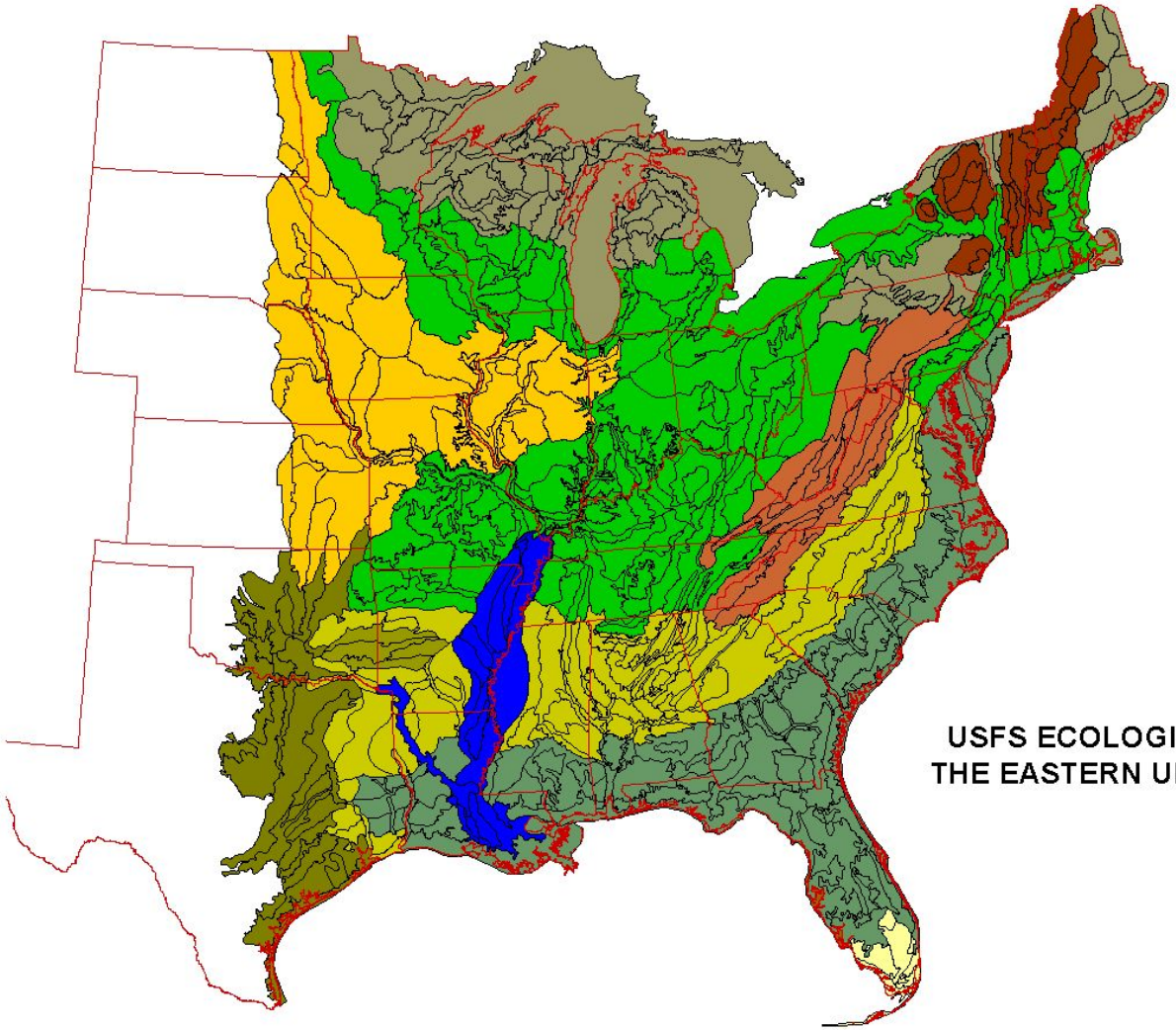
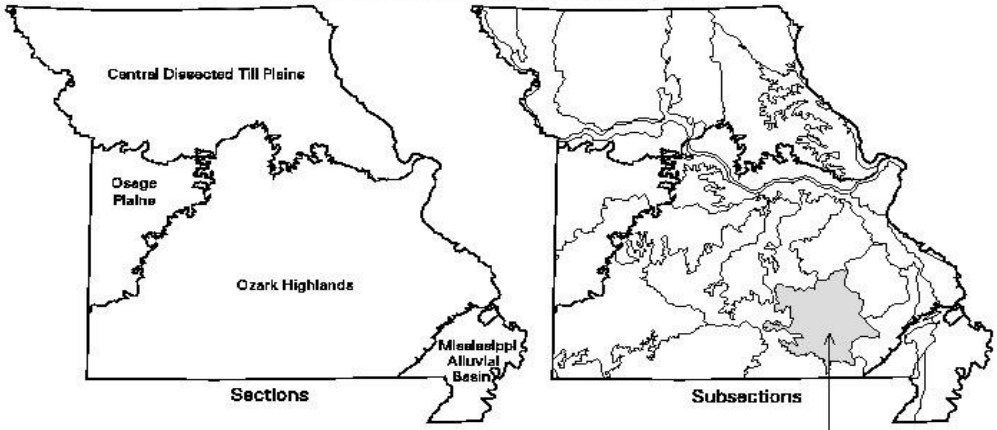
Ecological Classification Systems

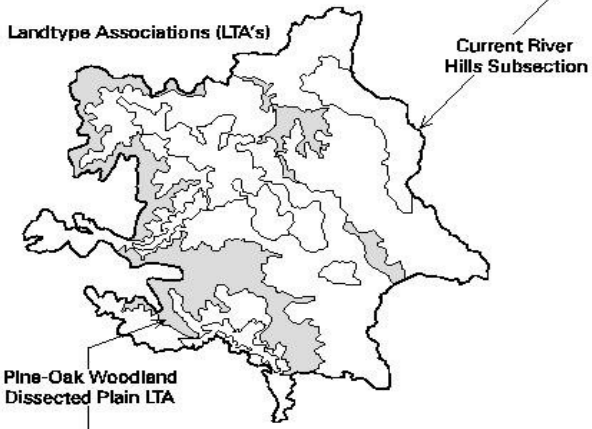
Development and Use for Natural Resources Planning in Missouri

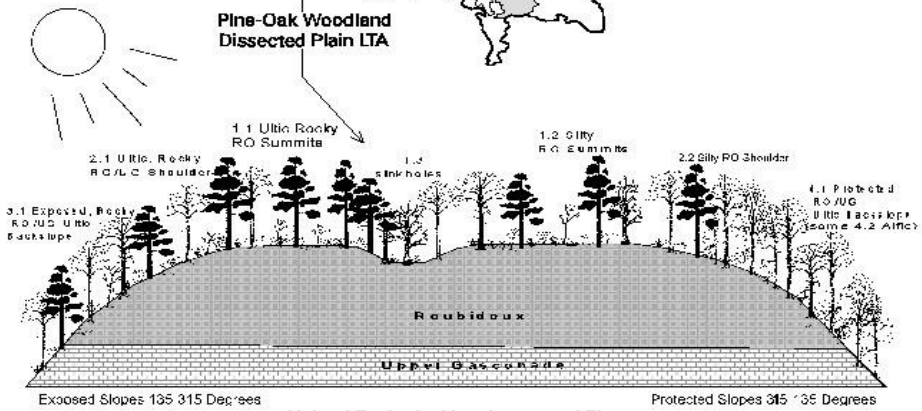


USFS ECOLOGICAL UNITS OF
THE EASTERN UNITED STATES

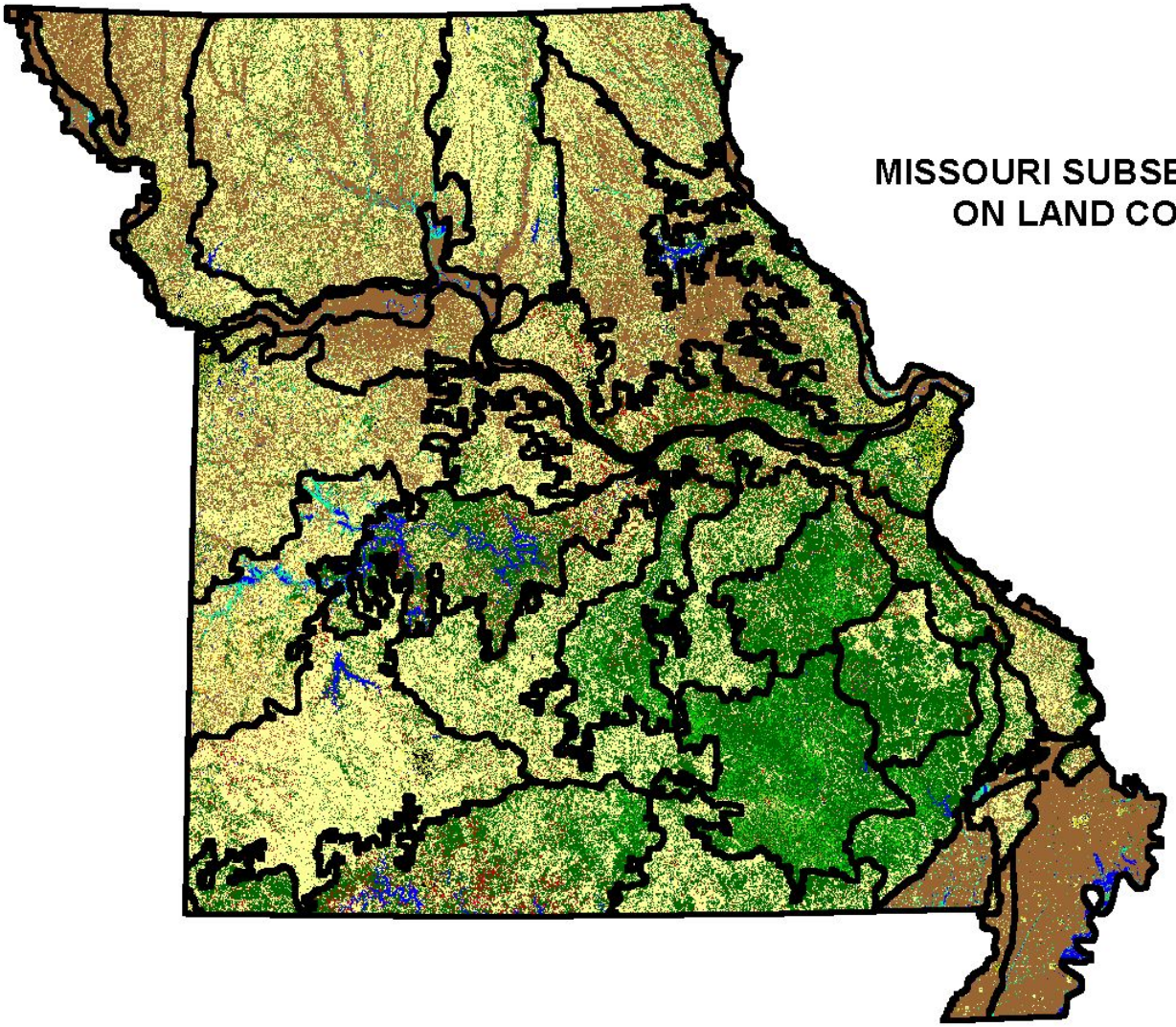
Figure 1. USFS ECS Hierarchy and Missouri



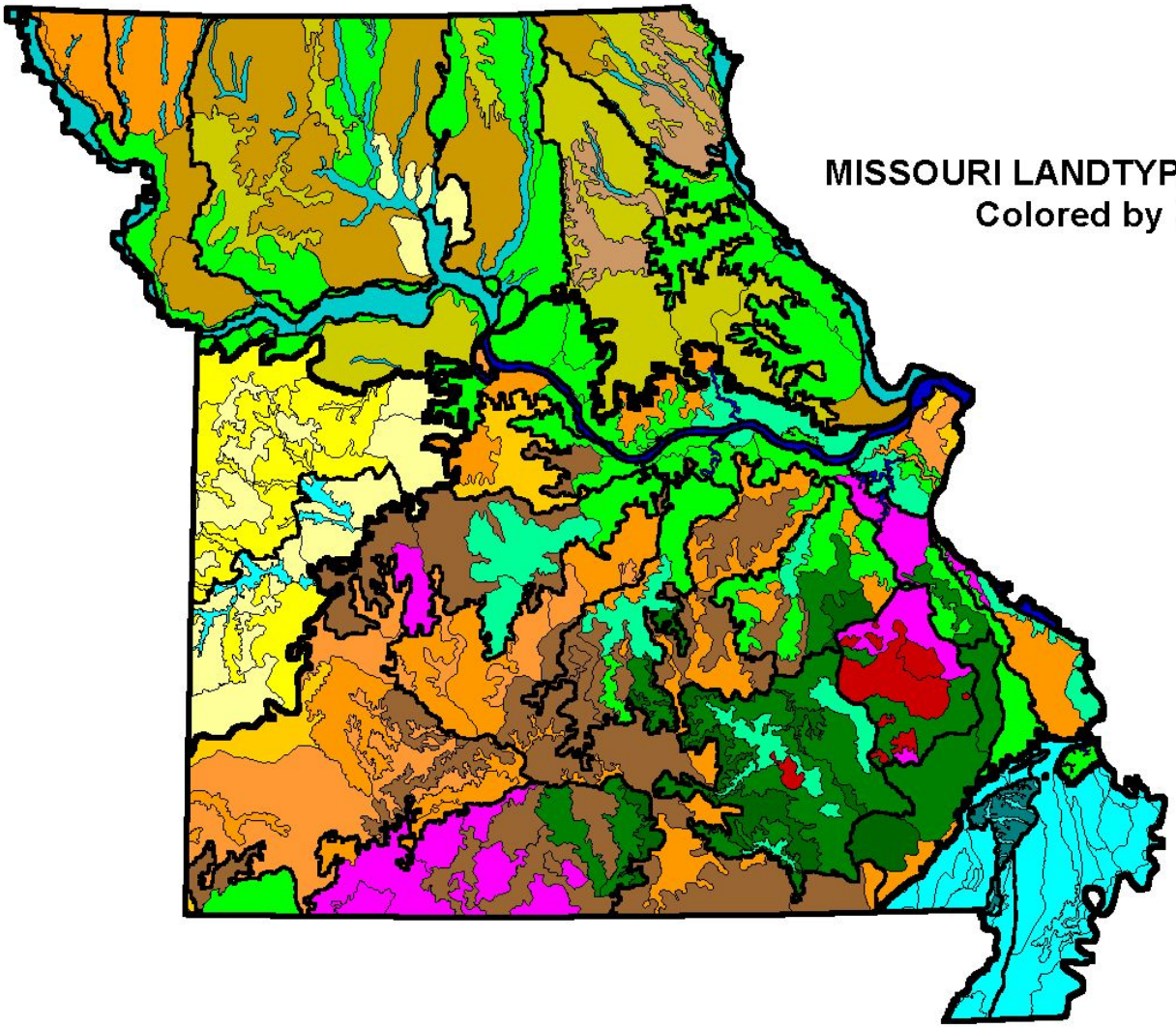




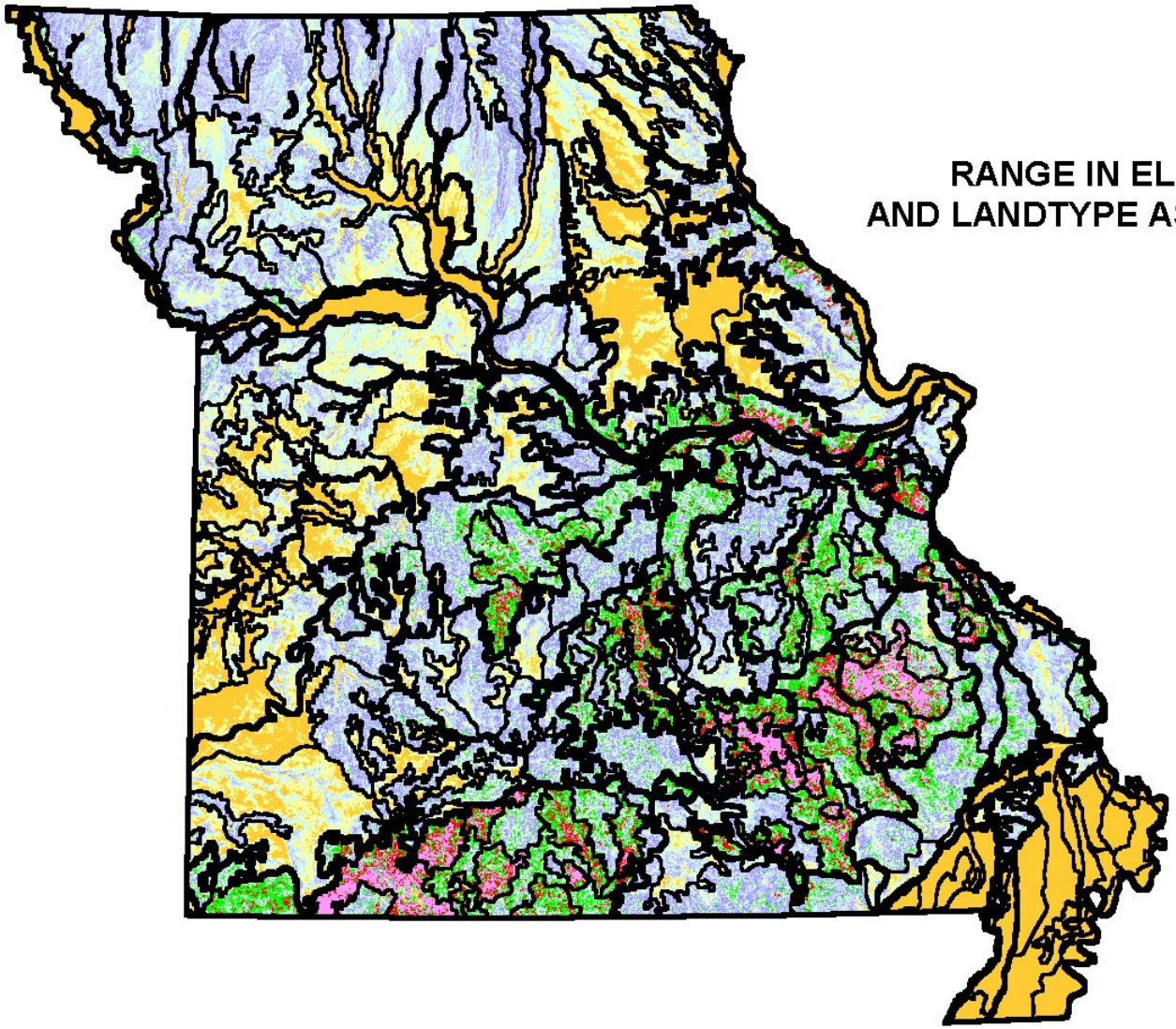
Upland Ecological Landtypes and Phases



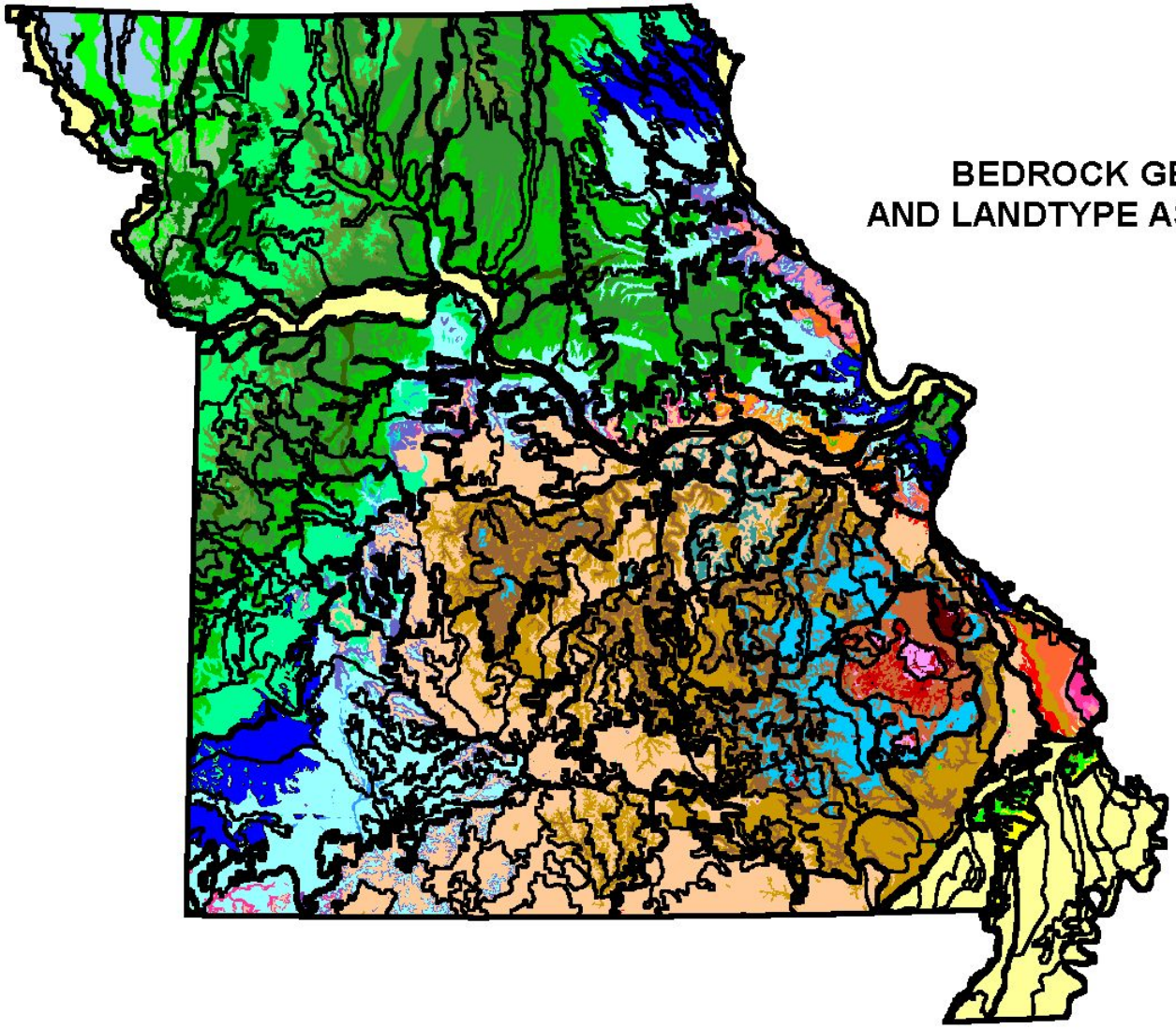
MISSOURI SUBSECTIONS
ON LAND COVER



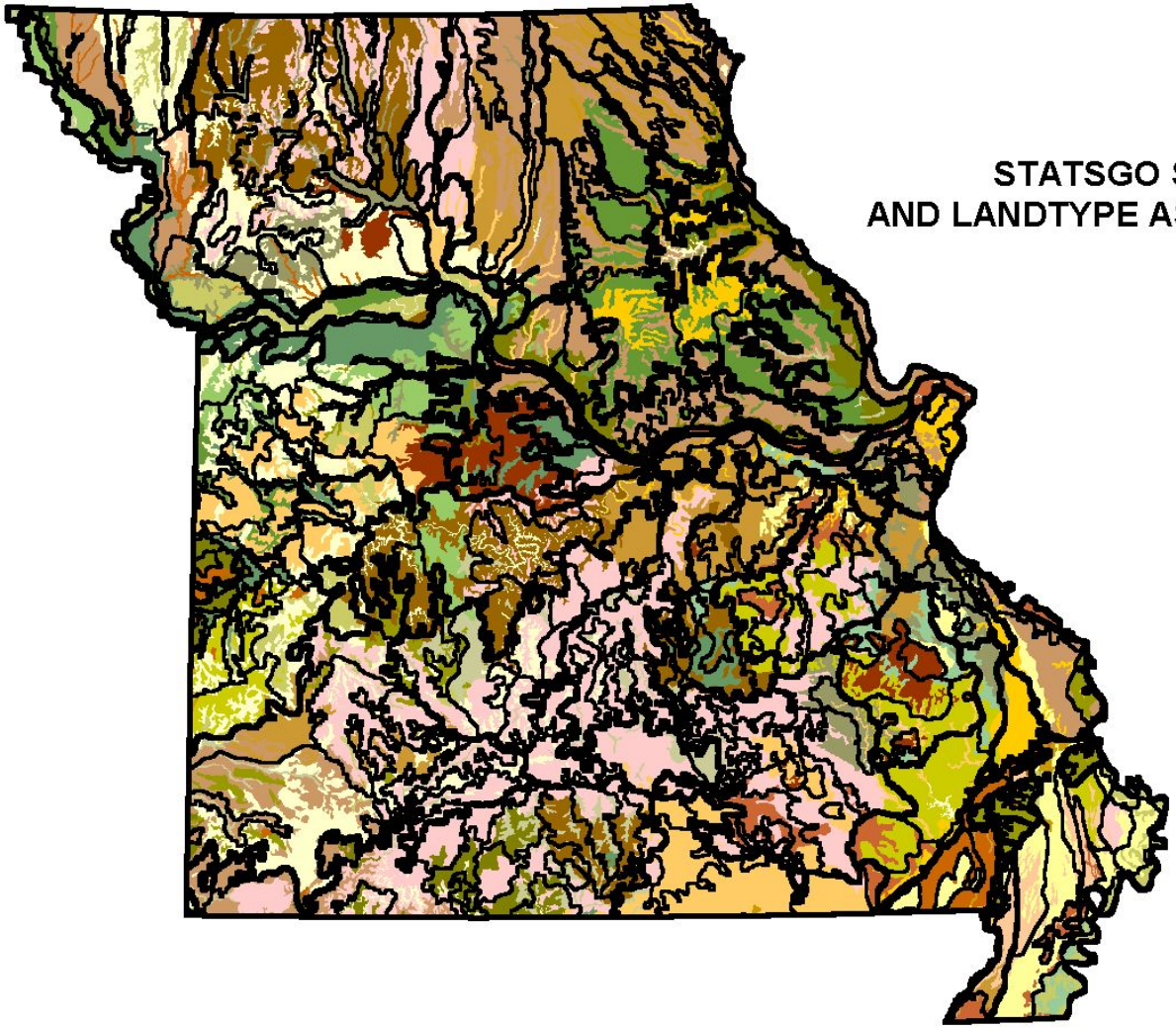
MISSOURI LANDTYPE ASSOCIATIONS
Colored by LTA Type



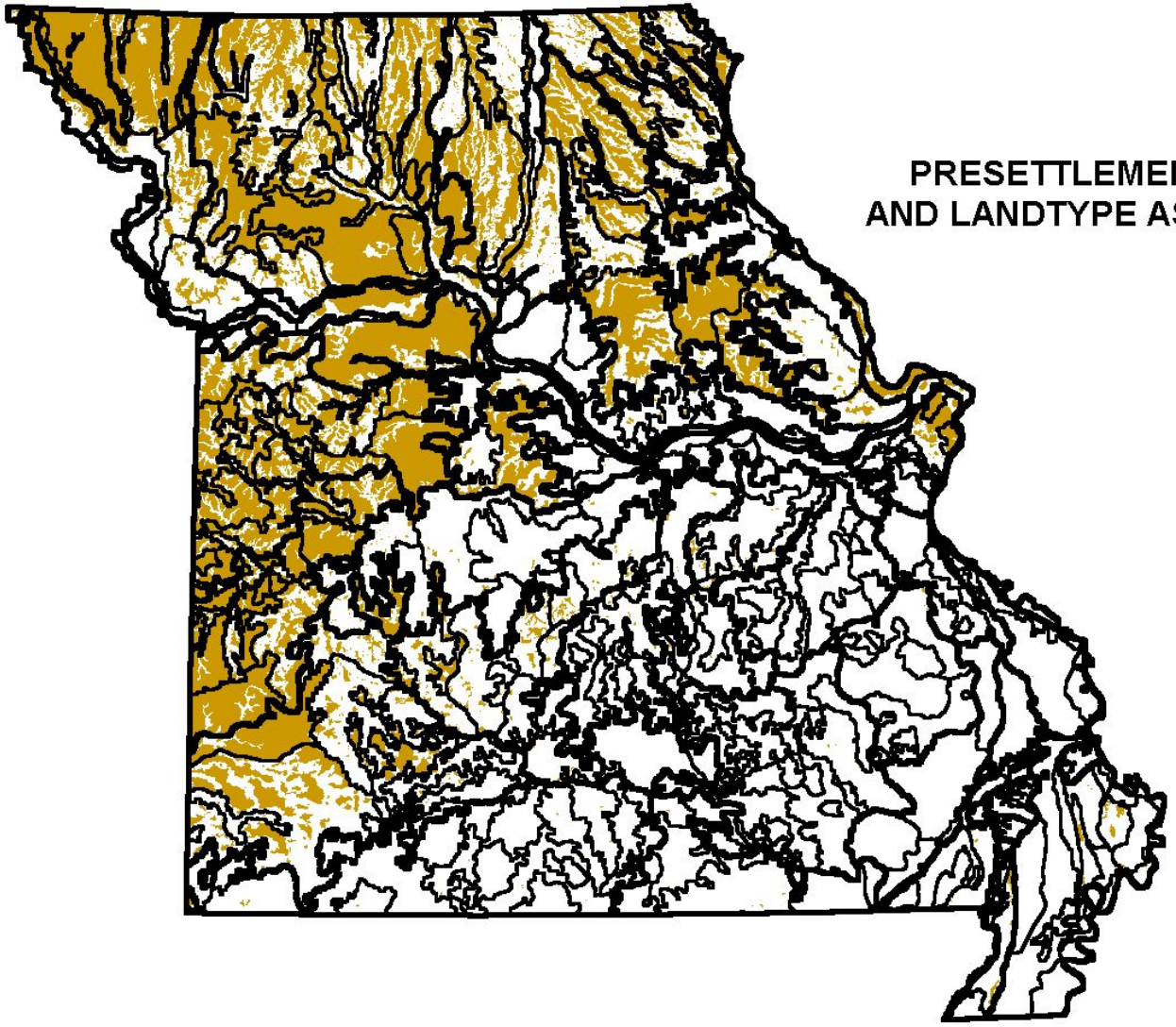
RANGE IN ELEVATION
AND LANDTYPE ASSOCIATIONS



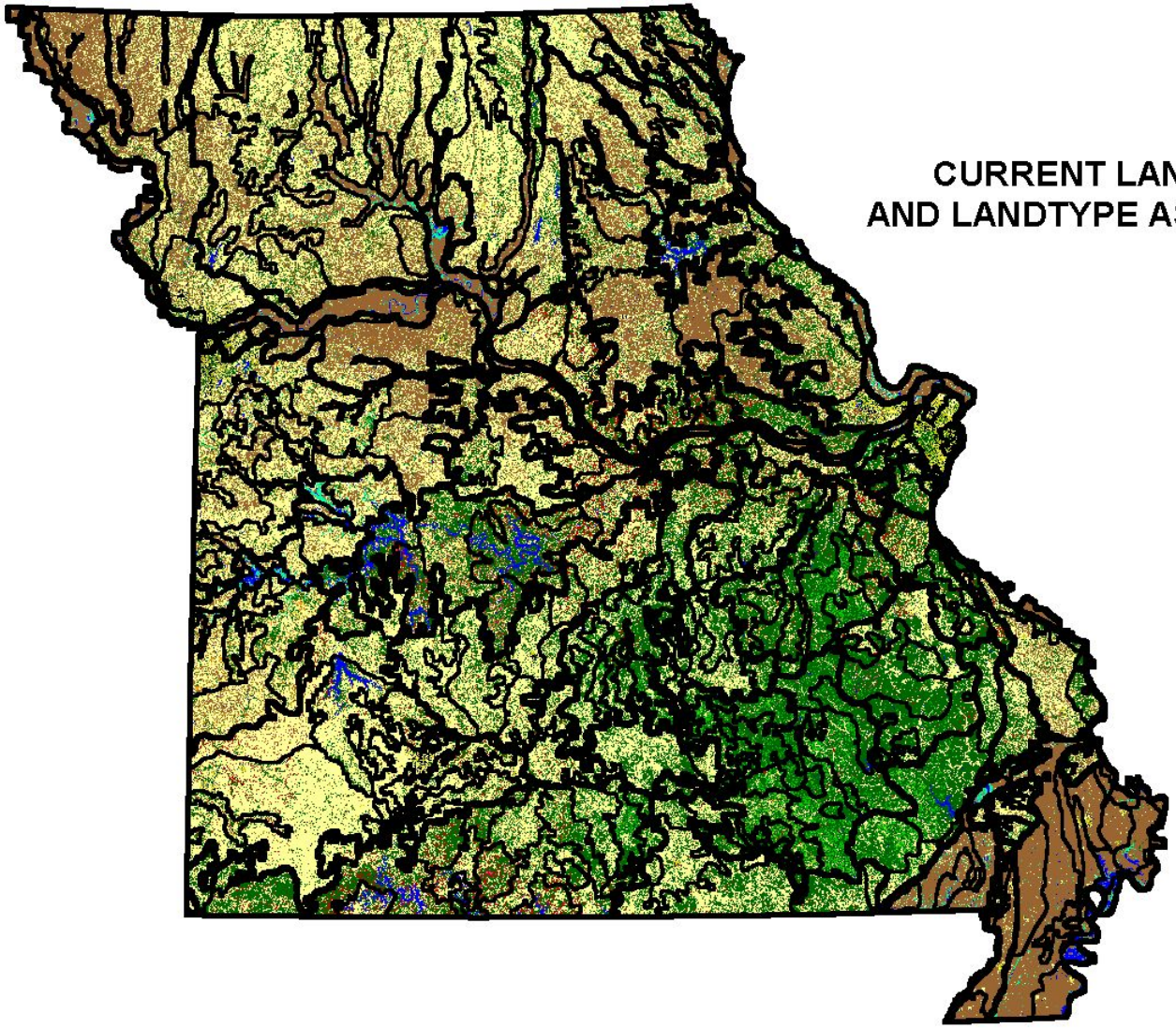
BEDROCK GEOLOGY
AND LANDTYPE ASSOCIATIONS



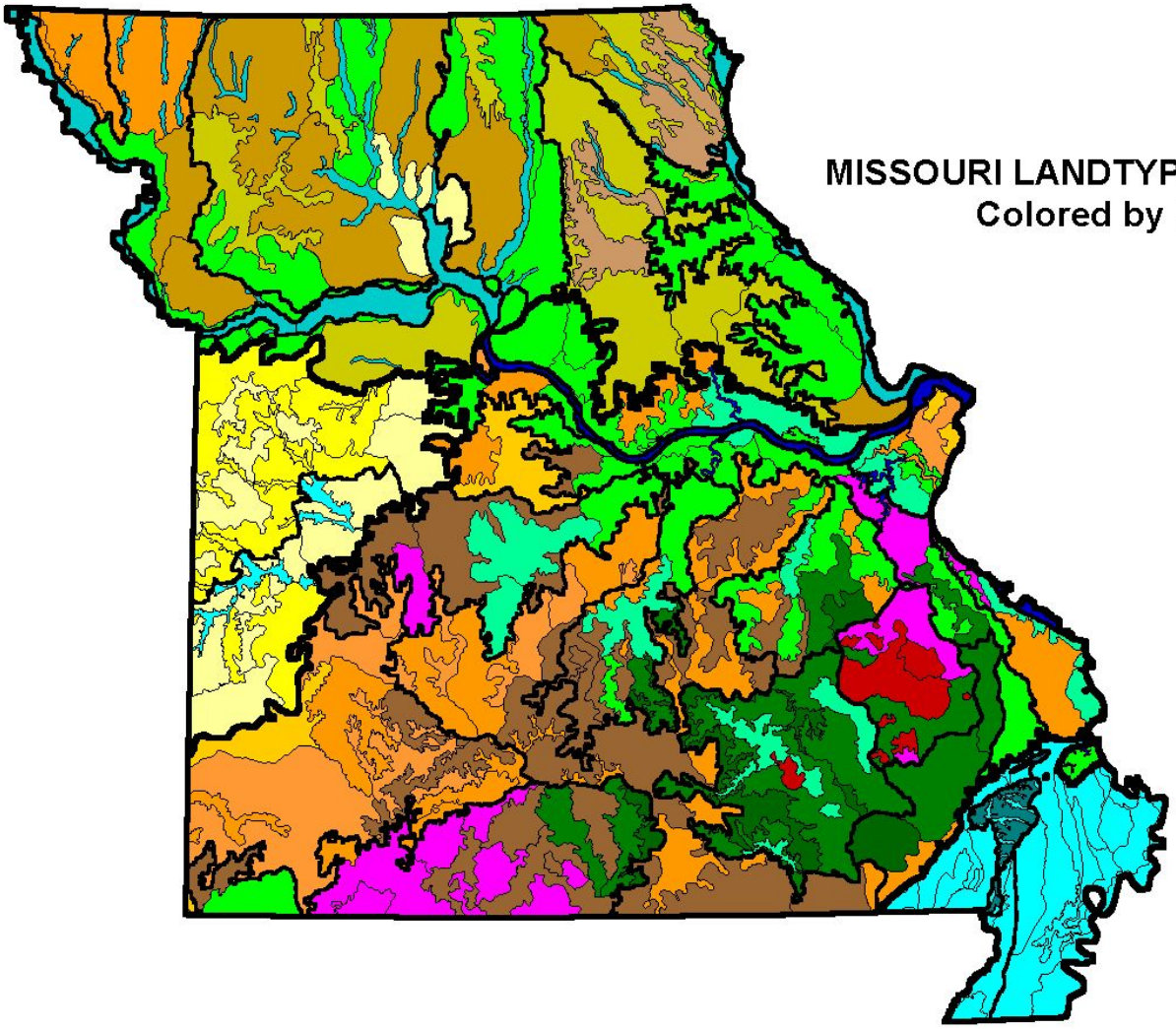
STATSGO SOILS
AND LANDTYPE ASSOCIATIONS



PRESETTLEMENT PRAIRIE
AND LANDTYPE ASSOCIATIONS

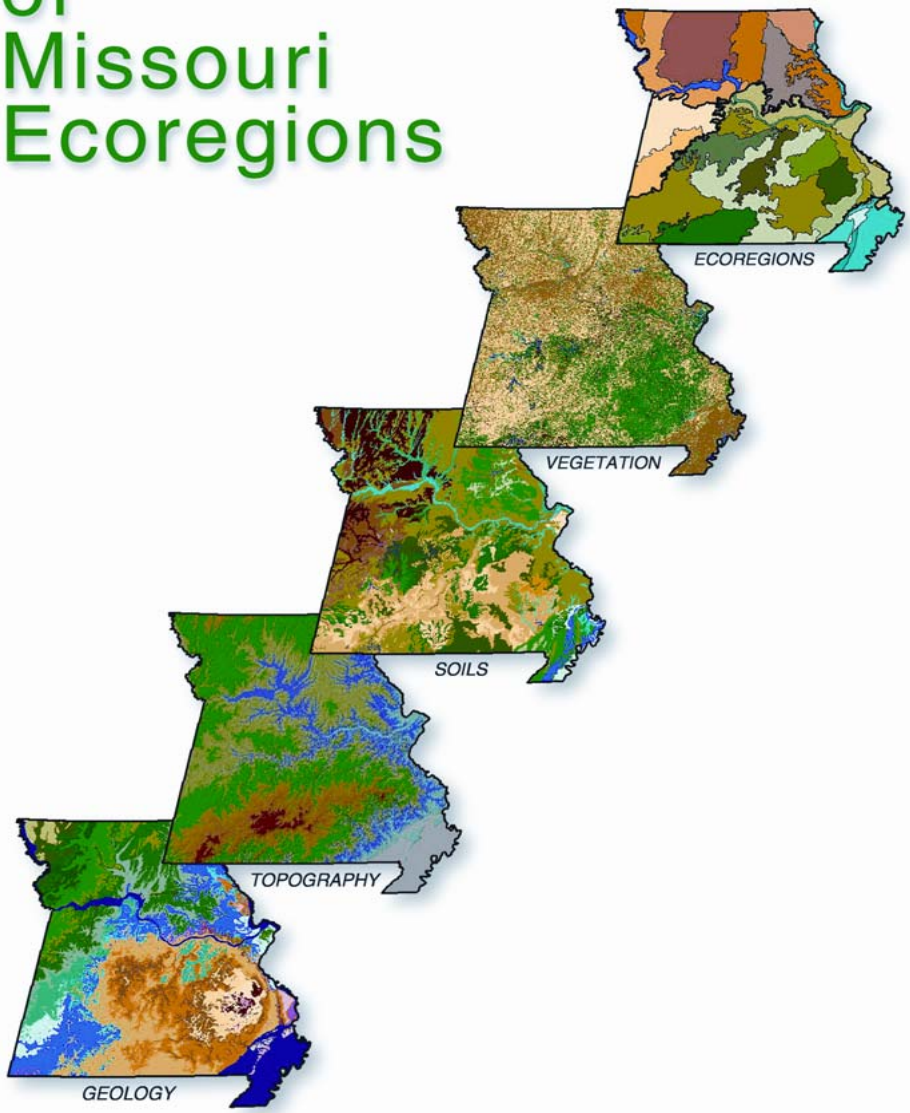


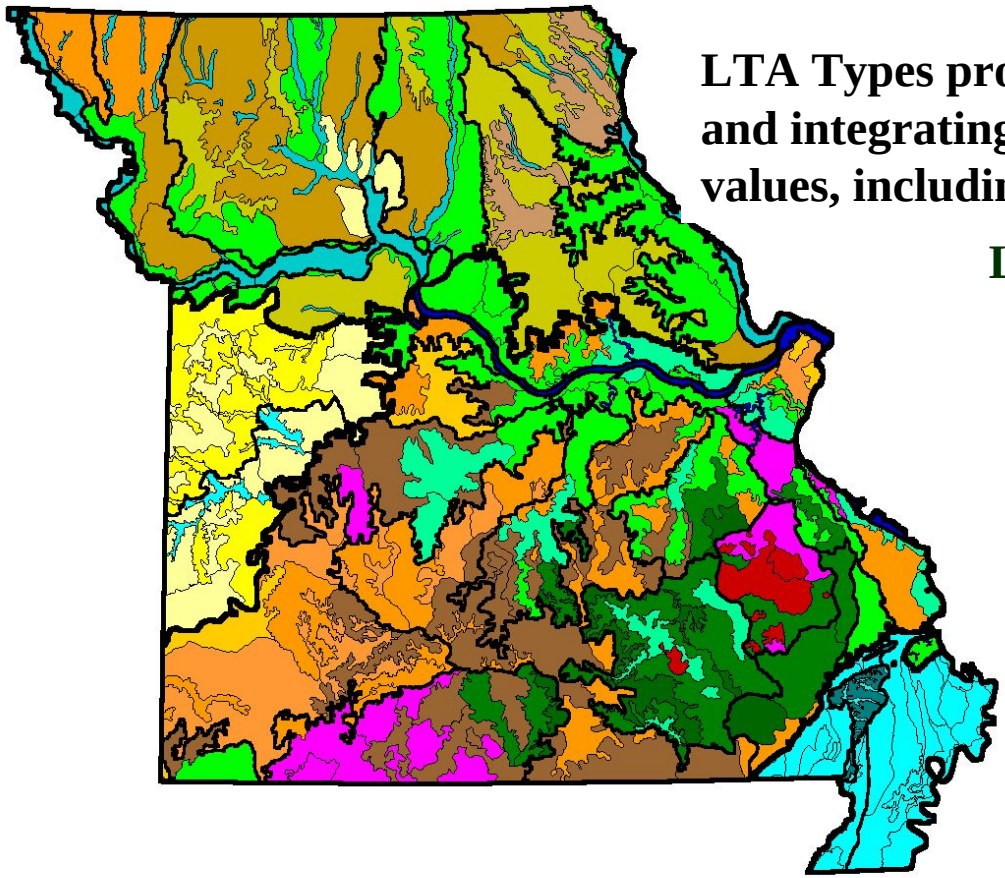
CURRENT LAND COVER AND LANDTYPE ASSOCIATIONS



MISSOURI LANDTYPE ASSOCIATIONS
Colored by LTA Type

Atlas of Missouri Ecoregions





LTA Types provide a framework for identifying and integrating conservation priorities for multiple values, including:

Landscape Scale Patterns

Natural Communities and Habitats

Rare Species

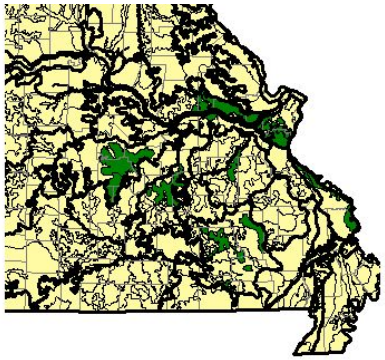
Wildlife Emphasis Species

Recreational and Educational Opportunities

Resource Commodity Production

INTEGRATION OF PUBLIC AND PRIVATE LAND PROGRAMS

Z3 OZARK FORESTED RUGGED HILLS AND BREAKS LTAs



CHARACTERISTICS: The exceptionally steep and rugged lands associated with many river valleys. Local relief 250 to 450 feet, with narrow ridges, steep sideslopes and narrow, sinuous valleys. Historically the most densely wooded landscapes in the region. Associated with a variety of parent materials (including loess, limestone and cherty residuum), soils and forest types. Outstanding spring-fed perennial creeks and small rivers with gravel beds and deeply incised valleys. Today, still largely timbered with high habitat diversity including numerous forest types, glades, fens, cliffs, caves, springs and outstanding streams.

MANAGEMENT ISSUES AND OPPORTUNITIES:

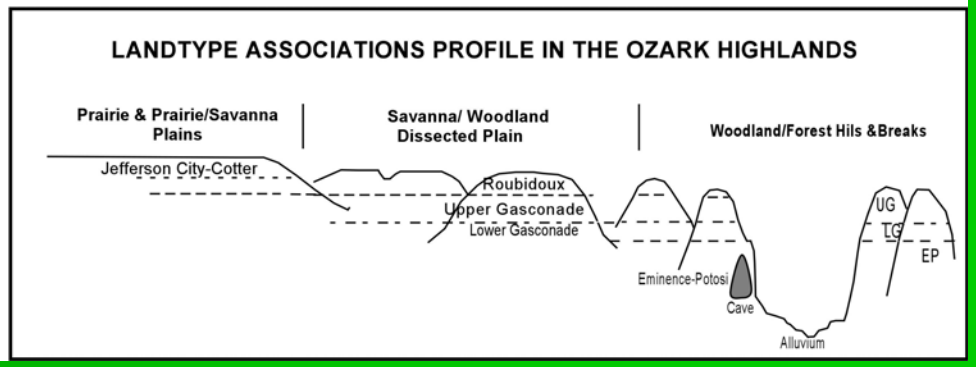
* These lands encompass nearly 2 million acres. Public lands comprise almost 300,000 acres or 15% of these landscapes; this offers outstanding opportunities to manage these ecosystems at a landscape scale. Mark Twain National Forest and MDC own approximately 100,000 acres each. Prominent CAs are Sunklands, Current River, Angeline, Weldon Spring, Huzzah, Rocky Creek, Meramec and Daniel Boone.
* These LTAs are often in the center of some of the largest blocks of contiguous forest in the lower Midwest; consequently they are very important for forest interior birds and other species.
* Multiple productive forest types occur, many that lend themselves to advanced age and multiple tiered structure.
* Bottomland forests are often cleared for agriculture.
* Glades, fens, cliffs, caves, springs and outstanding streams are interbedded in the forest matrix. Many require conservation actions including prescribed fire or protection from site disturbing activities.
* Streams impacted by riparian forest clearing, intensive livestock grazing and in stream gravel mining.
* Excellent areas for deriving high quality hardwood timber products.
* These landscapes tend to support concentrations of rare species.
* Outstanding scenery and streams draw concentrations of outdoor recreation.
* The rugged lands offer opportunity for remote recreation.

Conservation Targets:

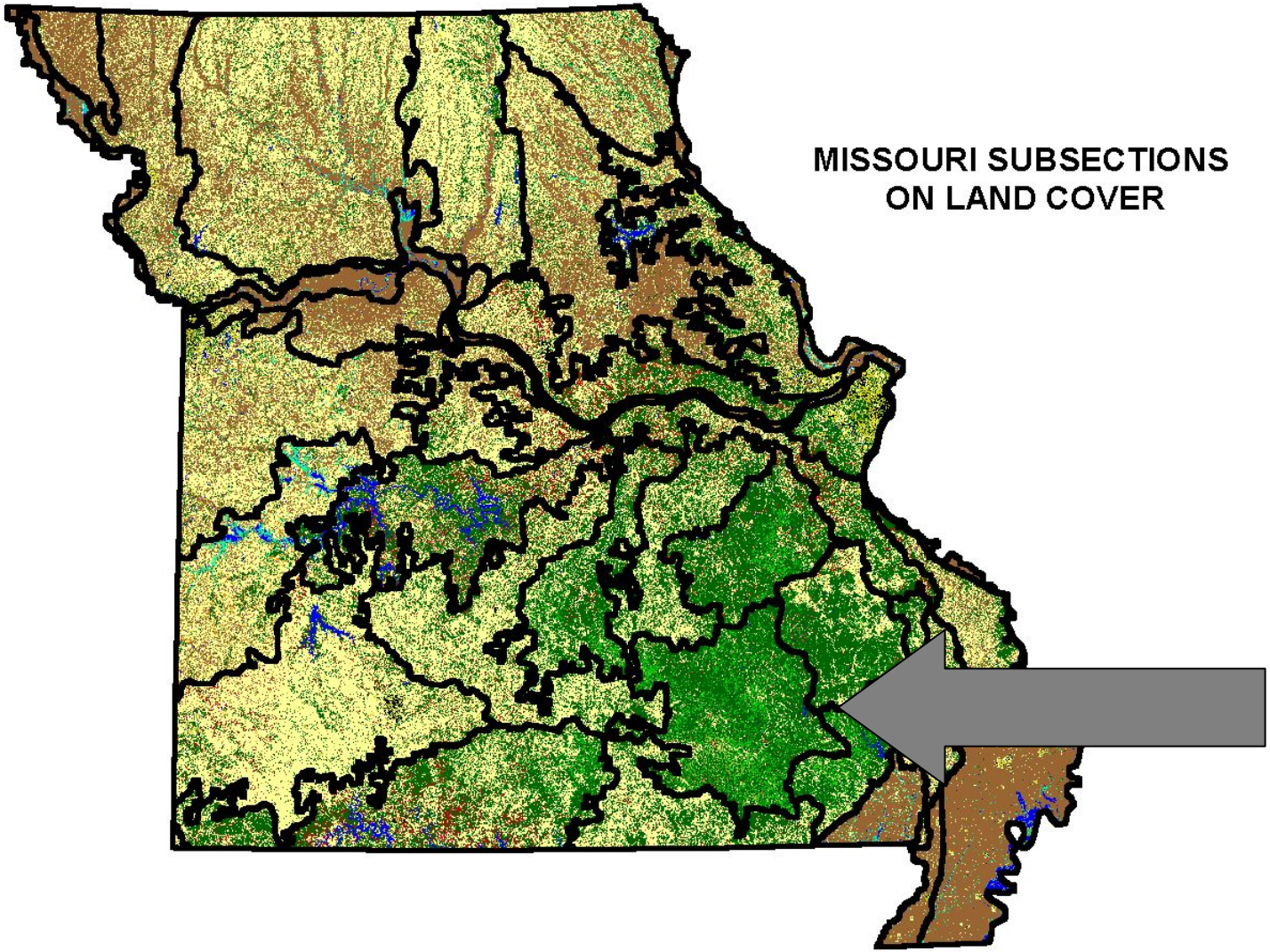
Landscapes

Communities

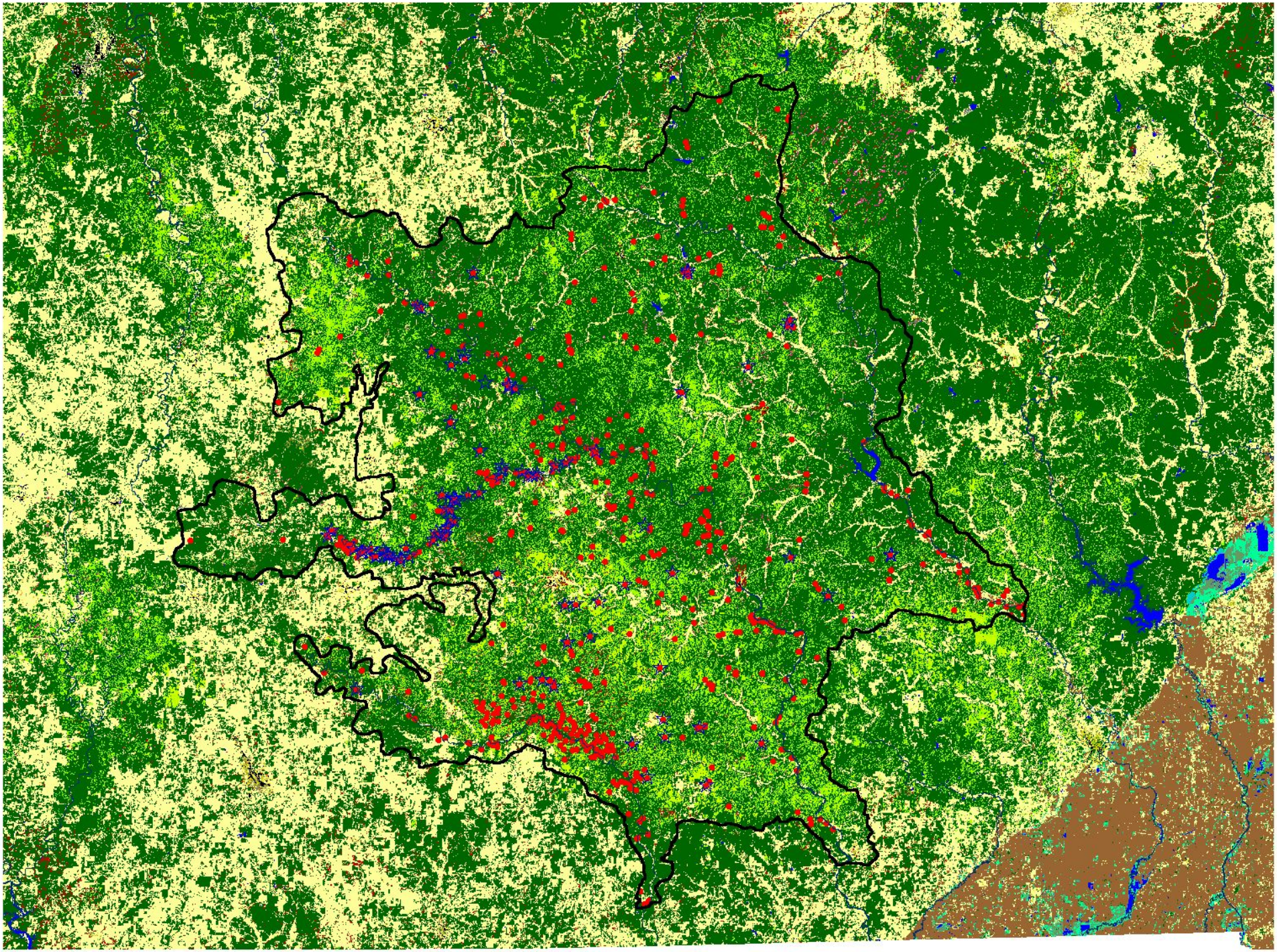
Species



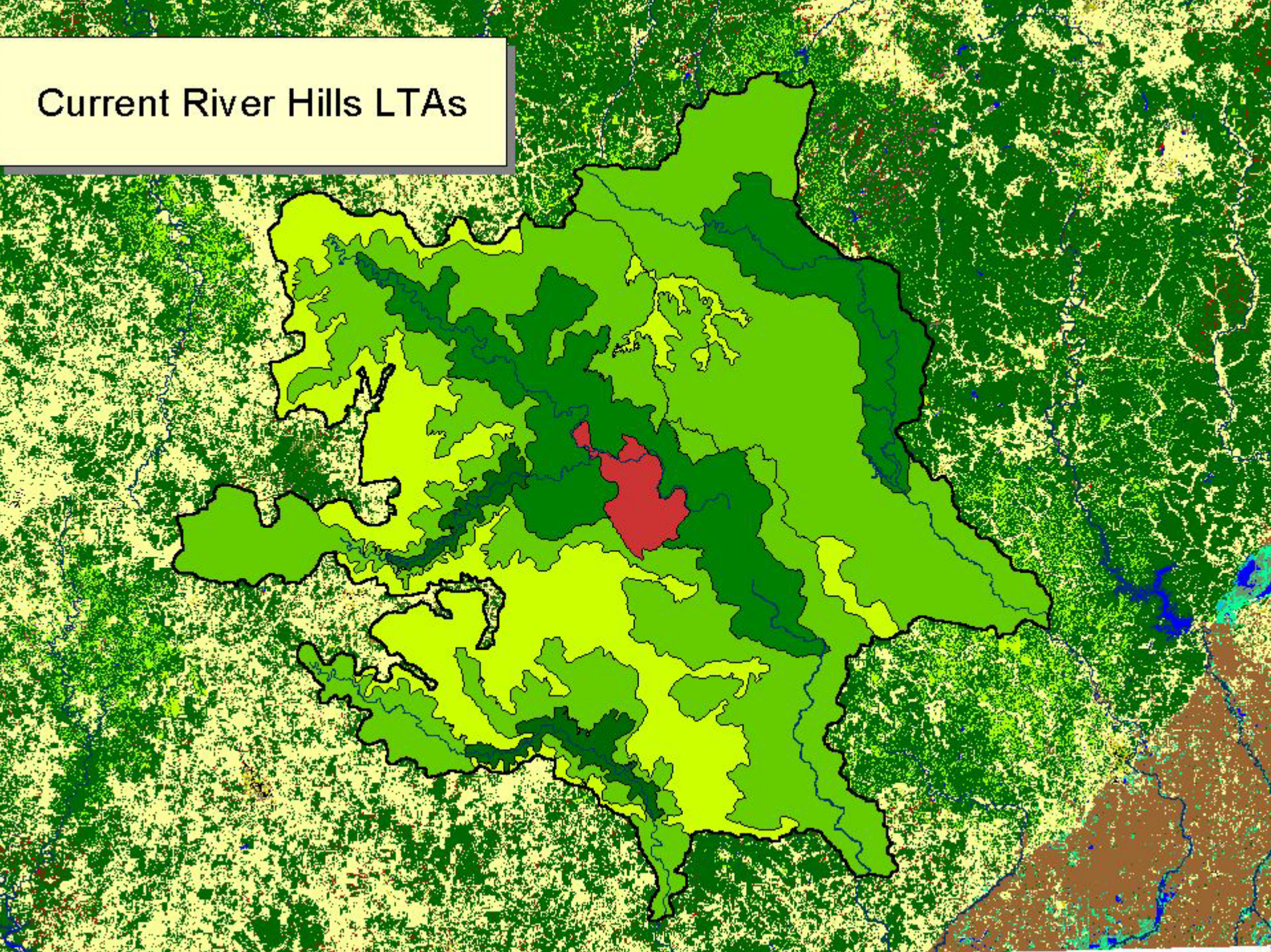
Landscape 2000+ acre Prairie/Grassland Core in 10,000+ acre Grassland landscape 500+ acre Prairie-Shrubland Complex	**Landscape** 2000+ acre Shrub/Savanna/Woodland Mosaics	**Landscape** 10,000+ acre Forested Core in 85,000+ acre Forested Landscape
Communities Tallgrass Prairie Oak Savanna Flatwoods	**Communities** Shrubland Oak Savanna Oak Woodland	**Communities** Pine-oak Woodland Upland Oak Forest Bottomland Forest
Grassland Species Greater Prairie Chicken Henslow's Sparrow Grasshopper Sparrow Prairie Vole Northern Crawfish Frog Grassland Crayfish Regal Fritillary Mead's Milkweed	**Shrubland Species** Prairie Warbler Blue Winged Warbler Northern Bobwhite Field Sparrow Yellow Breasted Chat Brown Thrasher Eastern Towhee Northern Fence Lizard	**Pine-oak Woodland Species** Bachman's Sparrow Pine Warbler Ringed Salamander Buck Moth Shrubby Sundrops
Shrubland Species Bell's Vireo Field Sparrow Broad-headed Skink Prairie Willow	**Savanna Species** Red Headed Woodpecker Eastern Tiger Salamander	**Upland Oak Forest Species** Wood Thrush Yellow Throated Warbler Kentucky Warbler Ringed Salamander Wood Frog Golden Mouse Goldies Fern
	Woodland Species Whip-poor-will Orchard Oriole Ozark Wake Robin	**Bottomland Forest Species** Cerulean Warbler Worm-eating Warbler Swainson's Warbler Acadian Flycatcher Running Buffalo Clover Swamp Rabbit

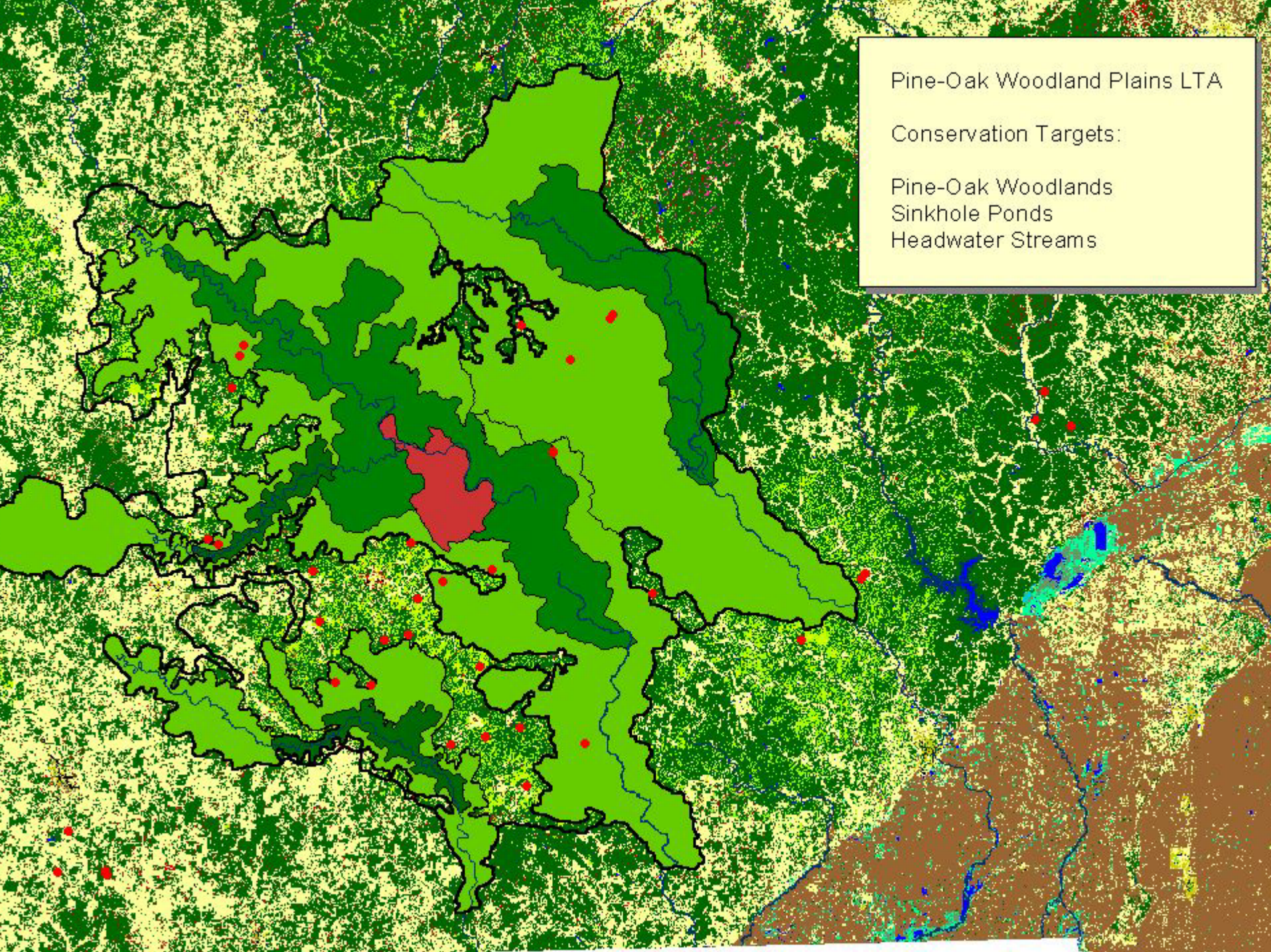


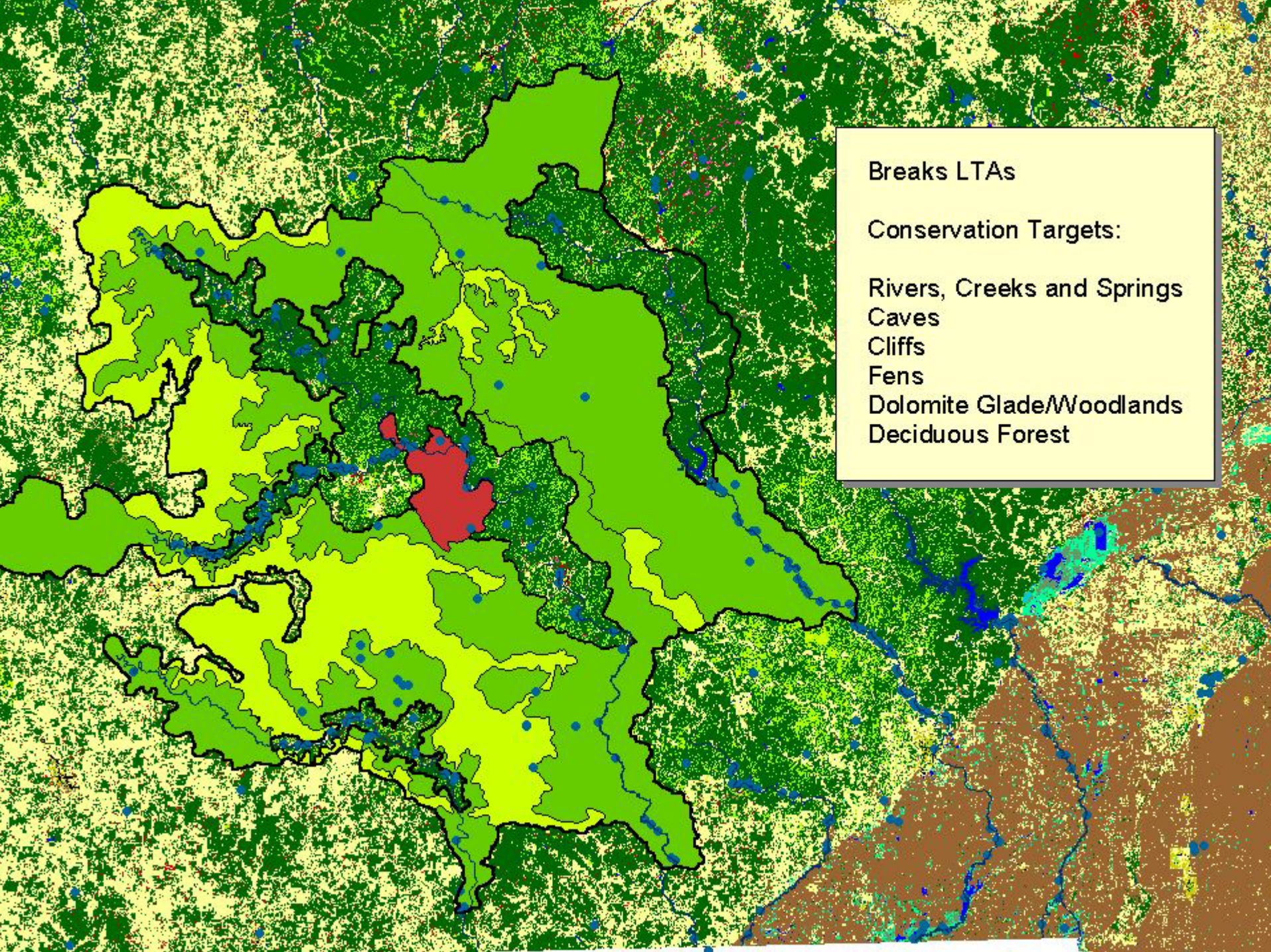
Current River
Hills
Subsection

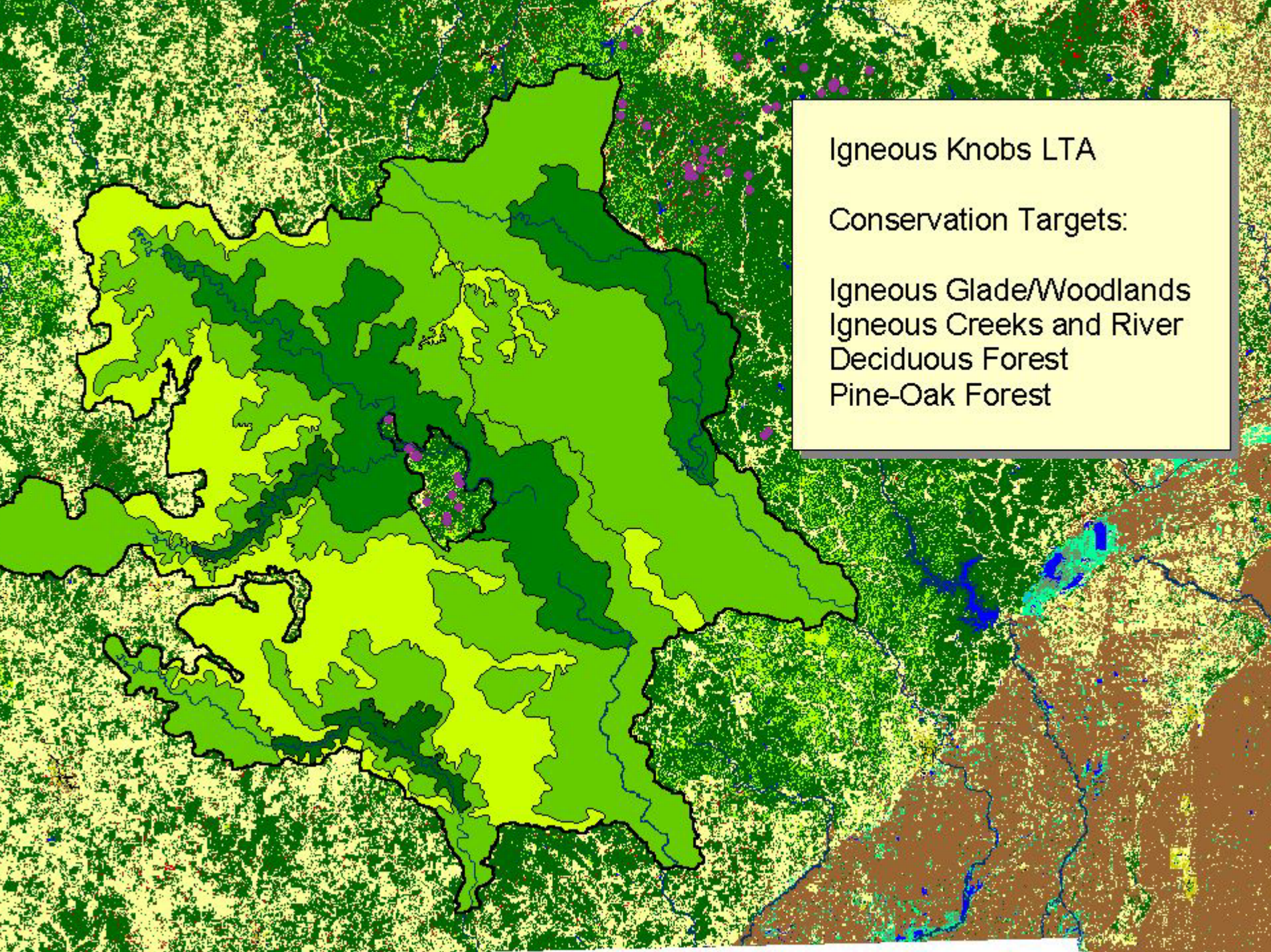


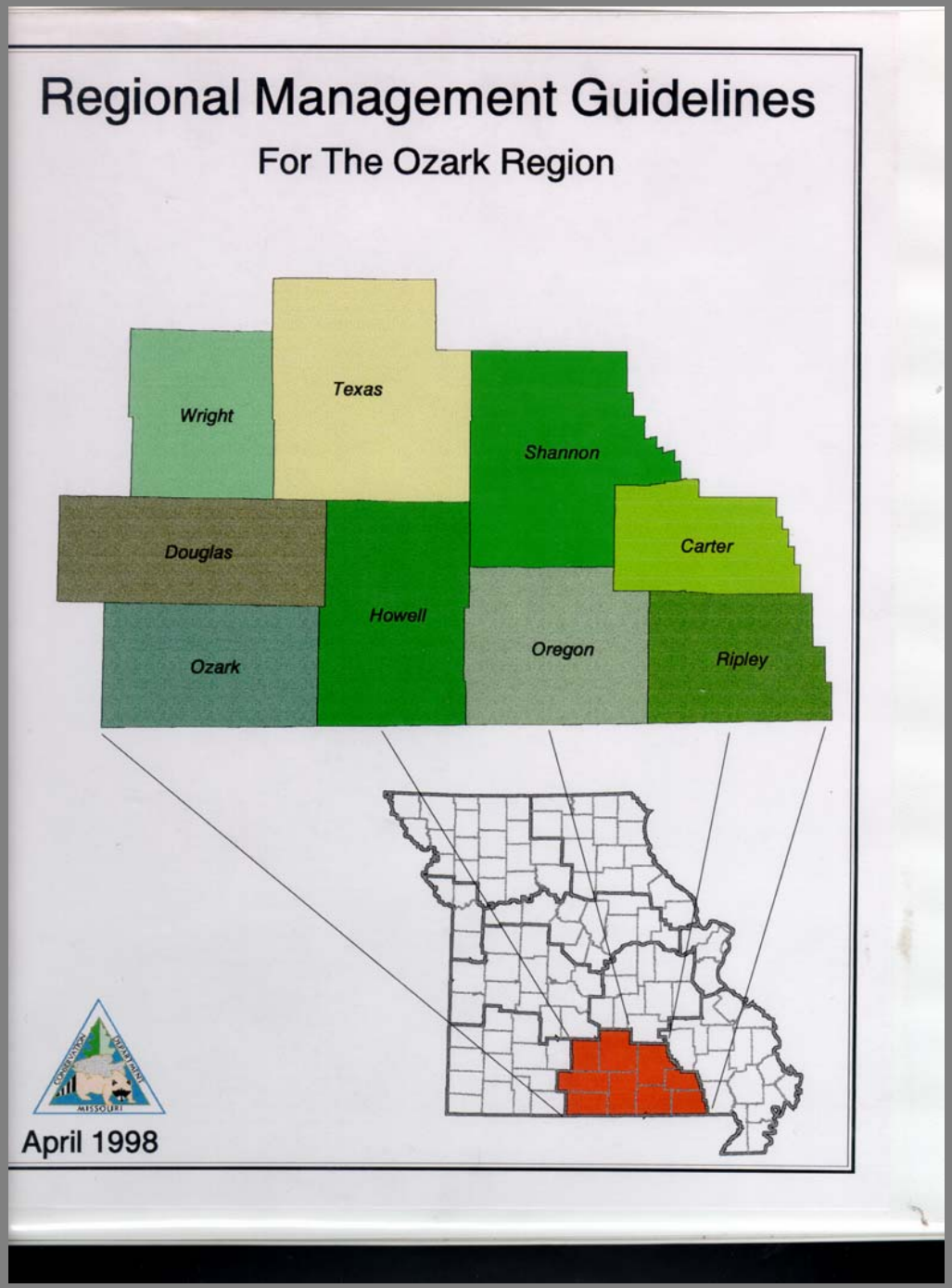
Current River Hills LTAs




Pine-Oak Woodland Plains LTA
Conservation Targets:
Pine-Oak Woodlands
Sinkhole Ponds
Headwater Streams

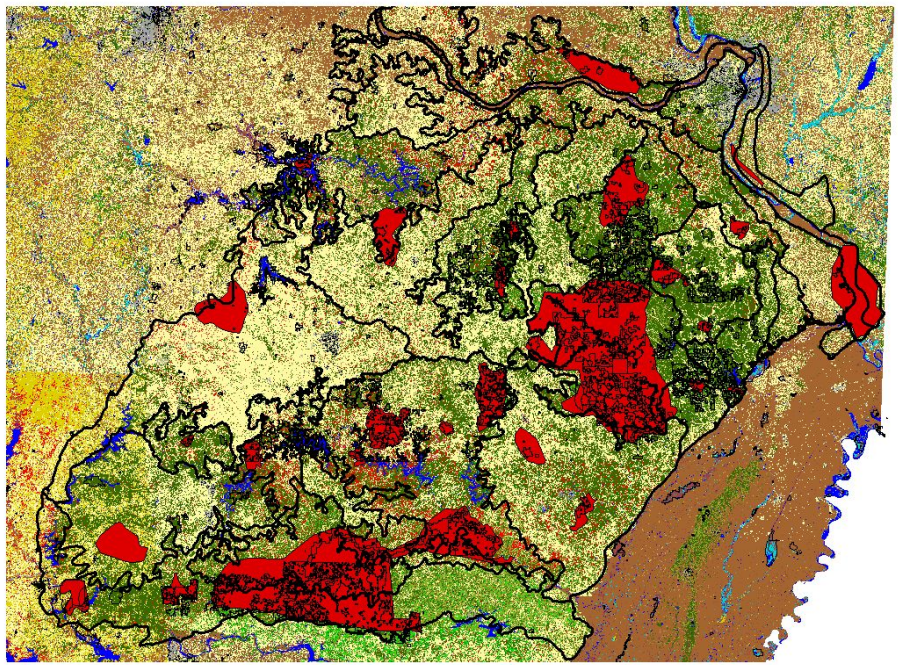

Breaks LTAs
Conservation Targets:
Rivers, Creeks and Springs
Caves
Cliffs
Fens
Dolomite Glade/Woodlands
Deciduous Forest

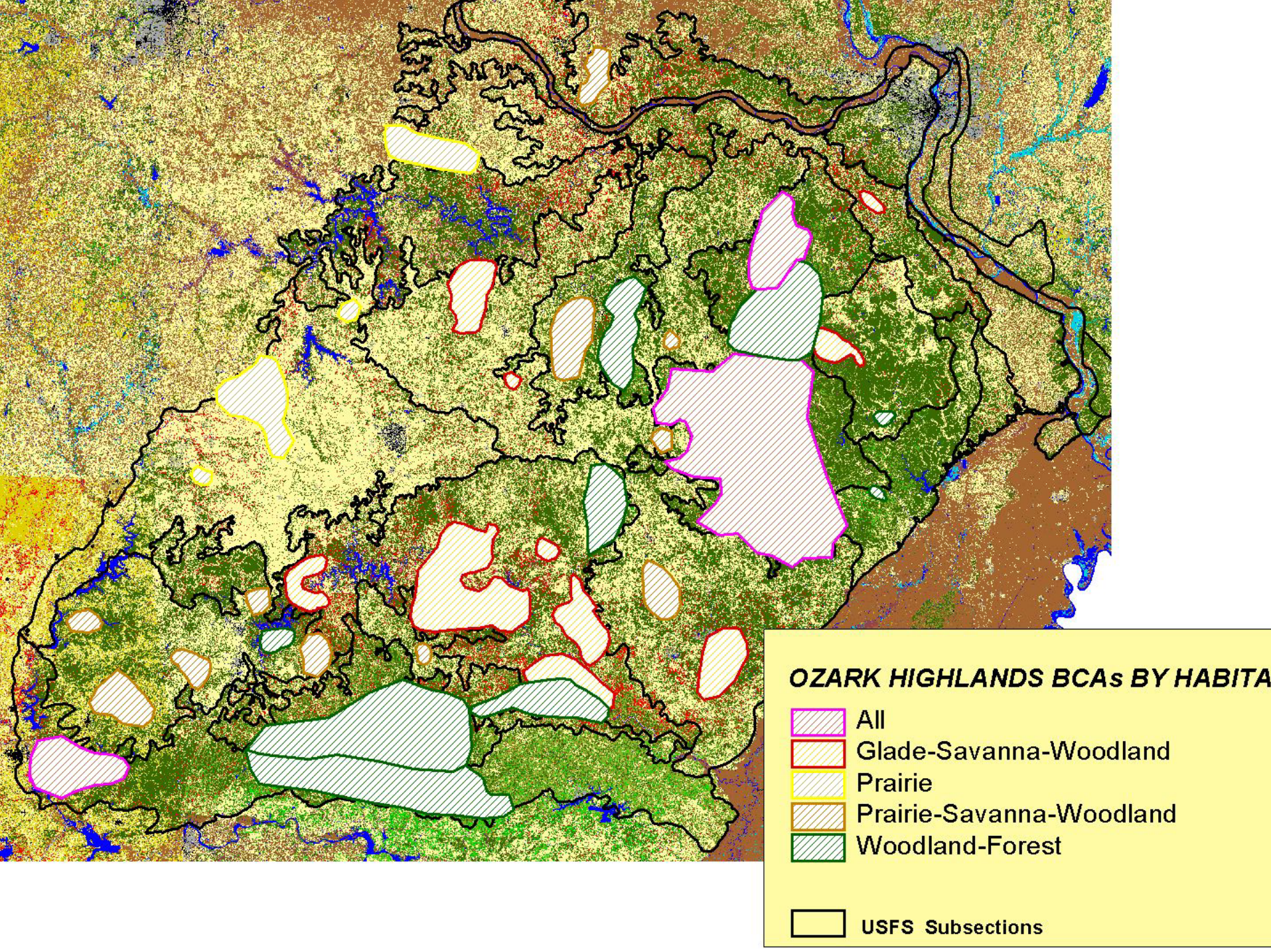

Igneous Knobs LTA
Conservation Targets:
Igneous Glade/Woodlands
Igneous Creeks and River
Deciduous Forest
Pine-Oak Forest

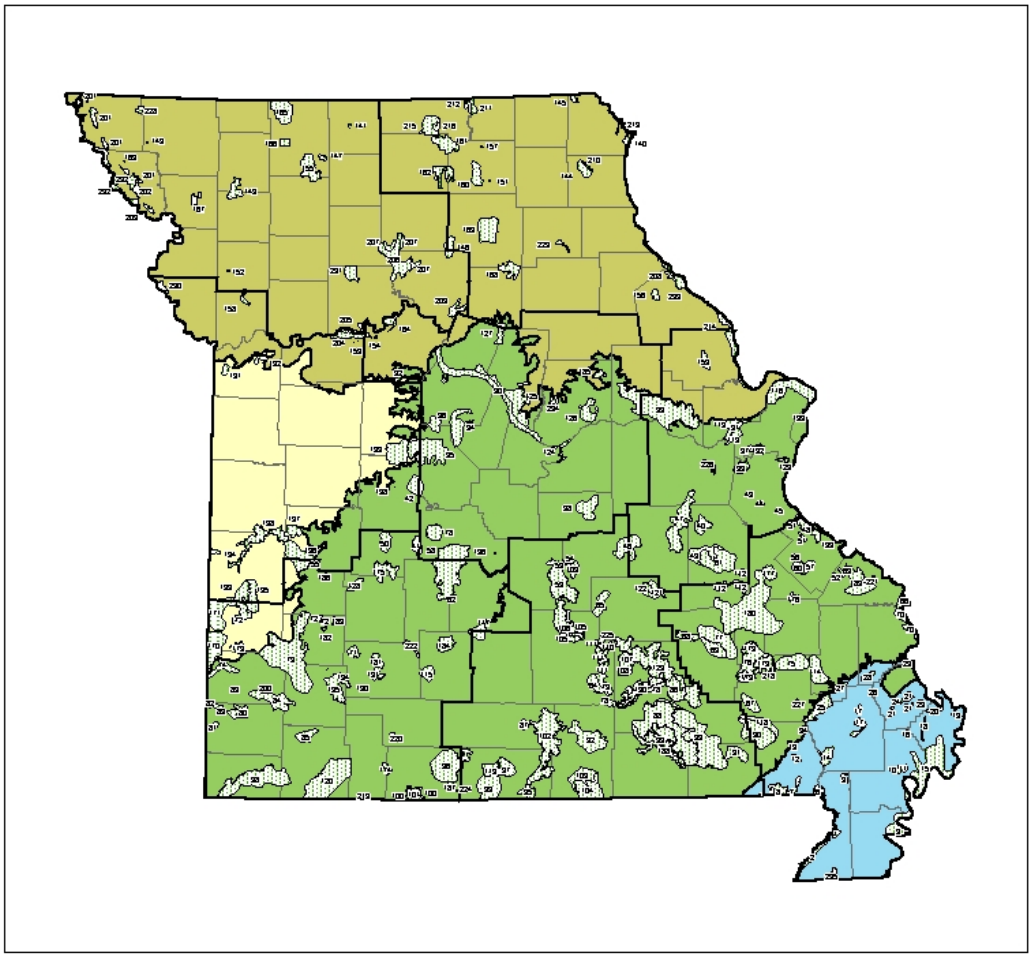


Ozark-Quachita Highlands
Assessment

TNC Ozark HighlandsPortfolio Sites



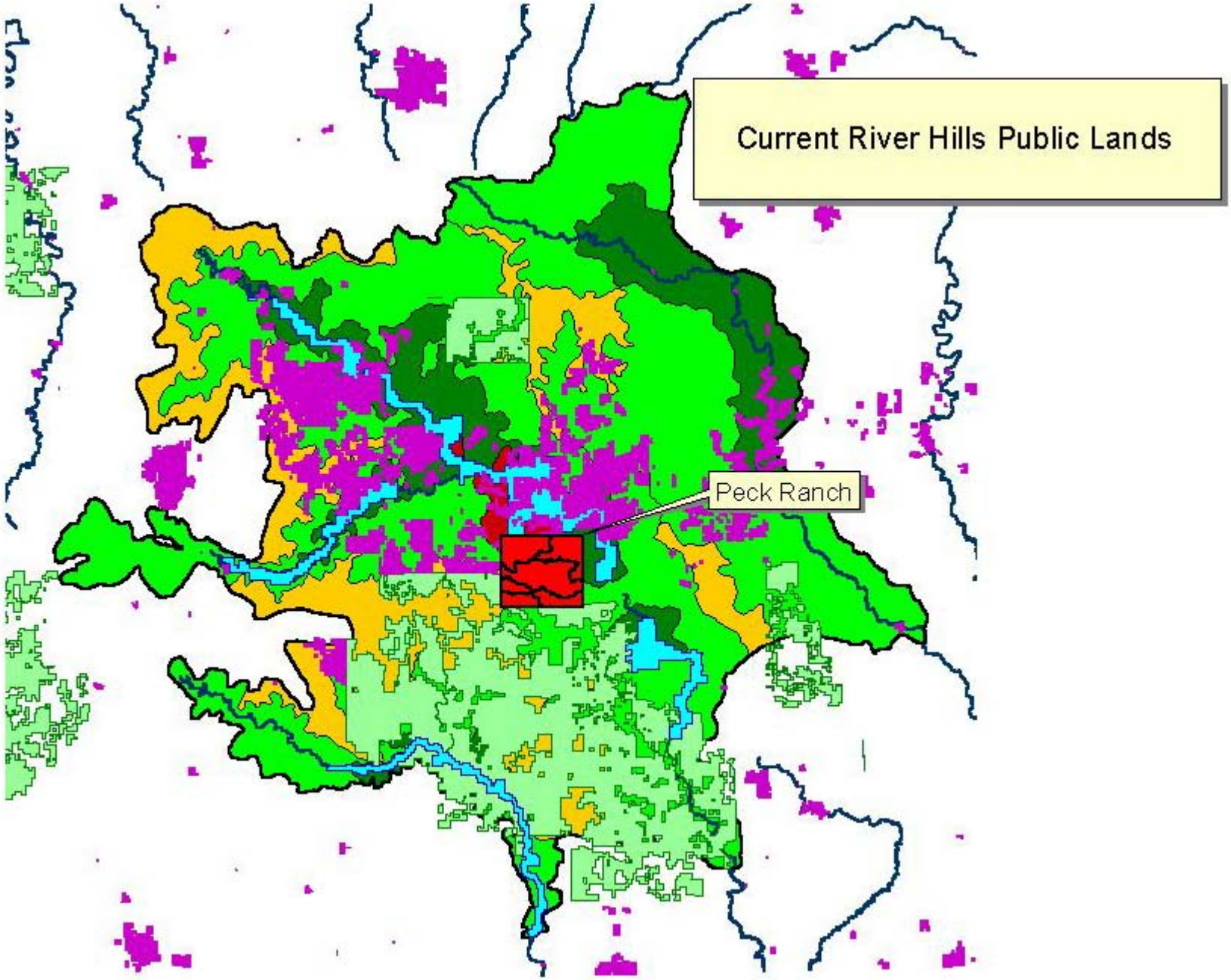

OZARK HIGHLANDS BCAs BY HABITA
All
Glade-Savanna-Woodland
Prairie
Prairie-Savanna-Woodland
Woodland-Forest
USFS Subsections

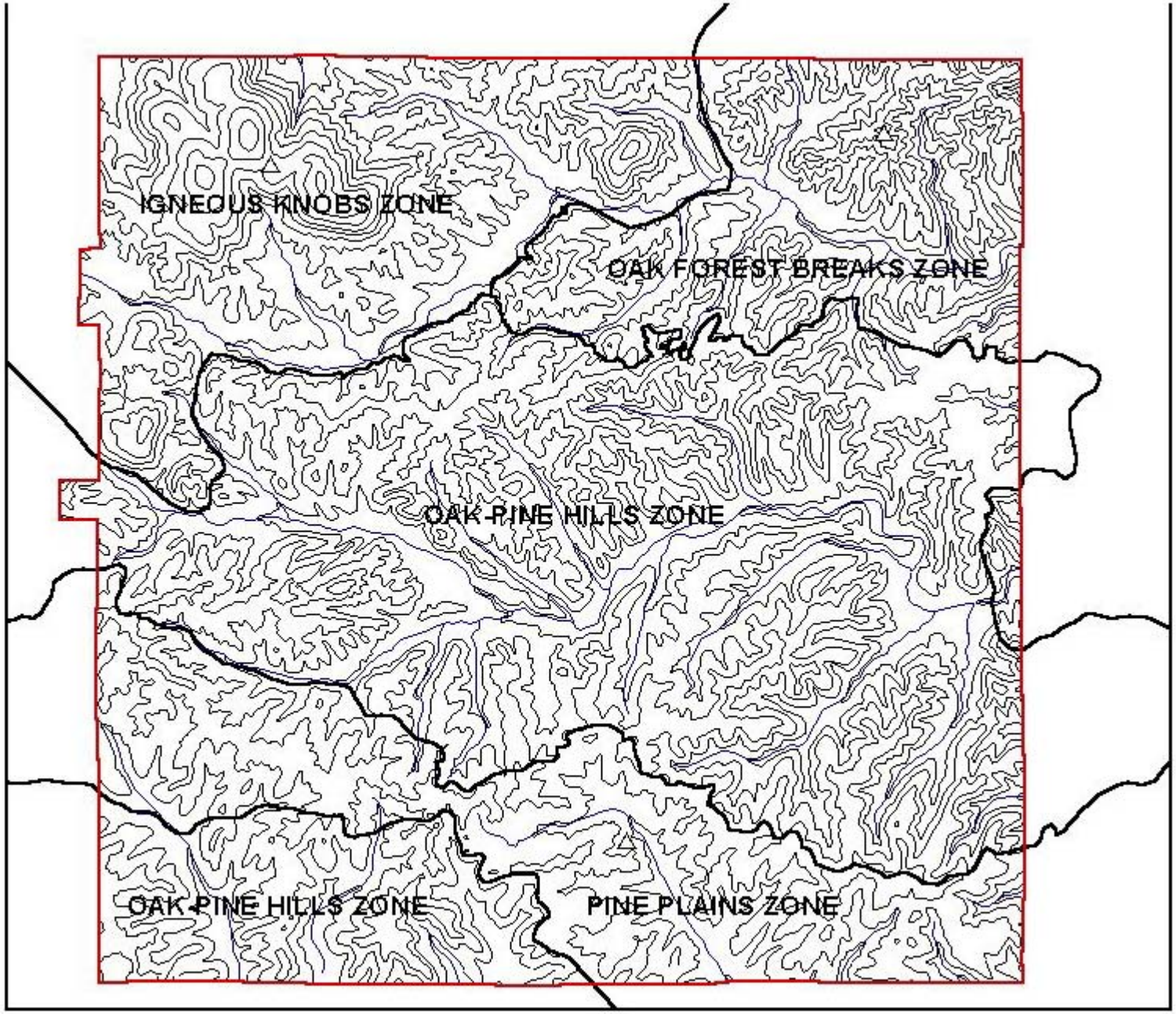


Ecological Sections

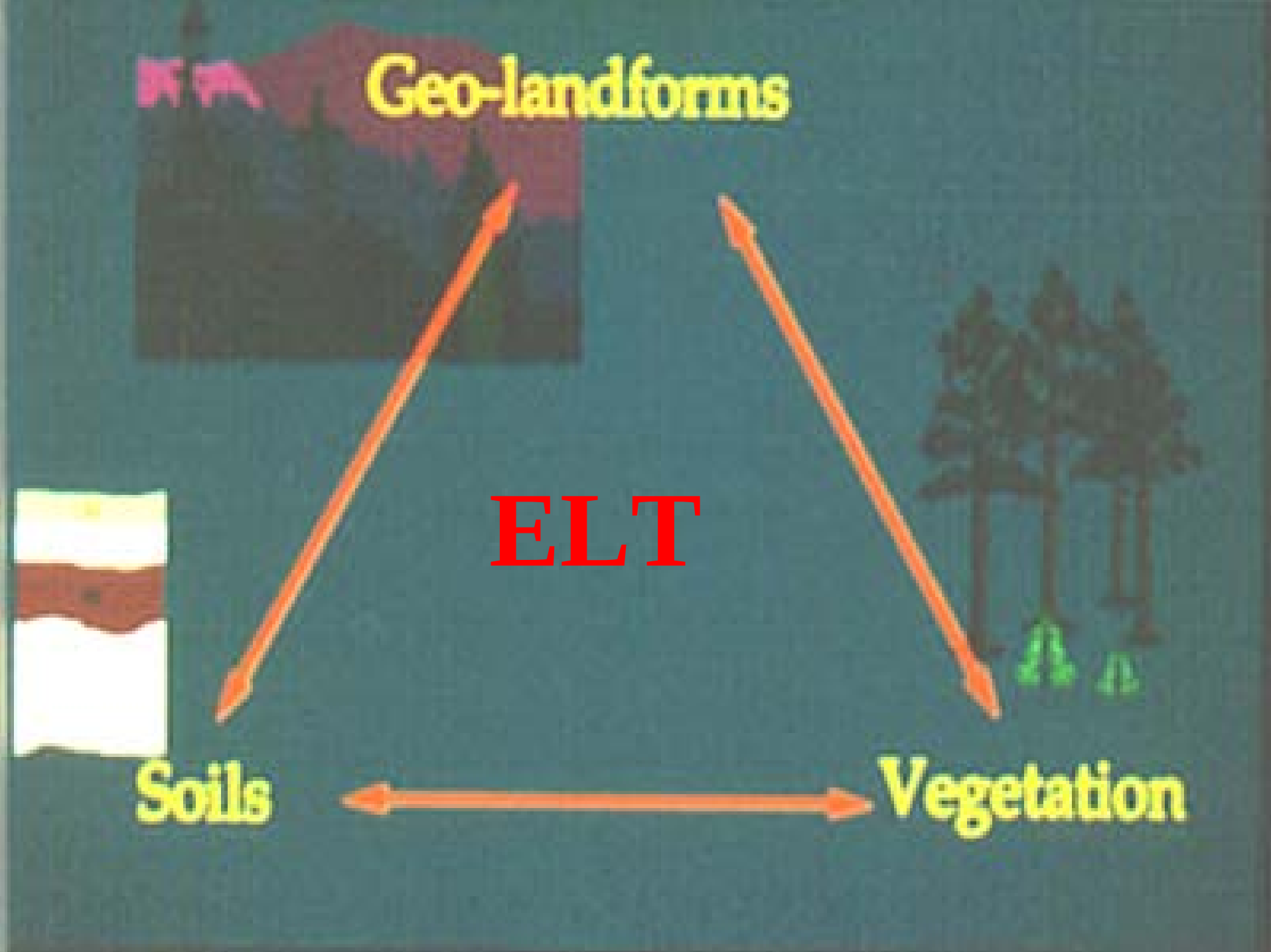
- Central Dissected Till Plains
- Mississippi River Alluvial Basin
- Osage Plains
- Ozark Highlands

- MDC_Terrestrial Conservation Opportunity Areas
- COUNTY
- regions


Current River Hills Public Lands
Peck Ranch



Peck Ranch Conservation Area


Geo-landforms
ELT
Soils
Vegetation

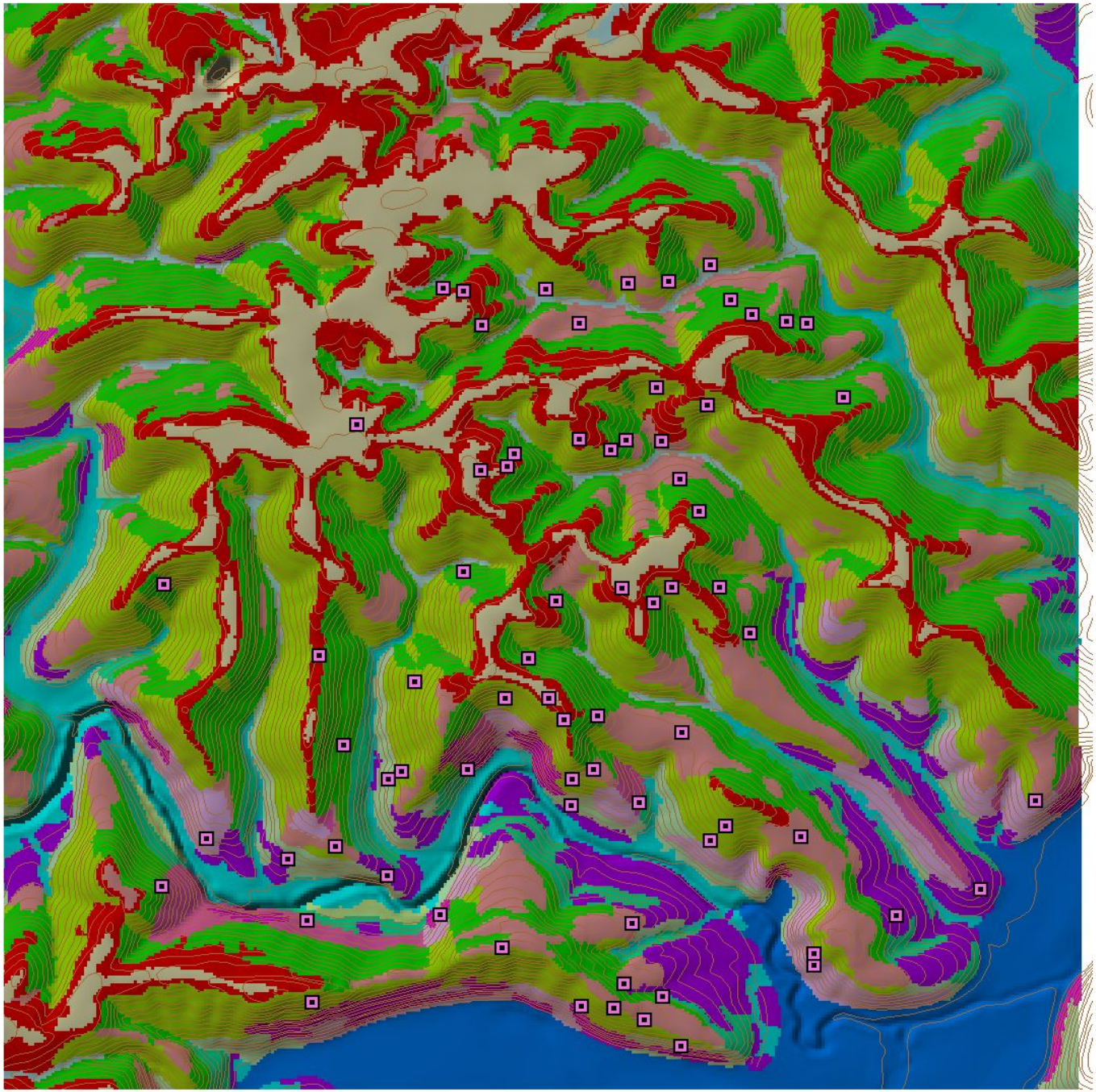
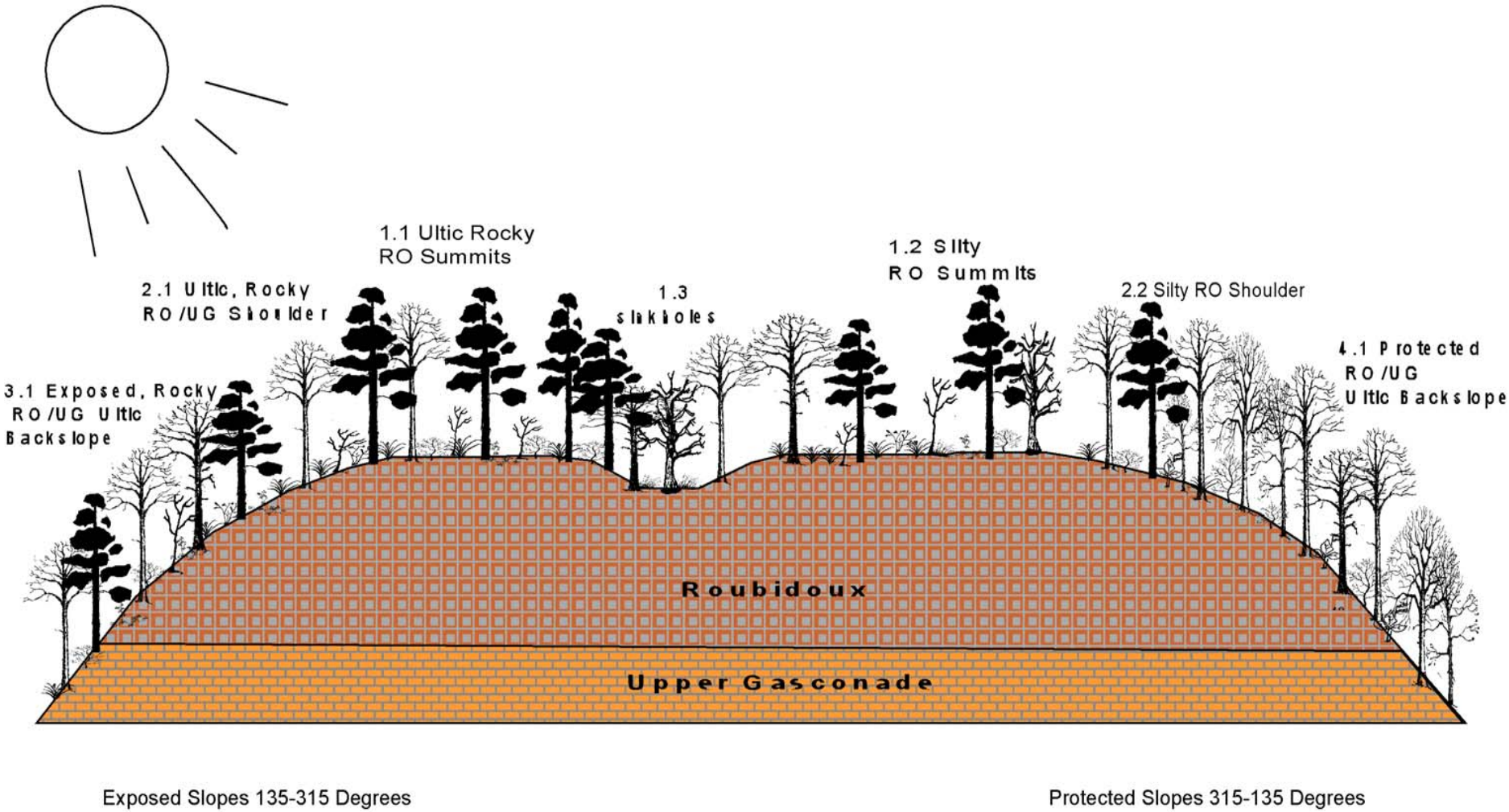
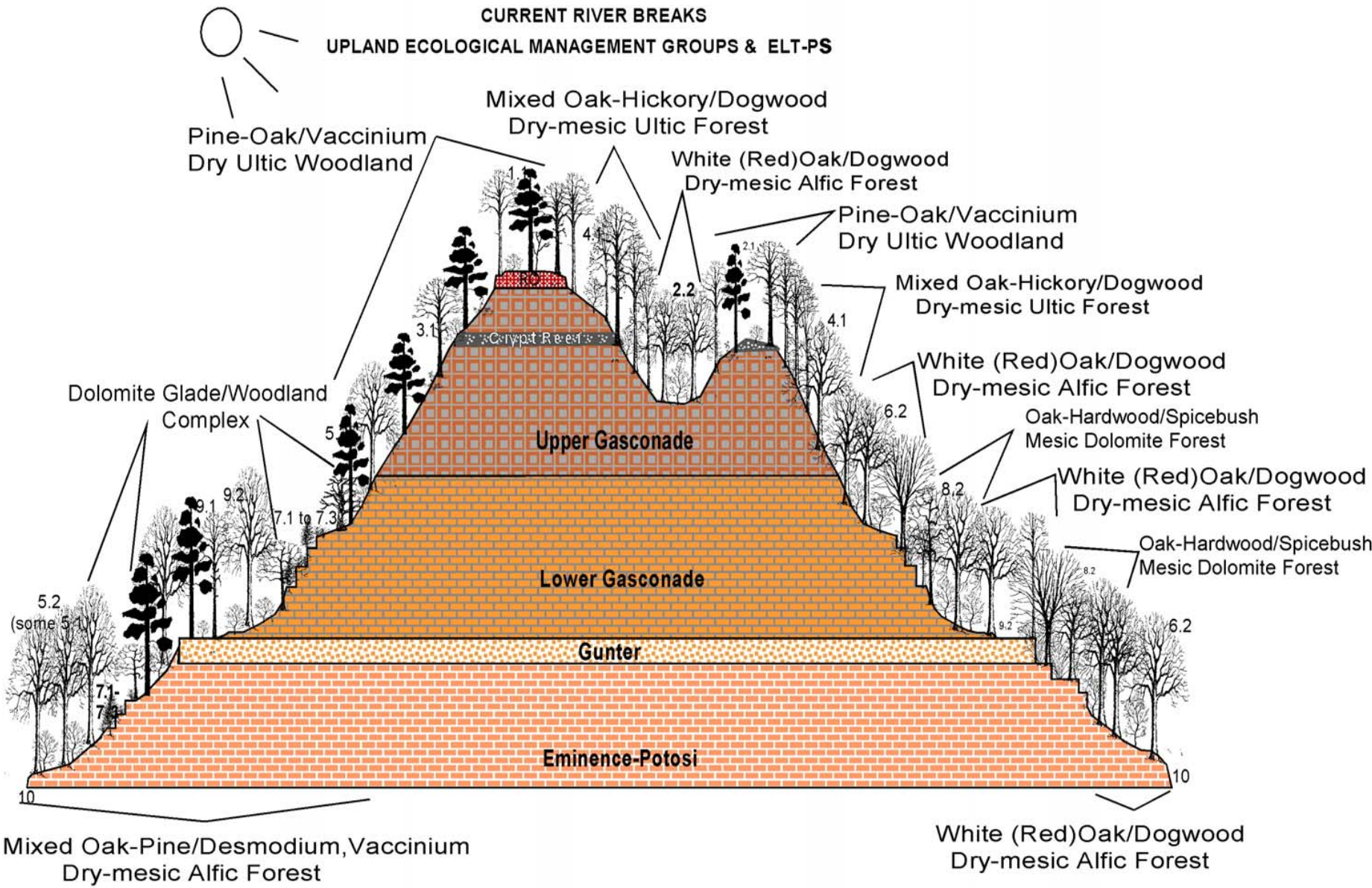


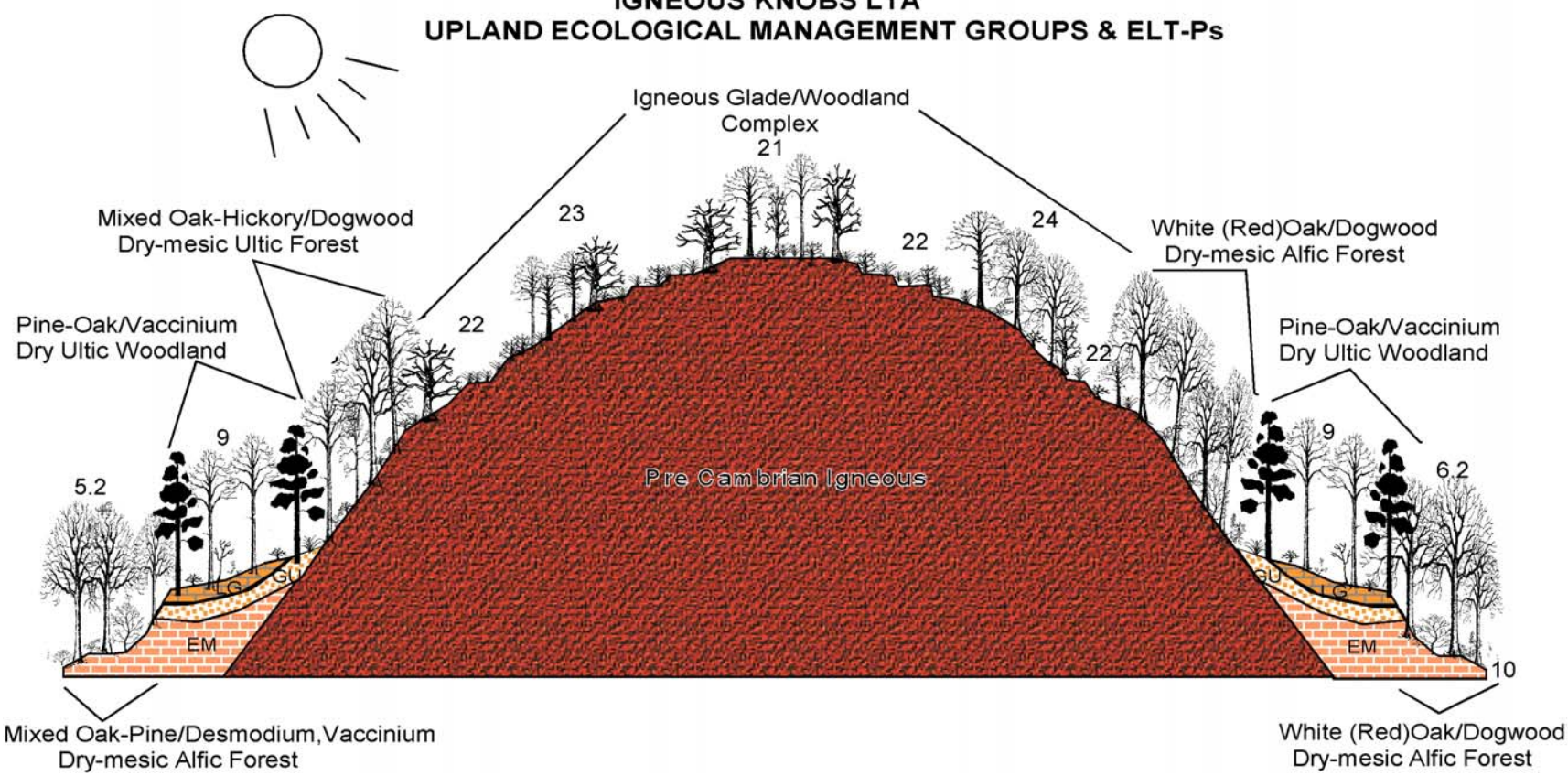
FIGURE 2.1 UPLAND ELT-Ps IN THE CURRENT-ELEVEN POINT PINE-OAK WOODLAND DISSECTED PLAINS LTA



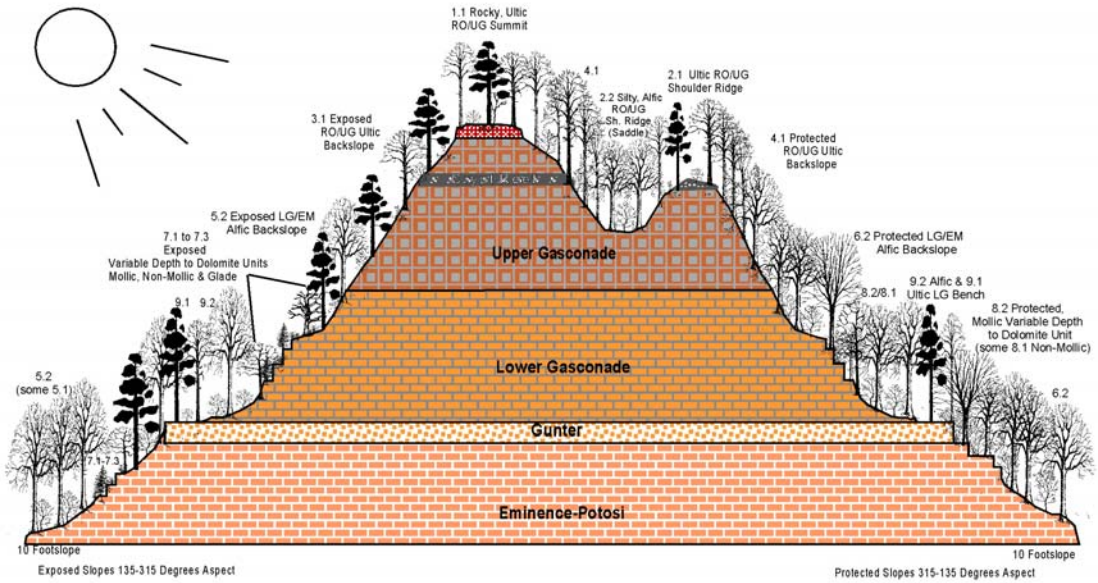
Note: Ecological units in Dissected Plains LTA based on field reconnaissance only; no plot data.


CURRENT RIVER BREAKS
UPLAND ECOLOGICAL MANAGEMENT GROUPS & ELT-PS
Pine-Oak/Vaccinium
Dry Ultic Woodland
Mixed Oak-Hickory/Dogwood
Dry-mesic Ultic Forest
White (Red)Oak/Dogwood
Dry-mesic Alfic Forest
Pine-Oak/Vaccinium
Dry Ultic Woodland
Mixed Oak-Hickory/Dogwood
Dry-mesic Ultic Forest
White (Red)Oak/Dogwood
Dry-mesic Alfic Forest
Oak-Hardwood/Spicebush
Mesic Dolomite Forest
White (Red)Oak/Dogwood
Dry-mesic Alfic Forest
Oak-Hardwood/Spicebush
Mesic Dolomite Forest
Dolomite Glade/Woodland
Complex
Crypt Reef
Upper Gasconade
Lower Gasconade
Gunter
Eminence-Potosi
1.1
4.1
2.1
2.2
4.1
3.1
6.2
5
8.2
9.1
9.2
7.1 to 7.3
5.2
(some 5.1)
7.1-
7.3
10
10
Mixed Oak-Pine/Desmodium,Vaccinium
Dry-mesic Alfic Forest
White (Red)Oak/Dogwood
Dry-mesic Alfic Forest

IGNEOUS KNOBS LTA
UPLAND ECOLOGICAL MANAGEMENT GROUPS & ELT-Ps

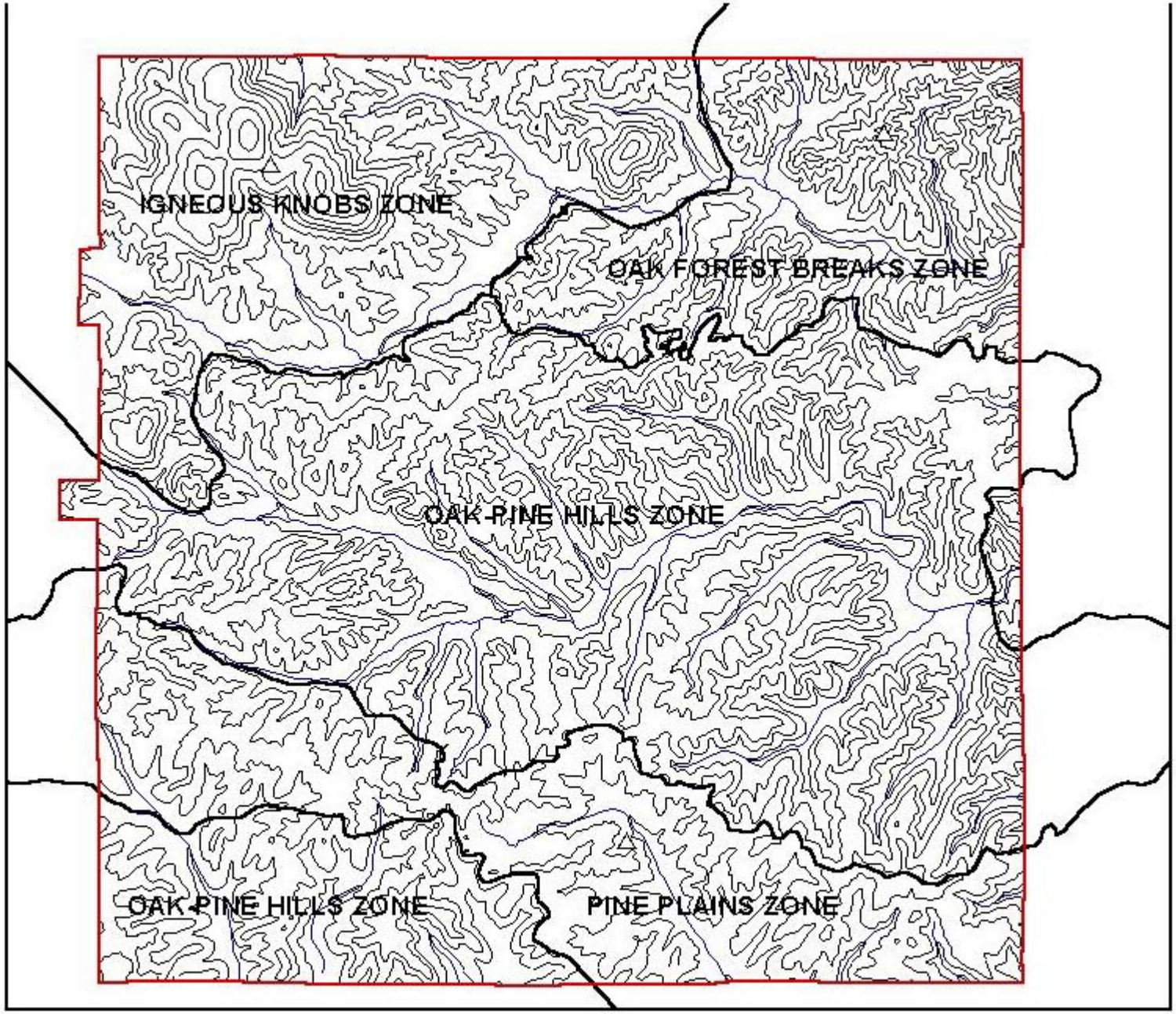


AN ECOLOGICAL CLASSIFICATION SYSTEM FOR THE CURRENT RIVER HILLS SUBSECTION

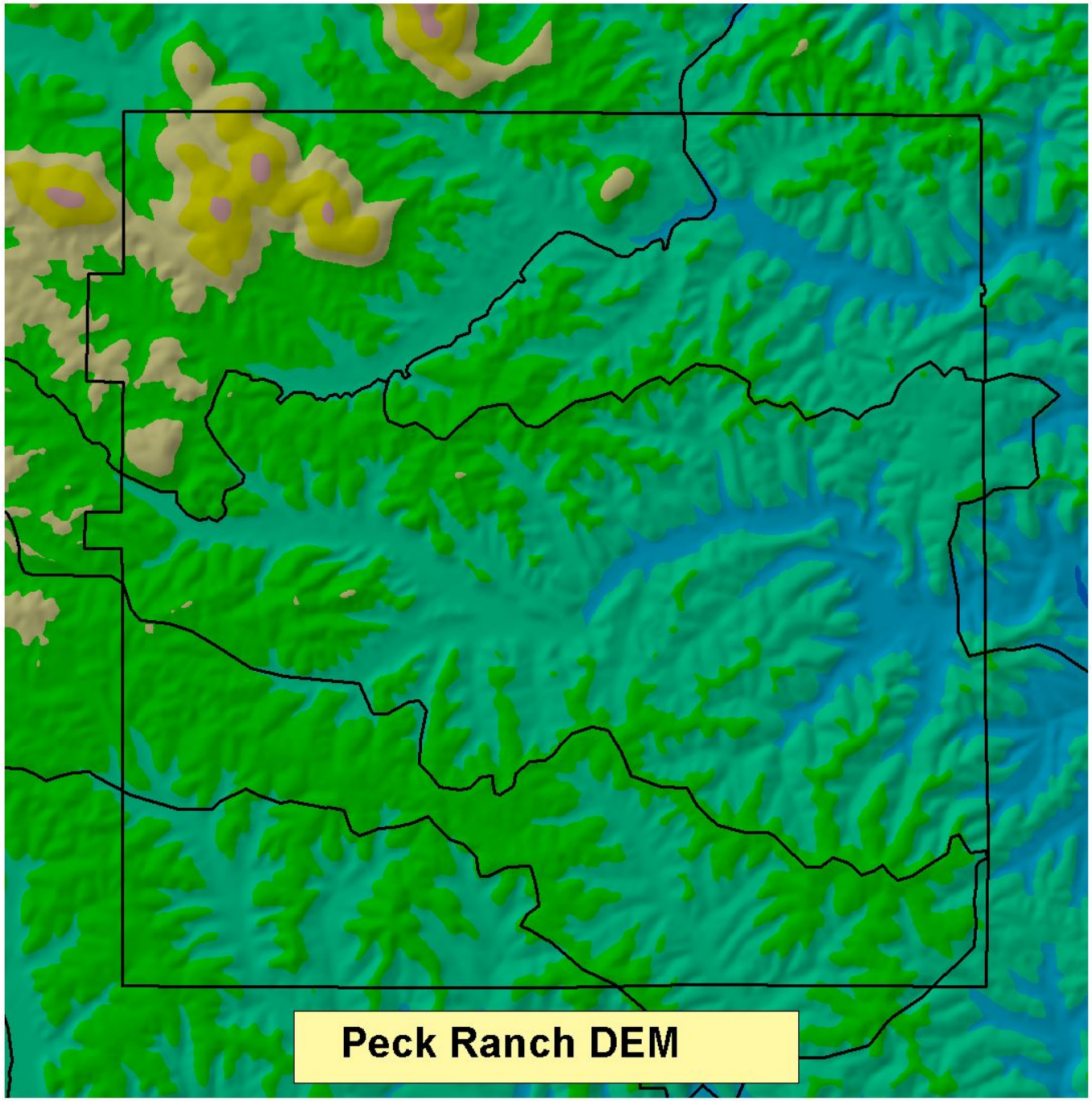


A Manual By:
Tim Nigh, Cindy Buck, Jennifer Grabner, John Kabrick and Dennis Meinert

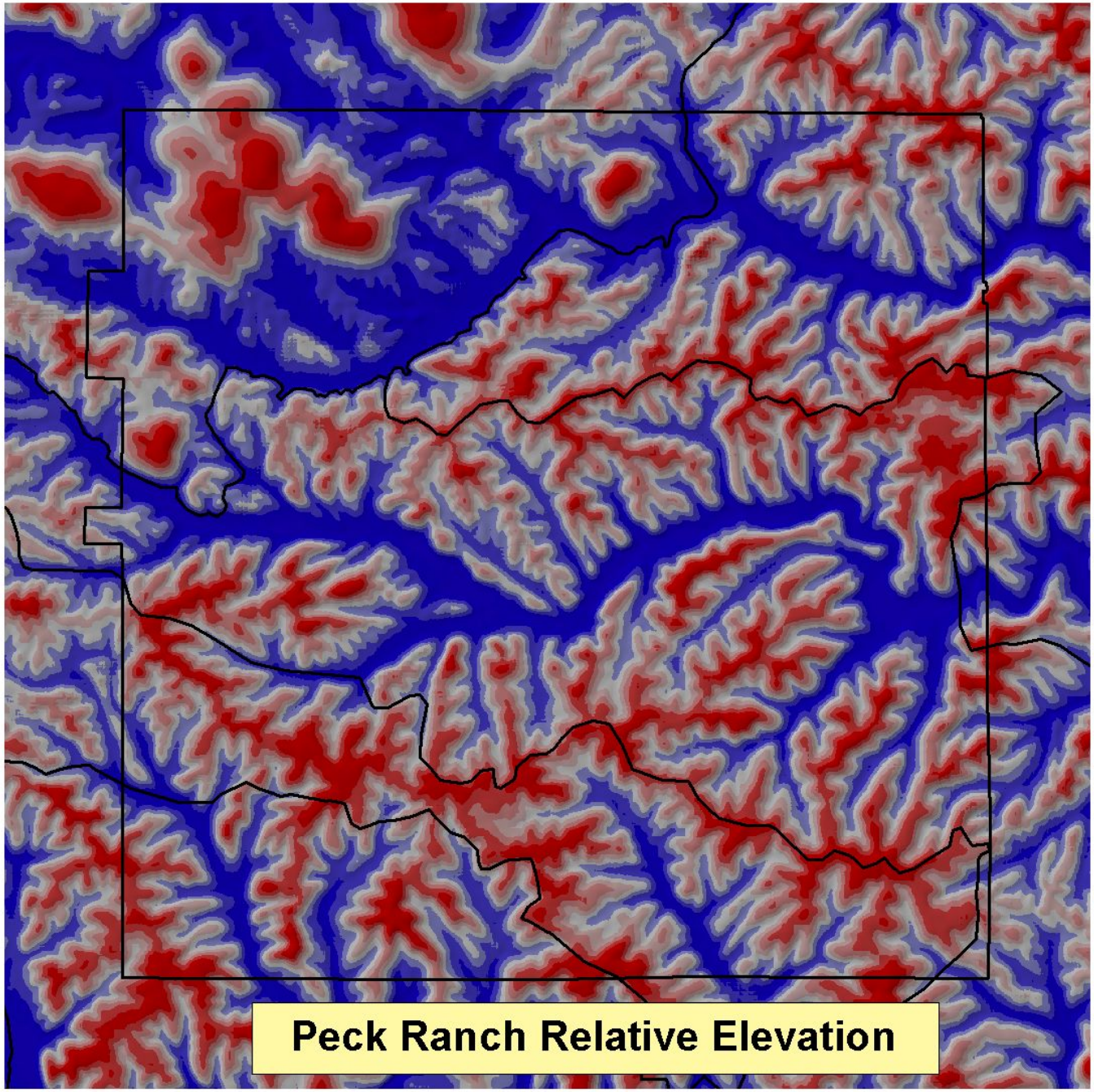
June 2000 Working Draft

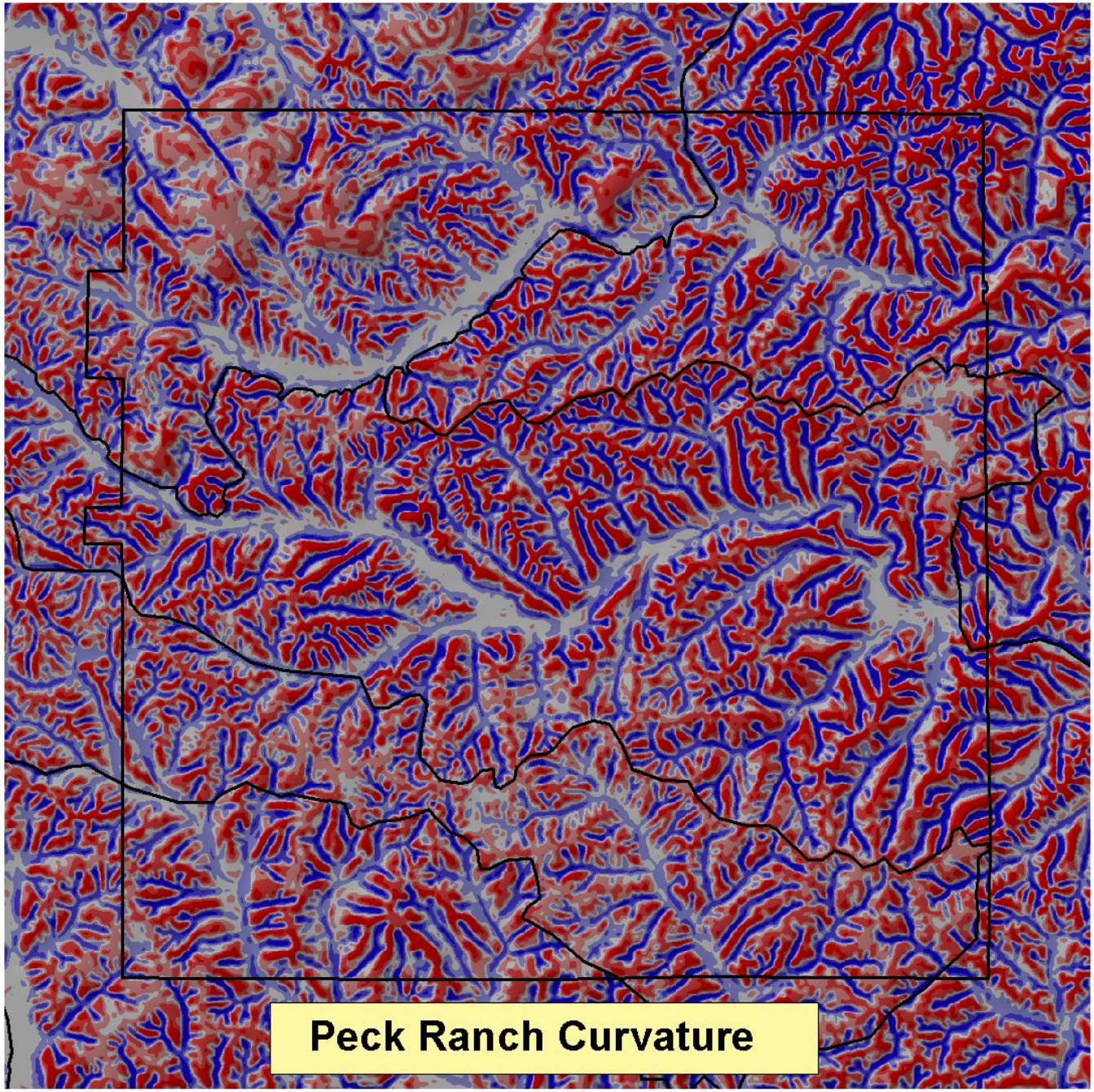


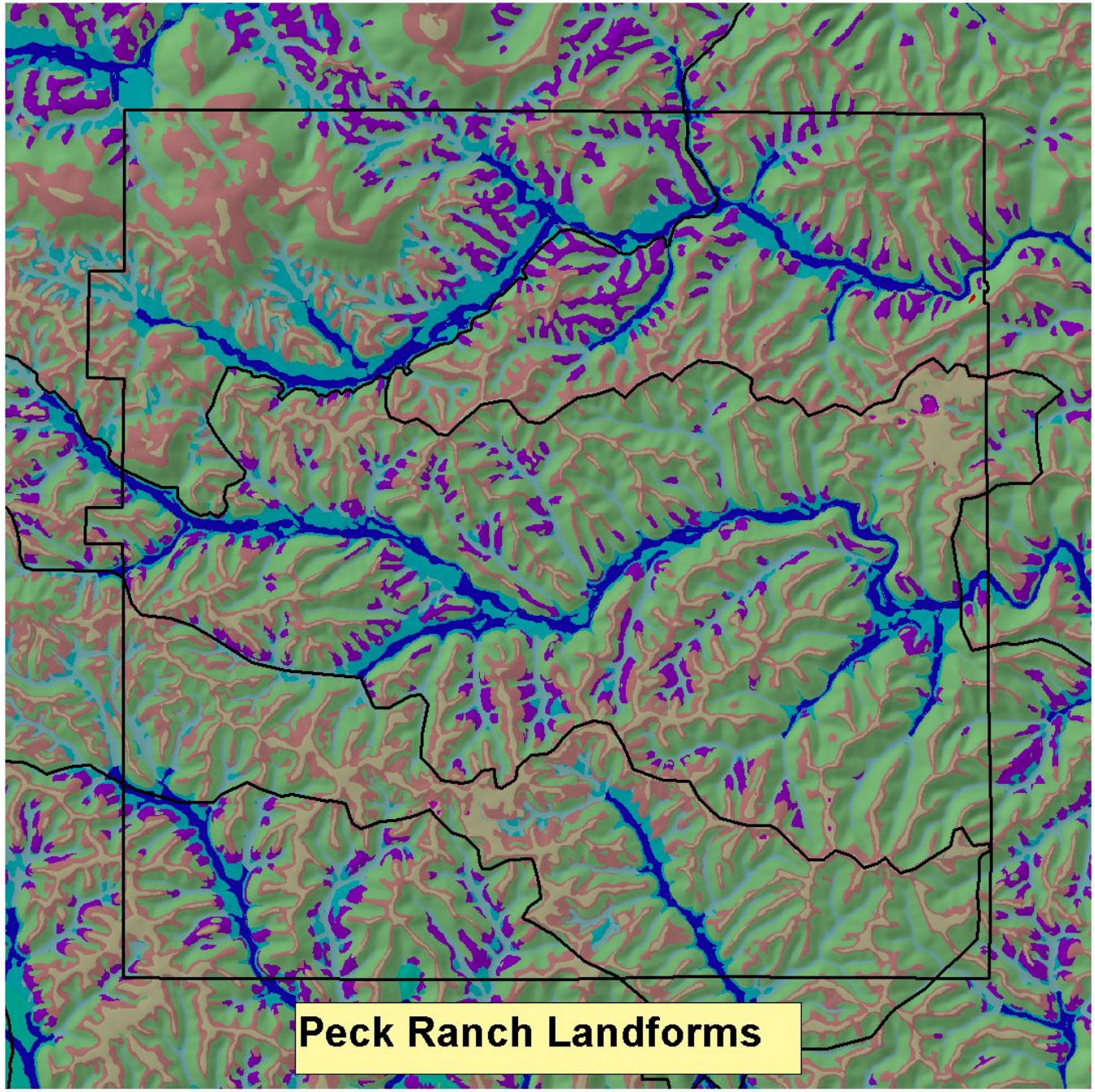
Peck Ranch Conservation Area

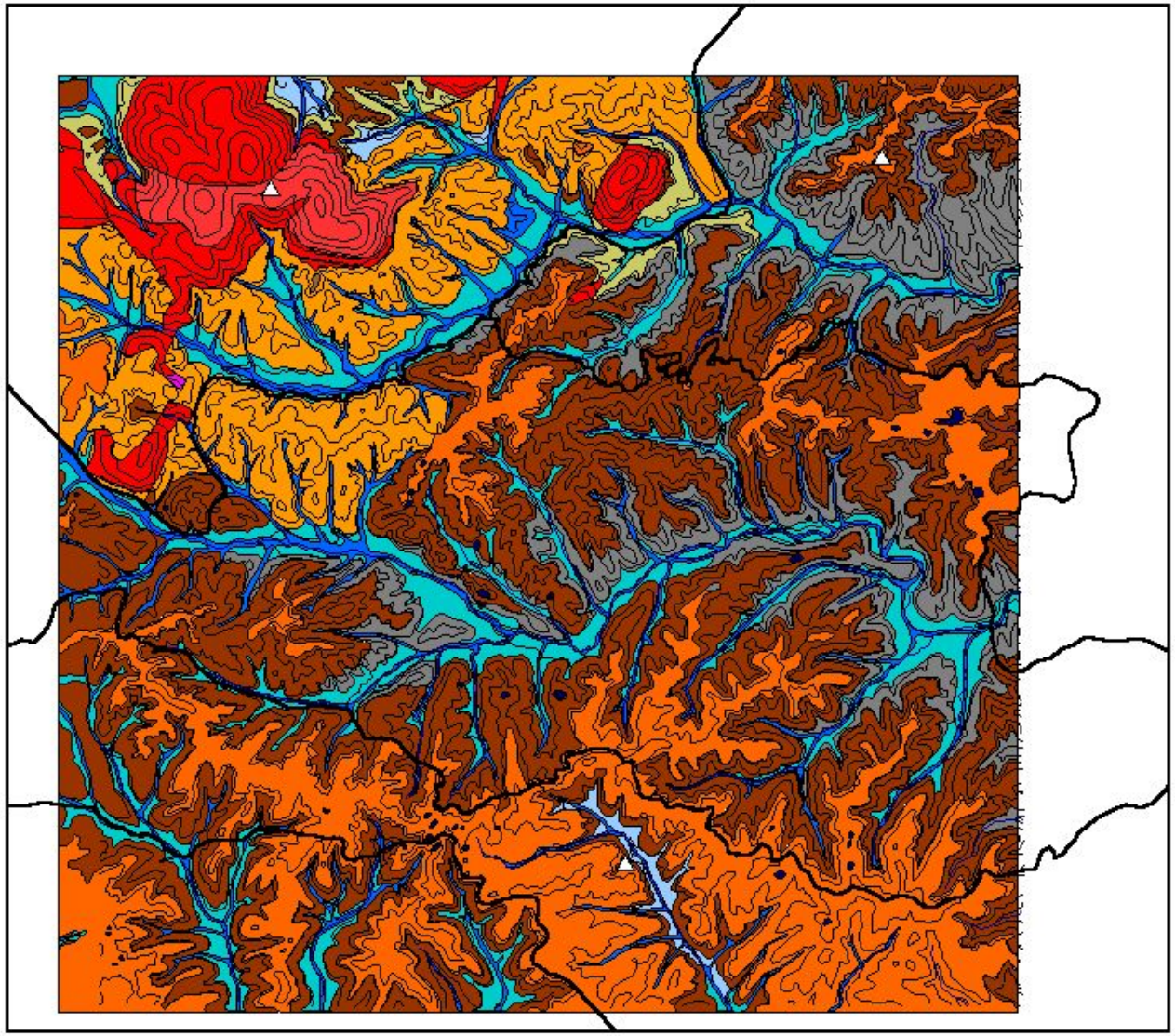

Peck Ranch DEM

Peck Ranch Slope%


Peck Ranch Relative Elevation


Peck Ranch Curvature


Peck Ranch Landforms



Peck Ranch Conservation Area
Geology

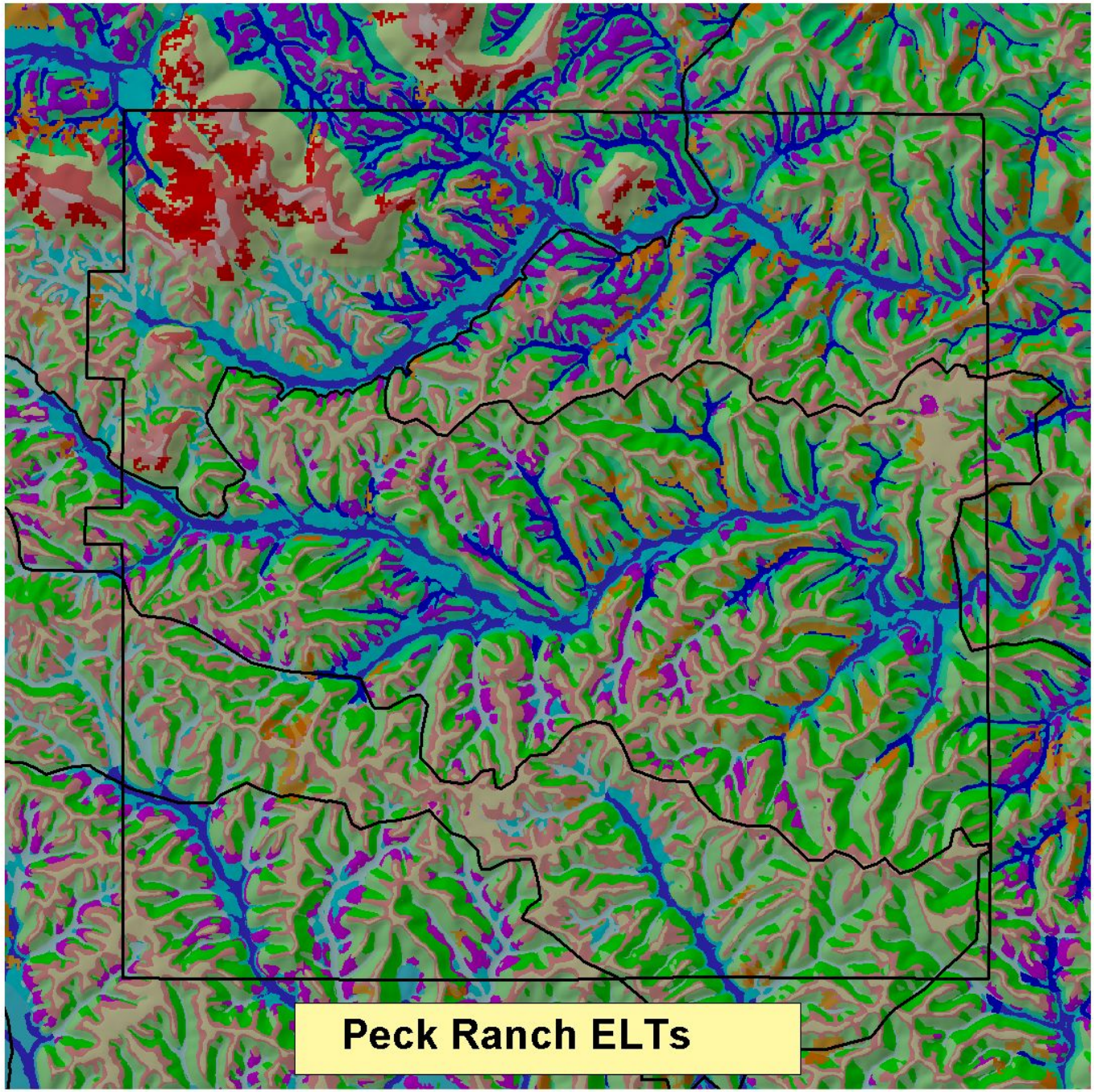
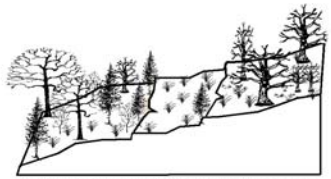
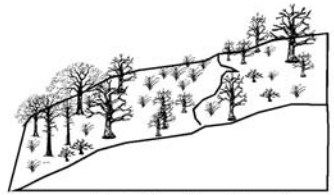

Peck Ranch ELTs

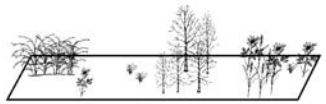
FIGURE 3. Natural Community ELTP Management Groups on Rocky Creek CA



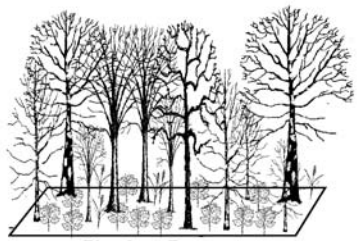
Dolomite Glade/Woodland Complex
ELTPs 7.1, 7.2, 7.3, 8.1, 2.4, 9.3



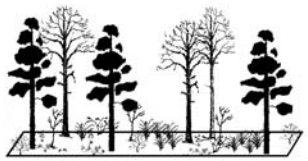
Igneous Glade/Woodland Complex
ELTPs 21, 22, 23, 24



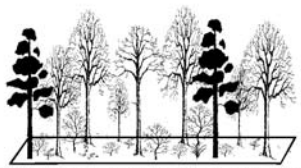
Gravel Bar
ELTPs 17.1, 17.2, 17.3, 13.1



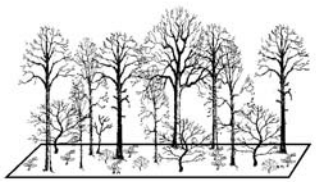
Riverfront Forest
ELTPs 16.1, 16.2



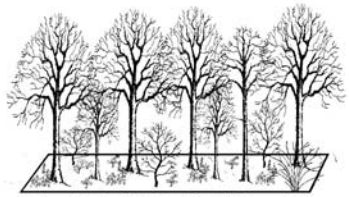
Shortleaf Pine-Oak/Vaccinium (Bluestem)
Dry Ultic (Chert) Woodland
ELTPs 1.1,1.2, 2.1, 2.3, 3.1, 5.1, 9.1



Mixed Oak-Pine/Desmodium,Vaccinium
Dry-mesic Alfic (Chert, Igneous) Woodland
ELTPs 2.2, 3.2, 5.2, 25



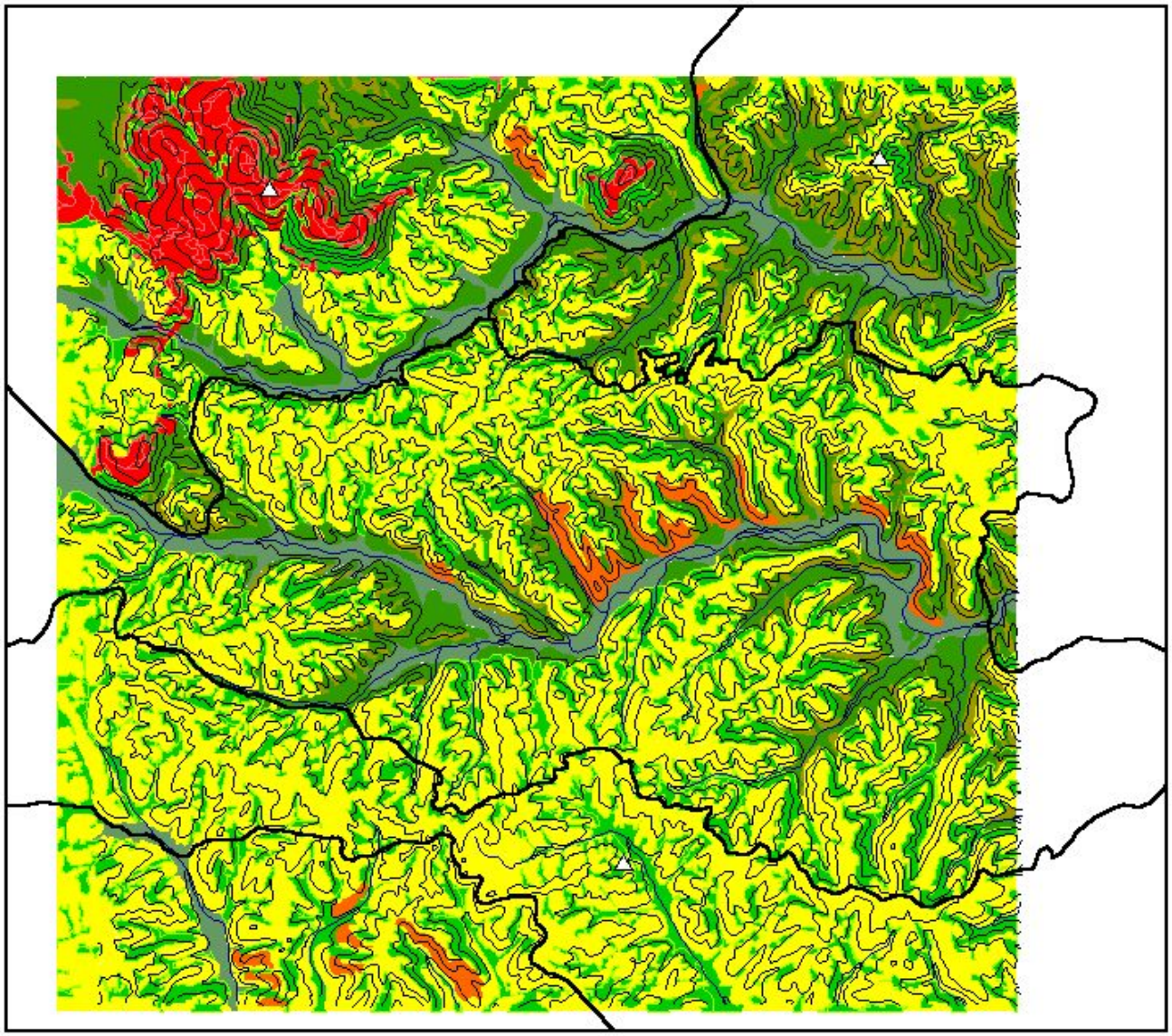
Mixed Oak (Scarlet,Black)-Hickory/Dogwood
Dry-mesic Ultic (Chert,) Forest
ELTPs 1.3, 4.1, 11.1



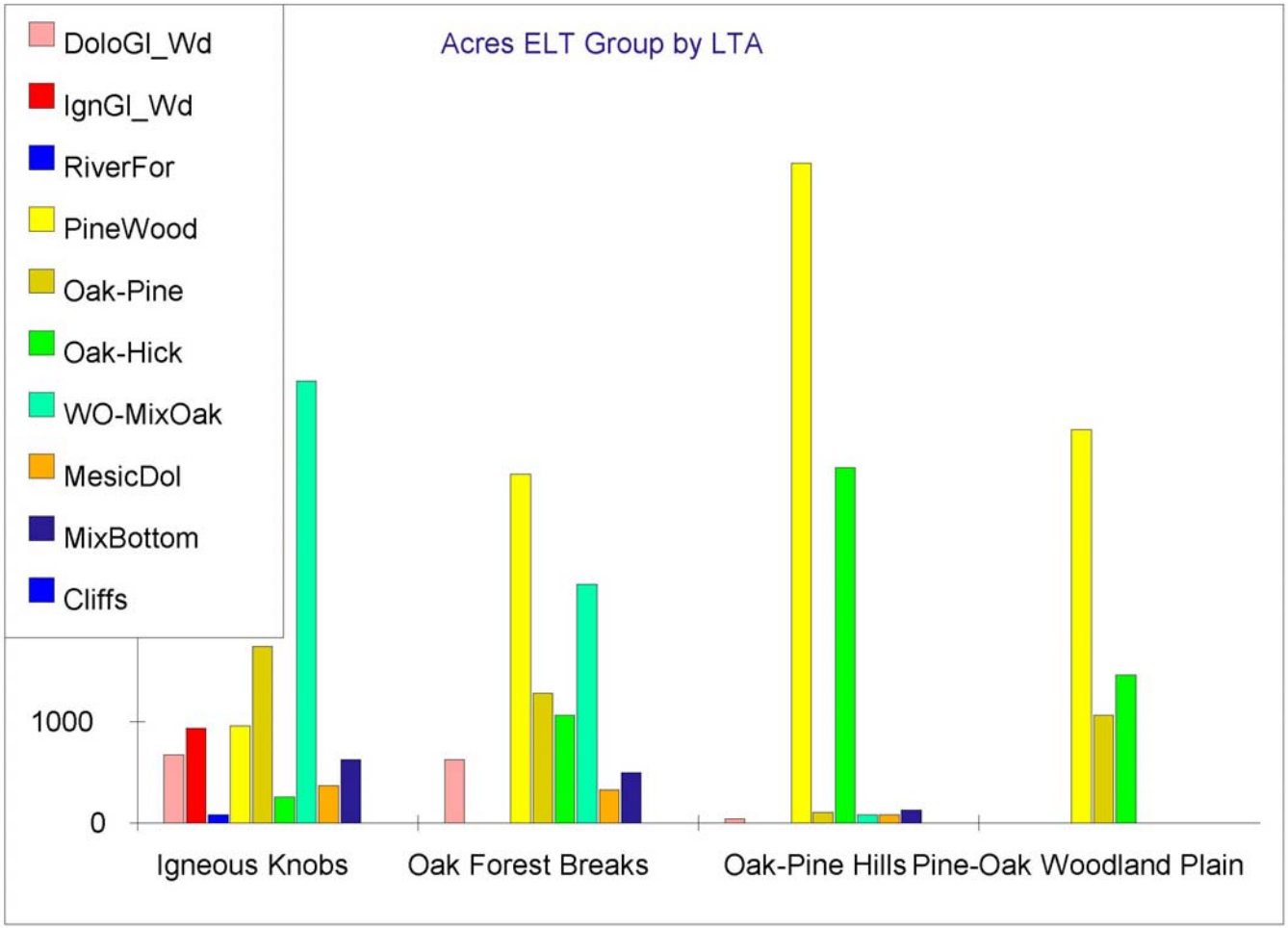
Mixed Oak (White, Red)/Dogwood
Dry-mesic (Chert, Igneous) Forest
ELTPs 4.2, 6.2, 9.2, 10, 11.2, 12.1, 13.3, 26

Mixed Oak-Hardwood/Spicebush
Mesic Forest
ELTPs 8.2, 14

Mixed Hardwood Bottomland Forest
ELTPs 12.2, 12.3, 13.2, 15.1, 15.2



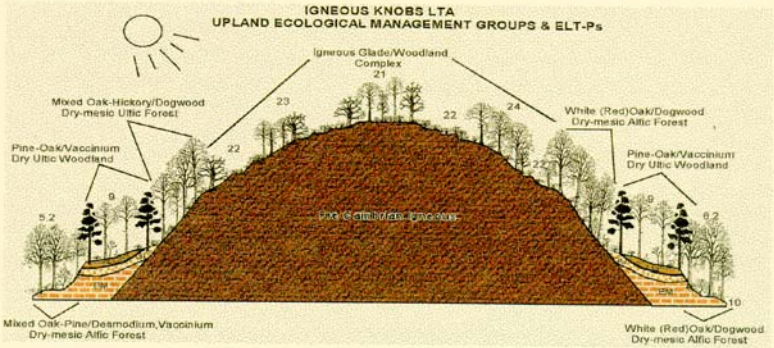
Peck Ranch Conservation Area
Ecological Management Units
EMUs



Peck Ranch
Potential Natural Communities by LTA

PECK RANCH CONSERVATION AREA

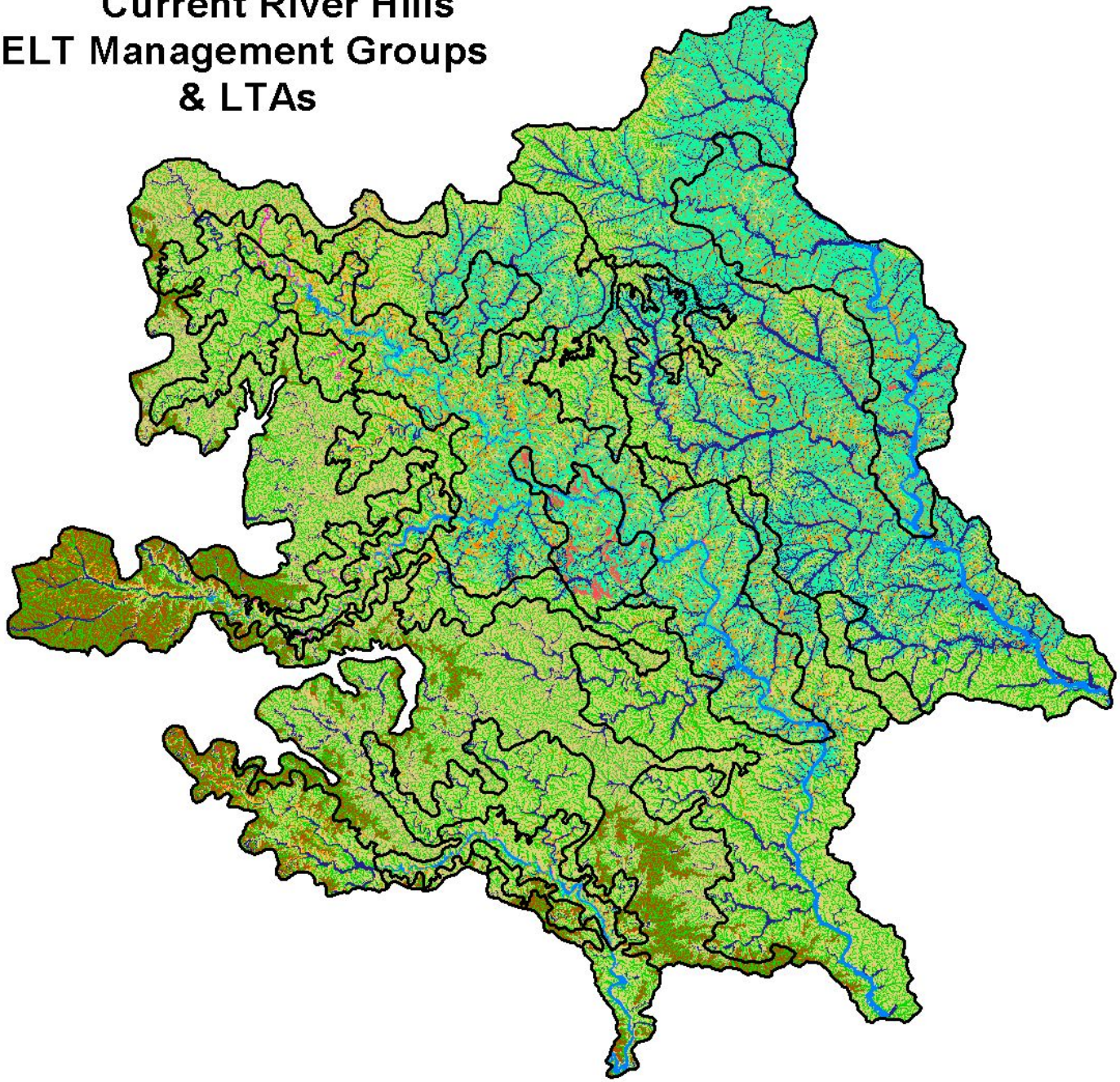
MANAGEMENT PLAN

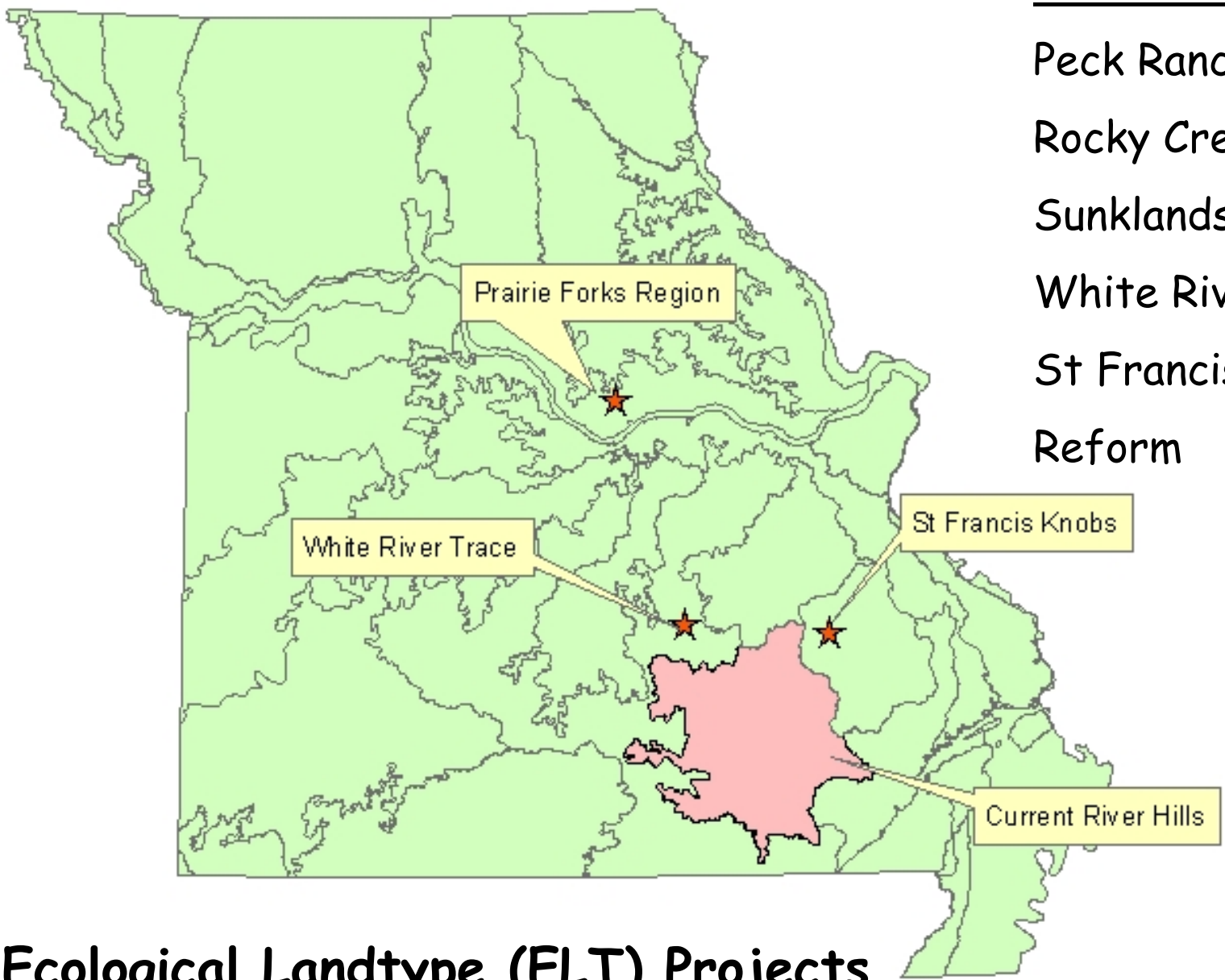


A MANAGEMENT PLAN TO MAINTAIN, ENHANCE AND RESTORE NATIVE PLANT AND ANIMAL COMMUNITIES, AND PROVIDE OUTDOOR RECREATION AND EDUCATION OPPORTUNITIES

April 2000

Current River Hills ELT Management Groups & LTAs





Area Planning:

Peck Ranch

Rocky Creek

Sunklands

White River Trace

St Francis BCA

Reform

Ecological Landtype (ELT) Projects

Developing Ecological Landtypes and Ecological Site Descriptions in Concert with the Missouri Soil Survey

MDC Project Leader: Tim Nigh

Co-Investigators: Dr. Fred Young (NRCS) and

Dr. David Diamond (MoRAP)

Forest Land Management Guides:

A Two Tiered Approach

LTA Types

↓

Management
Issues & Opportunities

↓

Broad Strategic Direction
by Ecological Landscape

↓

Regional Priorities

Forest Management
Technical Guide

*Focused on Forest and Woodland
Natural Communities
& Associated Critical Habitats or Species

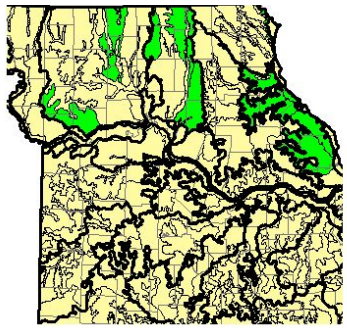
*Identifies Management Issues & Opportunities
& Relevant Management Guidance
for Forest & Woodland Communities

*Utilizes Existing Guides and Other Sources

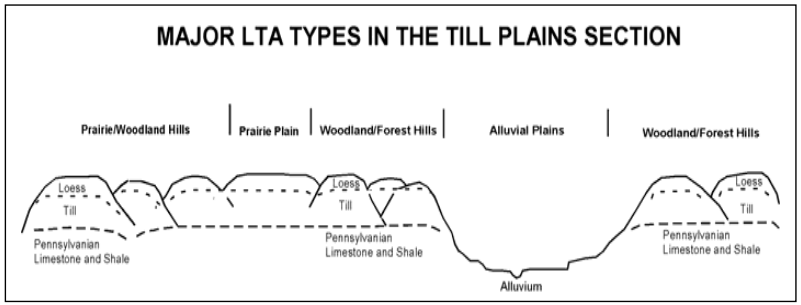
*Applies New Science and Technology

*Binder Format for Adding/Updating Content

TILL PLAINS WOODLAND/FOREST HILLS LTAs



CHARACTERISTICS: Strongly rolling to relatively rugged hills with rather narrow ridges, steep sideslopes, narrow valleys and over 200 feet of local relief. Uplands are mainly in till with a thin layer of loess, while lower slopes grade into sedimentary residuum. This LTA type includes hilly lands associated with the Crooked, Thompson, Weldon, Upper Chariton, Salt and Mississippi Rivers. Historically, this area consisted of a complex mosaic of narrow ridgetop prairies and savannas, grading into oak woodlands on upper slopes, with well-developed oak and mixed hardwood forests on protected slopes and bottoms. Floodplains with marshes and wet prairies are interspersed throughout. Streams have mainly sand bed channels and well-developed floodplains of variable soil texture. Today, while much of the landscape has been cleared for pasture, the largest blocks of remaining timber in this region occur here. Most is dense, second growth oak forest, fragmenting and simplifying a potentially diverse landscape.

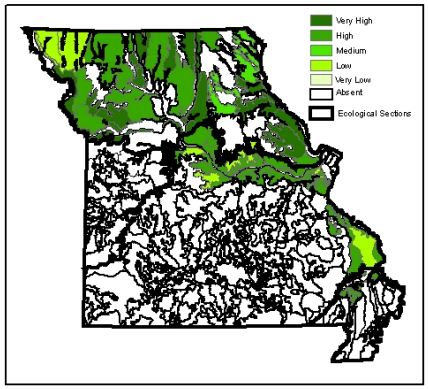


MANAGEMENT ISSUES AND OPPORTUNITIES:

- Size: almost 3 million acres. Conservation lands comprise nearly 188,000 acres (6% of the area). Much of the conservation lands are associated with Smithville and Mark Twain Lakes (U.S. Army Corps of Engineers), but MDC owns over 60,000 acres.
- While some of these LTAs contain large, contiguous patches of woodland and forest, most have been substantially fragmented.
- Much of the forested acreage is mature; and much of the wooded areas have been impacted by grazing and past management activities. Substantial opportunities to manage and restore a variety of oak woodlands and mixed oak, white oak and mixed hardwood and bottomland forest communities exist.
- A few prairies, savannas and wetlands are known, but they tend to be small, isolated remnants; restoration potential exists.
- Many streams are threatened by channelization, poor riparian corridors, agricultural runoff and sedimentation.
- Woodland and forest management could supply products from thinning and harvest activities, often on very productive land.
- Varied outdoor recreation opportunities exist, including hunting, fishing, wildlife viewing, hiking, and camping.

Landscapes, Communities and Species worthy of special consideration in this LTA Type include:		
Landscapes	10,000+ acre Woodland/Forest Landscapes	
	2000+ acre Prairie/Savanna/Woodland Landscapes	
Natural Communities	Mixed Oak and White Oak Dry-mesic Loess/Glacial Till Forests	
	Oak-Mixed Hardwood Mesic Loess/Glacial Till Forest	
	Riverfront Bottomland Forest	
	Mixed Hardwood Mesic Bottomland Forest	
	Mixed Oak Loess/Glacial Till Woodland White Oak Loess/Glacial Till Woodland	
	Dry-mesic Loess/Glacial Till Savanna	
	Dry-mesic Loess/Glacial Till Prairie, Glacial Fen	
		False Mermaid (*Floerkea proserpinacoides*)
		Quaking Aspen (*Populus tremuloides var.tremuloides*)
		Nannyberry (*Viburnum lentago*)
		Ringed Salamander (*Ambystoma annulatum*)
		Four-toed Salamander (*Hemidactylium scatatum*)
		Wood Frog (*Rana sylvatica*)
		Yellow-billed Cuckoo (*Coccyzus americanus*)
		Cerulean Warbler (*Dendroica cerulea*)
	Woodland	Eastern Wood-pewee (*Contopus virens*)
		Orchard Oriole (*Icterus spurius*)
		Baltimore Oriole (*Icterus galbula*)
		Red-headed Woodpecker (*Melanerpes erythrocephalus*)
		Great Crested Flycatcher (*Myiarchus crinitus*)
		Eastern Phoebe (*Sayornis phoebe*)
		Silver-haired Bat (*Lasionycteris noctivagans*)
		Northern Myotis (*Myotis septentrionalis*)
		American Tree Sparrow (*Spizella arborea*)
		Field Sparrow (*Spizella pusilla*)
		Brown Thrasher (*Toxostoma rufum*)

Type: **White Oak Loess/Glacial Till Forests**



Distribution

Along with the Mixed Oak-Hickory Loess/ Glacial Till Forests, these communities are the most common forest types in the Till Plains. They also are associated with Loess deposits in the Ozark Border and on Crowley's Ridge. They are most prevalent on protected slopes, often occurring just below or across the valley from the Mixed Oak-Hickory type; but they can occur on most upland landscape positions. Soils are deep and well drained, often with a thin layer loess over till (eg. Lindley). Can often be found with nearly pure stands of white oak, but red oak, white ash and other moisture loving species become mixed in on better sites.

Natural Communities Included:

White Oak-Hickory Dry-mesic Loess/Glacial Till Forest
White Oak-Red Oak Dry-mesic Loess/Glacial Till

Vegetation Composition and Structure

Stratum	Height (Ft.)	% Canopy Closure	Dominant Species
Canopy	70-100	80-100	white oak, red oak, shagbark hickory, white ash, sugar maple
Sub-Canopy	40-70	40-60	white oak, red oak, shagbark hickory, sugar maple, white ash, elm
Sapling	10-25	50-80	ironwood, sugar maple, dogwood, black haw, Ohio buckeye, redbud, elm
Shrub/Vine	0-5	30-50	Virginia creeper, Hazelnut, grapes, prickly ash
Groundflora	0-2	20-40	sedges, may apple, bedstraw, beggar's ticks, black snakeroot, spring ephemerals

Management Issues and Opportunities

- Large forested landscapes in the Till Plains are rare. This community is often a dominant component of forested tracts. Efforts to maintain large blocks > 1000 acres will provide important habitat for forest interior species.
- One of the most productive upland forest types in Missouri. Multi-layered structure important habitat for forest interior species.
- They are distinguished from woodlands by their closed canopy, dense understory and shade tolerant ground flora; and are often on better sites adjacent to woodlands and mixed oak-hickory forest.
- Oak regeneration is often poor. Ironwood, sugar maple and other species are often dominant understory competitors.
- Red oak often drops out of the stand with age.

Management Guidelines

- Understory treatments to remove ironwood, sugar maple and others will be necessary to recruit adequate oak regeneration. Use of herbicide may be necessary.
- A wide variety of management treatments are appropriate in this type. Establishing advanced regeneration before harvest is a principle consideration.
- Productive sites and long-lived trees provide potentialfor extended rotations of 120-150 years and large diameter trees
- Maintenance of red oak will require shorter rotations, intermediate treatments, and/or under planting.