interest in expanding our knowledge of the distribution of the state's herpetofauna. Briggler and Johnson (2021) published an updated version of the *The Amphibians and Reptiles of Missouri* that incorporated all *Atlas* records up until that time. In order to provide herpetologists working in Missouri with current information that is easily taken into the field, we are presenting revised species distribution and county records maps in a format that can be easily updated as new records are documented.

In 1997, with the initiation of the Missouri Herpetological Atlas Project (MOHAP), a database was established to serve as the basis for verifying new distribution records and tracking changes in individual species distributions within the state (Edmond and Daniel 2026). Qualification for inclusion in the database requires a catalogued voucher specimen housed in an institutional collection (Appendix A). However, in order to be valuable in tracking changes in the distribution of individual species, it is important to document historical records. Many of the specimens collected prior to the 1970s, most notably those reported by Hurter (1911) and Anderson (1965), were documented by specimens that have since been lost or destroyed. In order to provide the most accurate picture of the distribution of the state's herpetofauna we have included some literature records (Appendix B).

Some records were not included because the identification could not be determined with certainty. Within Missouri, the *Dryophytes versicolor* complex consists of two broadly sympatric and morphologically indistinguishable species (*D. chrysoscelis* and *D. versicolor*). Specimens collected for which the species identification was not determined by some non-morphological trait were not included.

Currently, the MOHAP database contains 38,958 entries and 34,819 valid, non-duplicated collections. This represents specimens housed in 37 museum collections and cited from 34 historical literature sources; 5,363 documented county records; 11,200 unique localities; and 18,556 unique species / locality combinations. This new total constitutes 603 new database entries since the 2023 edition of the *Atlas* (Daniel and Edmond 2024). The total number of species contained in the current edition of the atlas is 119, comprised of 117 native species and 2 non-native species. We follow the most recent SSAR Checklist (Nicholson 2025) with an adjustment to some common names.

Previous editions of the atlas are available upon request. Readers may also contribute new records for the project. The MOHAP web site (Edmond and Daniel 2026)

contains project details. Questions, comments, and suggestions should be directed to the senior author.

Distribution

Distribution is one of many characteristics used to describe a species and range maps (such as those found in Conant and Collins (1998)) are used to approximate a species' likely distribution. This atlas uses locality dot maps, with each dot representing a known locality for that species. This conservative method results in an underestimate of a species distribution but is more accurate than a range map. The purpose of the atlas project is to document as closely as possible both current and historical distributions for all native amphibians and reptiles in Missouri.

However, the printed version of the atlas only reflects the best historical approximation of each species' distribution in the state. The most noticeable resulting incongruity is that fact that some species are shown in historical localities in which they are almost certainly no longer found. For example, the Smooth Greensnake (*Opheodrys vernalis*) was once found in scattered populations in the prairie regions of the state. Due to extensive habitat loss and possibly other reasons, they are extremely rare or extirpated in the state.

While natural communities have long been a staple in ecology, formal classification of natural communities has been undertaken relatively recently in Missouri (Nelson 2005). Like individual species, natural communities can be described and characterized with distinct distributions and abundances in different ecoregions (see next section). For example, glades are common in the Ozarks but rare elsewhere in the state. Steyermark (1963), Yatskievych (1999), Pflieger (1989), Hawker (1992), and Unklesbay and Vineyard (1992) all describe and summarize the complex interplay among geology, natural history, ecoregions, natural divisions, natural communities, and the passage of time from slightly different perspectives. Taken together, these ideas form the basis of the biogeography of Missouri and they are essential in understanding why plants and animals have the distributions that we see today.

Terrestrial Ecoregions

An ecoregion classification system attempts to define and describe geographic regions that correspond to broad ecosystem patterns, topography, geology, soils, vegetation patterns, and the distributions of plants and animals. Omernik (1987) described ecoregions (Levels I, II, and III) for the conterminous United States as a hierarchical scheme with Level I corresponding to large regions and Level III representing smaller, more precisely described regions. The Environmental Protection Agency (2003) is coordinating an effort to further subdivide Level III regions into Level IV regions. Nigh and Schroeder (2002) published Level III and Level IV ecoregions for Missouri.

Some amphibian and reptile species follow defined ecoregions closely. For example, the Cave Salamander (*Eurycea lucifuga*) is neatly confined to the Ozark

Highlands (Level III) and found throughout the ecoregion, with the exception of most of the Springfield Plateau (Level IV). Several species found in the southeastern alluvial plain are particularly characteristic and also confined to that area (e.g., Three-toed Amphiuma (*Amphiuma tridactylum*) and Southern Watersnake (*Nerodia fasciata*)).

Many species, however, seem to be abundant throughout Missouri, regardless of the region or natural community. The North American Bullfrog (*Lithobates catesbeianus*) and North American Snapping Turtle (*Chelydra serpentina*), among many others, fall into this category. Finally, many species are more closely associated with a particular natural community or habitat than with a particular ecoregion or natural division. For example, The Flat-headed Snake (*Tantilla gracilis*) can be found in the Ozark Highlands, Osage Prairie, and Interior River Valleys and Hills but it is restricted to rocky glades.

In general, Level IV ecoregions are too granular to be useful in describing the distributions of Missouri amphibians and reptiles, several Ozark salamander species and many of the coastal plains species being notable exceptions. However, this level of detail is useful to understand natural community distributions on which some species are dependent. It also underscores the importance of looking at border states and across artificial political boundaries to understand distributions within Missouri.

Level I (page 8), Level II (page 9), Level III (page 10), and Level IV (page 11) ecoregion maps for Missouri and surrounding states, based on Omernik (1987) and Nigh and Schroeder (2002) are included here. The hierarchy for Levels I, II, and III is included in Table 1 (below), while the Level III and Level IV hierarchy is included in Table 2 (below). Unfortunately, the authors' coding scheme for Level III is inconsistent, though the names do match. Both authors' codes for Level III are included in the tables as a cross-reference. An earlier approach by Thom and Wilson (1980) divided Missouri into natural divisions and sections (page 7), roughly corresponding to Level III and Level IV ecoregions, respectively.

Table 1. List of Level I, II, and III Terrestrial Ecoregions from Omernik (1987). Those regions marked with an asterisk (*) do not occur in Missouri but are sufficiently close to be of interest to Missouri biologists. Level III codes from Nigh and Schroeder (2002) are in parentheses.

- 8. Eastern Temperate Forests
 - 8.3. Southeastern USA Plains
 - 8.3.3. Interior Plateau* (71)
 - 8.3.6. Mississippi Valley Loess Plains (74)
 - 8.3.2. Interior River Valleys and Hills (72)
 - 8.4. Ozark / Ouachita / Appalachian Forests
 - 8.4.5. Ozark Highlands (39)
 - 8.4.6. Boston Mountains* (38)
 - 8.5. Southeast US Coastal Plain
 - 8.5.2. Mississippi Alluvial Plain (73)
- 9. Great Plains
 - 9.2. Temperate Prairies
 - 9.2.3. Western Corn Belt Plains (47)
 - 9.2.4. Central Irregular Plains (40)

Table 2. List of Level III and Level IV Terrestrial Ecoregions from Nigh and Schroeder (2002). Those regions marked with an asterisk (*) do not occur in Missouri but are sufficiently close to be of interest to Missouri biologists. Those regions marked with a caret (^) are contained entirely within the state's borders.

- 38. Boston Mountains* (8.4.6)
 - 38a. Upper Boston Mountains*
 - 38b. Lower Boston Mountains*
- 39. Ozark Highlands (8.4.5)
 - 39a. Springfield Plateau
 - 39b. Elk River Hills
 - 39c. White River Hills
 - 39d. Central Plateau
 - 39e. Osage / Gasconade River Hills^
 - 39f. Saint Francois Knobs / Basins^
 - 39g. Meramec River Hills^
 - 39h. Current River Hills^
 - 39i. Easter Ozark Border^
 - 39j. Black River Hills Border^
 - 39k. Prairie Ozark Border^
- 40. Central Irregular Plains (9.2.4)
 - 40a. Loess Flats and Till Plains
 - 40b. Osage Cuestas*
 - 40c. Wooded Osage Plains
 - 40d. Cherokee Plains
 - 40e. Claypan Prairie^
- 47. Western Corn Belt Plains (9.2.3)
 - 47d. Missouri Alluvial Plain
 - 47e. Steeply Rolling Loess Prairies
 - 47f. Rolling Loess Prairies
 - 47h. Nebraska / Kansas Loess Hills*
 - 47i. Loess and Glacial Drift Hills*
 - 47m. Western Loess Hills
- 71. Interior Plateau* (8.3.3)
 - 71m. Northern Shawnee Hills*
 - 71n. Southern Shawnee Hills*
- 72. Interior River Valleys and Hills (8.3.2)
 - 72a. Wabash / Ohio Bottomlands*
 - 72d. Upper Mississippi Alluvial Plain
 - 72e. Middle Mississippi Alluvial Plain
 - 72f. River Hills
 - 72g. Southern Ozarkian River Bluffs*
 - 72i. Western Dissected Illinoian Till Plain*
 - 72j. Southern Illinoian Till Plain*
 - 72k. Cretaceous Hills*
 - 72l. Karstic Northern Ozarkian River Bluffs*
- 73. Mississippi Alluvial Plain (8.5.2)
 - 73a. Northern Holocene Meander Belts
 - 73b. Northern Pleistocene Valley Trains*
 - 73c. Saint Francis Lowlands
 - 73f. Western Lowlands Holocene Meander Belts
 - 73g. Western Lowlands Pleistocene Valley Trains
- 74. Valley Loess Plains (8.3.6)
 - 74a. Bluff Hills
 - 74b. Loess Plains

Aquatic Subregions

Like terrestrial ecoregions, aquatic subregions can be classified in discrete units, based on watershed and hydrological characteristics. Subregions are composed of ecological drainage units, which are major watersheds that are consolidated based on similarity and proximity (MSDIS 2009a). Subregions and their component drainage units can be seen in Table 3 (below).

Naturally, many of the same patterns emerge in both terrestrial and aquatic geographic classifications since the two are not independent of one another. However, aquatic subregions and ecological drainage units can differ from their terrestrial counterparts since most aquatic organisms are confined to watersheds as well as specific habitats. Since many species of amphibians and reptiles are partially or wholly dependent on aquatic habitats, distributions can sometimes be best understood and explained by examining aquatic subregions, ecological drainage units, and even individual watersheds.

The base map for major rivers and streams (page 12) shows locations of actual rivers and streams inside Missouri and just outside the state's borders where appropriate (USGS 1994; MDC 2007b). The watershed boundaries map (page 13) displays the maximum terrestrial boundary for major watersheds (NRCS 2002). Both of these maps are underlain with unique background colors to display Missouri's primary drainage systems: a) Mississippi River, b) Missouri River, c) Arkansas River, and d) White River.



Some species found in the state exhibit distributions that can be better understood by referring to these primary drainage systems. The ecological drainage units map (page 14) shows a somewhat consolidated view of the watersheds map based on those watersheds and other characteristics. It is underlain with unique background colors showing the three broad aquatic subregions in the state. Still more detailed aquatic region classifications are available but often include areas based on very small creeks and their watersheds and are therefore not included here.

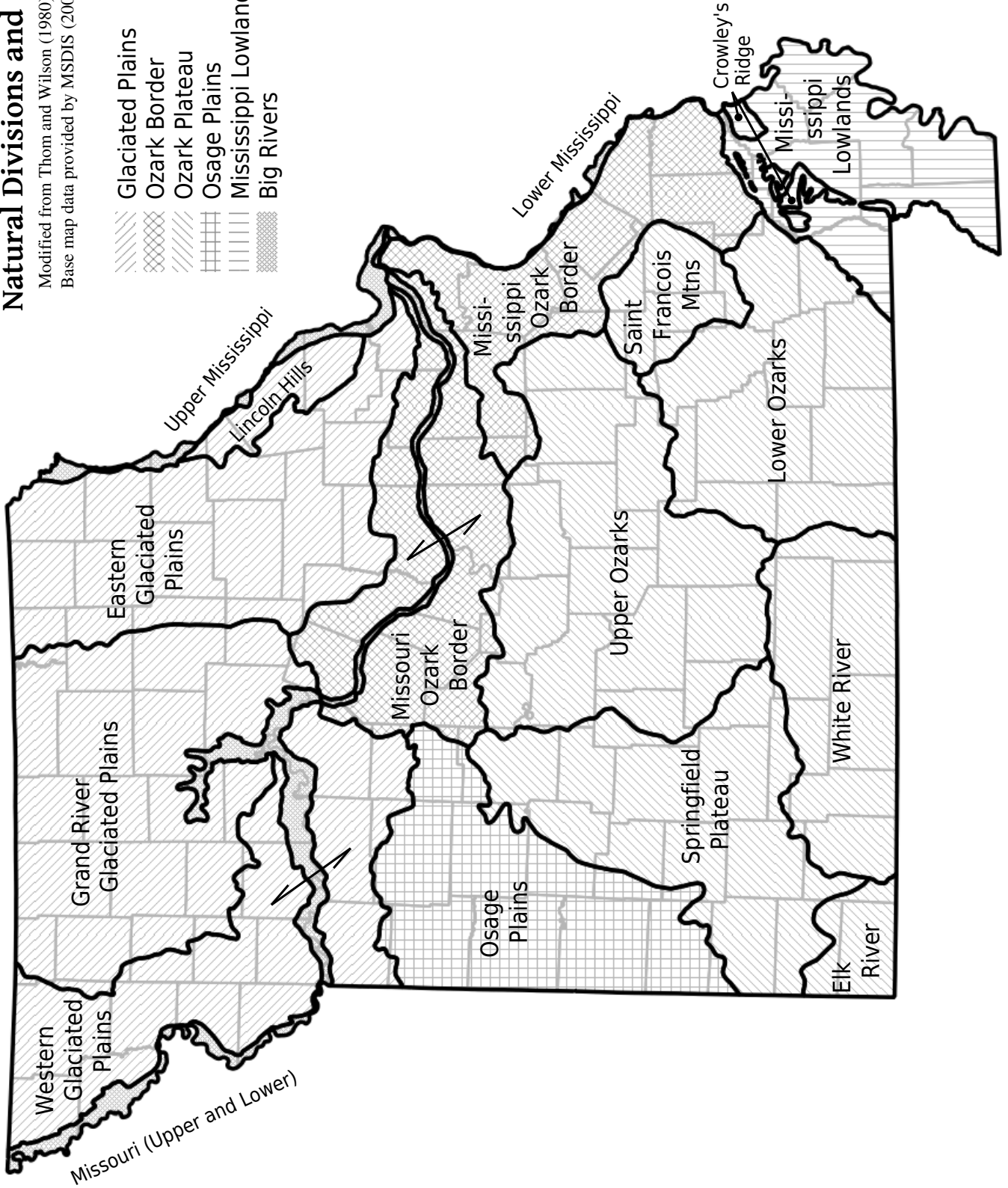
Table 3. List of Aquatic Subregions and Ecological Drainage Units from MSDIS (2009a, 2009c). Each drainage unit is indicated with its primary drainage system: a) Mississippi River, b) Missouri River, c) Arkansas River, d) White River.

- * Central Plains Subregion
 - * Blackwater / Lamine (b)
 - * Cuivre / Salt (a)
 - * Des Moines (a)
 - * Grand / Chariton (b)
 - * Kansas (b)
 - * Nishnabotna / Platte (b)
 - * Osage / South Grand (b)
- * Ozarks Subregion
 - * Apple / Joachim (a)
 - * Black / Current (d)
 - * Gasconade (b)
 - * Meramec (a)
 - * Moreau / Loutre (b)
 - * Osage (b)
 - * Neosho (c)
 - * Upper Saint Francis / Castor (a)
 - * White (d)
- * Mississippi Alluvial Subregion
 - * Black / Cache (a)
 - * Saint Francis / Little (a)
 - * Saint Johns Bayou (a)

Natural Divisions and Sections

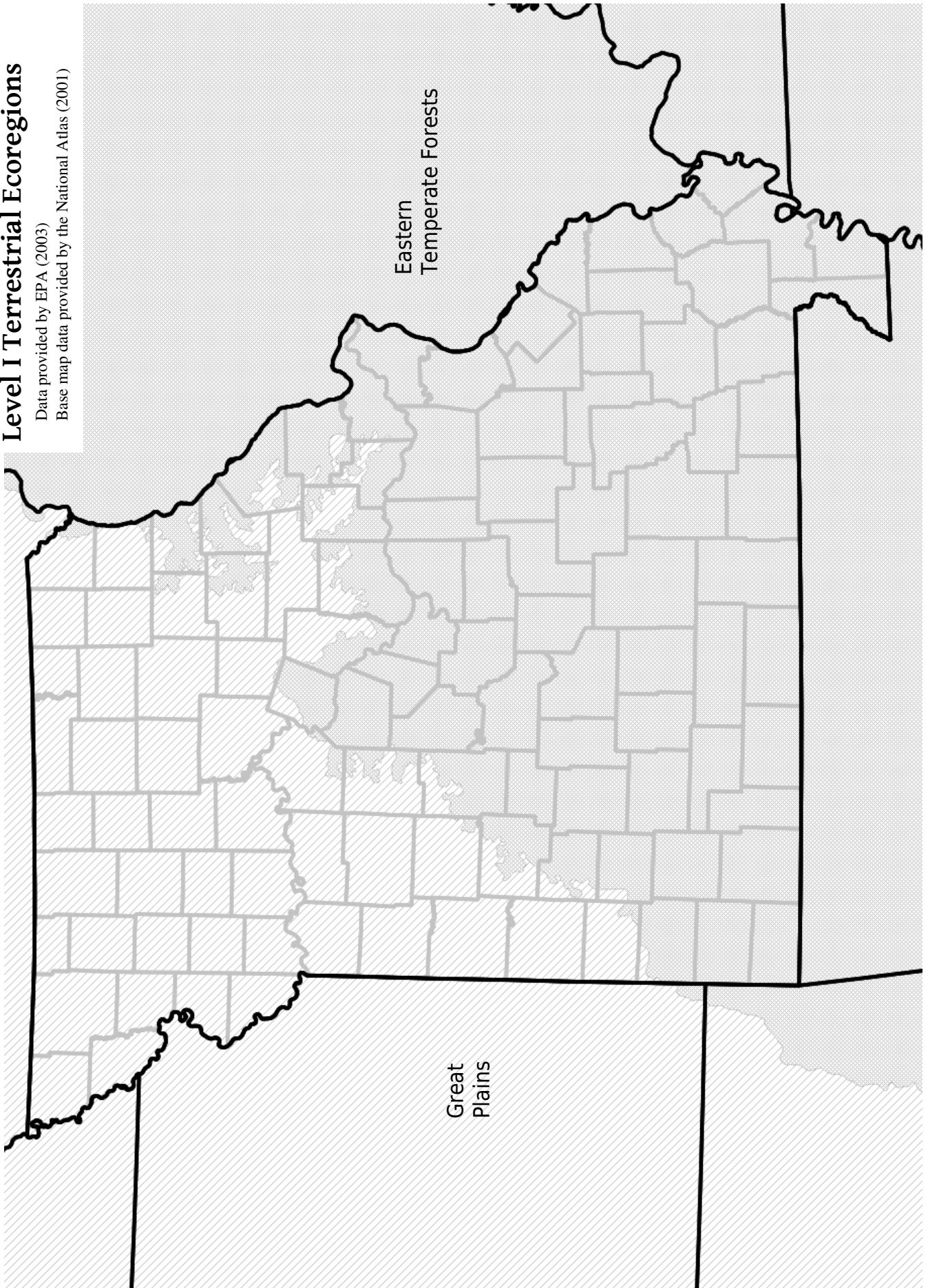
Modified from Thom and Wilson (1980)
 Base map data provided by MSDIS (2009b) and MDC (2007a)

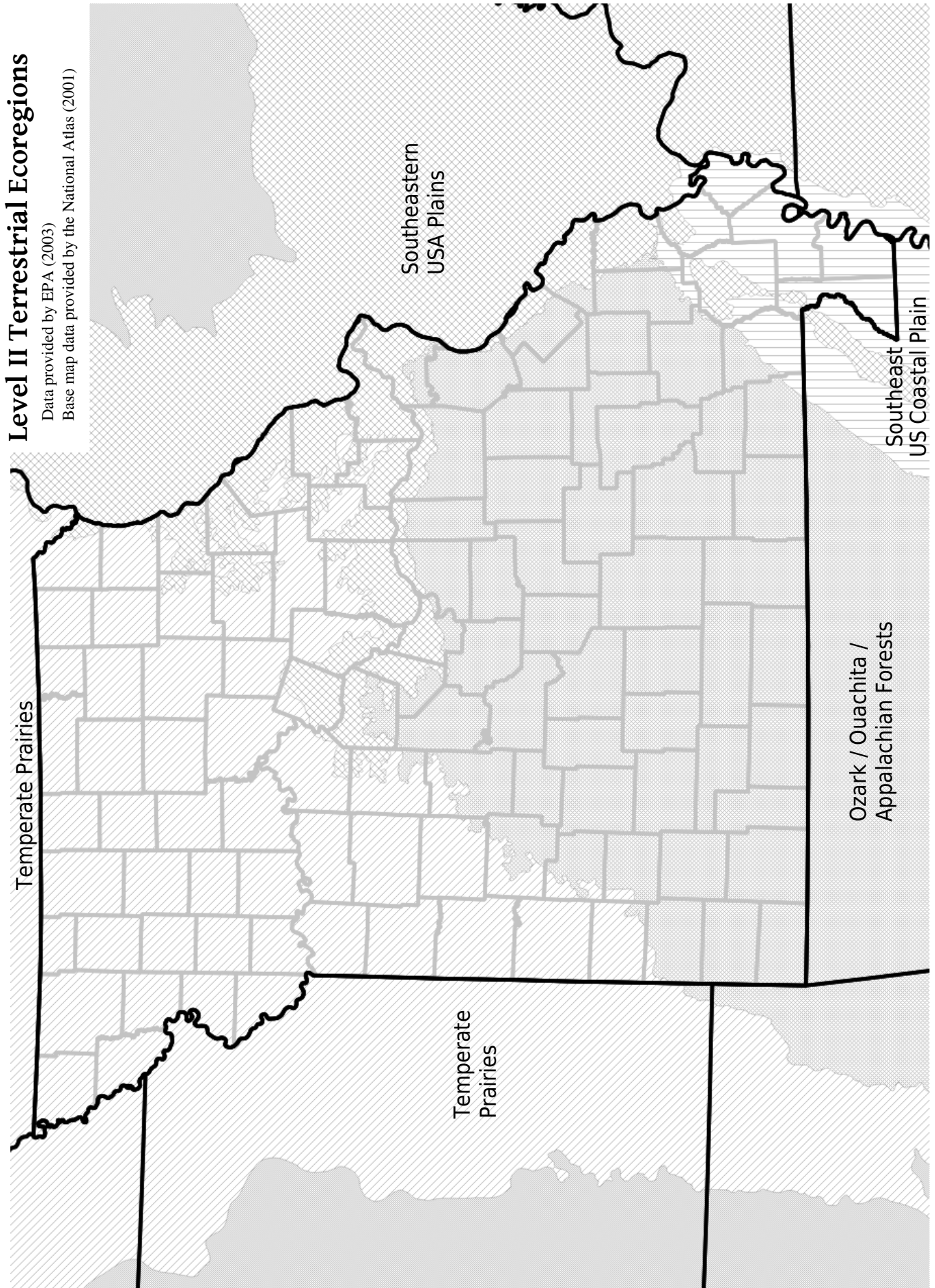
-  Glaciated Plains
-  Ozark Border
-  Ozark Plateau
-  Osage Plains
-  Mississippi Lowlands
-  Big Rivers



Level I Terrestrial Ecoregions

Data provided by EPA (2003)
Base map data provided by the National Atlas (2001)



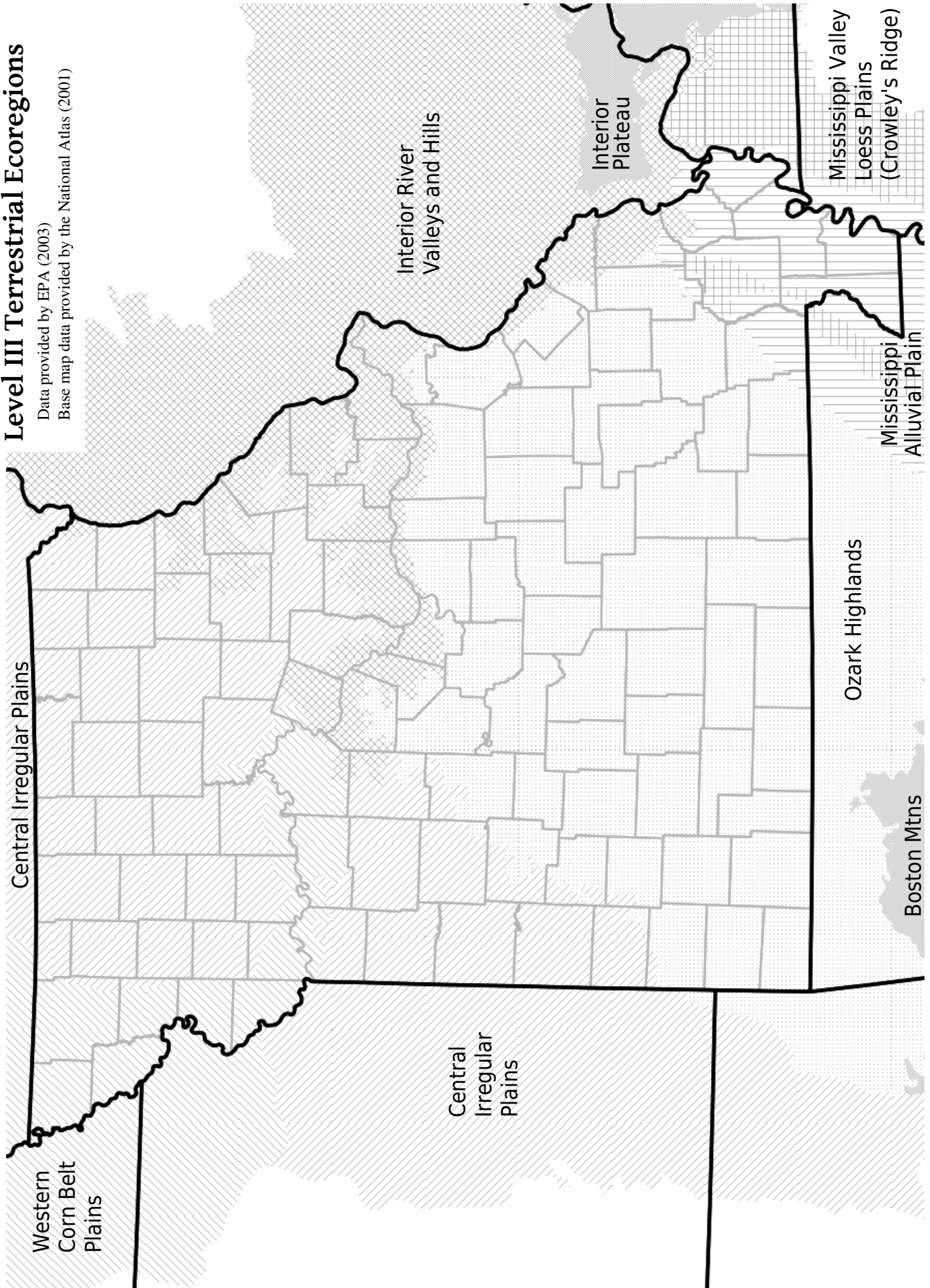


Level II Terrestrial Ecoregions

Data provided by EPA (2003)
Base map data provided by the National Atlas (2001)

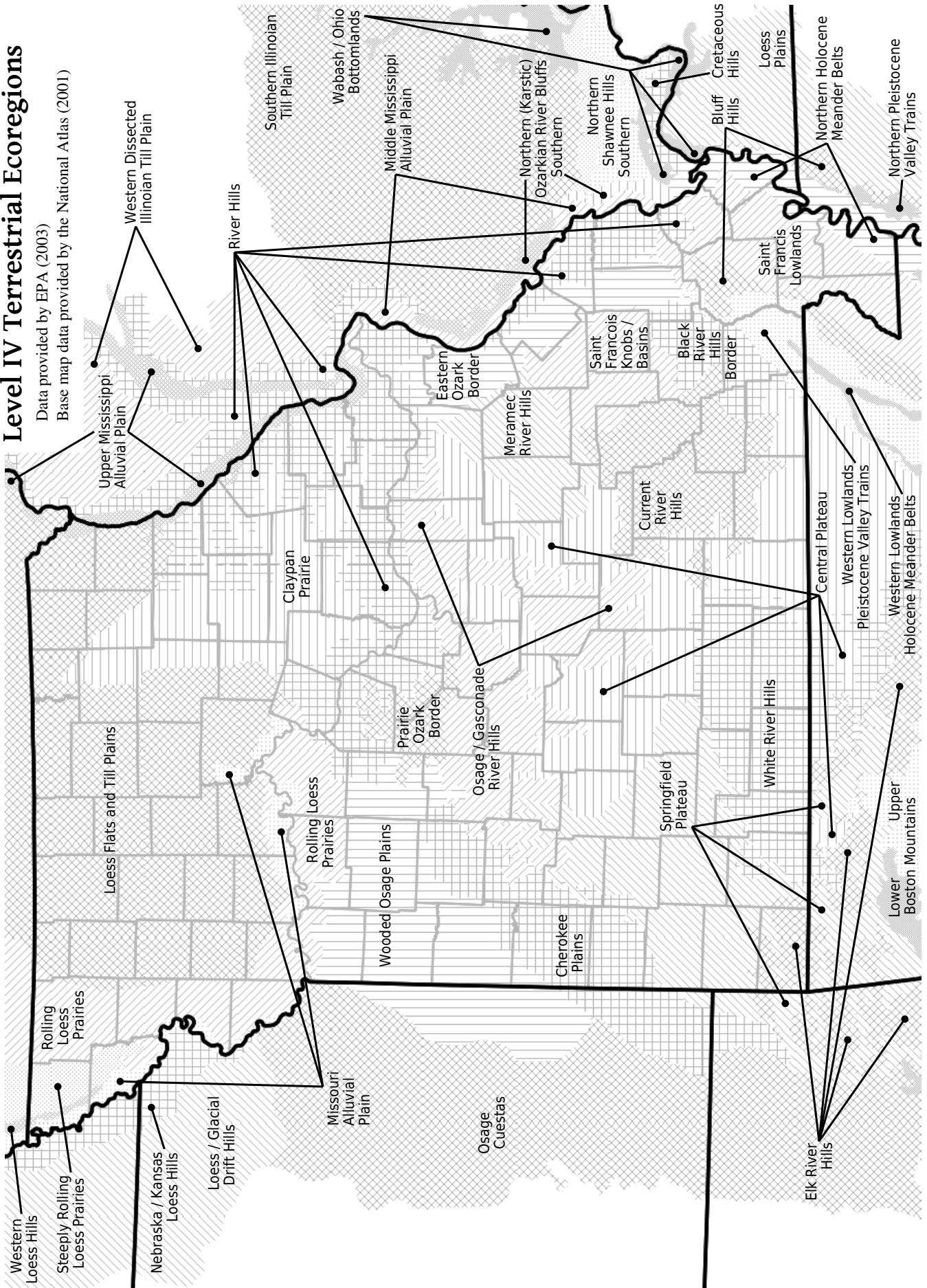
Level III Terrestrial Ecoregions

Data provided by EPA (2003)
Base map data provided by the National Atlas (2001)



Level IV Terrestrial Ecoregions

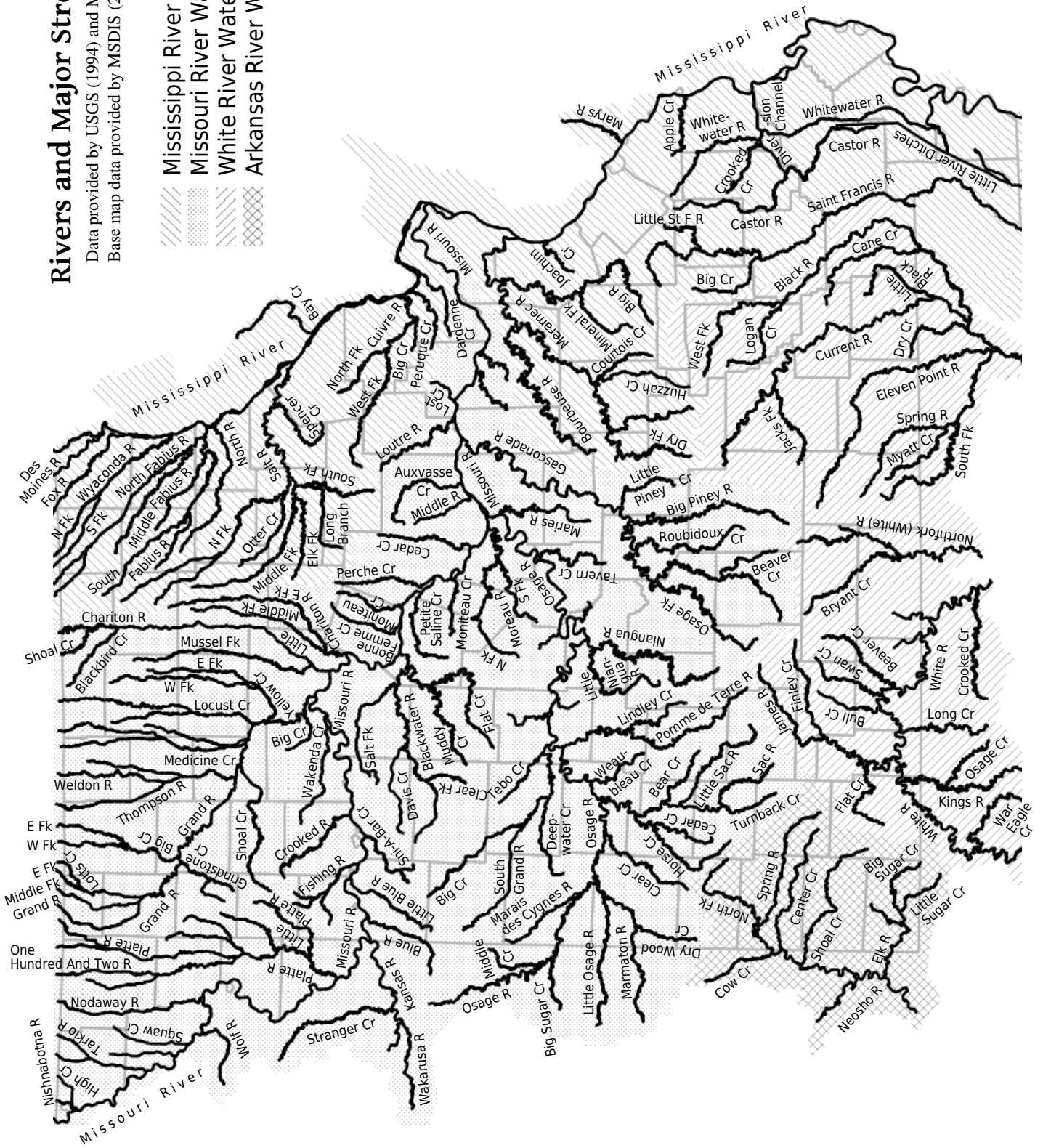
Data provided by EPA (2003)
Base map data provided by the National Atlas (2001)



Rivers and Major Streams





Data provided by USGS (1994) and MDC (2007b)
Base map data provided by MSDIS (2009b)

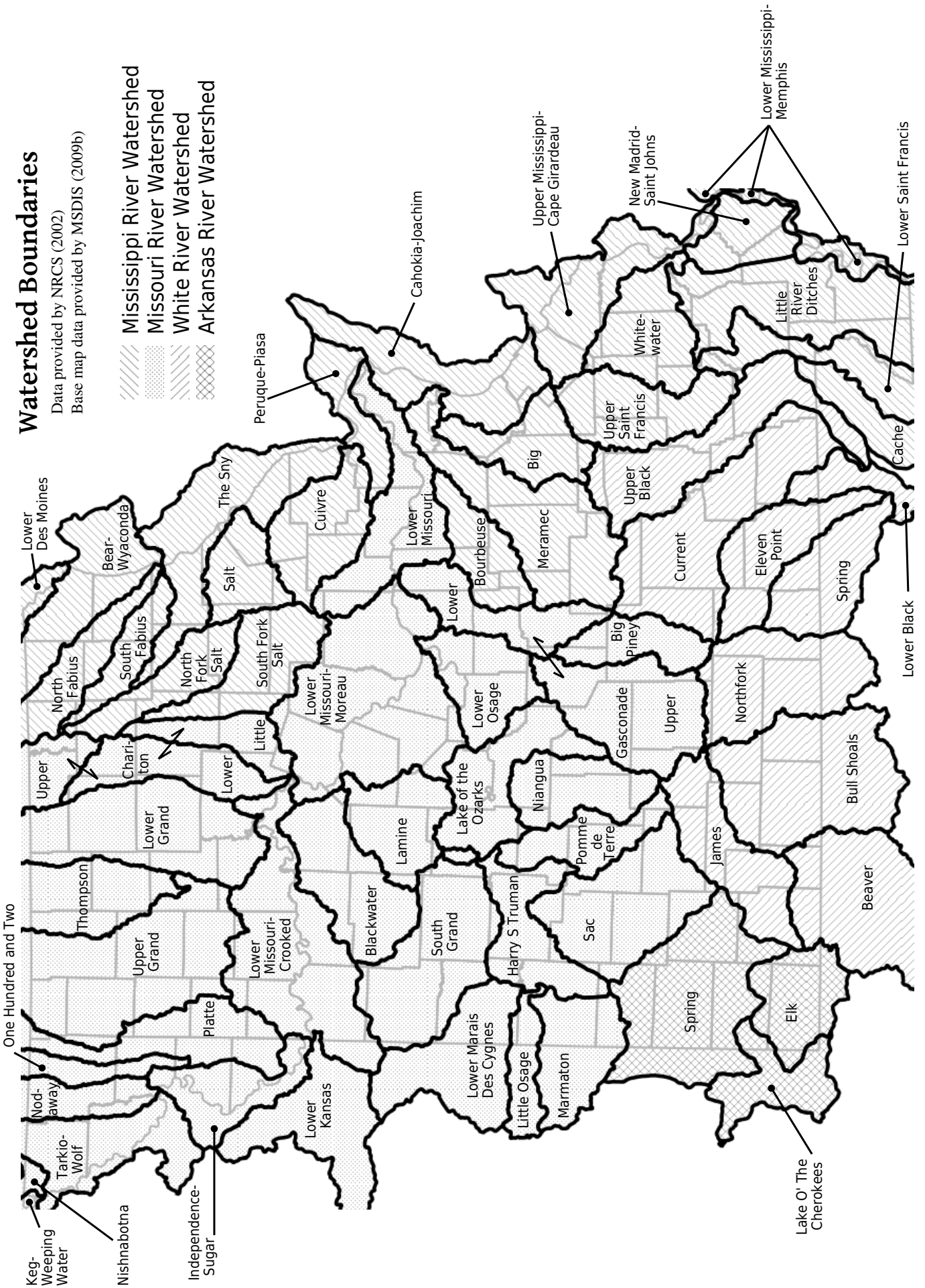
- Mississippi River Watershed
- Missouri River Watershed
- White River Watershed
- Arkansas River Watershed



Watershed Boundaries

Data provided by NRCS (2002)
 Base map data provided by MSDIS (2009b)

-  Mississippi River Watershed
-  Missouri River Watershed
-  White River Watershed
-  Arkansas River Watershed

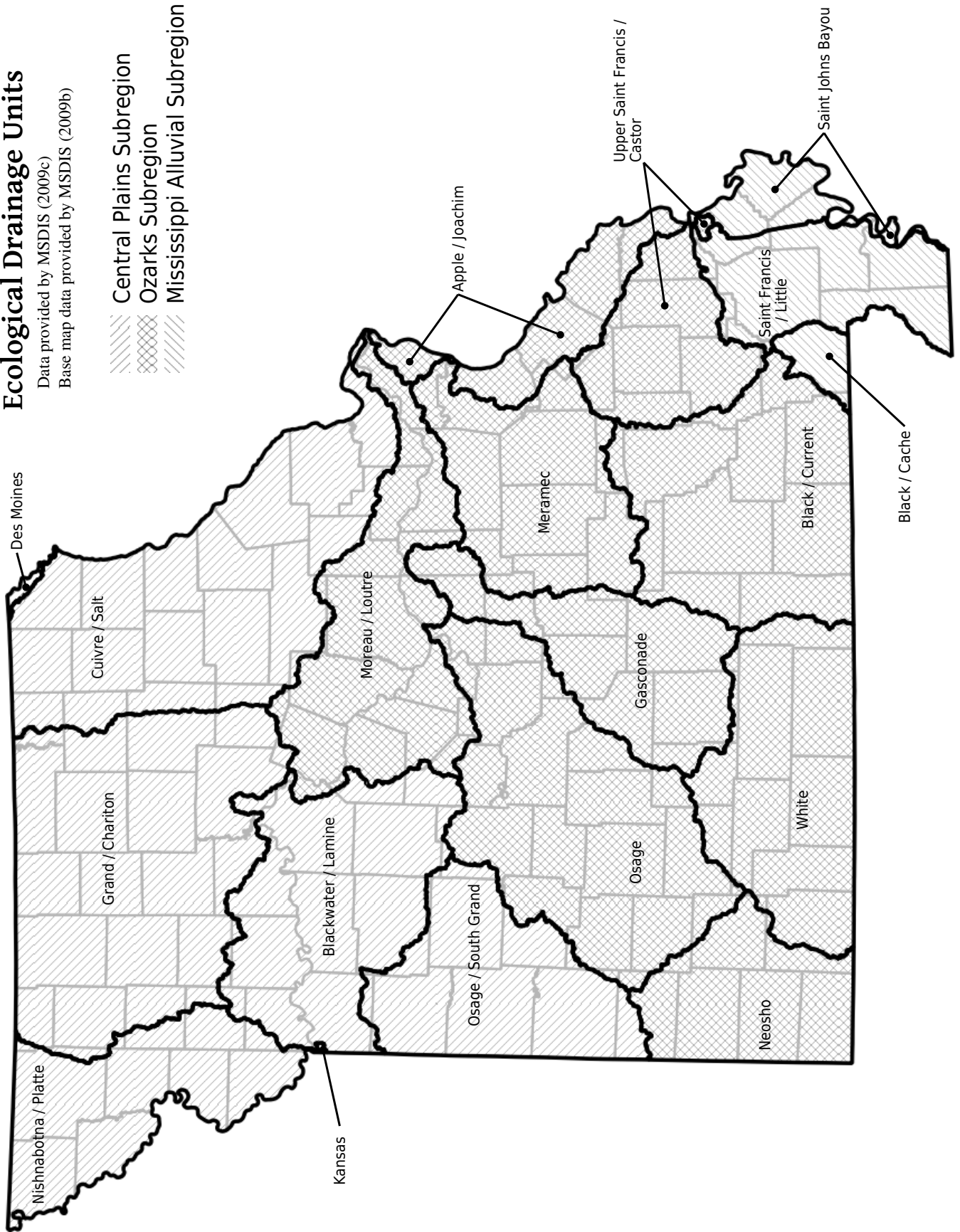


Ecological Drainage Units

Data provided by MSDIS (2009c)

Base map data provided by MSDIS (2009b)

- Central Plains Subregion
- Ozarks Subregion
- Mississippi Alluvial Subregion



County and Surrounding States Map

Base map data provided by MSDIS (2009b)

