

No Baptisms In This Jordan

*Heavy Metal Concentrations In
Jordan Creek Sediments*

*by
Mary Mantei*

Problem

- ❑ Heavy metal concentrations from industrial activities along the Jordan Creek, in Springfield, Missouri, drain into the Jordan Creek waters. These heavy metals can concentrate in the sediments and stay there for long periods of time.
- ❑ Fish-Kills have occurred in the industrial area along the creek. Emissions of organics and/or heavy metals could have caused these kills.
- ❑ My study looks at the concentrations of some heavy metals in the stream sediments.

Hypothesis

I believe the concentrations of copper, lead, zinc, cadmium, and silver will be higher in the Jordan Creek sediments in the vicinity of the highest industrial-active area.

I also believe that the average concentrations of these metals in the Jordan Creek sediments are higher than in the sediments of other local streams.

Variables

Independent Variables

- The different locations along the Jordan Creek at which I collected my sediment samples.

Dependent Variables

- The concentrations of copper, lead, zinc, cadmium, and silver I found in the sediment samples collected.

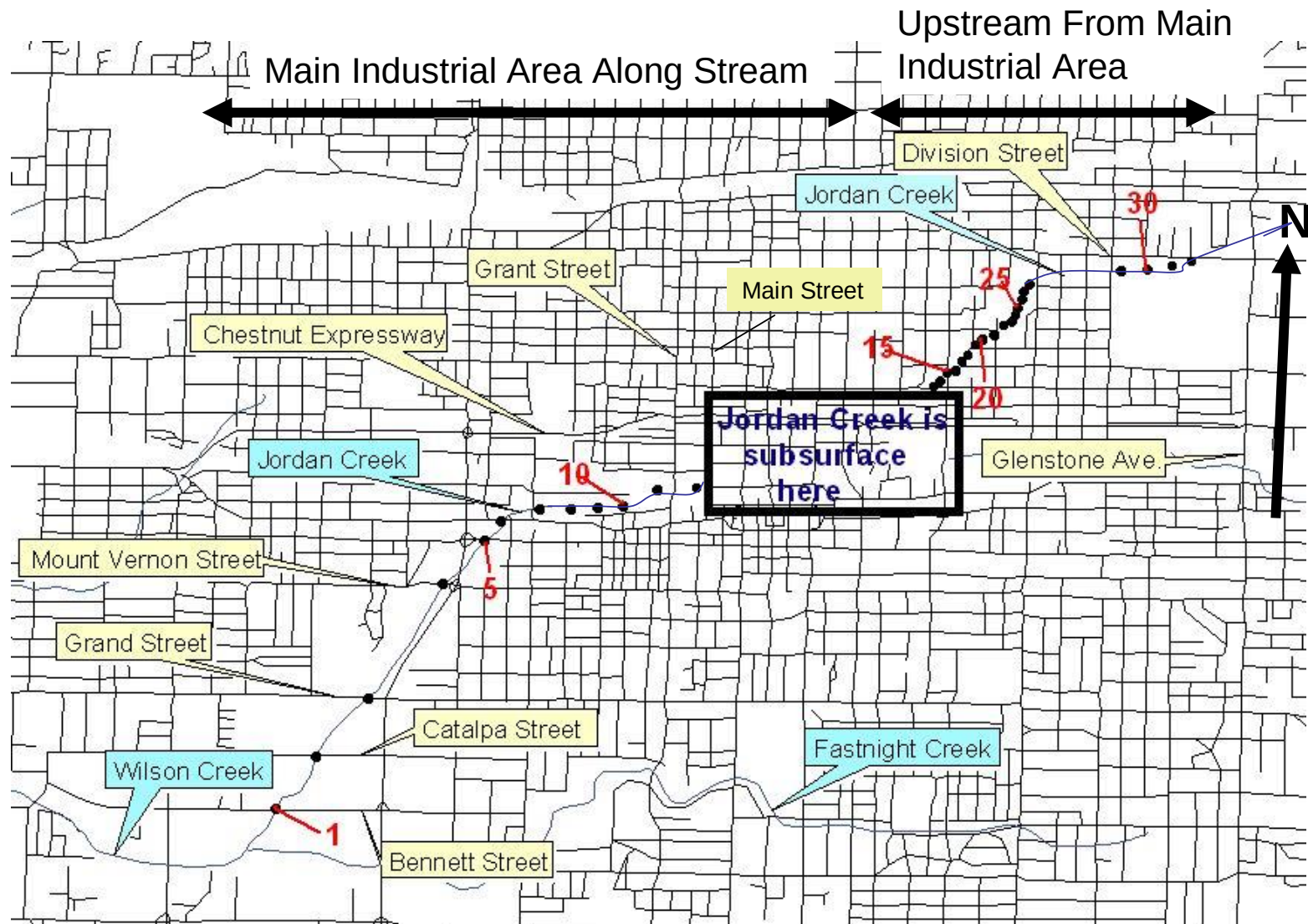
Materials

- ◆ Hand Spade
- ◆ Labeled Sandwich Bags
- ◆ Mortar and pestle
- ◆ 120 mesh size stainless steel sieve
- ◆ Labeled lab bottles
- ◆ Analytical Balance
- ◆ Centrifuge tubes
- ◆ 3N nitric acid
- ◆ Hot water shaker bath
- ◆ High speed centrifuge machine
- ◆ A standard and a blank
- ◆ An ICP machine (Inductively Coupled Plasma Spectrophotometer)
- ◆ Calculator
- ◆ Computer (Microsoft Word, Excel, and PowerPoint)

Procedure

- ◆ Twenty sediment samples were collected upstream from the highest industrial activity area (control samples), and 12 sediment samples in and downstream from the highest industrial activity area (test samples). All samples were collected within a 2 week period and under the same stream and weather conditions.
- ◆ A traditional procedure was used for the physical and chemical preparation of the samples before the determination of copper, lead, zinc, cadmium, and silver concentrations in each sample. An ICP Spectrophotometer was used for the analysis.

Collection Sites And Research Area

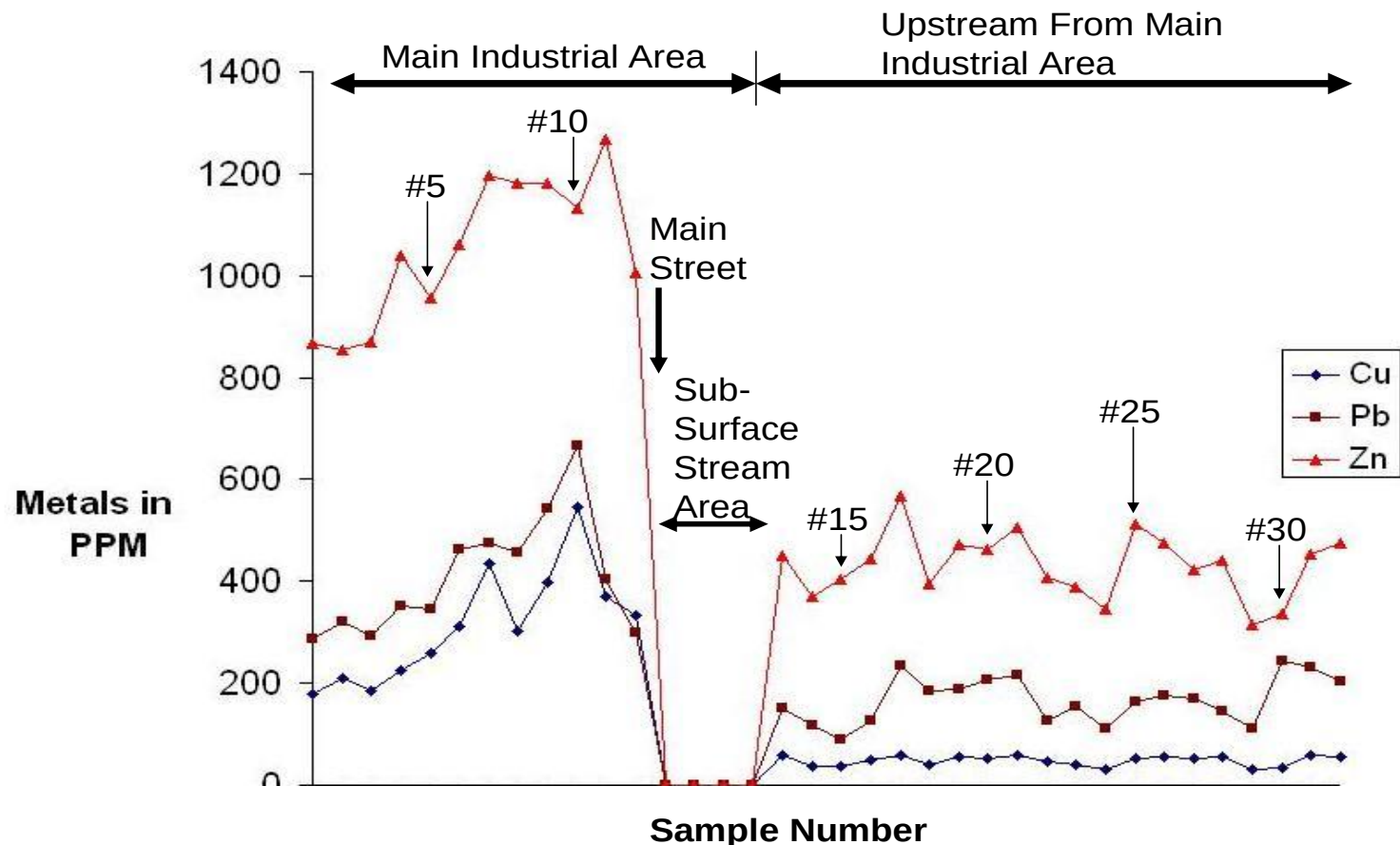


Results

The concentrations of Cu, Pb, Zn, Cd, and Ag were higher in the highest industrial activity area (test samples) compared to the same in the upstream samples (control).

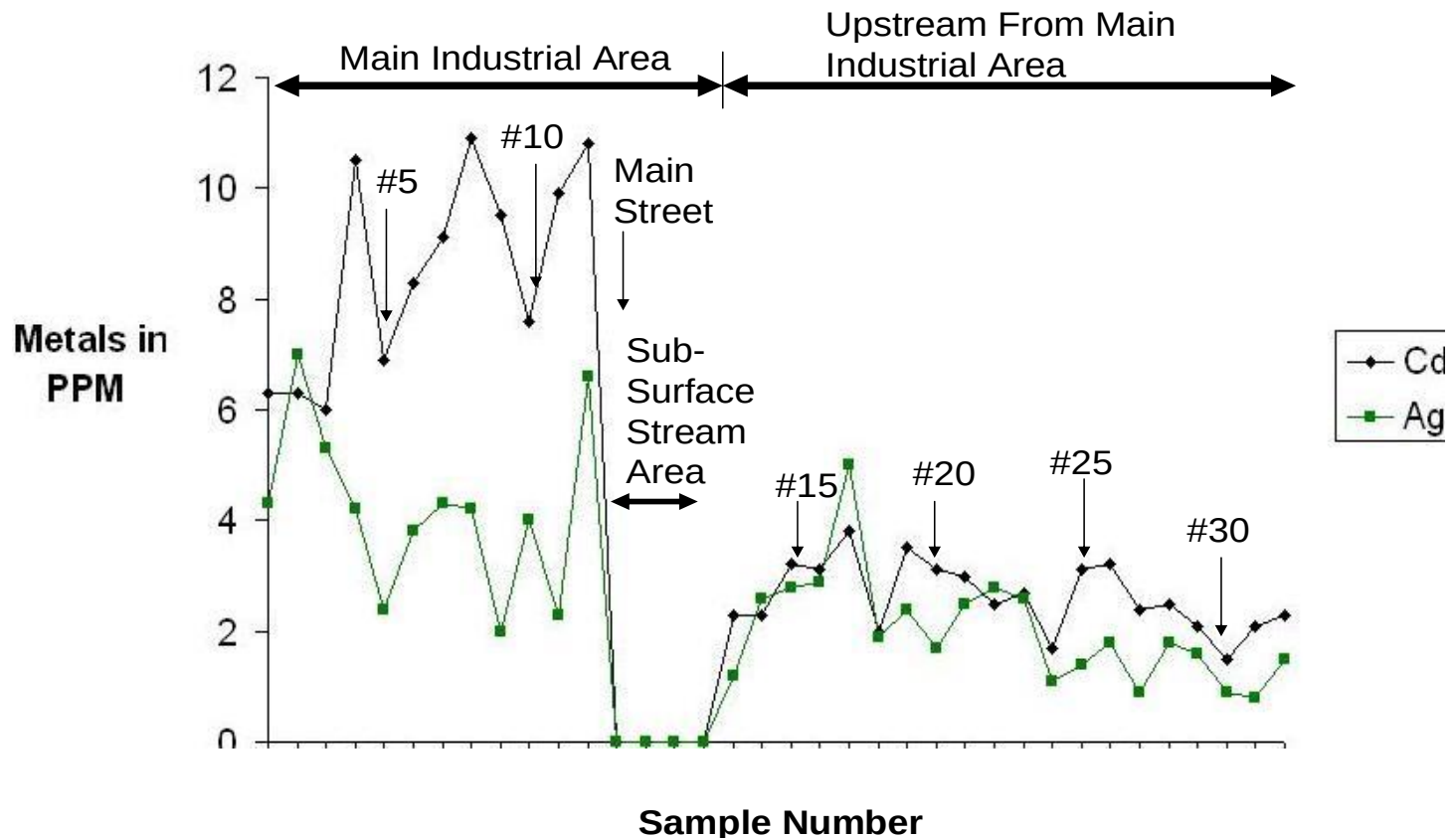
- ◇ No samples were collected from subsurface area
- ◇ Metals decreased downstream in Main Industrial Area—emissions of these metals may occur from primarily the upper Main Industrial Area
- ◇ No specific trend in Control Sample Area— expected to be normal for control

Copper, Lead and Zinc Concentrations in the Sediments Along Jordan Creek



- ◇ Metal concentrations appear to increase slightly in Control Area-- so did the industrial activity
- ◇ Metal concentrations did not decrease downstream in Main Industrial Area— possibly because emissions of Cd and Ag existed in different places along this portion of stream

Cadmium and Silver Concentrations in the Sediments along Jordan Creek

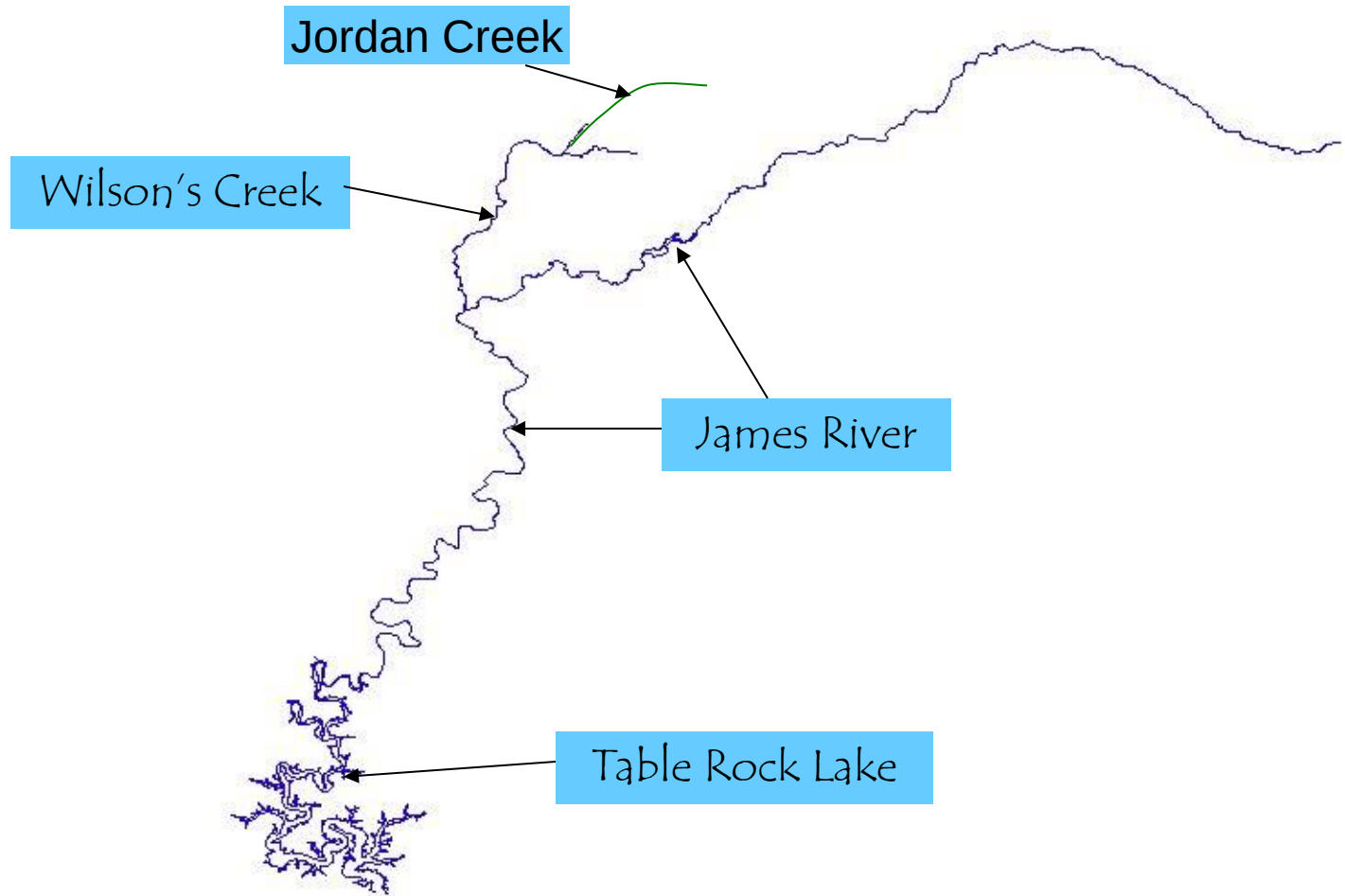


The average concentrations of these metals in the Jordan Creek sediments were much higher than the metal concentrations found in the sediments of other local streams formed in the same bedrock .

Mean Metal Concentrations in Sediments of Other Local Streams (reported by others) with Those of Mine in Jordan Creek					
Stream Name	Metal Concentrations in PPM				
	Cu	Pb	Zn	Cd	Ag
South Dry Sac River	16	44	52	0.4	0.47
Unnamed Tributary of the James River	8	35	24	0.4	1.1
James River	49	61	219	not reported	not reported
Wilson's Creek	37	66	152	not reported	not reported
Little Sac River	26	26	70	0.4	not reported
Jordan Creek	147	258	664	4.8	2.8
downstream from Main Street	312	408	1050	8.5	4.2
upstream from Main Street	47	167	434	2.6	2

Jordan Creek
may have an
effect on other streams:

It feeds Wilson's
Creek and James River which empties into Table Rock Lake....
this may be one reason why these
two streams and the lake
are becoming "tainted".



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BIBLIOGRAPHY

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