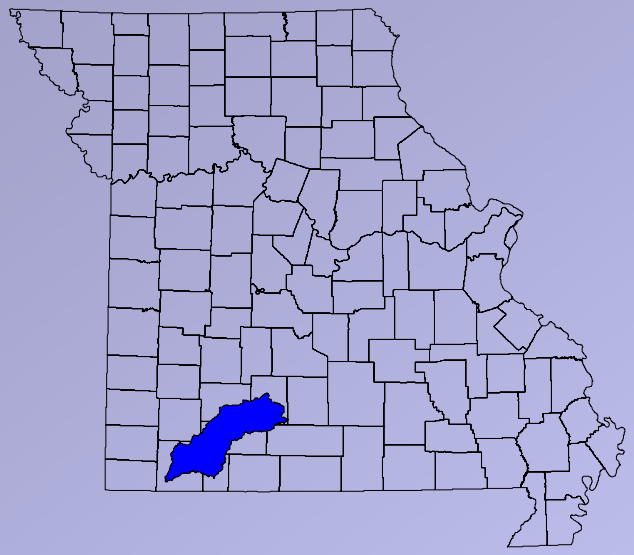
Information Development and Delivery for Conservation of Sensitive Ecosystems within the James River Basin



Taisia Gordon, GIS Specialist

Robbyn Abbitt, GIS Specialist / NHD Coordinator

Melissa Lanclos, GIS and Remote Sensing Specialist

Objectives

- **Identify the location and extent of sensitive and representative ecosystems in the James River Basin**

- **Organize, interpret, and deliver results in highly accessible forms to citizens and decision-makers in the watershed**

Determining GIS data & analysis needs

- **July meeting with EPA, JRBP, and MoRAP to discuss project direction.**
- **September meeting with James River Basin and Springfield area entities to identify major concerns and data needs.**
- **Project updates to EPA and JRBP to refine deliverables.**

Goals

- **Urban Development**
  - **Change detection**
- **Conservation opportunity areas**
  - **Natural and semi-natural areas**
- **Agriculture**
  - **Current resources**
  - **Agricultural change/loss**
- **Aquatic Ecosystems**
  - **Aquatic ecological classification**
- **Outreach**
  - **James River canoe guide**

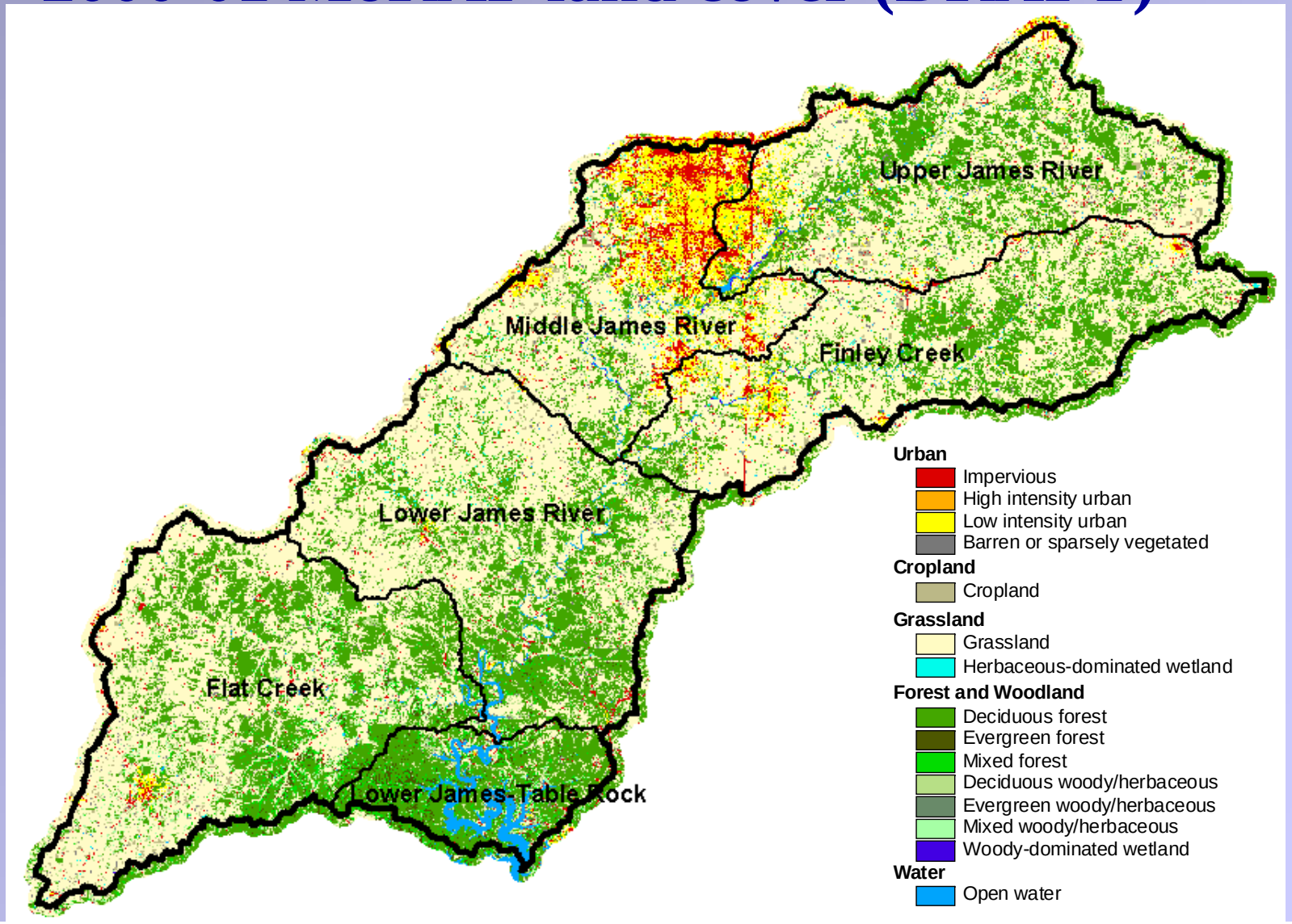
Urban Development

Change detection

- Melissa Lanclos

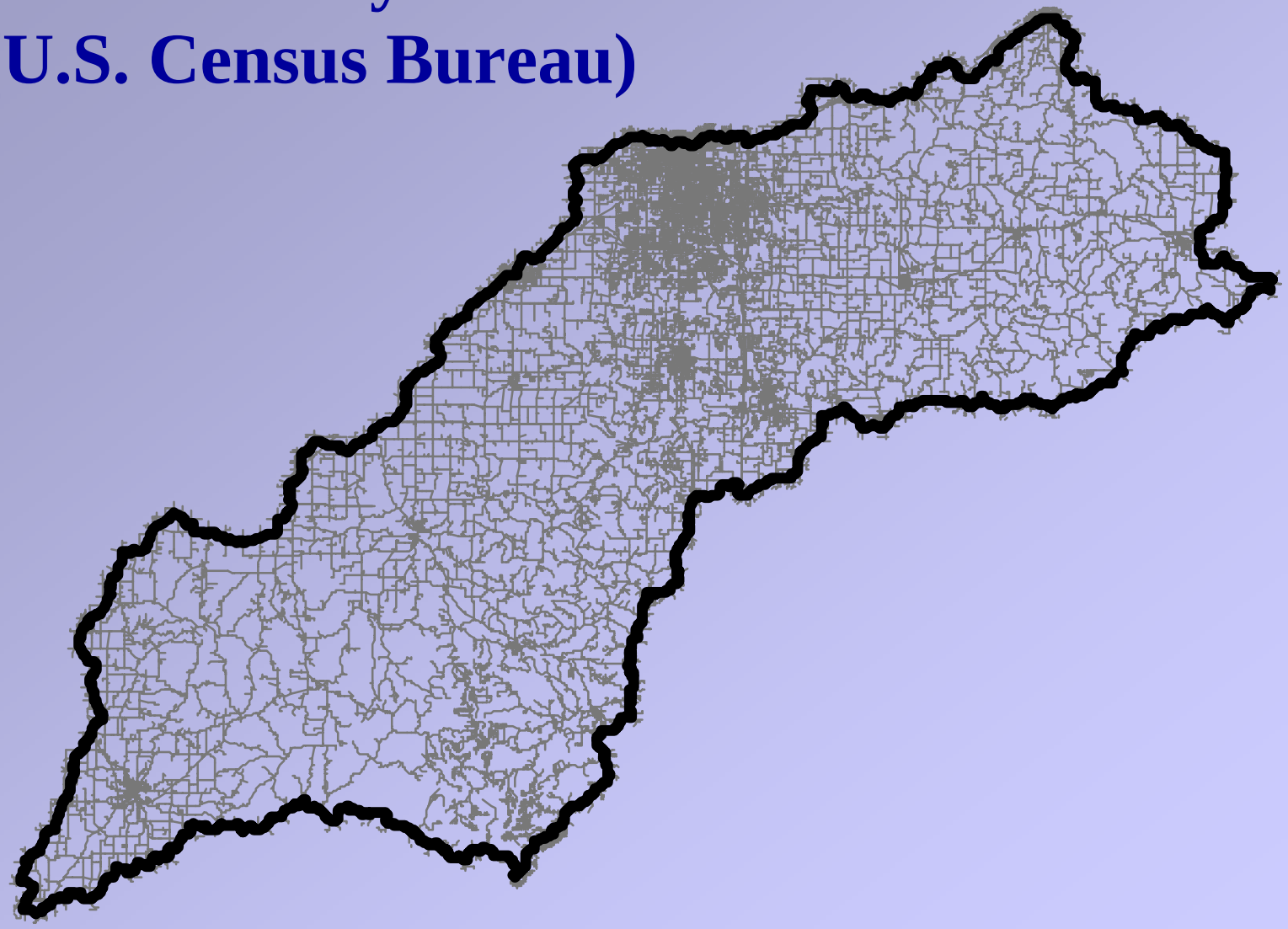
Conservation Opportunity Areas

- **2000-01 MoRAP land cover (DRAFT)**



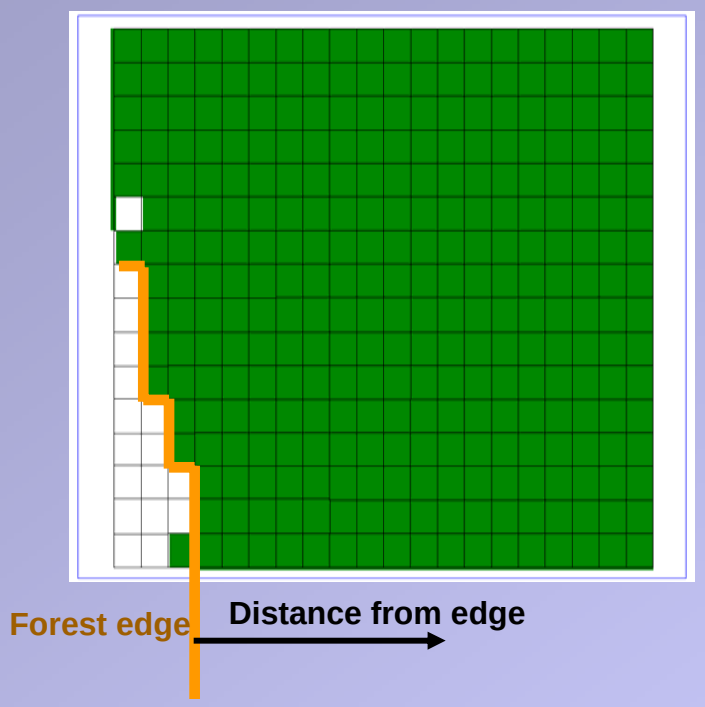
Conservation Opportunity Areas

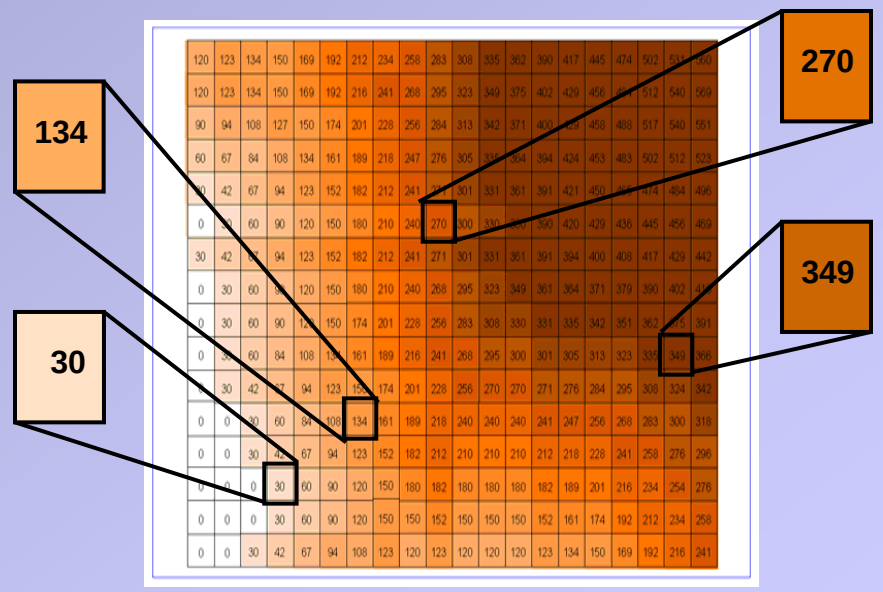
- **Road data layer from 2000 TIGER data (U.S. Census Bureau)**



Conservation Opportunity Areas

- **Natural and semi-natural vegetation patches that are away from roads and patch edges**
  - **Distance from patch edges and roads**

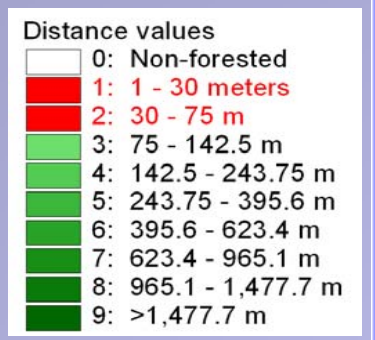


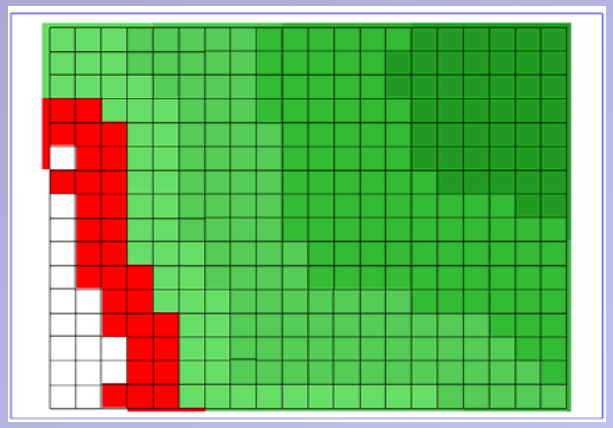


Each cell has a distance-to-patch edge value.

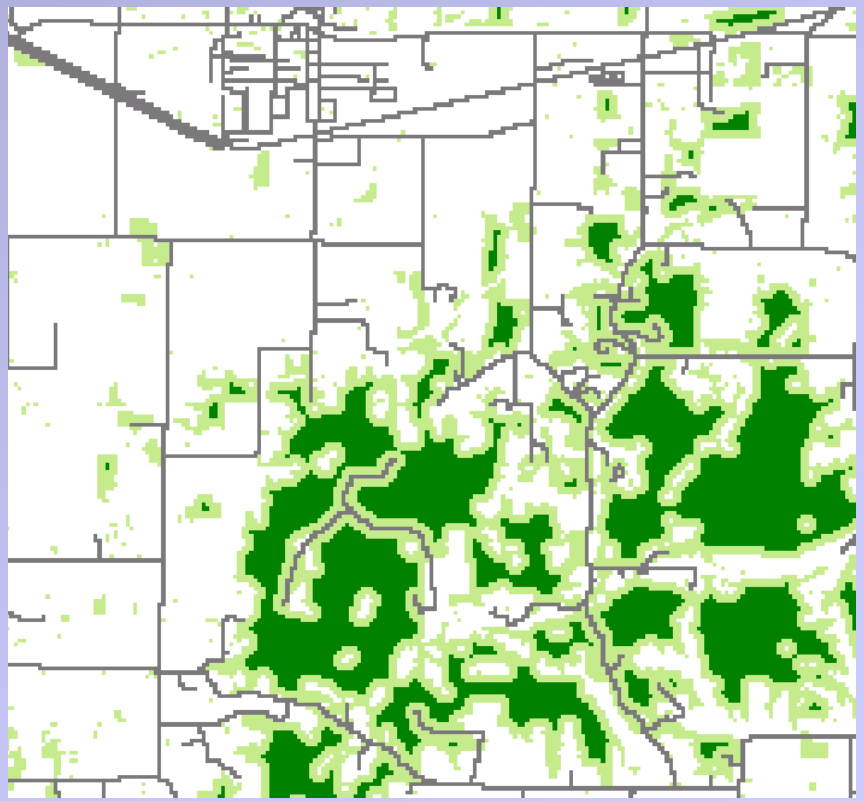
Conservation Opportunity Areas

- **Land cover and Road distances are joined to identify areas far from roads and far from patch edges.**





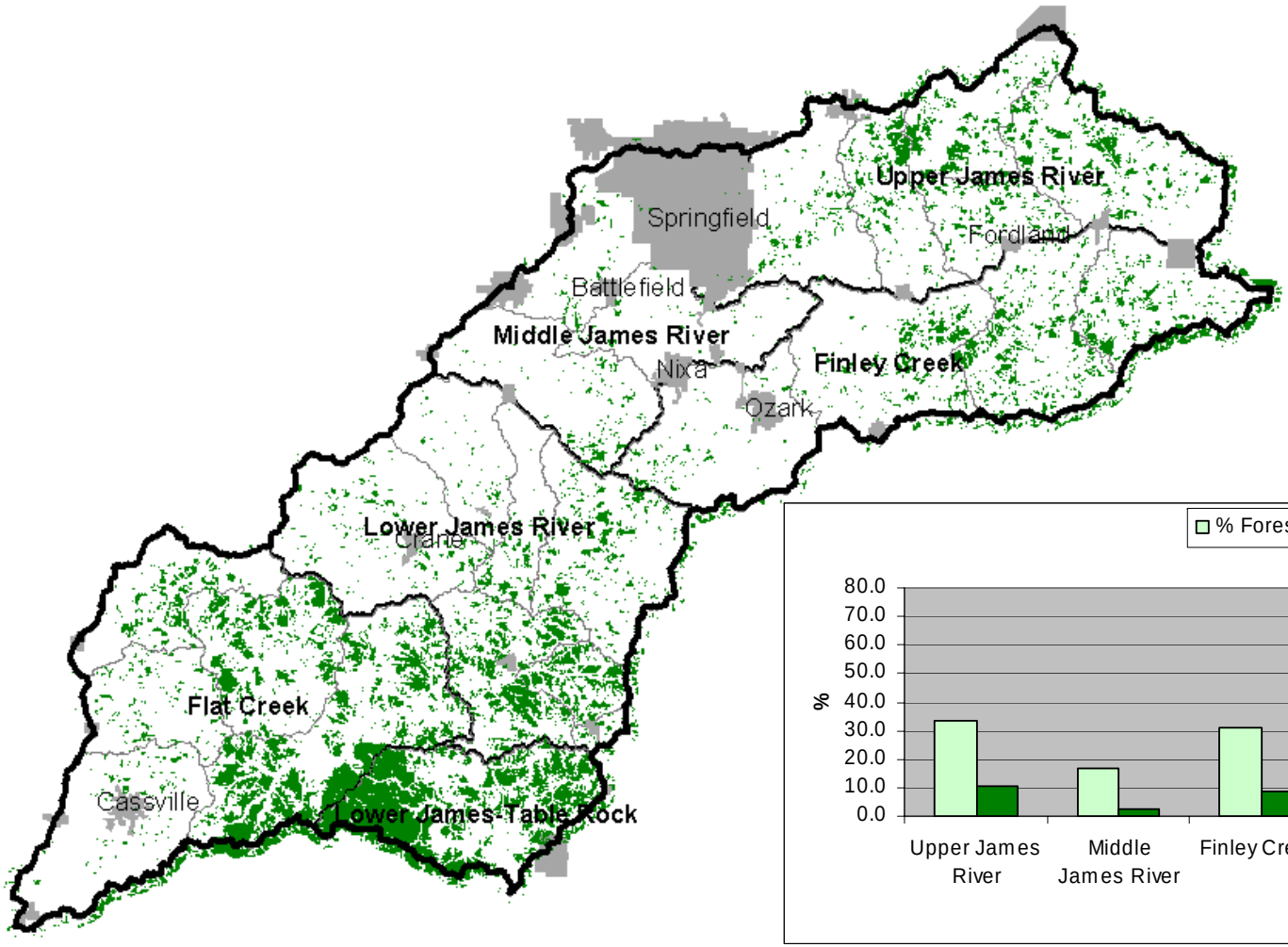
Each cell is assigned a rank (0-9) for distance to patch edge.

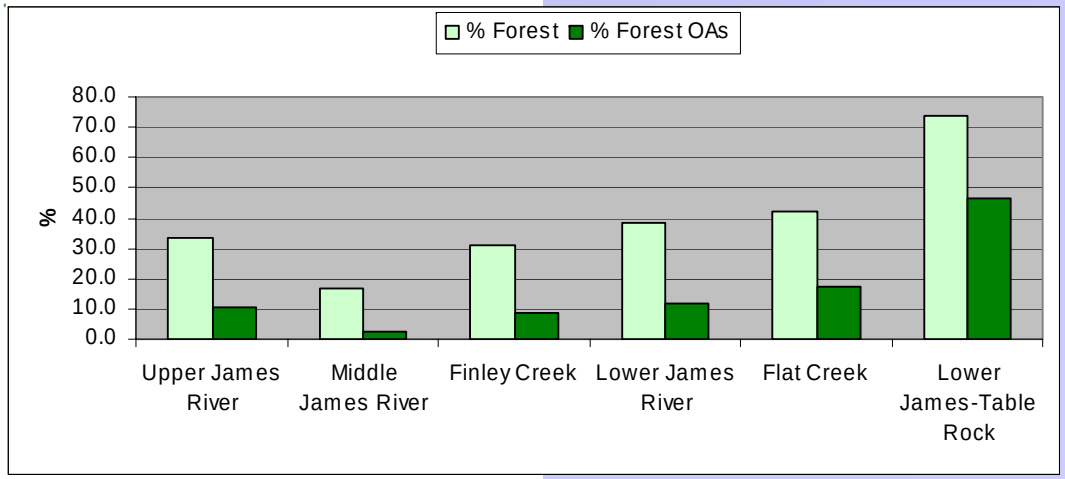


Roads **Forest** **Forest OAs**

Conservation Opportunity Areas

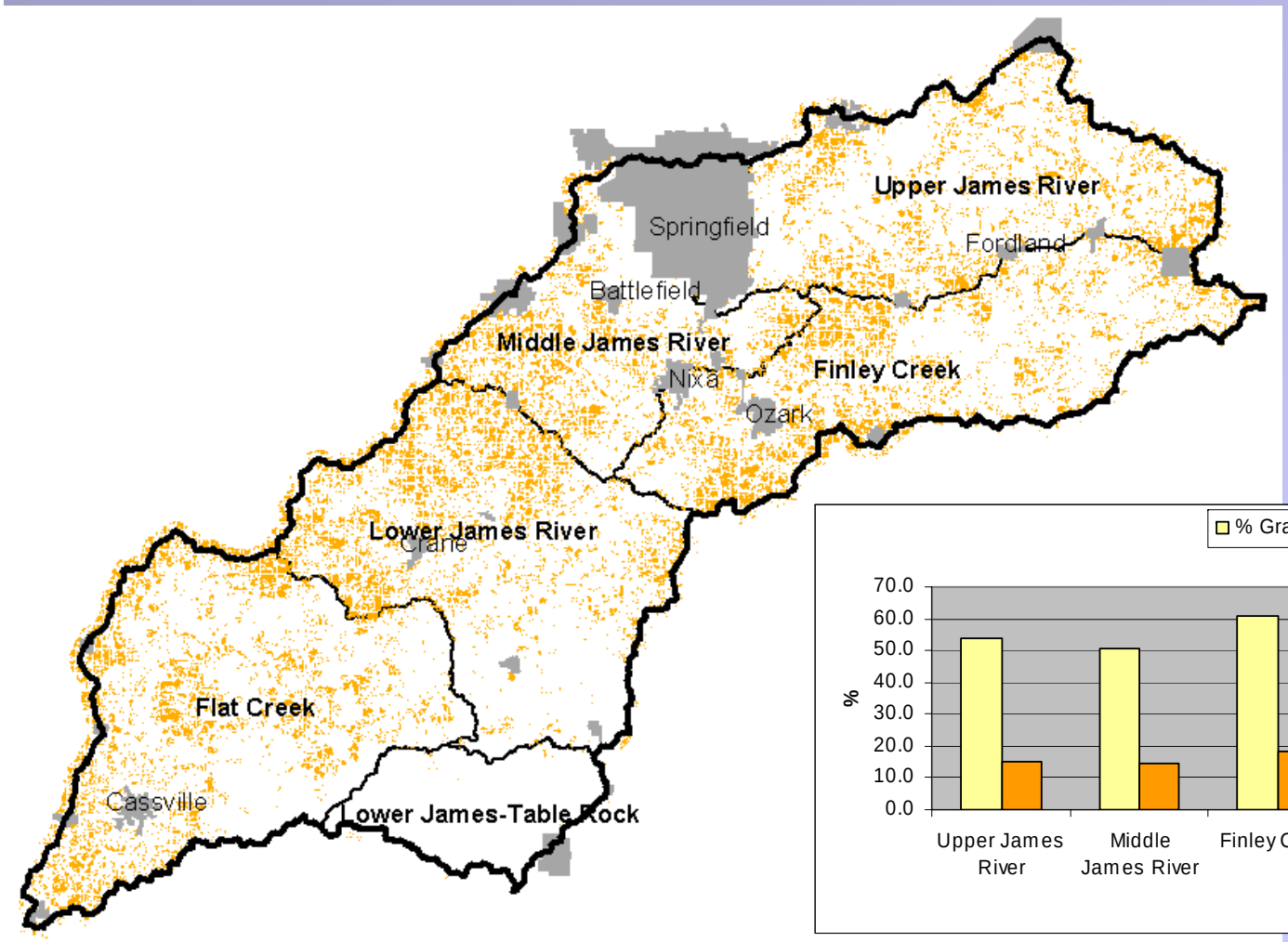
- **Forest OAs (at least 75 meters from a patch edge or road)**

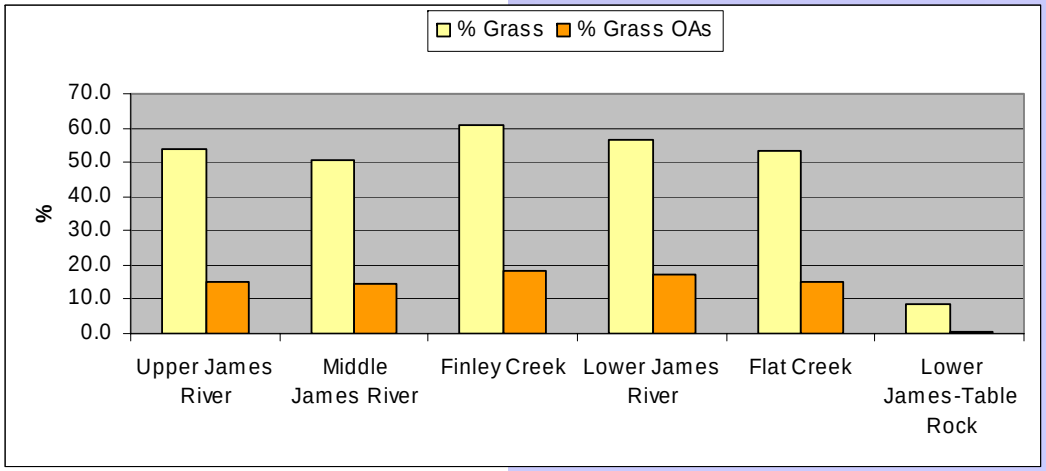




Conservation Opportunity Areas

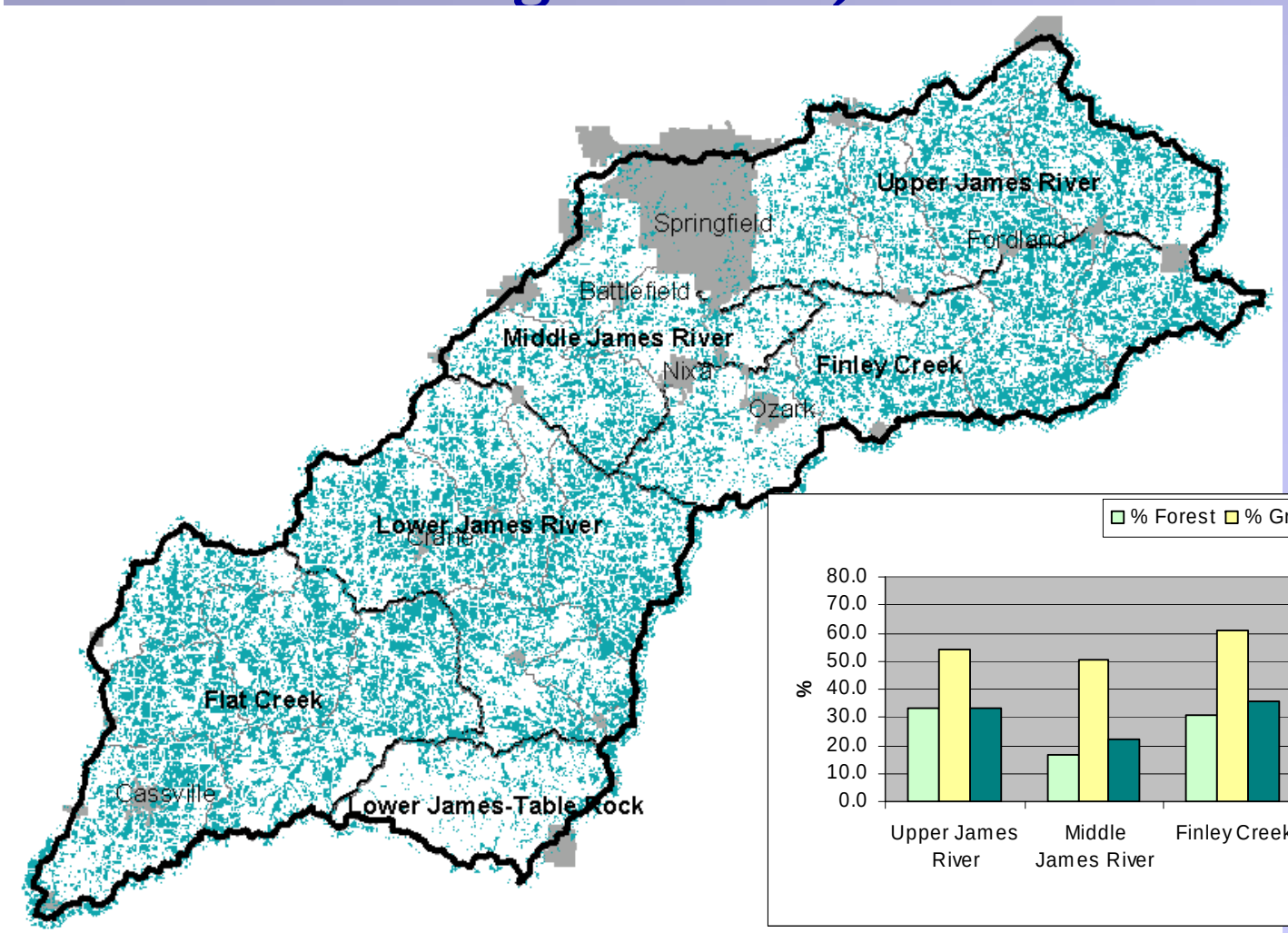
- **Grassland OAs (at least 75 meters from a patch edge or road)**

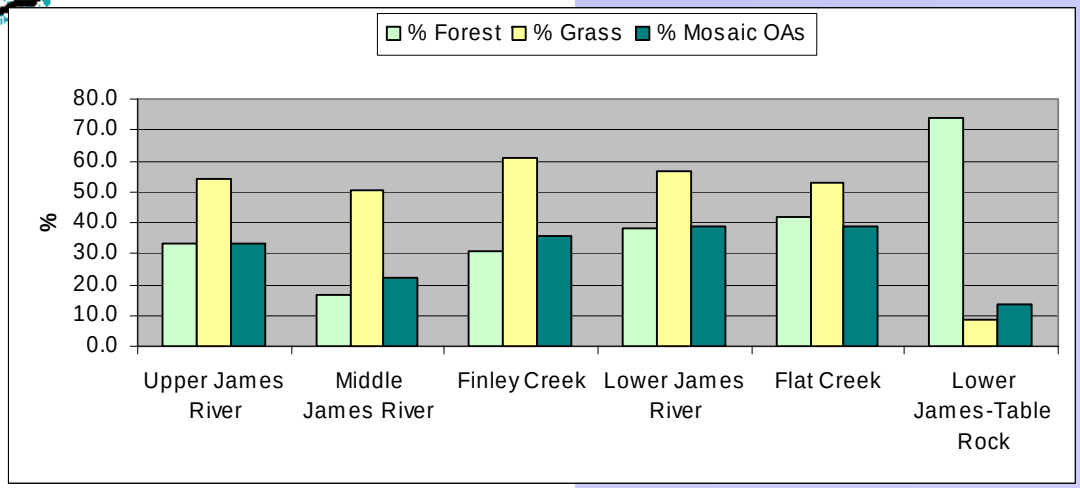




Conservation Opportunity Areas

- **Mosaic OAs (Small, interspersed patches of forest and grassland)**



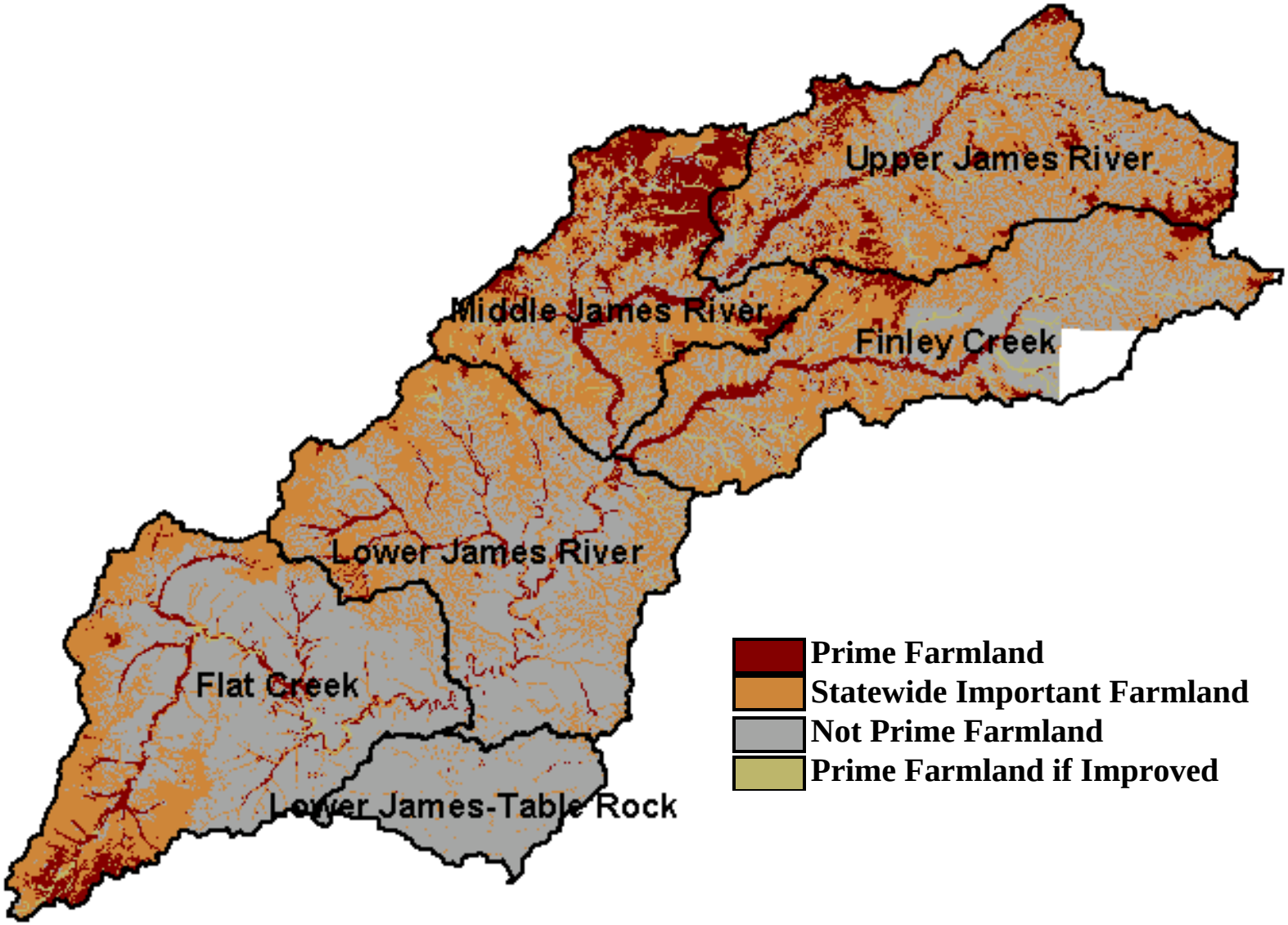


Agricultural resources

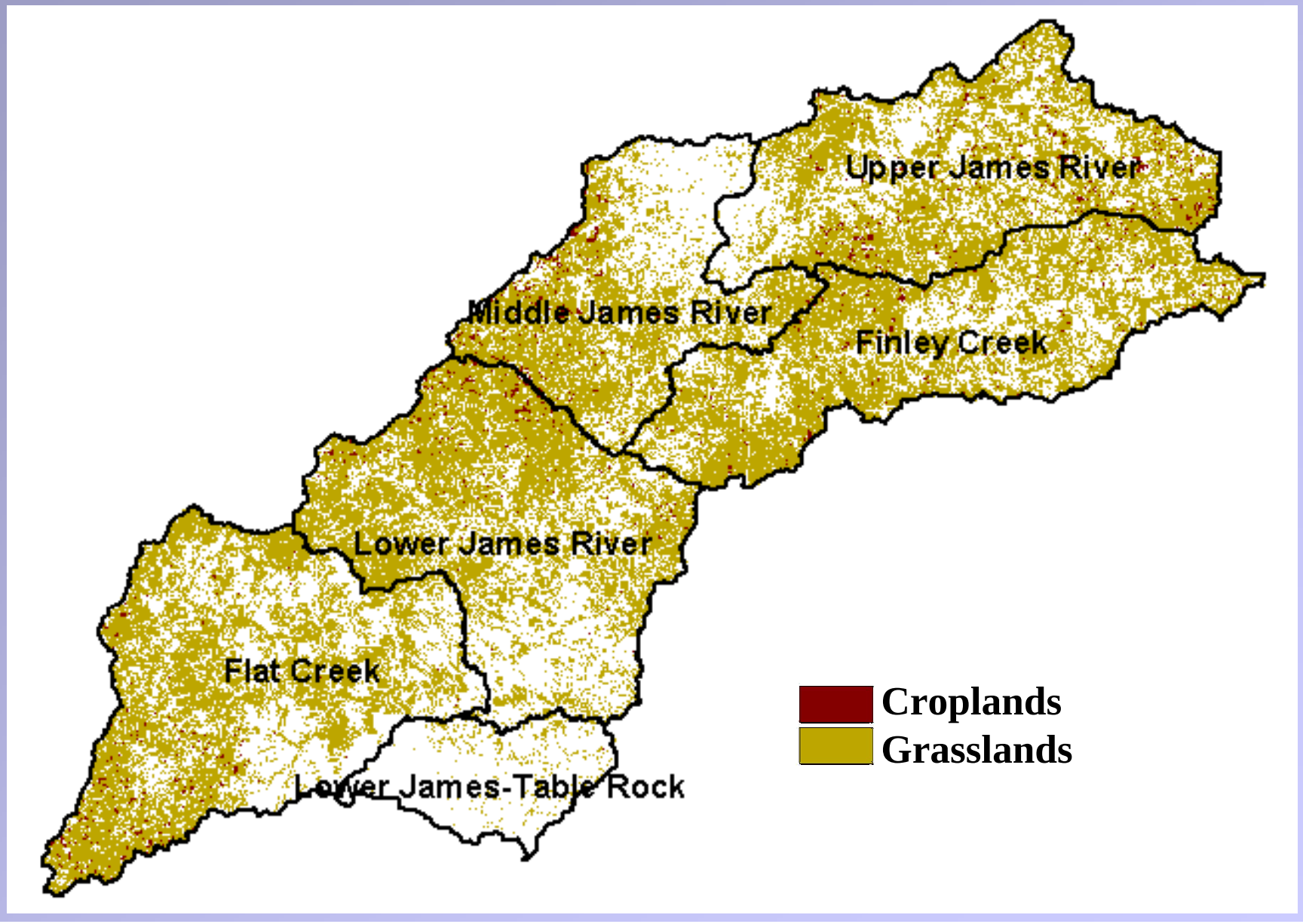
- **Prime and Statewide Important Farmland**
  - **Prime Farmland**
    - **"[L]and that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor…[without] excessive soil erosion…"**
  - **Statewide Important Farmland**
    - **"[L]and other than prime farmland that is determined to be important by the appropriate State…agencies…"**

Part 523 – Farmland Protection Policy Act
Subpart C – Important Farmland Soils
Section 523.52 Exhibit C

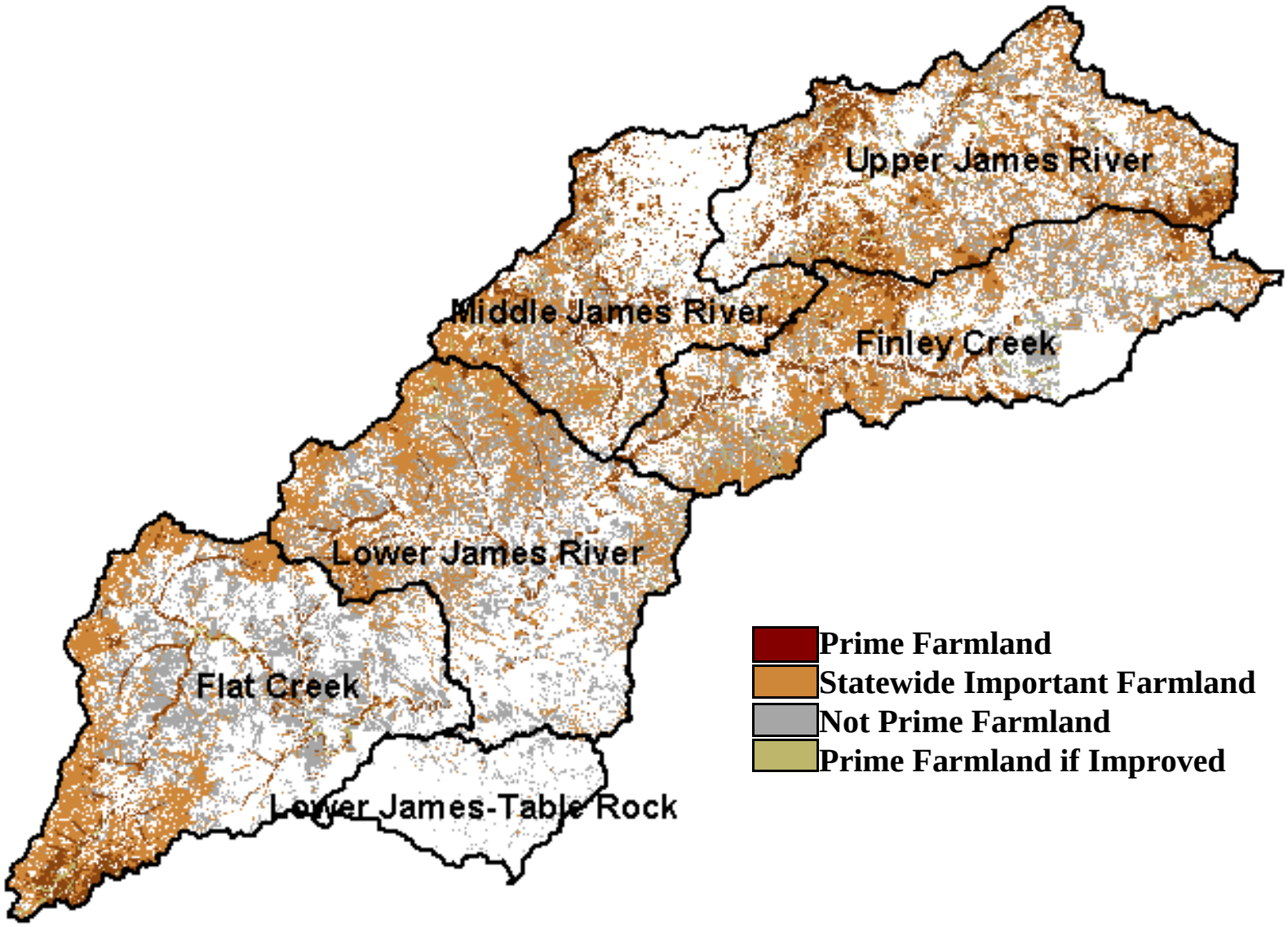
Identify Prime and Statewide Important Farmland using SSURGO II



Cropland and grassland (2000-01 land cover)

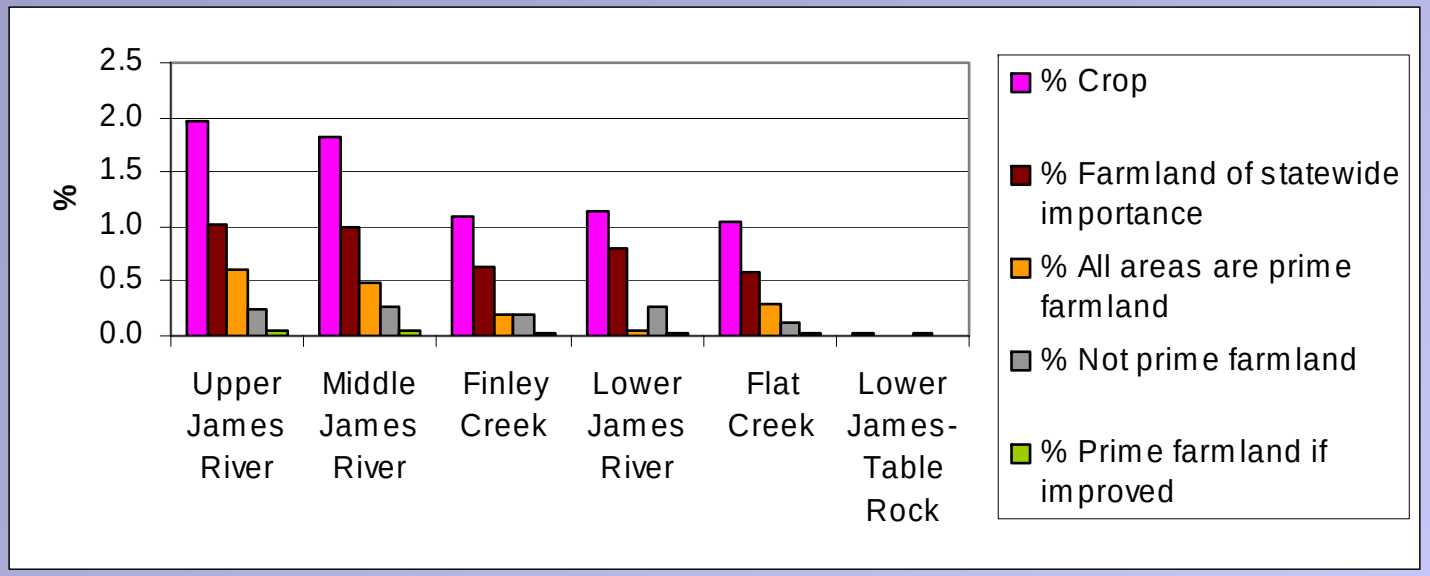


Intersect agricultural land with prime and statewide important farmland

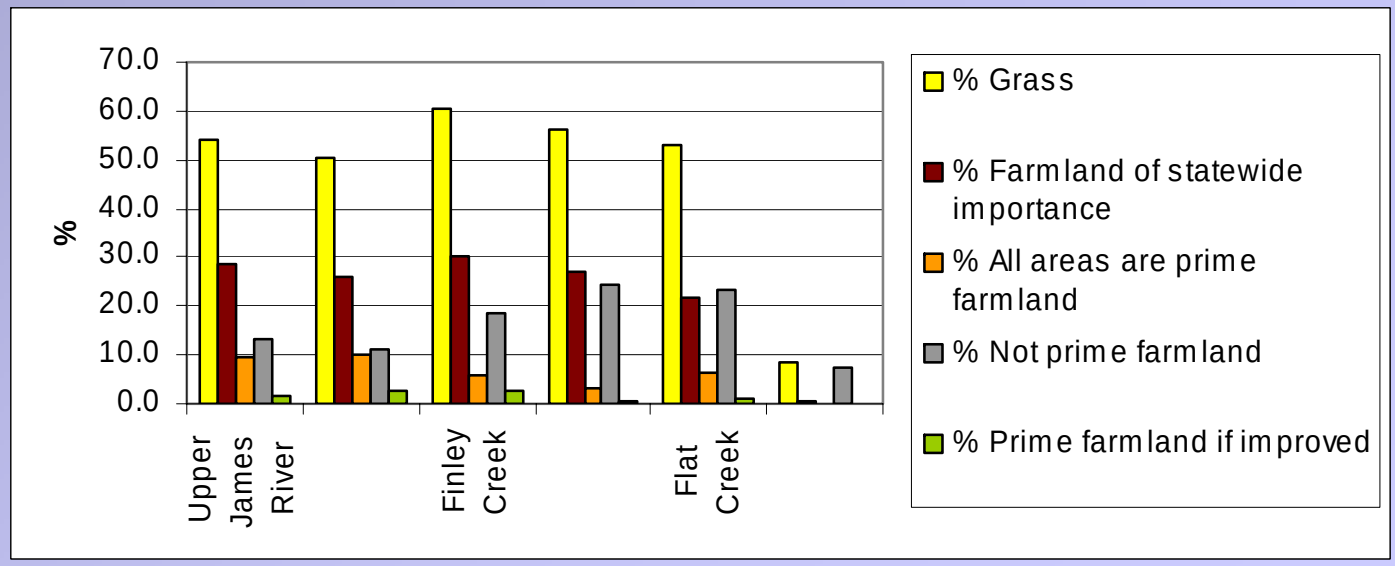


Intersect agricultural land with prime and statewide important farmland

- **Crop**

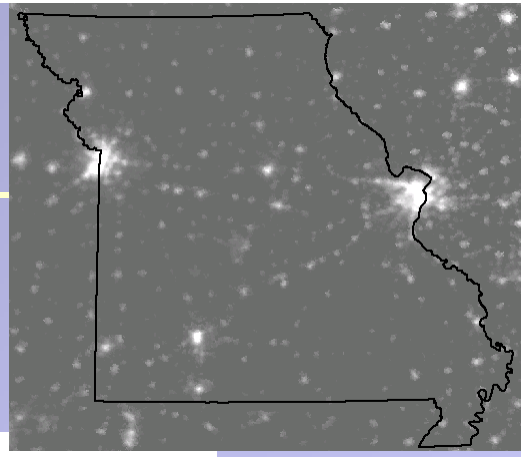


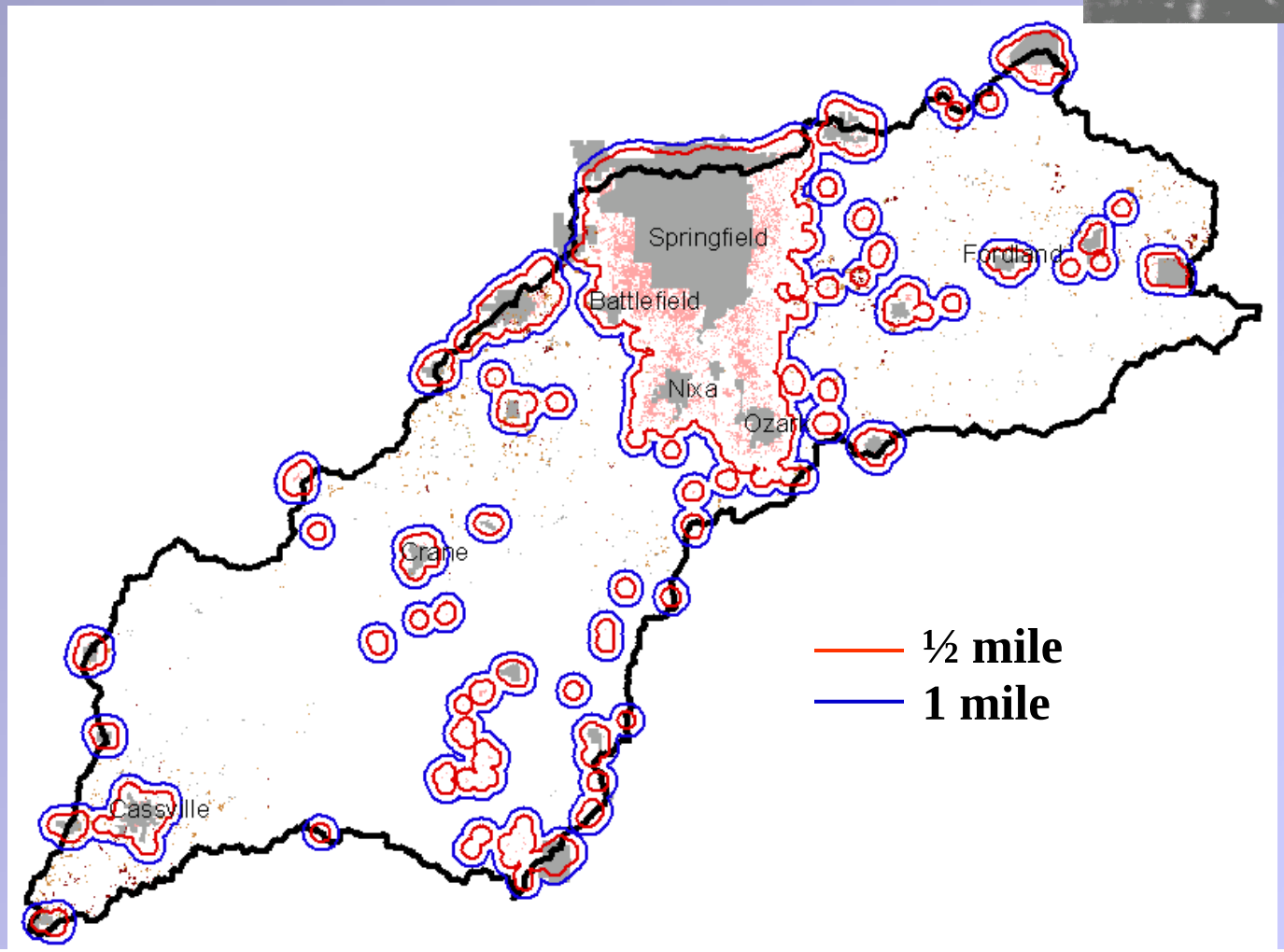
- **Grass**



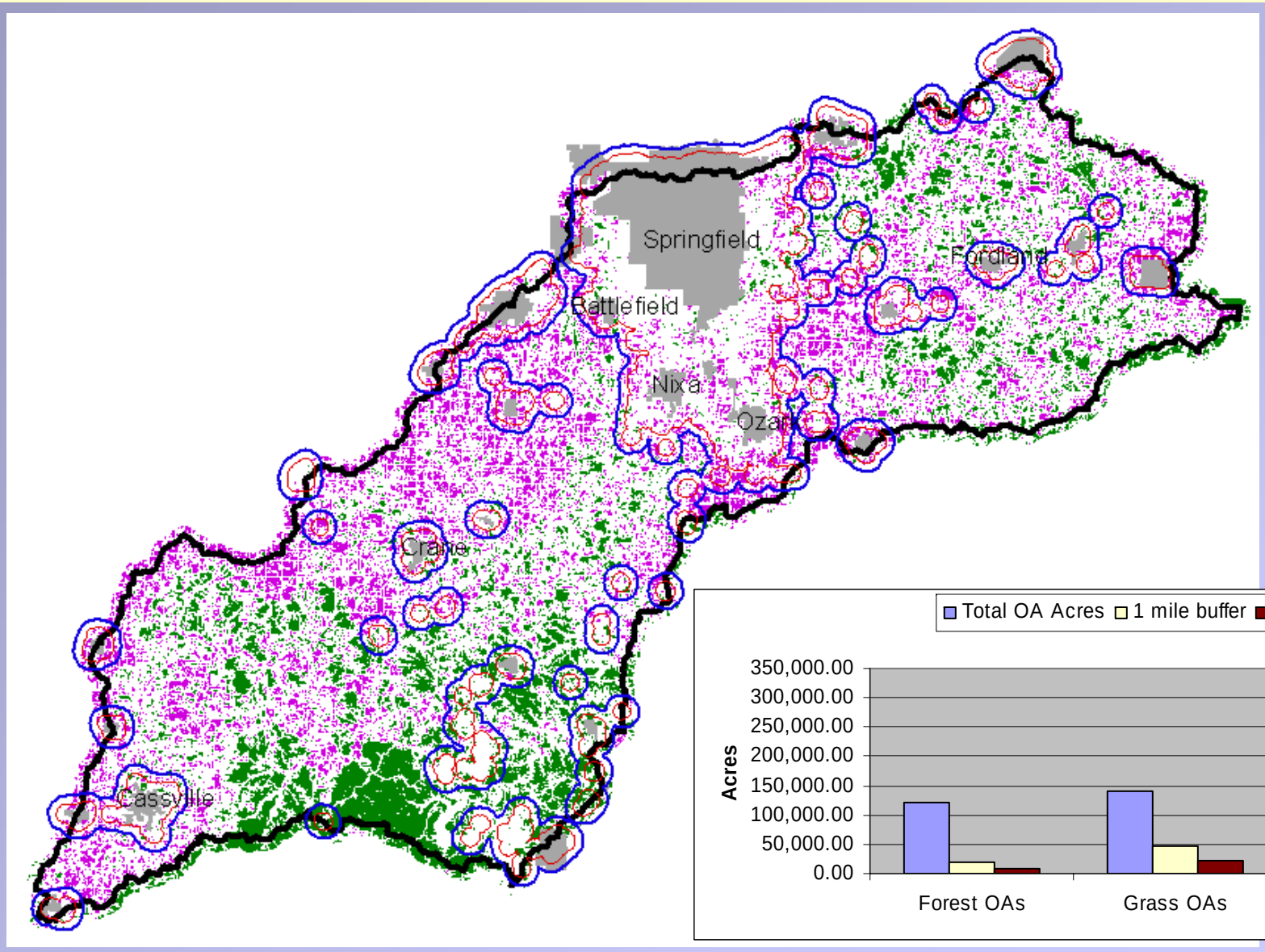
Proximity to urban areas

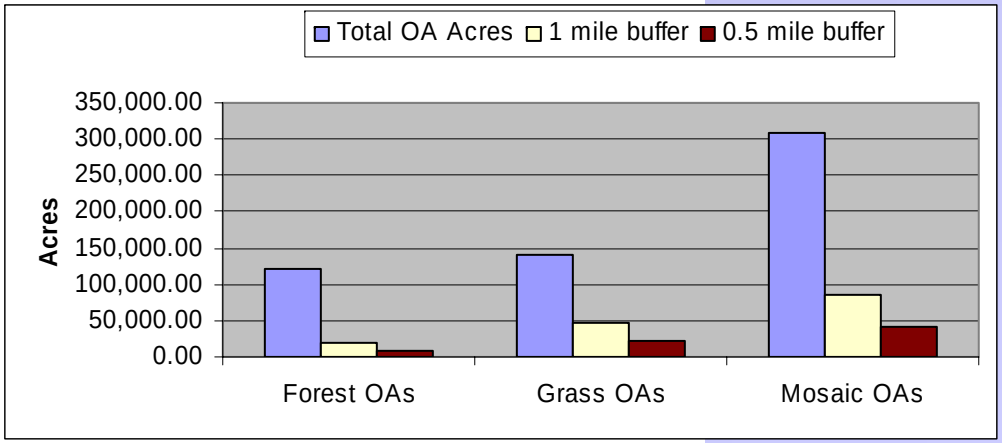
- **½ mile and 1 mile buffer around metropolitan areas.**



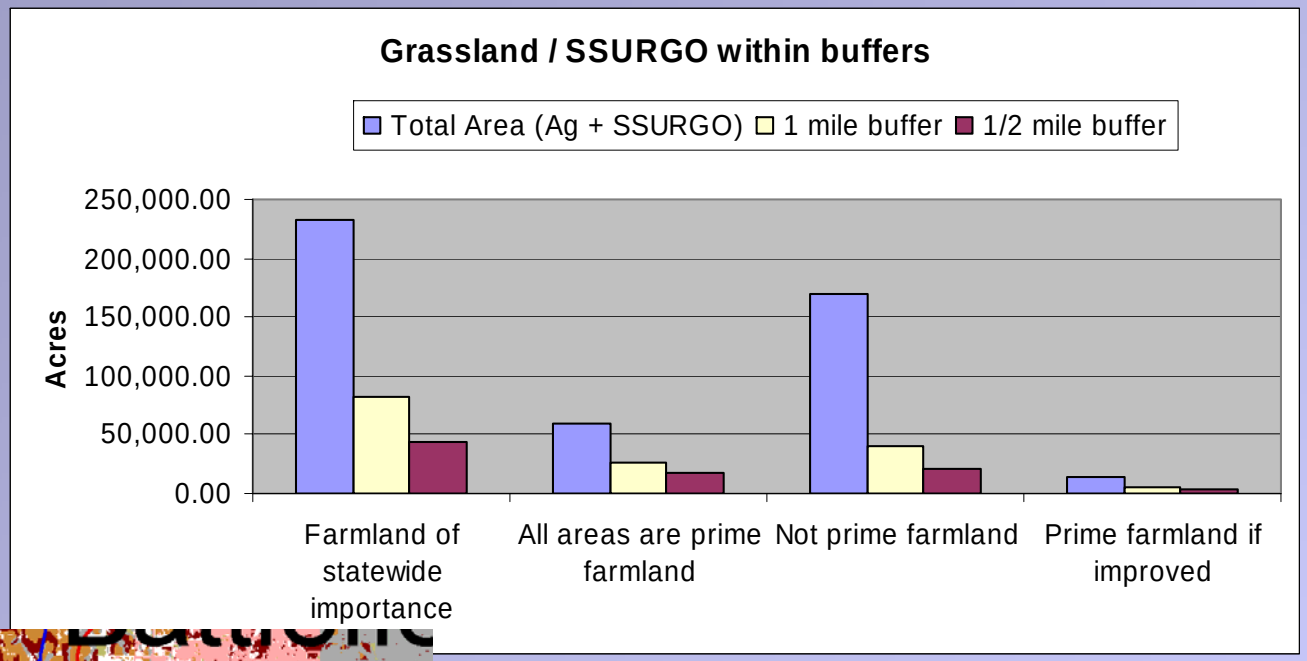


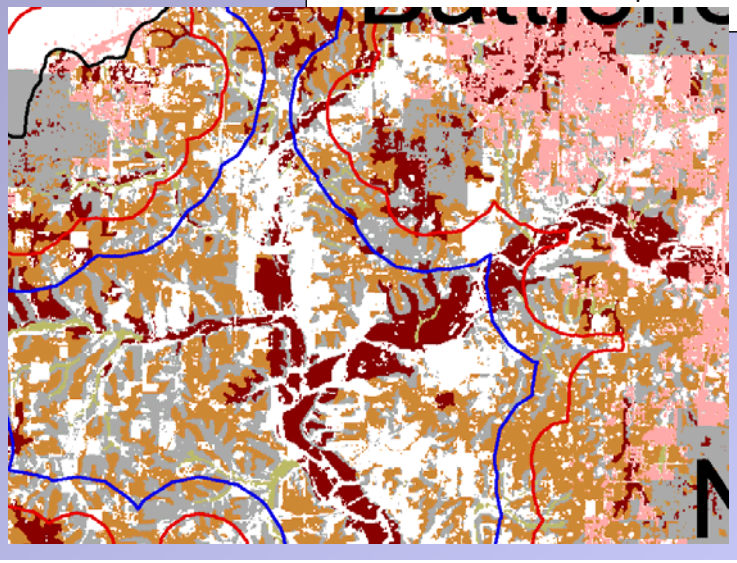
Conservation OAs in buffered zones



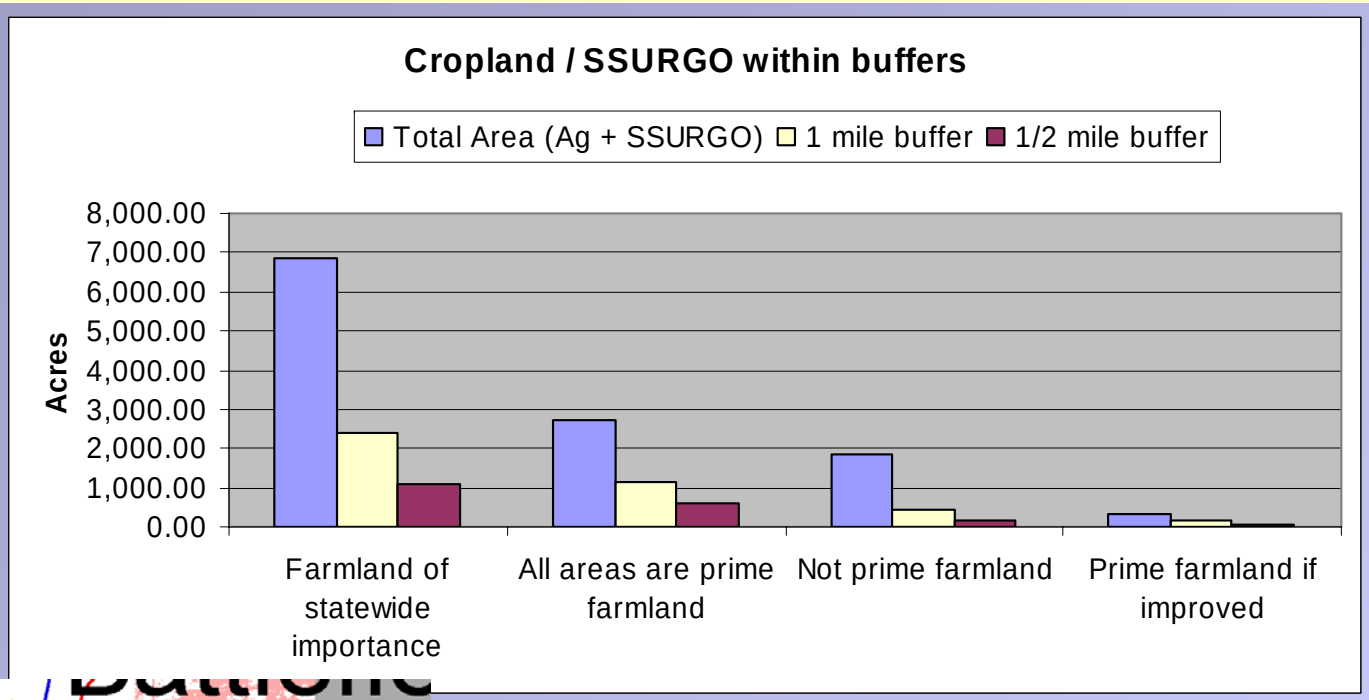


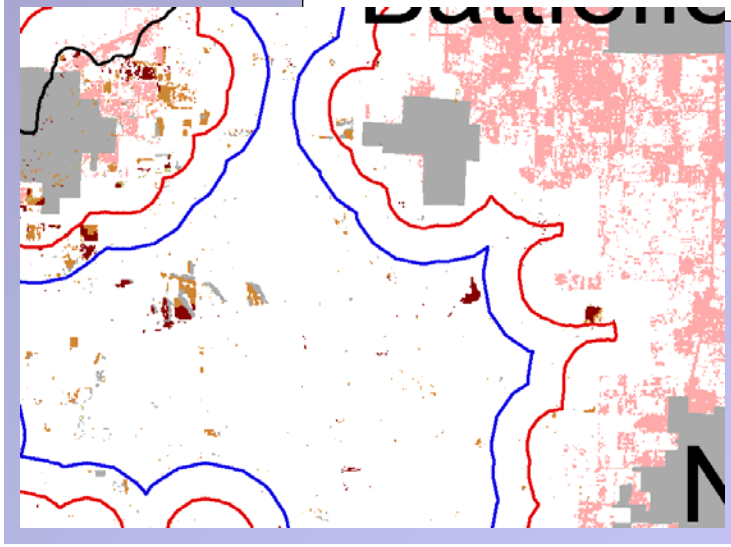
Prime-designated grassland within buffered zones





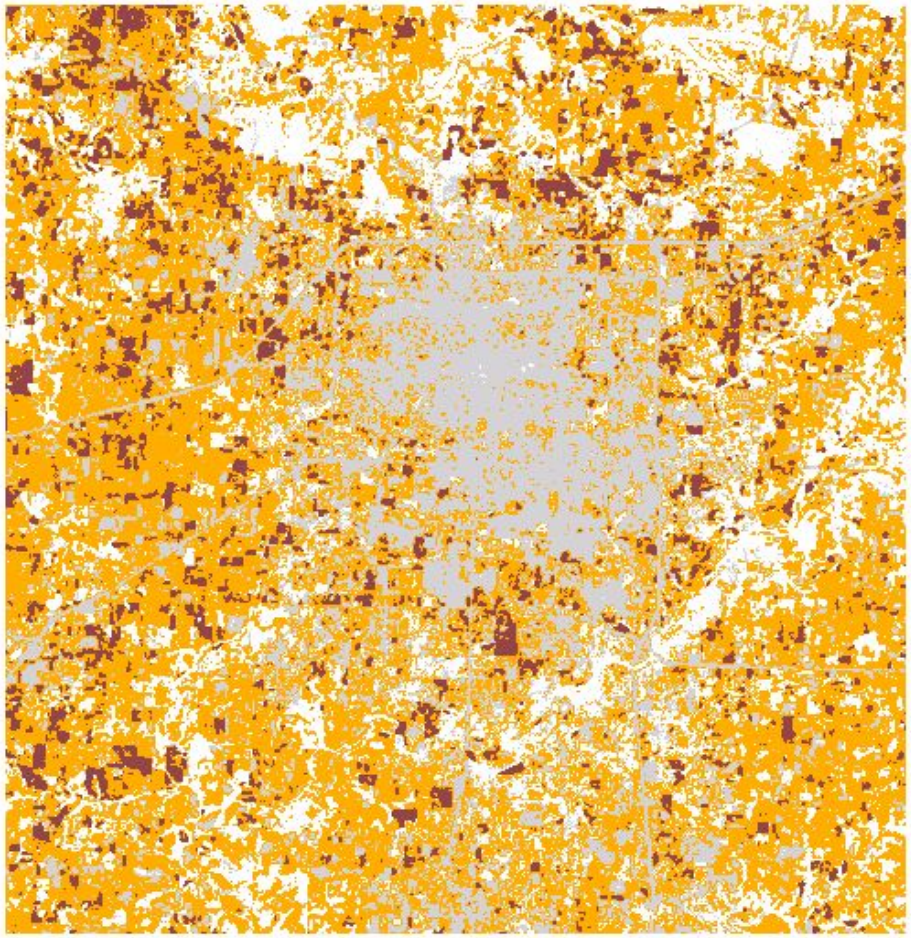
Prime-designated cropland within buffered zones

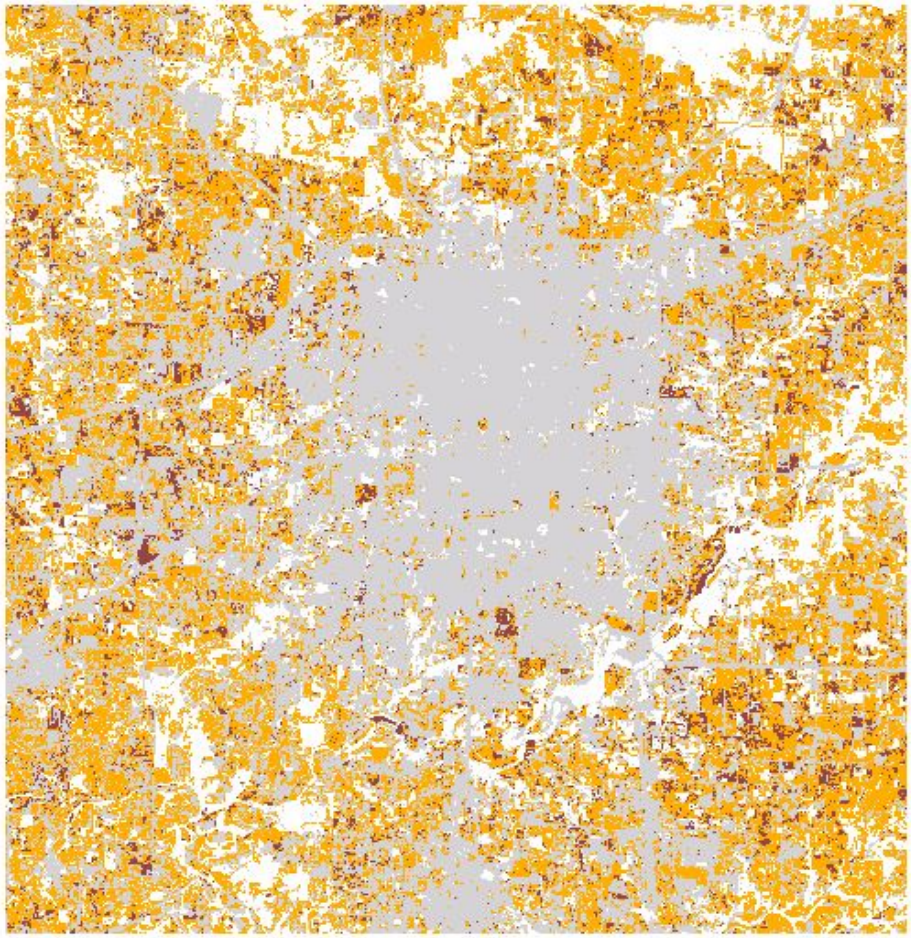




Agricultural change

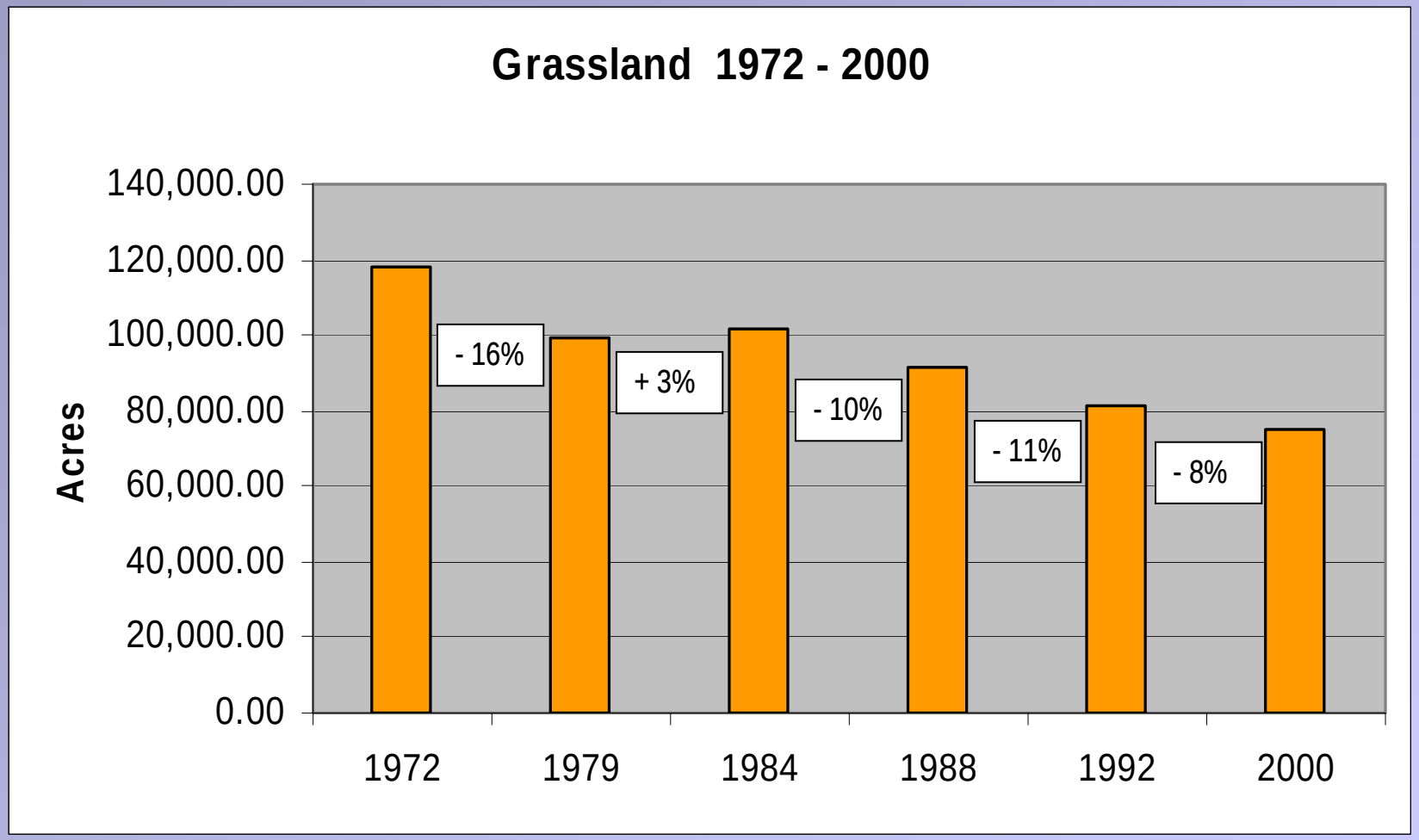
Grassland Cropland





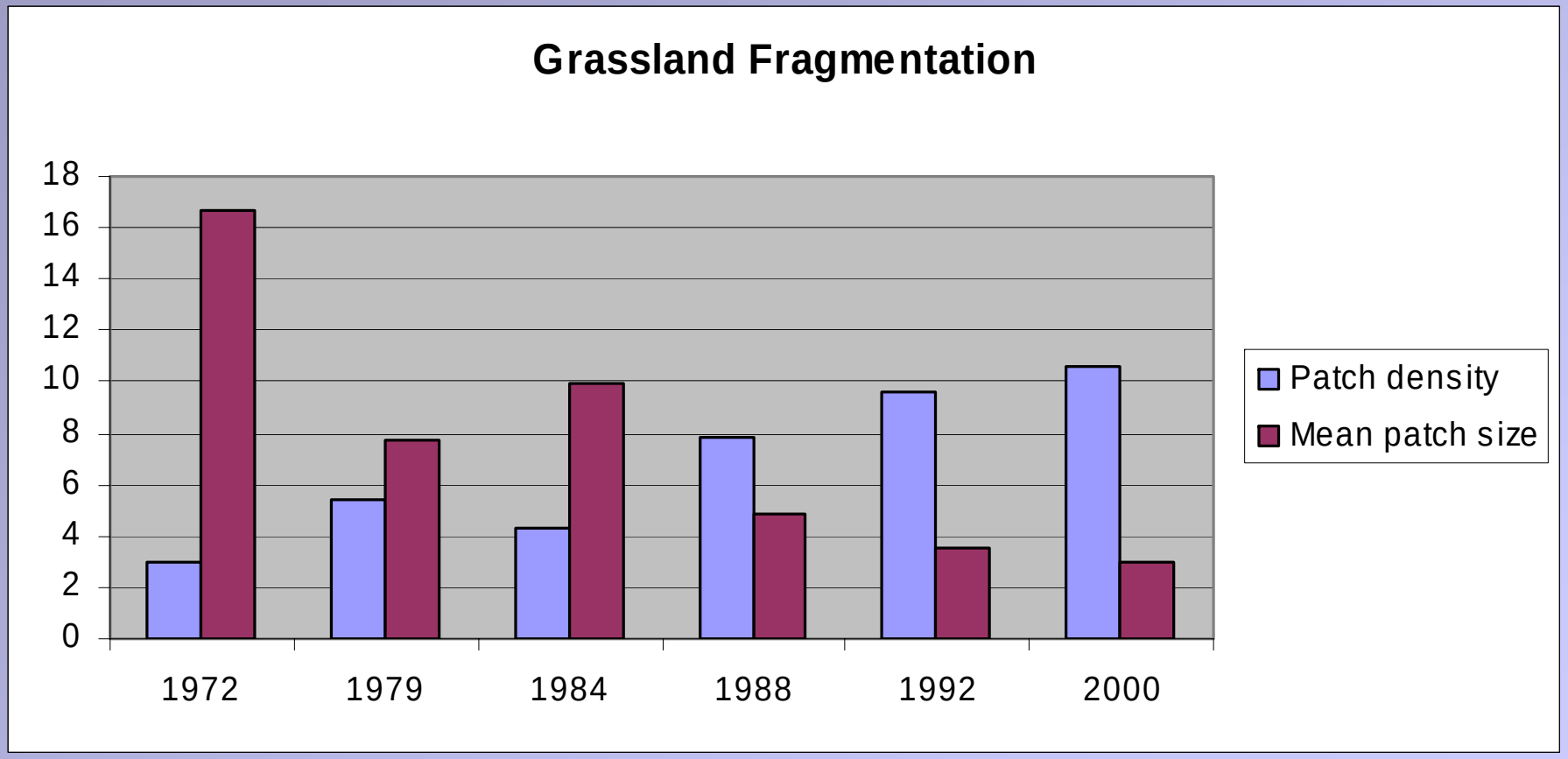
1972 2000

Acres of grassland from 1972-2000

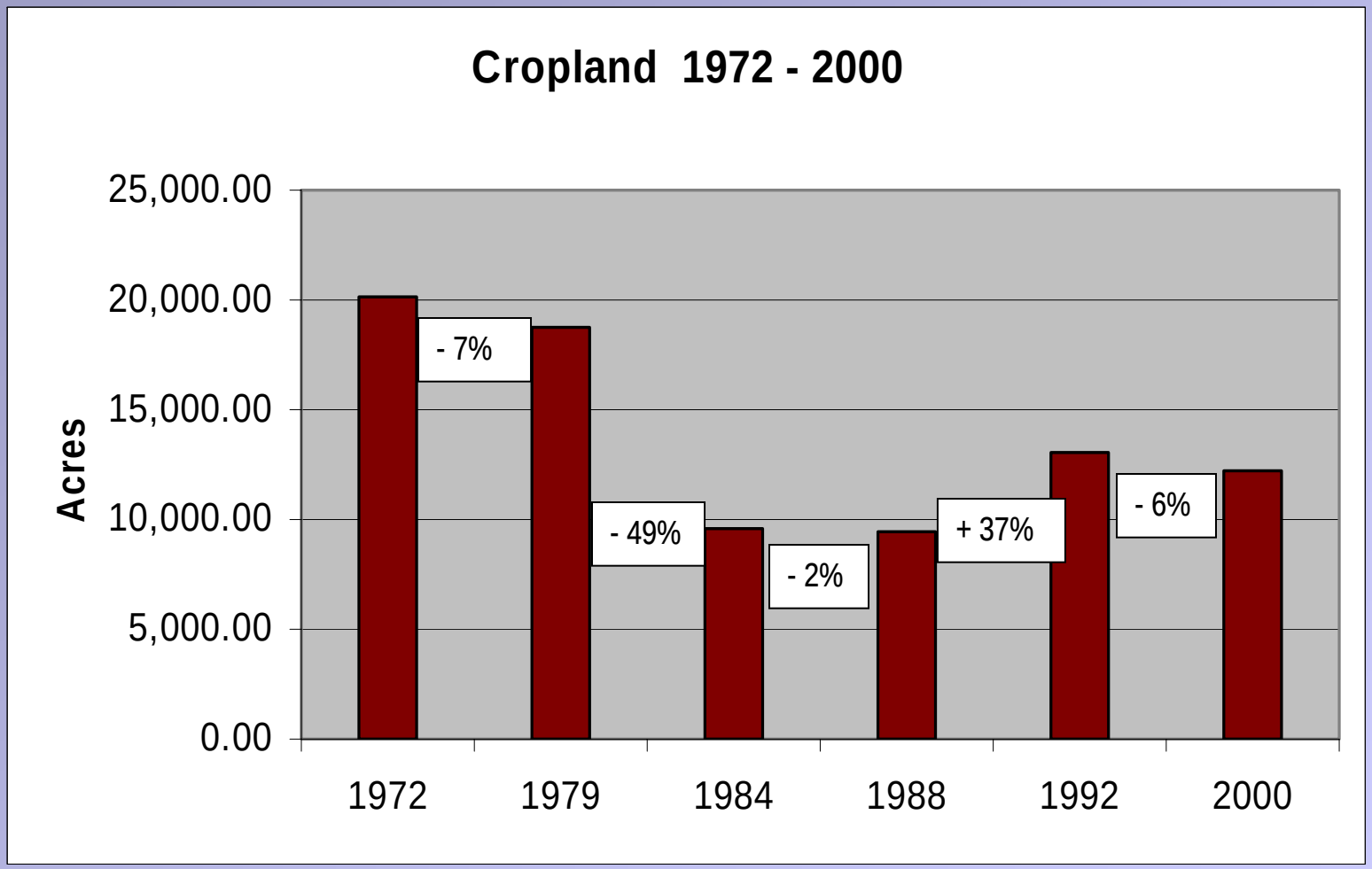


42,841 total grassland acres lost from 1972 – 2000 (36%)

Changes in the grassland landscape

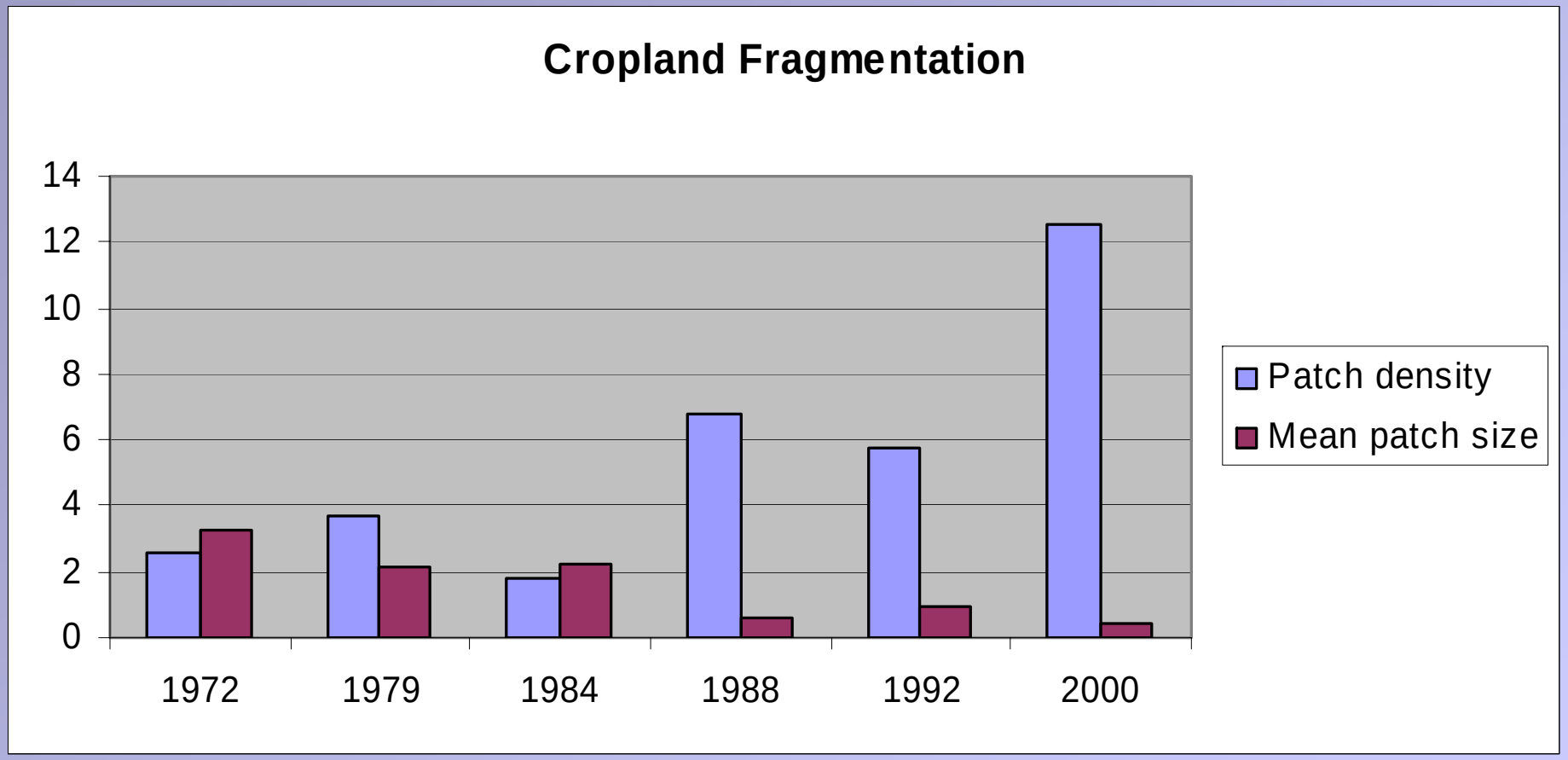


Acres of cropland from 1972 - 2000



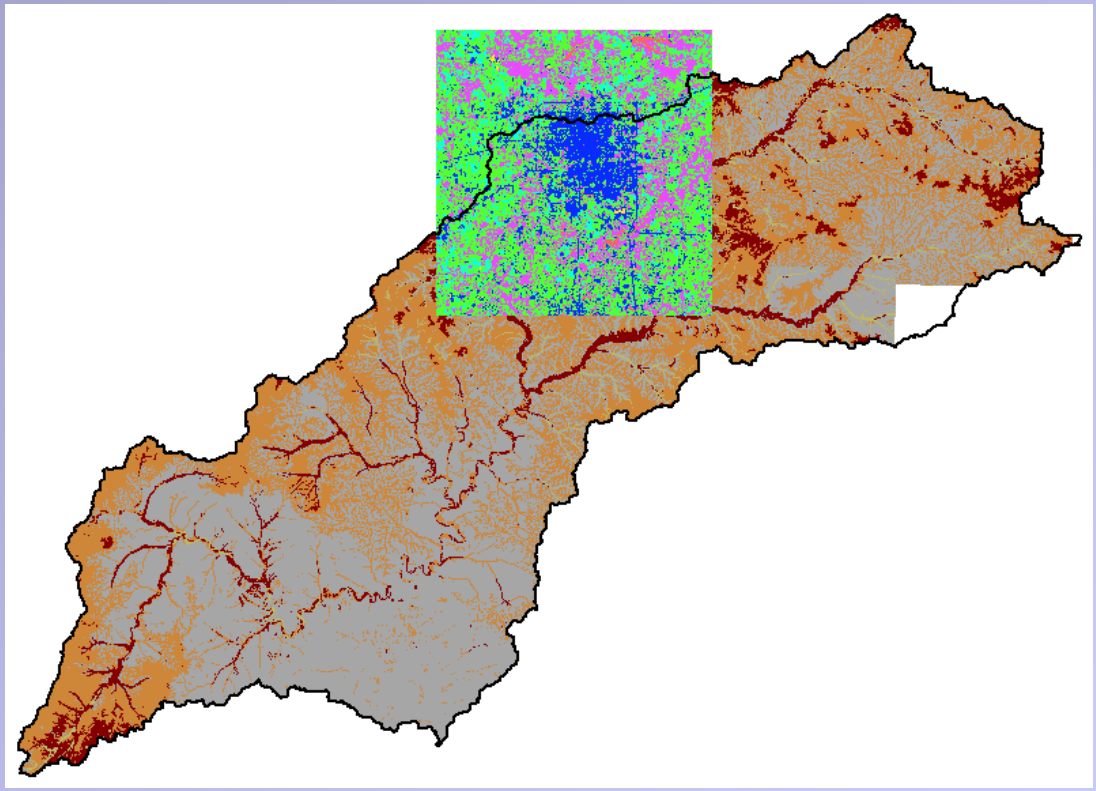
7,885 total cropland acres lost from 1972 – 2000 (39%)

Changes in the cropland landscape

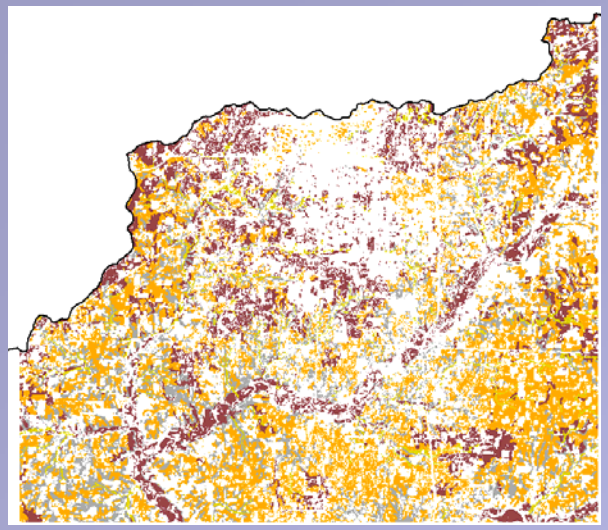


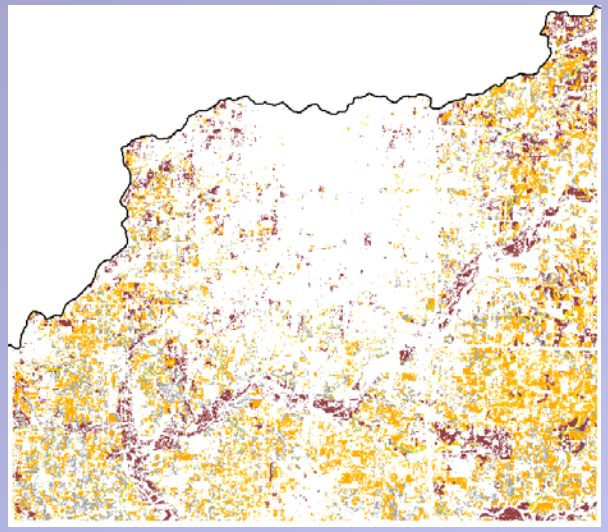
Prime and Statewide Important agricultural change

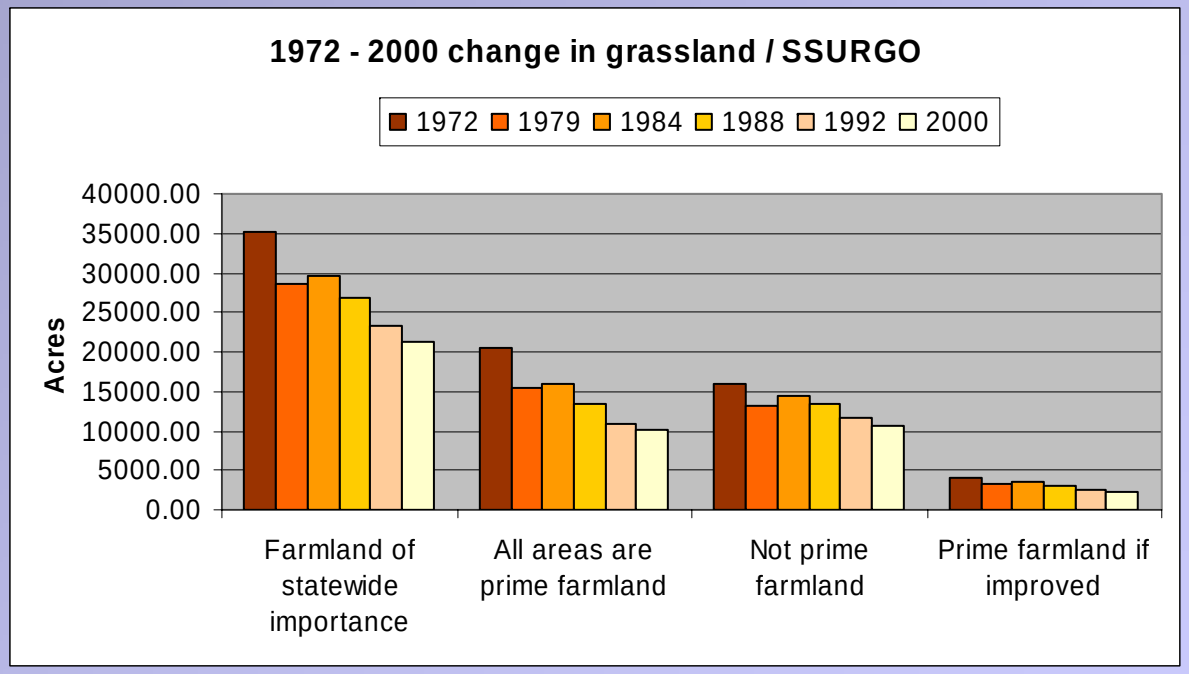
- **How much prime agricultural land has been lost from ’72-’00?**



Loss of prime grassland



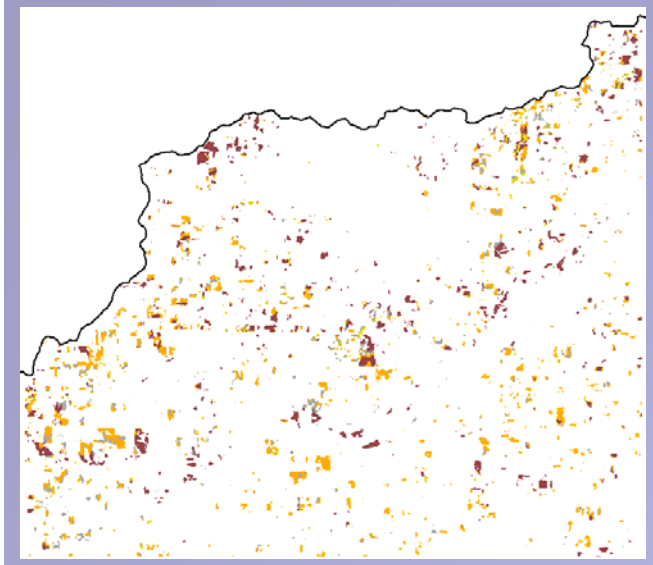


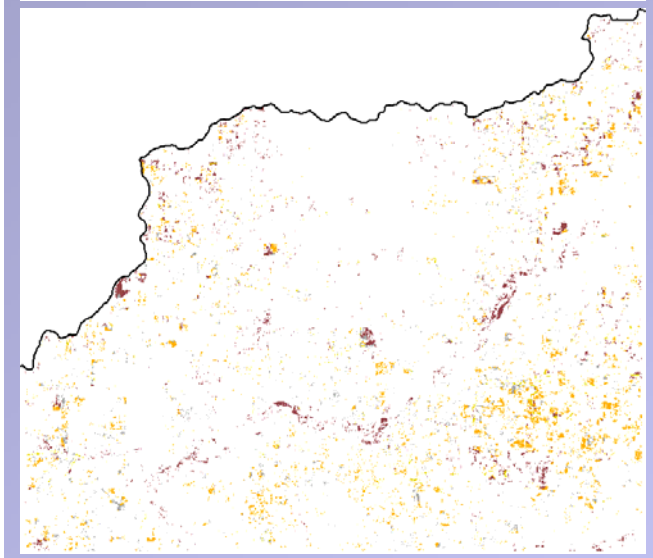


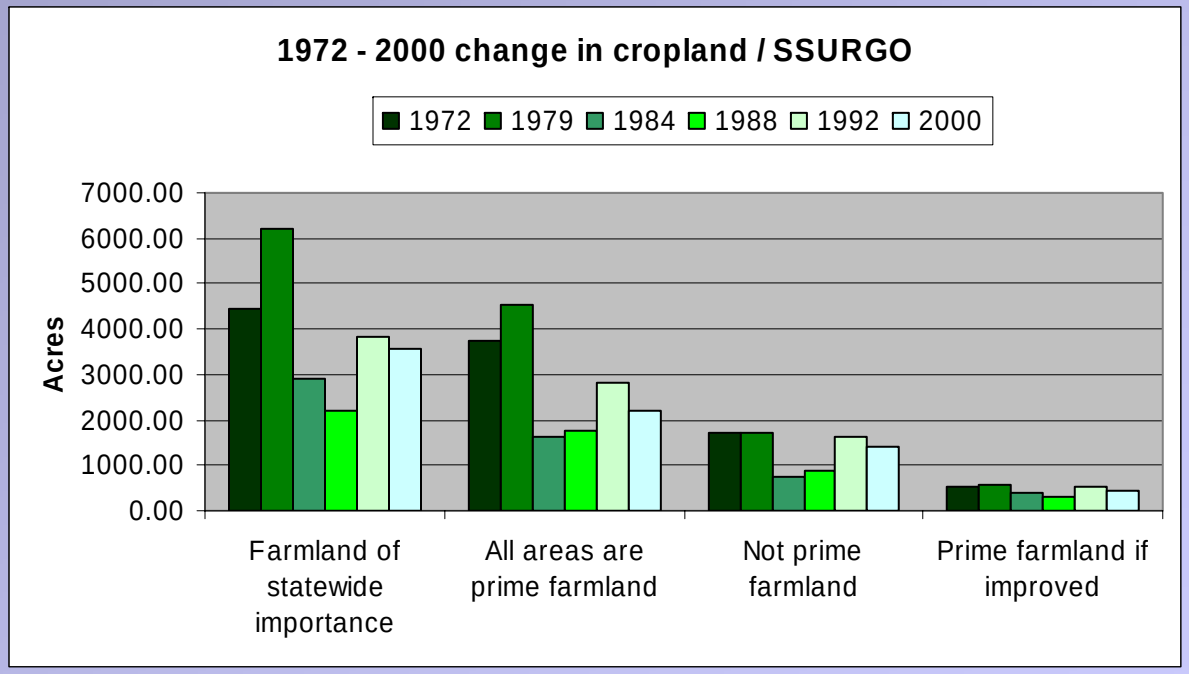
Net loss:	**40%**	**51%**	**34%**	**43%**

Prime Farmland
Statewide Important Farmland
Not Prime Farmland
Prime Farmland if Improved

Loss of prime cropland





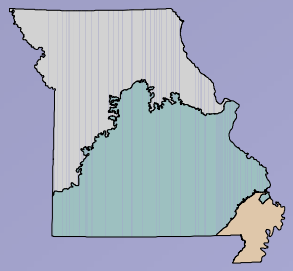


Net loss: 20% 41% 19% 18%

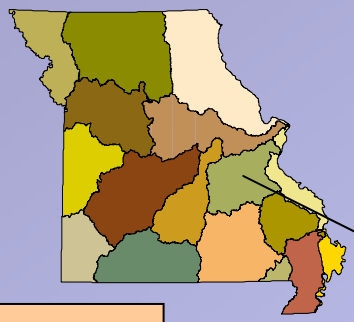
- **Prime Farmland**
- **Statewide Important Farmland**
- **Not Prime Farmland**
- **Prime Farmland if Improved**

Aquatic Ecological Classification for Riverine Ecosystems

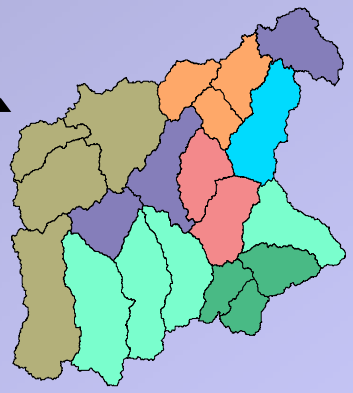
Level 4
Subregions



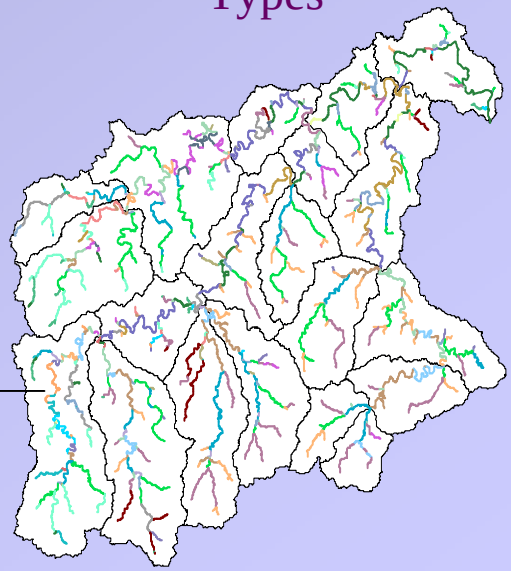
Level 5
Ecological Drainage Units



Level 6
Aquatic Ecological Systems



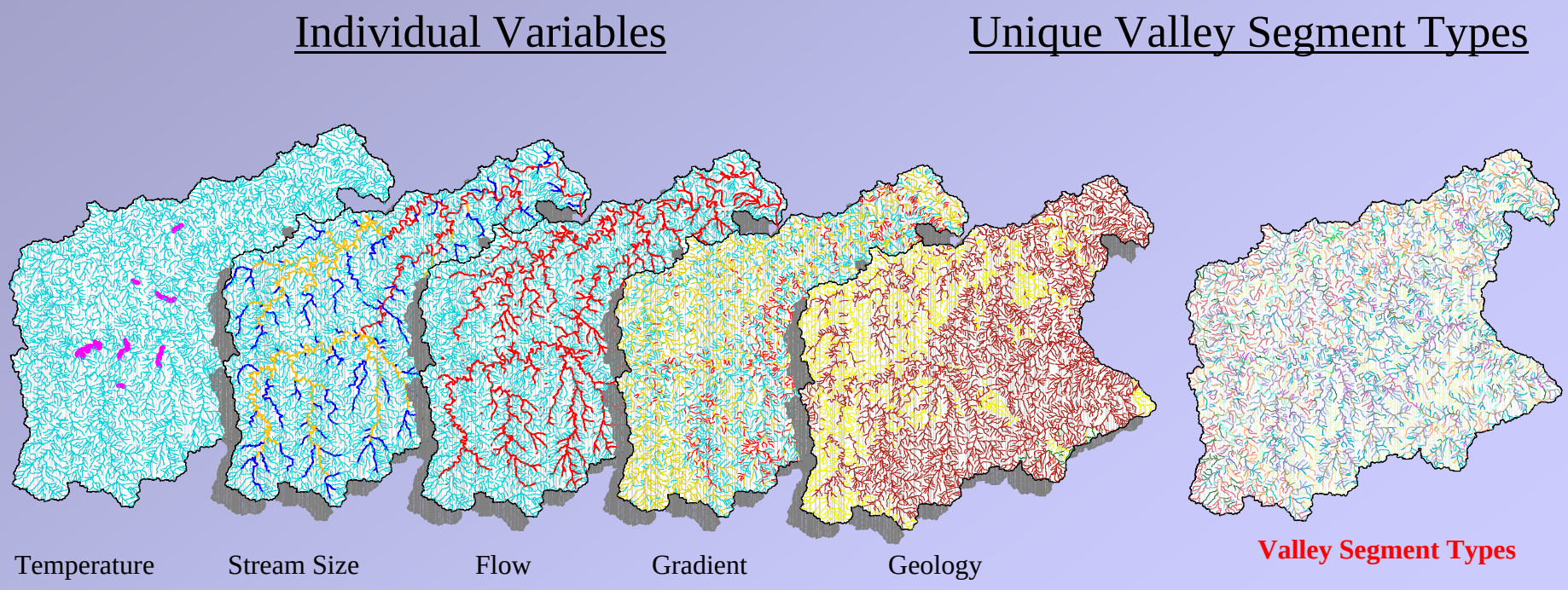
Level 7
Valley Segment Types



Zone:
Nearctic zoogeographic zone
Subzone:
Arctic/Atlantic Drainages
Region:
Mississippi Drainage
Subregion:
Ozark Plateau
Ecological Drainage Unit:
Ozark Plateau/Meramec Drainage
Aquatic Ecological System:
Upper Meramec/Dry Fork, Oak/Woodland Plain, sandstone dominated, low gradient and spring density stream complex
Valley Segment Type:
Warm, perennial, creek with a relatively high gradient, flowing through sandstone, and connecting to another creek

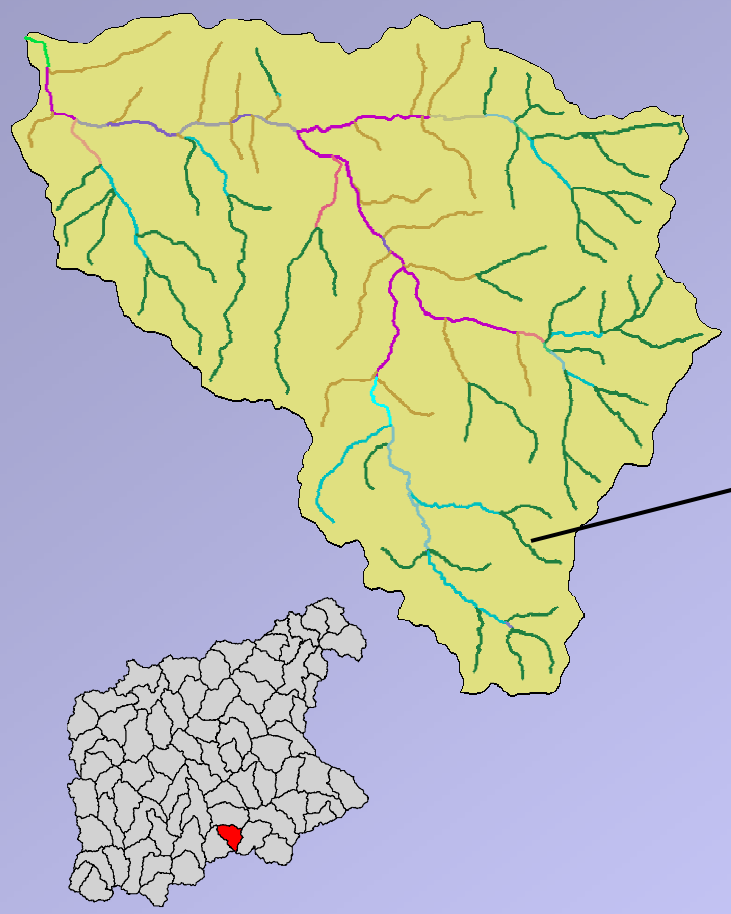
Aquatic ecosystems

- **Level 7: Valley Segment Types**
  - Valley segments stratify a continuous stream network into distinct hydrogeomorphic patches



Aquatic ecosystems

- **What we know from Valley Segment Classification**



211210121
211220021
211220121
211230021
211230121
212210021
212210121
212220021
212220121
212230021
212230121
221210021
221220021
221230021
221230421

Valley Segment Type Codes and Descriptions

212230021 = Valley Segment Type Code

2 = Warm water

1 = Headwater size class

2 = Intermittent flow

2 = Flowing through dolomite/limestone

3 = Relatively high gradient

0 = Valley wall interaction (N/A)

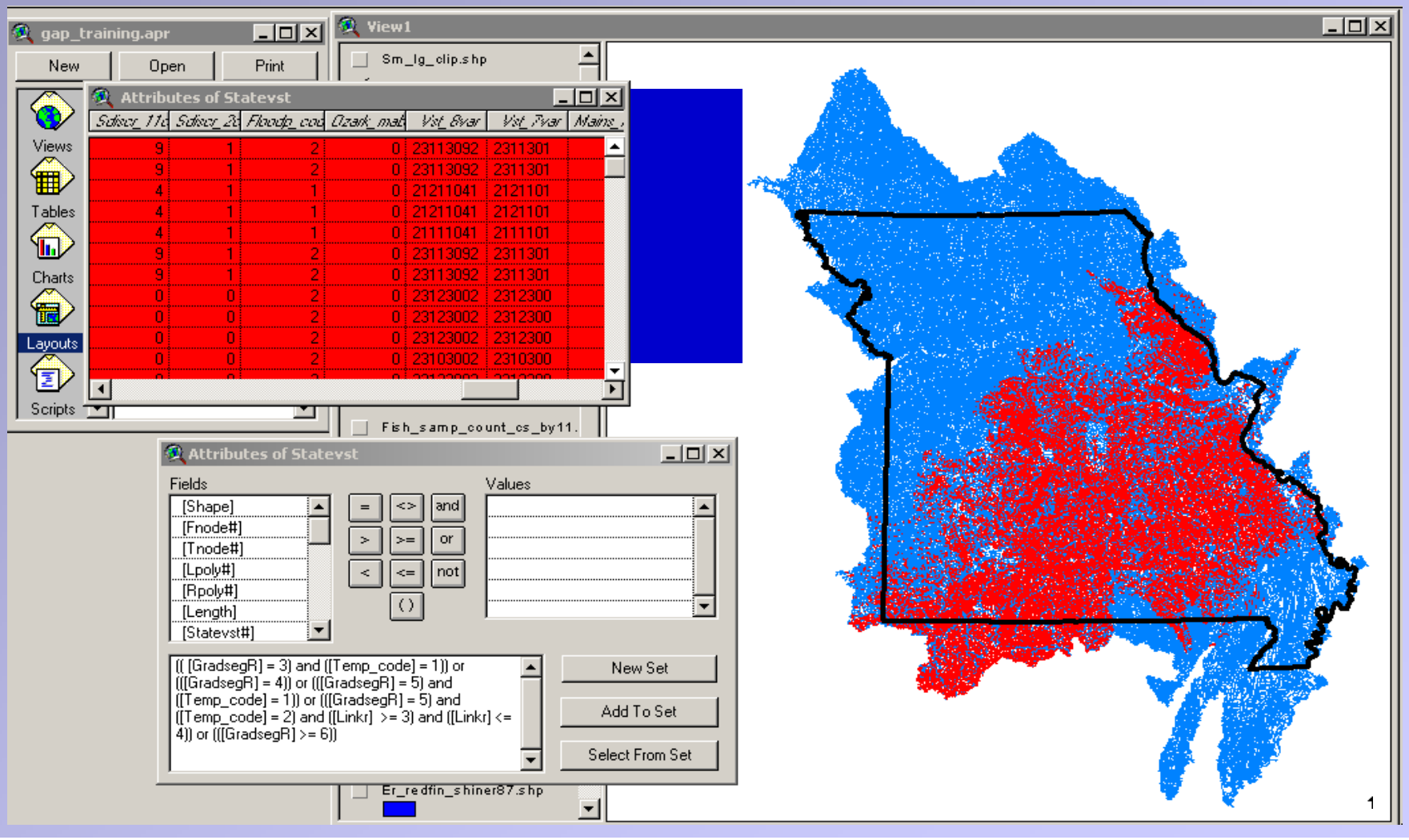
0 = Flows into another headwater

2 = Flowing within own valley

1 = Primary channel

Aquatic ecosystems

- **Potential uses: predicting species distributions and biological potential**



Predicted biological potential

Plains: 10 Species

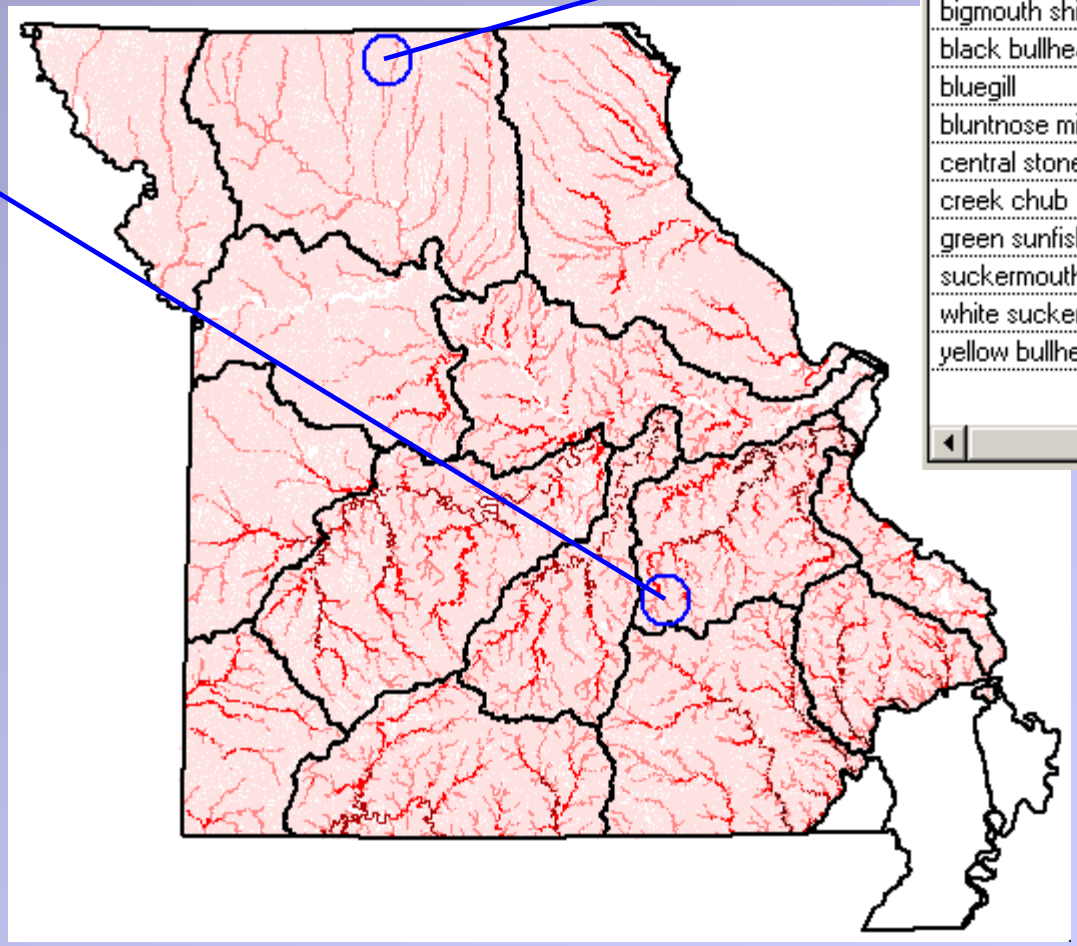
sum7.dbf

Vernacular
bigmouth shiner
black bullhead
bluegill
bluntnose minnow
central stoneroller
creek chub
green sunfish
suckermouth minnow
white sucker
yellow bullhead

Ozarks: 27 Species

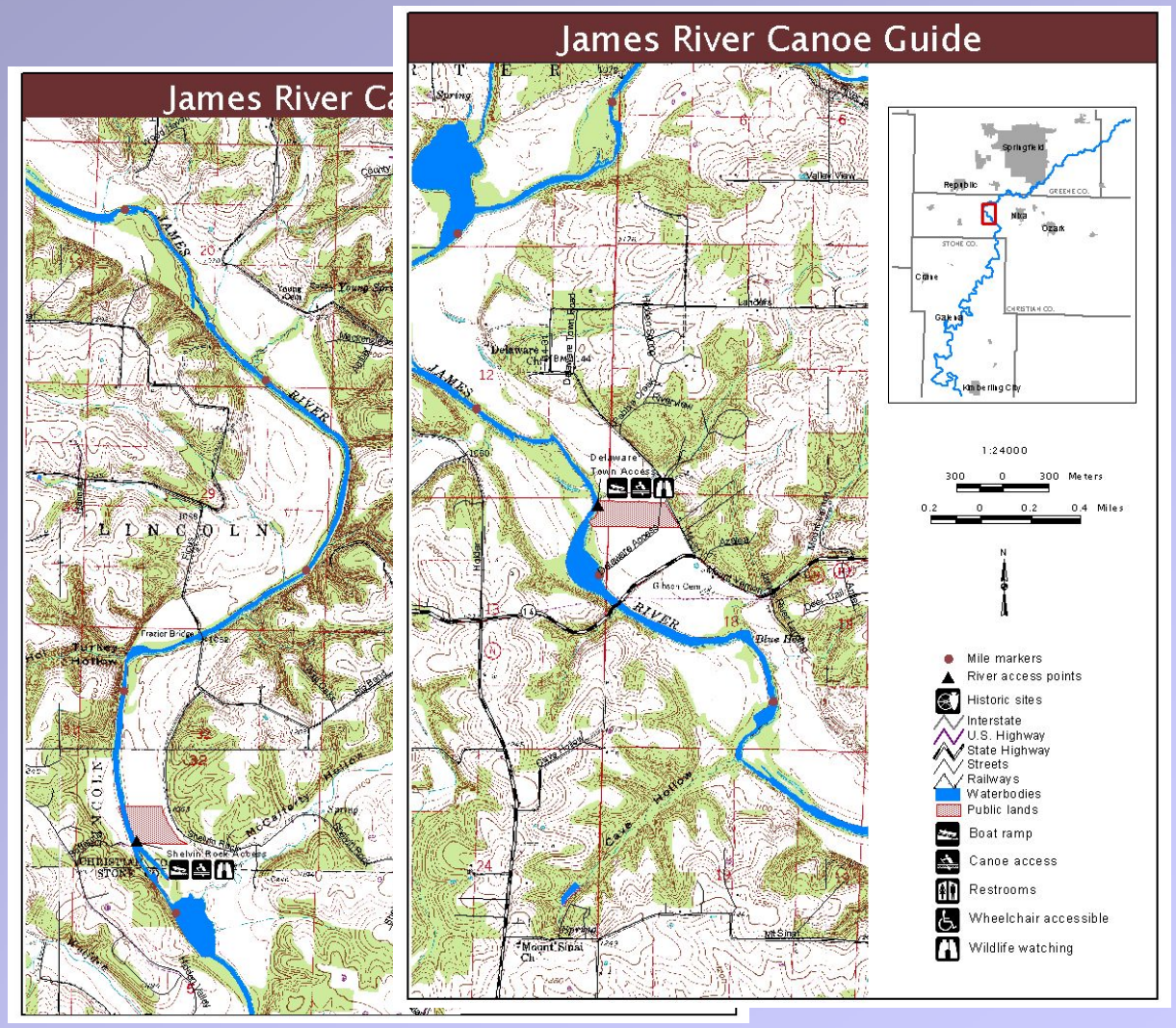
sum6.dbf

Vernacular
Ozark minnow
bigeye chub
black bullhead
blackspotted topminnow
bleeding shiner
bluegill
bluntnose minnow
brook silverside
central stoneroller
common carp
creek chub
creek chubsucker
golden redhorse
golden shiner
green sunfish
greenside darter
largescale stoneroller
logperch
longear sunfish
northern hog sucker
northern studfish
plains topminnow
rainbow darter
slender madtom
smallmouth bass



Outreach

- **James River canoe guide (DRAFT)**

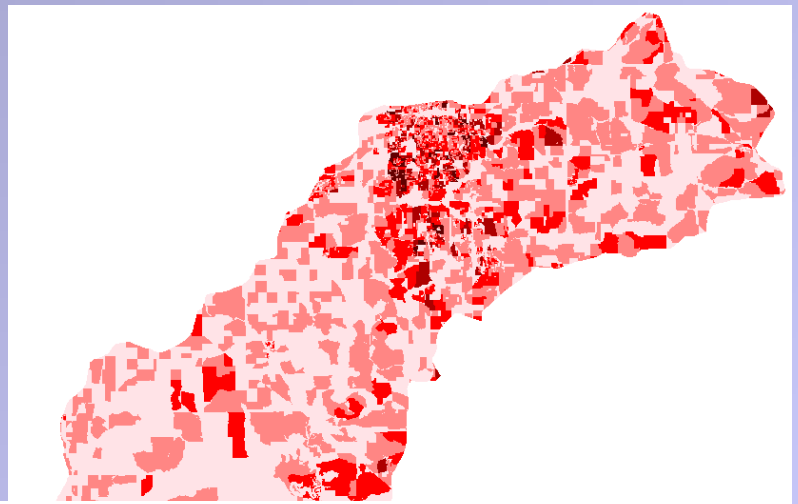
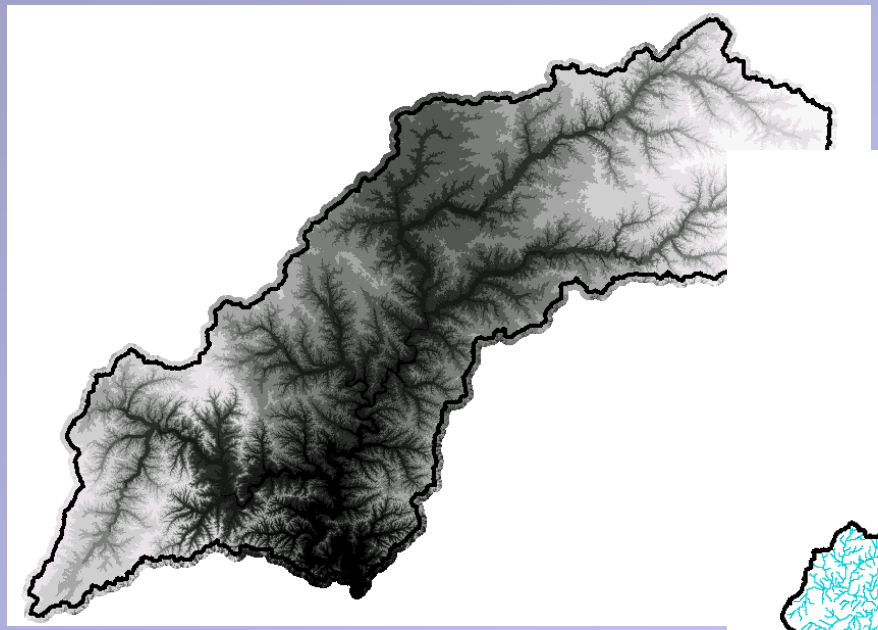
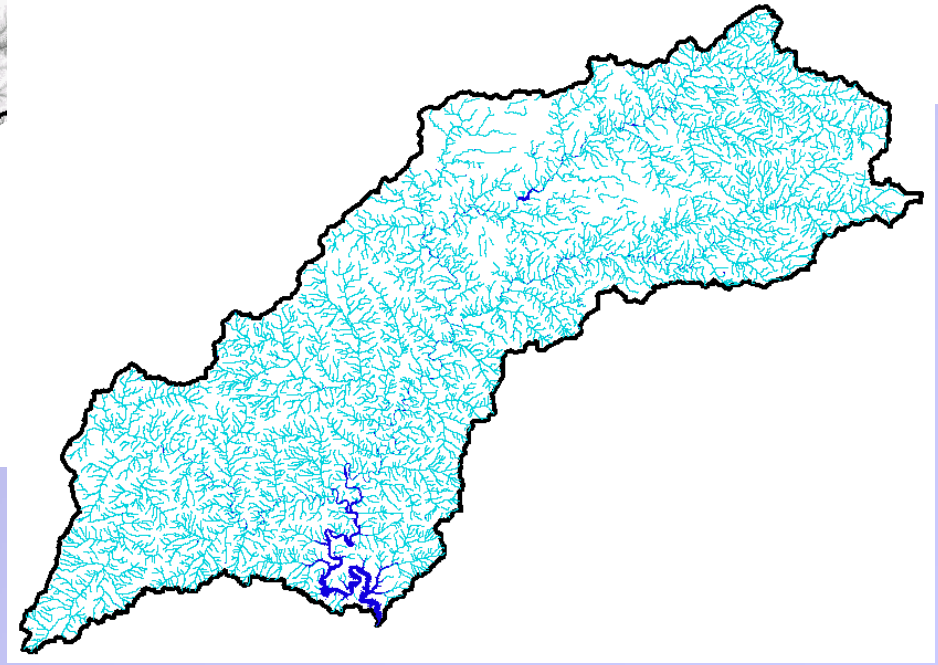


Data list

- **Final products:**
  - **List of data collected or created for this project.**
  - **Check the data of interest.**
  - **Include your name, contact information, and mailing address.**
  - **Distribution of final maps, tables, and reports will go through JRBP or EPA.**

Additional data

Population (1990 and 2000)

High resolution stream network

30 meter digital elevation model