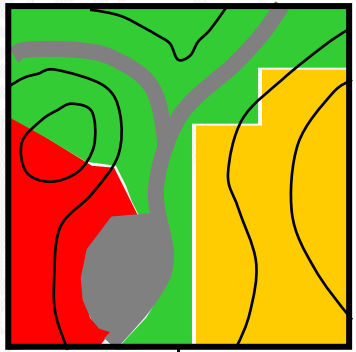


Least-Cost Transportation Corridor Analysis Using Raster Data

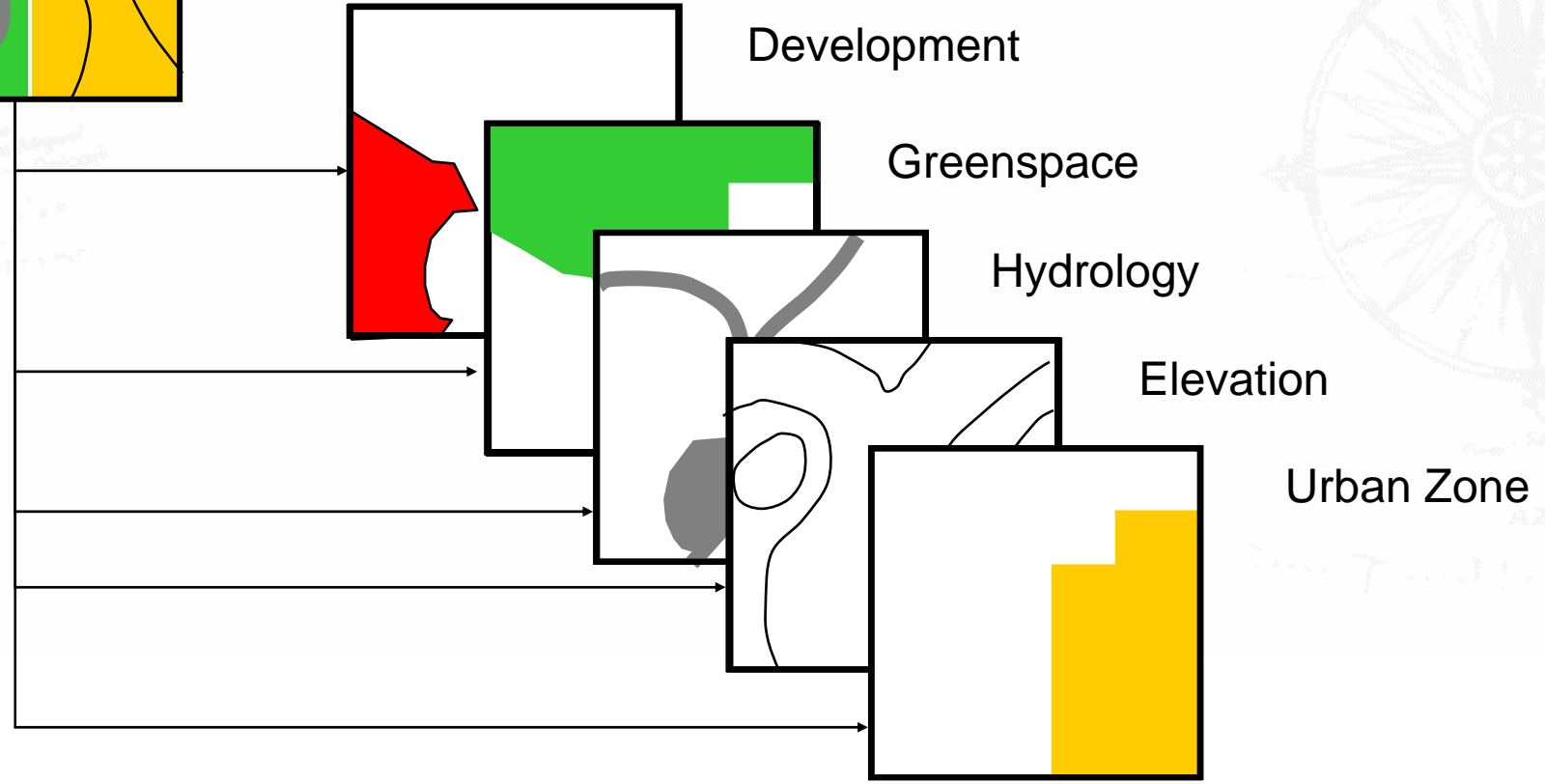


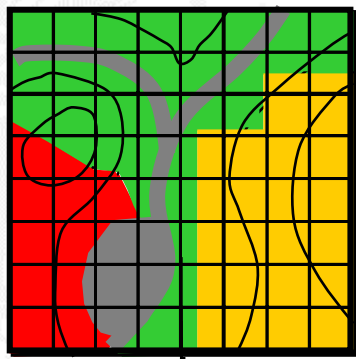
What is GeoMedia Grid: Key Grid Concepts



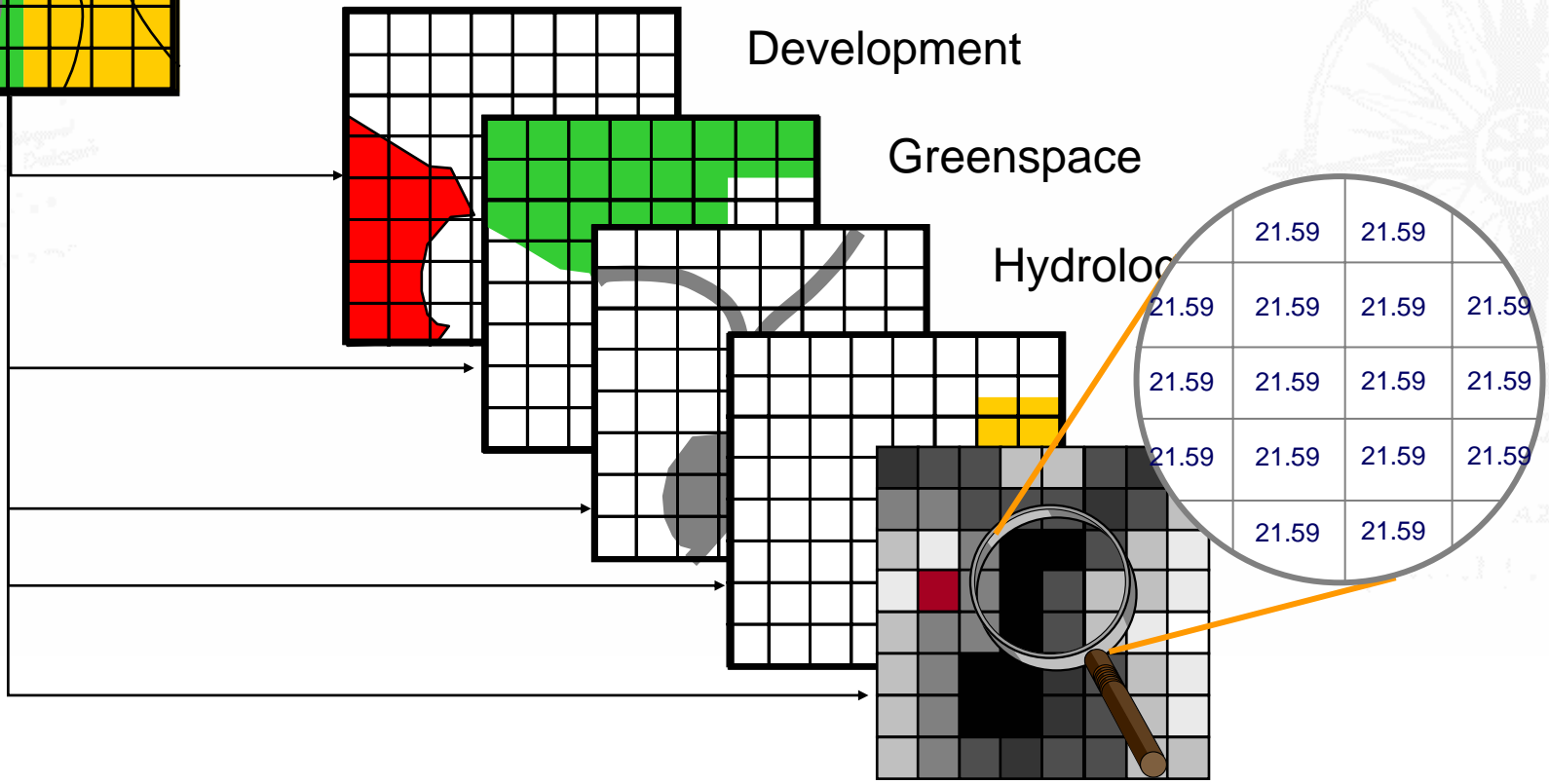


Vector based systems show data by means of a series of **points**, **lines**, and **polygons**. Each layer contains information about one theme or topic.





Grid based systems show data by means of a series of **gridded cells**. Each layer contains information about one theme or topic.



Vector

Employs points, lines, and polygons to represent data.

Reliance on databases for data storage and retrieval.

Compares layers of information based on database queries.

Strong query tools.

Example: GeoMedia.

Grid

Employs cells or images to represent data.

The maps themselves contain the data. (can be tied to a database)

Compares layers of information based on cell-by-cell comparisons.

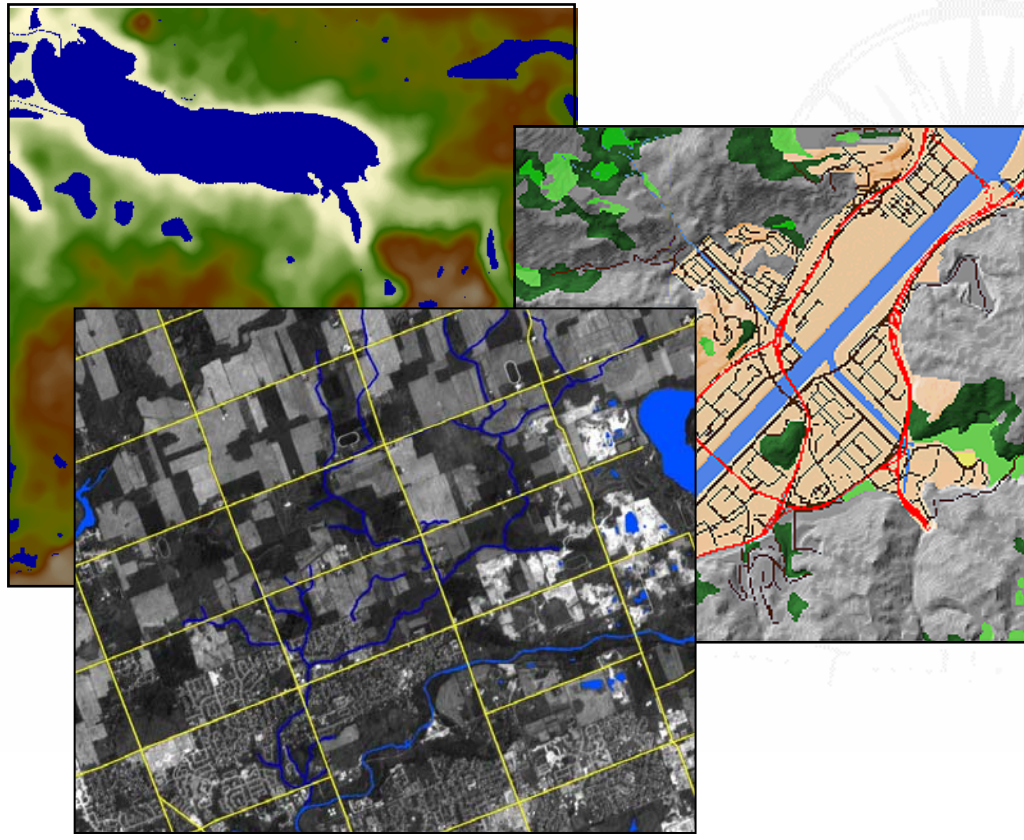
Strong analytical tools.

Example: GeoMedia Grid

Vector Maps



Grid Maps



- In a grid layer, geographic space is divided into a grid of square cells in which each cell represents a square parcel of land.
- Each cell has a **location, value, resolution, and appearance.**
- These can be combined into **zones** of similar cells.
- A grid layer legend in the edit window provides information about the layer.
- Using this concept, multiple layers can be used to describe or analyze different features of the same geographic space.

- Cell Value

- Imported grid layers have values that are attributes, such as elevation, insolation, temperature, electromagnetic reflectance, or population,
- Nominal values indicating a quality or category, such as soil type, highway designation, tree species, or political district are also possibilities.

12	4	5	5
3	22	22	23
3	22	22	23
12	12	12	22

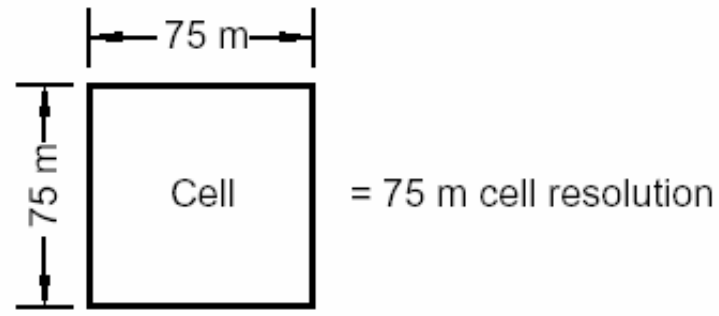
A single cell with a value of 22



- Cell Resolution

- The cells making up a grid layer all have the same cell resolution.

- Cell resolution is the length of one side of the “real world” square represented by the cell.

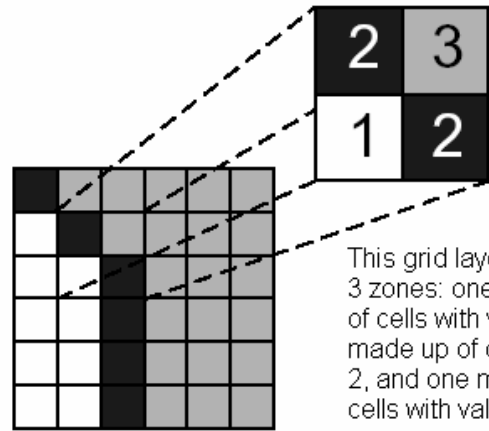


- Grid layers that are used together in grid analysis must all have the same cell resolution.

- **Zones**

- All of the cells in a grid layer that have the same value are collectively called a zone.

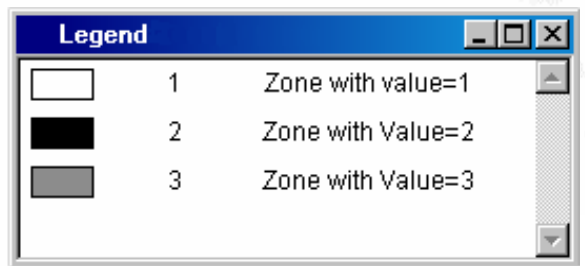
- A zone can be a single, contiguous region, several disjointed regions, or a scattering of individual cells.



This grid layer has 3 zones: one made up of cells with value 1, one made up of cells with value 2, and one made up of cells with value 3.

- Each zone is represented by a single entry in the legend.

Each entry of this grid layer legend shows the color (appearance), value, and descriptive text for the corresponding grid layer zone.



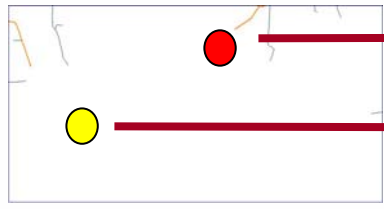
- Using Grid Analysis to Support Corridor Planning
 - Transportation is an intrinsically spatial activity, making GIS a natural tool
 - Many, if not all, DOTs use GIS tools to support a wide range of planning, maintenance, monitoring, and analysis
 - Some of these functions are essentially computerized versions of the paper map processes they replace
 - While others take advantage of the unique capabilities of GIS

- Corridor planning takes many factors into account including:
 - traffic demand
 - engineering requirements
 - environmental factors
 - cultural factors
 - Social factors
 - economic factors
- Outside agencies often supply the environmental and cultural data, and are active participants in evaluating and choosing alternatives
- Public participation is frequently an important part of the process

- Starts with a preliminary project design based on transportation needs and engineering constraints
- The proposed corridor is then presented to regulatory and/or resource agencies for assessment of a variety of environmental, heritage, and cultural impacts
- It is most often an iterative process, in which different corridor plans are evaluated, debated, and modified
- The process is oftentimes lengthy and expensive

- Least Cost Analysis
- Costs can be assigned to building a roadway through each type of land use area
- Then a least-cost path between pre-defined start and stop points can be determined
- This process includes environmental concerns as part of the initial corridor location decision
- Costs can include:
 - land acquisition
 - construction costs
 - costs associated with mitigating environmental damage
 - acquiring compensatory acreage
 - performing archeological surveys

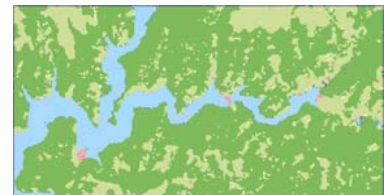
Existing roads
Start
End



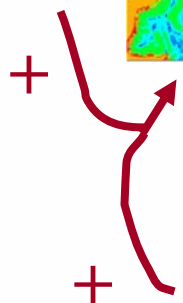
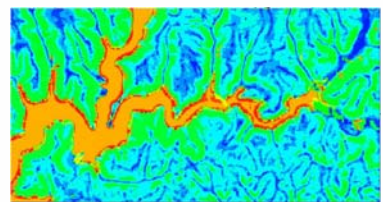
Wetlands



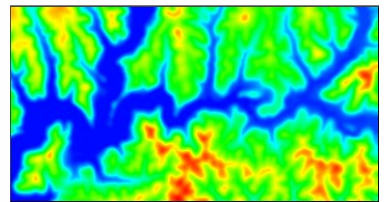
Land use



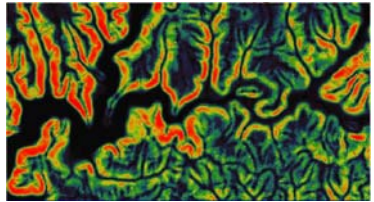
Total costs



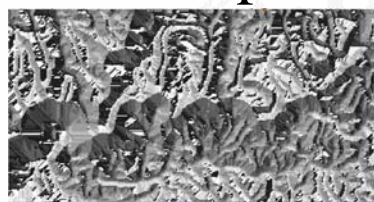
DEM



Grade

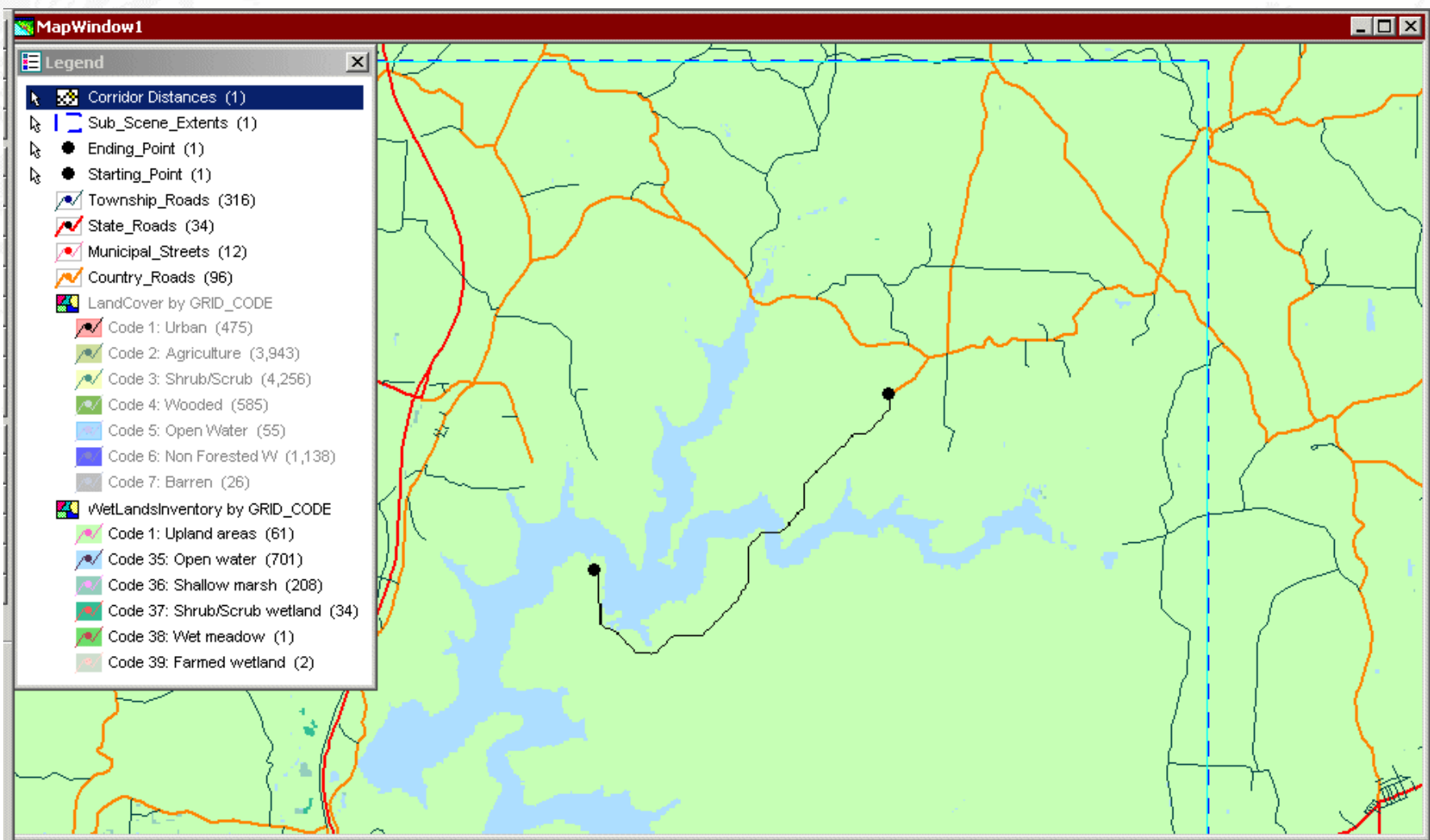


Path map

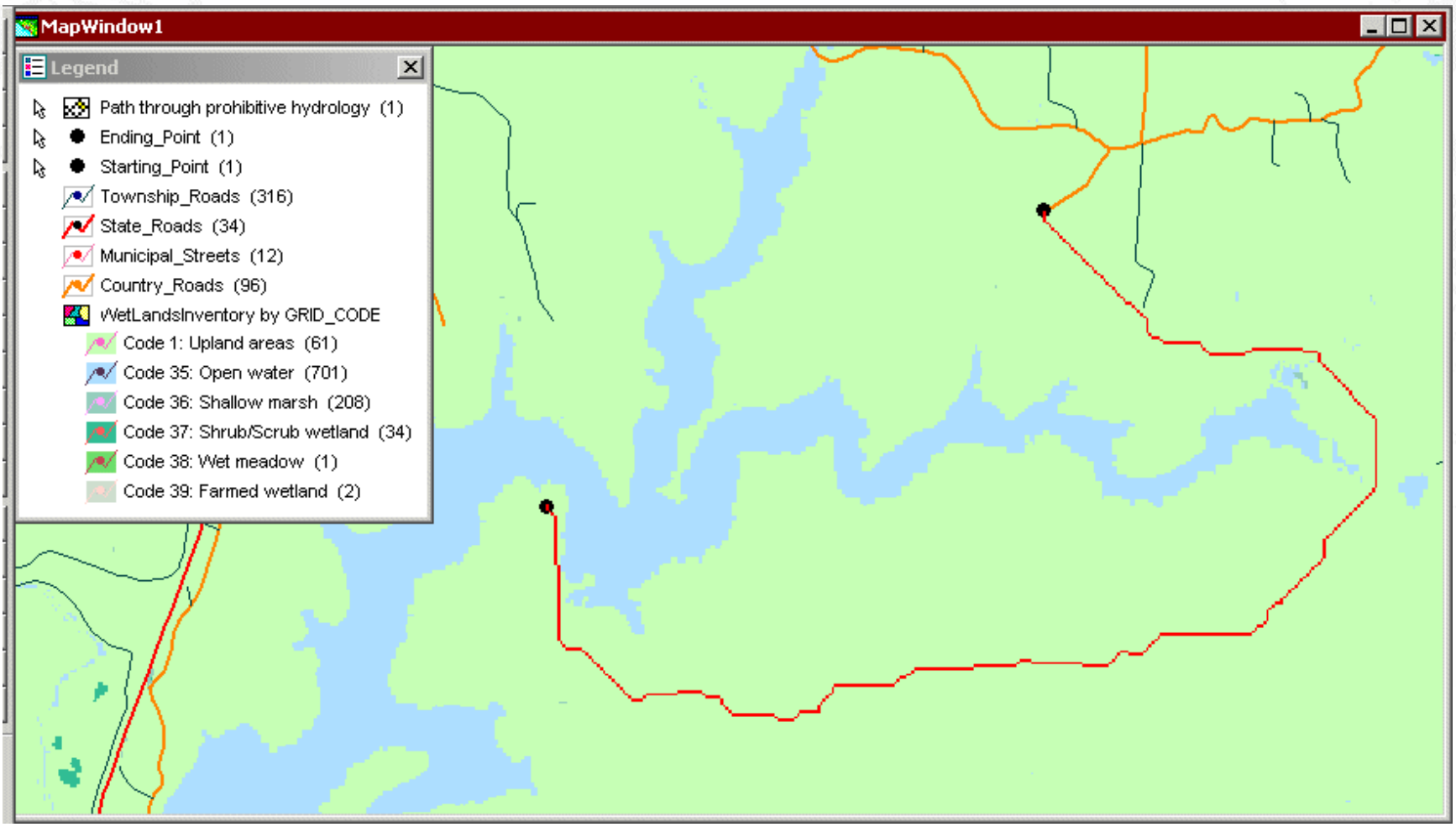


Corridor

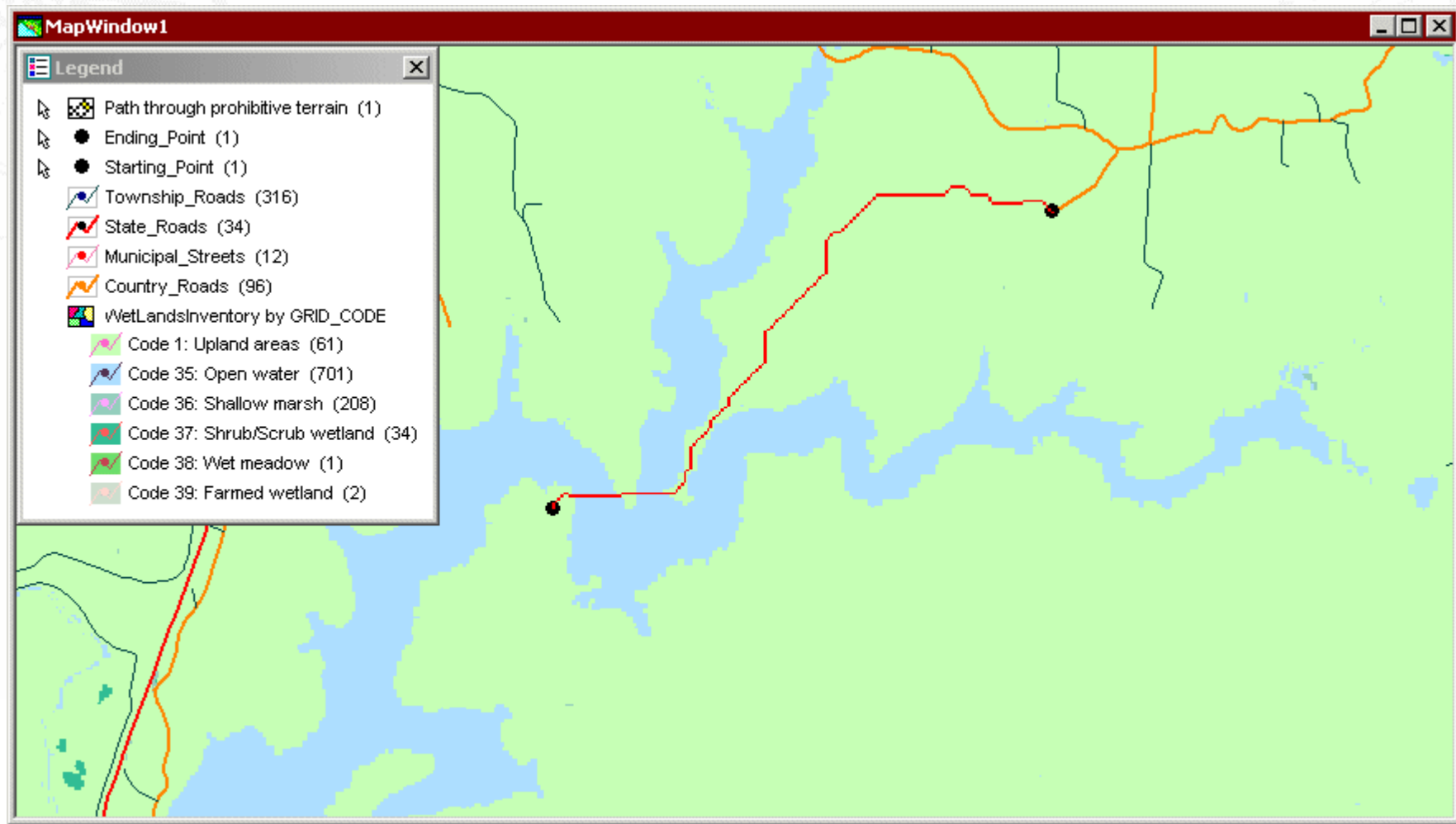




- Prohibitively expensive hydrology costs



- Prohibitively expensive terrain costs



Questions?

