



GIS Institute

Center for Geographic Analysis

Transformation of
Vectors/ Feature data



Geoprocessing

- Create new layers (spatial) and attributes (non spatial) based on simple rules
- Often use multiple data sets



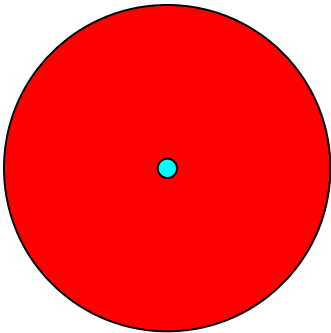
Geoprocessing Tools

- Buffer
- Clip
- Intersect
- Union

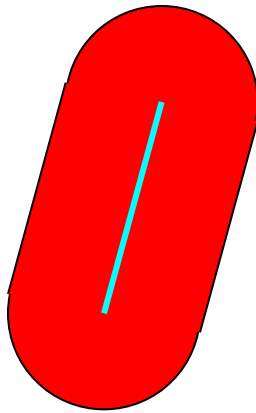


Buffering

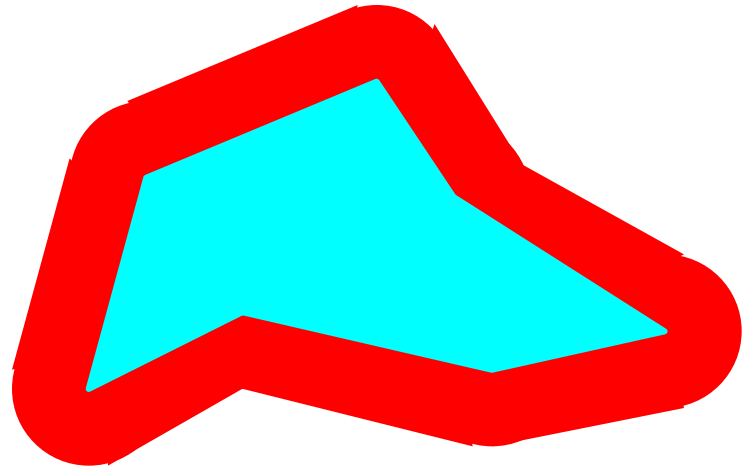
Point



Polyline

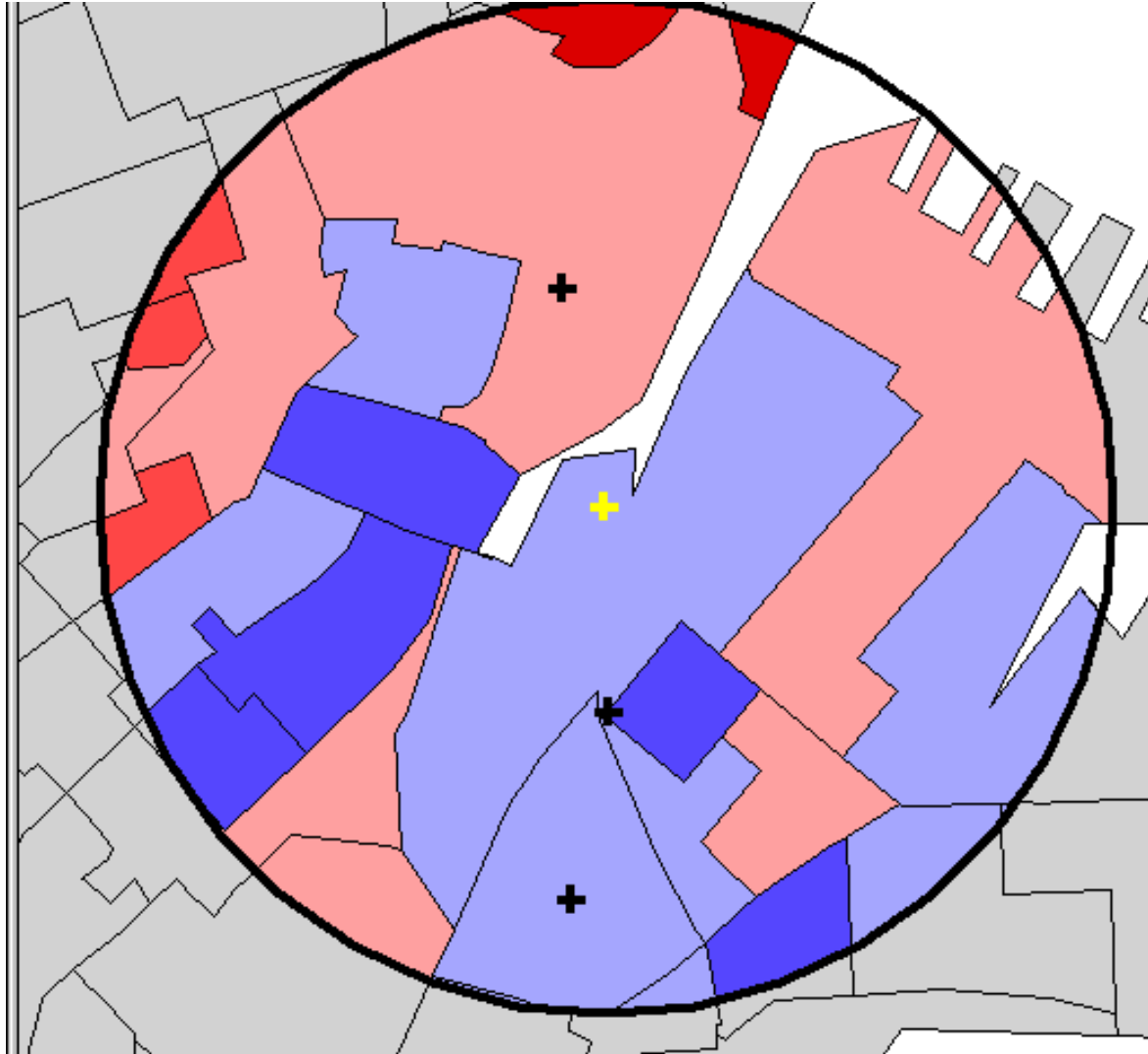


Polygon

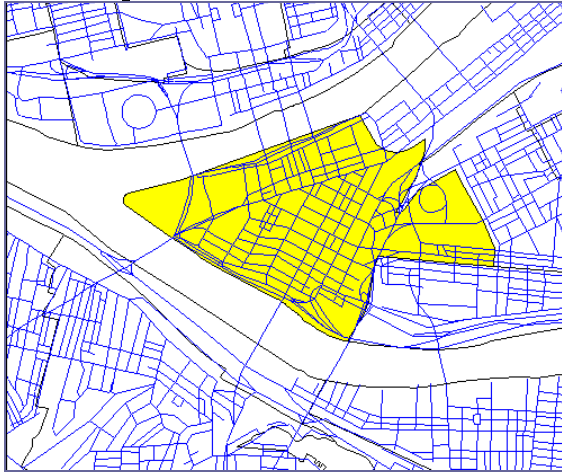




Buffering

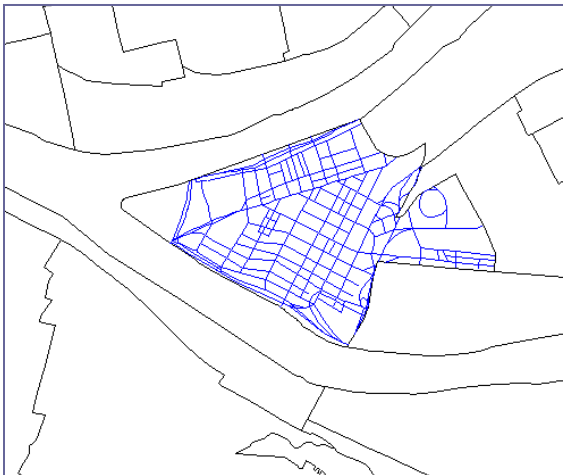


Line (Arc) Clipping



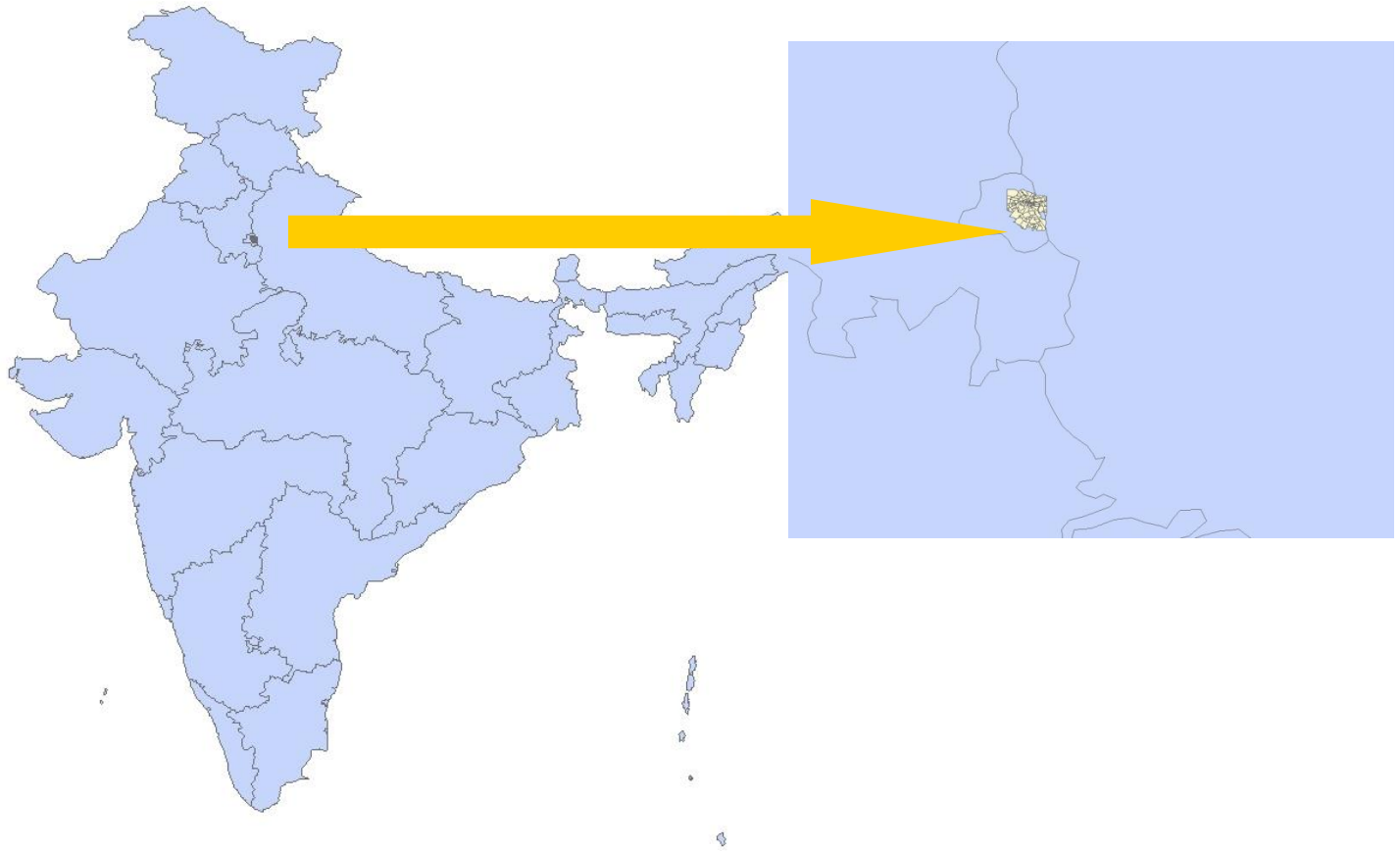
Input layer - Streets

*Clip layer – Central
Business District
(selected)*



*Output layer - Streets
within Central
Business District*

Polygon Clipping

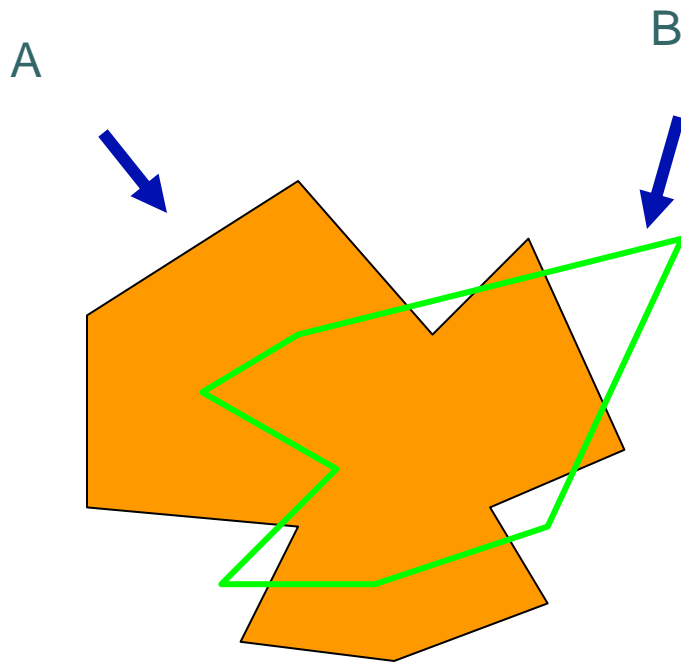




Polygon overlay

- In the polygons formed by the overlaying of two polygon layers:
 - do two polygons intersect?
 - where are areas in Polygon A but not in Polygon B?

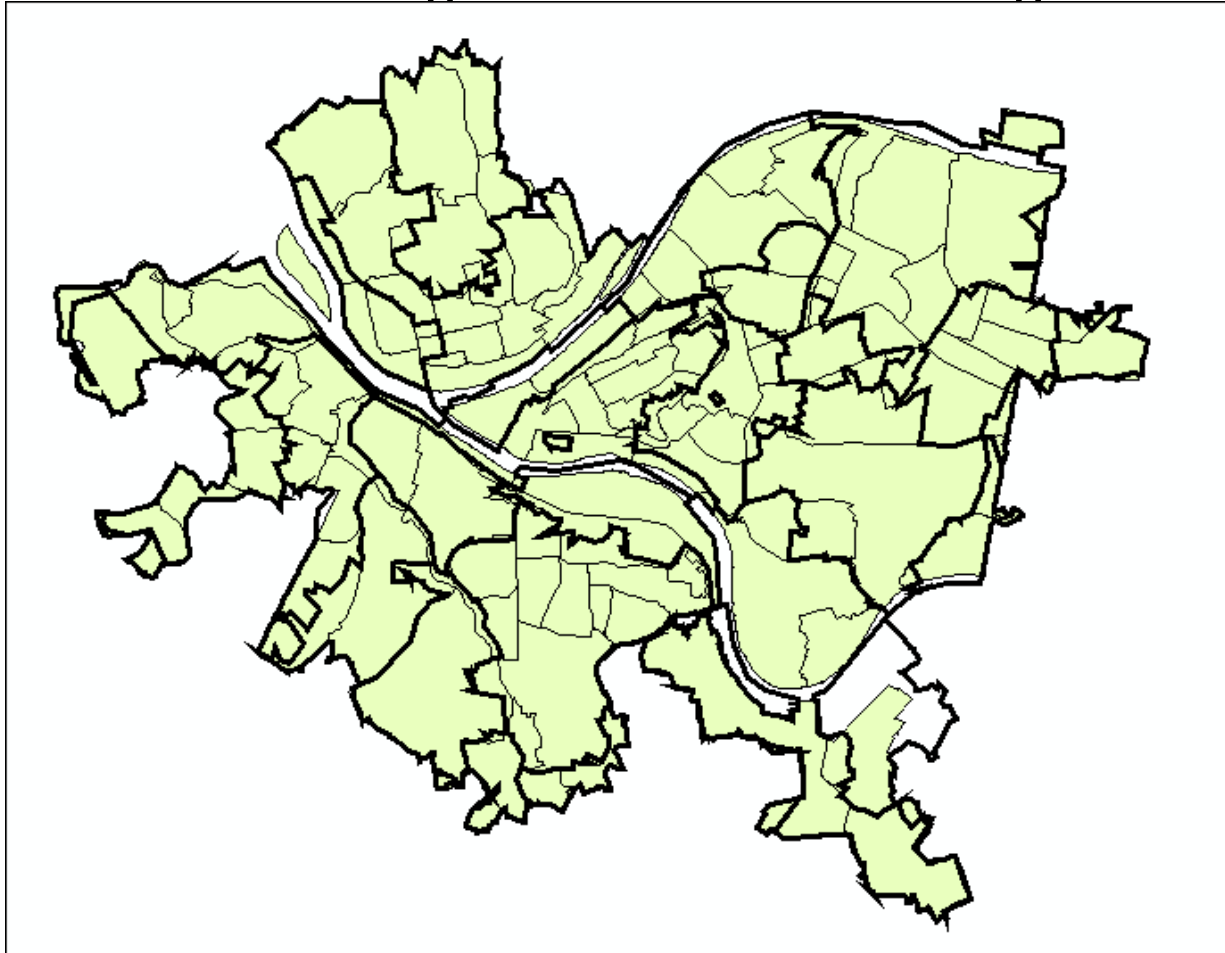
Polygon Overlay



In this example, two polygons are intersected to form 9 new polygons. One is formed from both input polygons; four are formed by Polygon A and not Polygon B; and four are formed by Polygon B and not Polygon A.

Union

Start with Pittsburgh ZIP codes and Neighborhoods



Union

Attributes tables contain different data

Attributes of PAZip_Clip

	FID	Shape*	ObjectID	ZIP	PO_NAME	STATE	AREA	SUMBLKPO	POP2003
▶	0	Polygon	66850118	15236	PITTSBURGH	PA	10.92901	30542	29947
	1	Polygon	66715656	15122	WEST MIFFLIN	PA	13.72712	22053	21473
	2	Polygon	66846720	15106	CARNEGIE	PA	10.03189	18931	18392
	3	Polygon	66846721	15136	MC KEES ROCKS	PA	11.05093	21757	21528
	4	Polygon	66846723	15202	PITTSBURGH	PA	4.92168	20993	20720
	5	Polygon	66846724	15203	PITTSBURGH	PA	1.60902	9382	9520
	6	Polygon	66846725	15204	PITTSBURGH	PA	1.76354	9634	9450
	7	Polygon	66846726	15205	PITTSBURGH	PA	10.46422	23355	22873
	8	Polygon	66846727	15209	PITTSBURGH	PA	5.2569	13200	13032

Record: 1 Show: All Selected Records (0 out of 38 Selected.) Options

Attributes of Neighborhoods

	FID	Shape*	AREA	PERIMETER	NEIGHBOR	NEIGHBOR_I	HOOD_N	HOOD	AC
▶	0	Polygon	11918303.60054	20661.1756	2	1	81	Summer Hill	
	1	Polygon	8653476.96644	13605.33288	3	12	58	Northview Heights	
	2	Polygon	25659093.182	26863.73963	4	27	62	Perry South	
	3	Polygon	16214358.91033	22853.9862	5	40	29	East Liberty	
	4	Polygon	12734567.89252	14551.4253	6	35	35	Garfield	
	5	Polygon	7401662.43843	13023.0284	7	37	33	Fineview	
	6	Polygon	19559866.44723	21371.15158	8	51	10	Bloomfield	
	7	Polygon	6069811.10695	11647.36761	9	48	15	California-Kirkbride	

Record: 1 Show: All Selected Records (0 out of 94 Selected.) Options

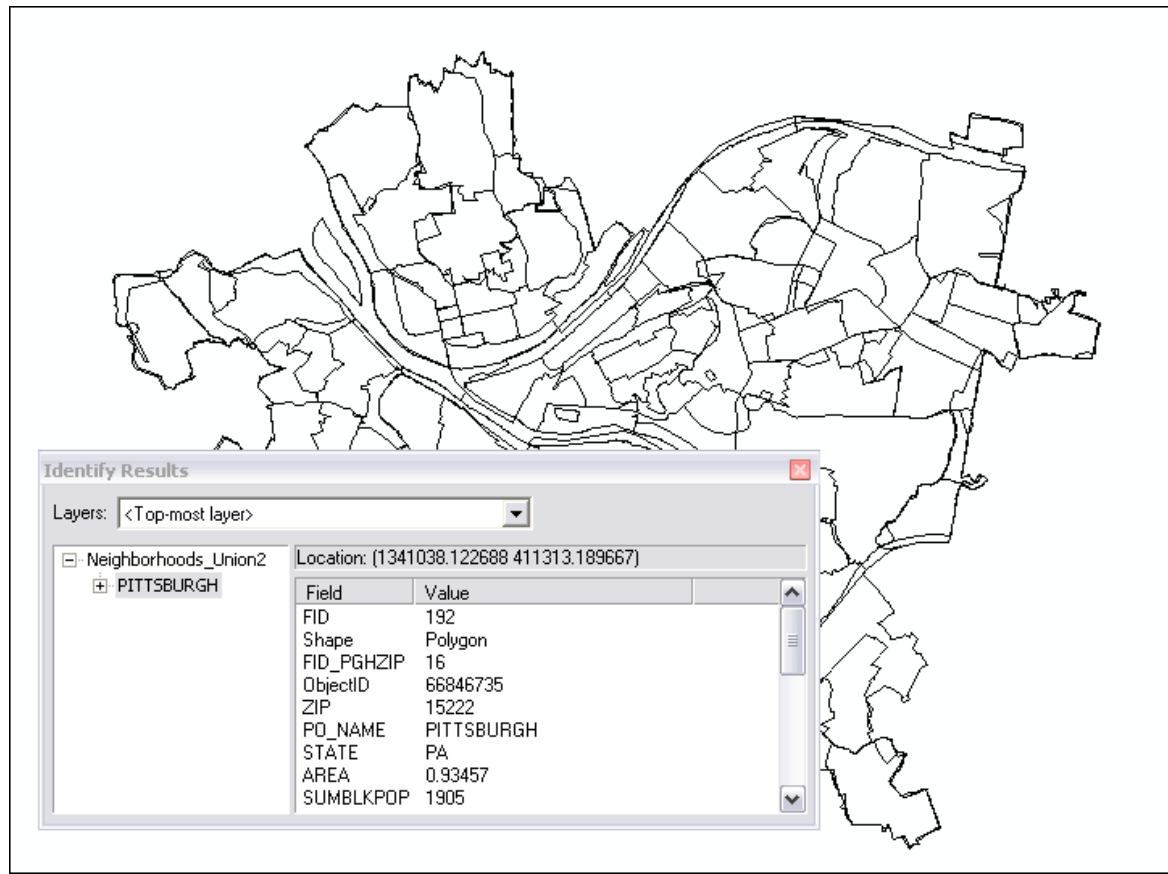


Union

- Union neighborhoods and ZIP Codes to include the zip on each neighborhood polygon

Union

- Result: Polygons with information from both layers



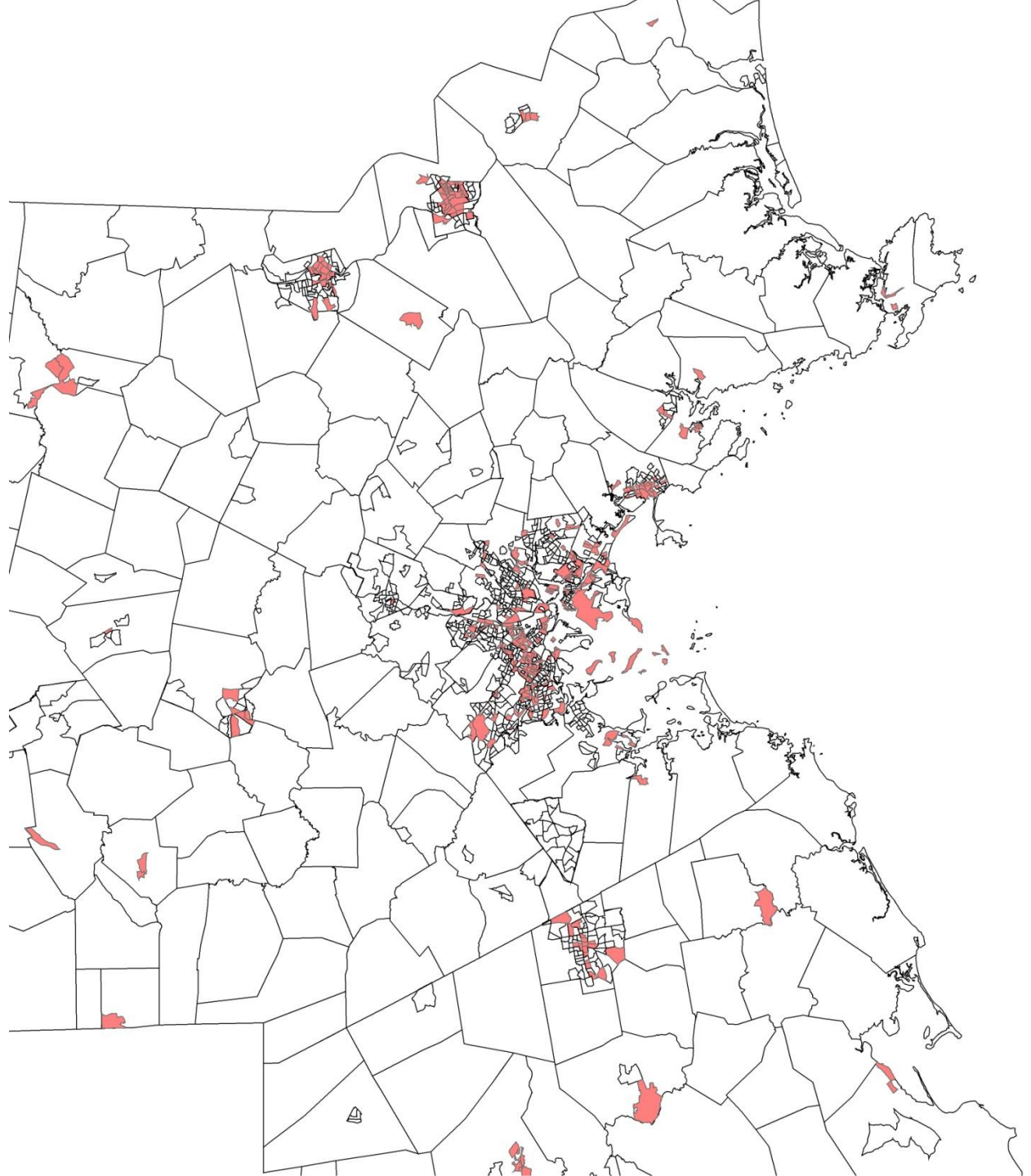


Intersect

- Use Intersect when you want to overlay a layer with the polygons in another layer so that the resulting output layer
 - has the combined attribute data of the features in the two inputs, and
 - only contains features that fall within the spatial extent of the overlay polygons.

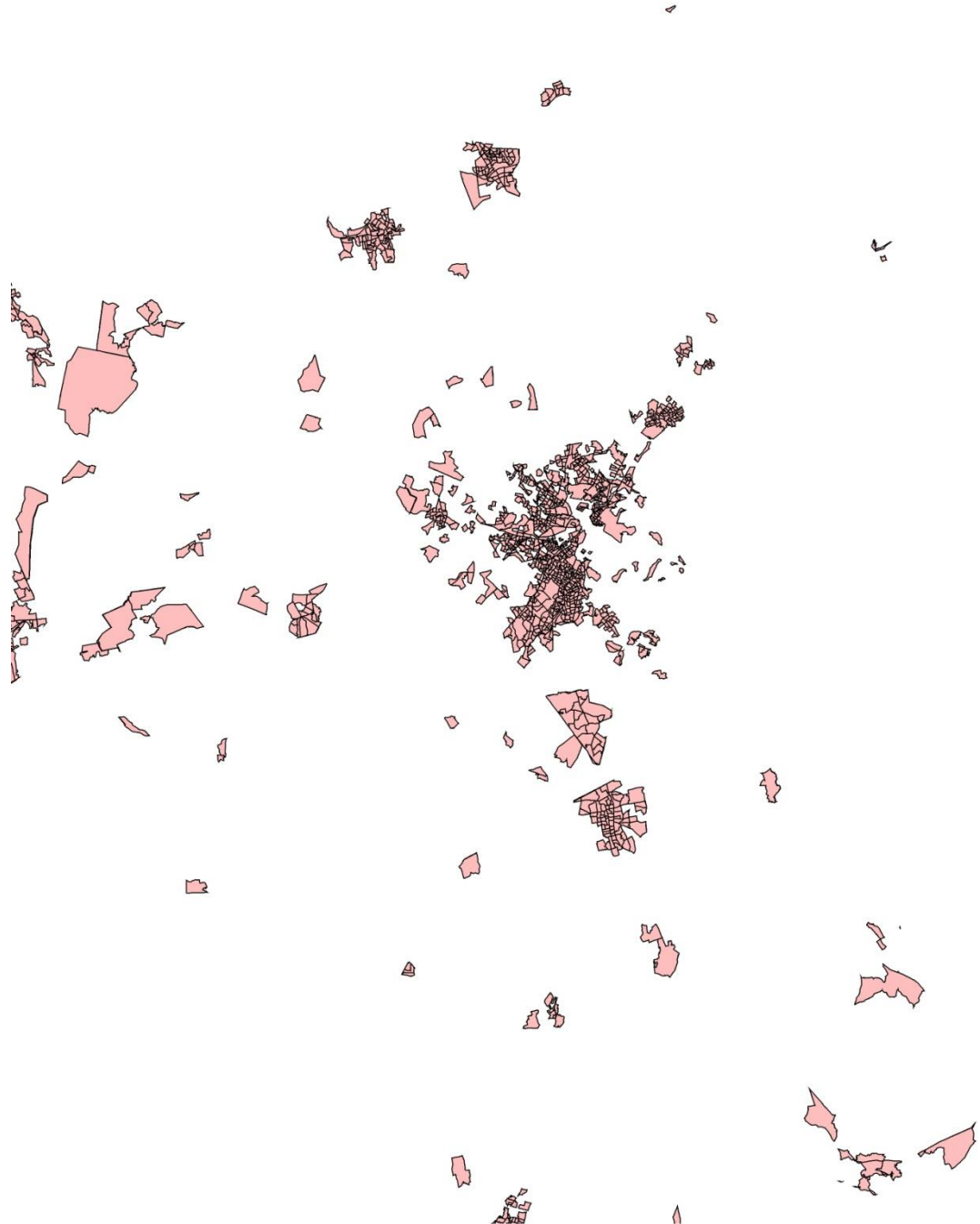


Union Result





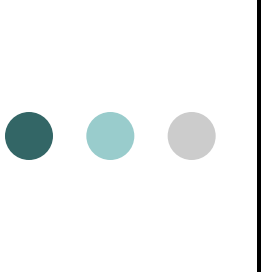
Intersect Result





Spurious or sliver polygons

- In any two such layers there will almost certainly be boundaries that are common to both layers
- The two versions of such boundaries may not be coincident
- As a result large numbers of small sliver polygons will be created



At the end of the Vector lab you should be able to

- Work with one spatial layer to
 - Clip and Select from a spatial dataset
 - Create a Buffer
- Work with multiple polygon layers to overlay
 - Intersect
 - Union
- Use location or attribute queries from the previous lab