Ecological Planning for the East-West Gateway Region

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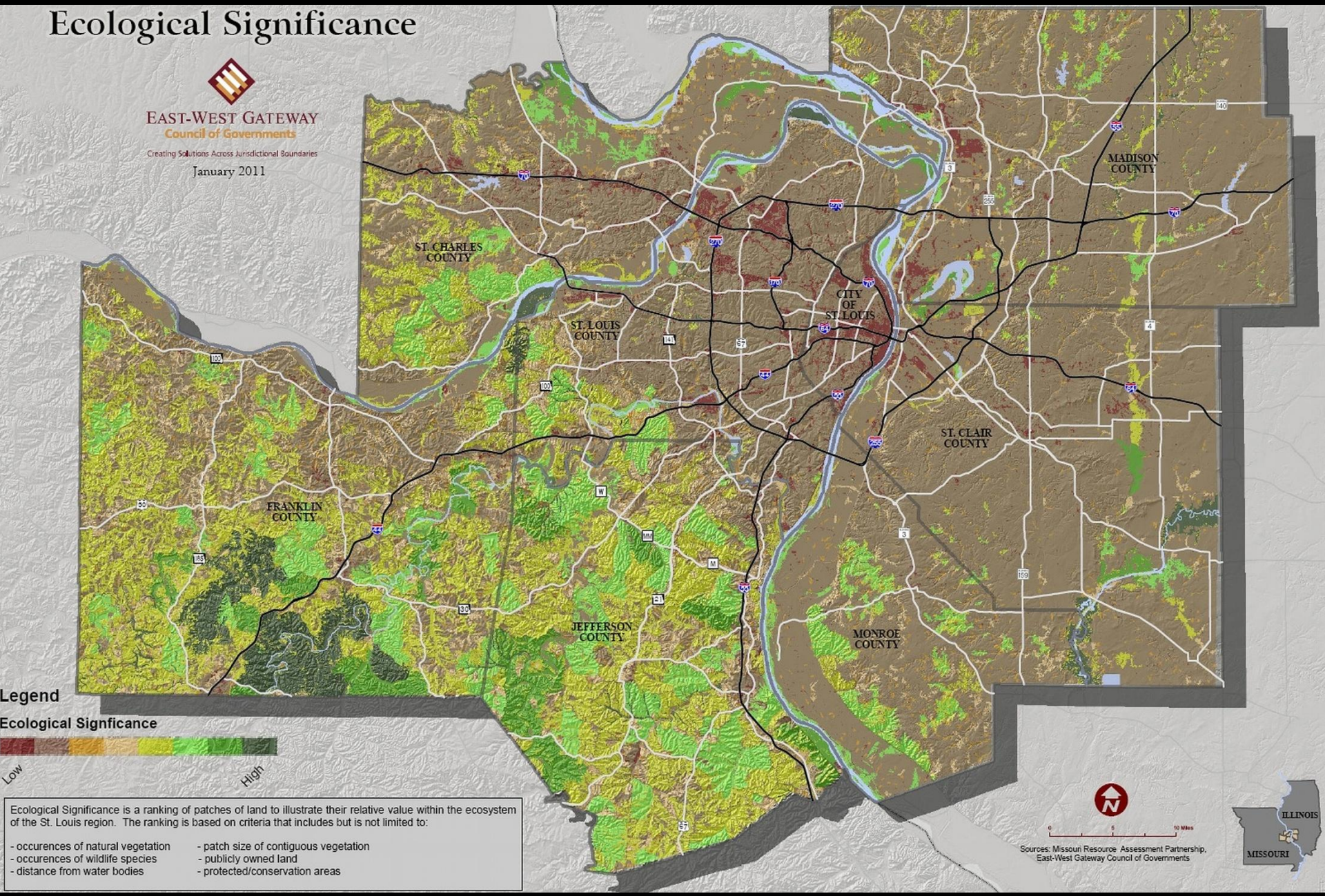
Ecological Significance

EAST-WEST GATEWAY
Council of Governments
Creating Solutions Across Jurisdictional Boundaries

January 2011



Ecological Significance is a ranking of patches of land to illustrate their relative value within the ecosystem of the St. Louis region. The ranking is based on criteria that includes but is not limited to:

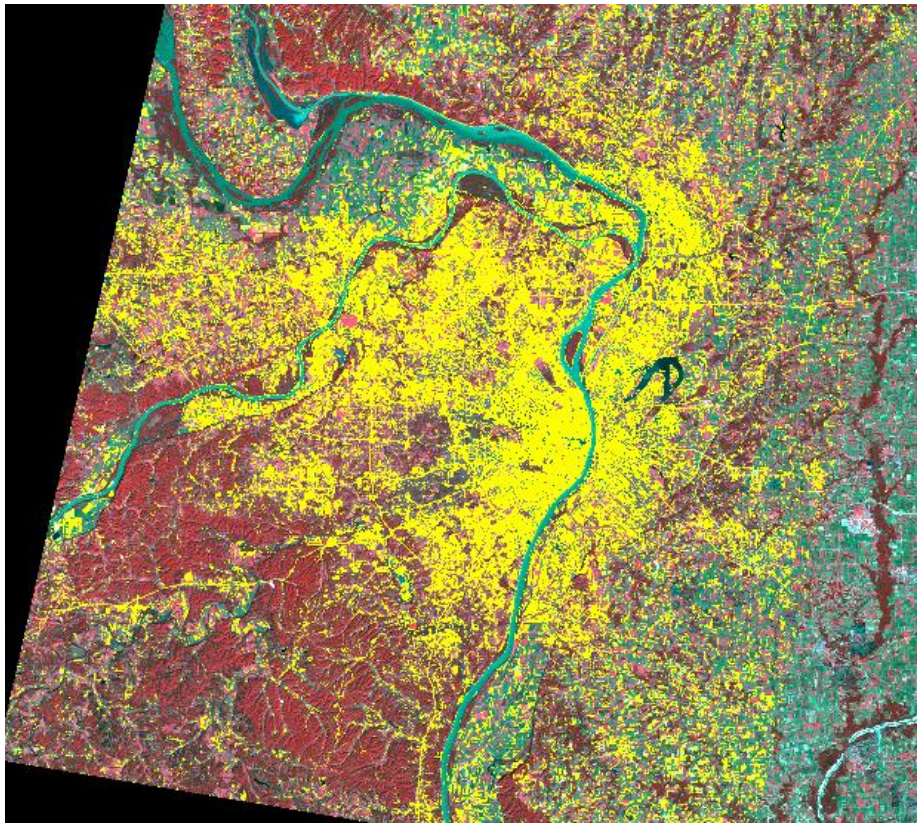
- occurences of natural vegetation
- occurences of wildlife species
- distance from water bodies
- patch size of contiguous vegetation
- publicly owned land
- protected/conservation areas

Sources: Missouri Resource Assessment Partnership, East-West Gateway Council of Governments

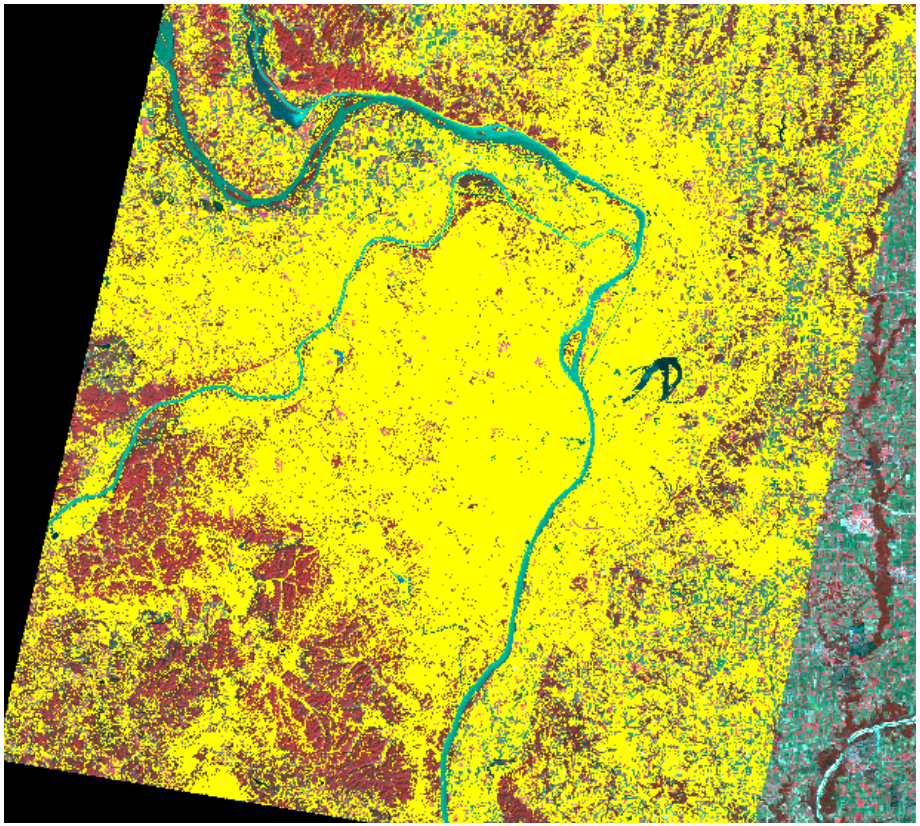
St. Louis, MO

Lost 965 square miles to urban development

1972

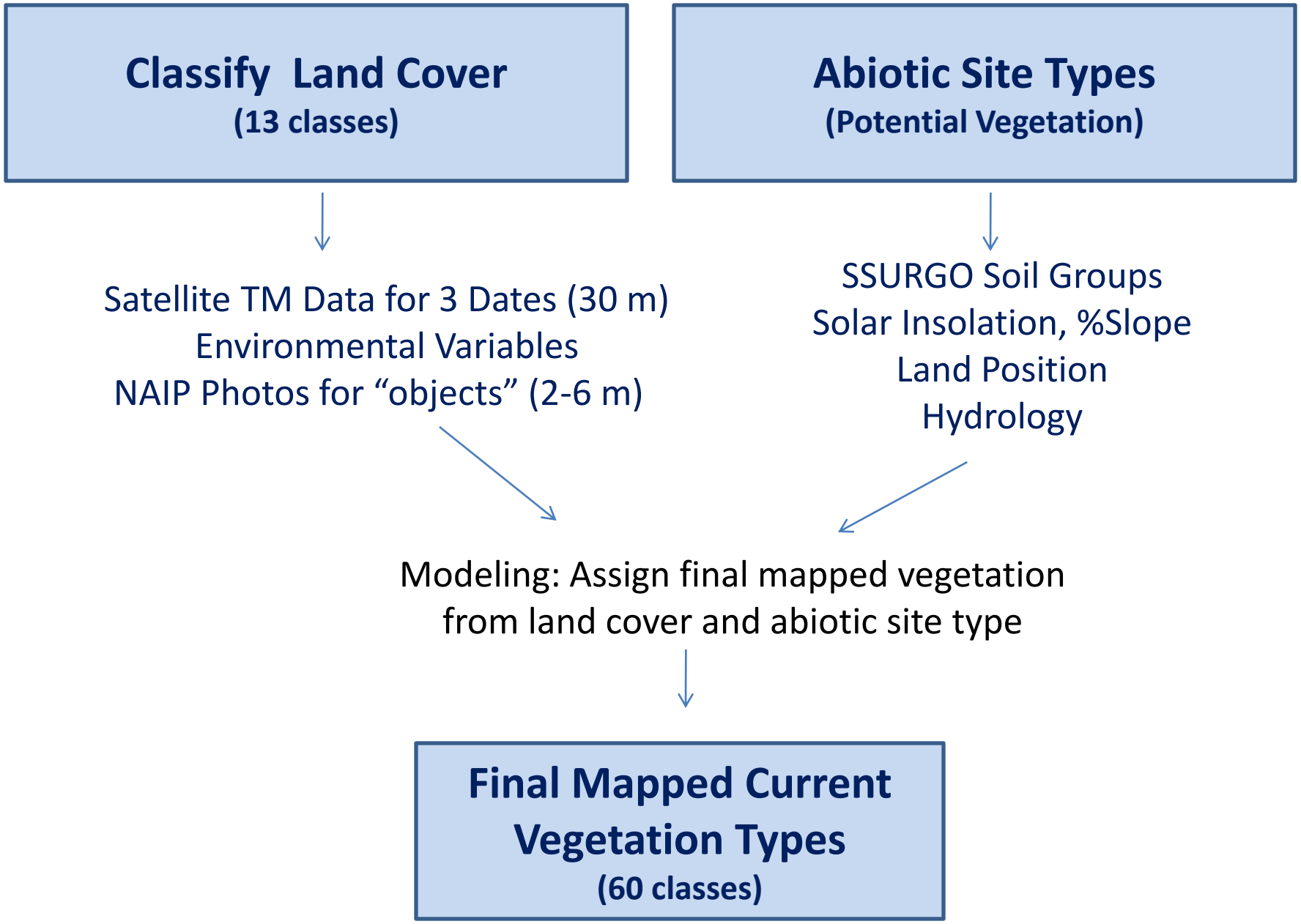


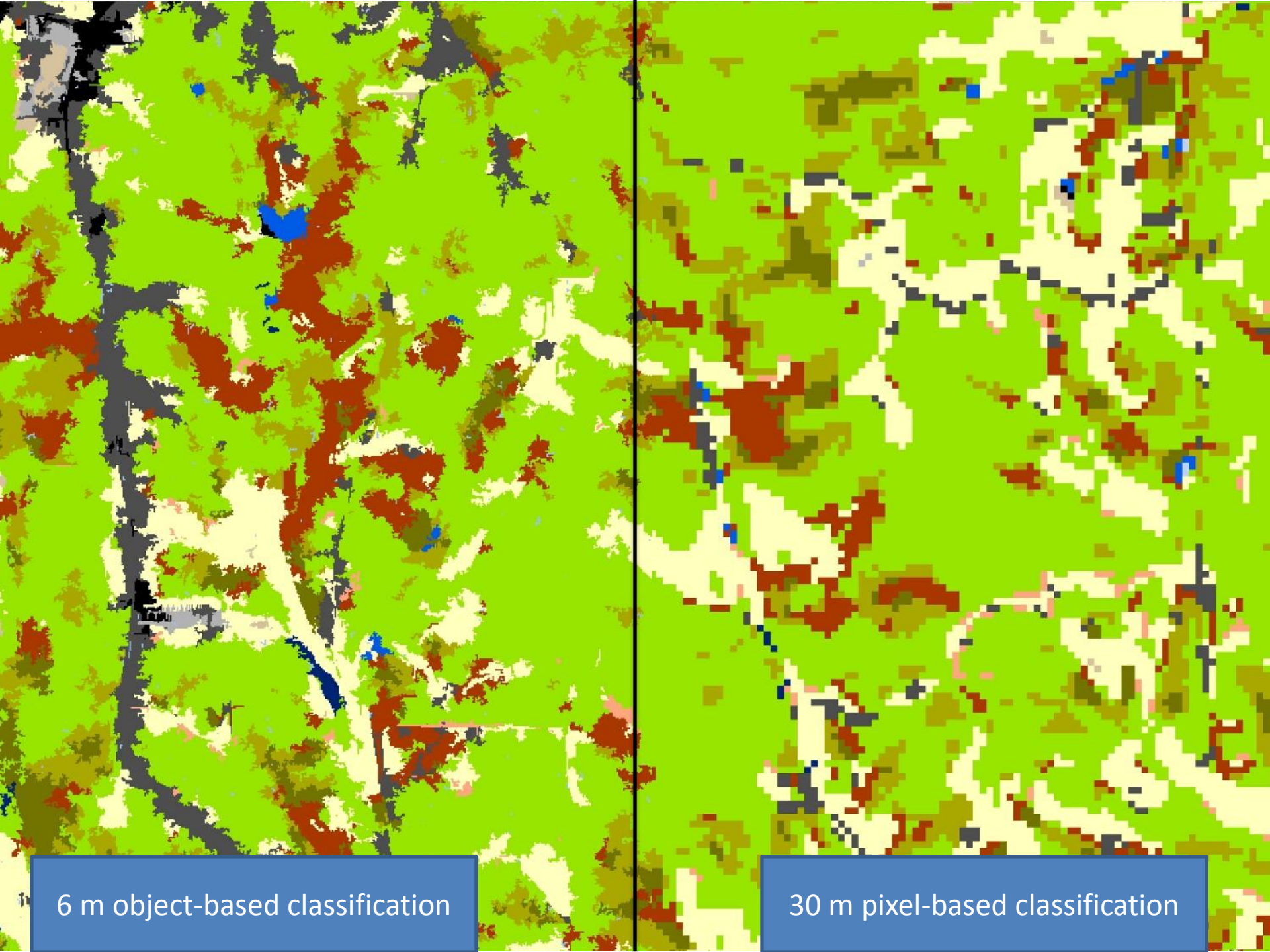
1999

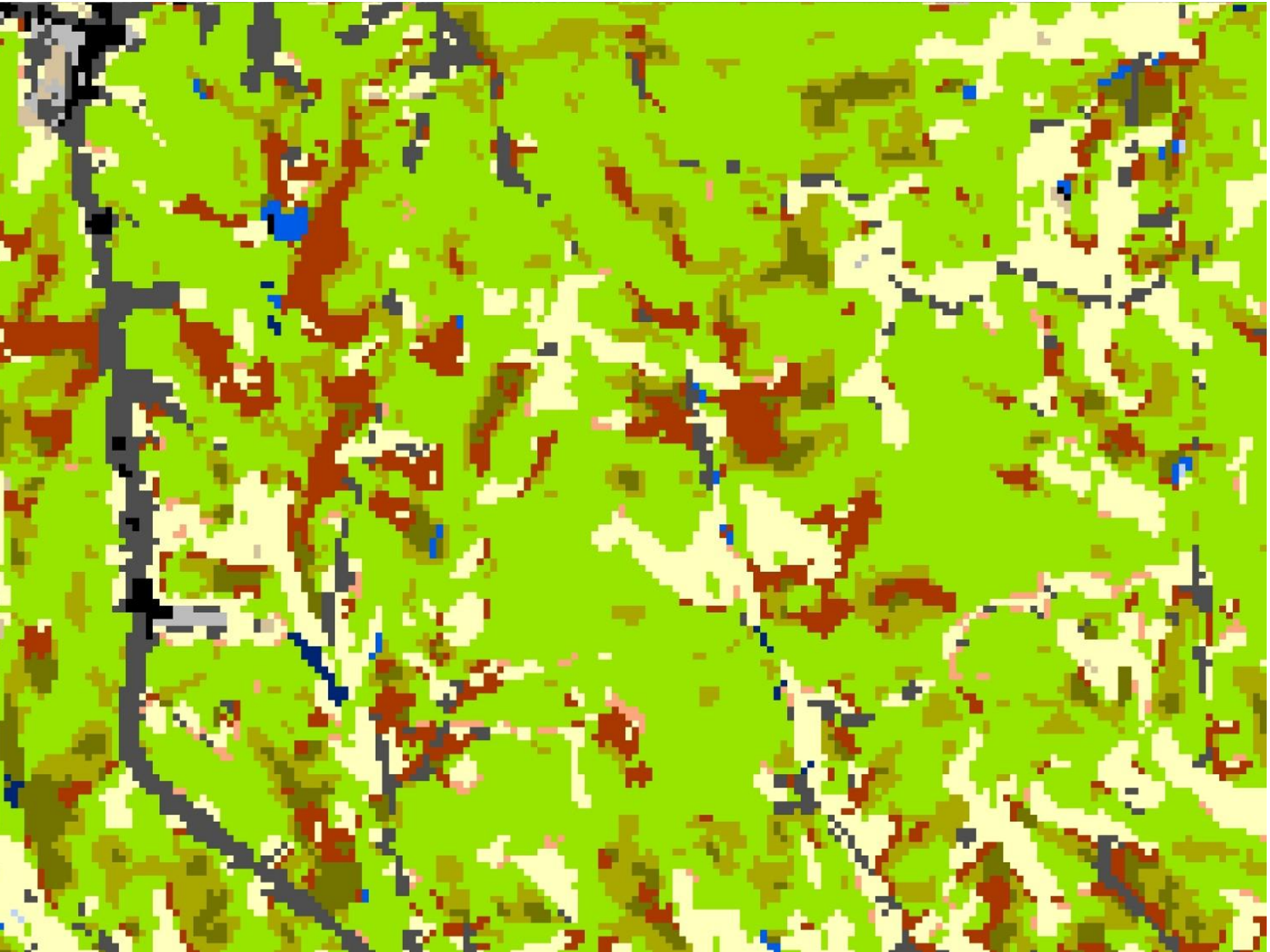


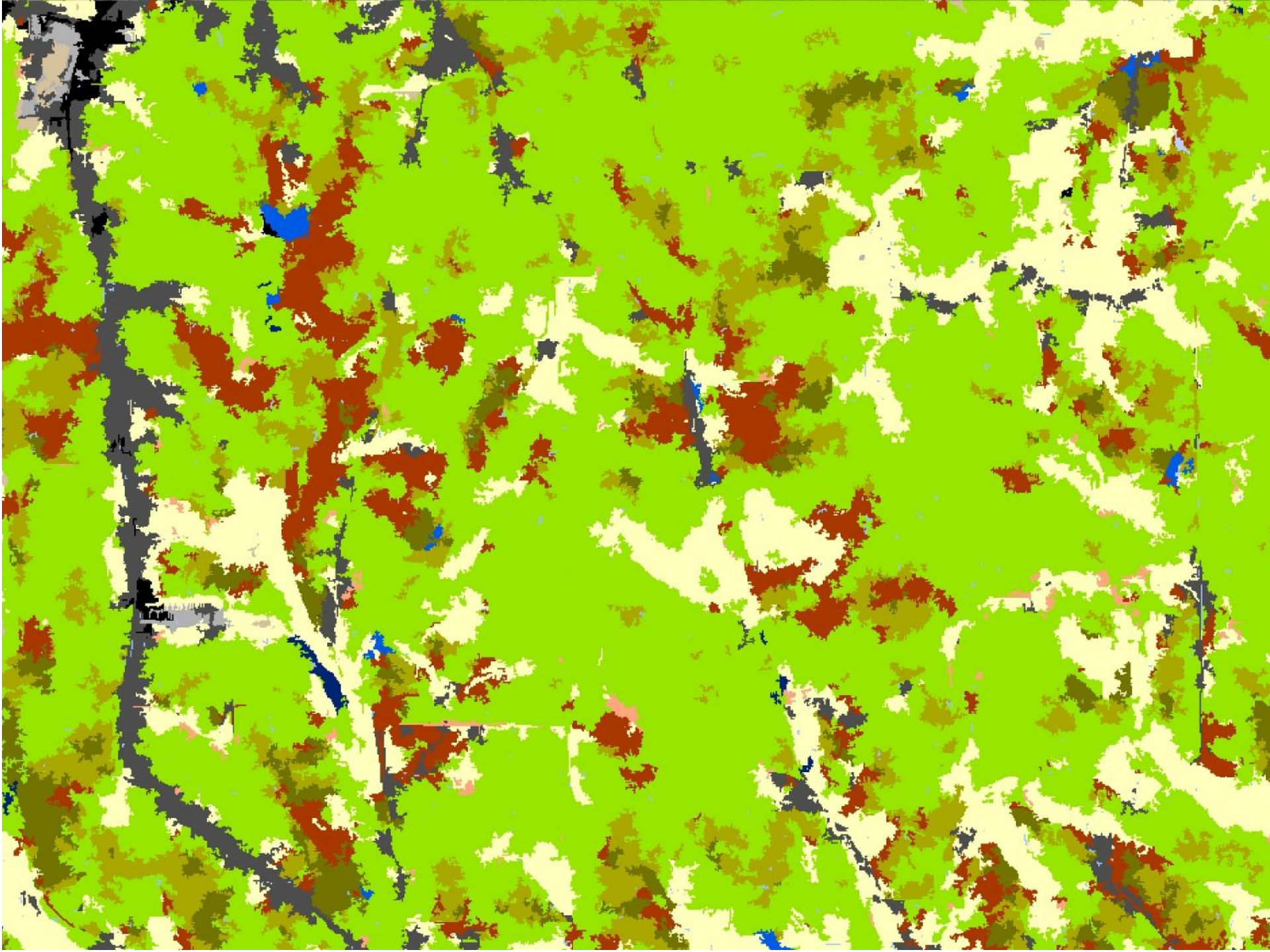
Guiding Criteria

- Provide results that improve conservation outcomes
- Products useful for local and regional planning
- Products easily understood and up-dated
- Requires enhanced mapping of current vegetation, followed by ranking (regional, project-level, wetlands) and use by multiple partners

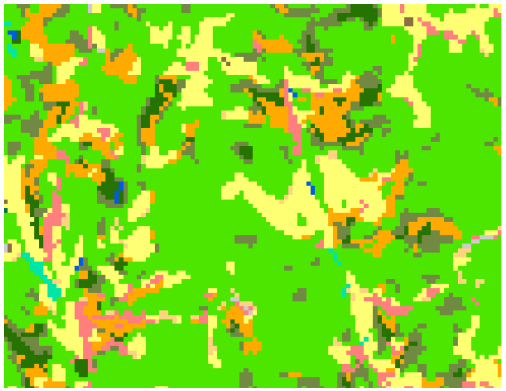

Classify Land Cover
(13 classes)
Abiotic Site Types
(Potential Vegetation)
Satellite TM Data for 3 Dates (30 m)
Environmental Variables
NAIP Photos for "objects" (2-6 m)
SSURGO Soil Groups
Solar Insolation, %Slope
Land Position
Hydrology
Modeling: Assign final mapped vegetation
from land cover and abiotic site type
Final Mapped Current
Vegetation Types
(60 classes)


6 m object-based classification
30 m pixel-based classification

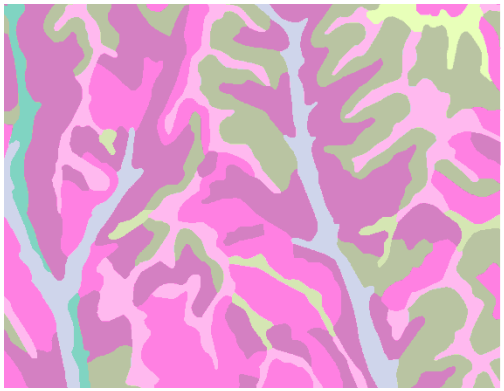




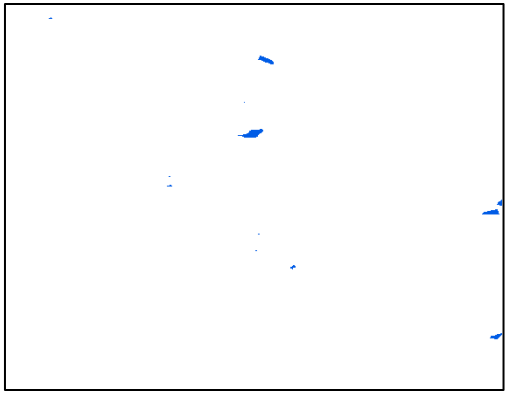
Land Cover and Ancillary Data Applied to Image Objects to Map 60 Current Vegetation Types



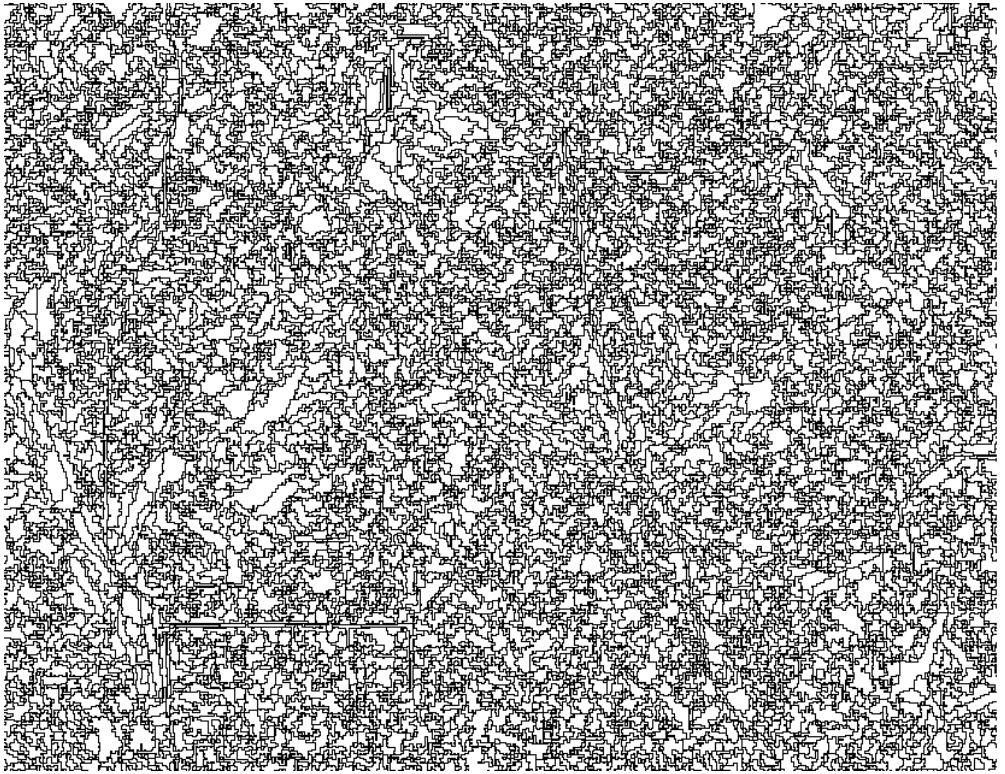
Land Cover

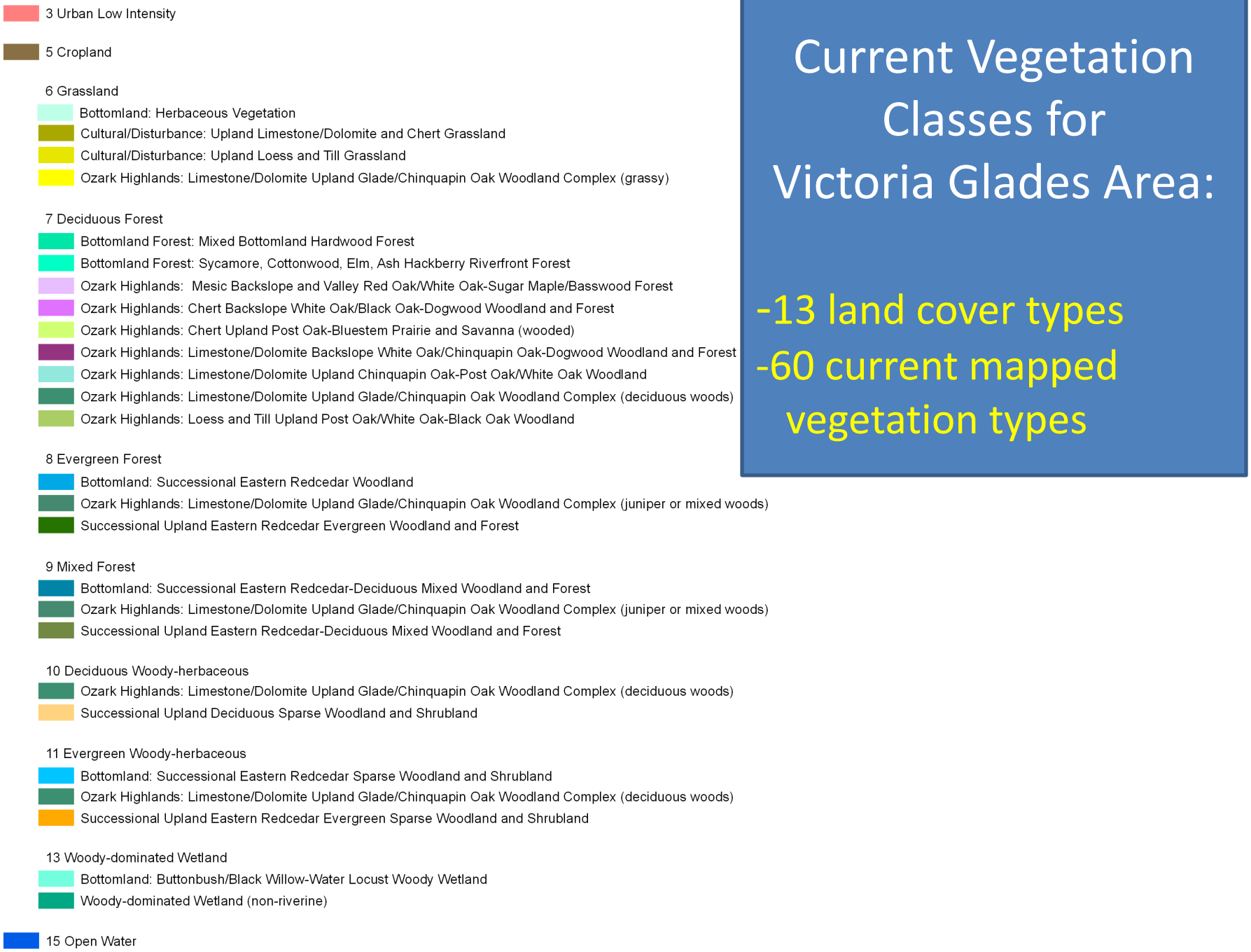


ELT's



"Wettest" Areas





Current Vegetation Classes for Victoria Glades Area:

-13 land cover types

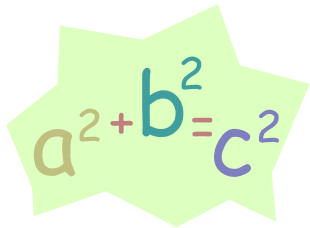
-60 current mapped vegetation types

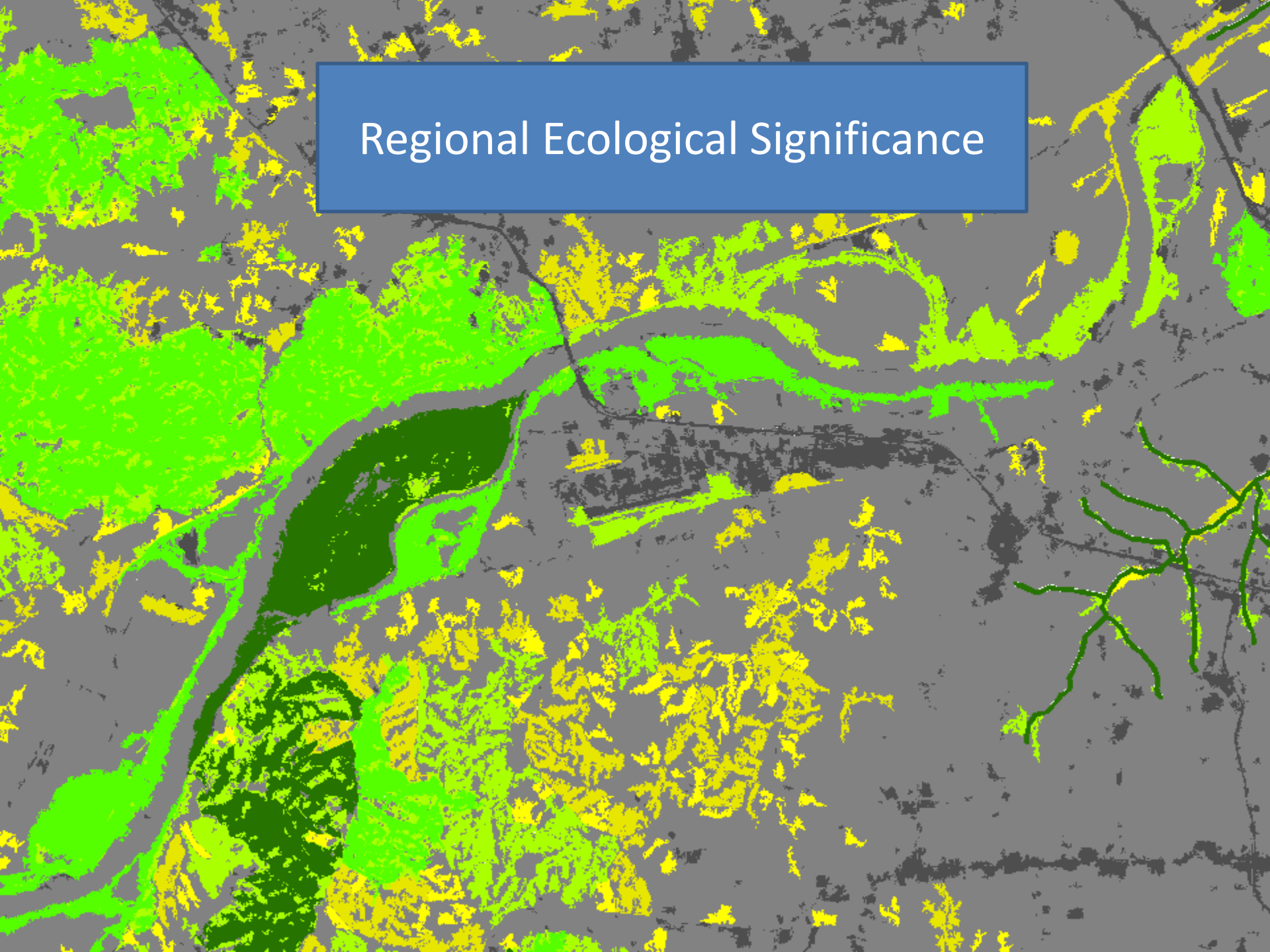
Table 1. Current vegetation of the East-West Gateway region based on community concepts. Disturbance and successional species are often more common in the modern landscape than indicated by these descriptions. Community importance is ranked from least (1) to most (9) important. See Appendix 1 for detailed descriptions of more natural types.

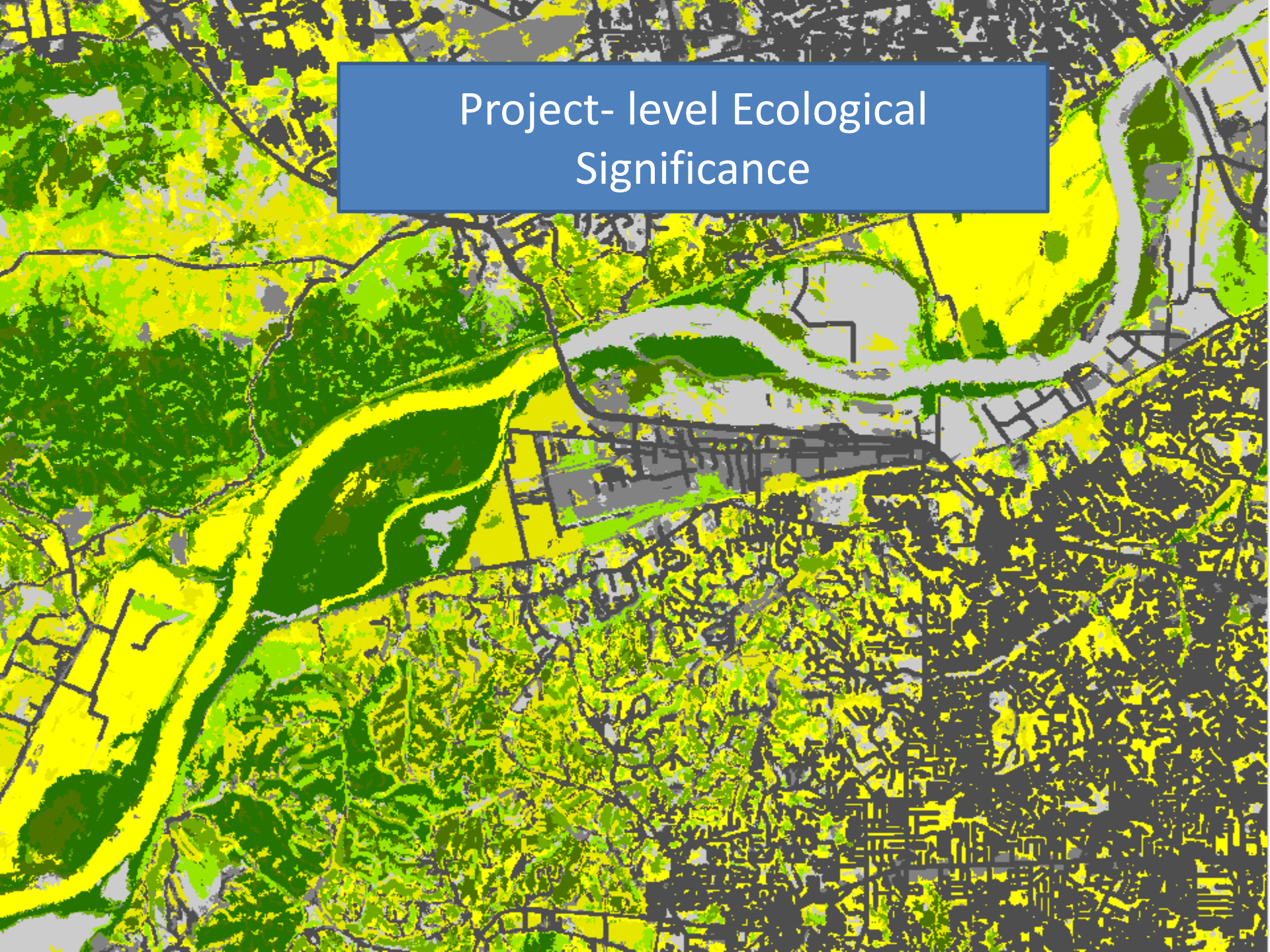
Current Vegetation	Area (ha)	Comm Import	Brief Conceptual Description	Ecological System
Barren or Sparsely Vegetated	3,635	1	Areas where little or no vegetation existed at the time of image data collection.	N/A
Bottomland Forest: Mixed Bottomland Hardwood Forest	7,135	9	Forests dominated by bottomland hardwoods including *Quercus macrocarpa* (bur oak), *Ulmus* spp. (elms), *Celtis* spp. (hackberries), *Fraxinus* spp. (ashes), and *Salix nigra* (black willow), along with *Juniperus virginiana* (eastern redcedar).	North-Central Interior Floodplain
Bottomland Forest: Pin Oak/Bur Oak-Swamp White Oak/Pecan Forest	5,504	9	Forests generally occupying relatively level sites that are temporarily or seasonally flooded and dominated by species such as *Quercus palustris* (pin oak), *Quercus macrocarpa* (bur oak), *Quercus bicolor* (swamp white oak), and *Carya illinoinensis* (pecan). Other canopy species may include *Ulmus rubra* (slippery elm), *Fraxinus pennsylvanica* (green ash), and *Celtis laevigata* (hackberry). A woody and herbaceous understory may be well-developed with species such as *Carpinus caroliniana* (American hornbeam) and vines including *Toxicodendron radicans* (poison ivy).	North-Central Interior Floodplain
Bottomland Forest: Sycamore, Cottonwood, Elm, Ash Hackberry Riverfront Forest	7,615	9	Forests occupying sites directly adjacent to riverfront and on first levees and successional terraces. These forests are dominated by species such as *Platanus occidentalis* (American sycamore), *Populus deltoides* (eastern cottonwood), *Fraxinus pennsylvanica* (green ash), *Acer saccharinum* (silver maple), *Celtis* (hackberries), *Ulmus* (elms), *Betula nigra* (river birch), *Salix nigra* (black willow), and *Acer negundo* (boxelder). Sites experience frequent flooding and understory vegetation is typically not well-developed.	North-Central Interior Floodplain
Bottomland Forest: White Oak/Red Oak-Dogwood/Sycamore Forest	1,319	9	Forests occupying less frequently flooded sites on slight rises such as elevated terraces and upper drainages. These forests are often dominated by mesic forest species such as *Quercus alba* (white oak), *Quercus rubra* (northern red oak), and *Platanus occidentalis* (American sycamore). Other common canopy components include *Carya cordiformis* (bitternut hickory), *Juglans nigra* (black walnut), *Ulmus rubra* (slippery elm), and *Quercus macrocarpa* (bur oak). Understory may be patchy with species including *Carpinus caroliniana* (American hornbeam), *Corylus americana* (American hazelnut), and *Lindera benzoin* (spicebush).	North-Central Interior Dry-Mesic Oak Forest and Woodland
Bottomland: Disturbance Grassland	57,126	5	Sites on bottomland soils where woody overstory is lacking. These sites are often occupied by managed grasslands.	N/A
Bottomland: Herbaceous-dominated Wetland	13,620	9	Marshes and herbaceous wetlands on bottomland sites often dominated by sedges, *Typha* spp. (cattails), and other wetland species.	Eastern Great Plains Wet Meadow, Prairie, and Marsh

Ranking Algorithms

- Regional: attributes by natural & semi-natural vegetation patches
  - Patch size, community type composition, rare species occurrence, public lands, GAP predicted species diversity
- Project-level: attributes by community type patches
  - Community type importance, regional significance, rare species, public lands, roads
- Wetlands – similar to project-level attributes

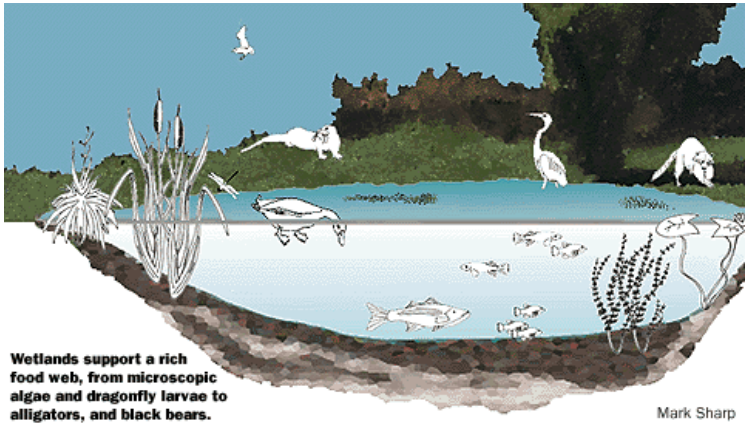



Regional Ecological Significance


Project- level Ecological Significance

Wetland Mitigation & Restoration Ranks

- Ranked all areas over bottomland soils
- Cropland, barren or sparsely vegetation land ranked for restoration
- Other extant vegetation ranked for mitigation



Wetlands support a rich food web, from microscopic algae and dragonfly larvae to alligators, and black bears.

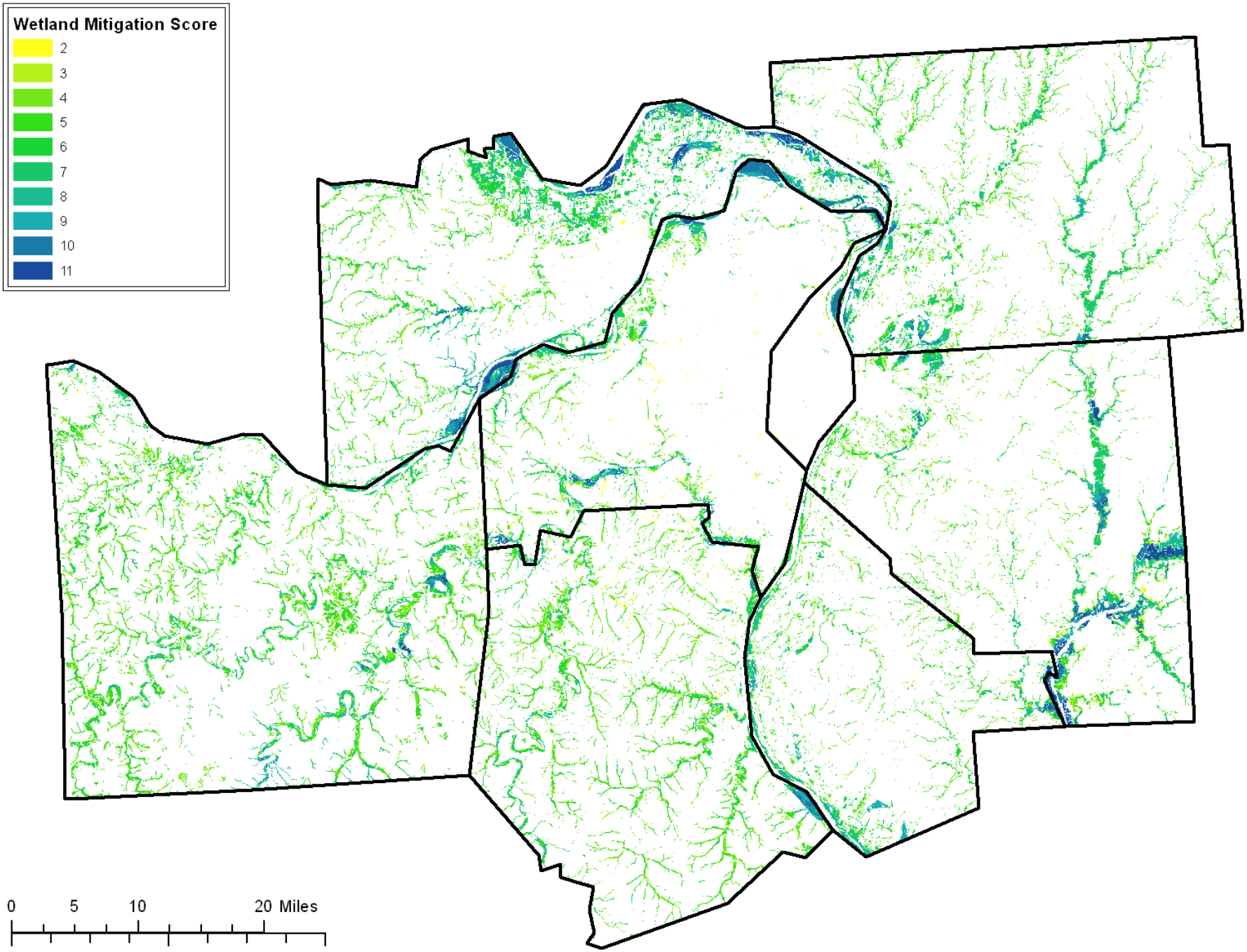
Mark Sharp

Wetland Mitigation Model

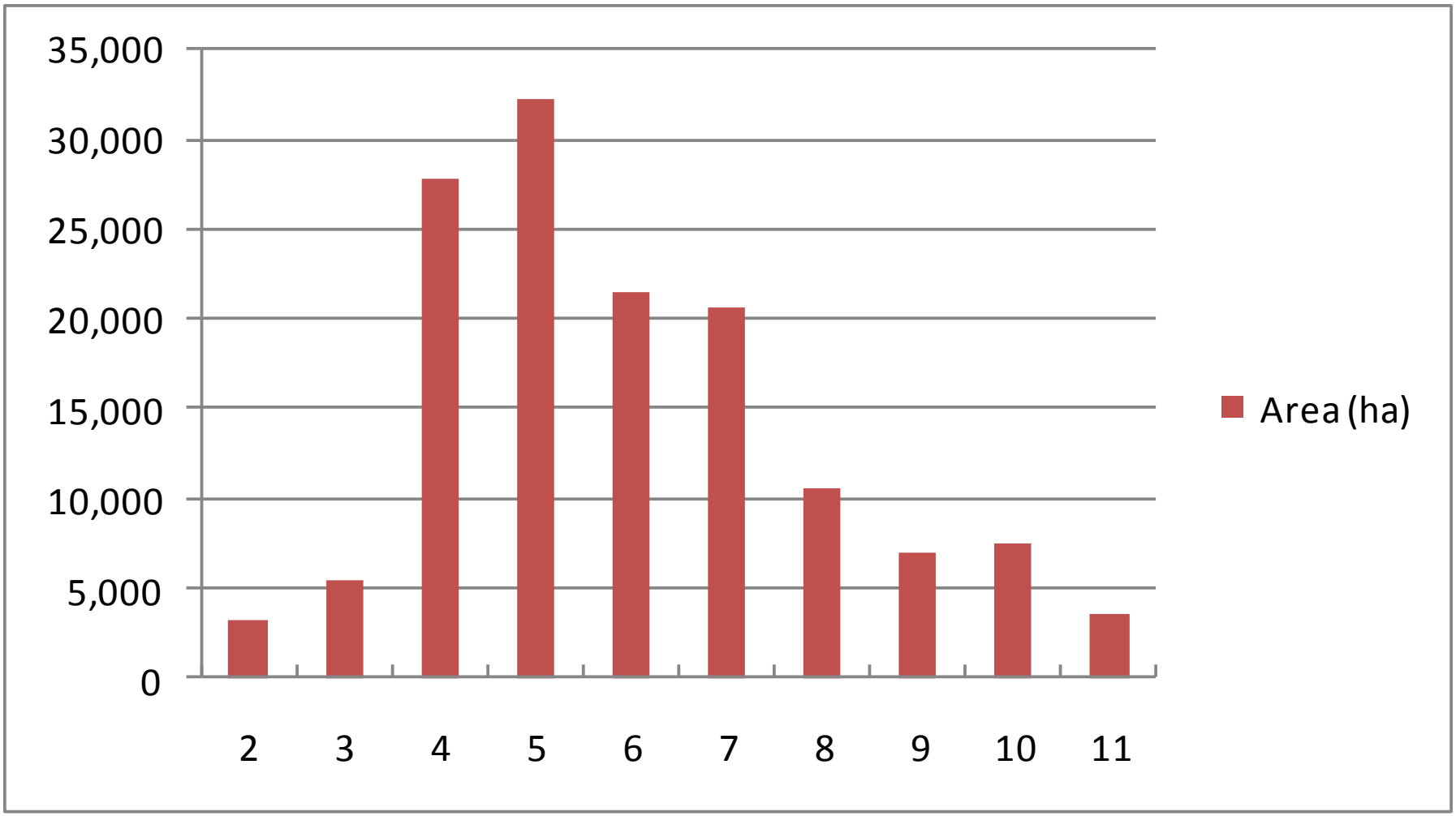
- Wetland Community Importance Rank (from 1 to 7)
- Project-level Significance (+1 if ranked 9 within the project-level significance datalayer)
- Public Lands (+2 if <50 m from public lands; +1 if <100 m but >50 m from public lands)
- Water (+1 if touching water)
- Roads and Urban land cover (-1 if touching a road buffer or urban land cover)

Table 2. Current vegetation, community importance rank, and area of mapped vegetation over bottomland soils for the East-West Gateway planning region. Bottomland soils are defined by digital county soils data, whereas current vegetation was assigned to image objects, which results in some spatial inconsistency and the inclusion of small amounts of upland types in the data. Community importance ranks are based on professional judgment and on ranks applied by NatureServe to community elements within the National Vegetation Classification (http://www.natureserve.org/explorer/classeco.htm).

Mapped Vegetation Name	Area (ha)	Importance Rank
Barren or Sparsely Vegetated	97	2
Bottomland Forest: Mixed Bottomland Hardwood Forest	4,704	6
Bottomland Forest: Pin Oak/Bur Oak-Swamp White Oak/Pecan Forest	5,005	6
Bottomland Forest: Sycamore, Cottonwood, Elm, Ash Hackberry Riverfront Forest	7,046	6
Bottomland Forest: White Oak/Red Oak-Dogwood/Sycamore Forest	1,130	6
Bottomland: Disturbance Grassland	50,404	5
Bottomland: Herbaceous-dominated Wetlands	12,948	7
Bottomland: Successional Deciduous Woodland and Shrubland	1,761	5
Bottomland: Successional Eastern Redcedar Sparse Woodland and Shrubland	5,828	5
Bottomland: Successional Eastern Redcedar Woodland	1,687	5
Bottomland: Successional Eastern Redcedar-Deciduous Mixed Woodland and Forest	2,724	5
Bottomland: Successional or Disturbance Woodland and Forest	566	5
Bottomland: Wooded Wetland	28,896	7

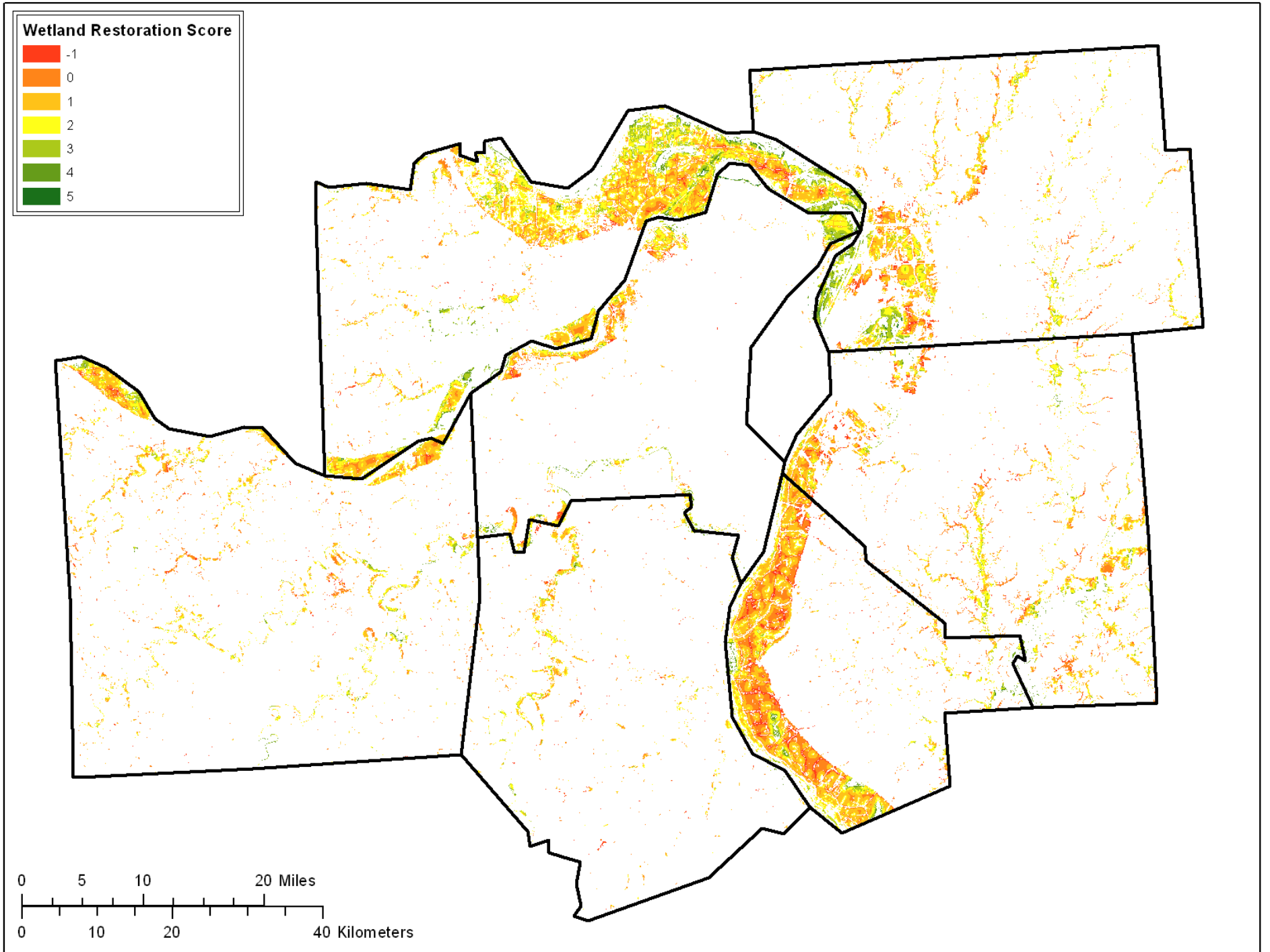

Wetland Mitigation Score
2
3
4
5
6
7
8
9
10
11
0
5
10
20 Miles
0
10
20
40 Kilometers

Mitigation Area by Rank

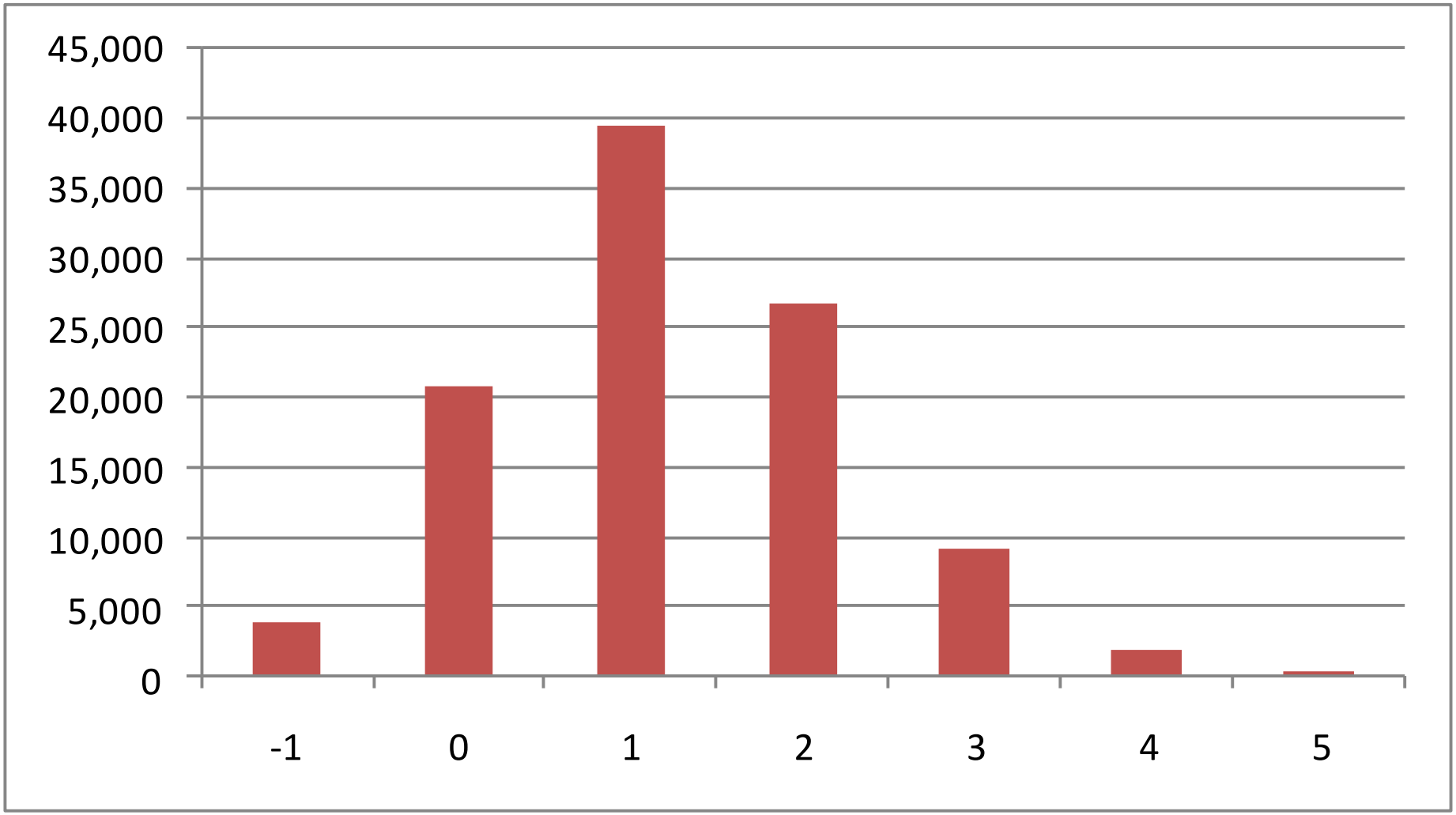


Wetland Restoration Ranking (does not include extant vegetation)

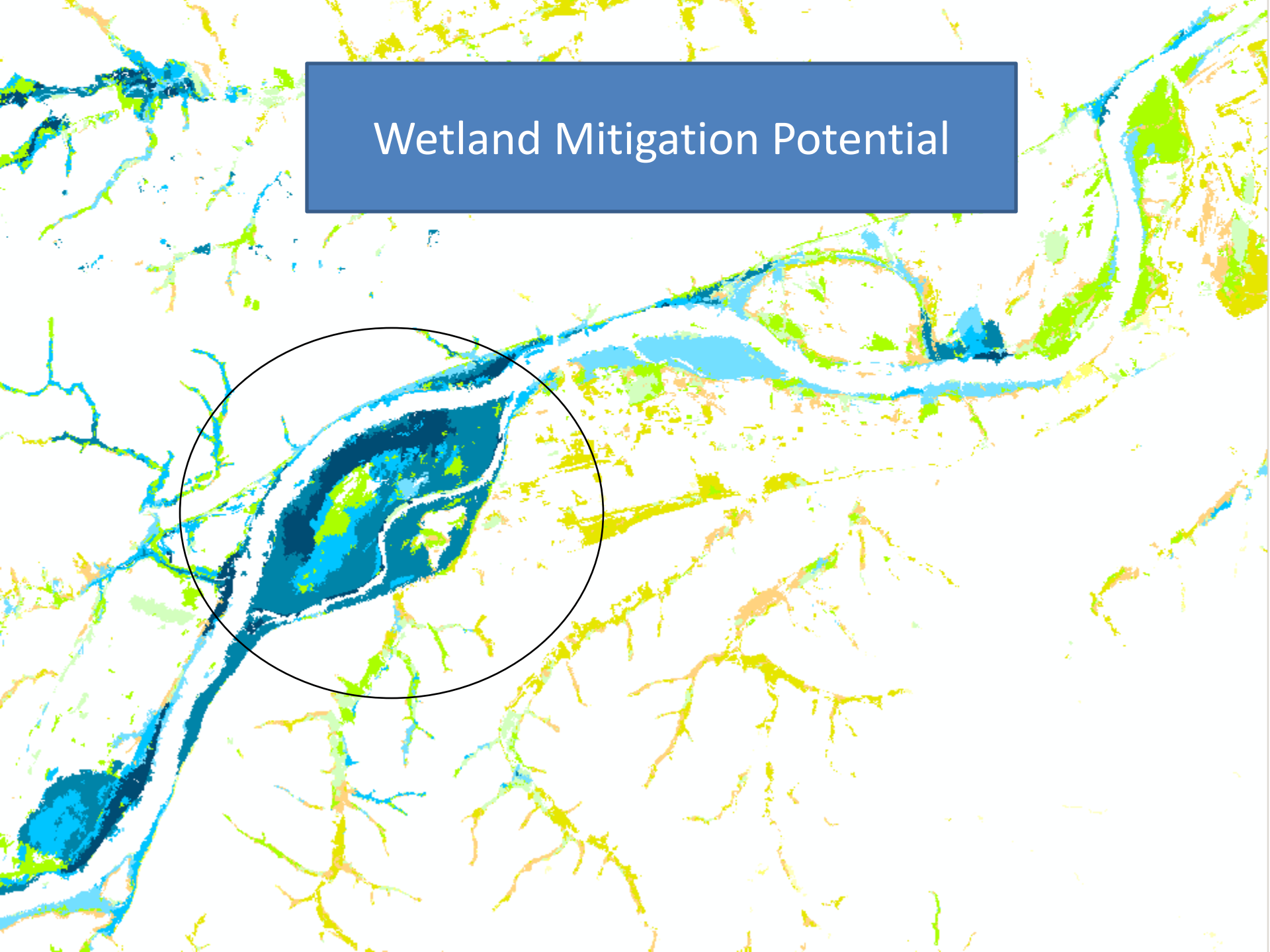
- Public Lands
  - +2 if <100 m from public lands
  - +1 if <500 m but >100 m from public lands
- Proximity to Extant Wetlands
  - +2 if <100 m from extant wetlands
  - +1 if < 500 m but >100 m
- Proximity to Water (+1 if touching water)
- Proximity to Roads and Urban Areas
  - -1 if touching a road buffer
  - -1 if within 100 m of urban


Wetland Restoration Score
-1
0
1
2
3
4
5
0
5
10
20 Miles
0
10
20
40 Kilometers

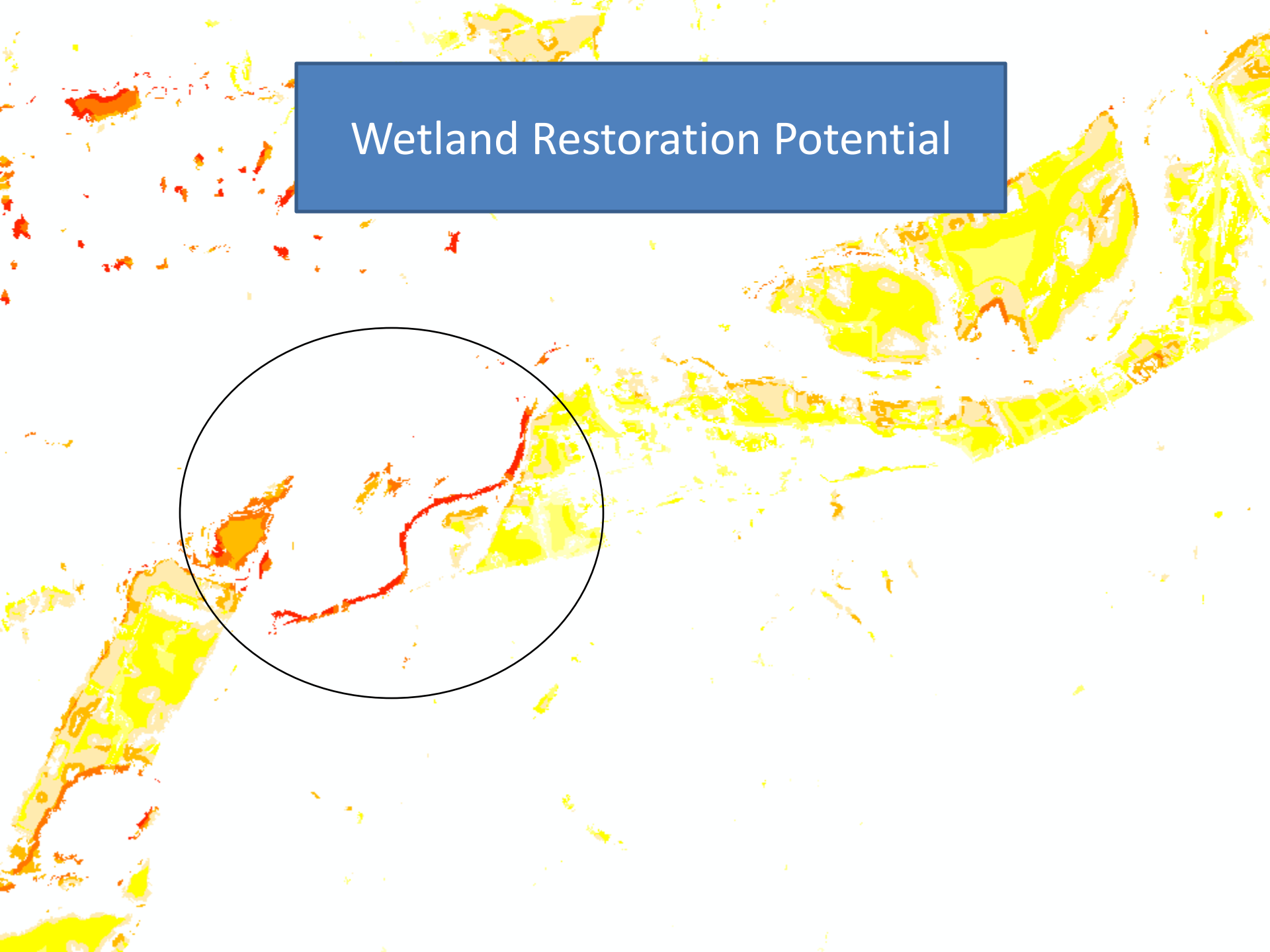
Distribution of wetland restoration scores from lowest (-1) to highest (5)



Wetland Mitigation Potential



Wetland Restoration Potential



Limitations of Wetland Scoring

- Lack of information on hydrologic regime
- Lack of fine-resolution elevation data
- Lack of information on vegetation composition, height and density
- **New LiDAR data helps**

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