Week 2 Learning Objectives

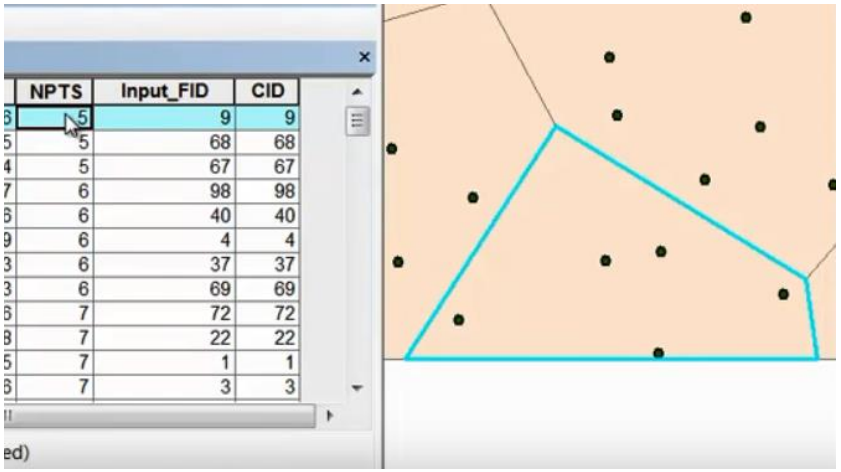
1. To become proficient at creating random and uniform sample locations
2. To become proficient at computing point densities
3. To become proficient at developing linear regression models
4. To become proficient in spatial interpolation of point quantities

Sampling Distributions

- Uniform points
- Random points within polygons
- Random points based on field values
- Stratified random samples
- Random locations along lines

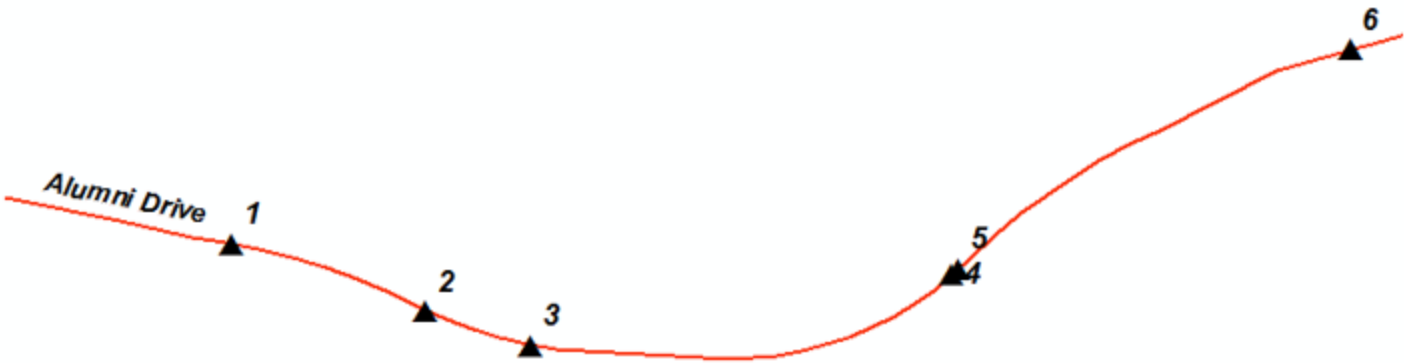
- Random Locations

- Uniform Locations



NPTS	Input_FID	CID
5	9	9
5	68	68
5	67	67
6	98	98
6	40	40
6	4	4
6	37	37
6	69	69
7	72	72
7	22	22
7	1	1
7	3	3

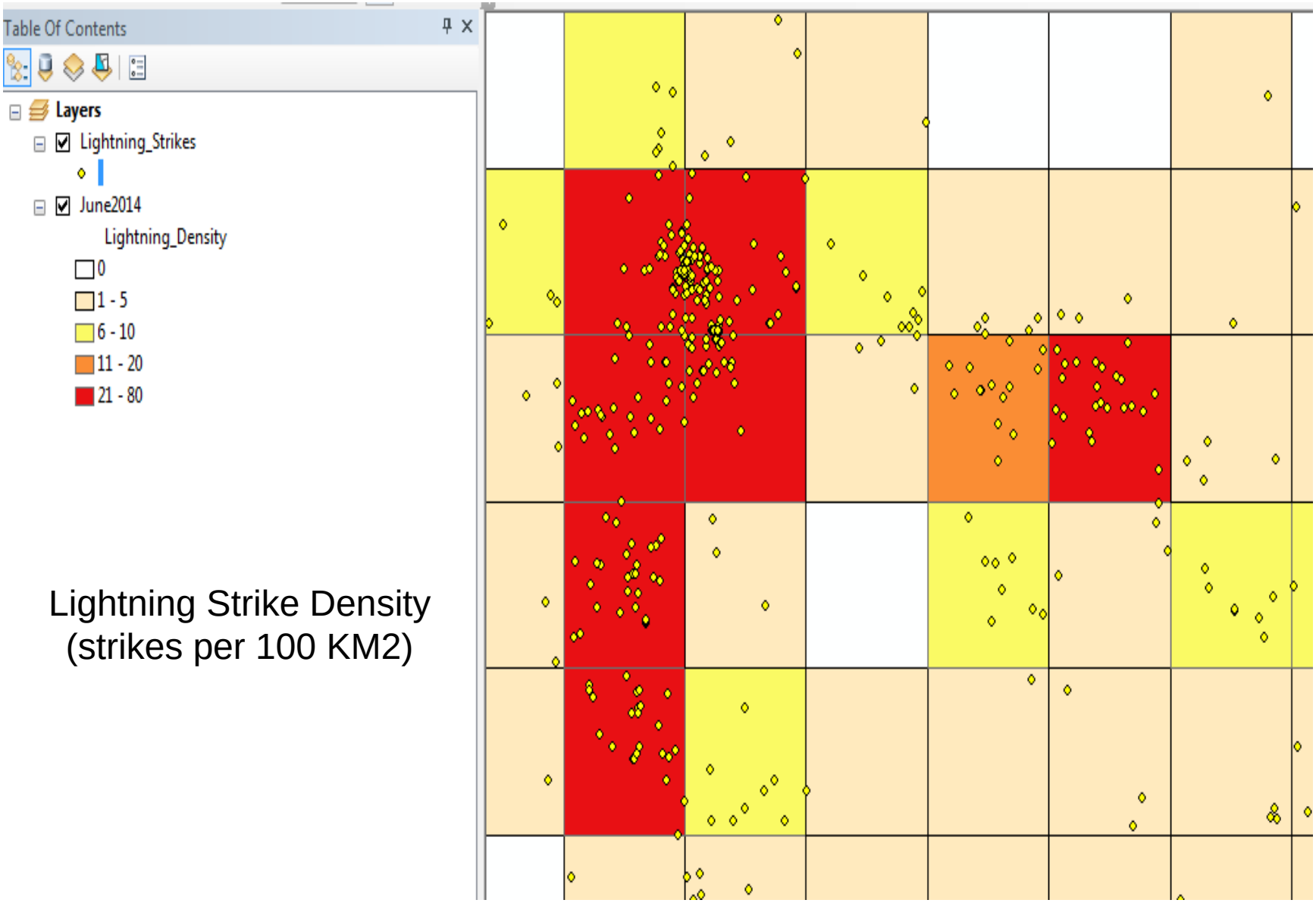
Stratified Random Locations
(based on NPTS value in each polygon)



Six Random Locations
(along a line)

Point Densities

- Proximity polygons
- Density within each polygon
- Density per square unit area



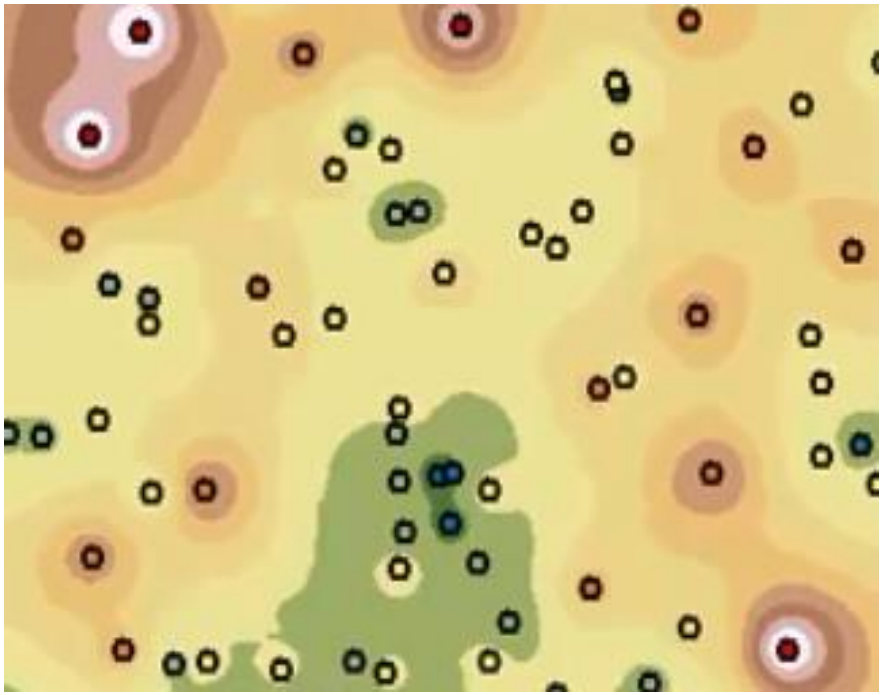
Lightning Strike Density
(strikes per 100 KM2)

Modeling Quantities

- Linear Regression
- Spatial Interpolation Using Inverse Distance Weighting (IDW)
- Spatial Interpolation Using Kriging

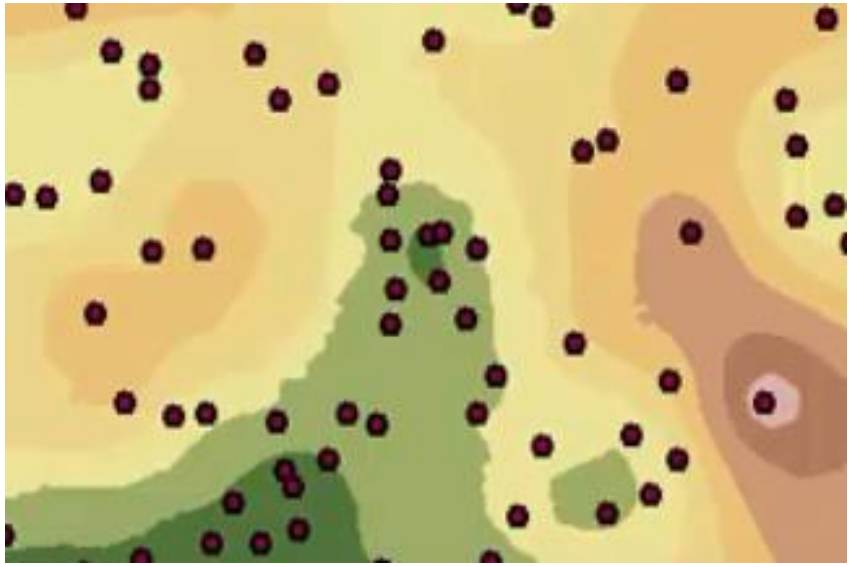
Linear Regression Examples

- Predict quanty from a predictor variable
- Example: predict air temperature from elevation value
- Example: predict parcel value from distance to lake
- Example: predict wildfire size from climate data
- Example: predict animal movement distance from air temperature



Point Interpolation: IDW

- Inverse Distance Weighting
- Closer points have greater interpolation weight
- Output is predicted quantities
- Example: predict area temperatures from climate stations
- Example: predict ocean depths from discrete depth sample locations



Point Interpolation: Kriging

- Geostatistical method
- Uses spatial autocorrelation
- Output is predicted quantities
- Includes uncertainty estimates