Spatial Analysis (Part 3)

1. Geoprocessing
2. Buffering
3. Clipping
4. Prep for next Tuesday

Course Website
https://sites.google.com/site/garp0244fall2014/home

GIS Resources
http://www.westfield.ma.edu/cbraun/resources/gis-resources/

Cool Maps
Frankenplace
Buffer Analysis
Service Area Analysis

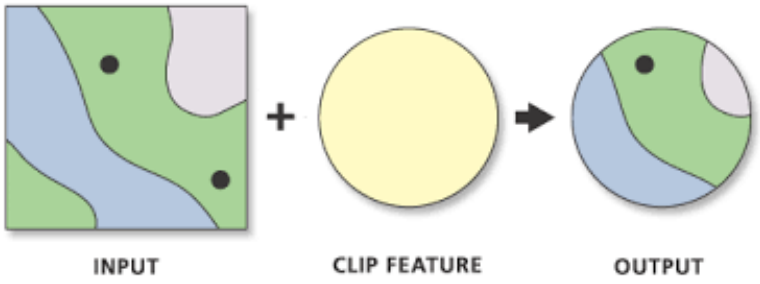
The rest of the semester:

Date	Topic	Work outside of class
Tu (11/25)	Spatial Analysis I	GTKArcGIS Ex. 15b, 17a, 17b Look-over the Land Use Project and get started if possible.
Tu (12/2)	Spatial Analysis 2	Prep for Th: GTKArcGIS Ex. 19a, 19b Work on the Land Use Project
Th (12/4)	Spatial Analysis 3	Work on the Land Use Project GTKArcGIS 18a, 18b
Tu (12/9)	Spatial Analysis 4	Work on the Land Use Project
Th (12/11)	Spatial Analysis 5	Due: Land Use Project Out: Final Project
Th (12/18)		Due: Final Project via Email

1) Geoprocessing

In the simplest form a geoprocessing tool takes an input data set, perform some type of geoprocessing, and creates a new output data set. For example, you might have a stream network (as lines) as your input data set and use the Buffer tool to create a new output data set showing the 100 foot buffer polygons around the streams.

A somewhat more complex geoprocessing tool begins with two input data sets, performs some type of geoprocessing, and creates a new output data set. For example you may have one input data set with all streams, lakes, and ponds in Massachusetts, but you are only interested in those that fall within your particular area of interest. Here you can use the Clip tool or Intersect tool in ArcGIS.

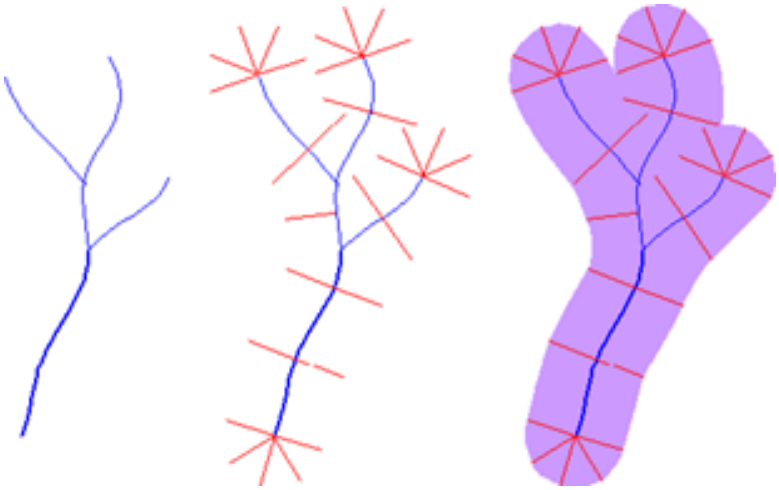


2) Buffering

The Buffer Tool is perfect example of GIS analysis!

Consider, for example, if you were asked to plot on a map a 100-meter-wide buffer zone surrounding a protected stream. If all you had to work with was a paper map, a ruler, and a pencil, you might have a lengthy job on your hands. You might draw lines scaled to represent 100 meters, perpendicular to the river on both sides, at intervals that vary in frequency with the sinuosity of the stream. Then you might plot a perimeter that connects the end points of the perpendicular lines.

⇒ ***The Buffer tool automates all this into one easy step!***

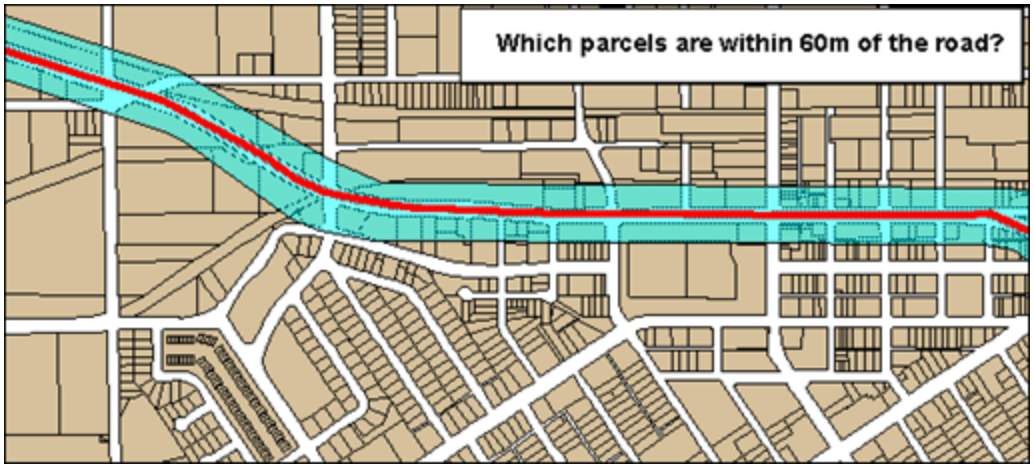


You can buffer any type of spatial feature.

Point. Example: location of schools in a town Buffer: Distance from schools where registered sex offenders are not allowed to live.

Lines. Example: stream and rivers (= linear water bodies). Buffer: The 100 foot non-disturb zone around water bodies

Polygons. Example: The U.S. border. Buffer: the 12 mile territorial waters extending into the oceans



Using the Buffer Tool is easy!

1. Open the ArcToolbox – Analysis Tools – Proximity and double-click on Buffer.
2. Or, open the Search window and enter Buffer.
3. Or, select Geoprocessing, Buffer.

Make sure you click the Show Help >> button! This opens a context-sensitive Help box on the right that explains every step of the tool and the settings.

Input Features. These are the spatial features that you want to buffer.

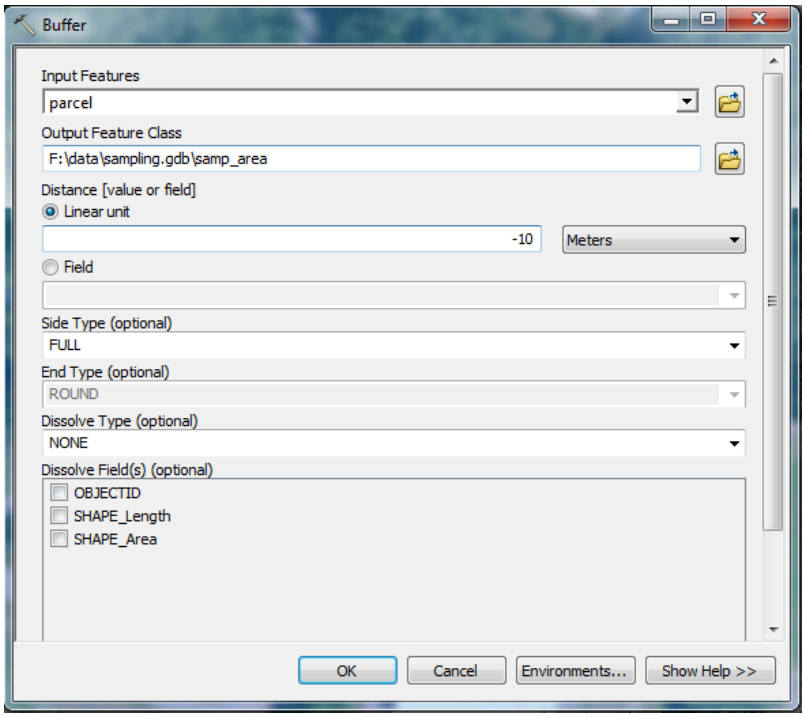
Output Feature Class. This is the file for your buffer, use a meaningful name!

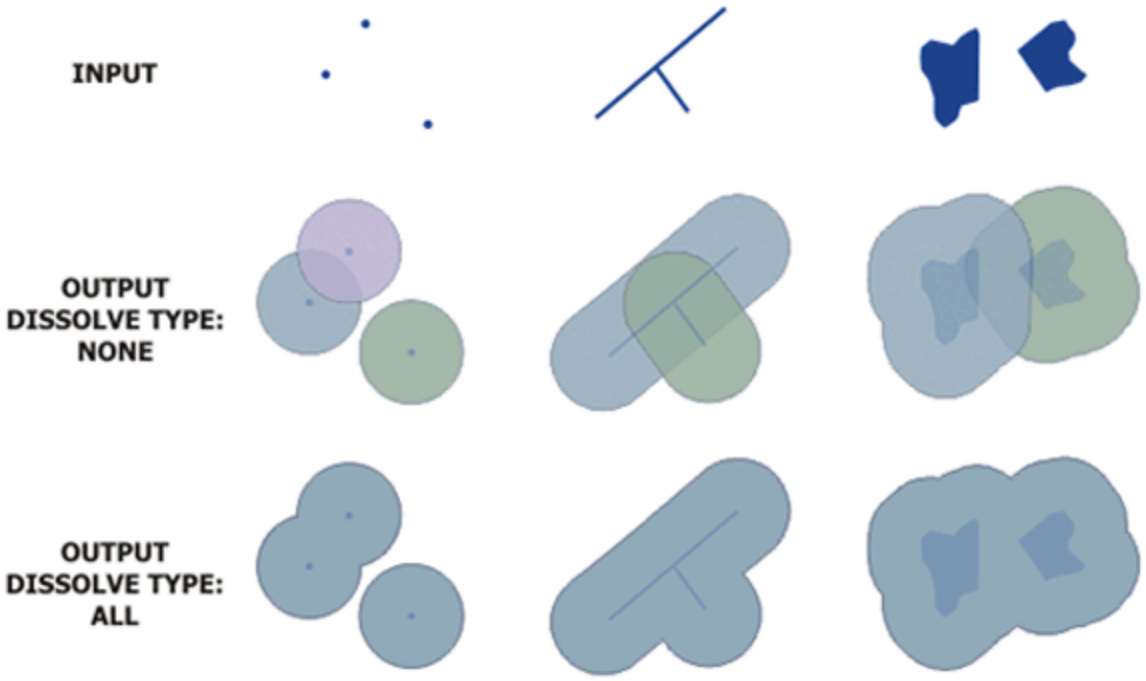
Linear Unit. Here you specify the size and unit of the buffer.

Side Type and End Type. Optional settings – refer to the explanations on the right!

Dissolve Type. Here you have two main choices: NONE and ALL.

- NONE creates an individual buffer around each feature.
- ALL takes these individual buffers and combines them into one large buffer. The combination often makes sense, so you will use Dissolve Type = ALL in most cases.





Exercise 1. Is there any place in Massachusetts more than 20 miles from a college or university?

Exercise 2. Is there any place in Massachusetts more than 3 miles from a fire station?

Exercise 3. Determine the 'hot zones' around Westfield State campus buildings: 50, 100, 150 feet buffers (depending on the specific incident type). What's the problem here for public safety personal?

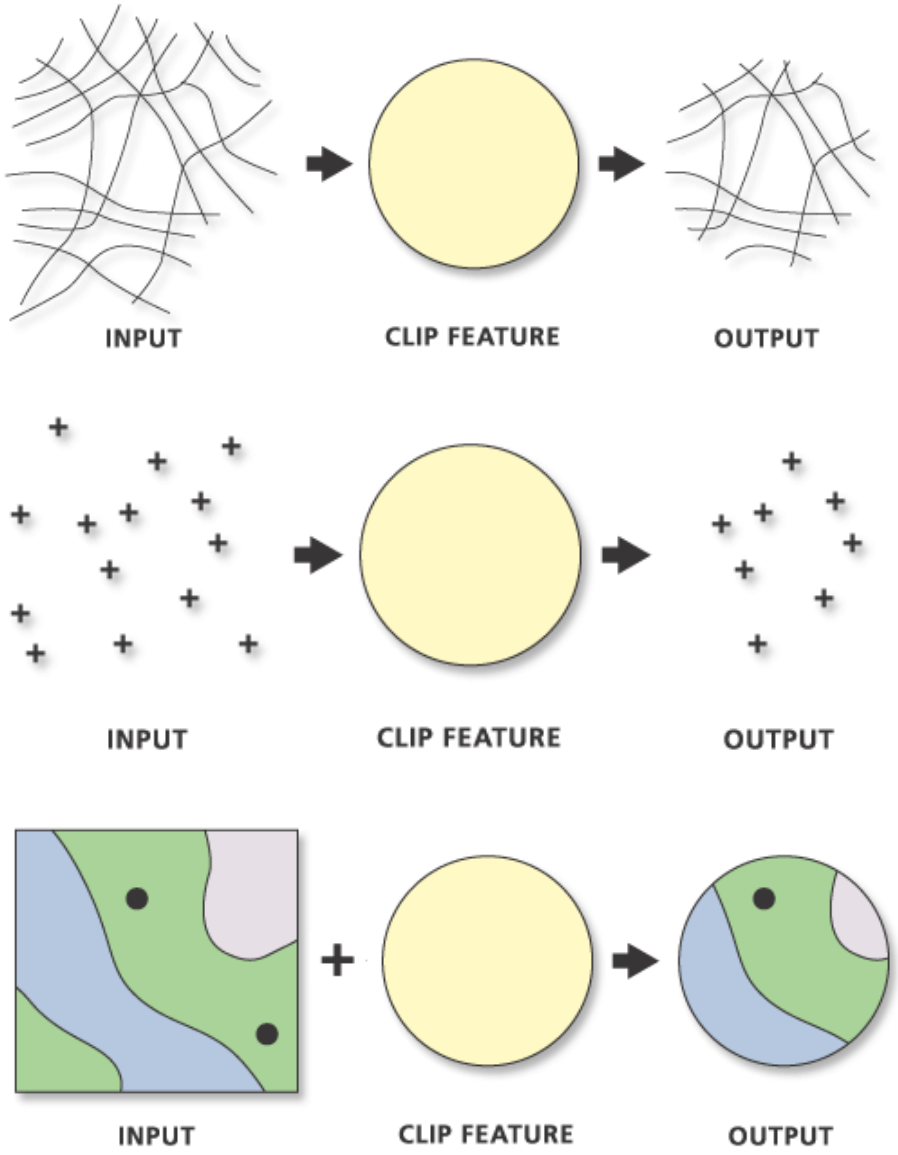
Exercise 4. Map all cities/towns and firestations located within 3 miles of the MassPike and I91. How many different ways can you answer this question? Hint: use the Major Roads layer from the course website.

You a) already have the data or b) I provided the data for you - check the course website or c) you may need to download the data from MassGIS.

3) Clipping

Clippint extracts input features that overlay the clip features.

Use this tool to cut out a piece of one feature class using one or more of the features in another feature class as a cookie cutter. This is particularly useful for creating a new feature class—also referred to as study area or area of interest (AOI)—that contains a geographic subset of the features in another, larger feature class.



Exercise 1. Clip the MA towns on the Quabbin and Westfield River watersheds.

Exercise 2. Clip the MA Major Roads on the Quabbin and Westfield River watersheds.

4) Prep for Tuesday

1. Work through GTKArcGIS Ex. 18a (Dissolving features) and print the map you have on your screen at the end of the exercise.
2. Work through GTKArcGIS Ex. 18b (Clipping layers) and print the map you have on your screen at the end of the exercise.
3. Finish our three in-class exercises.
4. Work on the Land Use Change Project.