Natural Resource Inventory

Council Work Session
December 11, 2006

What is a Natural Resources Inventory (NRI)?

A document that catalogs the natural resources of an area, collecting the data into a usable format, interpreting the results and providing findings. The major natural resource categories include:

- Hydrological Resources - rivers, streams, lakes, ponds

- Land Resources - topography, steep slopes, flood plain

- Ecological Resources - vegetation, soils, wetlands

- Landscape Analysis Resources - land use, land cover, impervious surface

NRI Purpose and Use

The Natural Resource Inventory provides information to:

- Guide development of goals, strategies and policies for resource conservation and management;

- Identify priorities for resource conservation;

- Evaluate current natural resource management practices;

- Provide information for parks, open space, trails and/or greenway planning

NRI Specific Applications

The Natural Resource Inventory can be used to:

- Identify sites to be preserved thru public ownership or conservation easements;

- Identify sites where special development standards may be appropriate due to special attributes such as floodplain, vegetation, soil types, steep slopes, sink holes; and

- Analyze visual impacts through view shed analysis

NRI Data Requirements

The NRI must be designed to document the necessary data:

- The scope of the inventory along with the methodologies and products should be selected to provide answers to community issues and provide a basis for sound decision making; and

- The specific products which the inventory needs to produce, such as maps, GIS databases, data sets, etc., need to be clearly defined in advance.

Available Resources for a NRI

The City of Columbia has GIS databases along with mapping and analysis capabilities to support a NRI:

- GIS geography and databases are available for the hydrological, land resource and landscape resources. Only the ecological component (vegetation) requires more data;

- Access to digital aerial photography;

- GIS based infrastructure modeling capabilities; and

- GIS terrain modeling and view-shed analysis
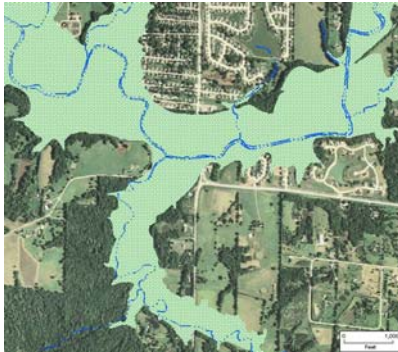
Available City GIS Resources

- **Color Imagery**
- Creeks and Streams
- Flood Plain
- Topography
- Steep Slope
- Sinkholes
- Soils
- Watersheds
- Parks
- Streets
- Trails
- Property Boundaries
- Buildings
- Sewer Lines
- Water Lines
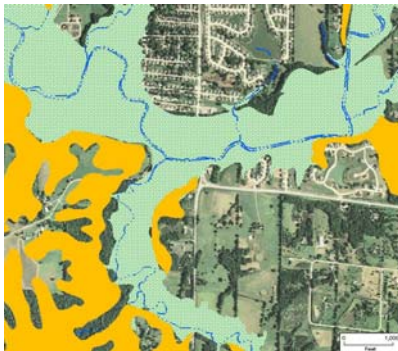- Zoning

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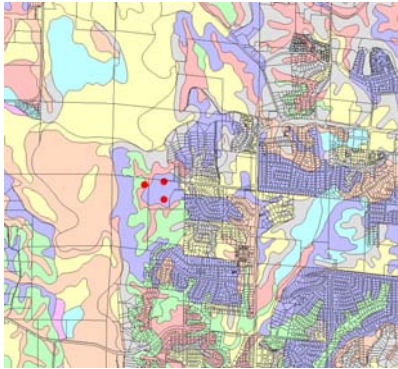- Zoning

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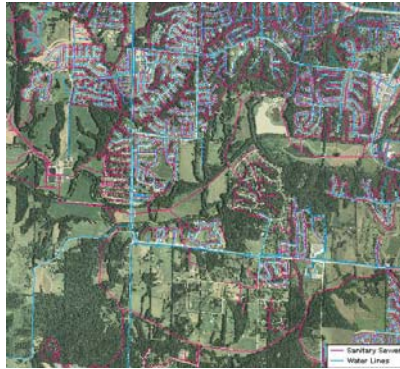- Zoning

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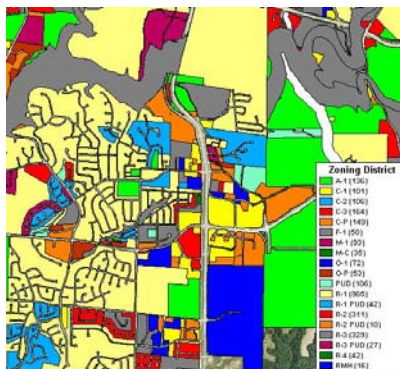- Water Lines
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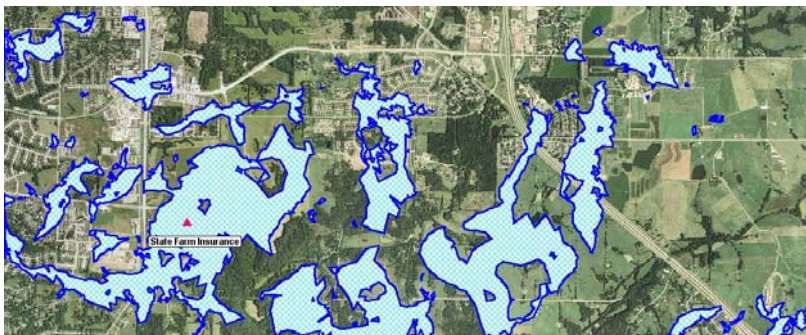
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City GIS: 3D Terrain Modeling

City GIS: View Shed Analysis

Additional Resources for a NRI

In addition to the existing GIS data, the acquisition of high resolution color (multi-spectral) aerial photography would be highly desirable for a NRI:

- High resolution multi-spectral imagery would significantly enhance the categorization of image data based on its spectral values;

- The unique spectral values of various types of land features, such as open land, forests, agriculture, water bodies, and structures, can be defined and used to map these areas; and

- High resolution multi-spectral imagery makes it possible to refine the resulting land cover themes to provide information on the types of trees or other vegetation growing in a forest using pattern recognition.

Imagery Comparison @ 1"=200 Feet

Multi-spectral 2 meter pixels   **Panchromatic 6 inch pixels**

Imagery Comparison @ 1"=50 Feet

Multi-spectral 2 meter pixels   **Panchromatic 6 inch pixels**

NRI Products

The most useful products of a natural resource inventory and analysis would be:

- Coordinated sets of computer databases and GIS map layers which are compatible with the tools used for planning and engineering purposes;

- Color aerial photography at a resolution compatible with the black & white aerial photography available from the Boone County Assessor;

- Easy access to the natural resource information (data layers) that can be updated by City staff

NRI Project Scope

As envisioned by staff a NRI for Columbia would:

- Cover the entire Metropolitan Planning Area

- Include the acquisition of high resolution multi-spectral aerial photography

- Contract with the University of Missouri Geographic Resource Center (GRC) to conduct the analysis of the imagery for vegetation mapping

- Rely on multi-departmental staffing representing applicable areas of expertise to complete the NRI document

- Involve City Commissions and public input as directed by Council

Estimated NRI Project Budget

- Based on current market values for 6 inch pixels photograph expect to spend between $180 to $250 per square mile for the digital acquisition of 5 bands of imagery (Panchromatic, Red, Blue, Green, and Color Infrared) for the Metro Area of 181 square miles. Estimated cost range of $32,580 to $45,250

- University of Missouri Geographic Resource Center (GRC) work on image analysis and production of a land cover and detailed vegetation map along with staff time would be approximately $35,000

- City Staff Time: Undetermined

  Estimated NRI Cost: $67,580 to $80,250 + City staff time

NRI Project Time Frame

- **Multi-spectral imagery would be acquired in May 2007**

- **Image analysis by the University of Missouri Geographic Resource Center completed - September 2007**

- **Staff completes draft NRI document - December 2007**

- **Commission and public comment - June 2008**

Possible Staffing Sources

- **City Manager's Office**

- **Planning & Development**

- **Public Works**

- **Parks & Recreation**

Possible Funding Sources

- Stormwater Utility fund

- FHWA Planning grant funds

- Non-motorized Transportation Pilot Project funds

- General fund

- Cost sharing with other government agencies

Council Direction

What is the Council's specific area of interest associated with the NRI?