Questions that a GIS Can Answer

What types of questions can a GIS answer?

- Spatial questions
- Non-spatial questions

Spatial questions

- " How many people work with GIS in the major centers of Riyadh" OR " Which centers lie within 10 Km. of each other? "
- " What is the shortest route passing through all these centers".
- These are spatial questions that can only be answered using positional data and other information such as the radius of earth.
- GIS can answer such questions

Non-spatial questions

- "What is the average number of people working with GIS in each location?"
- is a non-spatial question – the answer to which does not require the stored value of latitude and longitude; nor does it describe where the places are in relation with each other.
- GIS can be used to answer such questions, but you could also use other technologies such as databases or spreadsheets.

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- 1) location (what is at...?);
- 2) condition (where is it...?);
- 3) trend (what has changed...?);
- 4) routing (which is the best way...?);
- 5) pattern (what is the best way...?);
- 6) modelling (what if...?).

Questions a GIS can answer

- Perhaps the simplest way to define a GIS is by listing the types of questions it can answer. For any application there are six generic questions that a sophisticated GIS can answer.

Location – What is at... ?

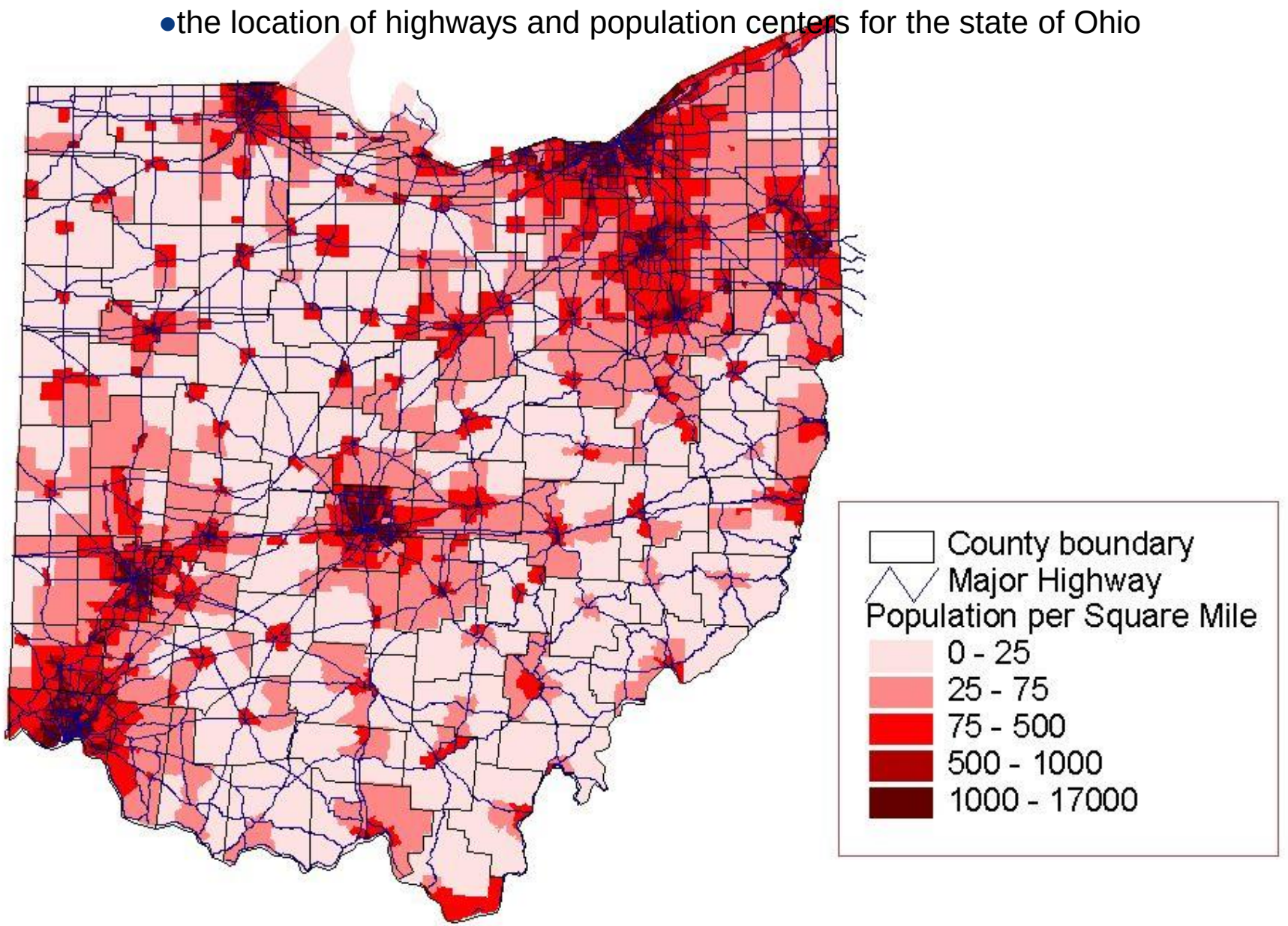
- Also known as a 'where is what?' query the first of these questions seeks to find out what exists at a particular location.
- A location can be described in many ways, using, for example place name, post code, or geographic reference such as longitude/latitude or x/y

Location: What is at...?

- A GIS can be used to display the features that exist at a certain location or that are associated with a certain location.
- For example, a GIS can be used to map public infrastructure, such as roads, utility lines, and schools.
- It can also be used to display characteristics that are associated with a particular place, for example, the population or median household income of counties.

1990 Population per Square Mile

- the location of highways and population centers for the state of Ohio



Condition – Where is it... ?

- The second question is the converse of the first and requires spatial data to answer.
- Instead of identifying what exists at a given location, a location is found where certain conditions are satisfied (e.g., a section of land of at least 2000 square meters in size, within 100 meters of a road, and with soils suitable for supporting buildings).

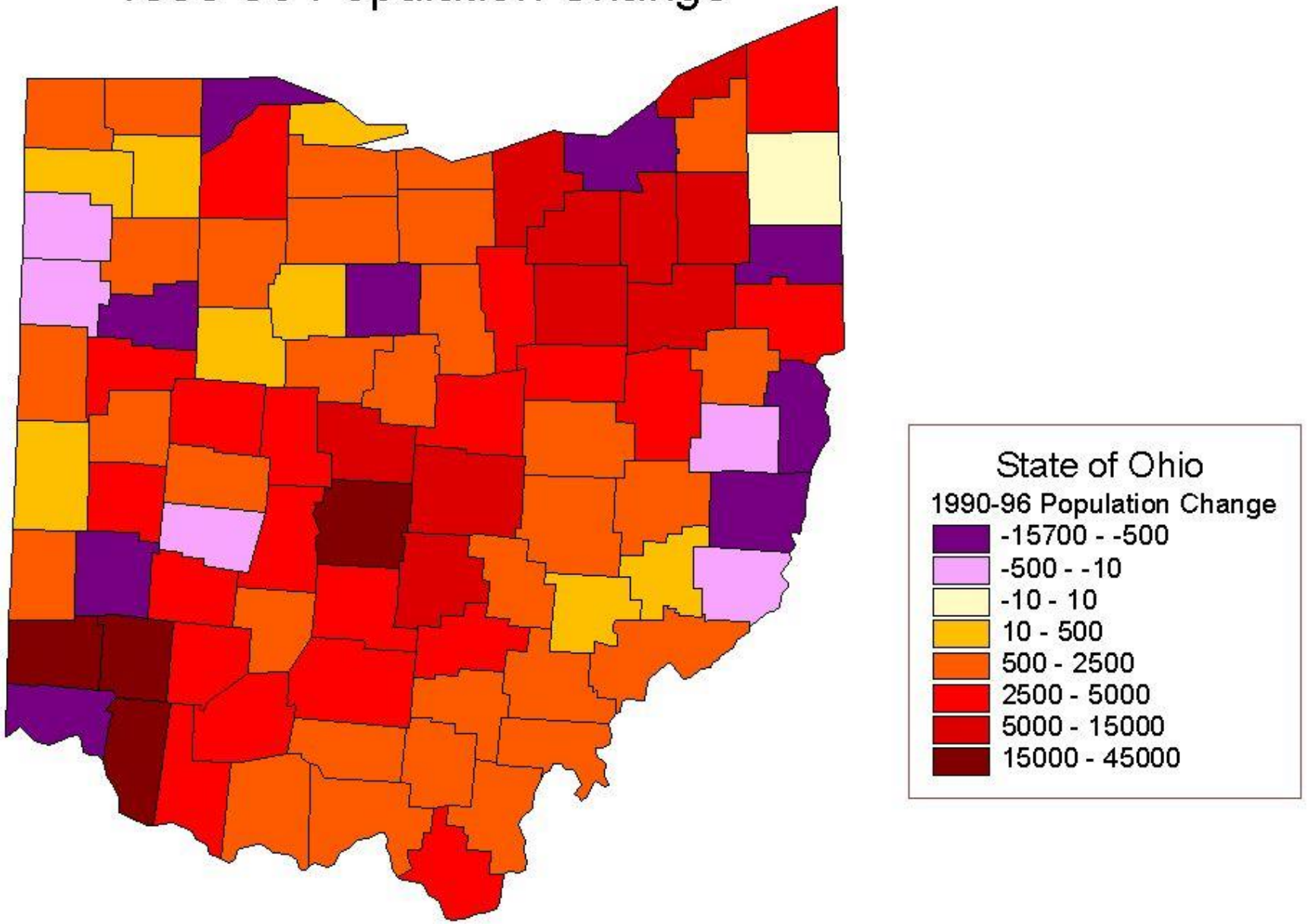
Trends – What has changed since... ?

- The third question might involve both the first two and seeks to find the differences e.g. in land use or elevation, over time.

What has changed...?

- By comparing data from two or more time periods, a GIS can be used to identify trends over time.
- For example, by looking at population change between two points in time, high growth areas within a region can be visually identified.

1990-96 Population Change



Patterns – What spatial patterns exists… ?

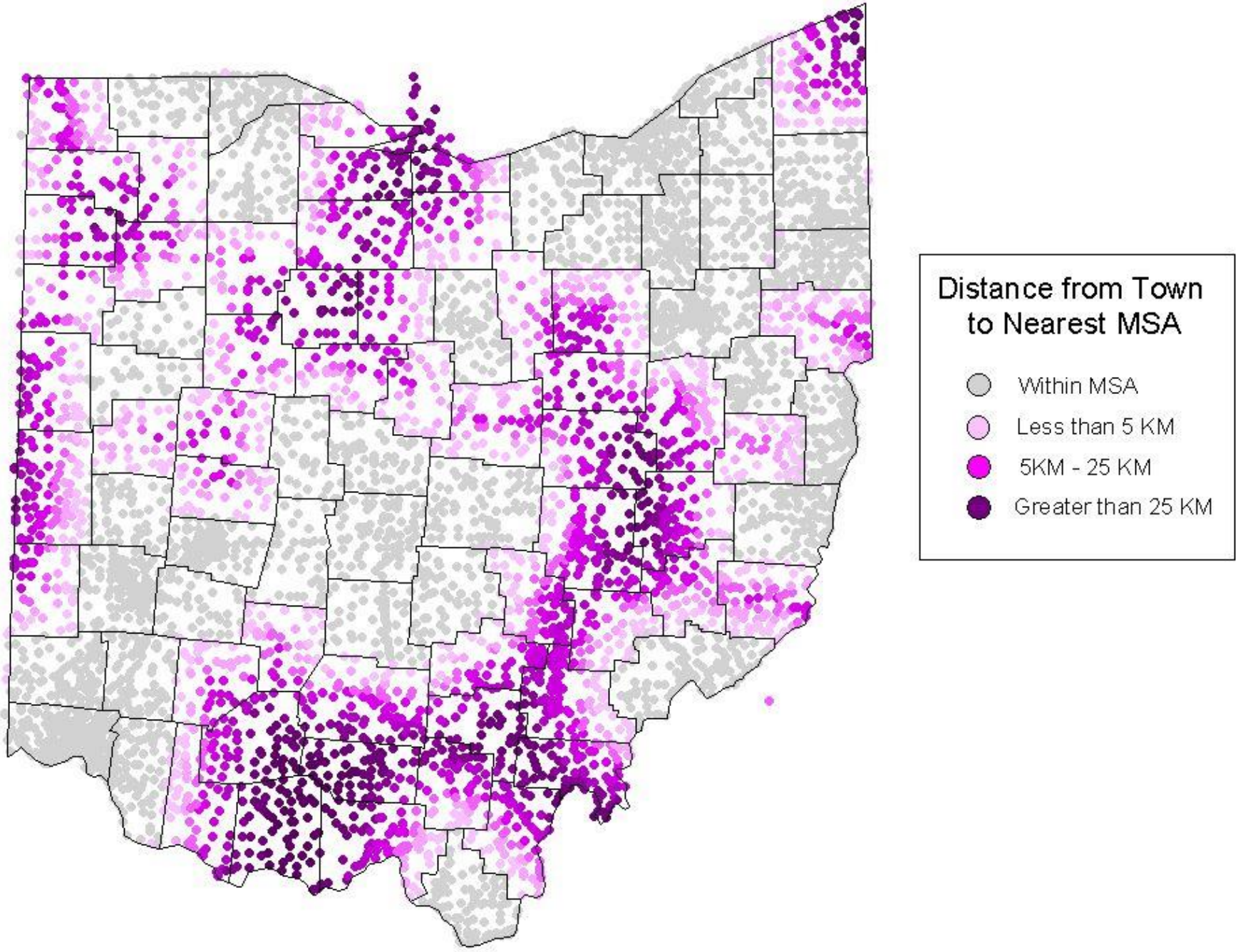
- This question is more sophisticated. One might ask this question to determine whether landslides are mostly occurring near streams.
- It might be just as important to know how many anomalies there are that do not fit the pattern and where they are located.

Patterns

- the question is asked to determine whether cancer is a major cause of death among residents near a nuclear power station or how many anomalies there are that don't fit a predetermined pattern and where they are located.

- Are certain health conditions concentrated in particular areas, for instance, and what else do those areas have in common?
- Where do low-income populations live, and how close are those areas to public transportation?

Distance from Ohio Towns to Nearest Metropolitan Statistical Area (MSA)



Modelling – What if... ?

- "What if..." questions are posed to determine what happens,
- for example, if a new road is added to a network or if a toxic substance seeps into the local ground water supply.
- Answering this type of question requires both geographic and other information as well as a specific model.