

# Amended Flux Chambers Results from Sept 2007

Turner/Jensen

# Deployed Two Mud Chambers



# Purposes of Experiments

- Building understanding of methylation
- Supply of inorganic mercury for methylation comes from water column?
- How do much higher and much lower water column total mercury affect flux/methylation?
- How does much higher sediment mercury affect methyl flux/production?
- Can manipulations affect methyl production?

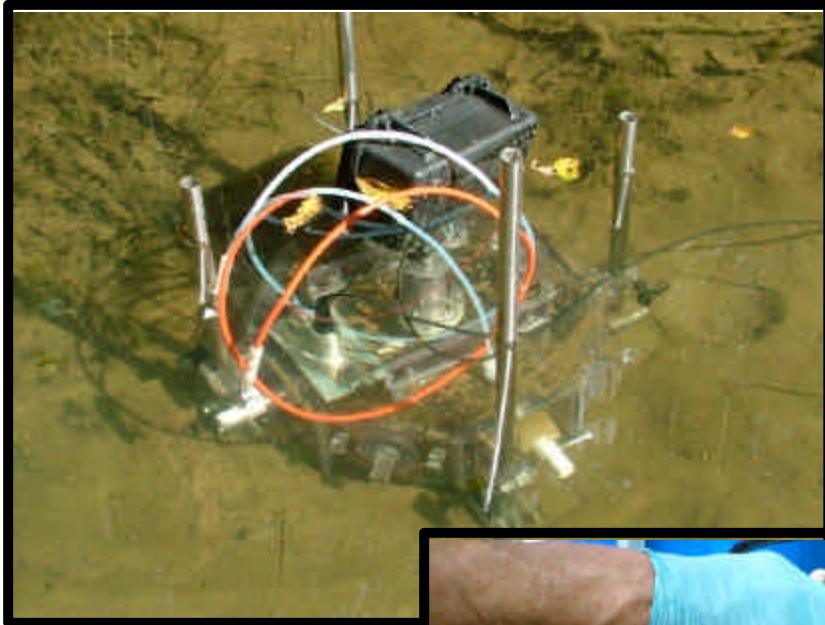
# Amended Flux Chambers

Sept 07

- Day 1 - Both unamended
- Day 2
  - #1: Highly enriched soil extract (17X increase)
    - 20X dilution of 9000 ng/L THg, 2.22 ng/L
  - #2: Total replacement with “clean” water from Lyndhurst (35% reduction in filter-passing THg)
- Day 3
  - #1: Soil slurry from elevated Hg bank at Basic Park (3X increase in sediment THg)
  - Acclimated overnight before closing

# Photos of Methods

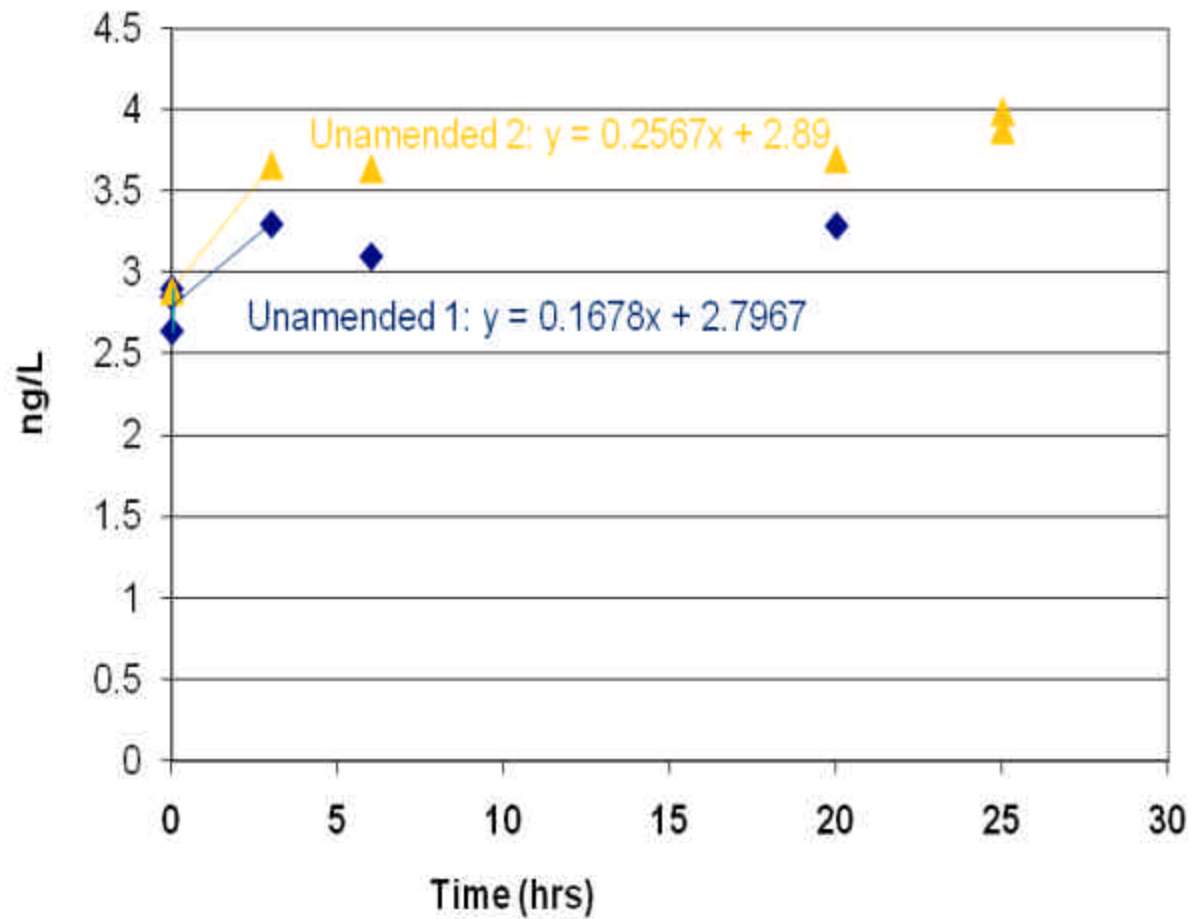
Feed/sample tubes, feed pump, filter funnel

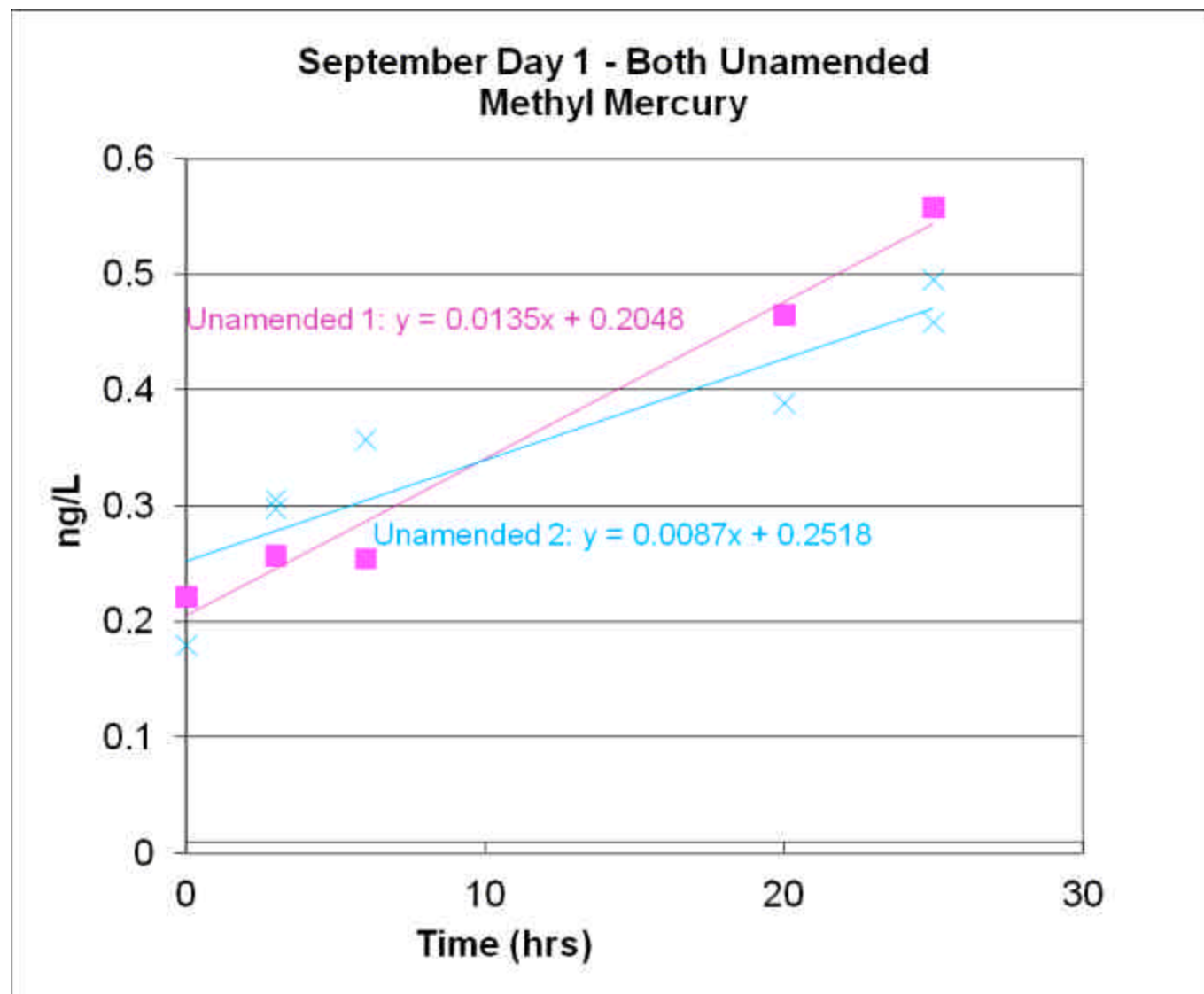


# Other Methods

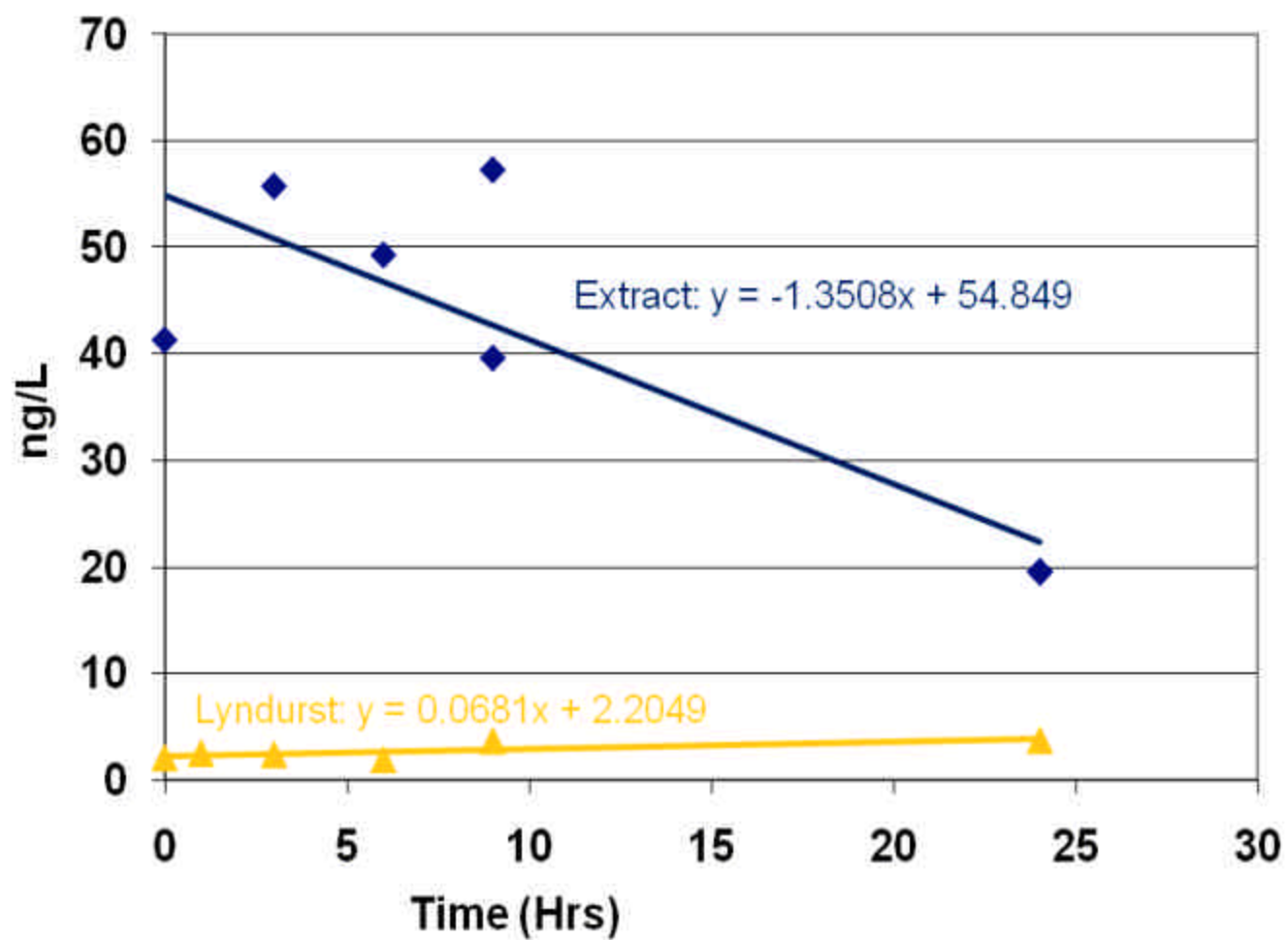
- For clean water exchange, diaphragm pump used to deliver several chamber volumes from large carboy of filtered Lyndhurst Avenue water.
- For soil addition, a slurry was prepared and delivered via funnel and large PVC tube to multiple chamber ports. Slurry allowed to settle and acclimate overnight before beginning experiment in morning.
- Sampling methods the same.
- Full day allowed between experiment days.

### September 2007 Day 1 - Both Unamended Total Mercury

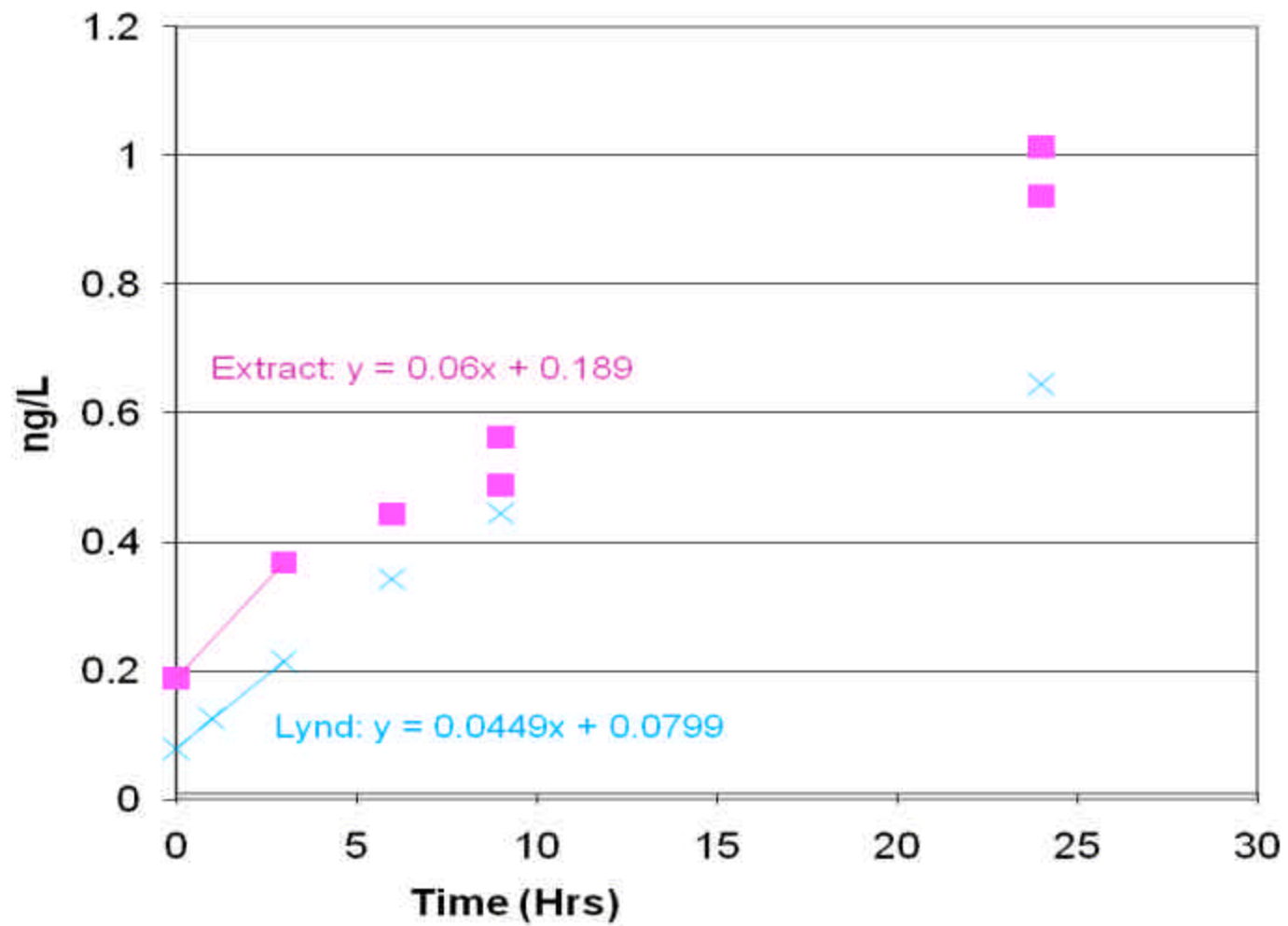




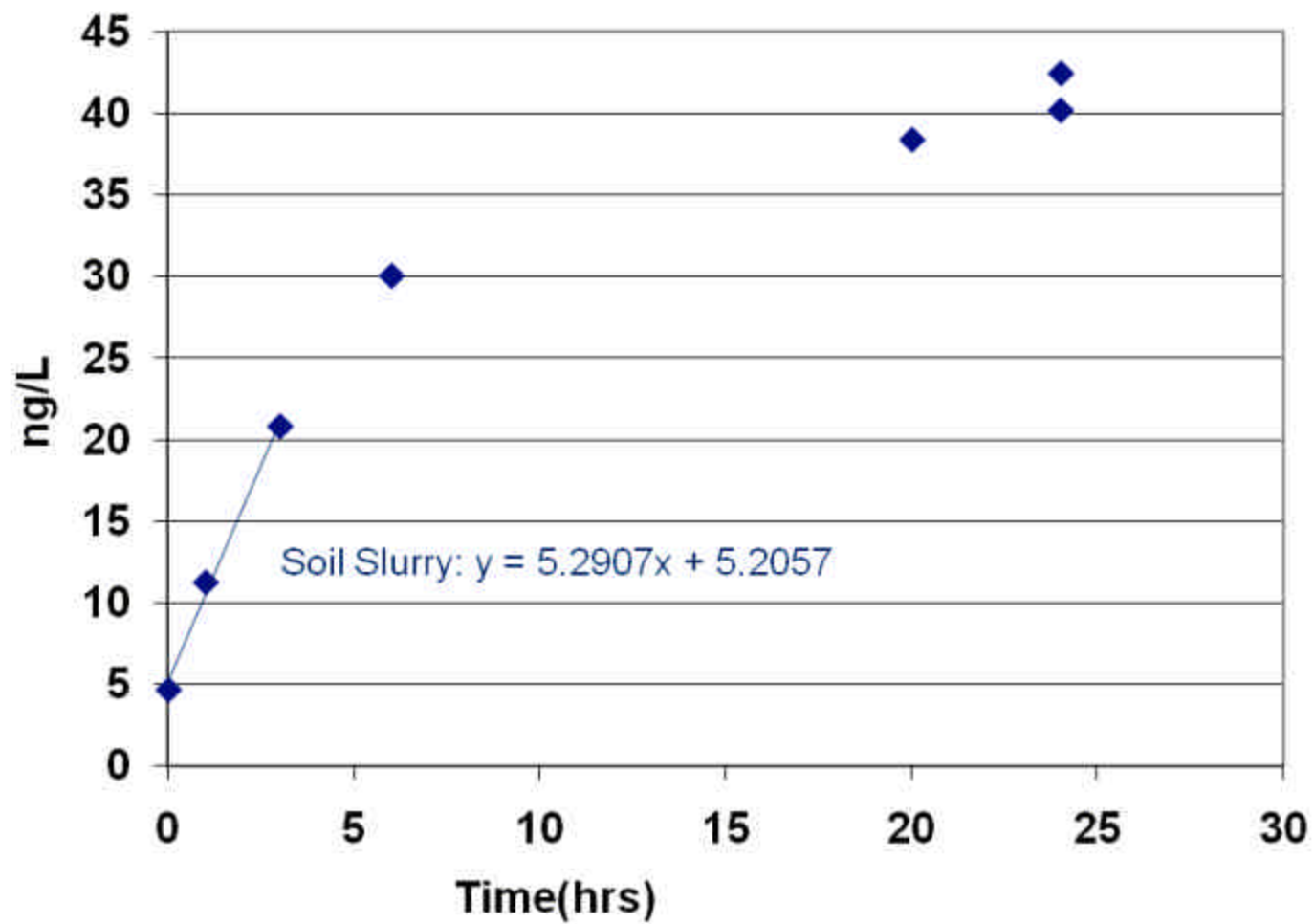
### September 2007 Day 2 - Extract & Lyndhurst Water Total Mercury



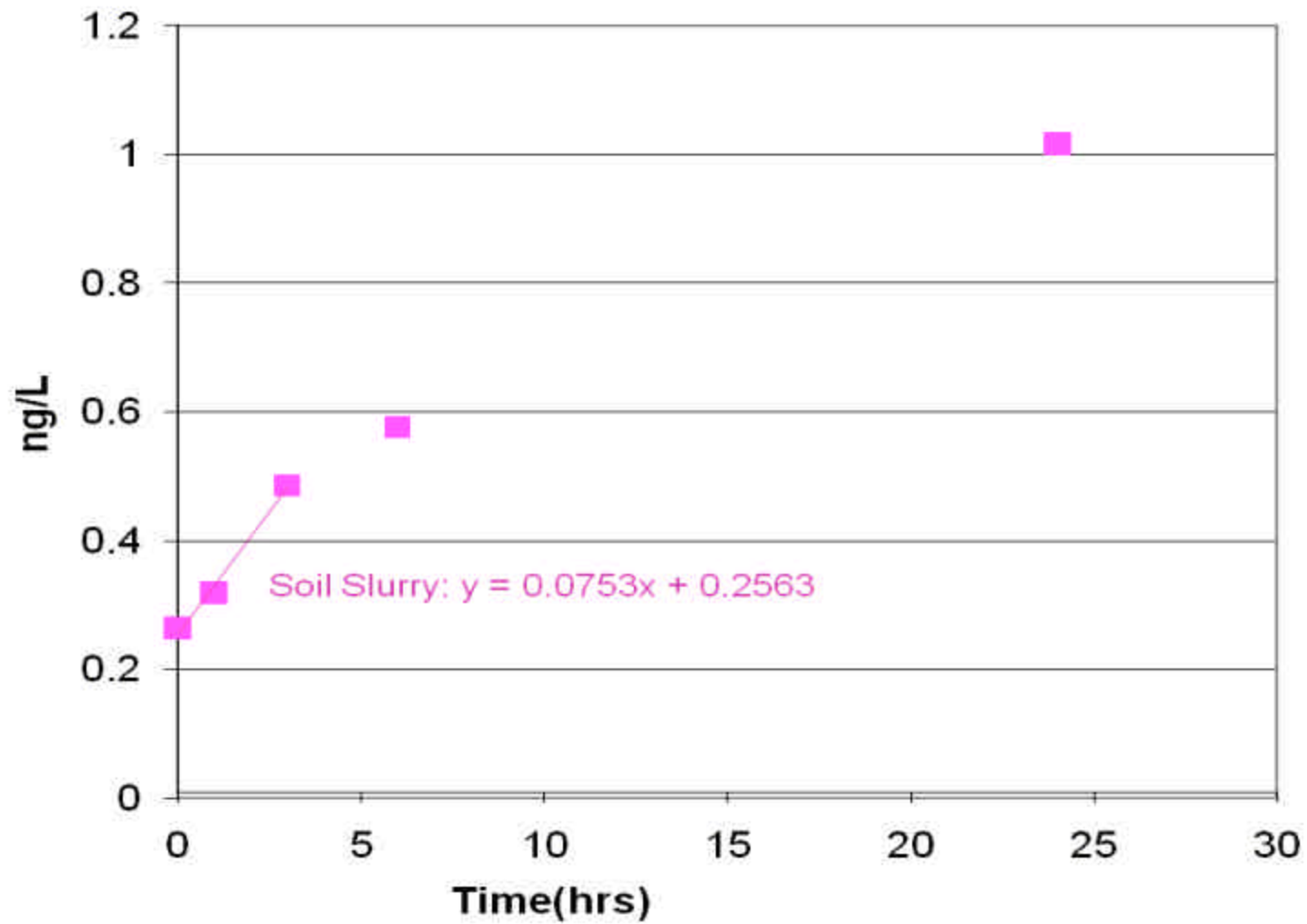
### September Day 2 - Extract & Lyndhurst Water Methyl Mercury



September 2007 Day 3 - Soil Slurry  
Total Mercury



**September Day 3 - Soil Slurry  
Methyl Mercury**



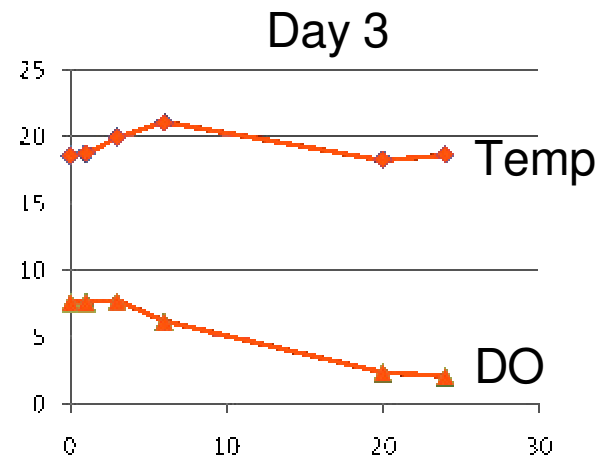
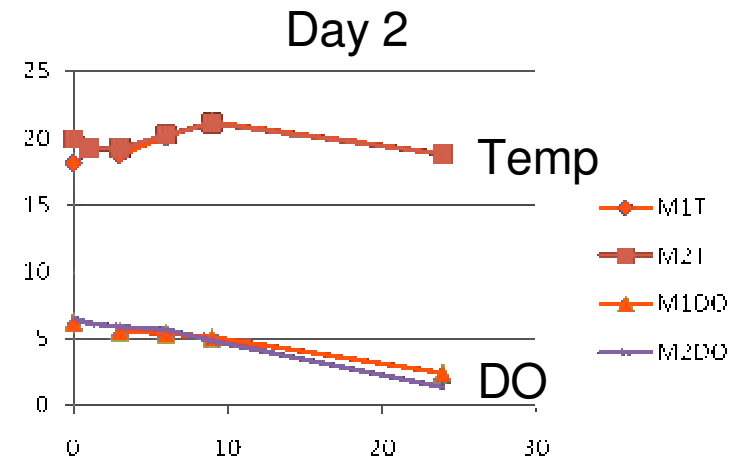
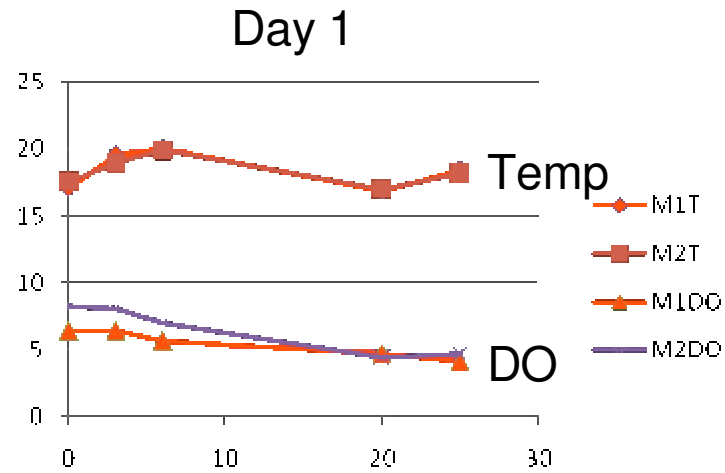
## Calculated Flux Results for September 2007 Amendments

| Total Mercury  |         |           |     |                       |
|----------------|---------|-----------|-----|-----------------------|
| Experiment     | Slope   | Hours     | Day | Flux                  |
|                | ng/L/hr | Regressed |     | ng/m <sup>2</sup> /hr |
| Natural-1      | 0.168   | 3         | 1   | 21.5                  |
| Natural-2      | 0.257   | 3         | 1   | 32.9                  |
| Extract        | -1.351  | 24        | 2   | -172.9                |
| LYND           | 0.068   | 24        | 2   | 8.7                   |
| Soil           | 5.291   | 3         | 3   | 677.2                 |
| Methyl Mercury |         |           |     |                       |
| Experiment     | Slope   | Hours     | Day | Flux                  |
|                | ng/L/hr | Regressed |     | ng/m <sup>2</sup> /hr |
| Natural-1      | 0.014   | 24        | 1   | 1.7                   |
| Natural-2      | 0.009   | 24        | 1   | 1.1                   |
| Extract        | 0.060   | 3         | 2   | 7.7                   |
| LYND           | 0.045   | 3         | 2   | 5.7                   |
| Soil           | 0.074   | 3         | 3   | 9.5                   |

**Results of Sediment Beneath Chambers on Day 3 (ng/g, dry)**

| Location                             | THg         | MHg       |
|--------------------------------------|-------------|-----------|
| Inside M1                            | 6,171/6,834 | 10.4      |
| Outside M1                           | 21,710      | 18.9/15.8 |
| Inside M2                            | 9,244       | 16.8      |
| Outside M2                           | 15,498      | 26.4      |
| Bank soil for slurry delivered to M1 | 61,041      | 5.512     |

# Temp & DO



# Amended Flux Summary

- Responses to THg in overlying water
  - 17X increase yielded a 5X increase in MeHg flux
  - 35% decrease seemed to **increase** MeHg flux
- Soil slurry produced highest MeHg flux
- Plateau-ing may be due to redox changes at interface (DO decline?) but
- Amended flux results difficult to interpret
  - Unaccounted for loss of THg from soil extract
  - Too many choices when calculating flux
  - Inside/Outside soils – no explanation

# Next Steps

- MHg-free amendments would be helpful
- A “sterile” or “SRB-inhibited” test might be informative
- Repeat soil extract amendments in April/May when apparent river-wide methylation rates highest