GIS to Estimate Archaeological Site Loss and Develop Conservation Strategies

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In 2000 Georgia established a state-supported green space program directed at the fastest growing cities and counties.

The Georgia Land Conservation Act 2005 increased the scope and funding of the program and extended eligibility to all local governments.

The program should provide unique opportunities for cultural resource managers to integrate historic preservation with the broader goals of green space conservation.

Green Space Planning and Historic Resources

- Protection of historic and archaeological resources is an important criterion for green space programs
- Land protection generally equates to archaeological site preservation
- Sites are common in popular green space areas such as river corridors and watersheds
- Known archeological sites and archaeological potential are reasons to support a green space project

A recent survey of Society for Georgia Archaeology chapters asked the question:

> "In case a Green Space Program becomes available in your area, can you think of any threatened sites that might be good candidates for purchase and protection by the local government? Be thinking about this as the months and years wear on."

Only a few specific responses were received indicating the need for a process or model to develop a list of recommended sites.

A model was developed to prioritize high value archaeological sites for preservation and to integrate those recommendations with other high priority green space goals.

Archaeological Site Loss

There are over 40,000 known archaeological sites in Georgia.

Once recent study estimated:

Nearly 900,000 sites in Georgia

5.9% have been destroyed

49% have been disturbed by more recent land use practices.

Green Space Loss

A 1999 USGS study ranked Georgia as third among states in urban conversion and green space loss.

Planners Reid Ewing, Rolf Pendal, and Don Chen in *Measuring Sprawl and Its Impact* (Ewing and Pendal: no date) identified sprawl as "a process in which the spread of development across the landscape far outpaces population growth."

They developed their *Sprawl Index for 83 Metropolitan Regions*, they identified Atlanta as the fourth worst.

Coordinated Comprehensive Planning- community planning could be the key to an integrated campaign for green space conservation and historic preservation.

Georgia cites, counties and regional development centers are required to prepare 10-year comprehensive plans.

General planning guidelines are provided by DCA.

Environmental Planning Criteria are provided by DNR.

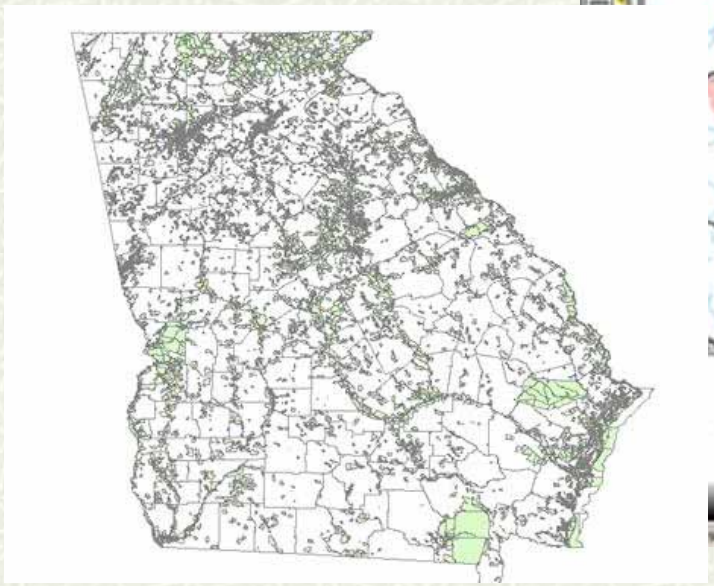
Comprehensive Plans have a 'Natural and Cultural Resources' planning element.

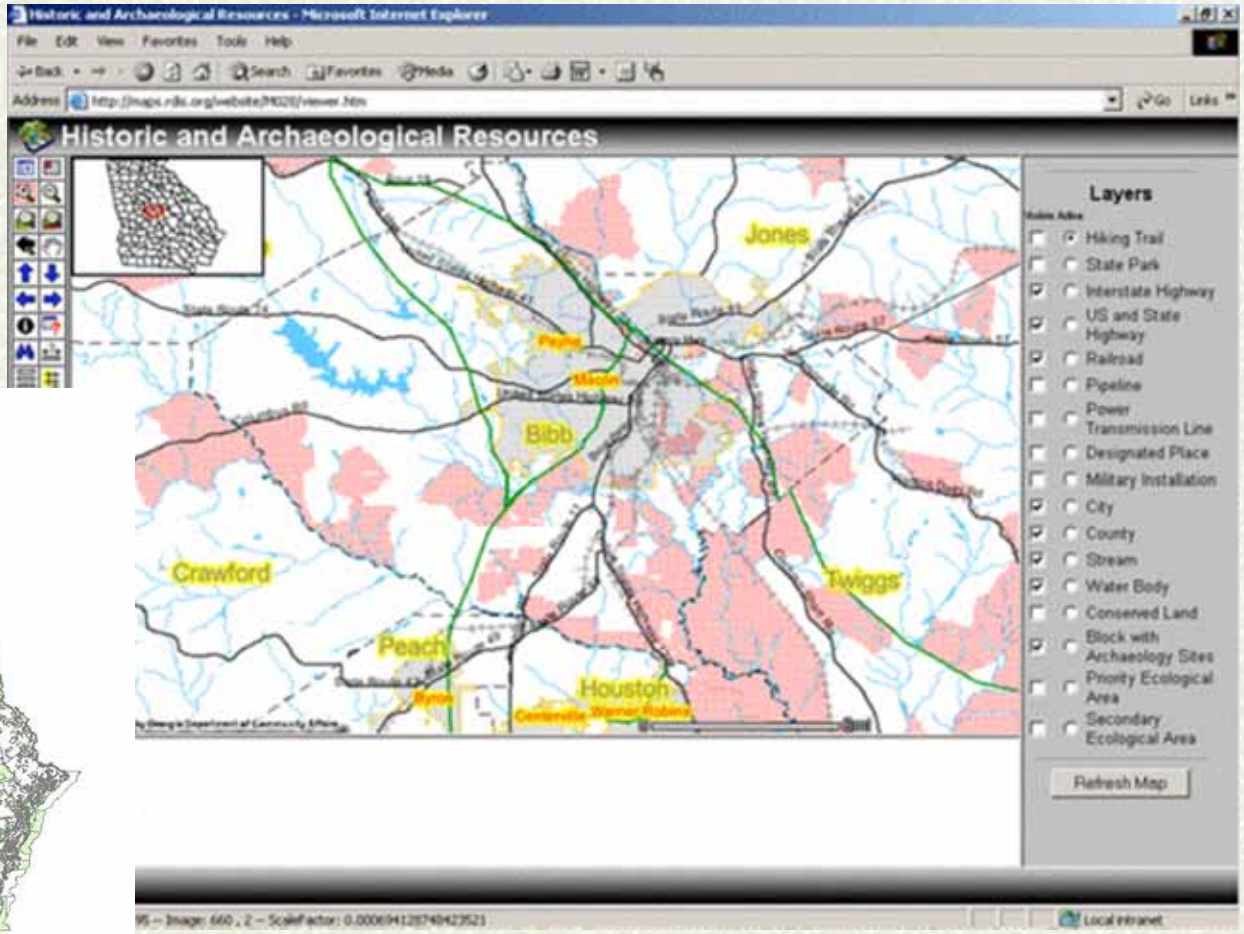
Required to map and "identify generalized locations of any archaeological sites identified as significant by the Georgia Department of Natural Resources."

Some plans contain green space planning elements. These goals can be coordinated and combined into mutually supportive initiatives- an integrated CRM-Land Conservation model.

Census Blocks with Archaeological Sites Map

Map initially provided by DCA and DNR to planners to identify "generalized locations".





Census Blocks with Archaeological Sites Map

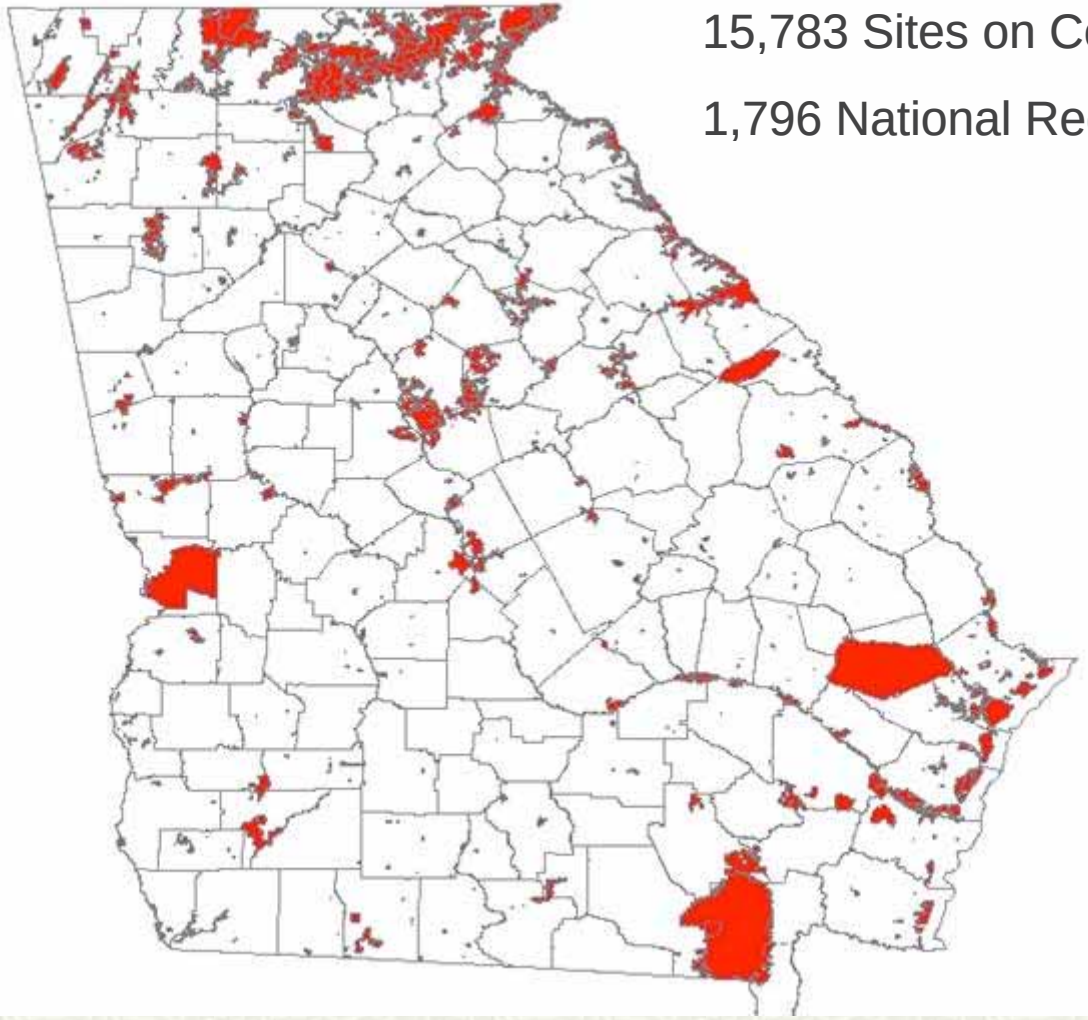
A review of all regional and local comprehensive plans revealed inadequate attention and detail to the Cultural Resources element, planners often citing that "no information was available."

The 'Census Blocks with Archaeological Sites' map was initially provided to planners by DCA and DNR to identify "generalized locations".

Some CRM professionals complained the map could be abused to approve, without further investigation, development in areas not indicated. However, metadata explained that sites probably exist in every census block area; the map merely indicates areas where some sites have already been found.

Despite fears about the map revealing too much, it is still too general to serve as an effective planning tool for site protection and it had no explicit relevance for land conservation planning.

Conserved Lands



15,783 Sites on Conserved Lands

1,796 National Register class sites (49%)

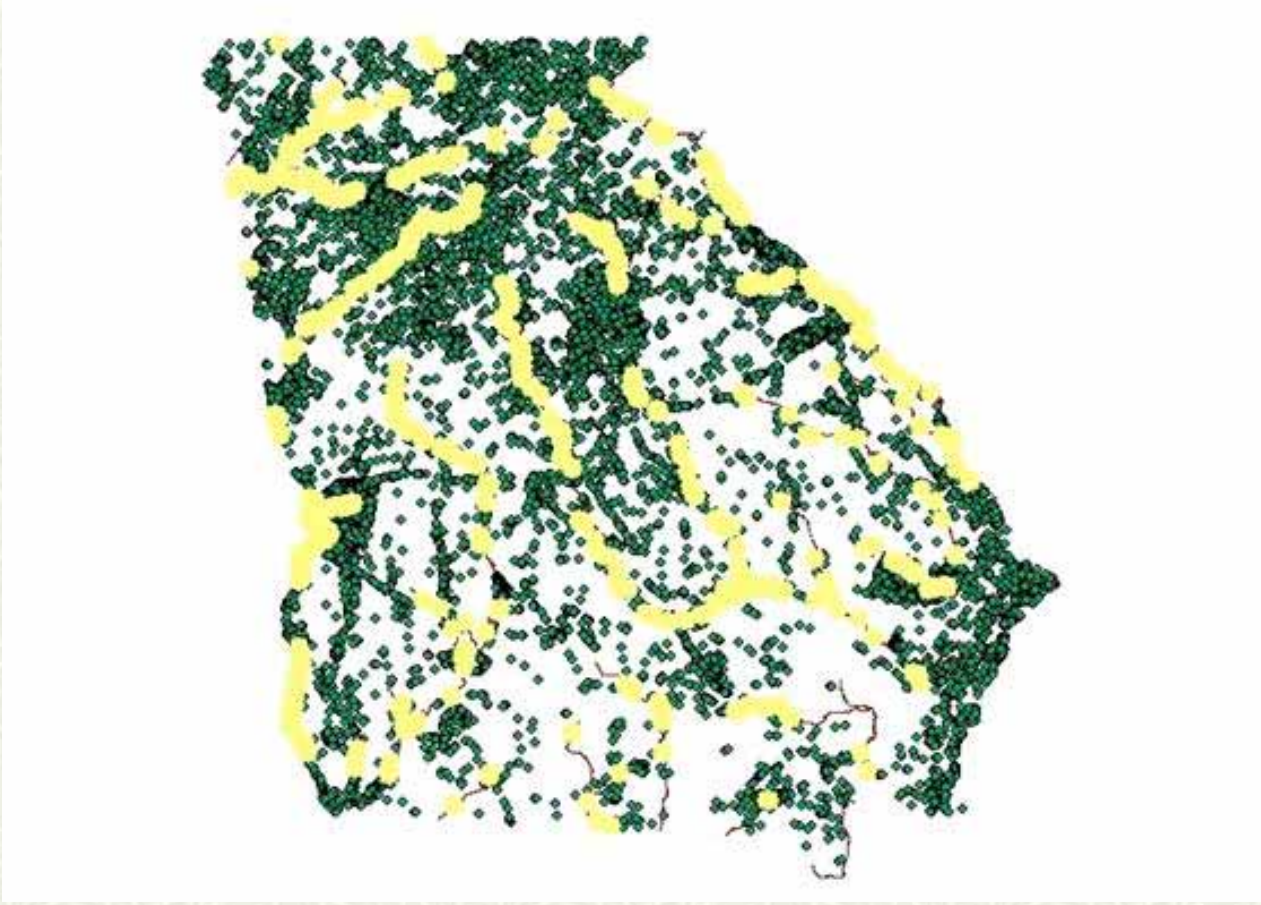
Georgia Environmental Planning Criteria and Sites

Current Georgia Planning Rules require local and regional governments to consider historic and archaeological sites of National Register status in:

- Protected River Corridors
- Wetlands
- Protected Mountain Areas

Protected River Corridor

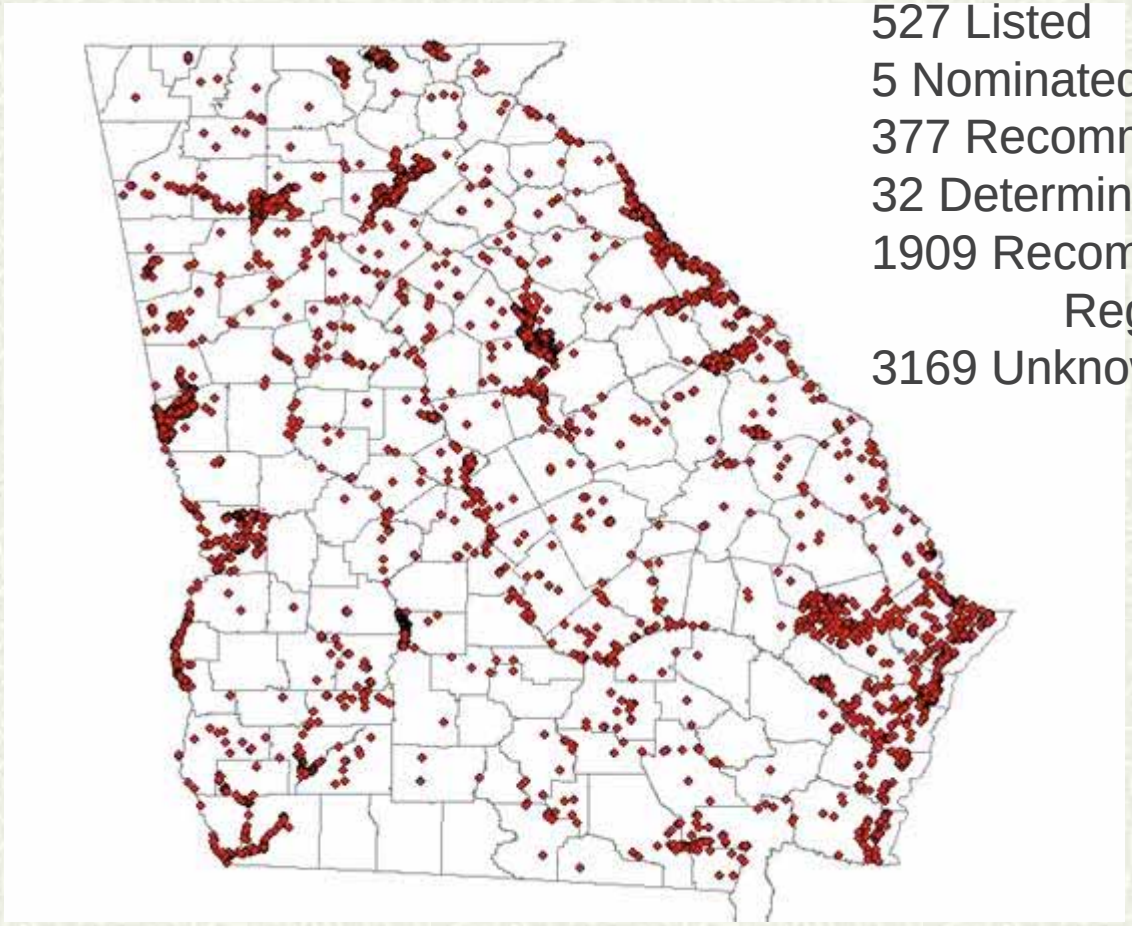
About 1800 known archaeological sites in Georgia River Corridors



GA DNR Rules Chapter 391-3-16-.04

Wetlands

3057 known archaeological sites in Georgia Wetlands



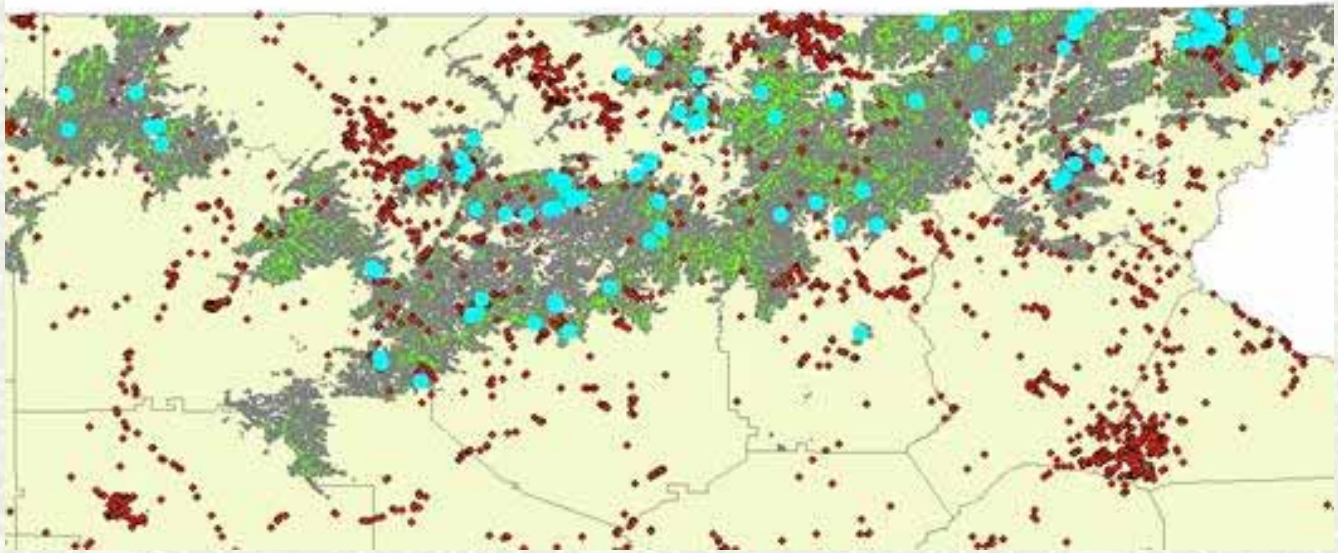
527 Listed
5 Nominated
377 Recommended Eligible
32 Determined Eligible
1909 Recommended Ineligible for National Register
3169 Unknown Eligibility

GA DNR Rules Chapter 391-3-16-.03

Protected Mountains (Northeast Georgia)

100 known archaeological sites in Protected Mountain areas
No sites of National Register status

Areas above 2,200-feet and >25% Slope



GA DNR Rules Chapter 391-3-16-.05

EPA Southeastern Ecological Framework

http://www.geoplan.ufl.edu/epa/index.html

Southeastern Ecological Framework (SEF)

The SEF is an 8-state GIS-based conservation model of the remaining important regional ecological hubs and corridors that connect them.

The hubs of the framework are typically land areas with important riparian areas, no or few roads, high habitat diversity, little habitat fragmentation, rare habitats or species, and greater than 5,000 acres in size. The hubs are usually associated with existing managed lands such as wildlife refuges, parks, national forests or private protected lands.

The corridors, connecting the hubs of the framework, typically follow natural land forms and water features, allowing ecosystem processes to operate regionally.

Southeastern Ecological Framework (SEF)

SEF areas contain 71-percent of known archaeological sites in Georgia.

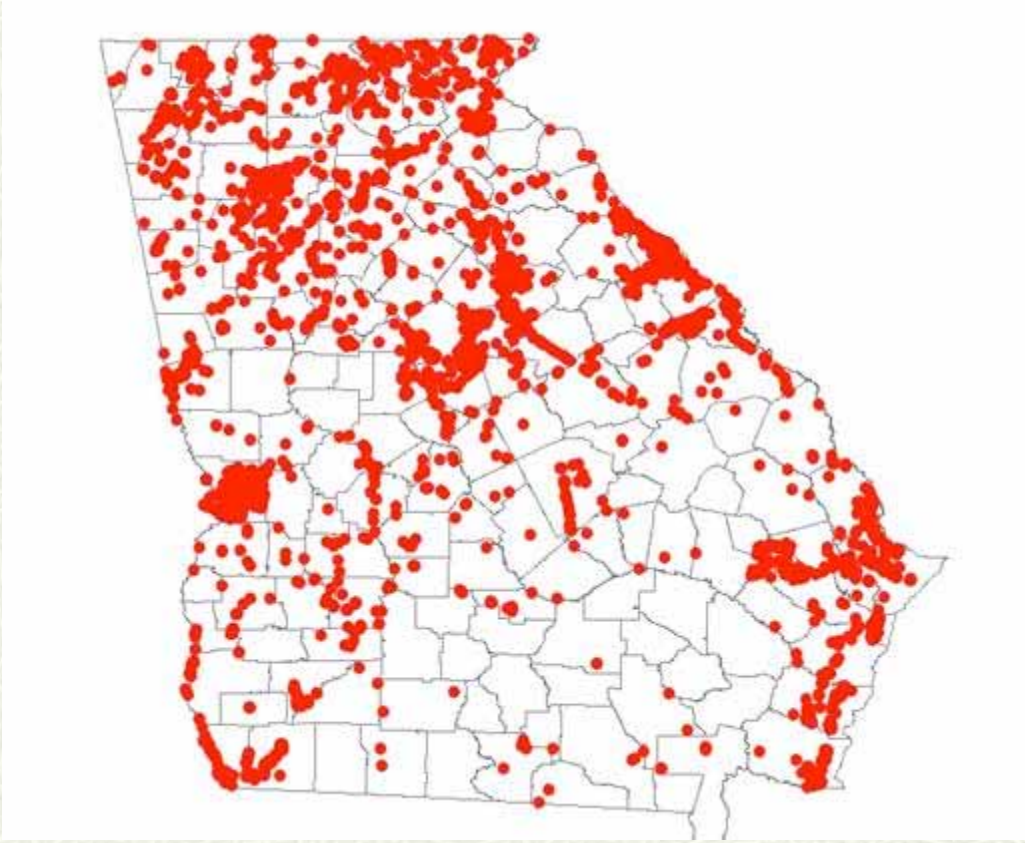
Another 12-percent more sites are in SEF Secondary Ecological Areas.

Therefore, 83-percent of known Georgia sites are within areas recommended for conservation for their ecological value.

National Register Sites in Georgia

3,654 National Register (NR) quality sites in Georgia

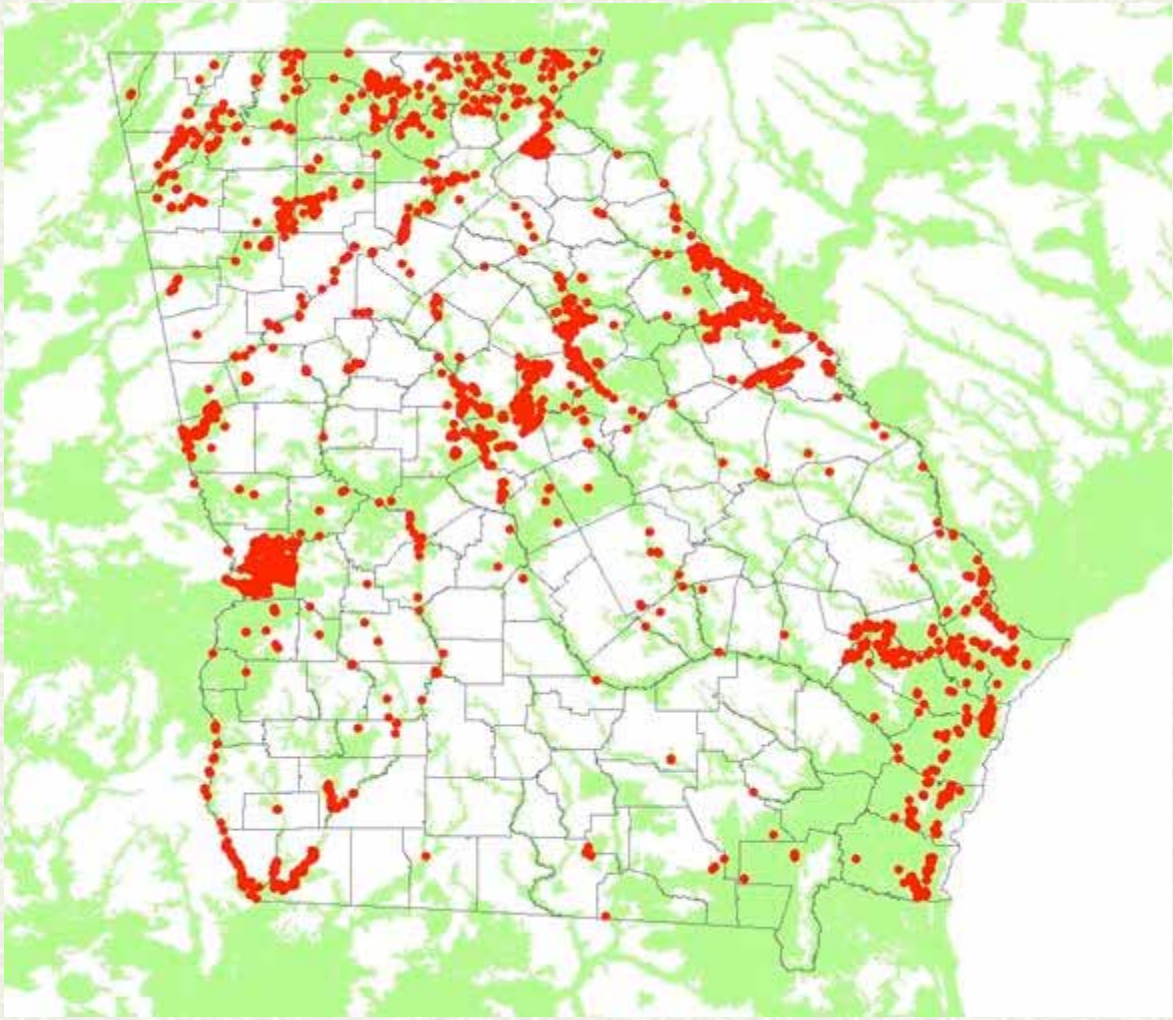
One or more NR sites in 140 of 159 counties.



National Register Sites in Southeastern Ecological Framework (SEF)

2,833 or 76-percent of the NR sites in SEF

20 more NR sites in Primary Ecological Areas and 94 NR sites in Secondary Ecological Areas that are not in SEF

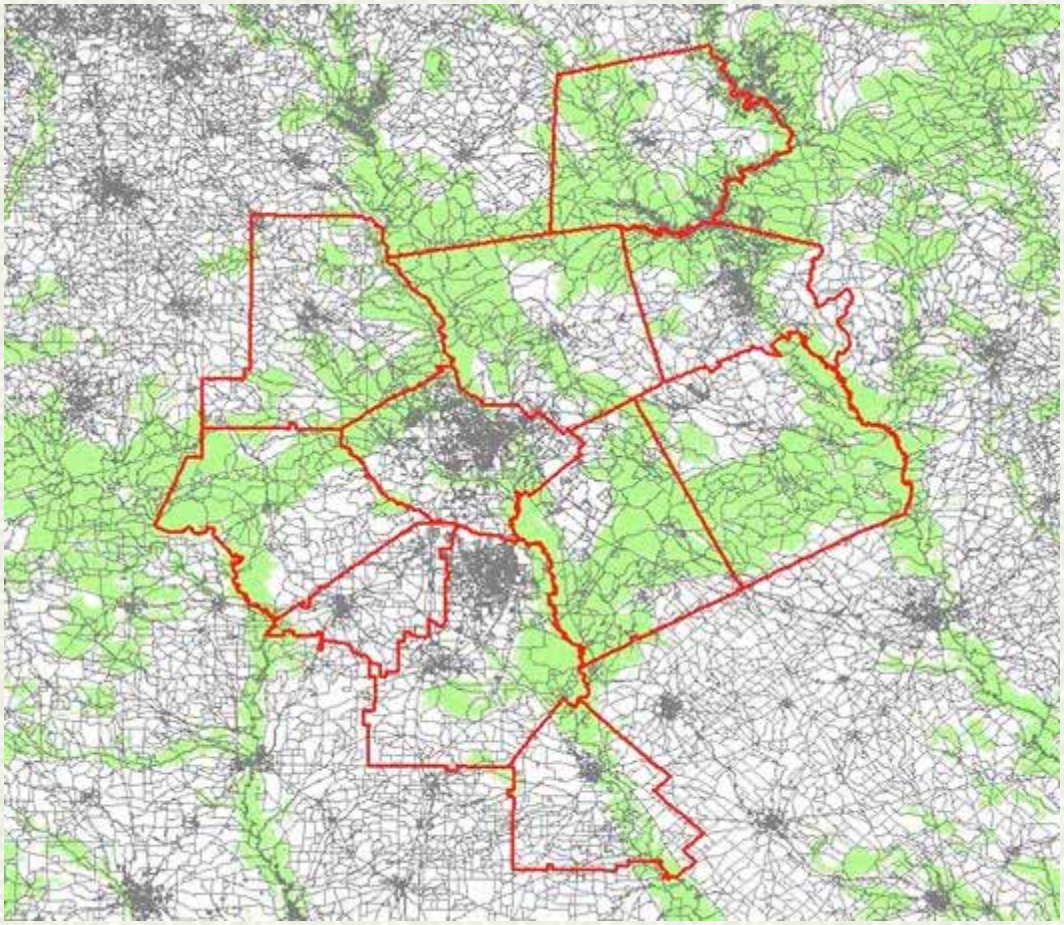


Census Block Subdivision of Southeastern Ecological Framework (SEF)

SEF is a continuous area with no subdivisions.

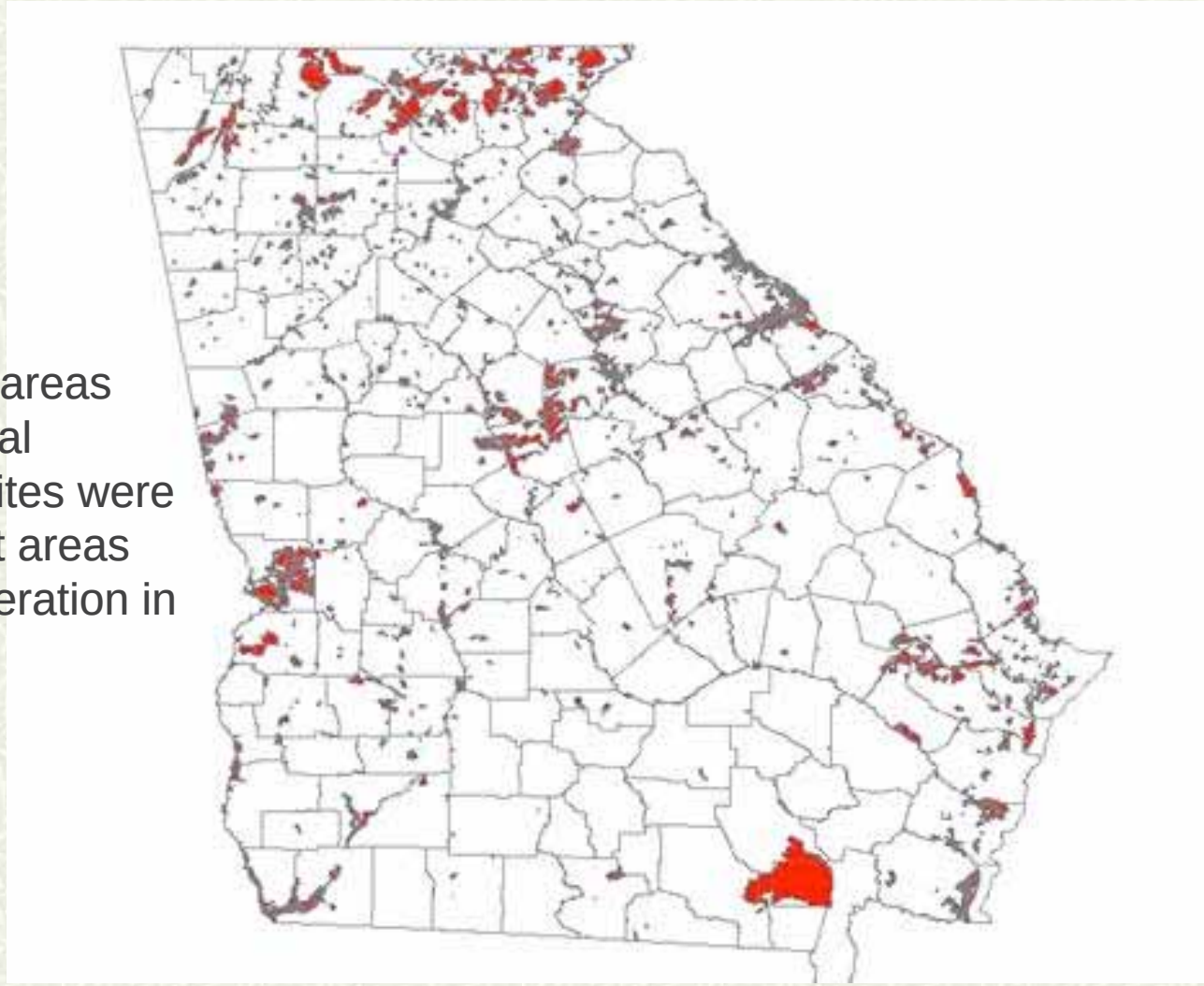
Census Blocks (217,402) were overlain with SEF to provide study sub-areas (59,377) for modeling.

The map here shows the combined census blocks with the SEF and the boundary for the multi-county Middle Georgia RDC planning area.

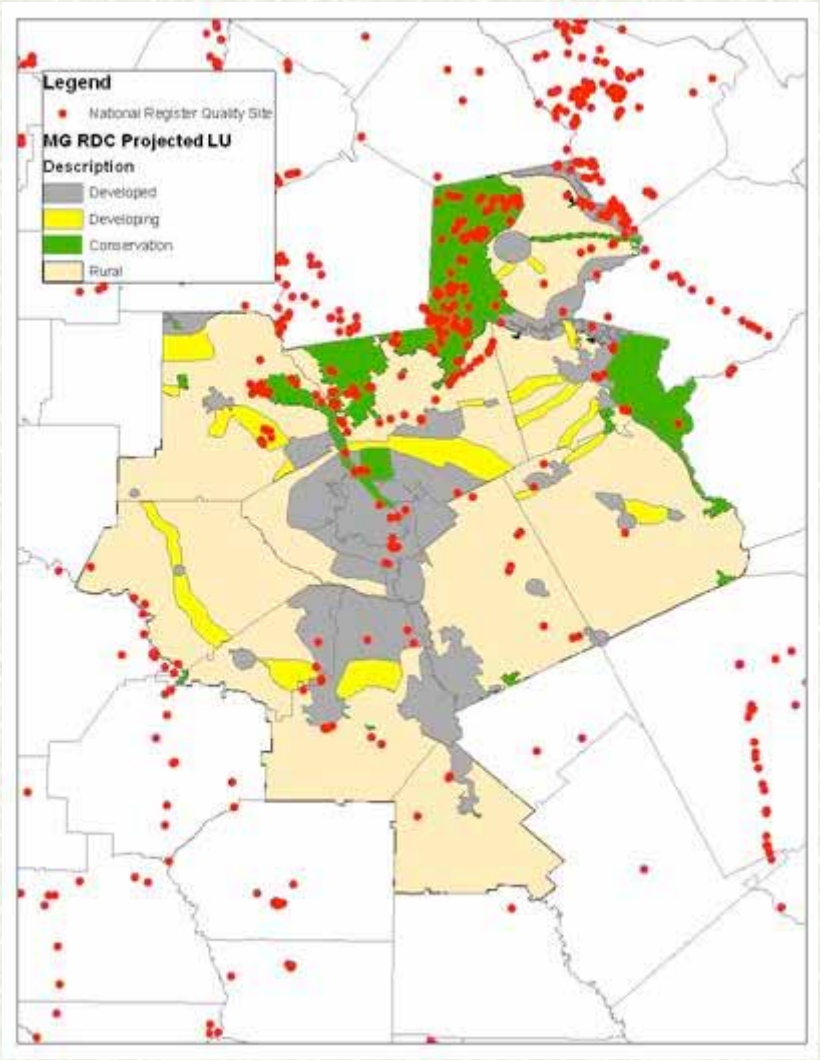


SEF-Site-Block Map: Areas Recommended for Land Conservation

Those 1,781 sub-areas containing National Register quality sites were selected as target areas for priority consideration in land conservation planning.



Projected Land Use- Middle Georgia RDC



Generalized four class regional land use map, showing areas as:

Developed

Developing

Conserved

Rural

3,036 sites in region

279 National Register quality sites

55 National Register sites in Developed areas. **Also in SEF**

8 National Register sites in Developing areas. **Also in SEF**

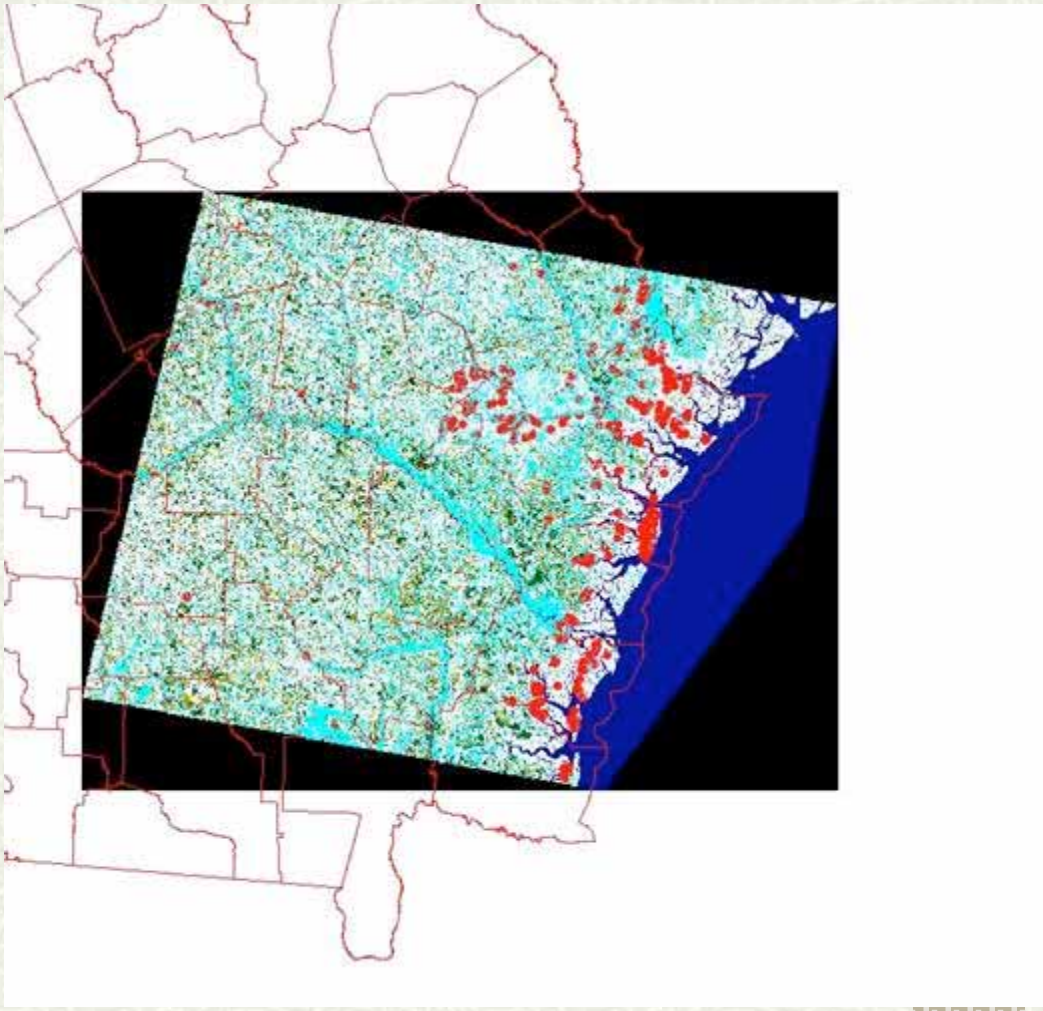
NOAA Coastal Change Analysis (C-CAP) Program

http://www.csc.noaa.gov/crs/lca/ccap.html

Change detection map from 1992- 1997 LANDSAT satellite imagery

564 National Register quality sites in the C-CAP study area.

Used Spatial Analyst Extract geoprocessor to find only three National Register quality sites impacted by urban conversion, changes from undeveloped to urban land cover.



Character Area Maps: A Problematic Trend?

There is a trend in planning to replace Future Land Use maps with Character Area maps, which are more general conceptual maps describing entire communities rather than their discrete land use classes.

While such maps may facilitate a simplified community vision, they may also obfuscate the potential impact of development on cultural and natural resources.

Character Area Maps: What's 'Developing'?

To identify 'Developing' areas, Existing and Character Area Maps, must be reclassified into the four regional classes and analytically combined by a UNION overlay. The difference between the land use columns reveals the 'Developing' areas.

Unfortunately, Open-ended Character Area class definitions may be difficult to reclassify into the four regional land use classes which would frustrate attempts at regional land use analysis.

Conclusions

1. The Southeastern Ecological Framework is a valuable mechanism for prioritizing and integrating the preservation of ecological and archaeological resources.

2. The utility of the SEF is constrained by:

    a. the scope and scale of the data, (1:100,000)
    b. the age of the data. (1992)

3. The integrated CRM land conservation model is limited by the lack timely large-scale, land use maps.

Recommendations

- Update SEF base maps and analysis.
- (For EPA) Develop a User Guide on ‘How to Update SEF’.
- Explore Integration of SEF concept and models with GAP Analysis Program.
- The State Archaeologist Office in consultation with the Professional Council Develop Priority list of known sites to recommend for the Georgia Land Conservation Program.

For more information please go to:

http://www.GeorgiaPlanning.com

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