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Mapping Where Things Are

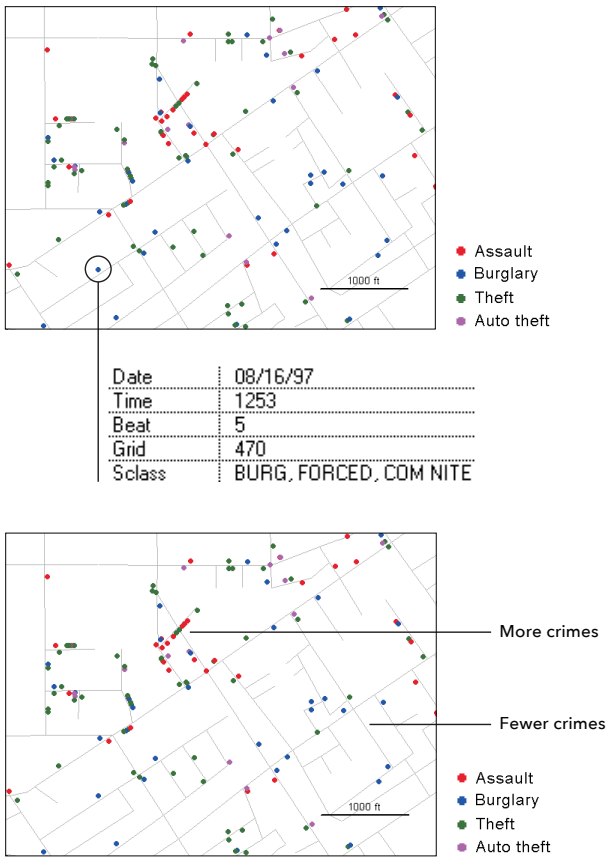
Mapping where things are lets you find places that have the features you're looking for and see where to take action. You can also begin to understand why things are where they are.

In this chapter:

- Why map where things are?
- Deciding what to map
- Preparing your data
- Making your map
- Analyzing geographic patterns

WHY MAP WHERE THINGS ARE?

People often use maps to see where, or what, an individual feature is. However, by looking at the distribution of features on the map, rather than at individual features, you can see patterns that help you better understand the area you're mapping.



You can use a map to identify individual features (top) or to look for patterns in the distribution of features (bottom).

Mapping where things are can show you where you need to take action, or where the areas are that meet your criteria. For example, using GIS, police can map where crimes occur each month, and whether similar crimes occur in the same place, or move to other parts of the city. This tells them where to assign patrols. Wildlife biologists studying the behavior of bears may want to find areas relatively free of roads to minimize the influence of human activity.

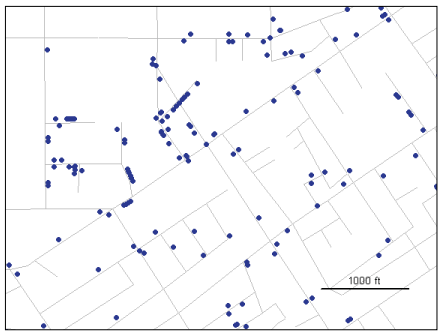
By looking at the locations of features, you can begin to explore causes for the patterns you see. For example, an ecologist might look at the distribution of plant communities to see if the patterns are related to terrain, rainfall, or other factors. Or a retail analyst looking at competition among grocery stores in a region might map store locations to see how far apart stores are.

DECIDING WHAT TO MAP

To look for geographic patterns in your data, you map the features in a layer using different kinds of symbols. You decide which features to display and how to display them based on the information you need and how the map will be used.

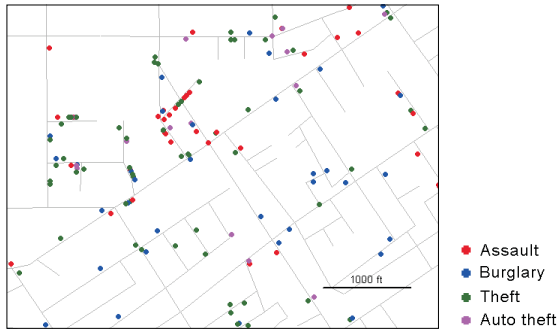
What information do you need from the analysis?

You might simply want to know where features are and where they're not. For example, a business might map the locations of its customers to see where to target an ad campaign. Or a police department might map the locations of all crimes each month to see where they are concentrated.



Locations of crimes.

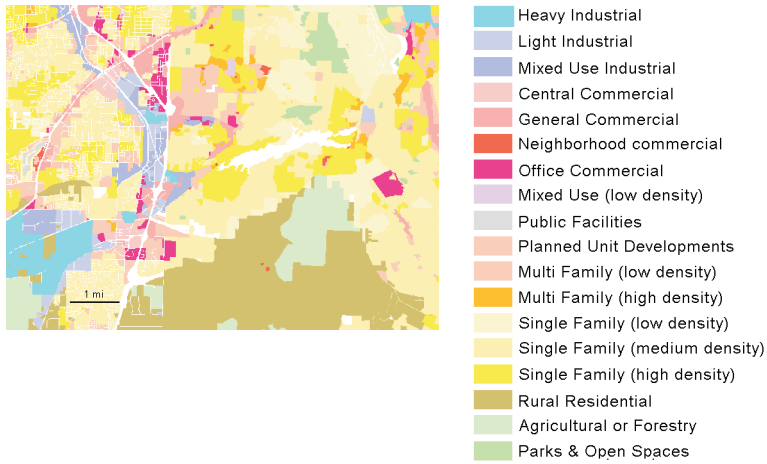
You can also use GIS to map the location of different types of features and see whether certain types occur in the same place. A business might map customers by age category, or a police department might create a map of crimes by type (burglary, assault, theft, and so on) to see, for example, whether assaults and thefts occur in the same area.



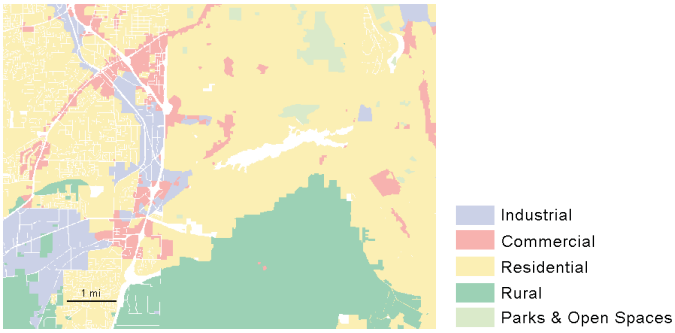
Locations of crimes, by type.

How will you use the map?

The map should be appropriate for the audience and the issue being addressed. If, for example, a planner is showing a zoning map to the public at a city council meeting to discuss the location of heavy industry in the city in relation to high-density housing, the map would have to display detailed categories.



If, on the other hand, the discussion is about overall zoning patterns in the city, displaying major categories of zoning (residential, commercial, industrial, and so on) would be sufficient. Showing the detailed categories would only add unnecessary information.



An audience that is unfamiliar with the area or the data being mapped will want to see information that provides reference locations, such as roads, lakes, or administrative boundaries.

The way the map will be presented also affects the amount of information you'll show. Smaller maps, such as those included in reports, should have only the information needed to show the patterns. Wall maps and posters can present more detailed data and more reference information, and still be readable.

PREPARING YOUR DATA

Before creating your map, make sure the features you're mapping have geographic coordinates assigned and, optionally, have a category attribute with a value for each feature.

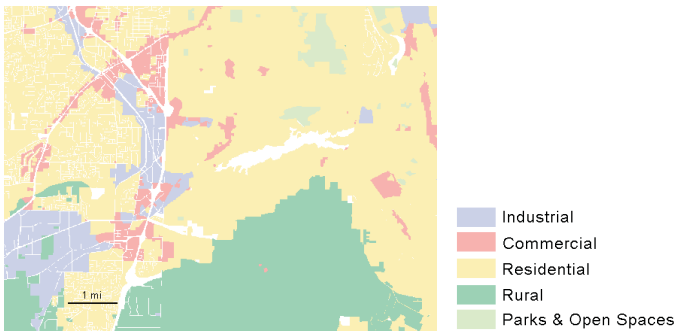
Assigning geographic coordinates

Each feature needs a location in geographic coordinates. If the data is already in a GIS database, the geographic coordinates have been assigned. If you're bringing the data in from another program, or entering it by hand, the features will need to have location information such as a street address, or latitude–longitude values. The GIS reads these and assigns geographic coordinates.

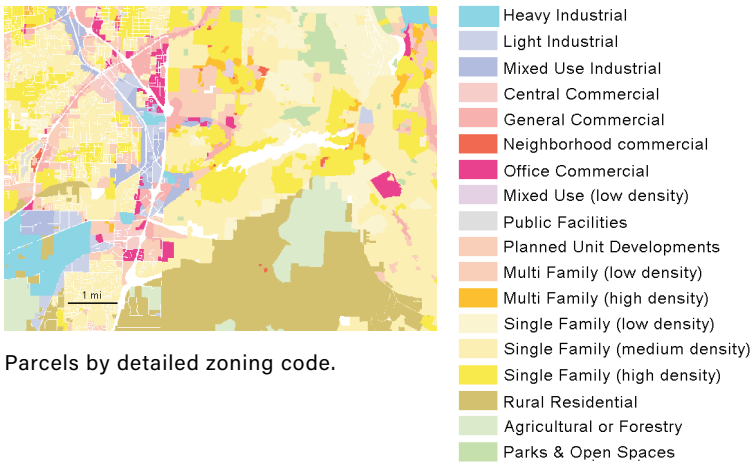
Assigning category values

When you map features by type, each feature must have a code that identifies its type (for example, whether a crime is an assault, theft, burglary, and so on). This information may already be stored with each feature, or you may need to add it. To add a category, you create a new attribute in the layer's data table and assign the appropriate value to each feature.

Many categories are hierarchical, with major types divided into subtypes. For example, parcels may have a general code indicating that they're zoned industrial and a detailed code indicating the type of industrial zoning: heavy, light, or mixed use.



Parcels by general zoning code.



Parcels by detailed zoning code.

In some cases, a single code indicates both the major type and subtype. For example, all crimes with a value between 500 and 599 are burglaries, but the type of burglary is indicated by the specific value.

ID	Date	Type	Description
108161454	08/11/97	629	THEFT, $200-$400
107941626	07/20/97	521	BURG, UNL ENT, RES NITE
109040815	11/07/97	521.1	BURG, UNL ENT, GAR NITE
106270910	02/03/97	513	BURG, FORCED, RES UNK
109040843	11/07/97	619	THEFT, OVER $400

In other cases, the separate attributes are used to store the major types and subtypes, as in this zoning layer.

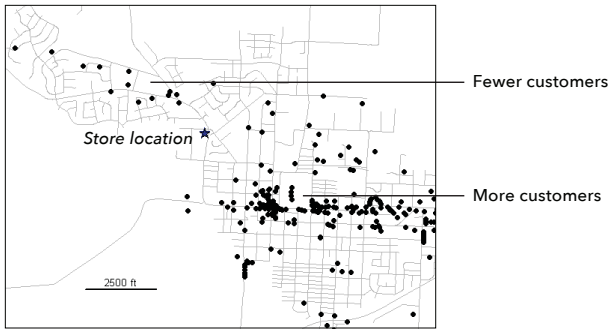
Acres	General Code	Detailed Code	Description
3.8	SFR	SFR2	Urban Low Density Residential (10000 sq. ft.)
17.6	COM	CO	Office Commercial
4.7	RUR	RRFU	Future Urban
104.9	SFR	SFR1	Urban Low Density Residential (30000 sq. ft.)
2.9	SFR	SFR3	Residential - 7500 sq. ft. area per unit
46.9	MFR	MFR1	Medium Density Residential
8.4	SFR	SFR2	Low Density Residential
7776.2	RUR	RRFU	Rural Residential/Farm Forest (5 Acres)
2650.0	RUR	RRFU	Rural Residential/Farm Forest (5 Acres)
4681.6	RUR	FF	Exclusive Farm Use
7.5	SFR	SFR2	Residential - 10000 sq. ft. area per unit

MAKING YOUR MAP

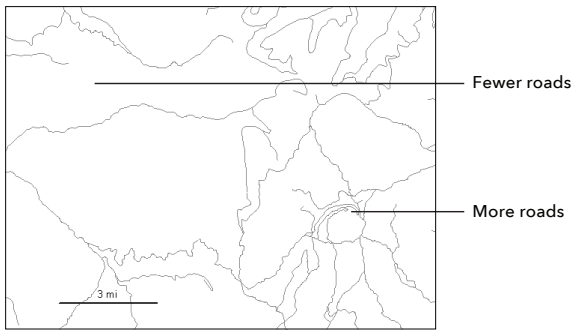
To create your map, you tell the GIS which features you want to display and what symbols to use to draw them. You can map all features in a layer as a single type or show them by category values.

Mapping a single type

To map features as a single type, you draw all features using the same symbol. Even these very basic maps that simply show where features are can reveal patterns. For example, a store owner can see where customers are, or a recreation planner can see where roads in a natural area are.



A business may map locations of its customers to target its advertising.



Wildlife biologists may look for a study area with few roads.

Mapping features as a single type might suggest differences in the features you could explore further. For example, you might suspect that the small, clustered parcels have a different use from that of the large parcels surrounding them.