

# The Great South River Floodplain Sampling Event of 2008

Calvin Jordan - DEQ

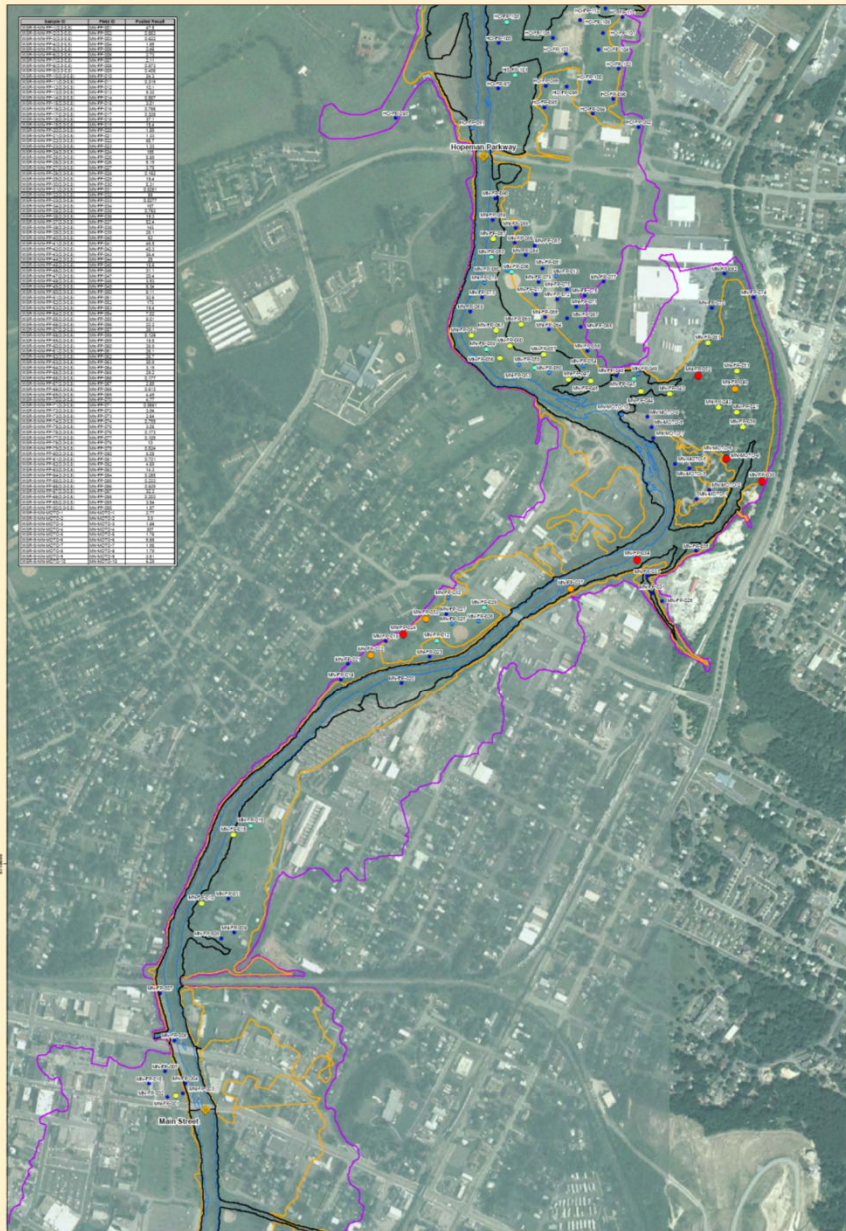


# The Facts

- Started 2/12/2008 and Finished 4/17/2008
- Planned to do 600 sites
  - 540 upland
  - 60 wetland
- Completed 618 sites
  - 8 extra sites sampled in second reach due to late permissions
  - 10 sites added at motocross track (first reach)
- 167 sites relocated
  - All 60 wetland sites relocated
- A total of **2700** man hours spent on this project

# Results





**Legend**

Total Mercury (mg/kg)

- 0.012 - 5.00
- 5.00 - 10.00
- 10.00 - 20.00
- 20.00 - 50.00
- 50.00 - 100.00
- > 100.00

Bridges  
 River Shoreline  
 2-Year Floodplain  
 5-Year Floodplain  
 62-Year Floodplain

**Figure 1**  
**Total Mercury Results (0 - 0.5 Feet)**  
**Inundation Sampling**  
**Main Street Bridge to**  
**Hopeman Parkway Bridge**

URS Corporation - Fort Washington  
 June 2008

Source: USGS 2005 SAMP Inventory  
 USGS Data & Maps CIP  
 Custom URS Data

Created in ArcGIS 9 using ArcToolbox

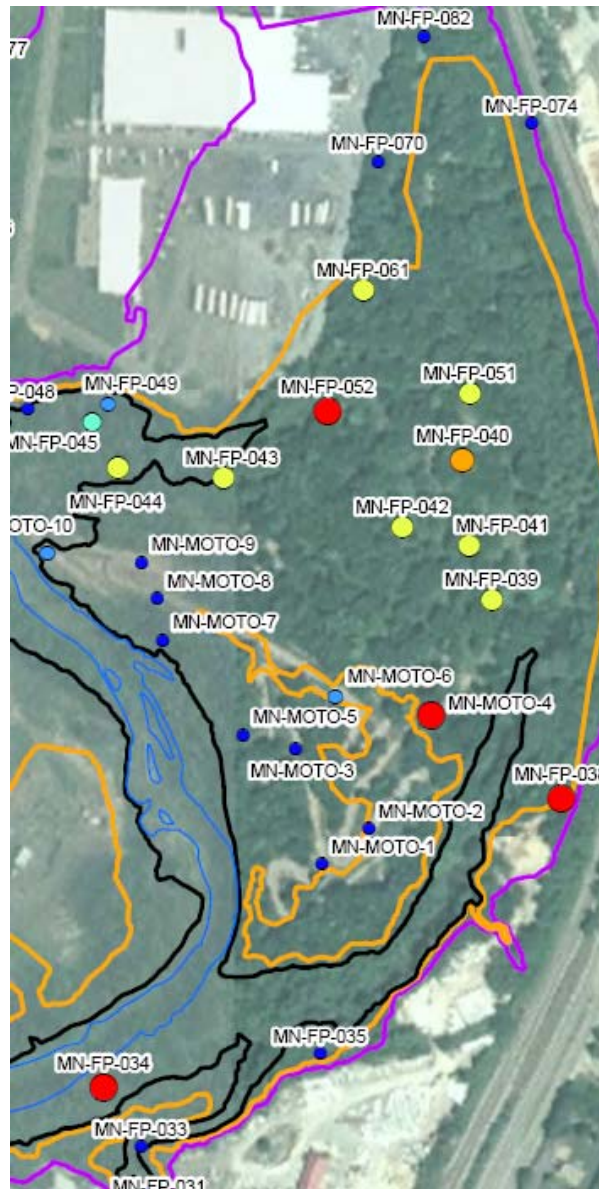
URS 2011 Smartphone Original with  
 4:00 AM Time  
 Project: Lateral Contamination Study  
 Date: 06/01/2008  
 Project: Lateral Contamination Study  
 Date: 06/01/2008  
 Project: Lateral Contamination Study  
 Date: 06/01/2008

1 inch equals 350 feet

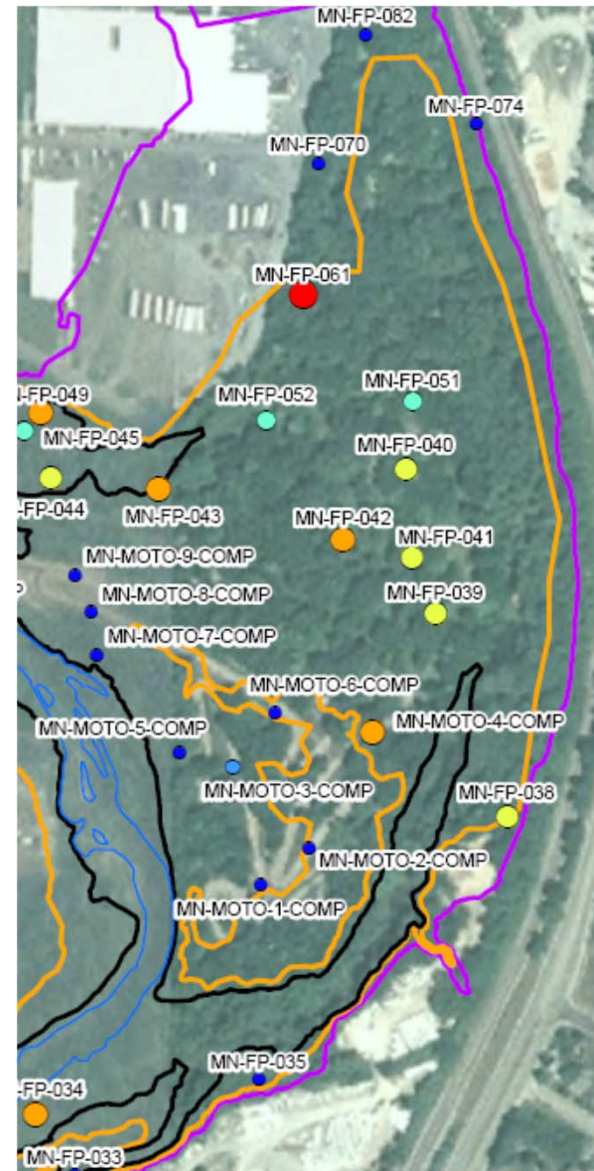
**URS**

# The Old Oxbow is Hot!

Surface Interval

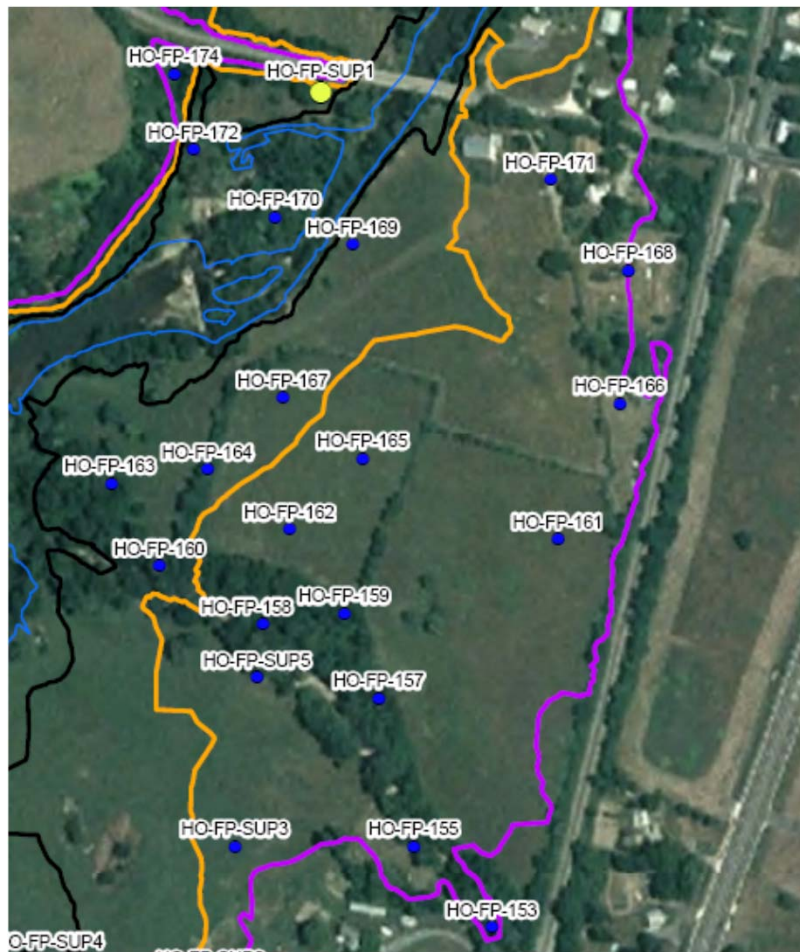


Composite Sample

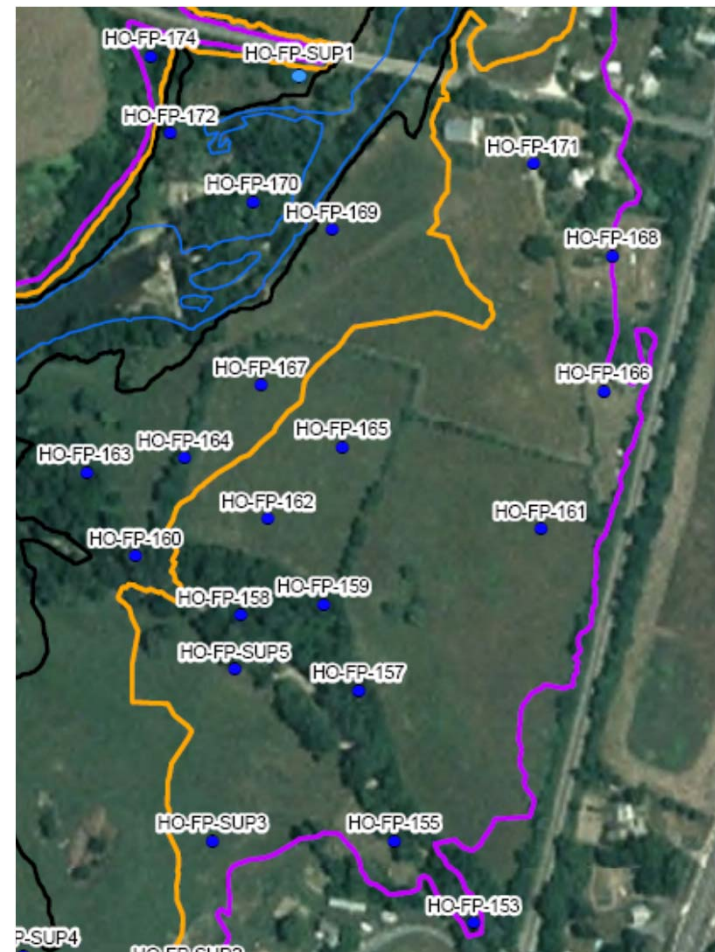


# Dooms Isn't Hot?

Surface Interval

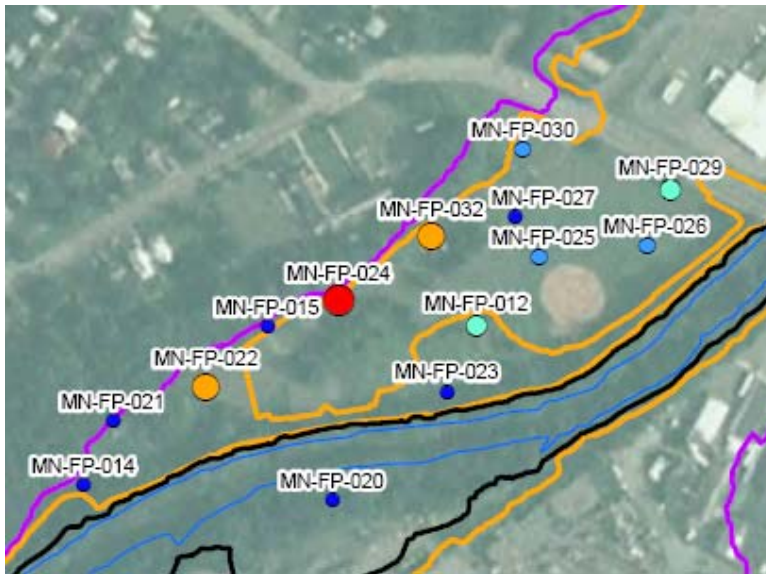


Composite Interval

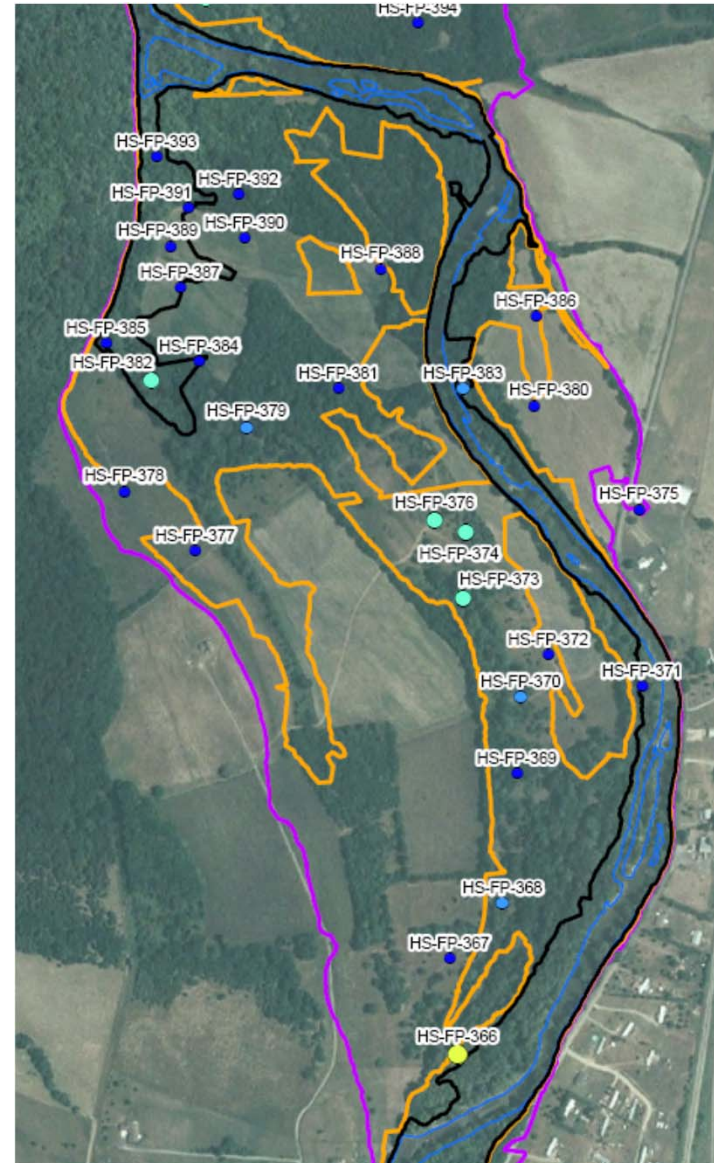


# A Story of Old Millraces and Side Channels

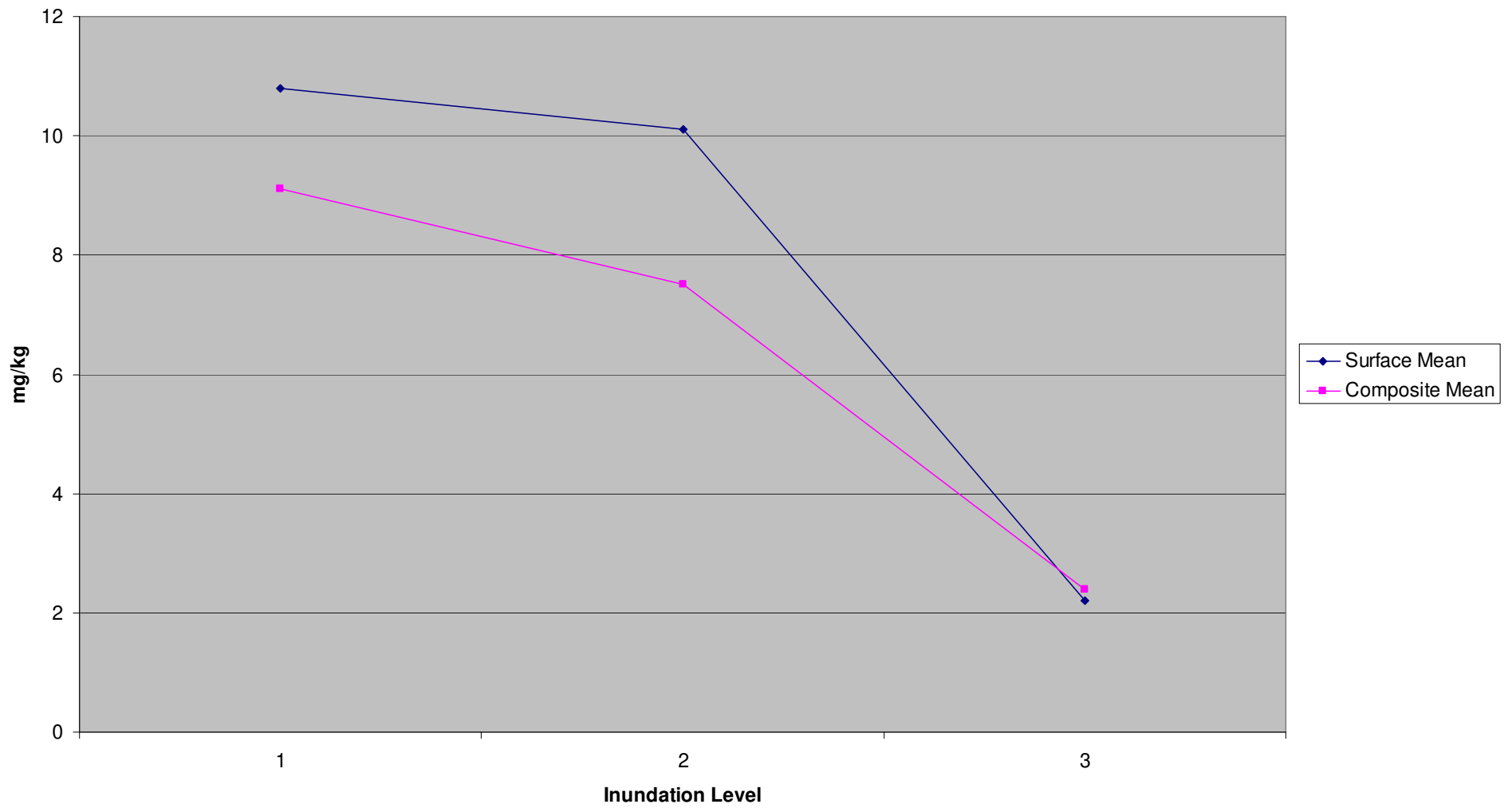
Old Millrace at North Park



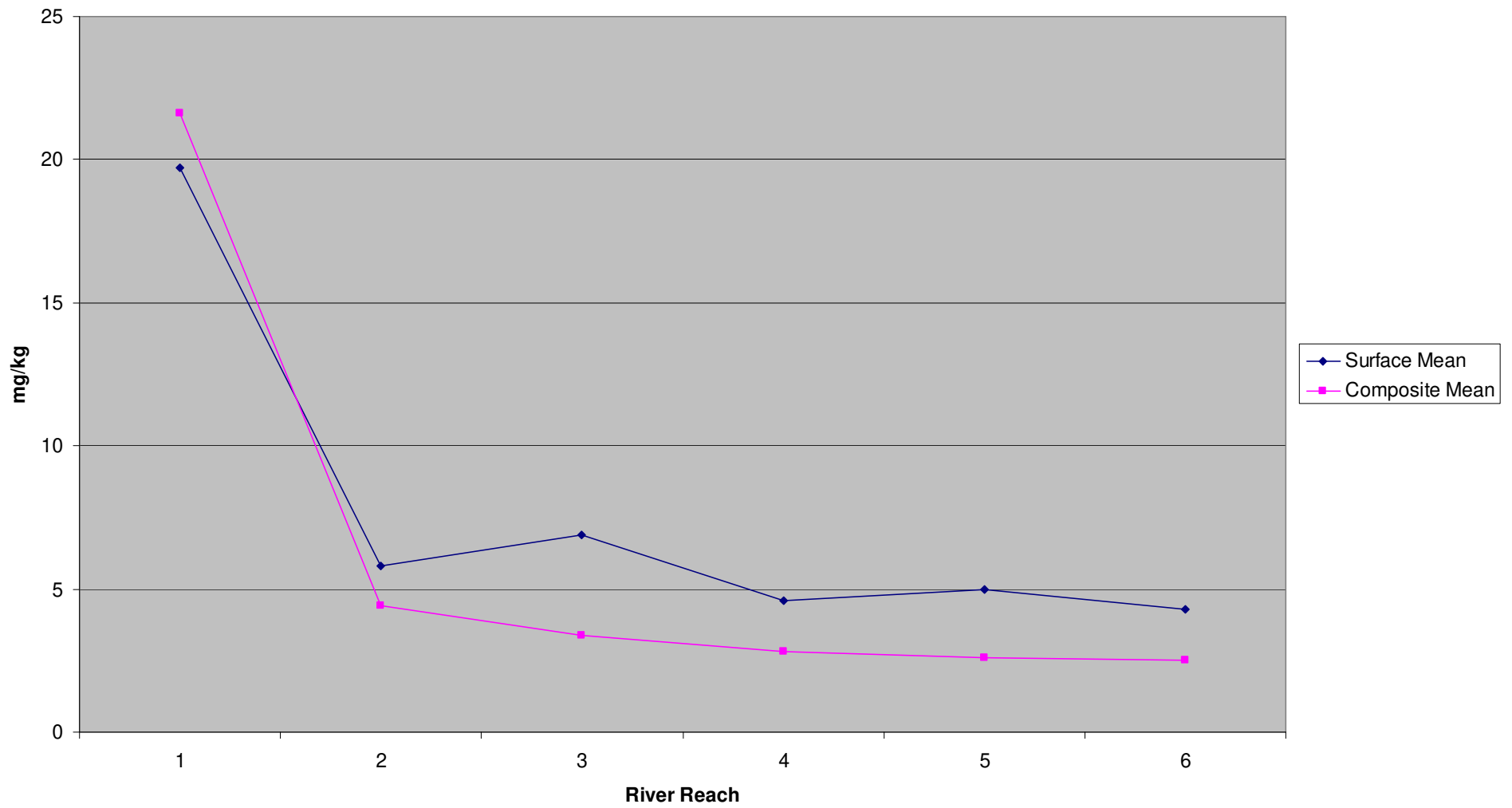
Side Channel Below Harriston



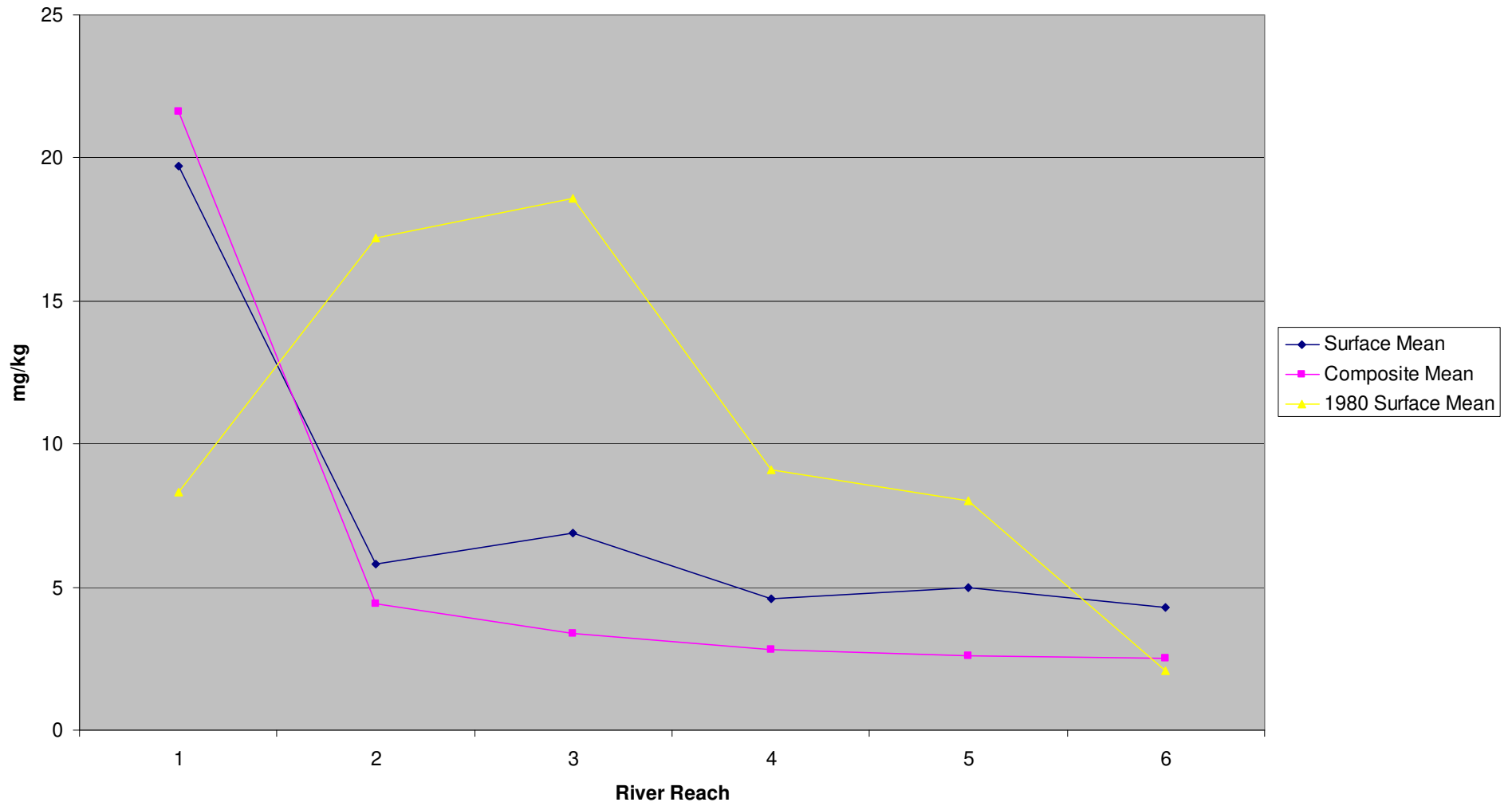
**Average Mercury Concentrations Per Inundation Level**



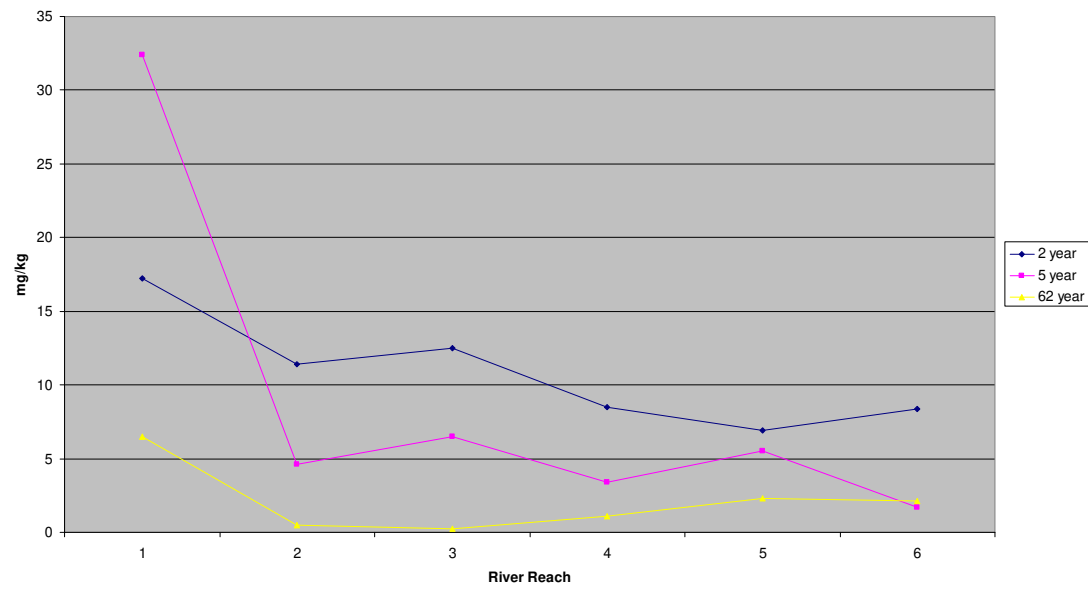
**Average Mercury Concentrations Per Reach**



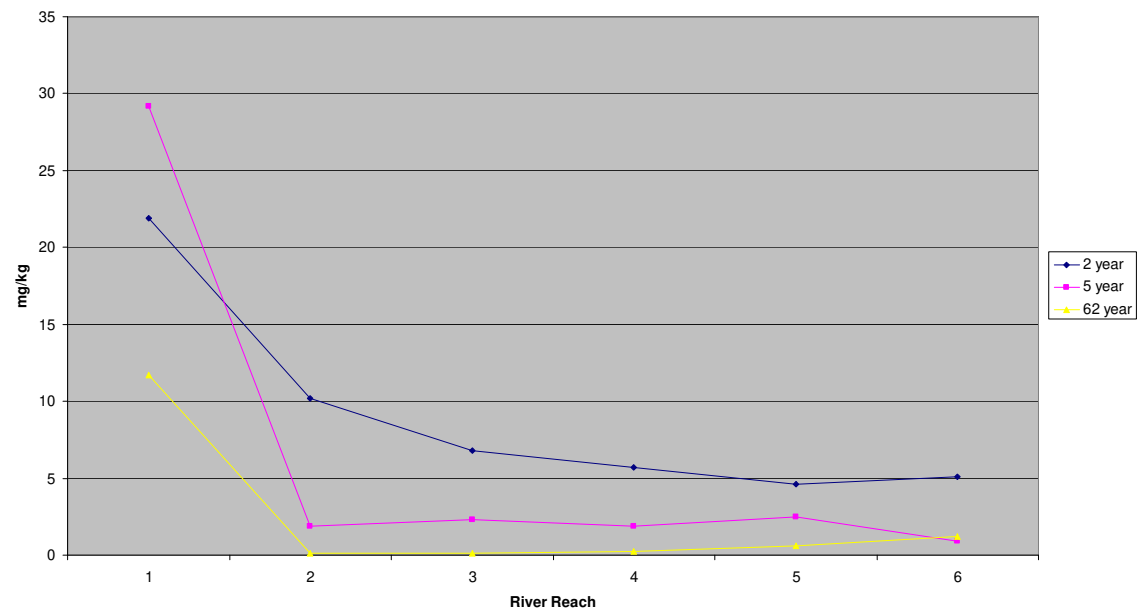
**Average Mercury Concentrations Per Reach**



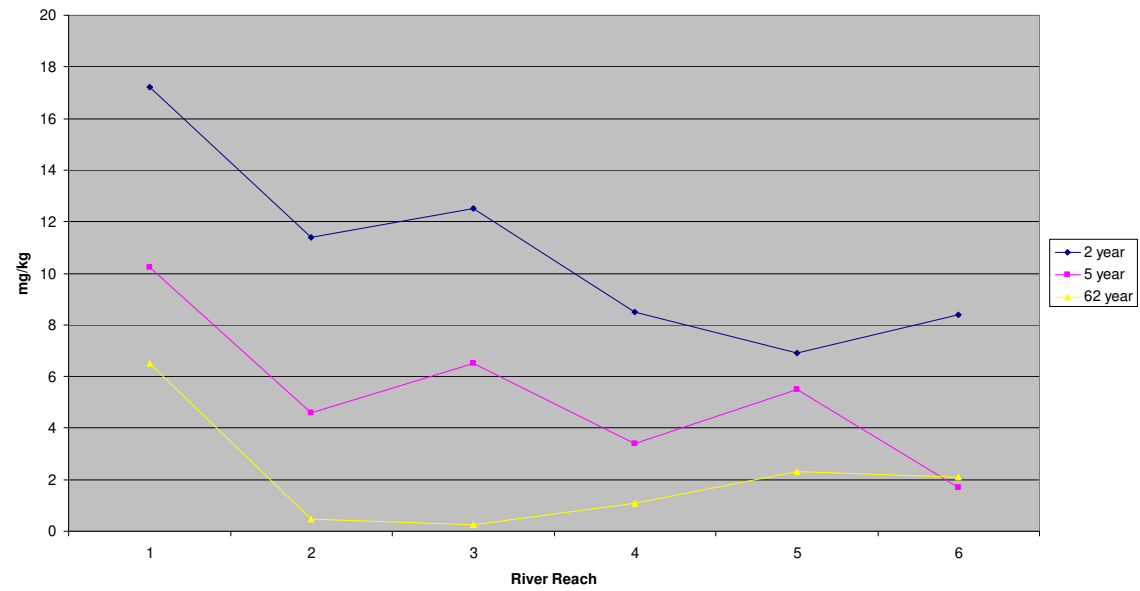
Average Surface Mercury Concentrations Per Reach and Inundation Level



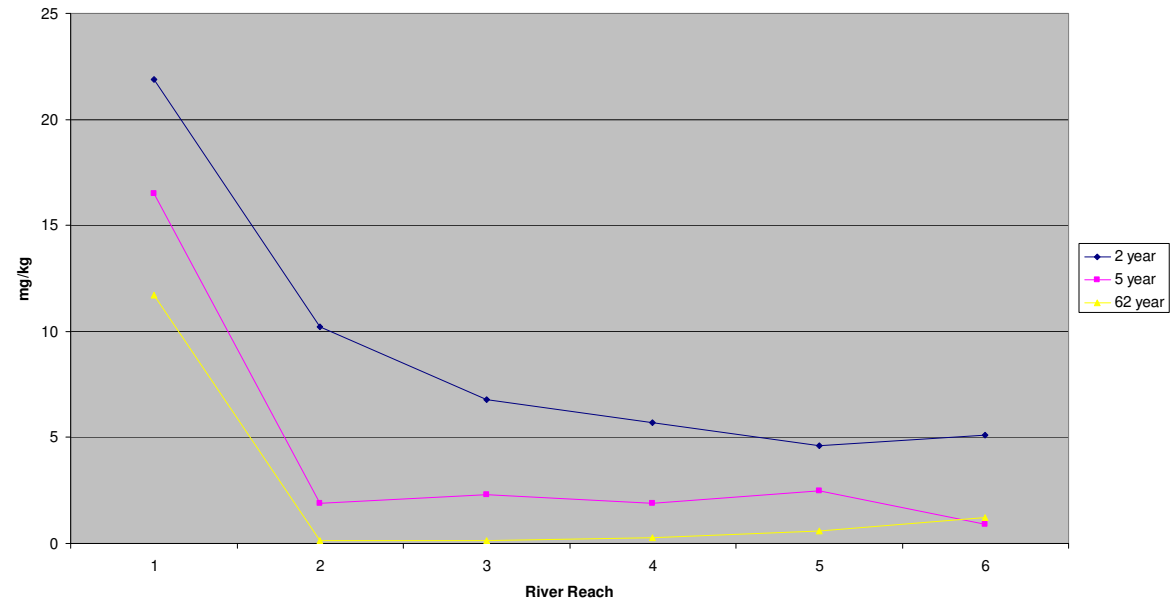
Average Composite Mercury Concentrations Per Reach and Inundation Level



**Average Surface Mercury Concentrations Per Reach and Inundation Level**  
**W/O Site MOTO-4 Surface Interval 307 mg/kg**



**Average Composite Mercury Concentrations Per Reach and Inundation Level**  
**W/O MN-FP-061 Comp Interval 535 mg/kg**



# More Fun Facts

- Background Hg levels in the state of Virginia range from 0.06 – 0.15 ppm according to a Virginia Tech study on biosolid application.  
[www.ext.vt.edu/pubs/compost/452-304/452-304.html](http://www.ext.vt.edu/pubs/compost/452-304/452-304.html)
- EPA screening levels for Hg in soil are 23 ppm for residential and 310 for industrial.  
[www.epa.gov/reg3wcmd/ca/ca\\_resources.htm#risk](http://www.epa.gov/reg3wcmd/ca/ca_resources.htm#risk)
- The following spreadsheet breaks down the number of samples into percentages based upon whether they were above residential screening levels (> 23 ppm), elevated (> 0.15 ppm but < 23 ppm), and background (0 – 0.15 ppm). Percentages are approximate. Only one sample was above the industrial screening level. That sample was a composite sample that measured 535 ppm and was located on the Allied Concrete property in Waynesboro. There was also a surface sample that measured 307 ppm on the same property on the motocross track.

**Entire Floodplain**

| Soil Interval | Above 23 ppm | Elevated | Background |
|---------------|--------------|----------|------------|
| Surface       | 7%           | 82%      | 11%        |
| Composite     | 7%           | 64%      | 29%        |

**0 - 2 Year Inundation Level**

| Soil Interval | Above 23 ppm | Elevated | Background |
|---------------|--------------|----------|------------|
| Surface       | 11%          | 87%      | 2%         |
| Composite     | 11%          | 83%      | 6%         |

**2 – 5 Year Inundation Level**

| Soil Interval | Above 23 ppm | Elevated | Background |
|---------------|--------------|----------|------------|
| Surface       | 8%           | 83%      | 9%         |
| Composite     | 6%           | 68%      | 26%        |

**5 – 62 Year Inundation Level**

| Soil Interval | Above 23 ppm | Elevated | Background |
|---------------|--------------|----------|------------|
| Surface       | 1%           | 62%      | 37%        |
| Composite     | 1%           | 38%      | 60%        |

**Surface Interval Percentages per Reach**

| <b>Reach</b> | <b>Above 23 ppm</b> | <b>Elevated</b> | <b>Background</b> |
|--------------|---------------------|-----------------|-------------------|
| <b>1</b>     | 23%                 | 72%             | 4%                |
| <b>2</b>     | 6%                  | 81%             | 13%               |
| <b>3</b>     | 7%                  | 67%             | 26%               |
| <b>4</b>     | 2%                  | 85%             | 13%               |
| <b>5</b>     | 0%                  | 89%             | 11%               |
| <b>6</b>     | 2%                  | 78%             | 23%               |

**Composite Interval Percentages per Reach**

| <b>Reach</b> | <b>Above 23 ppm</b> | <b>Elevated</b> | <b>Background</b> |
|--------------|---------------------|-----------------|-------------------|
| <b>1</b>     | 25%                 | 63%             | 13%               |
| <b>2</b>     | 37%                 | 61%             | 36%               |
| <b>3</b>     | 4%                  | 58%             | 38%               |
| <b>4</b>     | 3%                  | 64%             | 33%               |
| <b>5</b>     | 1%                  | 72%             | 26%               |
| <b>6</b>     | 2%                  | 67%             | 31%               |

# Conclusion

- The highest concentrations of Hg are found in the 0 – 5 year floodplain.
- The highest concentrations of Hg are found in the First Reach between Main Street and Hopeman Pkwy.
- There is contamination to at least 2.5 ft in some areas.
- 2008 study not comparable (yet) with 1980 study.
- Only 7% of the samples were > 23 ppm, but 80% were > background levels.
- Hot spots close to river and in old river channels and millraces.
- Didn't find peak in concentrations between Dooms and Crimora as we see with fish and other samples.
- Hopefully, Jim Pizzuto's work will fill in the gaps for riverside concentrations. (Dooms Farm 720 ppm ~ 40 ft from river, upriver dam).

# Questions?

