



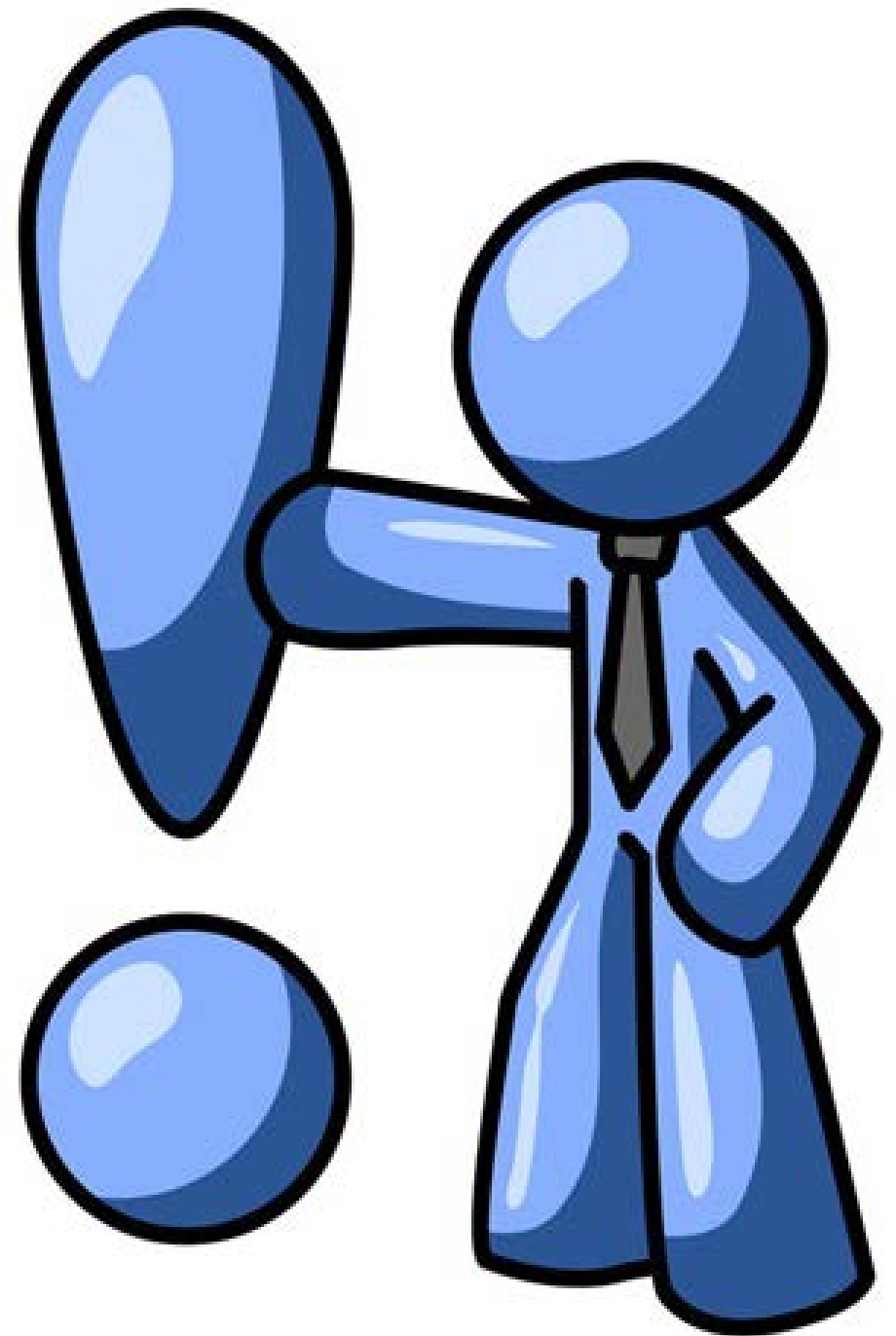
Spatial Analysis with ArcGIS

Jian Lange

Topics

- **Introduction to spatial analysis**
- **Demos and examples**
 - **Various types of spatial analysis**
 - **From basic to more advanced**
 - **Mixed ArcGIS products**
- **Takeaway points**

Introduction

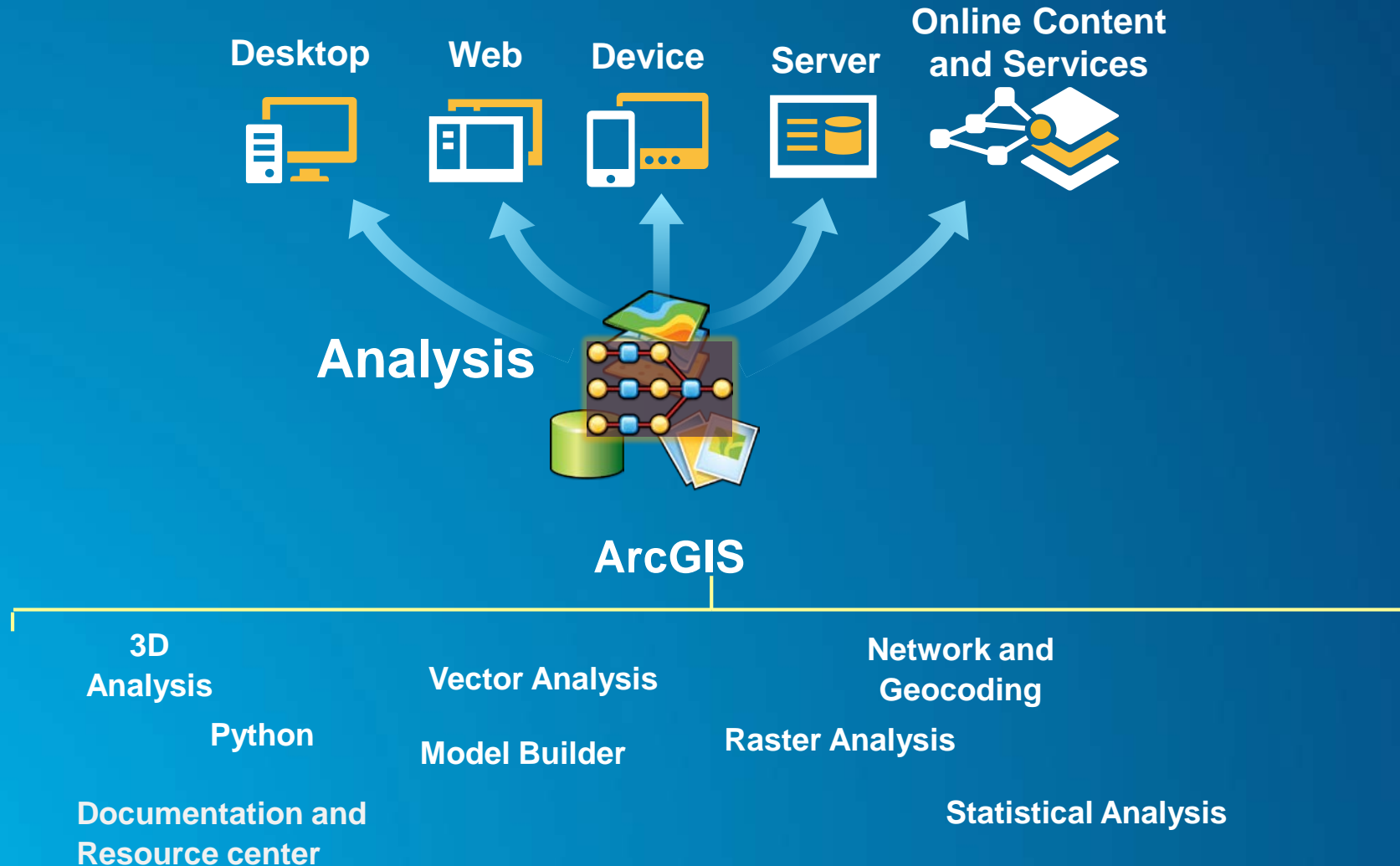


ArcGIS: a complete GIS platform

- Online
- Desktop
- Server
- Mobile
- Developer
- Solutions



Across the ArcGIS Platform

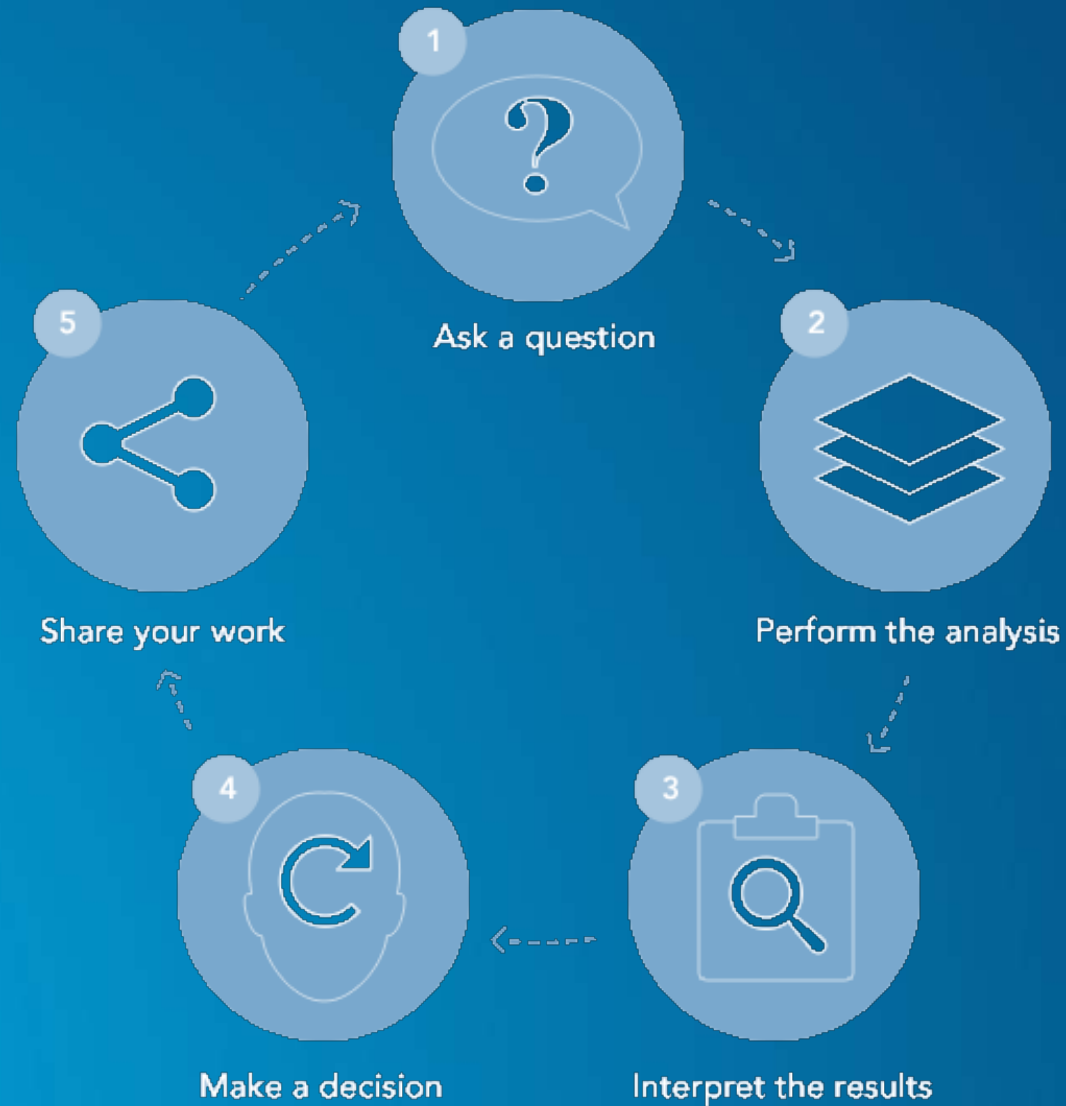


Spatial Analysis

- Analyze spatial data to address a question or gain useful knowledge

How Can We Estimate Values For A Whole Area
Why Things Occur Where They Do
What Is Nearby
What Is Inside An Area
Where Are The Events Concentrated
Where Do Things Move Over Time
What Is A Suitable Location For

Spatial analysis = problem solving



Demos & Examples



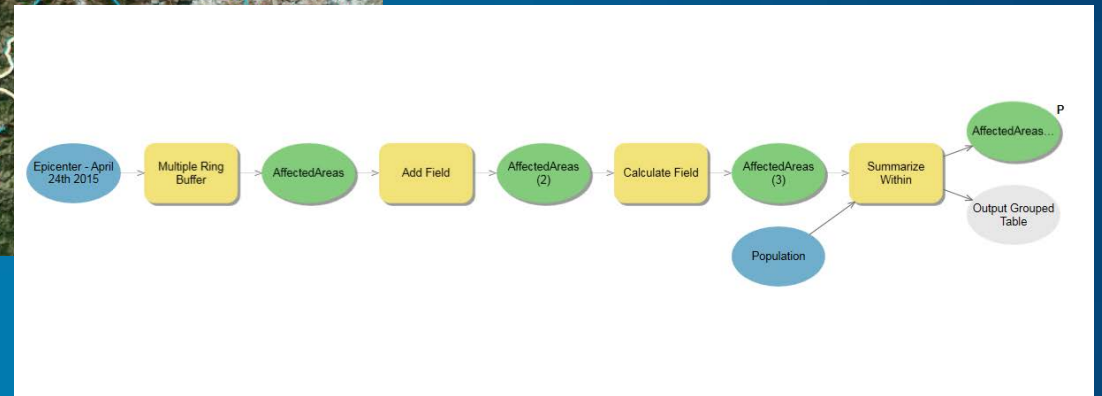
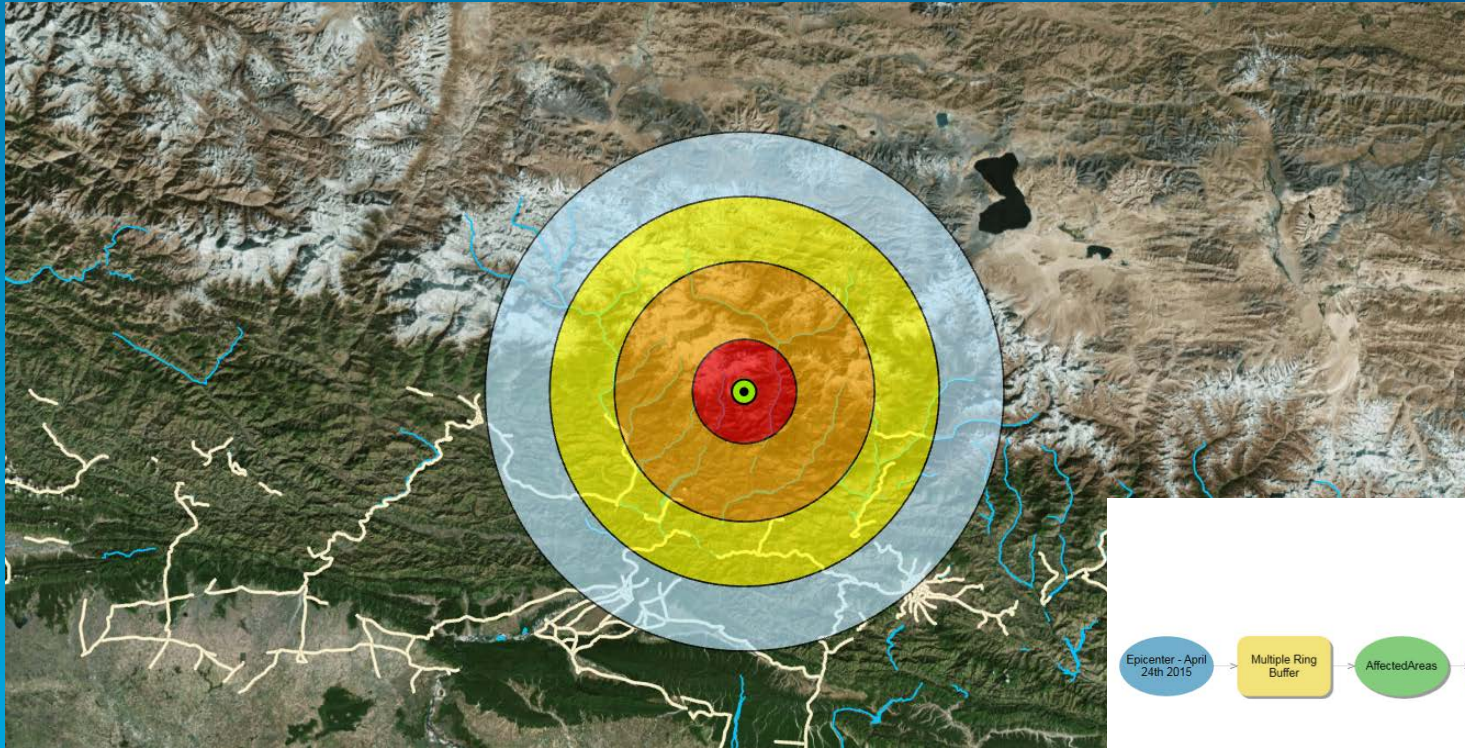
Demo

Multiple Ring Buffer and Automation

Proximity Analysis and ModelBuilder



Access Earthquake Impact



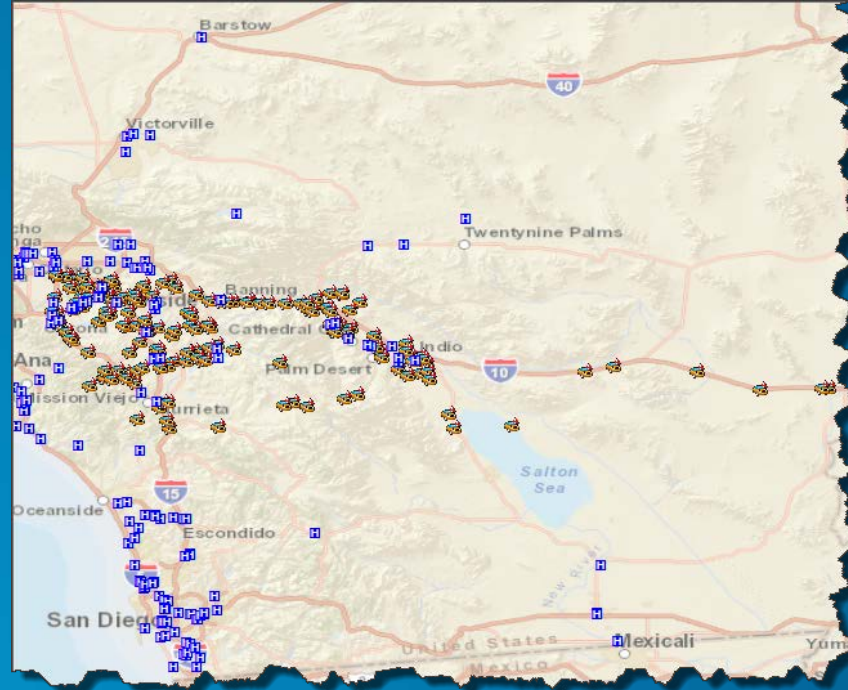
Demo

What is nearby?

Proximity analysis



Where is the closest hospital to accidents?



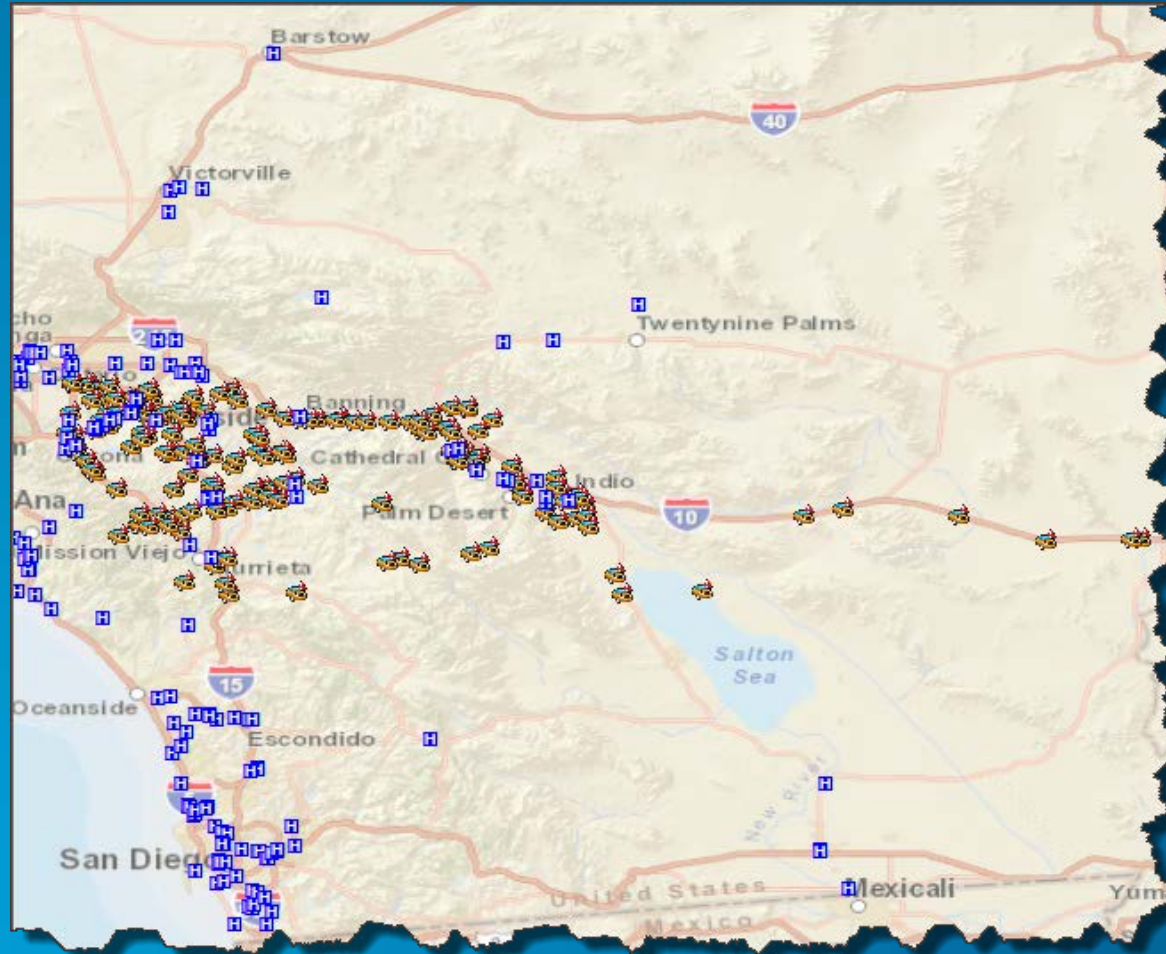
Demo

Proximity analysis online

ArcGIS Online - Find nearest



Where is the closest hospital to accidents?



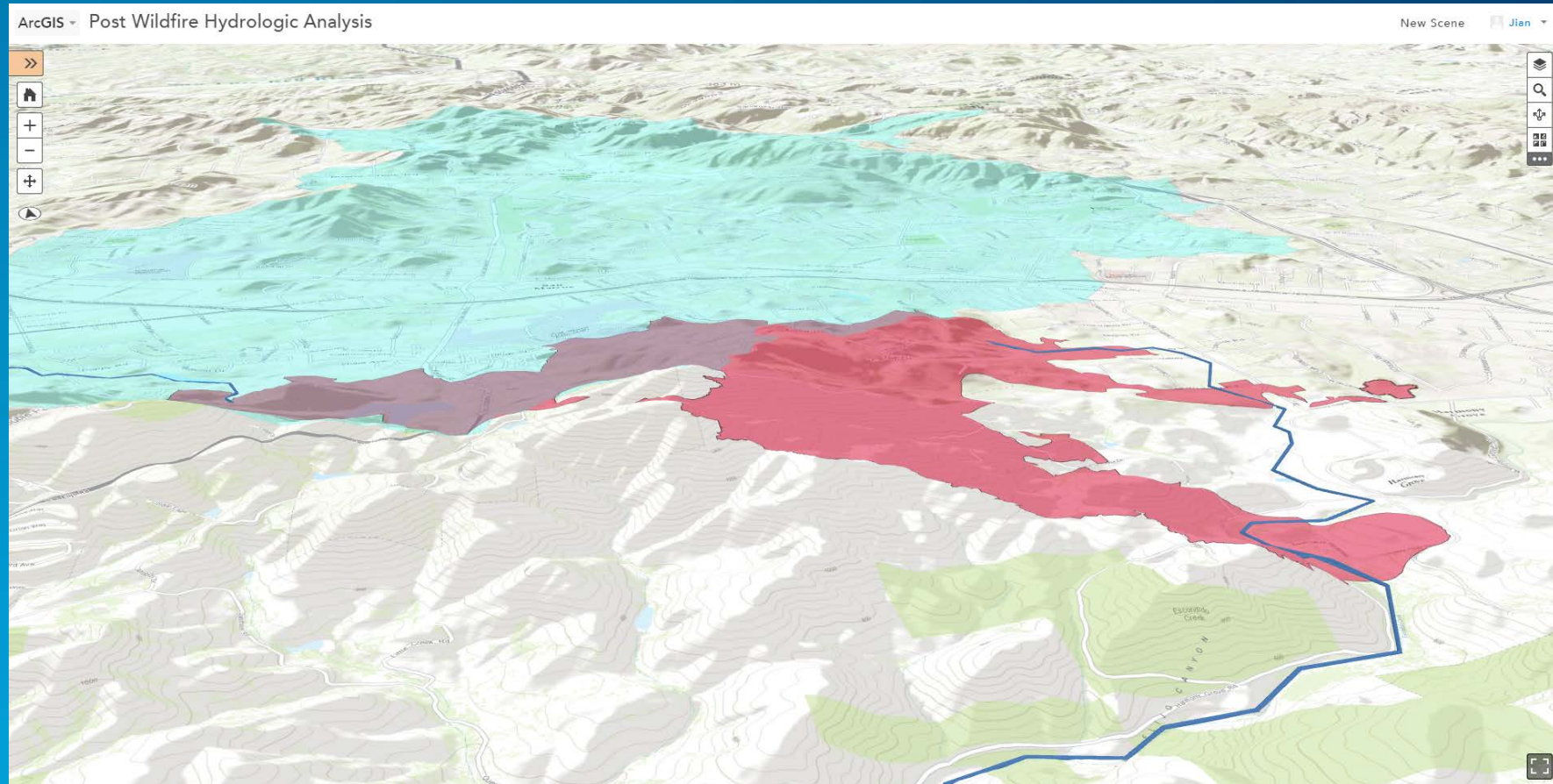
Demo

Create Watersheds Trace water flows

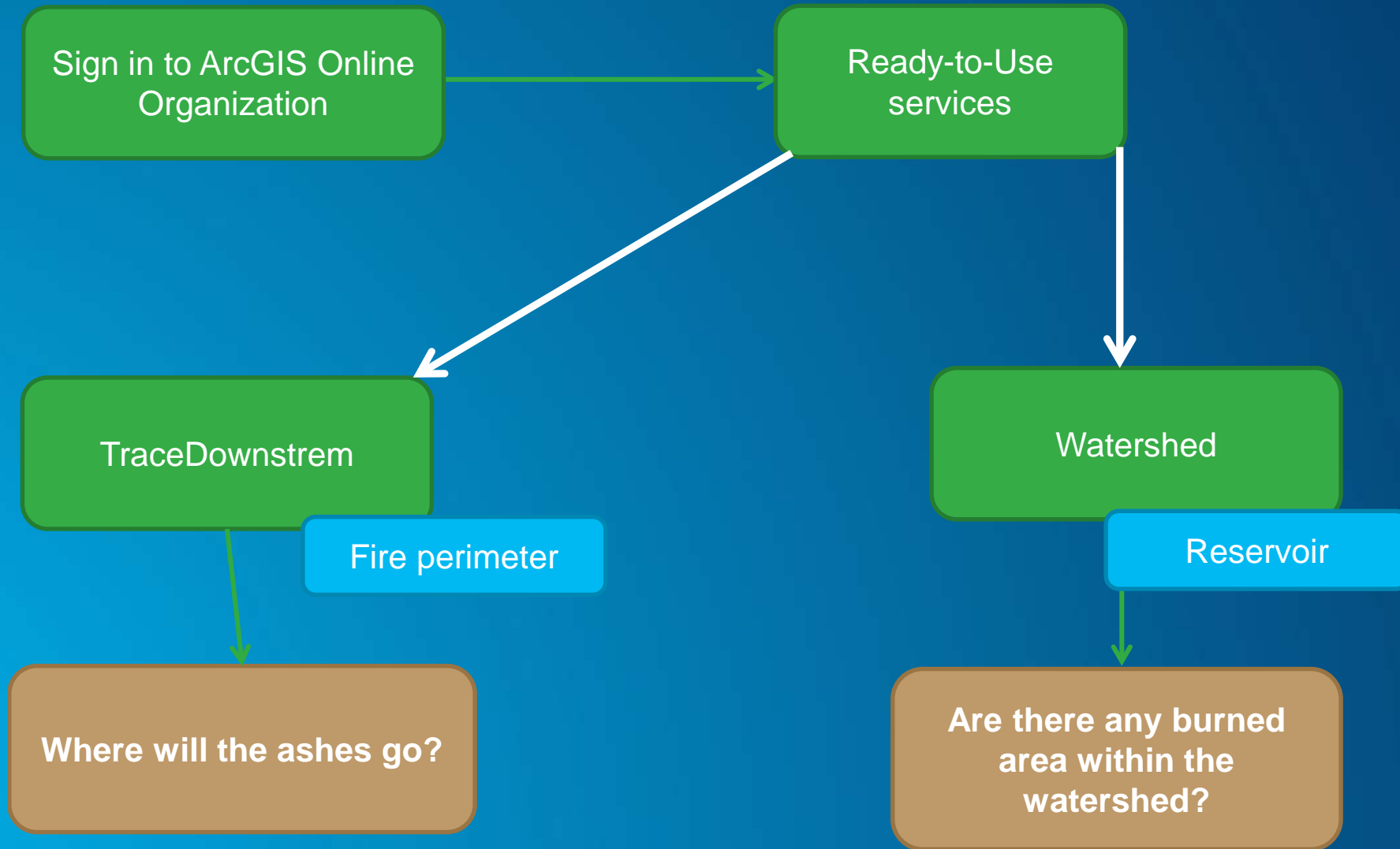
Elevation and Hydrological Analysis



Post Wildfire Hydrologic Analysis



Demonstration review (wildfire)



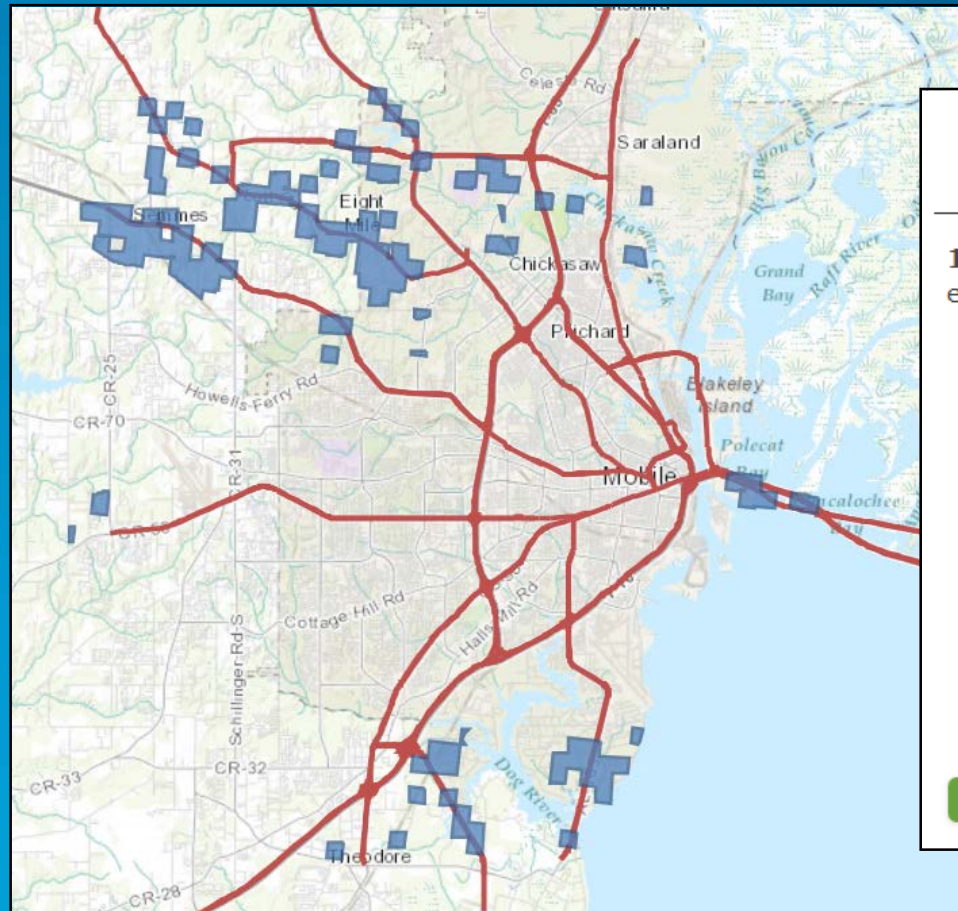
Demo

Query spatial data

ArcGIS Online – Find Locations



- How will an increase in traffic noise impact residential areas?



Derive New Locations

1. Derive new locations that match the following expression(s)

Landuse Cover where *LandCover* is 'Urban Residential'

and

Landuse Cover completely within ProjectBoundary

and

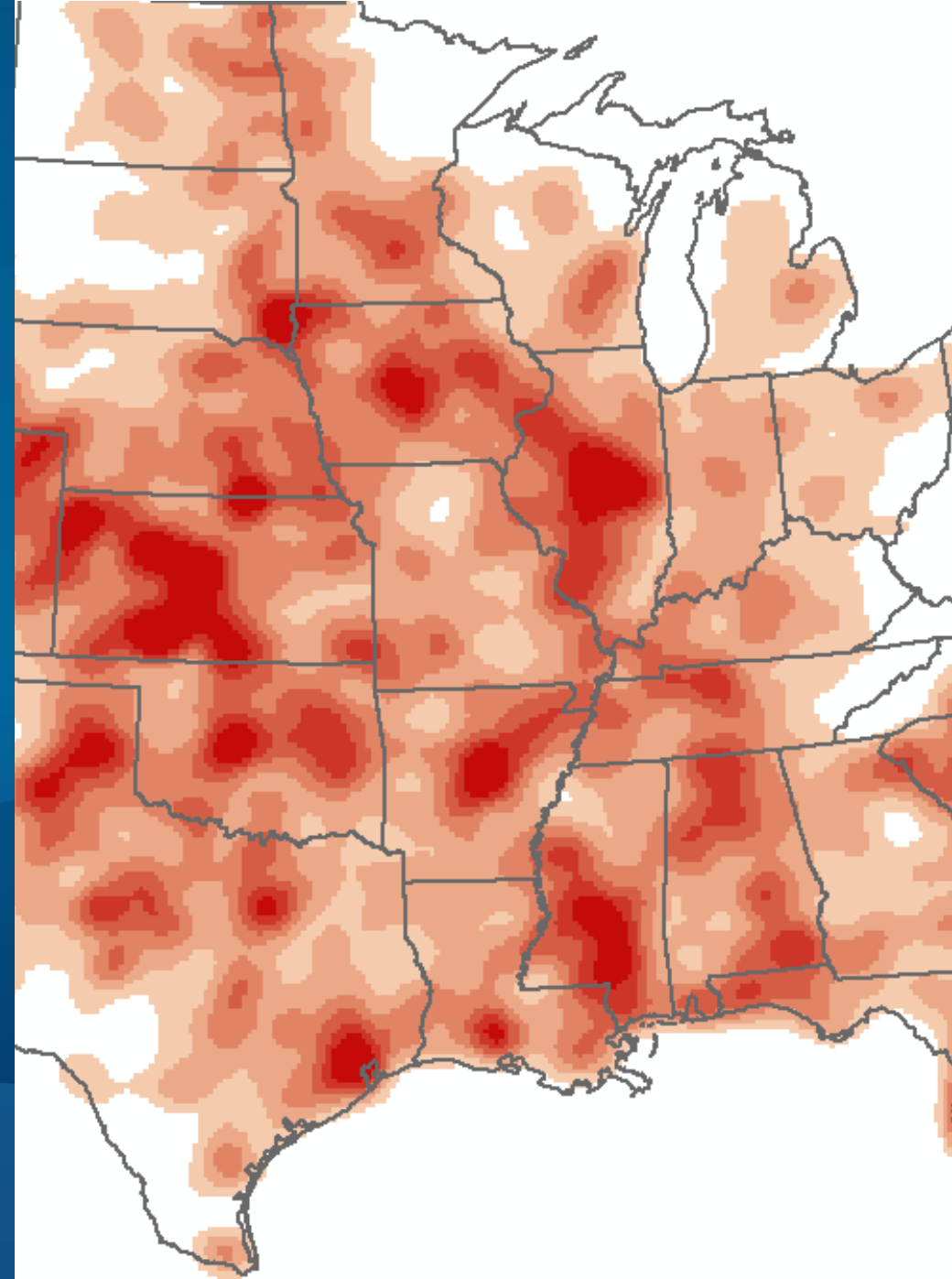
Landuse Cover within a distance of 1 Miles from Roads

ADD EXPRESSION

Demo

What's the distribution?

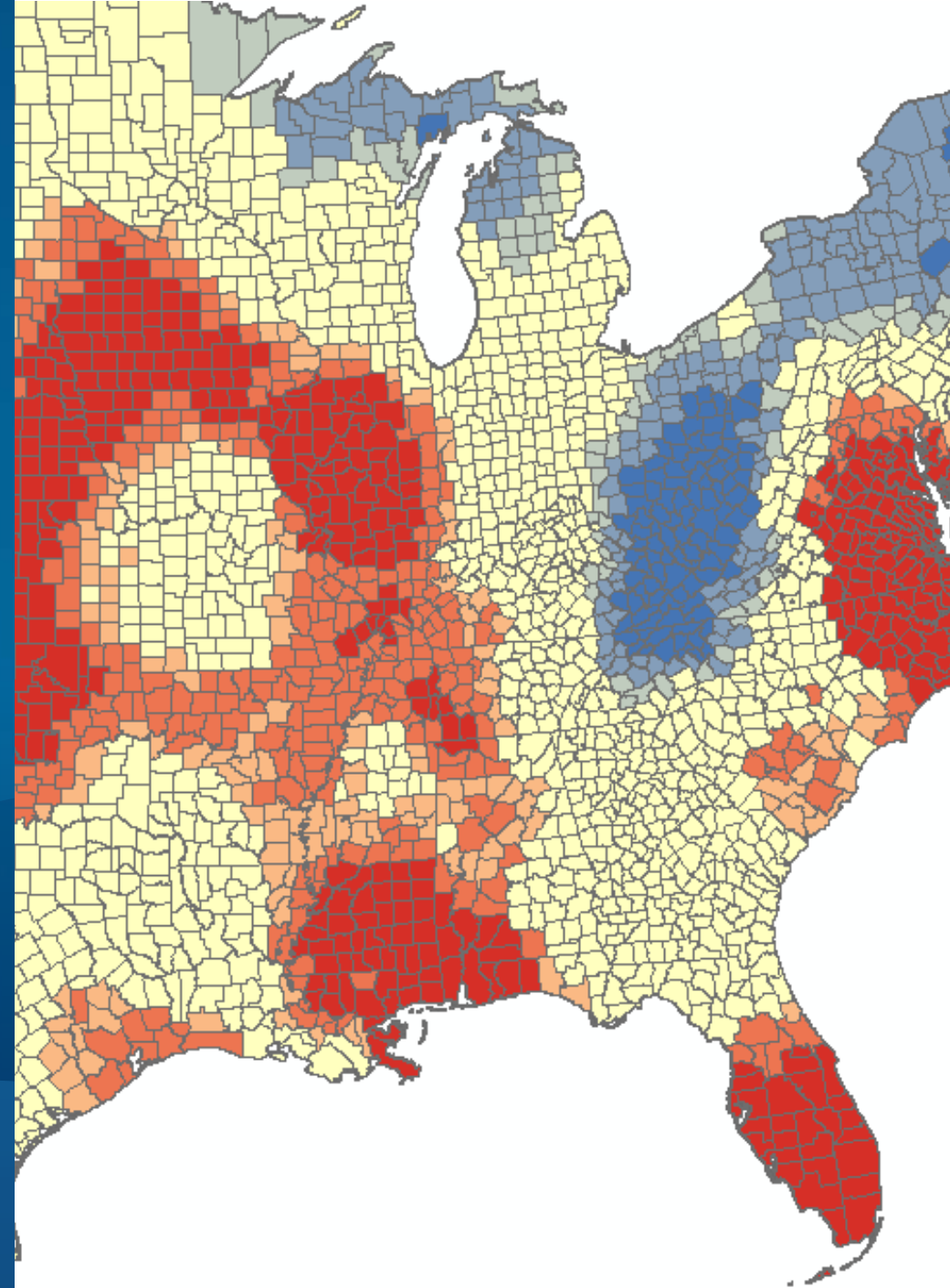
Density analysis



Demo

Identifying Clusters

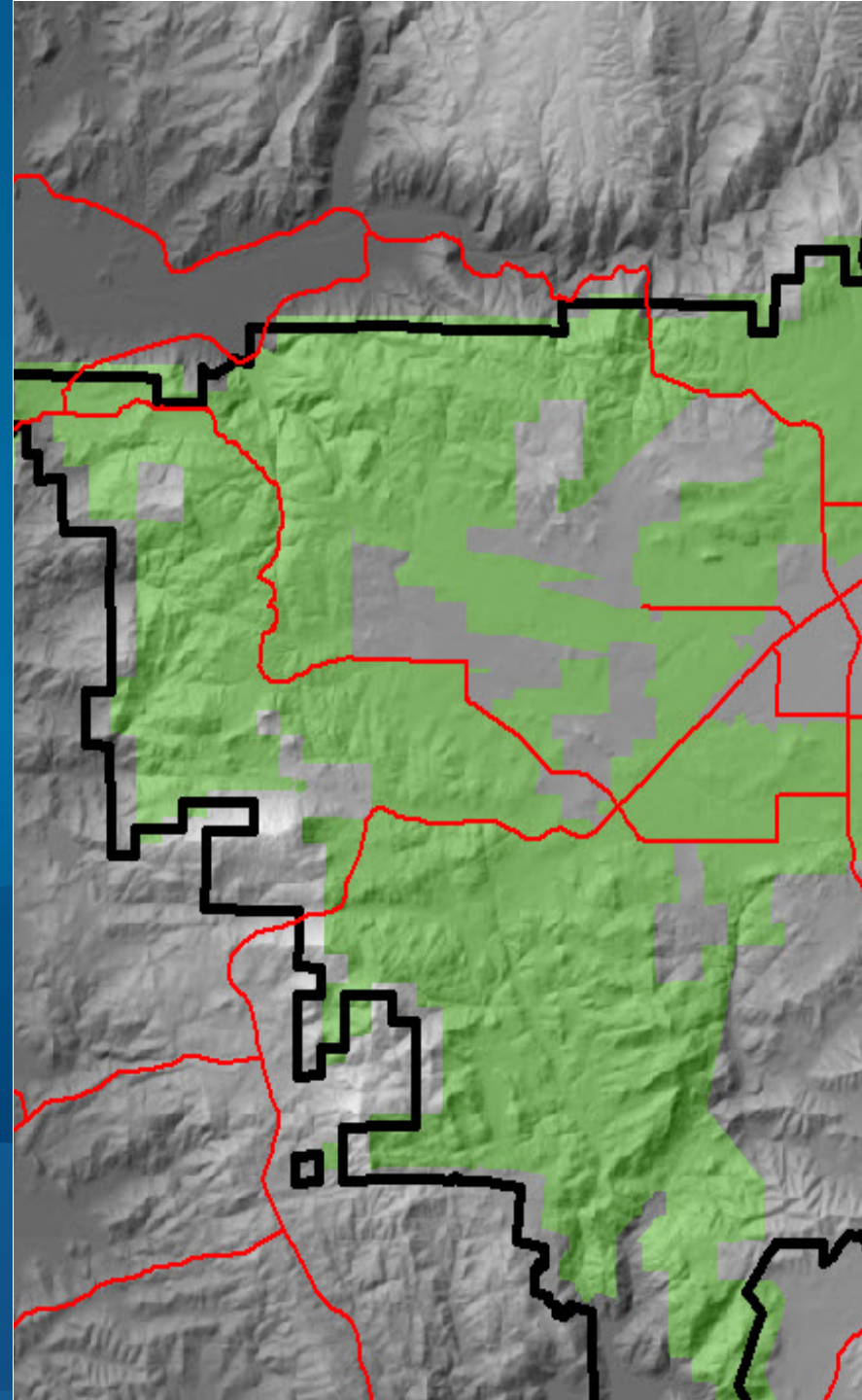
Hotspot analysis



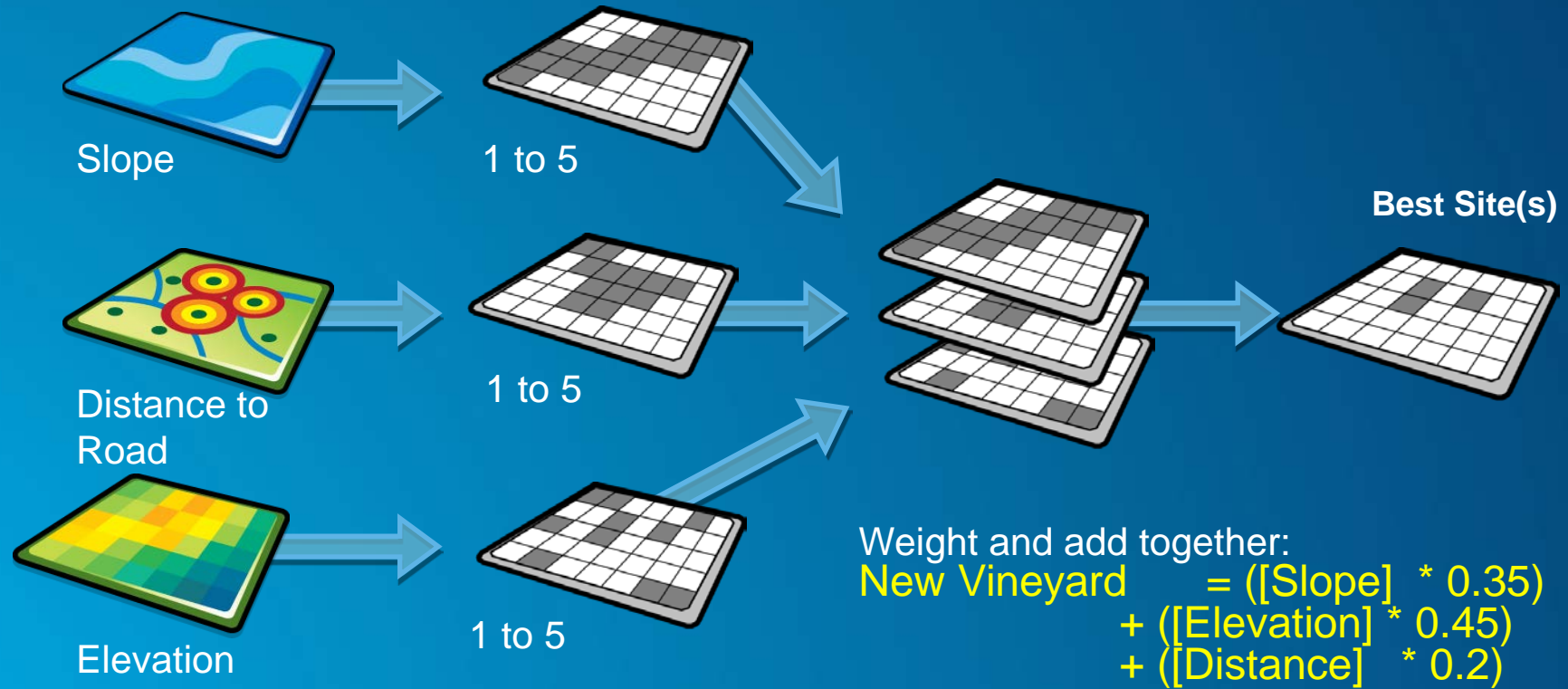
Demo

What is the best place for ...?

Suitability analysis



Where is the best place to have a new vineyard?



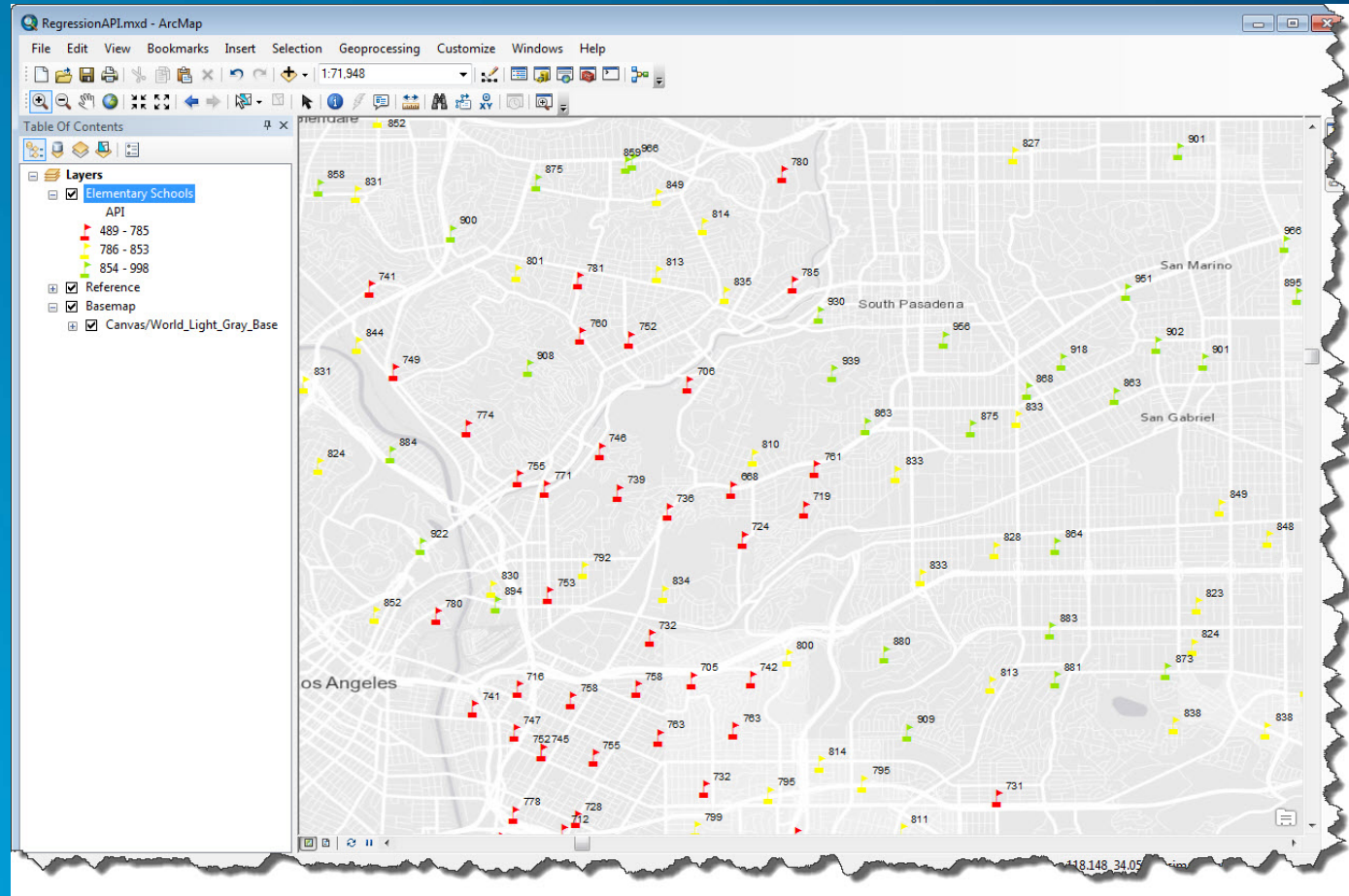
Demo

Why things occur where they do?

Regression Analysis



What contributes a school's API score?



Demo

Enrich data with demographic content

Geoenrichment



How do I get the variables for analysis?

EnrichData.mxd - ArcMap

File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help

1:7,806,492

Table

EnrichedSchools

NoHighSchool	GraduateSchool	2013 Total Population	2013 Diversity Index	2013 Total Households	2013 Median Household Income	2013 Average Household Income	20
10	44	23027	77.4	10532	49267	71382	
6	47	20418	40.9	8791	116878	149803	
5	37	40609	66.1	14221	47622	84260	
8	41	38988	66.3	17709	56814	84162	
12	30	56239	72	21968	43108	70711	
7	38	45468	76.1	19818	45721	68075	
2	40	30626	49.3	13680	82110	114077	
10	38	29041	50.2	12250	105251	135634	
6	43	55447	72.6	23399	40432	61415	
3	38	43469	63.8	19054	46891	76075	
6	27	35029	62.1	12557	59822	103467	
23	3	16661	84.1	5922	67398	94817	
25	2	27195	93.4	7623	51204	64216	
24	7	35173	91.5	11276	46618	63099	
30	2	34501	90.6	11406	48954	64141	
12	7	12379	84	4661	67303	96587	
16	5	37727	92.6	10414	52338	65241	
36	2	38866	92.9	10795	51940	64282	
36	2	22528	90.8	6787	49535	67683	
16	1	32258	91.7	8957	56492	70103	
24	4	29701	91.1	9180	53556	68950	
25	3	31072	92.1	8743	55274	68335	
30	2	36219	92.2	10469	52654	65692	
14	4	33141	91.4	9838	57218	71349	
14	4	13314	90.3	4137	75717	91607	
14	4	26228	84	10467	52222	70402	
11	3	19372	89	6221	60186	76294	
40	2	38807	93	10368	53612	66979	
10	10	23926	85.7	9563	51597	69499	
37	7	18859	76.1	7139	66219	91037	
3	30	13967	56.1	4842	101311	121069	
14	11	15355	59.7	5740	92616	113873	
13	9	18548	59.5	6968	86361	104468	
51	4	21852	74.7	7986	76518	94944	
4	28	17805	47.5	4478	106813	126804	

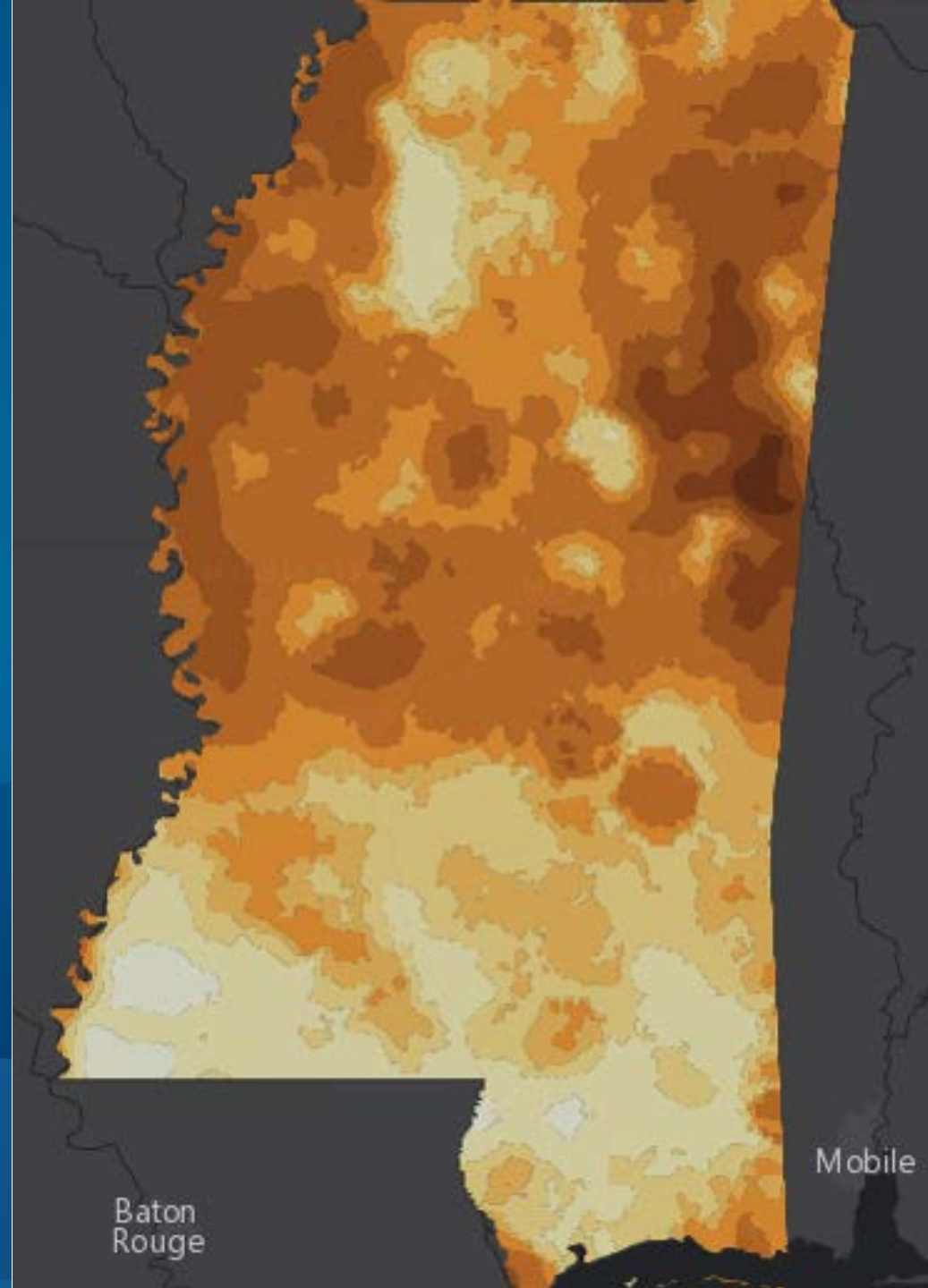
1 (0 out of 5379 Selected)

EnrichedSchools

Demo

Interpolating Lead in Soils

Empirical Bayes Kriging

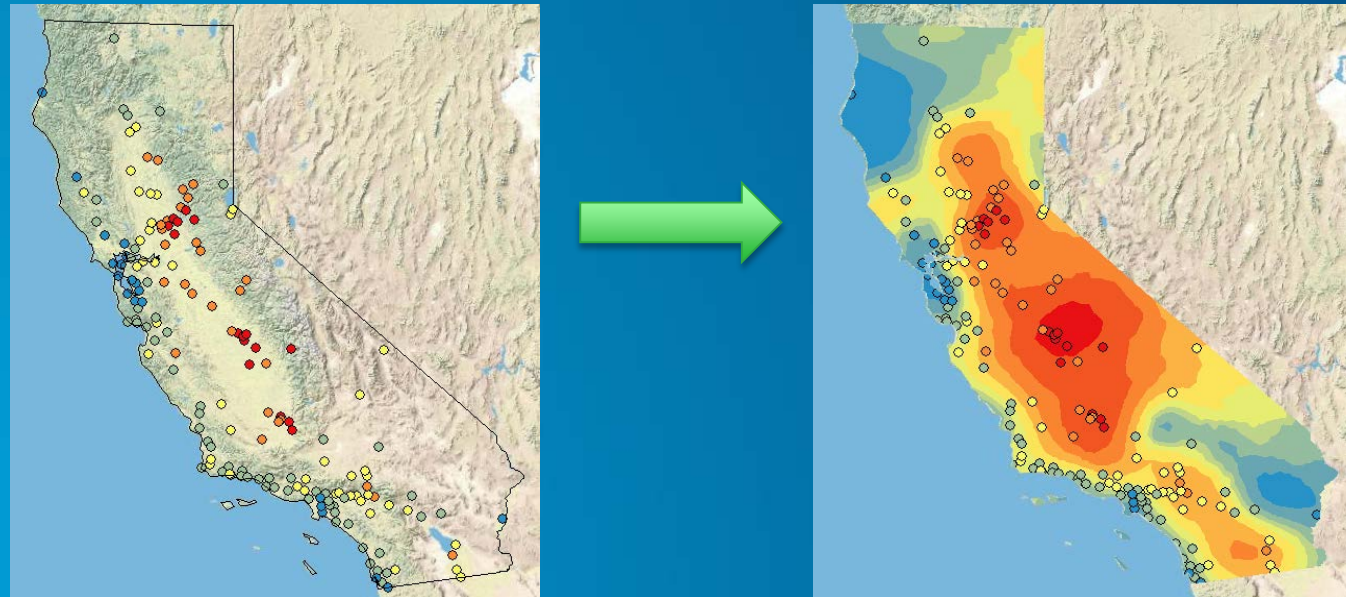


Baton
Rouge

Mobile

What is Interpolation?

- Predict values at unknown locations using values at measured locations
- Many interpolation methods: Deterministic and Geostatistical

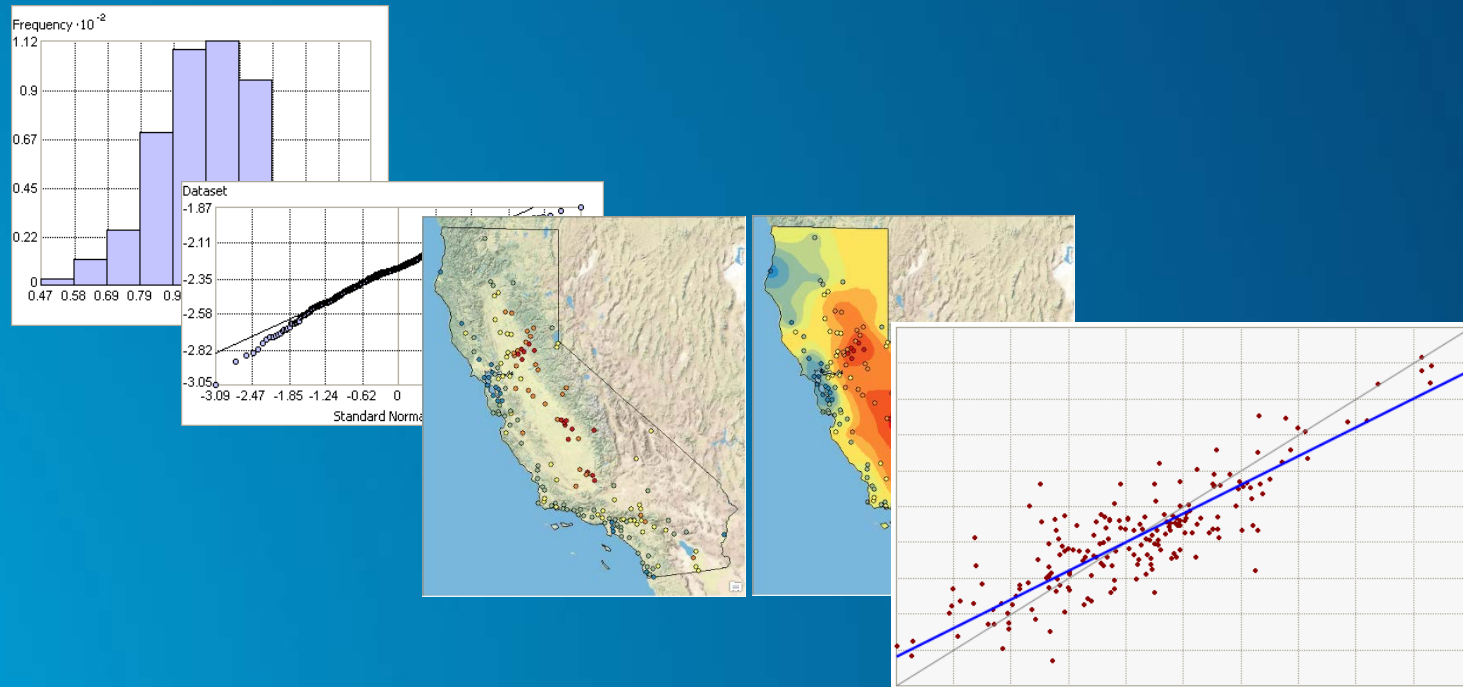


What is Kriging?

- **Kriging is a geostatistical interpolation technique**
- **The optimal interpolation method if the data meets certain conditions.**
- **Associates uncertainty with the predictions**
- **What are these conditions?**
 - **Normally distributed**
 - **Stationary**
 - **No trends**
- **How do I check these conditions?**
 - **Exploratory Spatial Data Analysis (ESDA)**

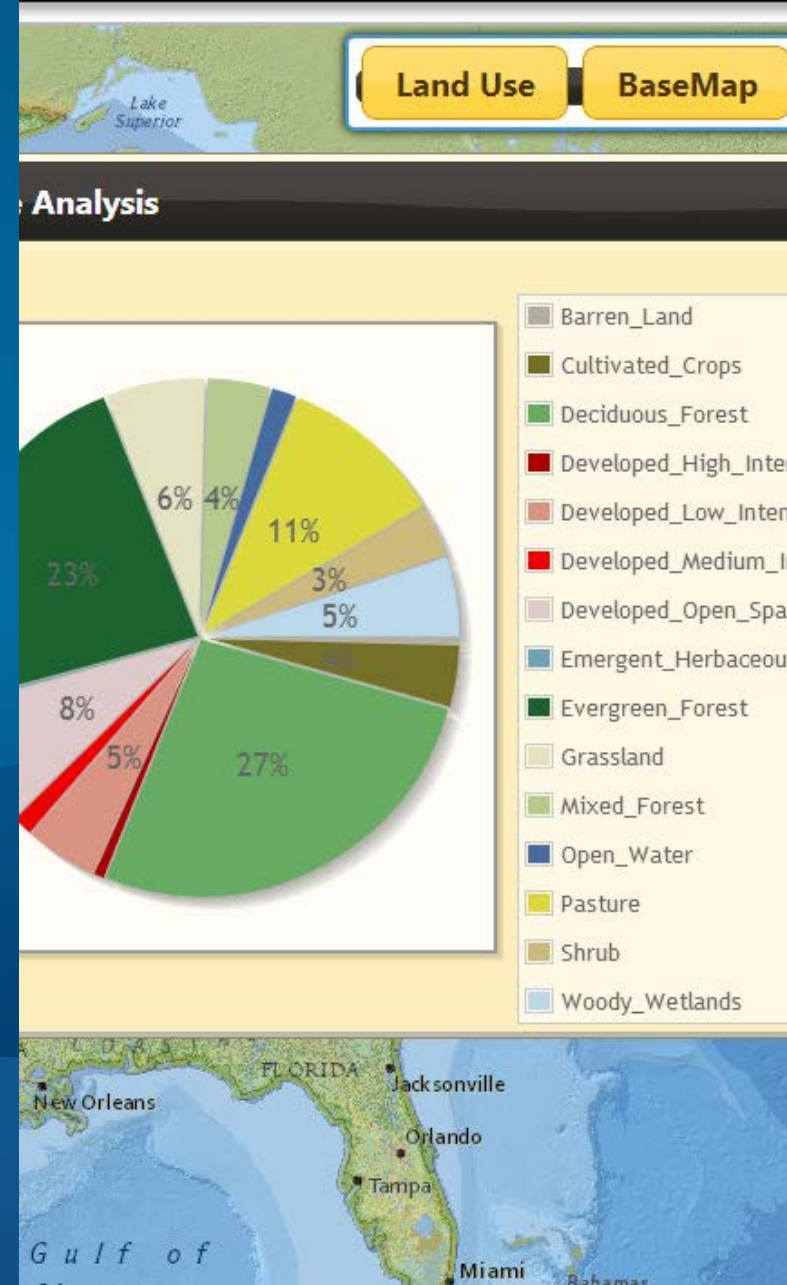
Interpolation workflow

- Exploratory Spatial Data Analysis (ESDA)
- Interpolate
 - *estimation of values at unsampled locations based on known values*
- Goodness of fit



Demo

Spatial analysis in a web app



Takeaway points...

- **Spatial analysis brings the true power of GIS. It is our core competence**
- **ArcGIS spatial analysis capabilities help users to make better decisions with sophisticated analytical tools**
- **Providing spatial analysis online reduces the learning curve and helps to reach a wider audience**

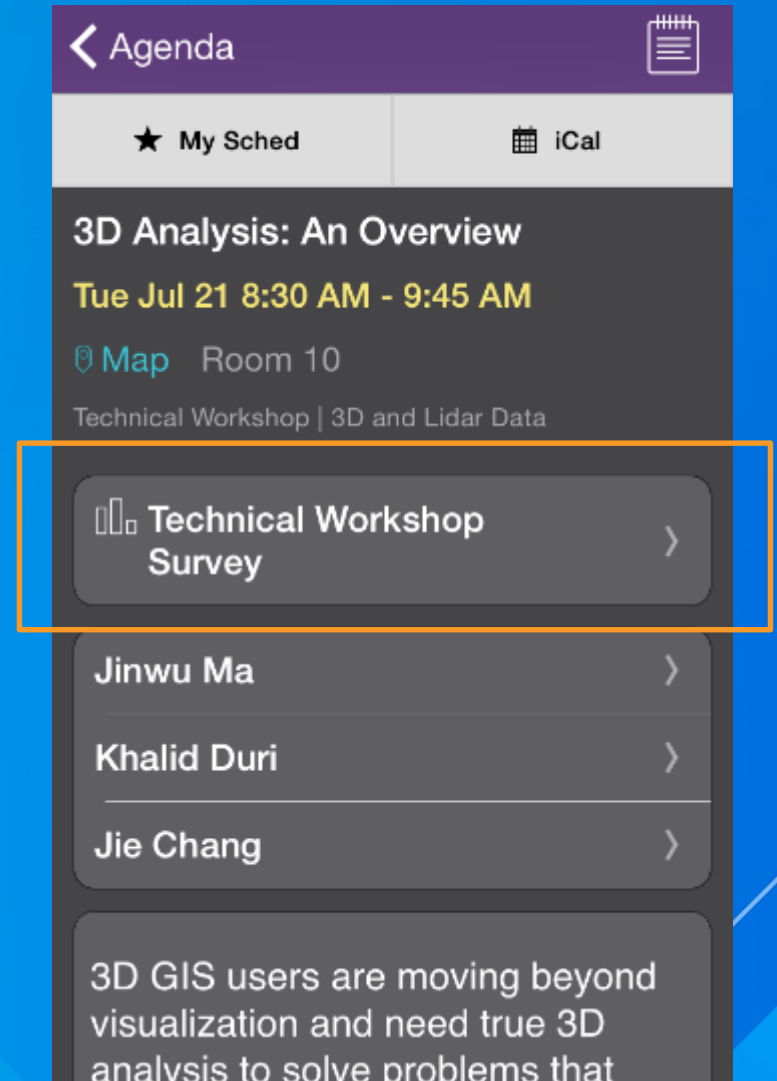
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Spatial Analysis with ArcGIS

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- Answer a few short questions and enter any comments

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Understanding our world.