



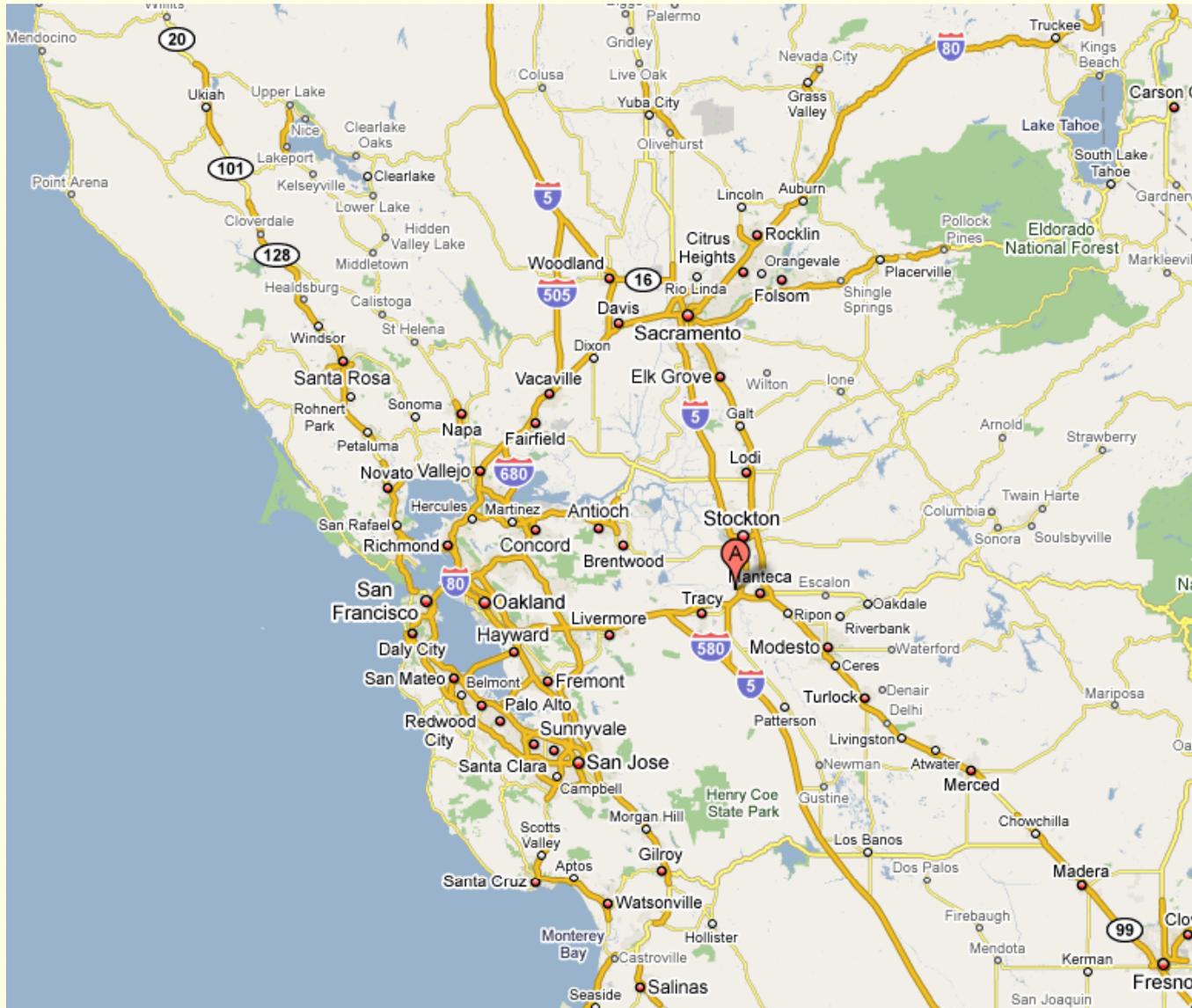
The Lathrop Urban Runoff Study: A First Look at Season 2 Data and Land Use

Rachel Pisor
MWQI Face-to-Face
7/27/2011

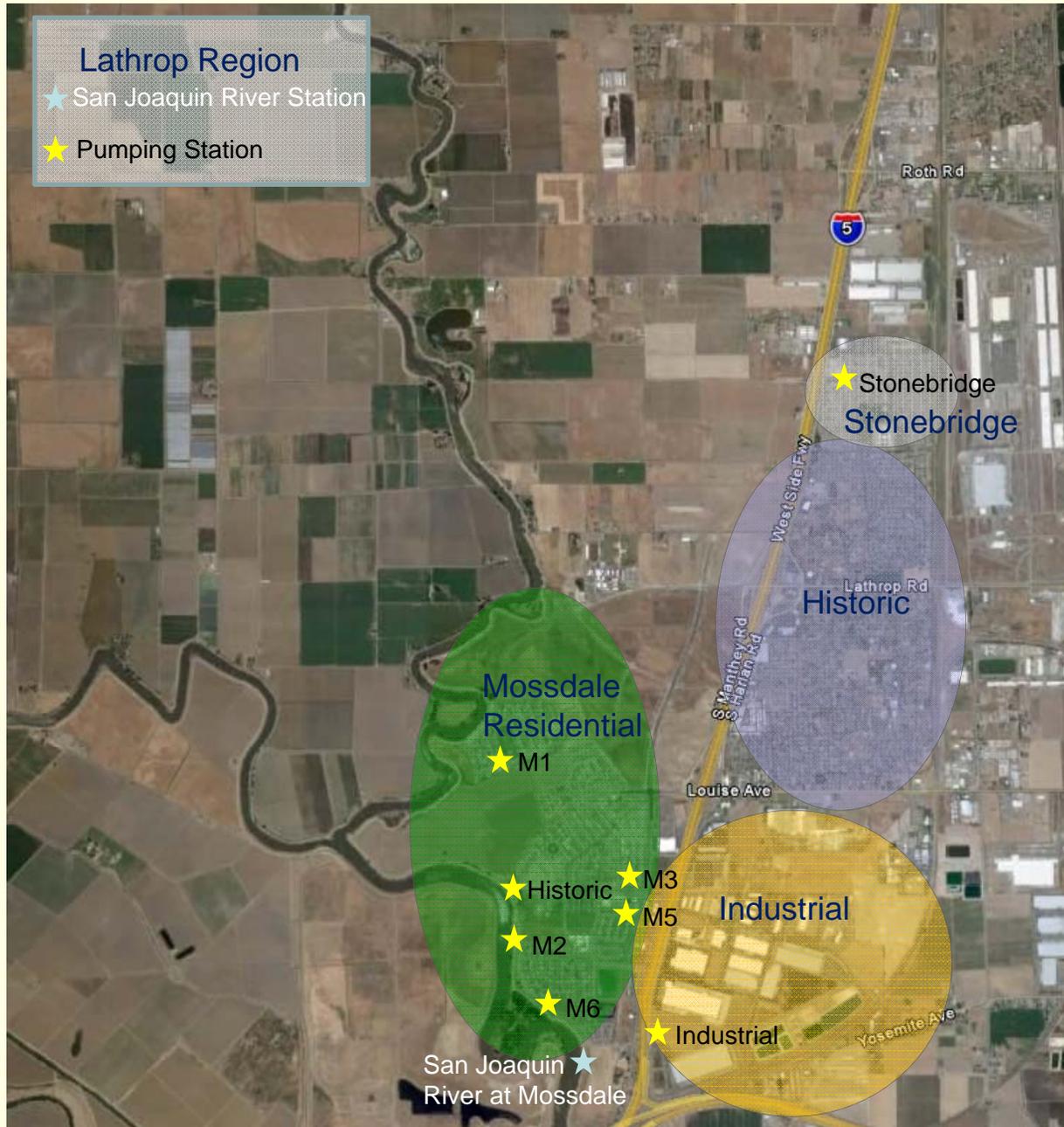
Outline

- ❖ Study Design
- ❖ Water Quality
 - Organic Carbon
 - Bromide
 - Ammonia
 - Pathogens
 - Pyrethroids
- ❖ Land Use Analysis
 - The Development Process
 - Land Use Results for Build Out
- ❖ Conclusions

Study Location

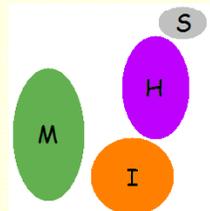


Study Design

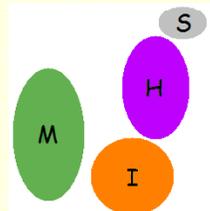
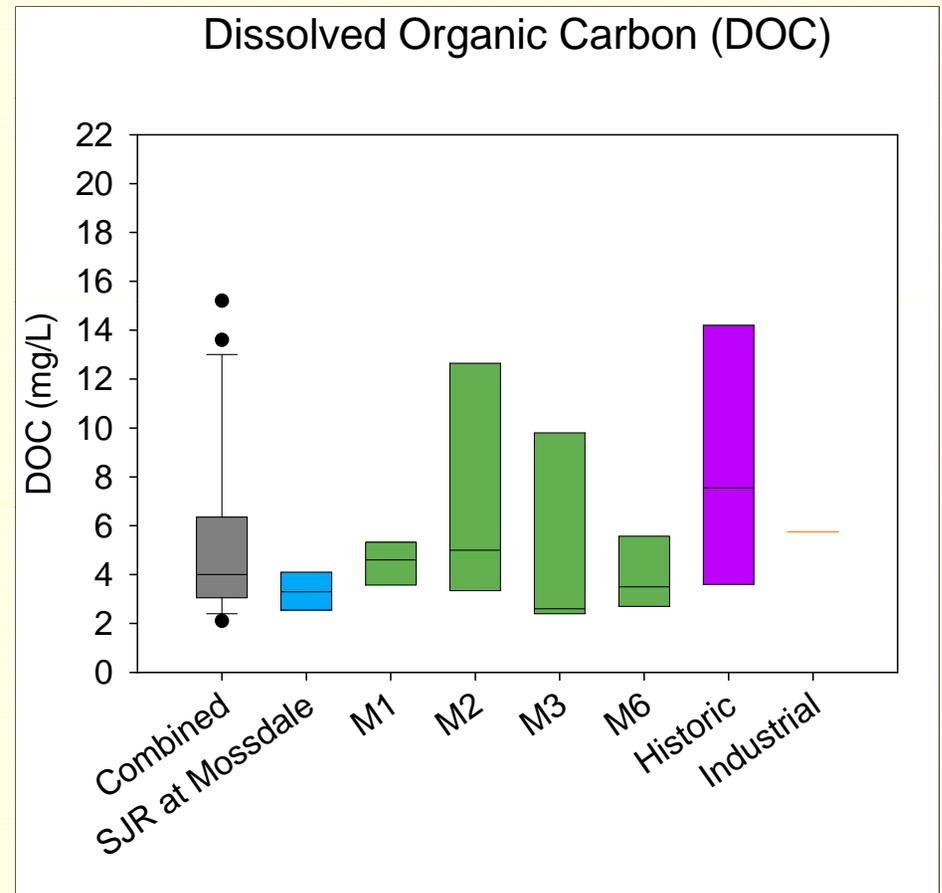
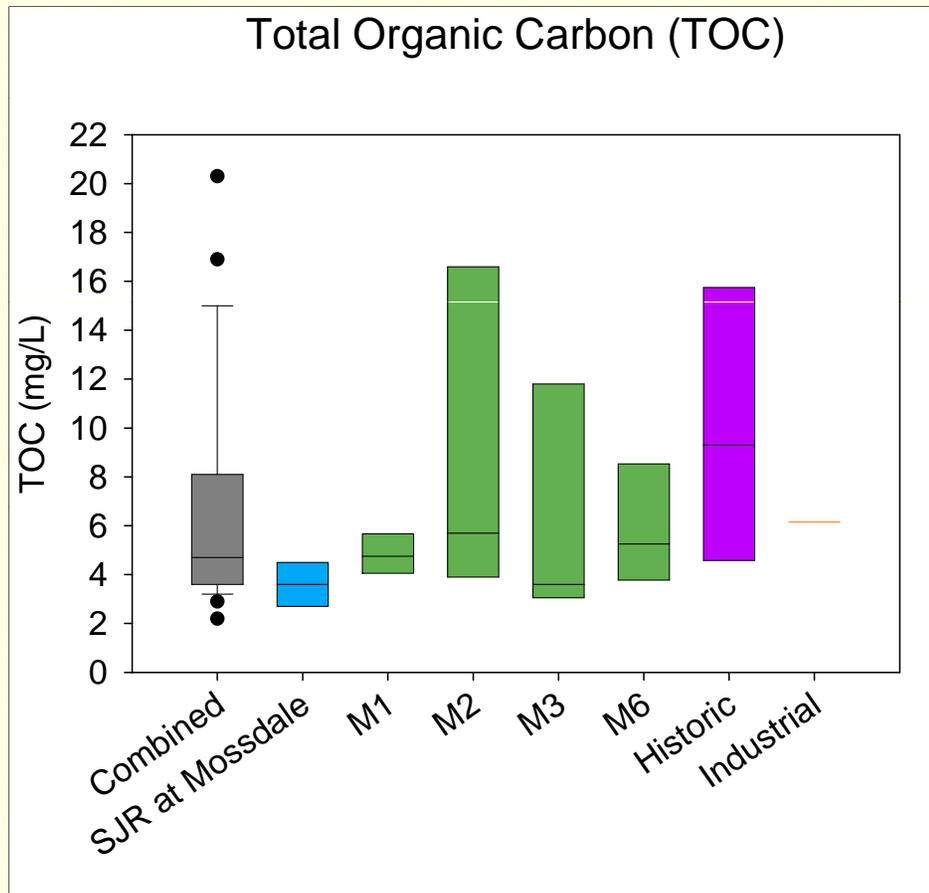


Region characteristics

- Historic: the original, historic region of the city. No in-ground storm sewer. Stormwater is dealt with by detention basins
- Industrial: Primarily industrial and commercial land uses
- Stonebridge: new development
- Mossdale residential: new development, some land is no yet developed

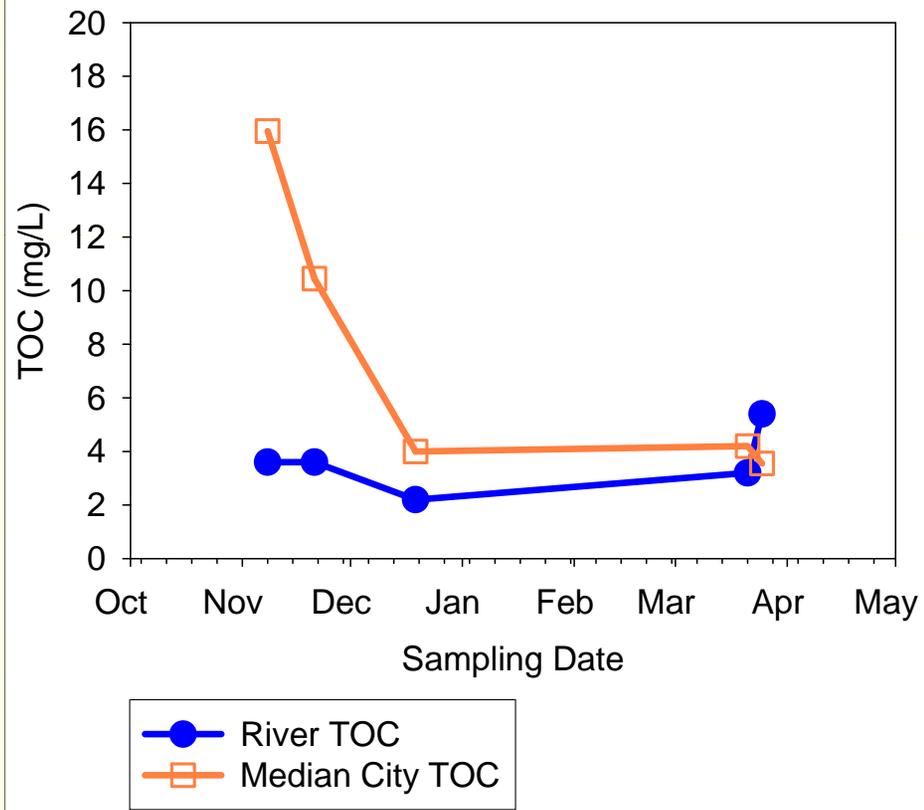


Total and Dissolved Organic Carbon (n=2-5)

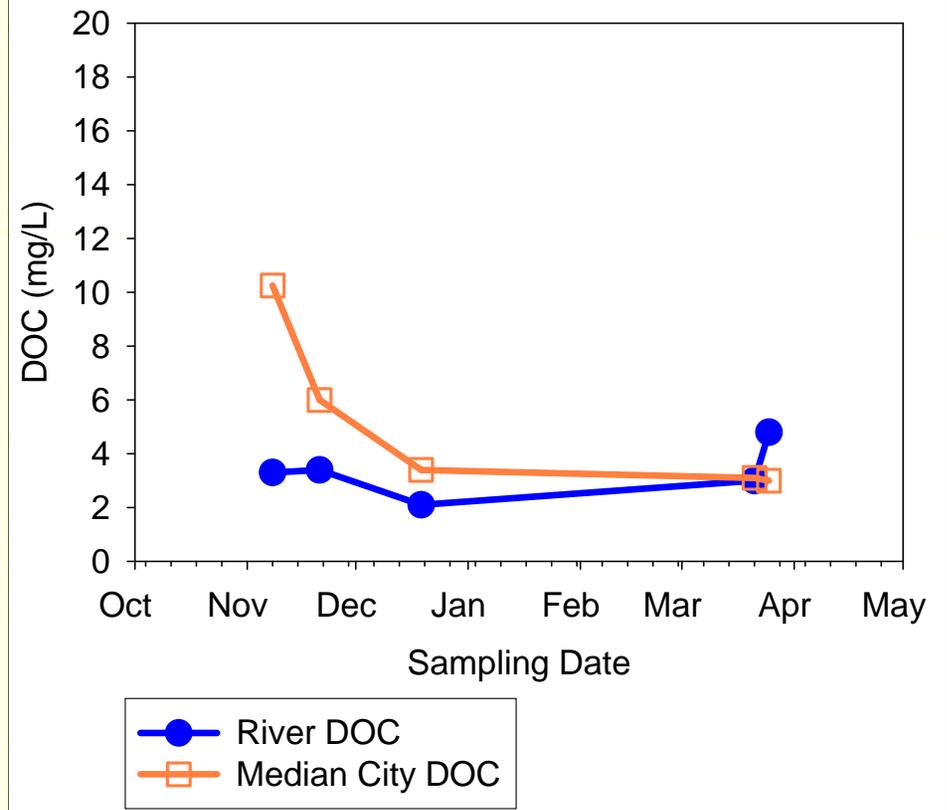


Organic Carbon Trends

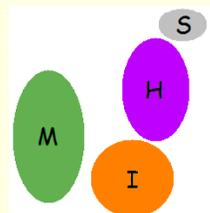
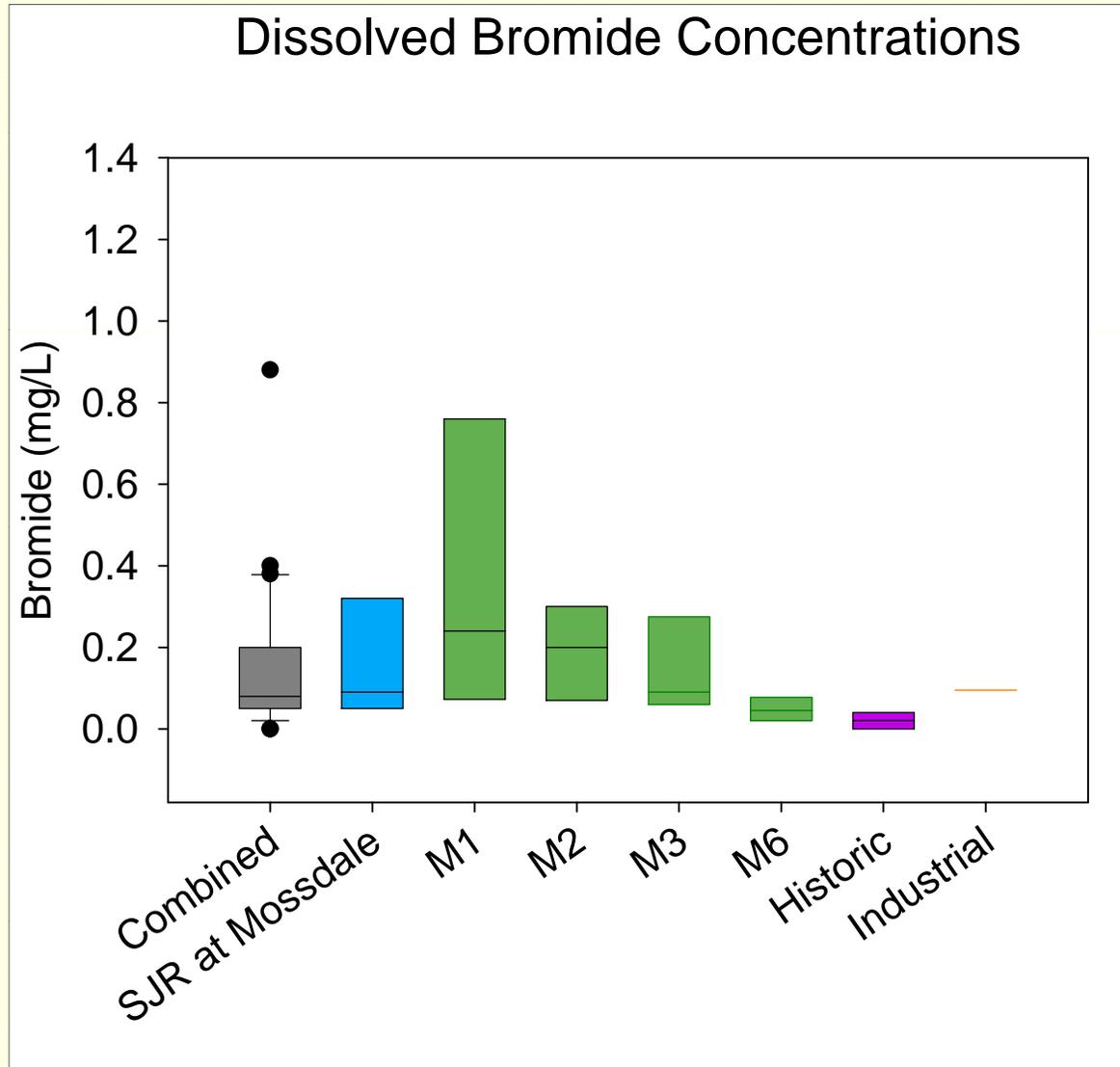
TOC Trends



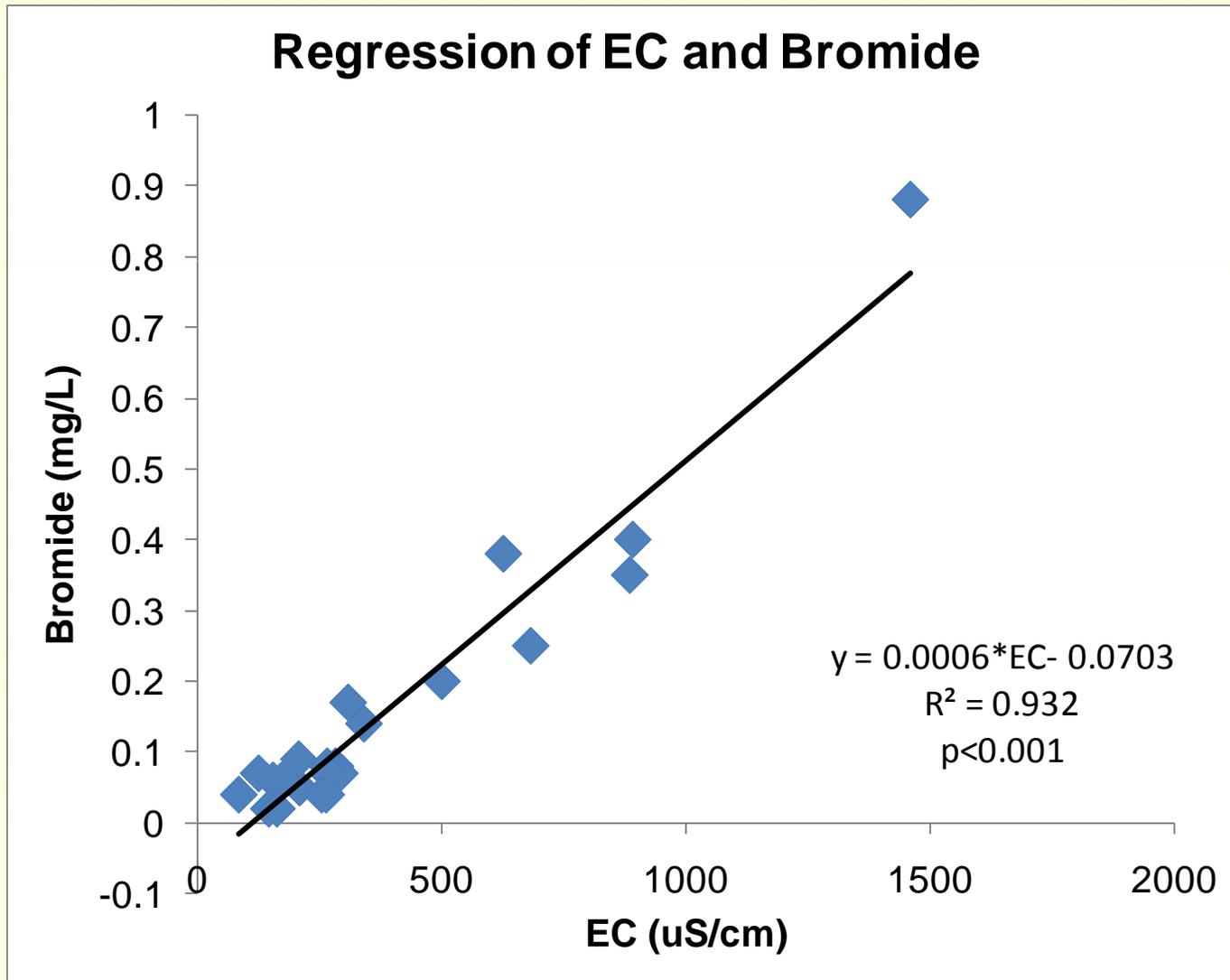
DOC Trends



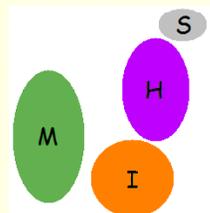
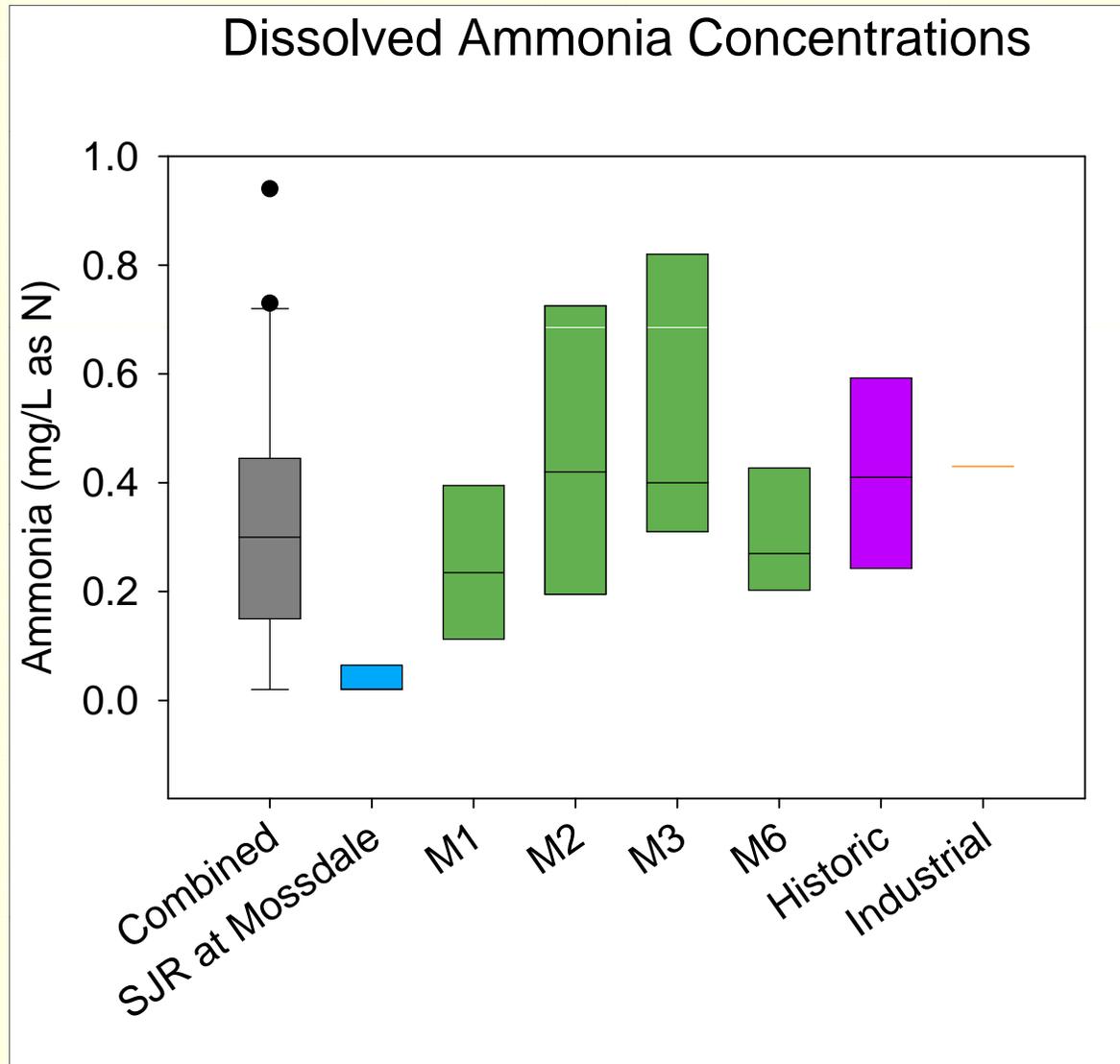
Dissolved Bromide (n=2-5)



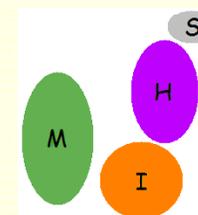
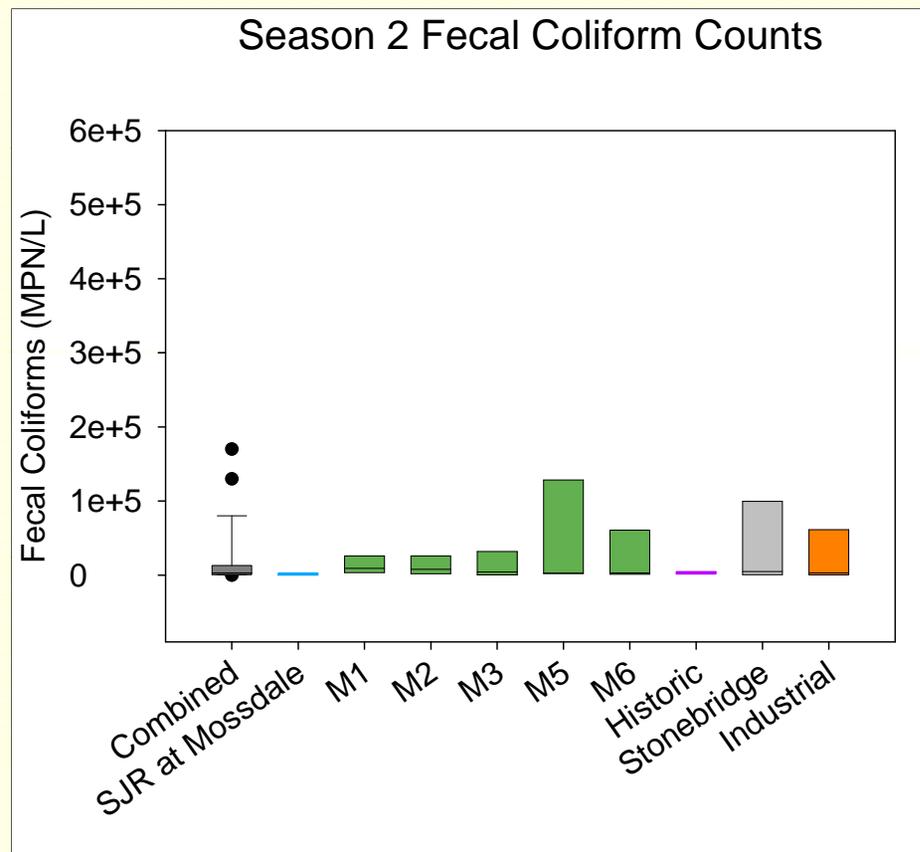
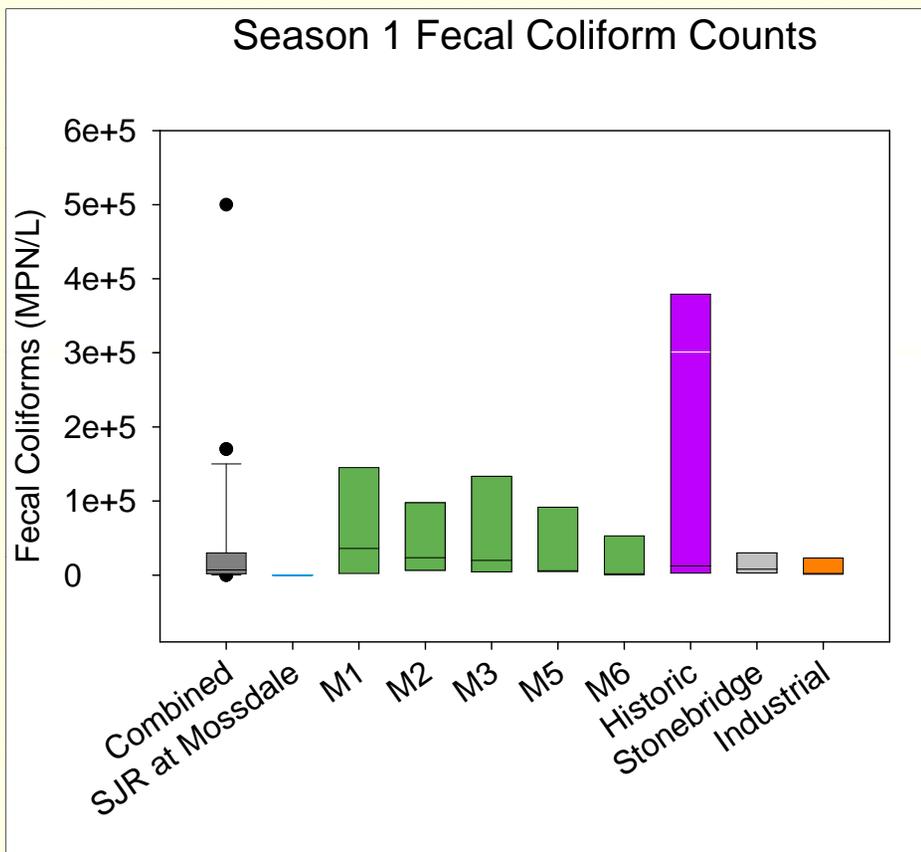
Relationship between Bromide and Electric Conductance (EC)



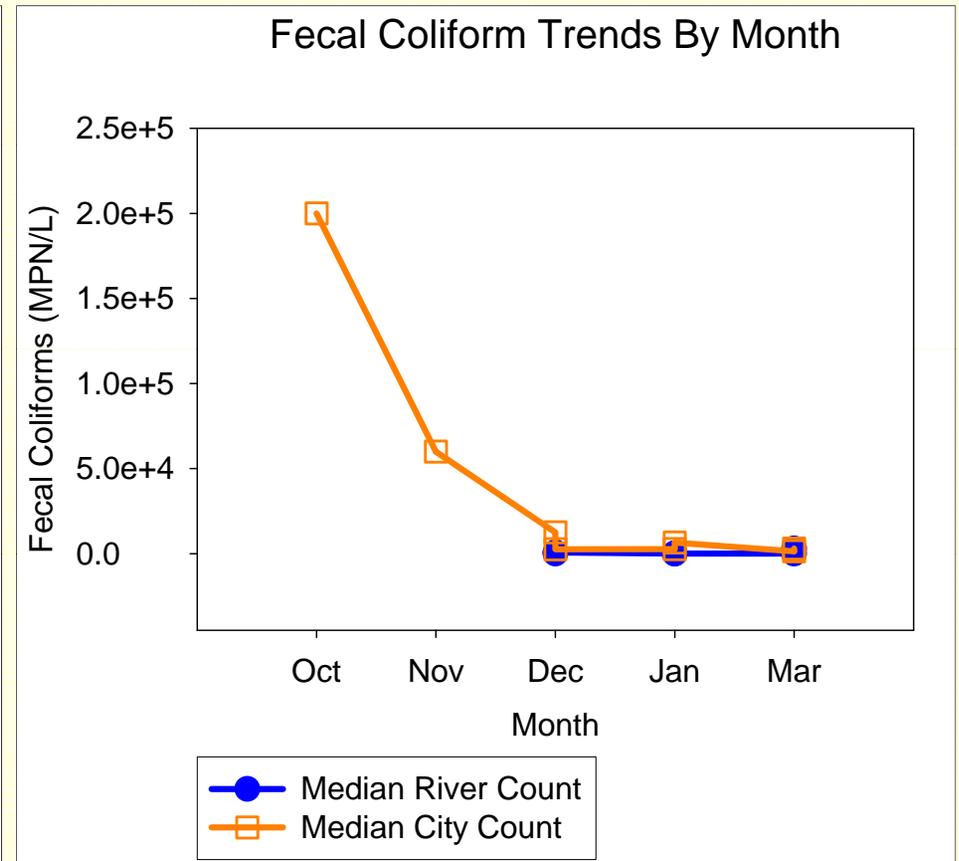
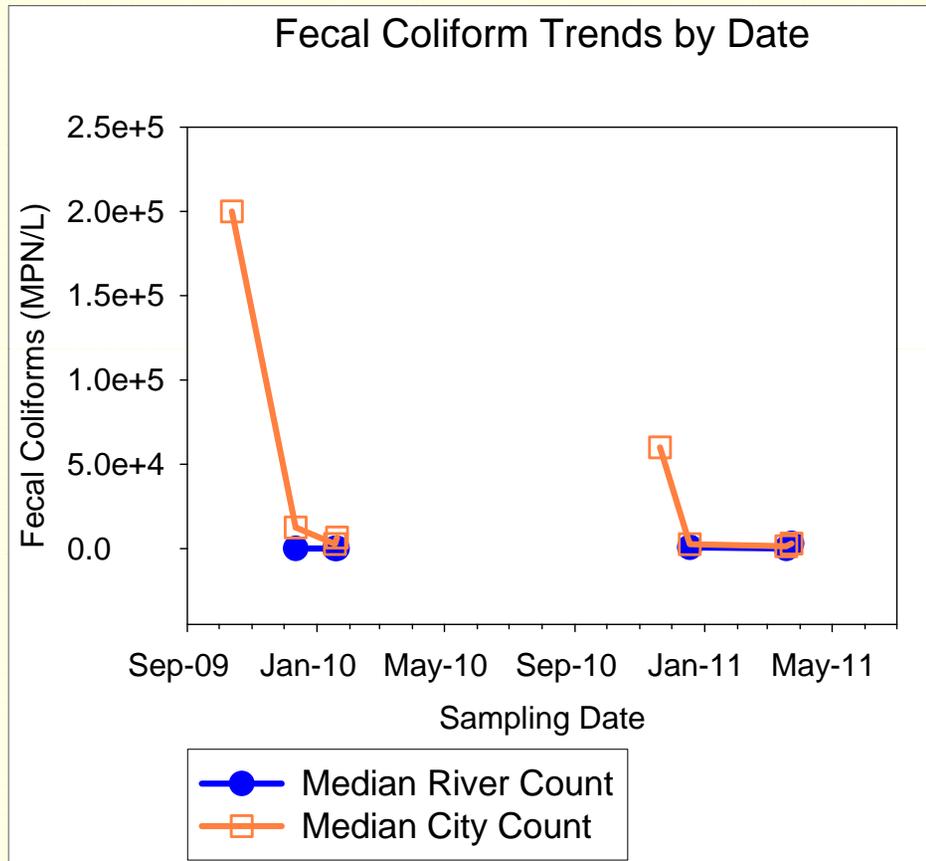
Dissolved Ammonia (n=2-5)



Fecal Coliforms (n=3-4)



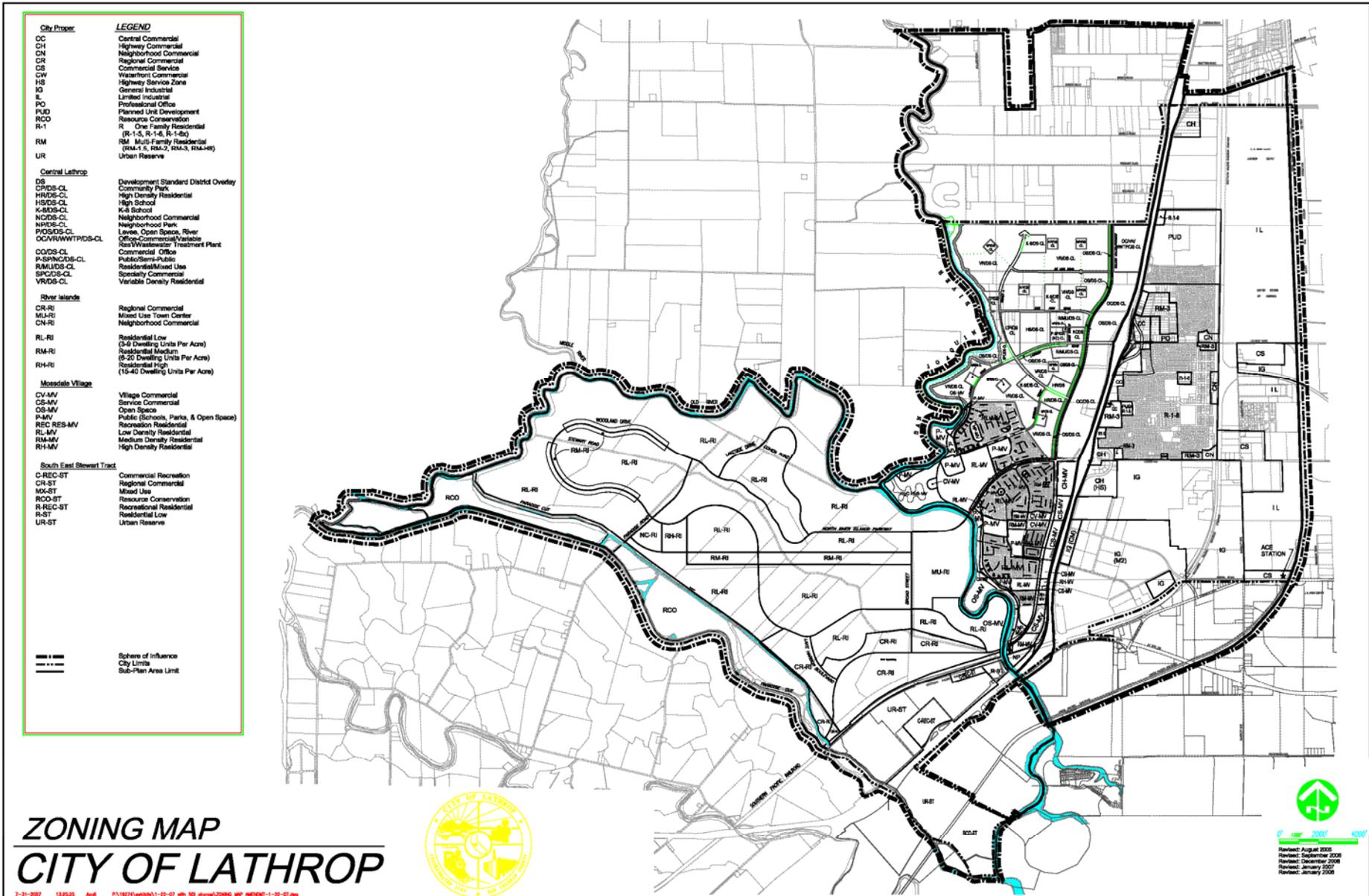
Fecal Coliform Trends



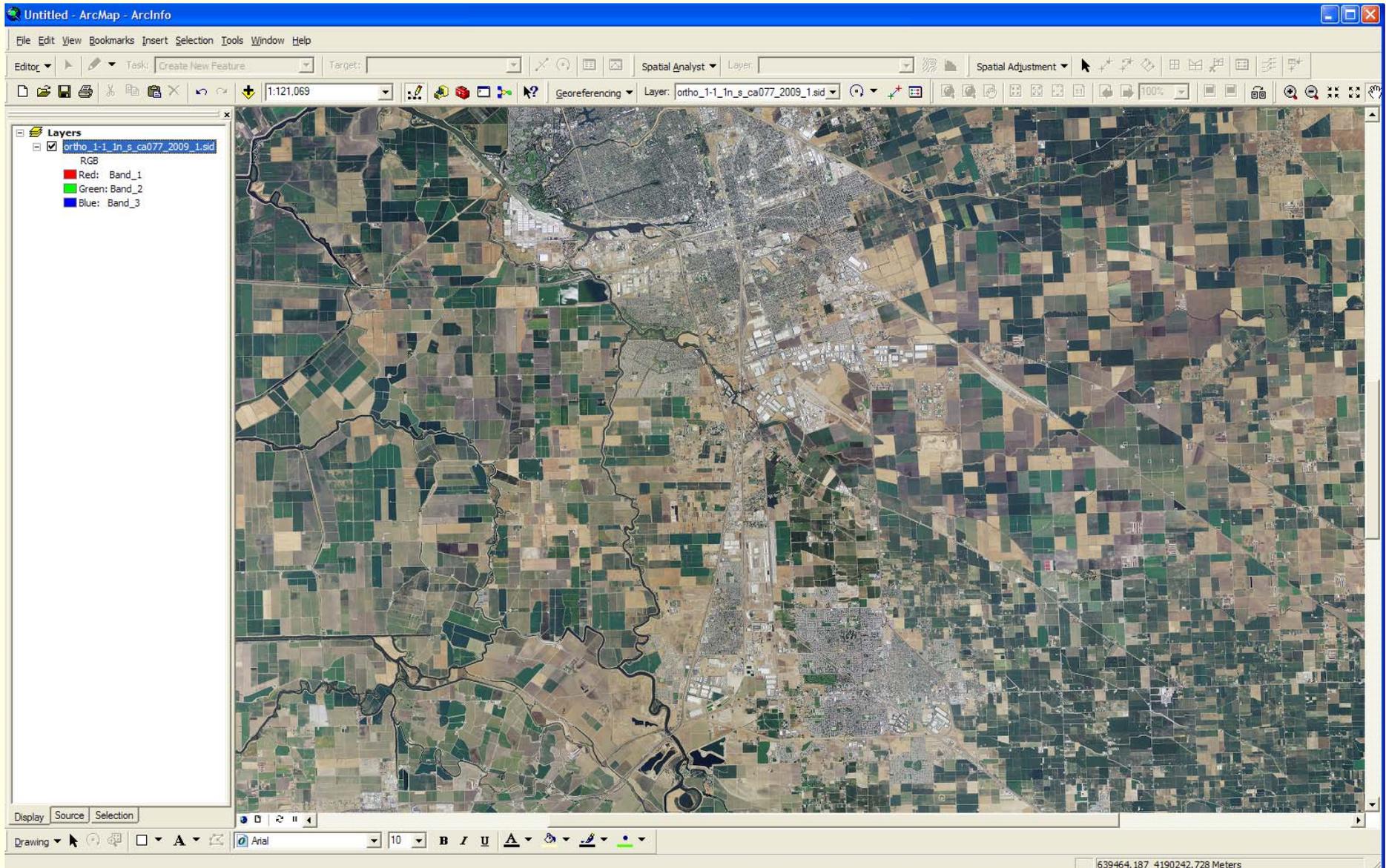
Pyrethroids

Date	Station	Concentration (ng/L)					
		Bifenthrin	Cyfluthrin	Cypermethrin	L-Cyhalothrin	Pendimethalin	Permethrin
11/8/2010	Historic	ND	ND	ND	ND	ND	ND
	M2	ND	ND	ND	ND	ND	ND
	SJR at Mossdale	ND	ND	ND	ND	ND	ND
3/25/2011	Historic	44	45	7.5	3.4	96	43
	M1	9.6	3.4	ND	ND	85	ND
	M2	16	ND	ND	ND	85	ND
	M3	ND	ND	ND	ND	29	ND
	M6	ND	10	ND	ND	110	ND
	SJR at Mossdale	ND	ND	ND	ND	7.2	ND

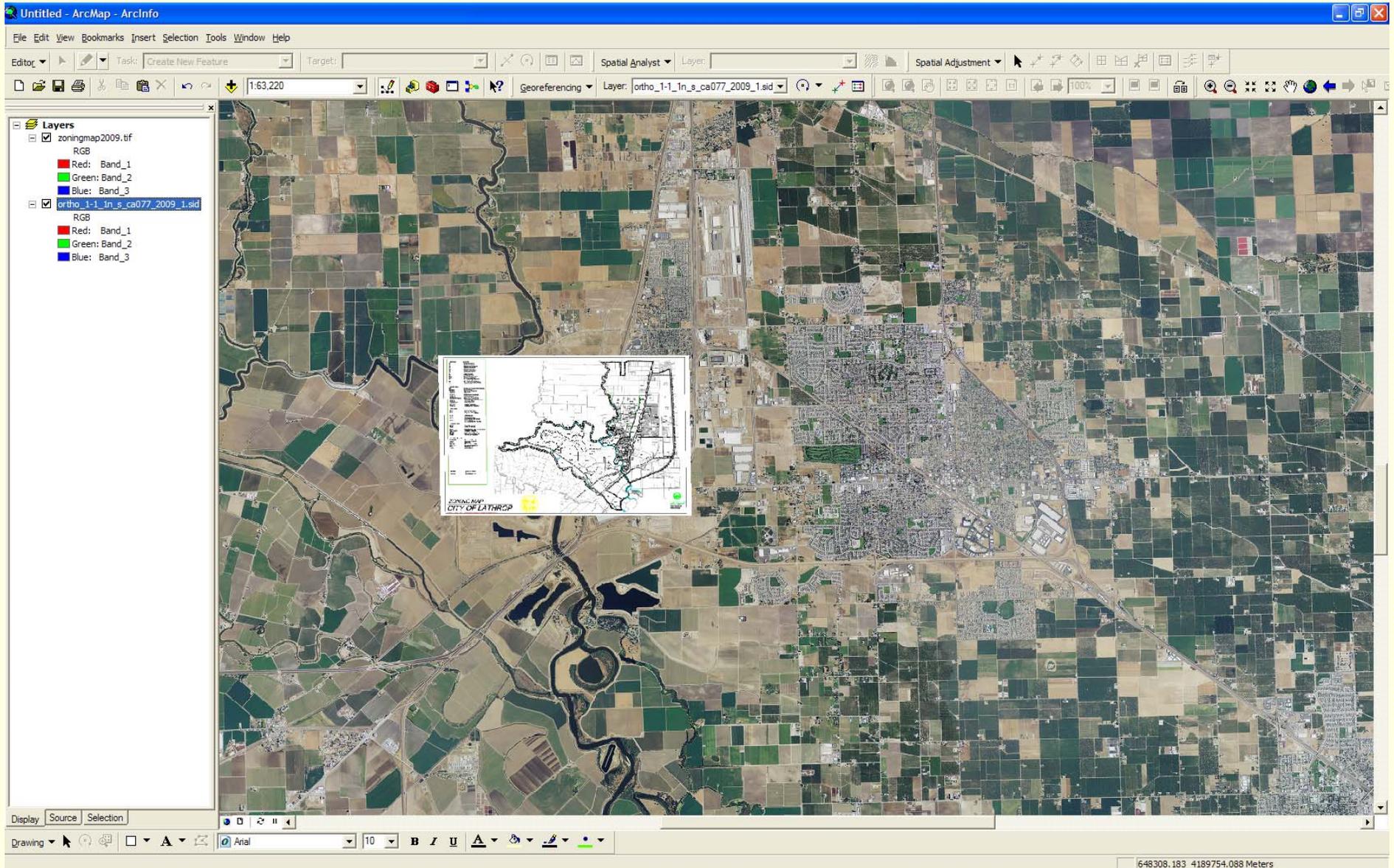
Zoning Map of Lathrop



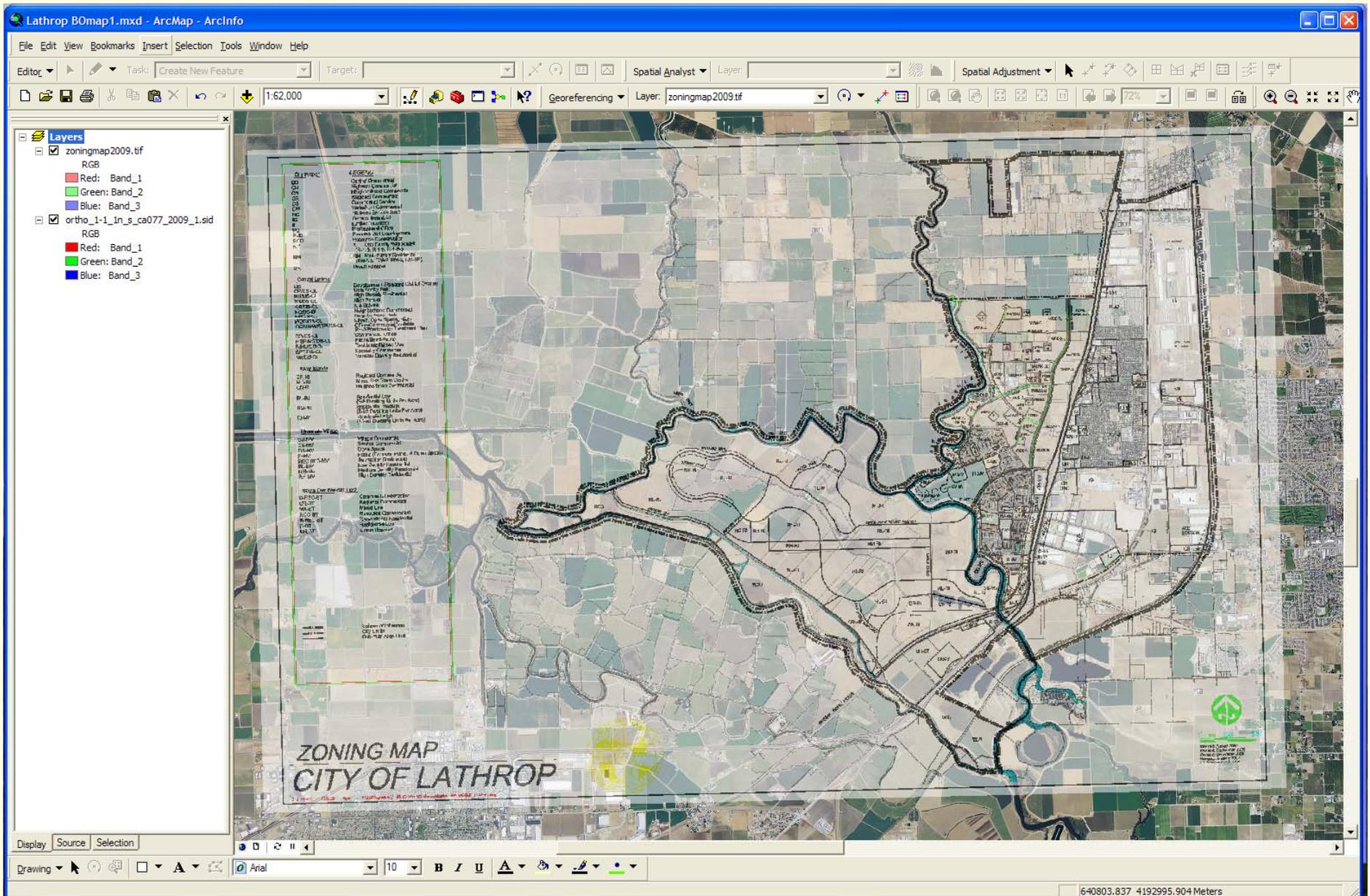
NAIP 2009 Base layer



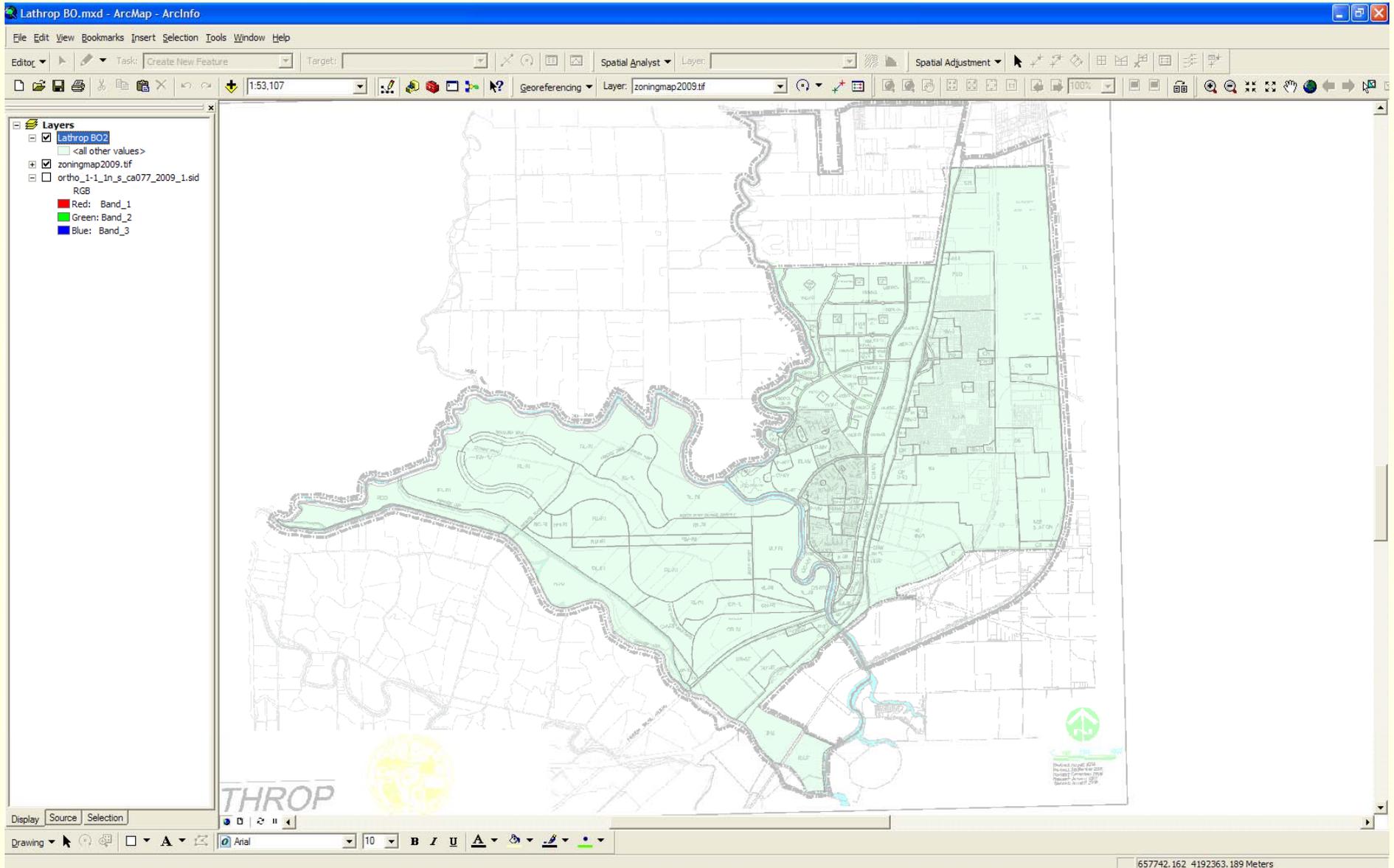
A Dilemma...



Zoning layer geo-referenced to NAIP Layer



Digitized Layer Created



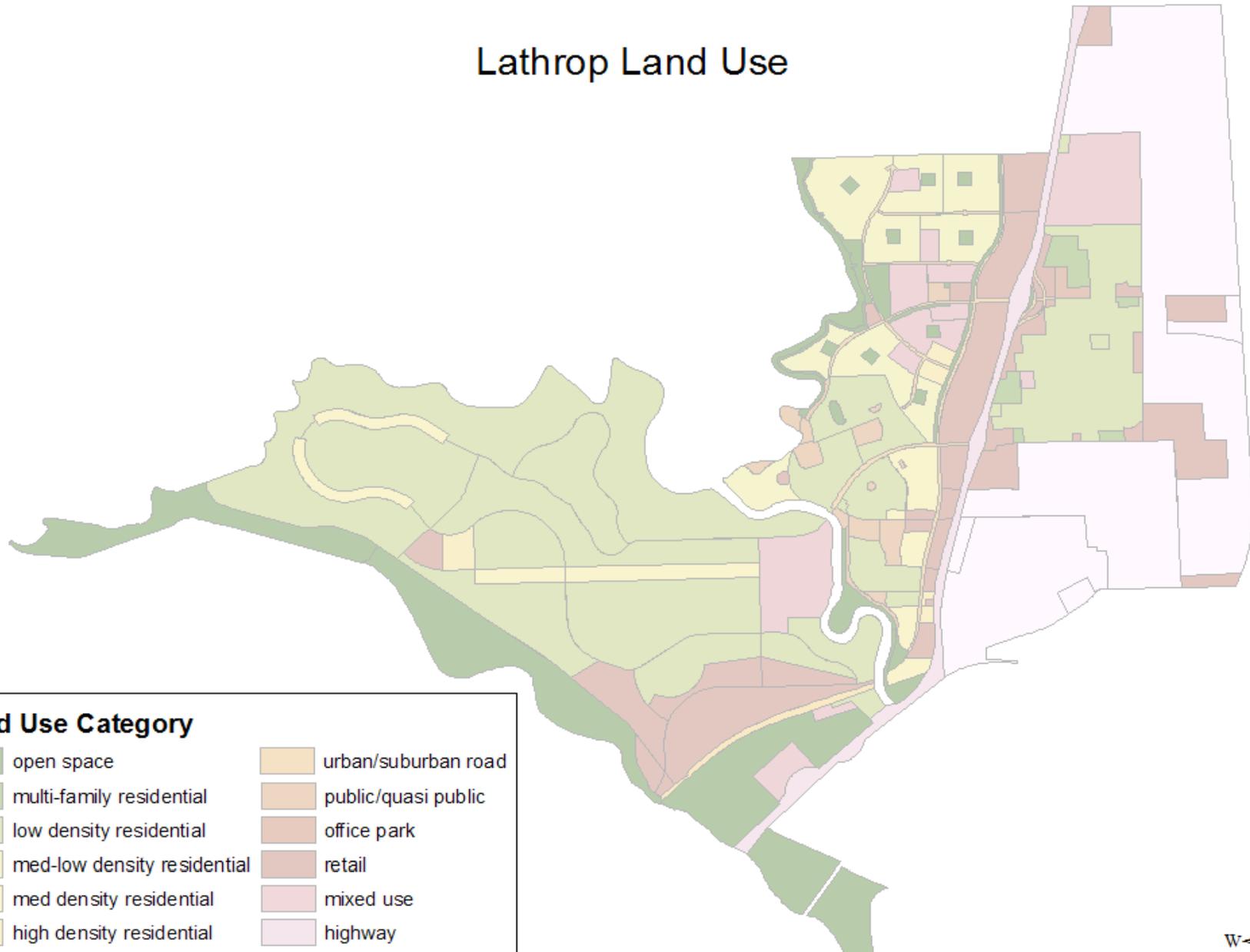
Attribute Table

Attributes of Lathrop B02

FID	Shape *	Id	Land_Use_C	Descrip	LUC	ISCpercent
0	Polygon	0	RL-RI	Residential Low (3-9 Dwellings/acre)	low density residential	41
1	Polygon	0	NC-RI	Neighborhood Commercial	retail	86
2	Polygon	0	RH-RI	Residential High (15-40 Dwelling Units/acre)	high density residential	73
3	Polygon	0	RL-RI	Residential Low (3-9 Dwelling Units/acre)	low density residential	41
4	Polygon	0	RL-RI	Residential Low (3-9 Dwelling Units/acre)	low density residential	41
5	Polygon	0	RM-RI	Residential Medium (6-20 Dwelling Units/acre)	med density residential	61
6	Polygon	0	RM-RI	Residential Medium (6-20 Dwelling Units/acre)	med density residential	61
7	Polygon	0	RL-RI	Residential Low (3-9 Dwelling Units/acre)	low density residential	41
8	Polygon	0	RL-RI	Residential Low (3-9 Dwelling Units/acre)	low density residential	41
9	Polygon	0	RL-RI	Residential Low (3-9 Dwelling Units/acre)	low density residential	41
10	Polygon	0	CR-RI	Regional Commercial	retail	86
11	Polygon	0	CR-RI	Regional Commercial	retail	86

area	area_impervious	area_road	percent_road	impervious_final	ISC_final
1312587	538160.68946	262517.40949	0.2	543411.03765	0.414
128433	110452.1926	19264.91731	0.15	102168.27816	0.7955
142008	103666.05102	28401.65781	0.2	95145.55367	0.67
536729	220059.06782	107345.88674	0.2	222205.98556	0.414
1220135	500255.52546	244027.08559	0.2	505136.06718	0.414
349486	213186.26336	69897.13553	0.2	200604.77896	0.574
159559	97330.7625	31911.72541	0.2	91586.65193	0.574
920010	377203.92695	184001.91559	0.2	380883.96526	0.414
1576863	646514.01534	315372.69041	0.2	652821.46915	0.414
555034	227563.90477	111006.78281	0.2	229784.04042	0.414
271044	233097.72285	40656.57957	0.15	215615.39363	0.7955
451734	388491.05545	67760.06781	0.15	359354.22629	0.7955

Lathrop Land Use



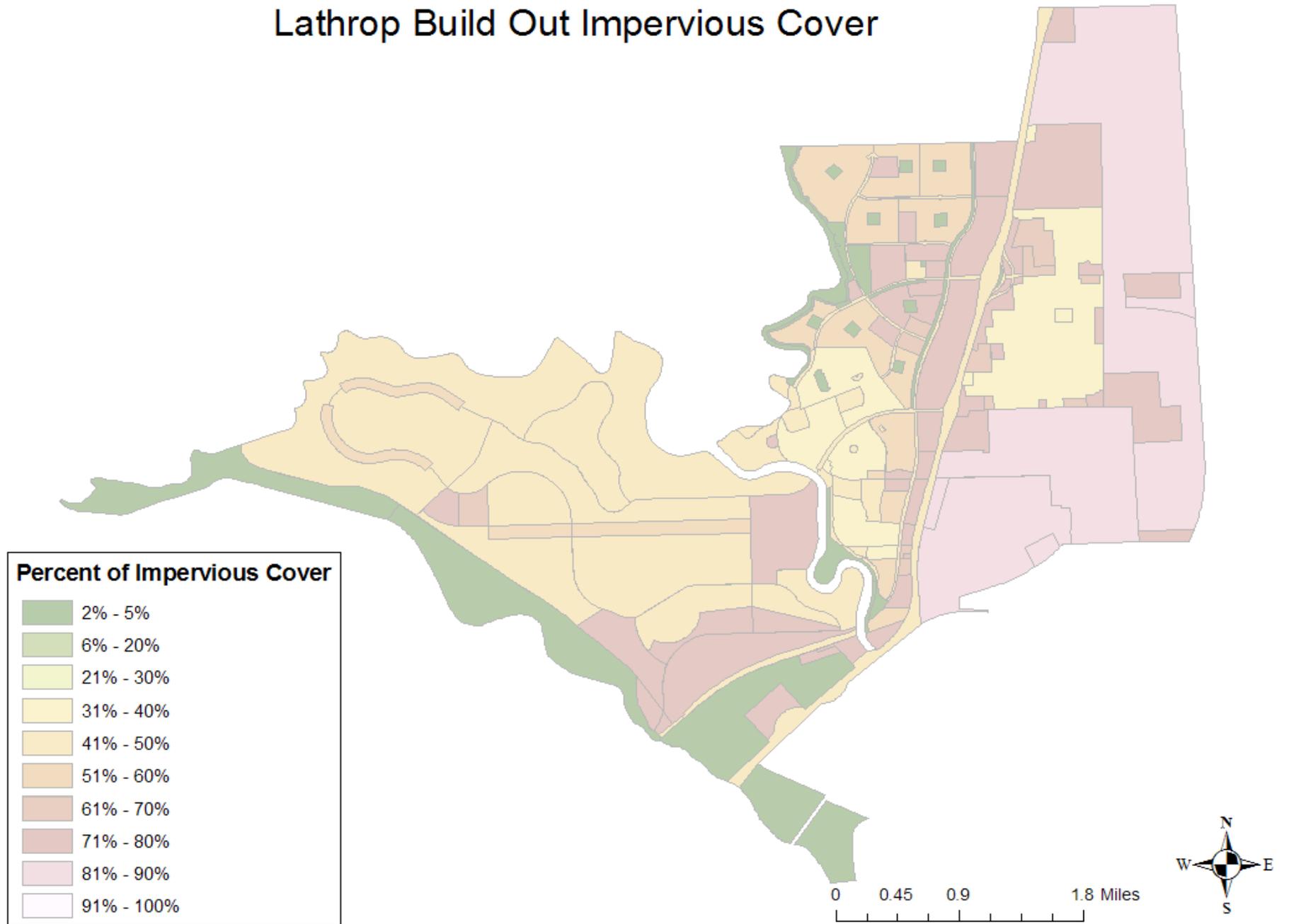
Land Use Category

- | | |
|-----------------------------|---------------------|
| open space | urban/suburban road |
| multi-family residential | public/quasi public |
| low density residential | office park |
| med-low density residential | retail |
| med density residential | mixed use |
| high density residential | highway |
| rural road | heavy industrial |

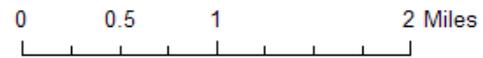
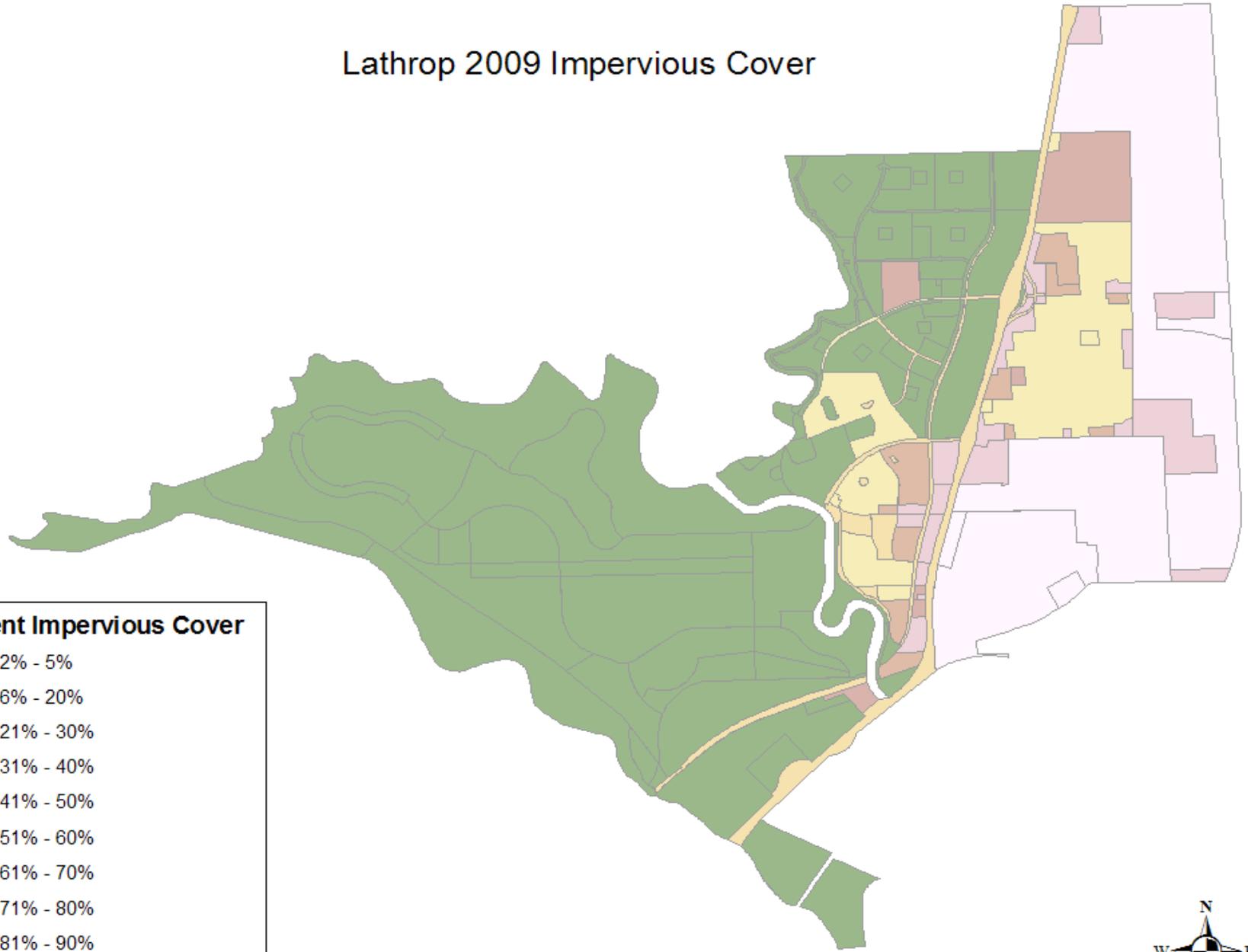
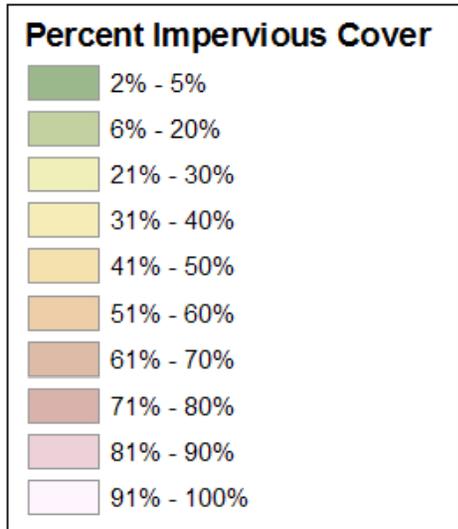
0 0.5 1 2 Miles



Lathrop Build Out Impervious Cover



Lathrop 2009 Impervious Cover



Conclusions

❖ Water Quality

- **Organic carbon:** Decreasing trends over the wet season
- **Bromide:** Higher concentrations in the Mossdale Residential region
- **Ammonia:** Concentrations in the city pump stations were significantly higher than the San Joaquin River station
- **Pathogens:** There was less variability in concentrations during the second season. Both seasons showed evidence of a first flush
- **Pyrethroids:** There was a significant increase in pyrethroids sampled during the spring

❖ Land Use

- Lathrop Impervious cover at Build Out: 53.5%
- Rough estimate of current Lathrop impervious cover: 31.8%

Where do we go from here?

- ❖ Development of loads
- ❖ Development of current land use
- ❖ Additional year of study to better define trends
- ❖ Development of a baseline
- ❖ Down the road, make correlations between water quality and land use

A photograph of a wide river with a dam in the background. The foreground is dominated by a rocky shoreline with large, grey and brown stones. The water is calm and reflects the sky. The background shows a hazy landscape with some trees and a hillside on the right.

Questions??

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