

South River Activities

March 2005

Turner bros, Jensen, VanWart, Reeser

Review for SRST Mtg

April 2005

March 2005 Activities

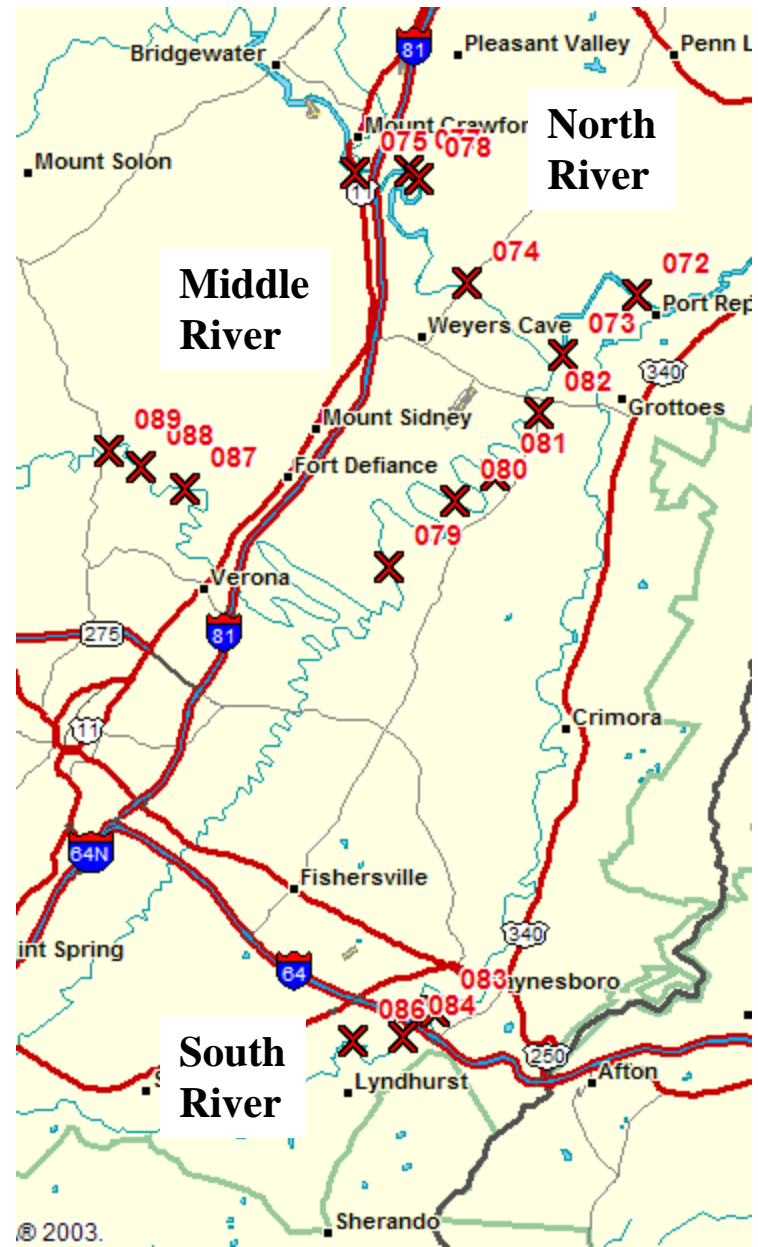
- Recon of potential reference areas: NR, MR, SR
- Water samples from provisional reference areas
- Evaluating Lumex for rapid soil screening
- Soil & sediment samples for Notre Dame (Erin)
- Water/soil/sediment evaluation of Oxbow/Steele Run
- Sediment samples (guzzler) at old millrace discharge
- Water samples of sewer outfall at old mill race
- Located/photographed old dam location by footbridge
- 1000 foot interval water sampling: Dooms to Crimora
- Other select water samples: 001, STP, etc.

Reference Area Recon

Van Wart, Reeser, Turner, Jensen



Potential Reference Locations Surveyed on 3/10



Selection Criterion

- “resemble the Study area but for the mercury contamination”
- “reach segments based on physical, chemical and biological criteria”
- “similar microhabitat characteristics (e.g., rocky vs. silty bottoms, stream current, sediment/water quality factors) to the Study area”

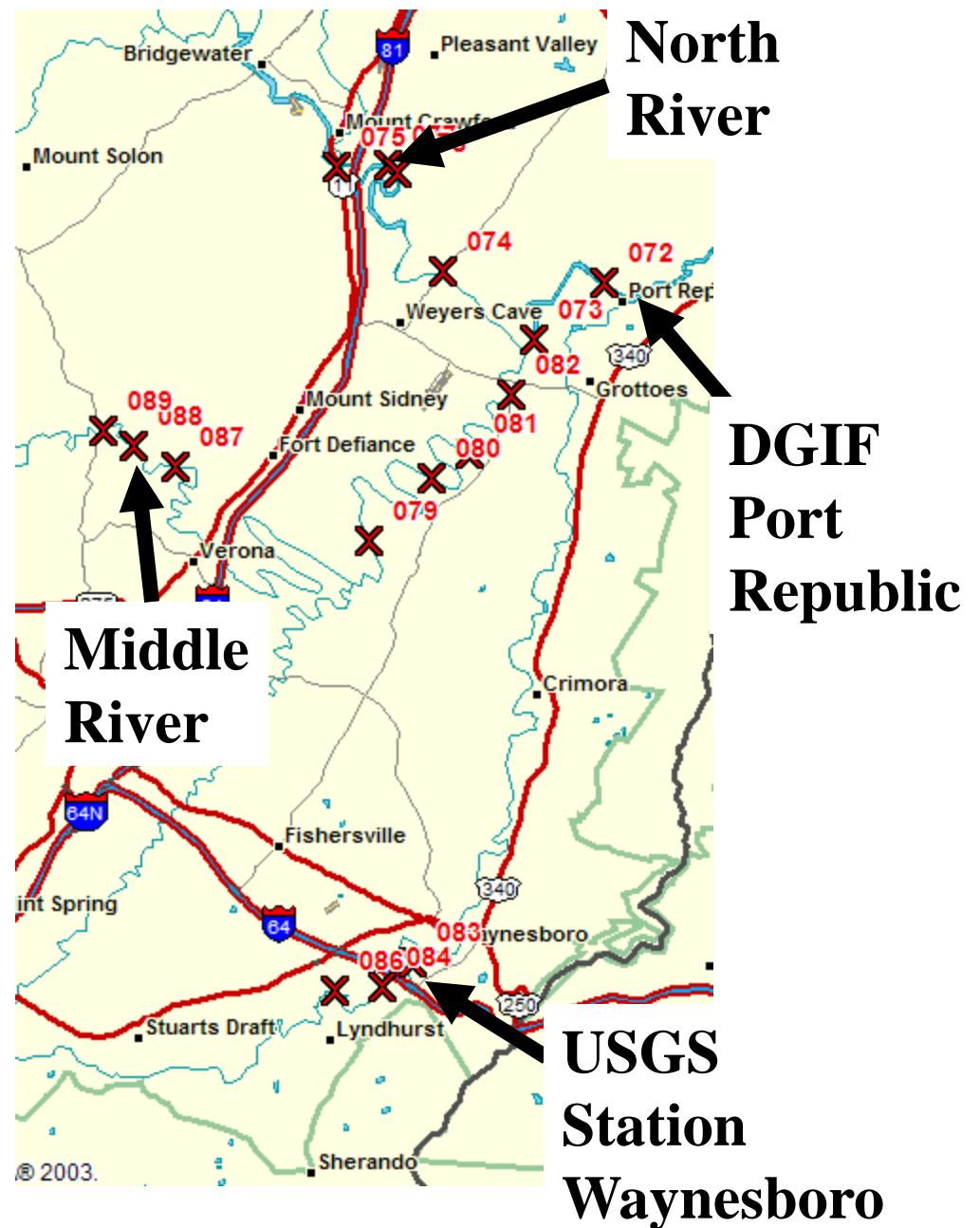
“Ideal” Sites

- Nearby/coincident discharge gauging
- Nearby/coincident historical water chemistry record
- Nearby/coincident biological record
- Convenient access
- Prominent urban influence (incl STP discharge)

Sites Considered

- South R upstream of Waynesboro (3)
 - Hg and WQ samples collected at USGS
- North/Middle R near Grottoes (2)
- North River (4)
 - Hg and WQ samples collected near USGS
- Middle River (7)
 - Hg and WQ samples collected at VDEQ

Provisional Reference Locations Sampled



Hg Results

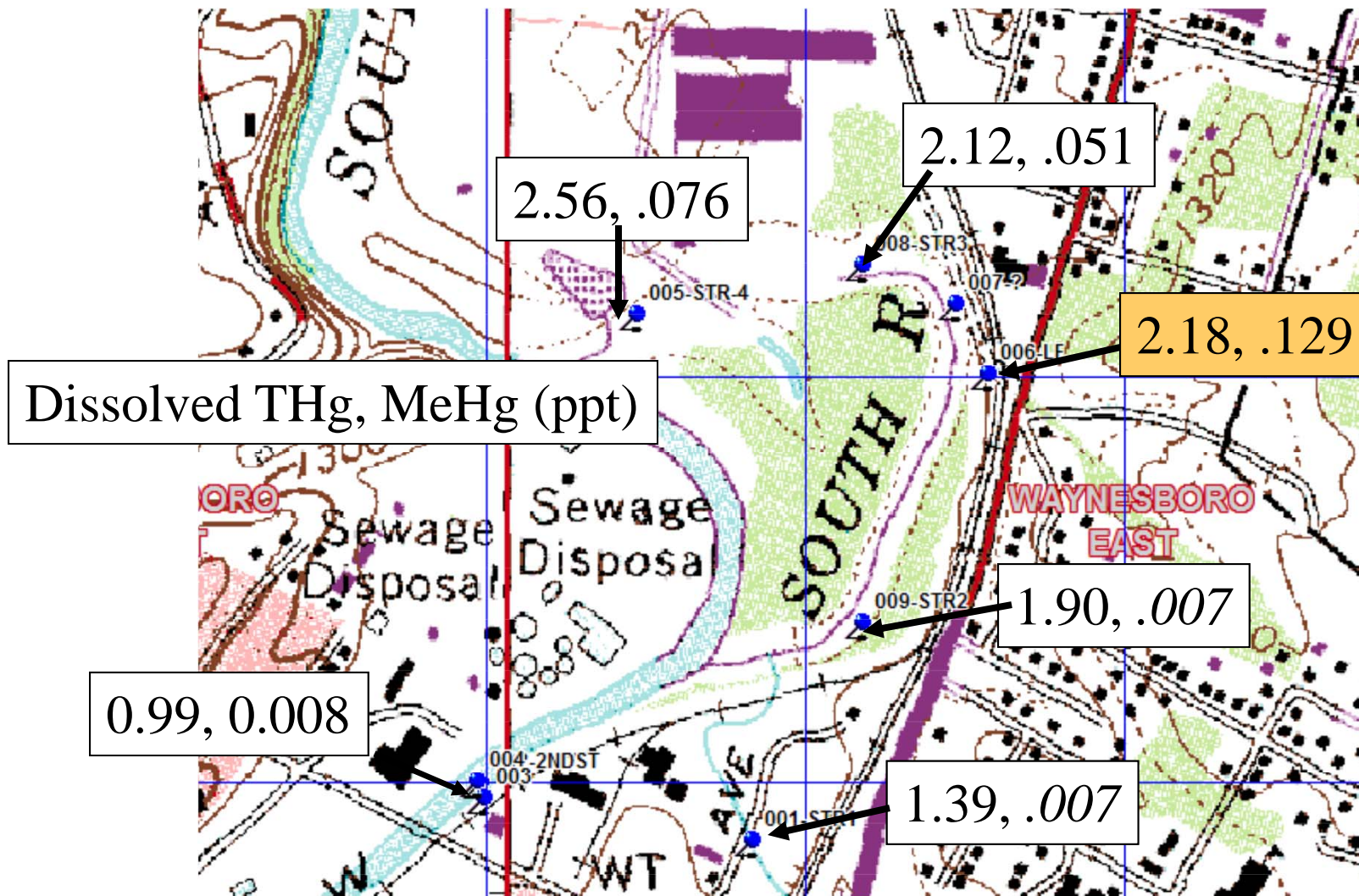
- South River at Waynesboro USGS
 - Tot/Diss Hg = 1.22/0.58 ng/L
 - Tot/Diss MeHg = 0.026/0.011 ng/L
- North River near Burkeston USGS
 - Tot/Diss Hg = 1.27/0.44 ng/L
 - Tot/Diss MeHg = 0.011/<MDL ng/L
- Middle River near Verona
 - Tot/Diss Hg = 0.94/0.39 ng/L
 - Tot/Diss MeHg = 0.012/<MDL

Oxbow/Steele Run Survey

Water samples from Old Landfill

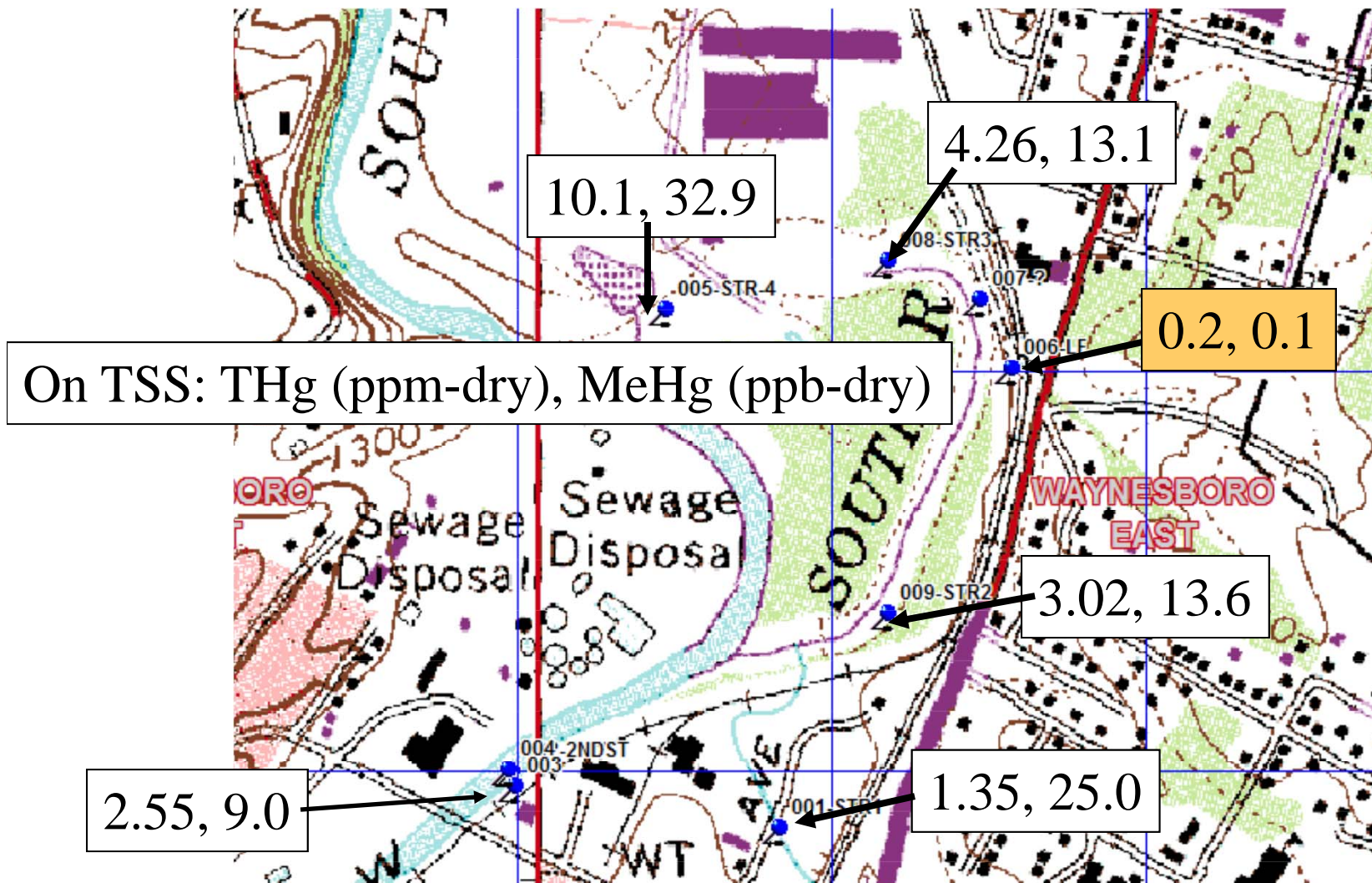


Oxbow/Steele Run Water Results

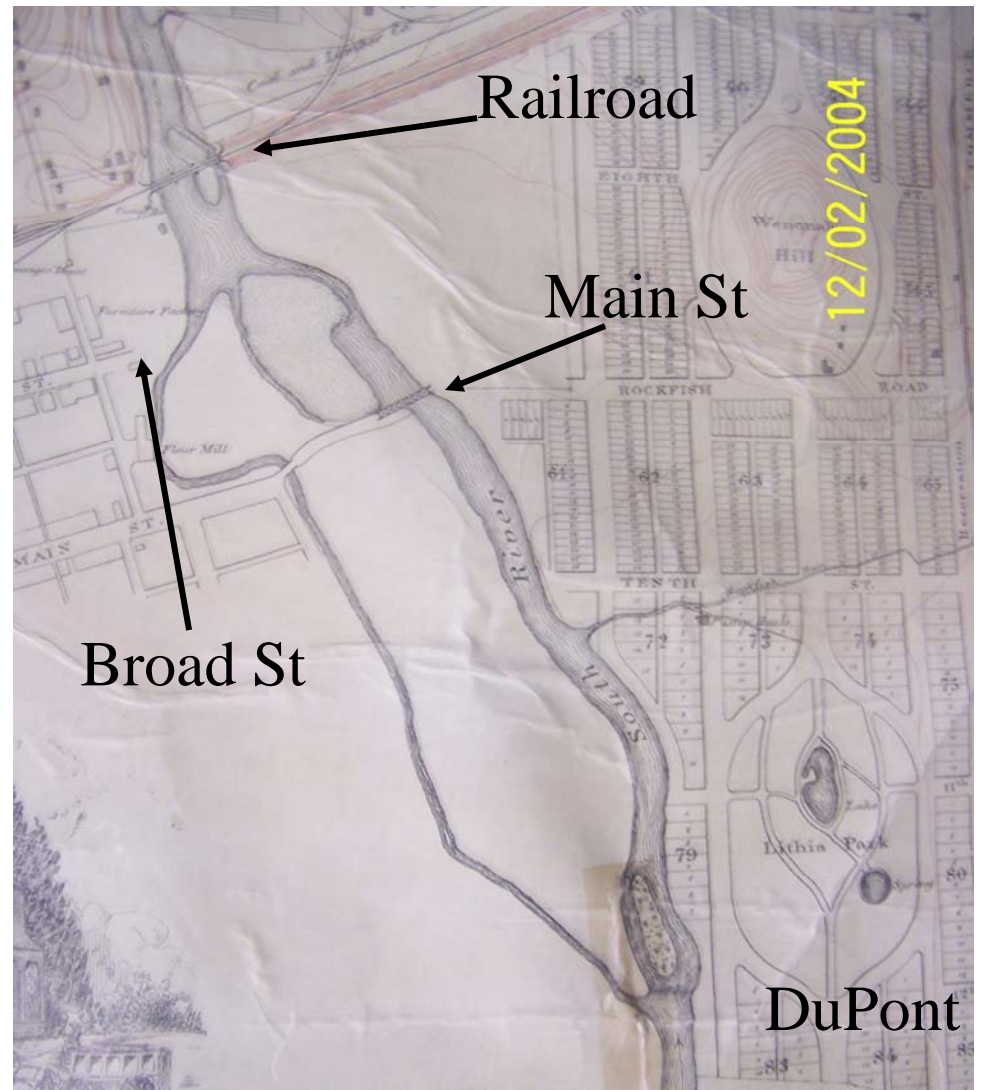


Oxbow/Steele Run Water Results

Hg on TSS, calculated



Mill Race Drawing



“Guzzler” Sediment Sampling (Pump-Sieve-Settle)



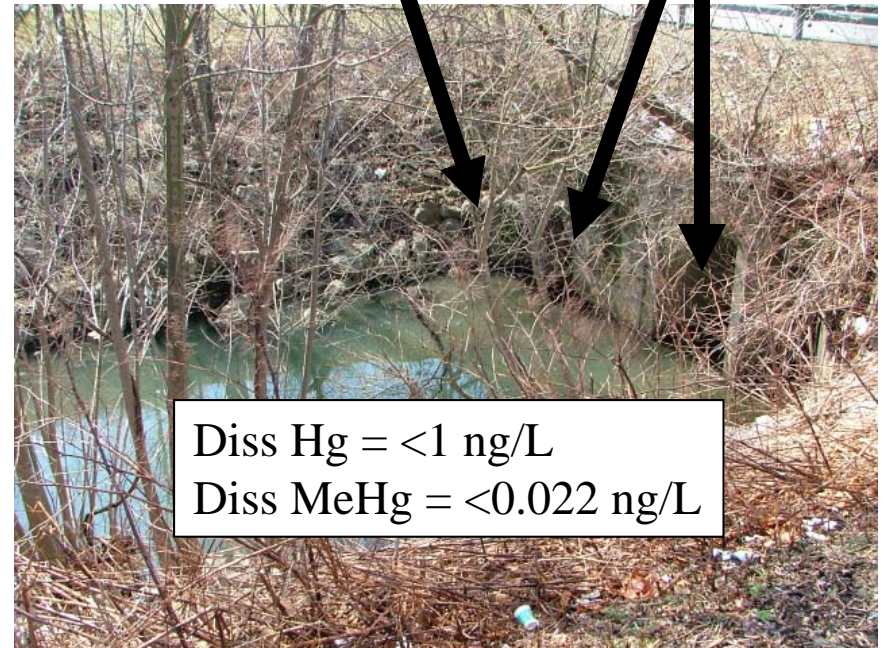
Sewer Embayment

Old Millrace Discharge Point



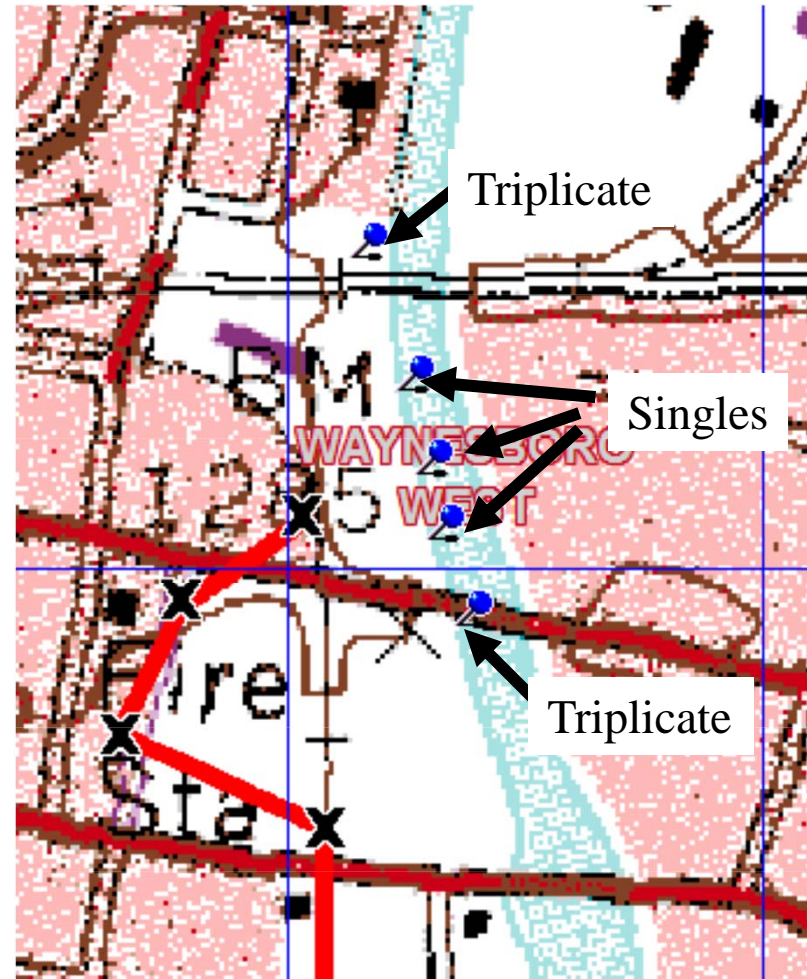
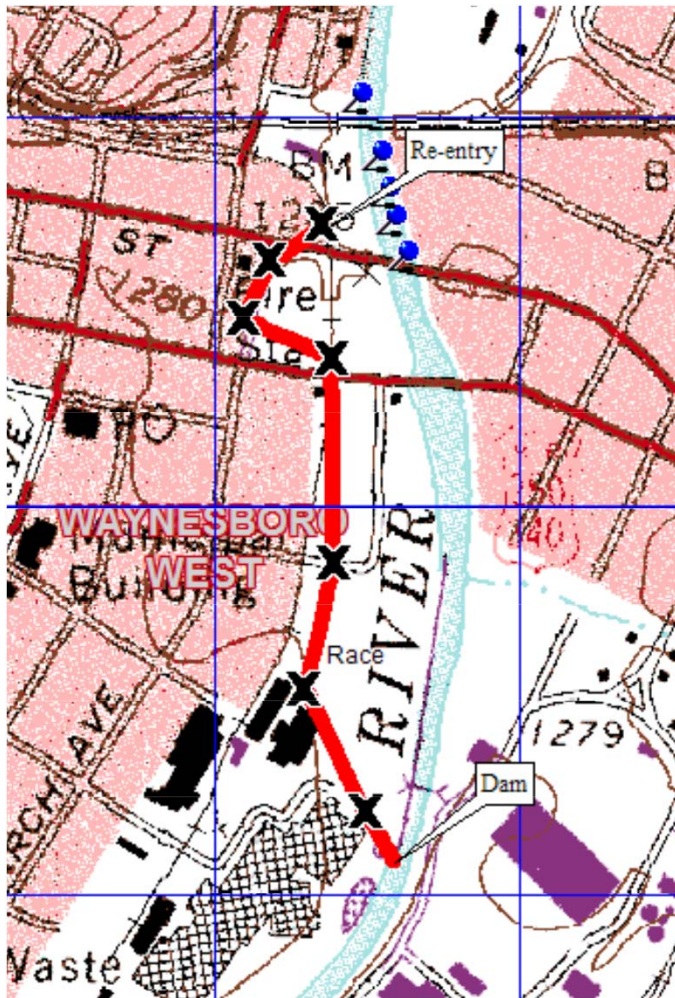
One
Round

Two
Rect.

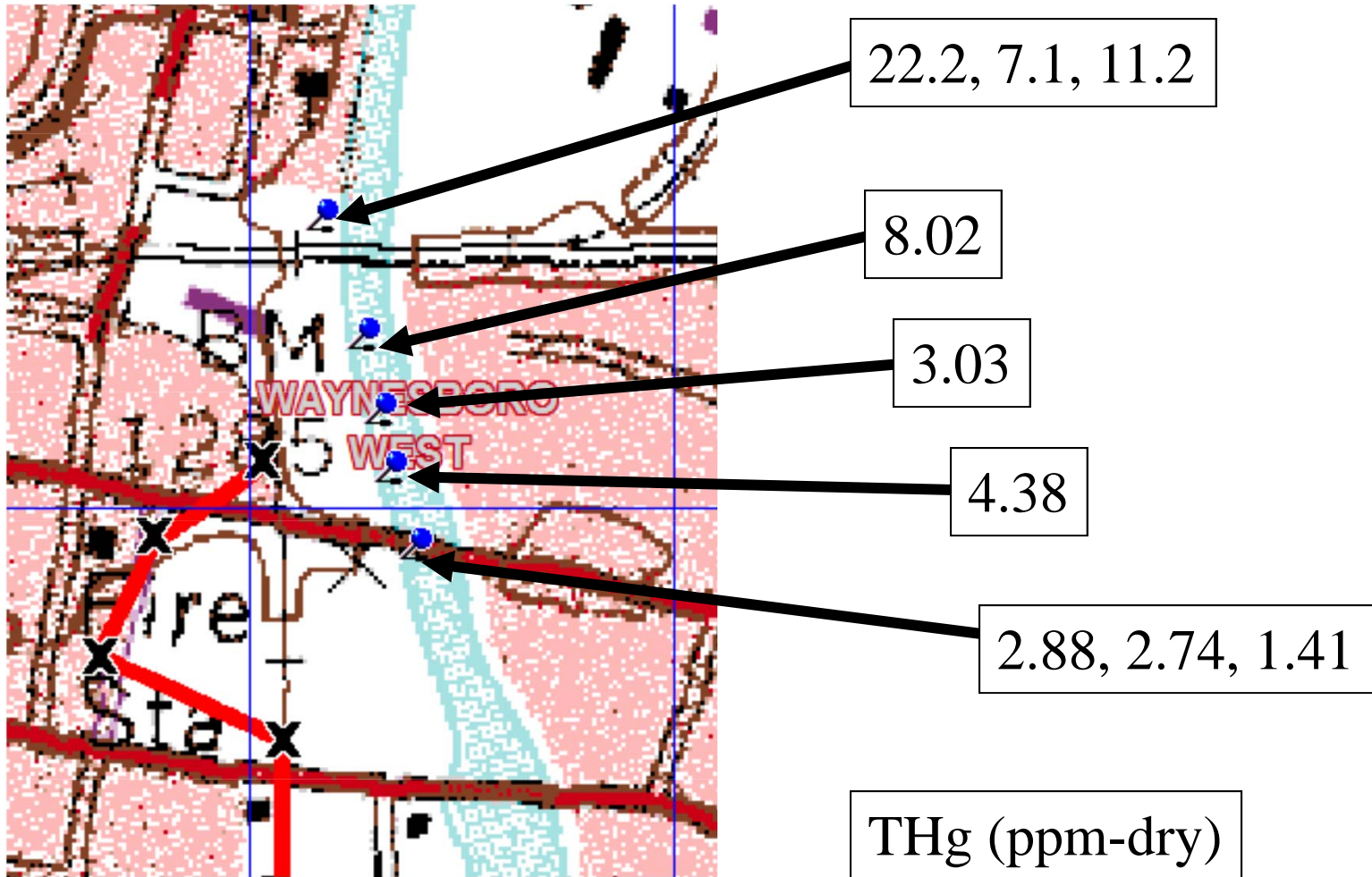


Diss Hg = <1 ng/L
Diss MeHg = <0.022 ng/L

Mill Race Guzzle Locations

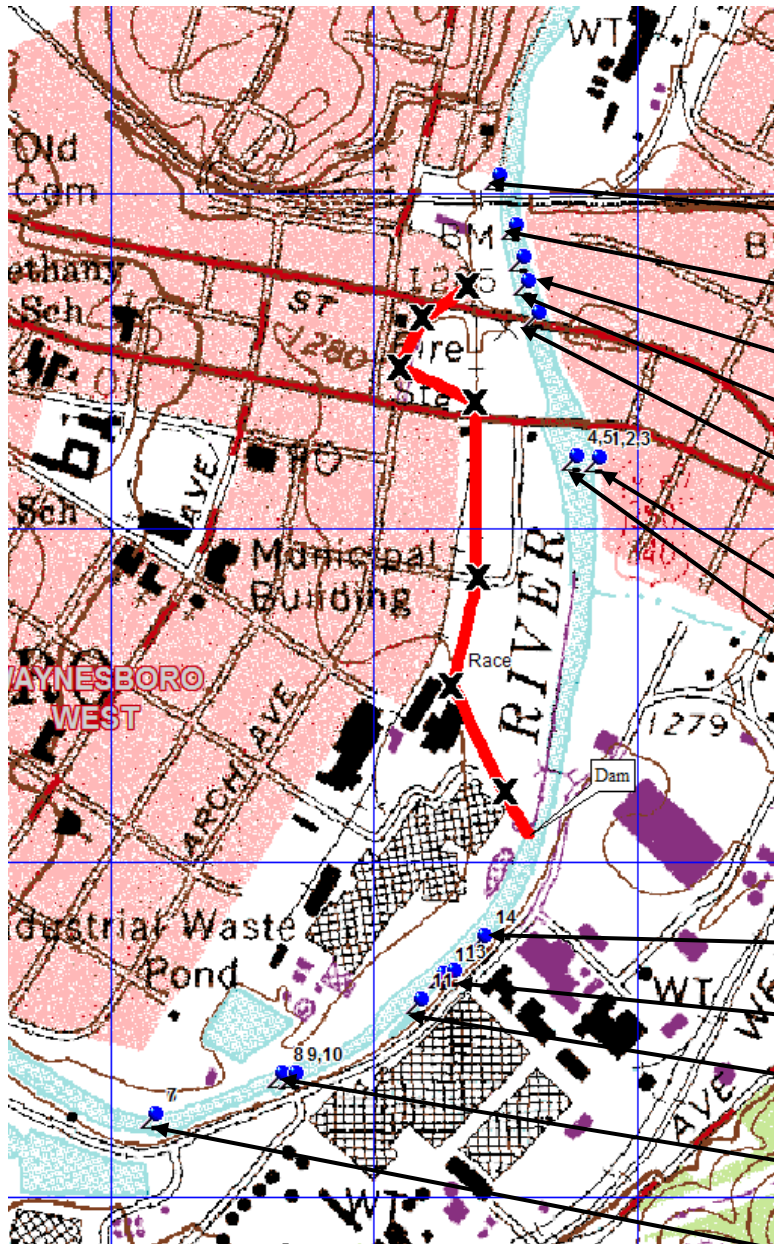


Mill Race Guzzle Results



All Guzzle Results

Near Plant, thru 3/05



THg (ppm-dry)

22.2, 7.1, 11.2

8.02

3.03

4.38

2.88, 2.74, 1.41

1.01, 4.55, 3.37

7.25, 2.72

.66

< .20, < .16

3.34

<0.16, 1.31

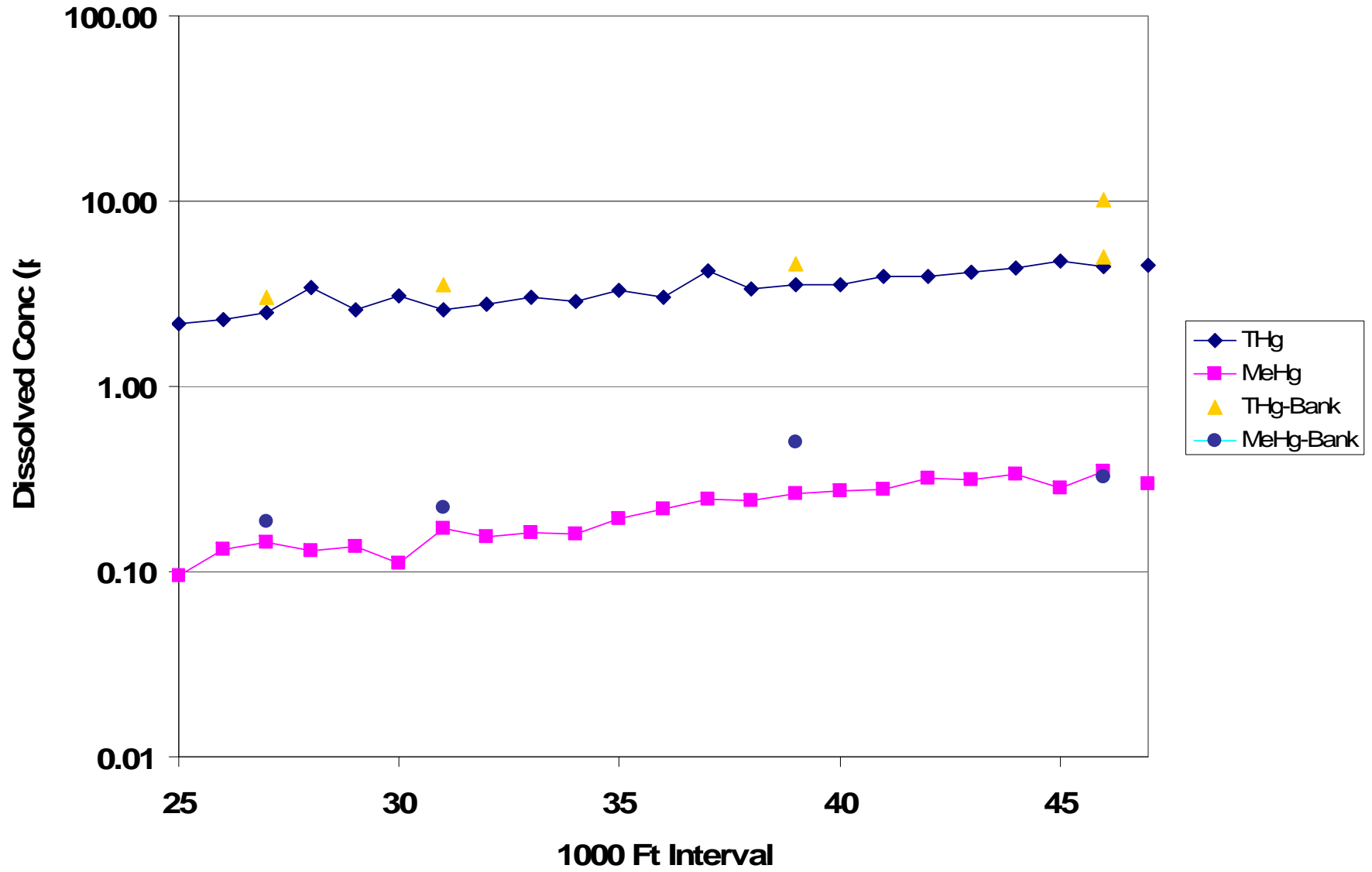
2.92, .28, .61

Historic Dam Location

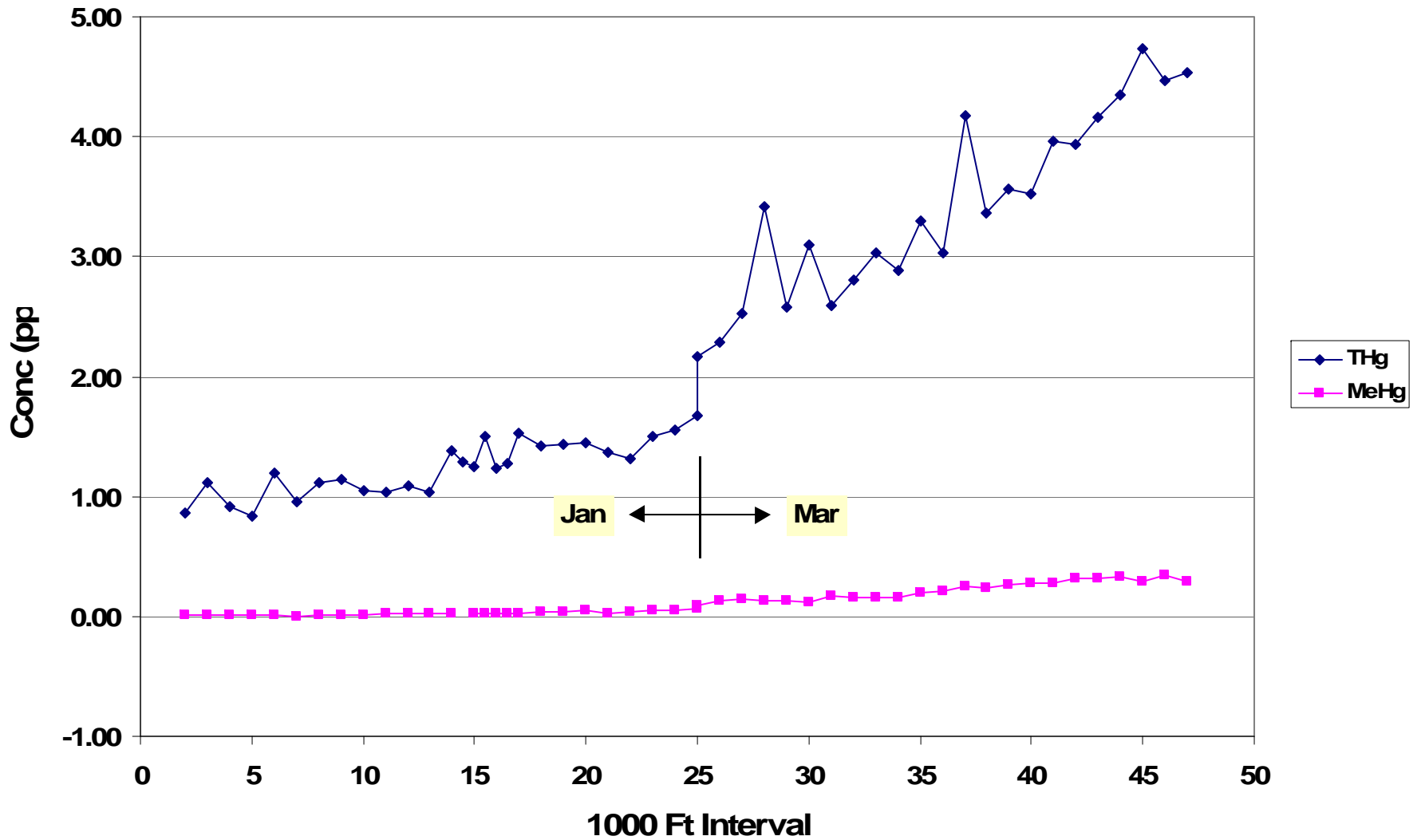
Probable Remnant



Hg vs 1000 Ft Interval



Jan & Mar 05 Float Data

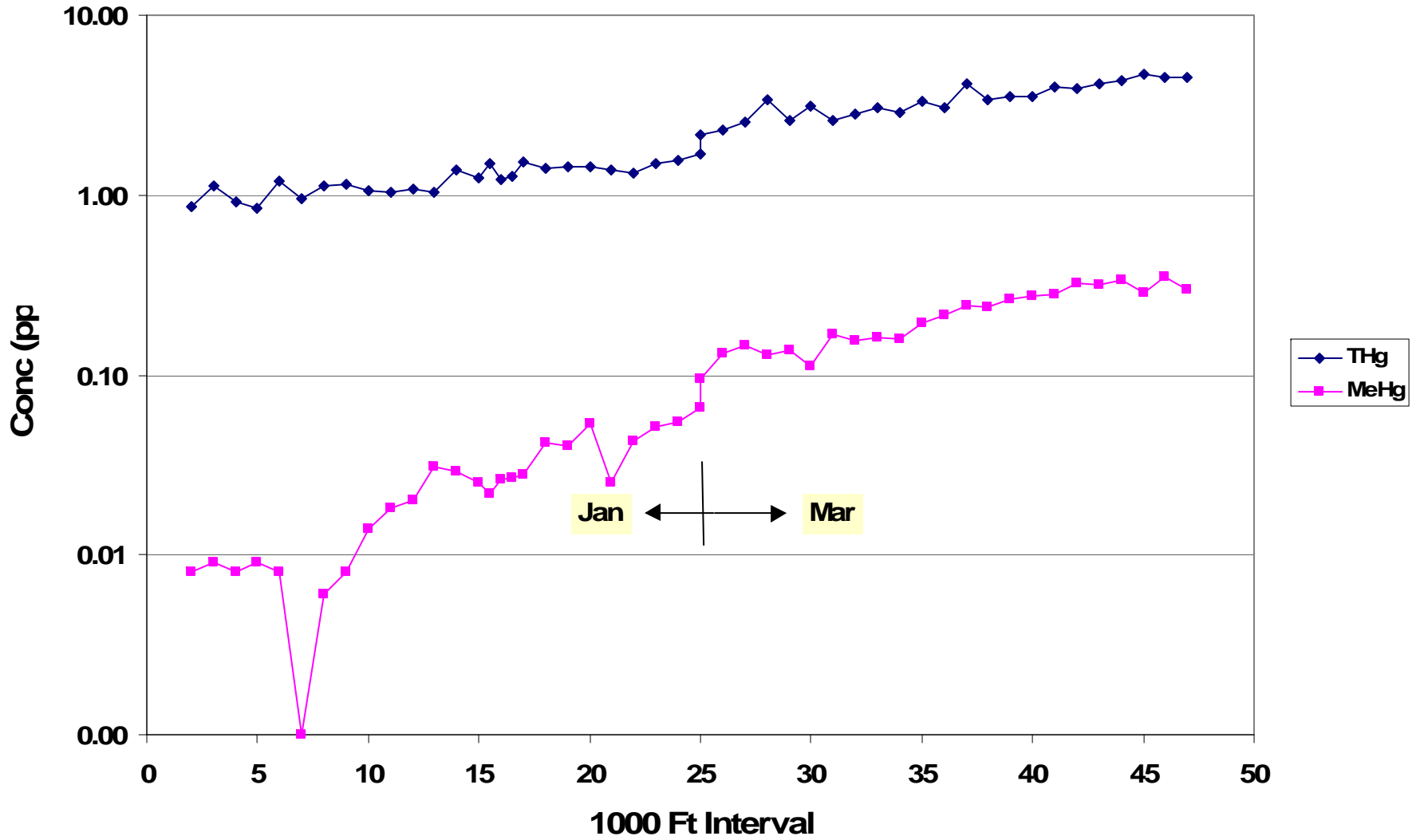


DuPont

Dooms

Crimora

Jan & Mar 05 Float Data

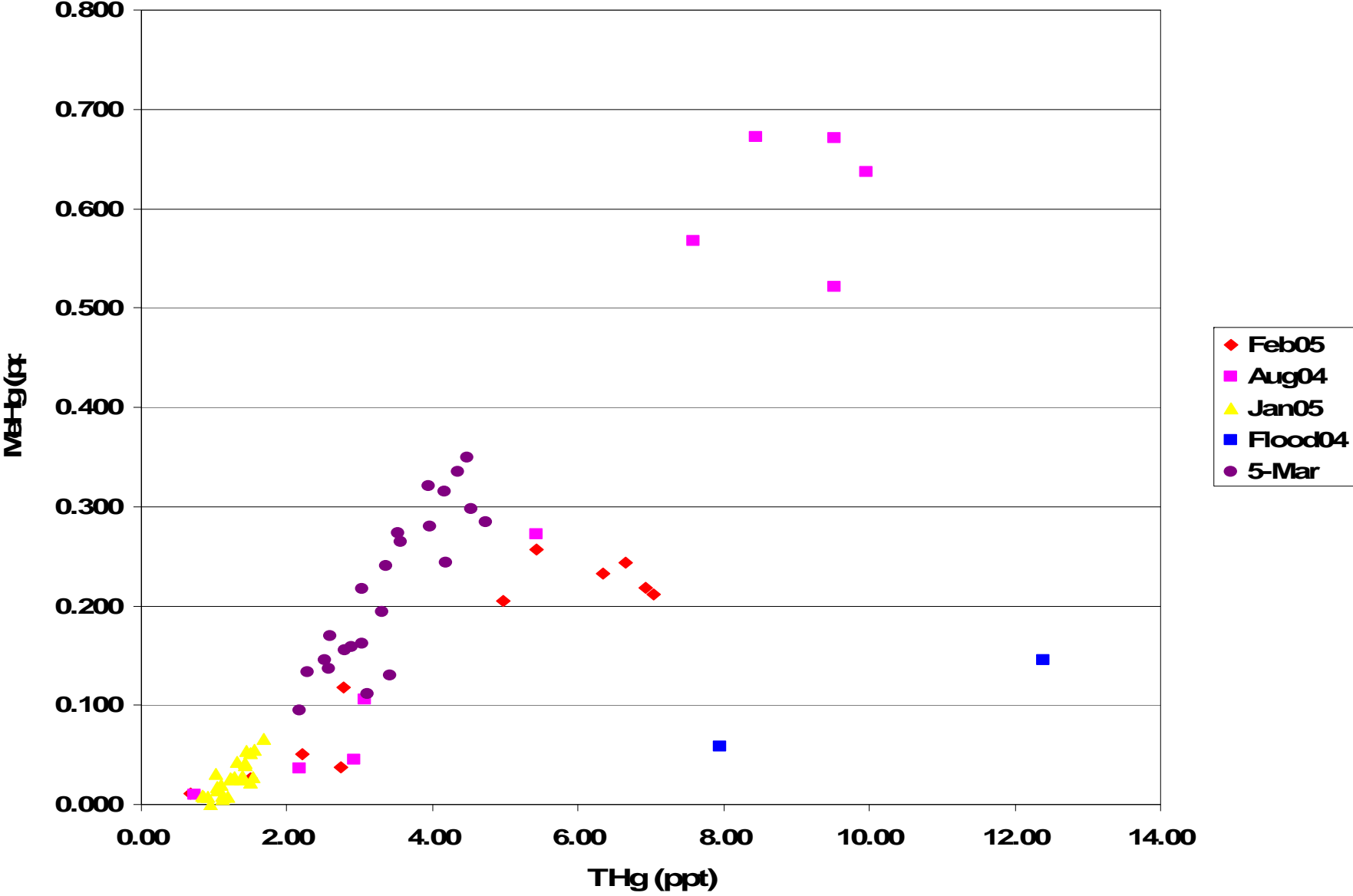


DuPont

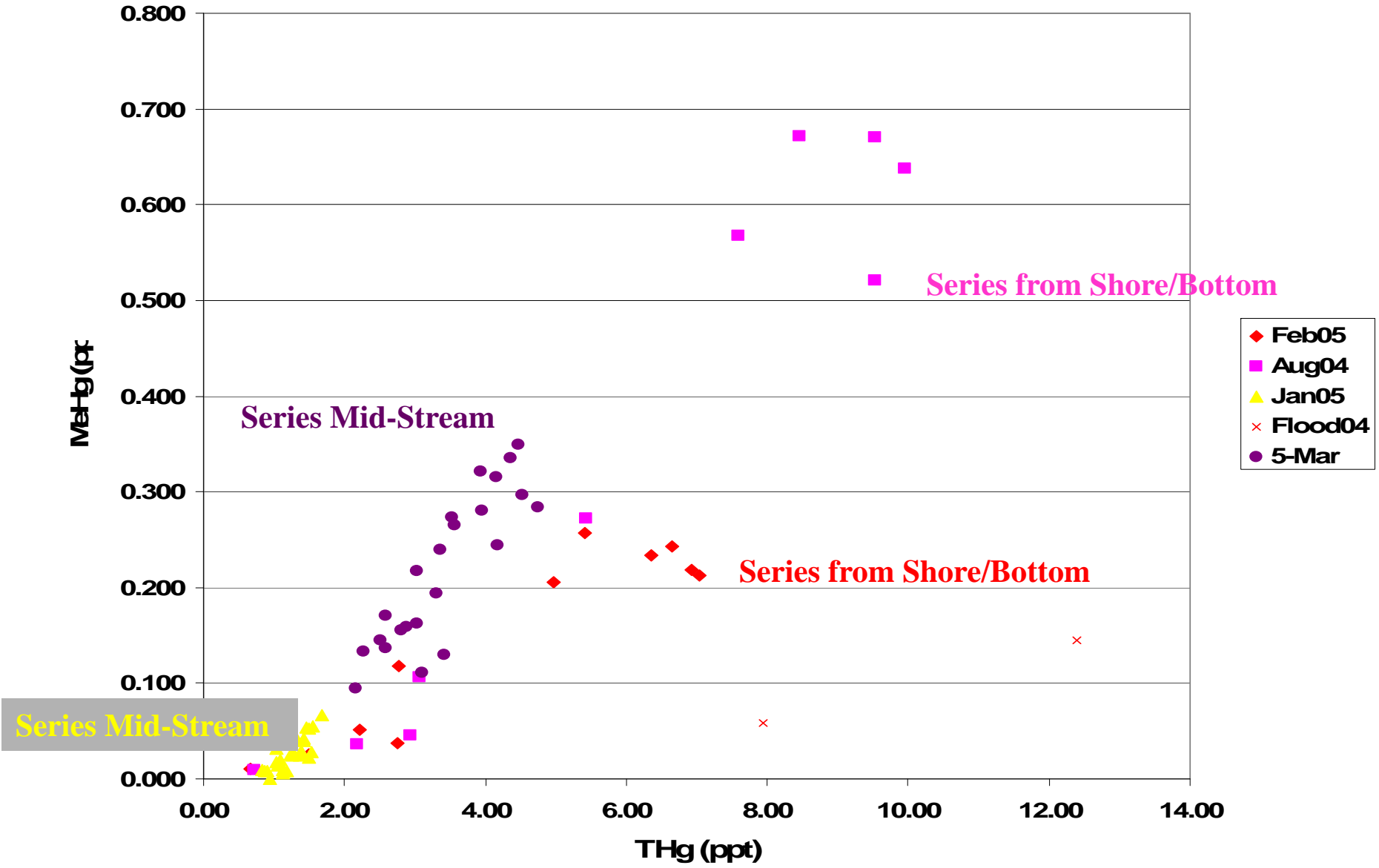
Dooms

Crimora

MeHg vs THg (Diss)

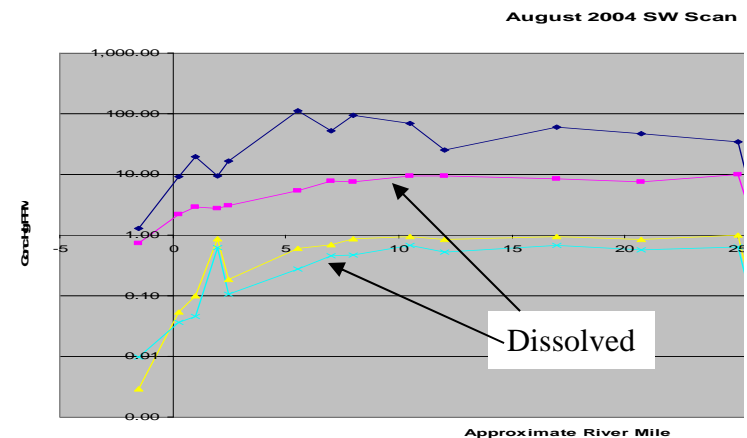


MeHg vs THg (Diss)



The River as a Very Large Flux Chamber

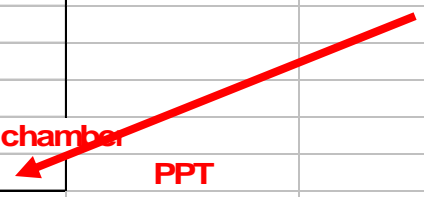
- Basis...
 - August 04 dissolved water data, THg & MeHg
 - Linear discharge profile, USGS : Harriston
 - Average river width: 70 ft
 - River length: 26.5 miles USGS to Port Republic
 - Flux chamber is 1 foot cube with 1 SF opening



The River as a Very Large Flux Chamber

Station	RM	Hg-T	MeHg	Flow (cfs)		LB/Day	Hg-T Flux (GWDay)	MeHg Flux (GWDay)	Hg-T Input	MeHg Input	
USGS above plant	-1.5	0.73	0.010	40	40.00	215,758,080	0.07140	0.00094	mg/day	mg/day	
Constitution Park	0.25	2.17	0.036		43.69	235,657,389	0.23250	0.00385	161.09587	2.90893	
North Park	1	2.93	0.045		45.27	244,185,665	0.32469	0.00499	92.19596	1.14220	
Basic Park	2.5	3.07	0.106		48.43	261,242,216	0.36445	0.01257	39.75445	7.57875	
Dooms	5.5	5.43	0.273		54.76	295,355,318	0.72839	0.03655	363.94045	23.97710	
Farm	7	7.79	0.450		57.92	312,411,869	1.10511	0.06387	376.72235	27.31976	
Betw Dooms & Crimora	8	7.48	0.474		60.03	323,782,902	1.09977	0.06974	-5.34207	5.86778	
Crimora	10.5	9.53	0.671		65.30	352,210,487	1.52405	0.10727	424.28292	37.53362	
Forestry Station	12	9.53	0.521		68.46	369,267,038	1.59786	0.08737	73.80549	-19.90113	
Harriston	17	8.45	0.672		79	79.00	426,122,208	1.63519	0.12998	37.33488	42.61095
Grand Caverns	20.7	7.59	0.568			86.80	468,195,034	1.61321	0.12071	-21.98073	-9.27490
Port Republic	25	9.96	0.637			95.86	517,090,480	2.33880	0.14959	725.58667	28.88837
Station	RM	Hg-T Input	MeHg Input	mg/s/day	mg/s/day	PPT MeHg in Day					
USGS above plant	-1.5	mg/day	mg/day	Hg-T	MeHg						
Constitution Park	0.25	161.09587	2.90893	2.49E-04	4.50E-06	0.1588					
North Park	1	92.19596	1.14220	3.33E-04	4.12E-06	0.1454					
Basic Park	2.5	39.75445	7.57875	7.17E-05	1.37E-05	0.4825					
Dooms	5.5	363.94045	23.97710	3.28E-04	2.16E-05	0.7633					
Farm	7	376.72235	27.31976	6.80E-04	4.93E-05	1.7395					
Betw Dooms & Crimora	8	-5.34207	5.86778	-1.45E-05	1.59E-05	0.5604					
Crimora	10.5	424.28292	37.53362	4.59E-04	4.06E-05	1.4339					
Forestry Station	12	73.80549	-19.90113	1.33E-04	-3.59E-05	-1.2671					
Harriston	17	37.33488	42.61095	2.02E-05	2.31E-05	0.8139					
Grand Caverns	20.7	-21.98073	-9.27490	-1.61E-05	-6.78E-06	-0.2394					
Port Republic	25	725.58667	28.88837	4.57E-04	1.82E-05	0.6416					
River is	70	ft wide.		Avg	2.45E-04	1.35E-05	0.4757	PPT			

For 1 ft cube flux chamber



Site of Old McGaheysville Dam

