



# *Using Hybrid Poplar to Meet "No Further Action" Criteria for an Organic Solvent Site*

**Craig L. Just**

VP for Research and Commercial Development  
Ecolotree

Co-author, Louis A. Licht  
Ecolotree President





# Outline

- What is “No Further Action”
- Challenges to “No Further Action”
- Environmental Liability and “No Further Action”
- Central Iowa Solvent Spill Site
- “Significant” Contaminant Removal
- Conclusions





## *What is No Further Action?*

- “No Further Action” status is a desirable goal for responsible parties at cleanup sites
  - Regulatory acknowledgement that human health and the environment is protected for a *given use*
  - A definite corrective action *end date* is in place
  - Property *use restrictions* are documented



# Challenges to “No Further Action”

- Protection of human health and the environment must be ensured
- Many can benefit from well-written NFA letters
  - Responsible parties, regulators, landowners, investors, lenders
- But, NFA letters are often filled with non-specific caveats
  - “No further action *at this time*”
  - “No further action *but case may reopened*”
- Clear regulatory triggers are needed



# *Environmental Liability and NFA*

- Regulators are reluctant to grant letters of NFA fearing interpretation as an end to environmental liability
  - Responsible parties view the letter as signifying the end of *corrective action* with consideration for site conditions and restricted uses
  - Environmental liability still remains should site conditions change or if new uses are proposed

Our news snippet culture is a problem for NFA:  
*“No Further Action Status Granted to Toxic Waste Site”*

<http://www.epa.gov/swerust1/rbdrm/nfalettr.htm>





## *Phytoremediation and NFA*

- Without NFA status, interested parties are likely to push for cleanup strategies more aggressive than phytoremediation
- The additional expense of more aggressive technologies may cause unnecessary economic hardship
- Phytoremediation will have to continually prove itself as a worthwhile technology for solvent spill sites.





# *Central Iowa Solvent Spill Site*

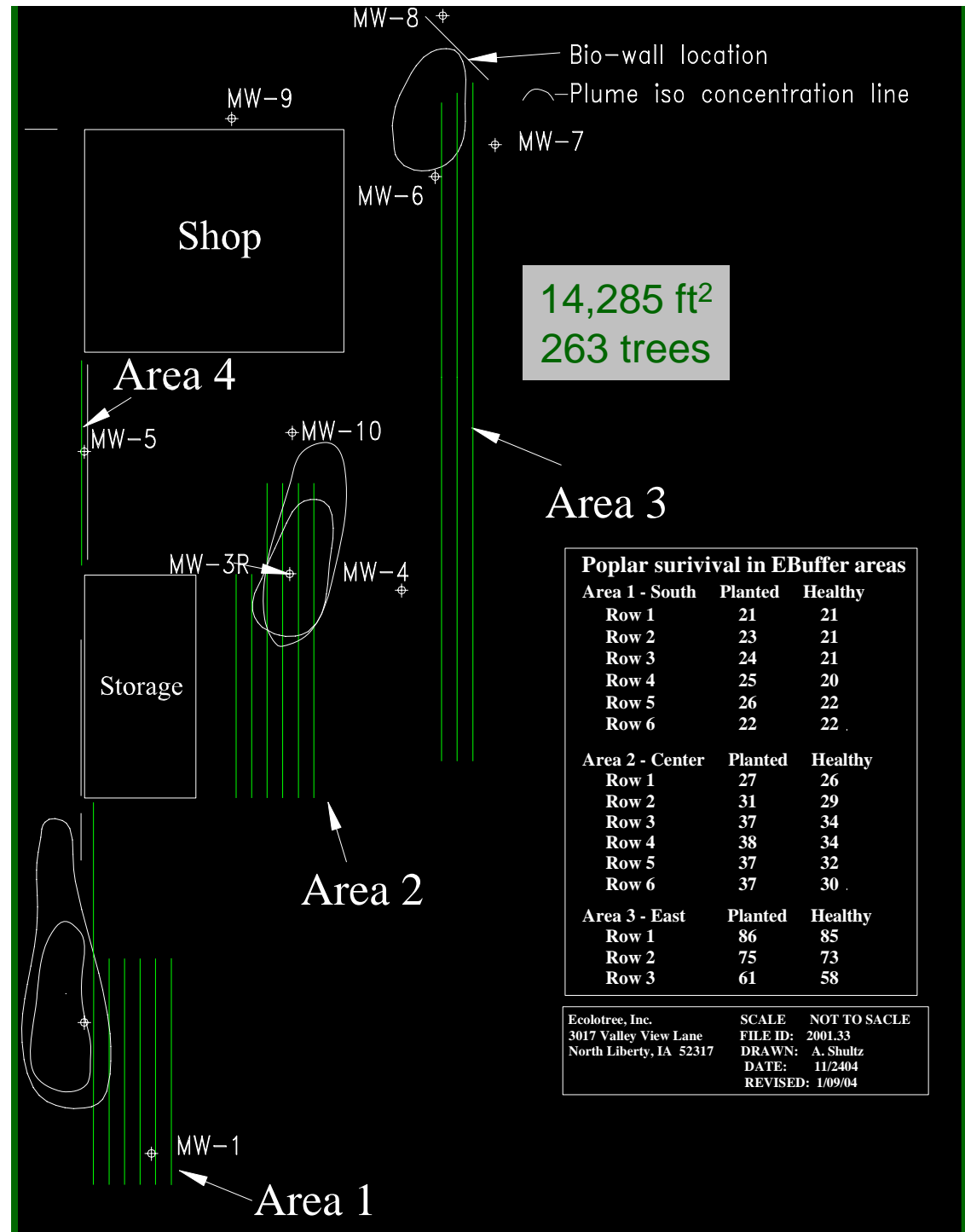
- Phase I and Limited Phase II Assessment  
Jan 2001
  - Identified groundwater impact areas (PCE, BTEX)
- Three distinct source areas:
  - Area one - PCE
  - Area two - highest PCE and some BTEX
  - Area three - PCE near property line (biowall installation)





# Central Iowa solvent spill site remediated with Ebuffers®

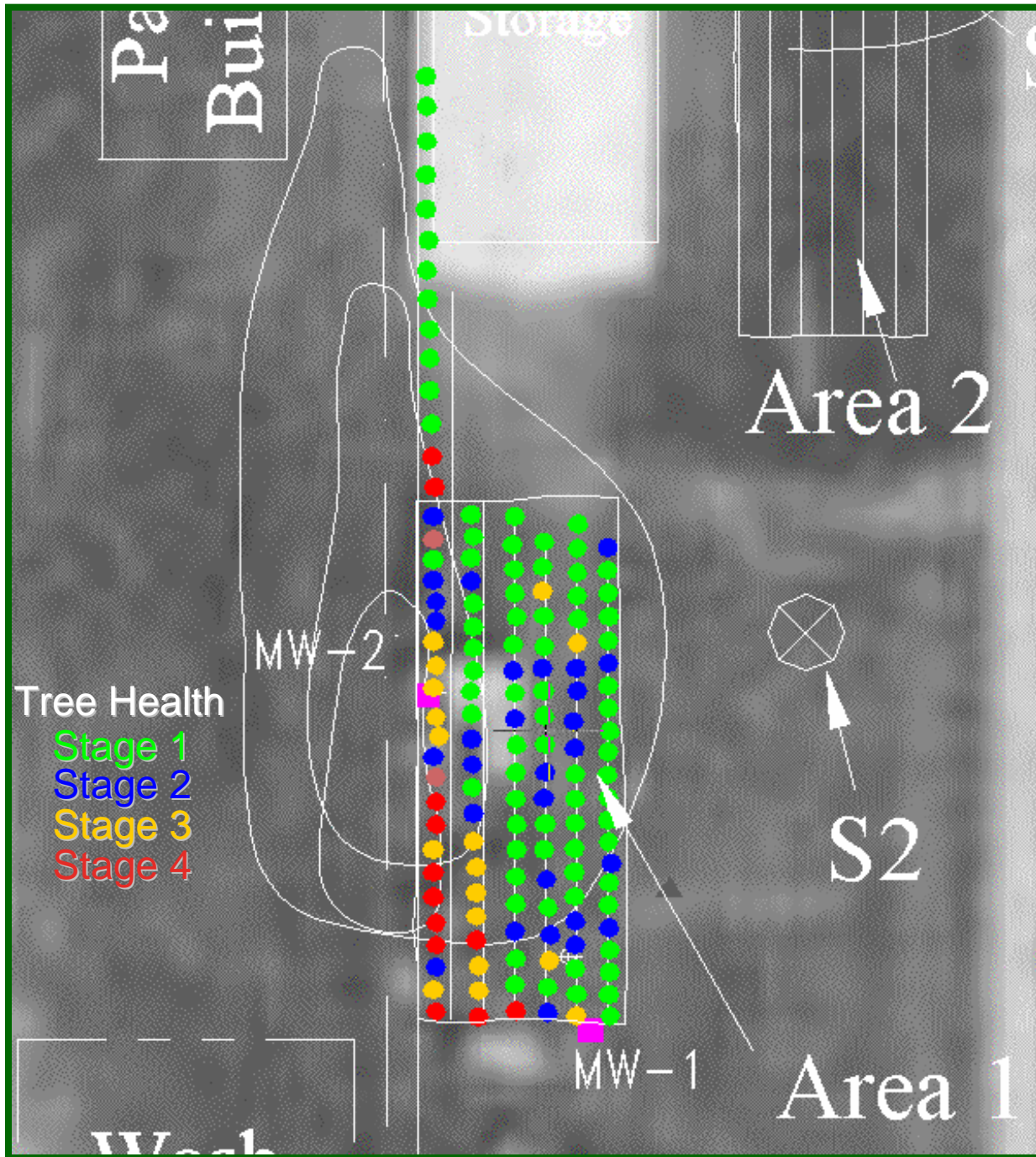
- GW = 11-14 ft bgs
- GW flow = NE
- Fine and medium grain sands
- Tight clay 13-21 ft bgs



Ecolotree, Inc.  
 3017 Valley View Lane  
 North Liberty, IA 52317

SCALE NOT TO SCALE  
 FILE ID: 2001.33  
 DRAWN: A. Shultz  
 DATE: 11/24/04  
 REVISED: 1/09/04





## Phytoforensics near monitoring well two

- PCE over 20,000 ug/L initially (MCL=5)
- Toxic effects to trees were evident





# *Monitored Natural Attenuation*

- “Source control and long-term performance monitoring will be fundamental components of any monitored natural attenuation (MNA) remedy”
- “MNA should not be considered a default or presumptive remedy at any contaminated site”
  - sound technical analyses which provide confidence in natural attenuation’s ability to achieve remediation objectives
  - performance monitoring
  - contingency (or backup) remedies where appropriate

# *Requirements for No Further Action*

- Historical groundwater and/or soil chemistry data that demonstrate **a clear and meaningful trend** of decreasing contaminant mass and/or concentration over time at appropriate monitoring or sampling points.
- Hydrogeologic and geochemical data that can be used to demonstrate **indirectly** the type(s) of natural attenuation processes active at the site, and the rate at which such processes will reduce contaminant concentrations to required levels.
- Data from field or microcosm studies (conducted in or with actual contaminated site media) which **directly** demonstrate the occurrence of a particular natural attenuation process at the site and its ability to degrade the contaminants of concern.



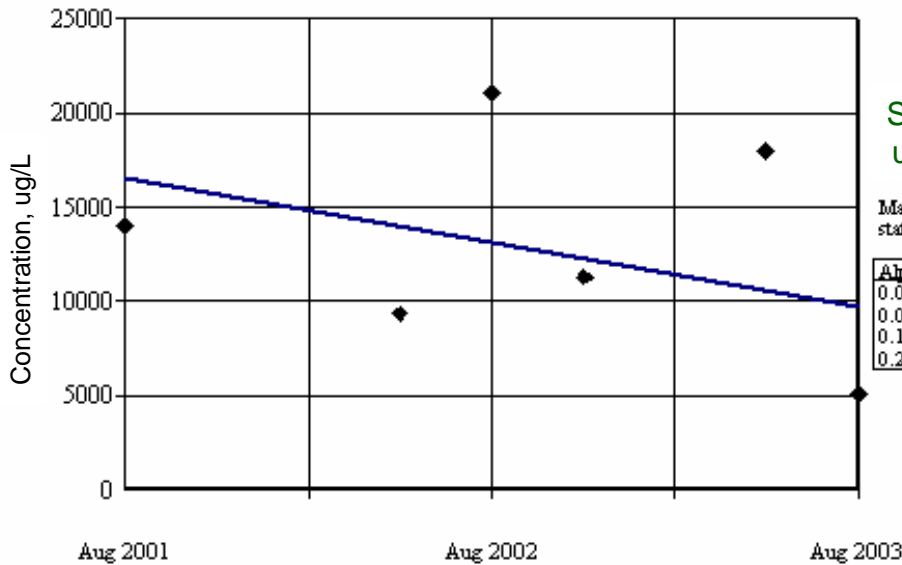
# *Potential Triggers*

- Contaminant concentrations in soil or groundwater at specified locations exhibit an increasing trend not originally predicted during remedy selection
- Near-source wells exhibit **large** concentration increases indicative of a new or renewed release
- Contaminants are identified in monitoring wells located outside of the original plume boundary
- Contaminant concentrations are not decreasing at a **sufficiently rapid rate** to meet the remediation objectives
- Changes in land and/or groundwater **use** will adversely affect the protectiveness of the MNA remedy





### SEN'S SLOPE ESTIMATOR MW3



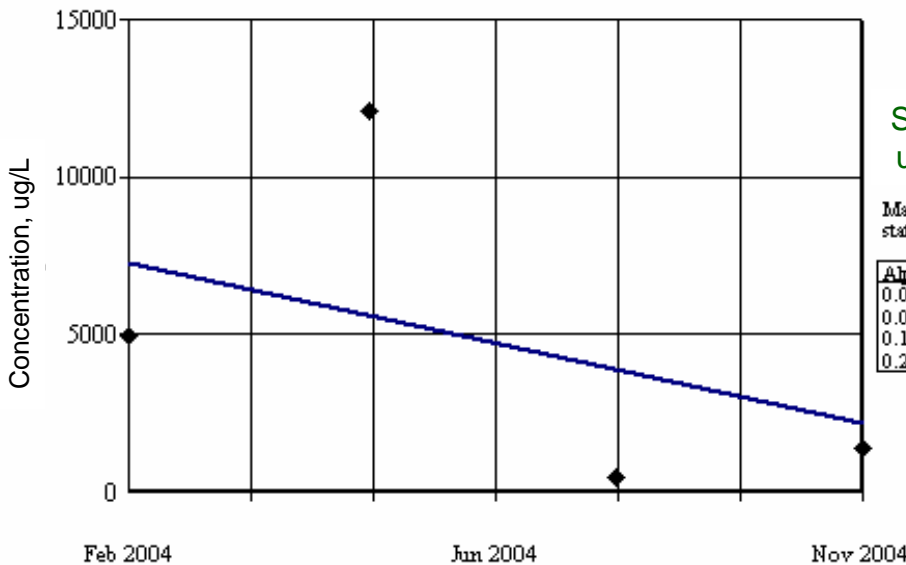
Slope = -3418  
ug/L per year

Mann Kendall  
statistic = -3

Alpha	Critical	Signif.
0.01	-14	No
0.05	-12	No
0.1	-10	No
0.2	-9	No

Tetrachloroethene concentration in groundwater is trending downward in monitoring well three.  
*Is this a sufficiently rapid rate of contaminant decrease?*

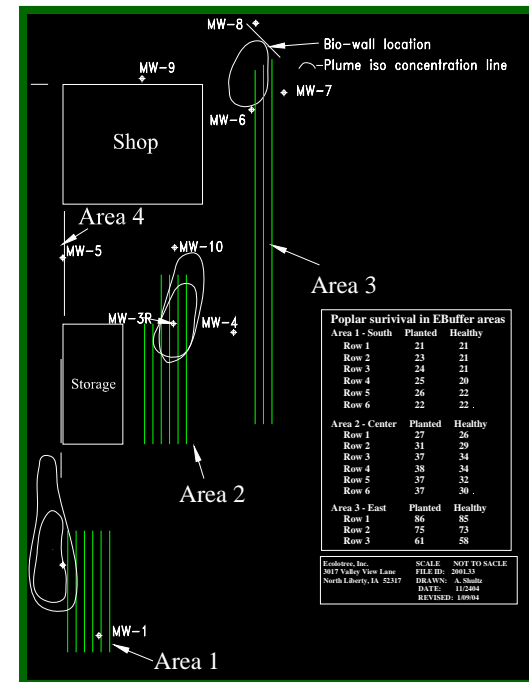
### SEN'S SLOPE ESTIMATOR MW3R



Slope = -6814  
ug/L per year

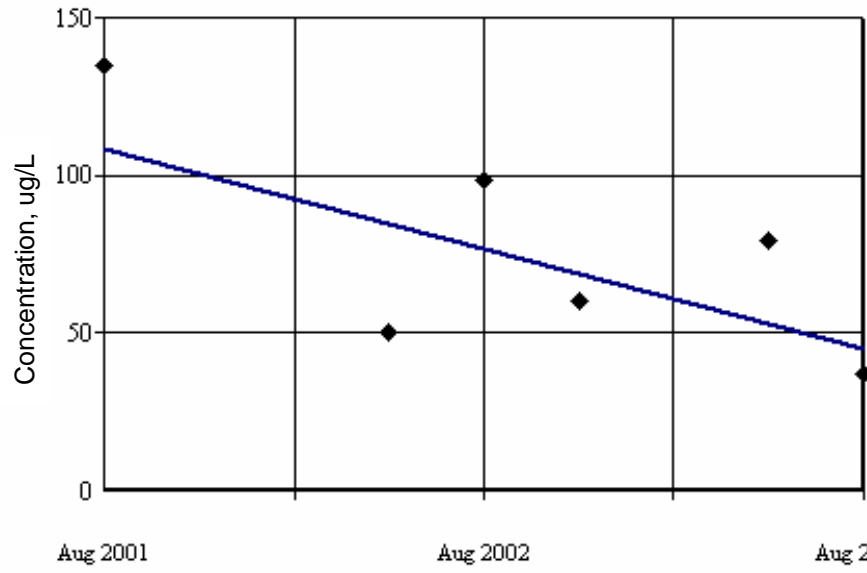
Mann Kendall  
statistic = -2

Alpha	Critical	Signif.
0.01	-8	No
0.05	-8	No
0.1	-6	No
0.2	-6	No





### SEN'S SLOPE ESTIMATOR MW3



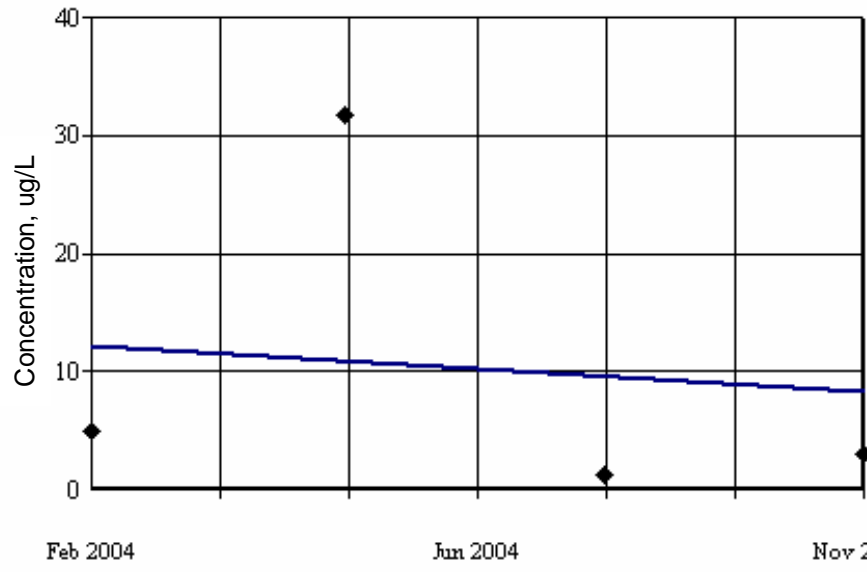
Slope = -32  
ug/L per year

Mann Kendall  
statistic = -.7

Alpha	Critical	Signif.
0.01	-14	No
0.05	-12	No
0.1	-10	No
0.2	-9	No

1,1,1-TCA concentration in groundwater is trending downward at MW3.

### SEN'S SLOPE ESTIMATOR MW3R



Slope = -5.1  
ug/L per year

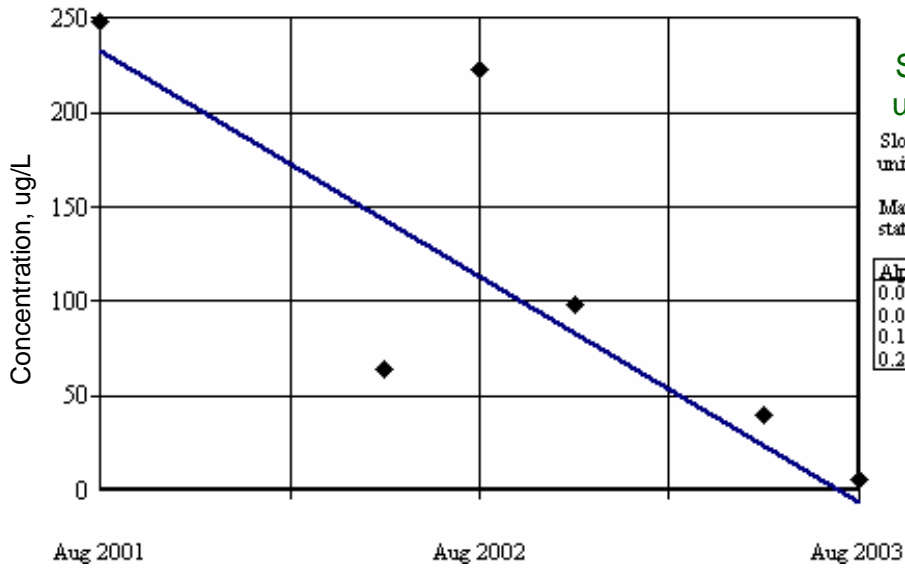
Mann Kendall  
statistic = -.2

Alpha	Critical	Signif.
0.01	-8	No
0.05	-8	No
0.1	-6	No
0.2	-6	No





### SEN'S SLOPE ESTIMATOR MW3



Slope = -120  
ug/L per year

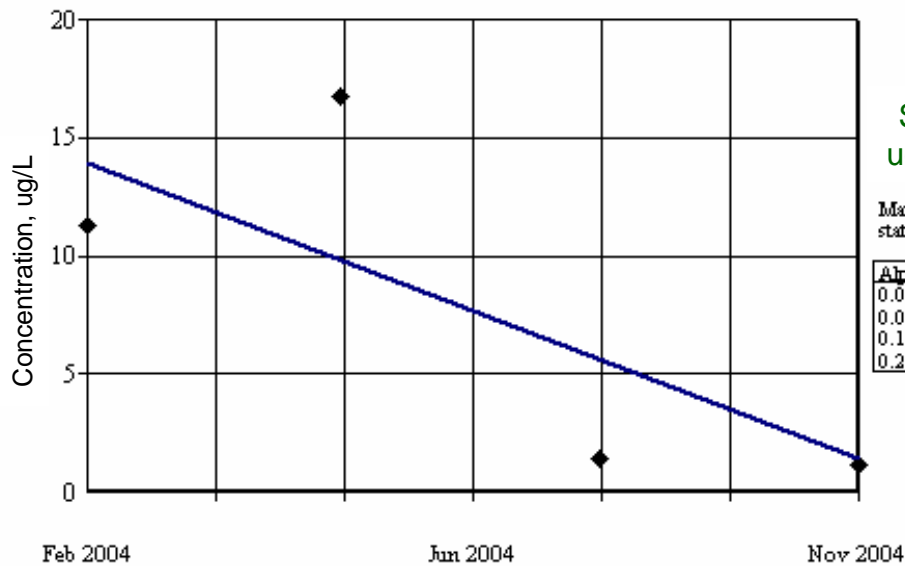
Slope = -119.793  
units per year.

Mann Kendall  
statistic = -11

Alpha	Critical	Signif.
0.01	-14	No
0.05	-12	No
0.1	-10	Down
0.2	-9	Down

Toluene concentration in groundwater is trending downward at MW3.

### SEN'S SLOPE ESTIMATOR MW3R



Slope = -17  
ug/L per year

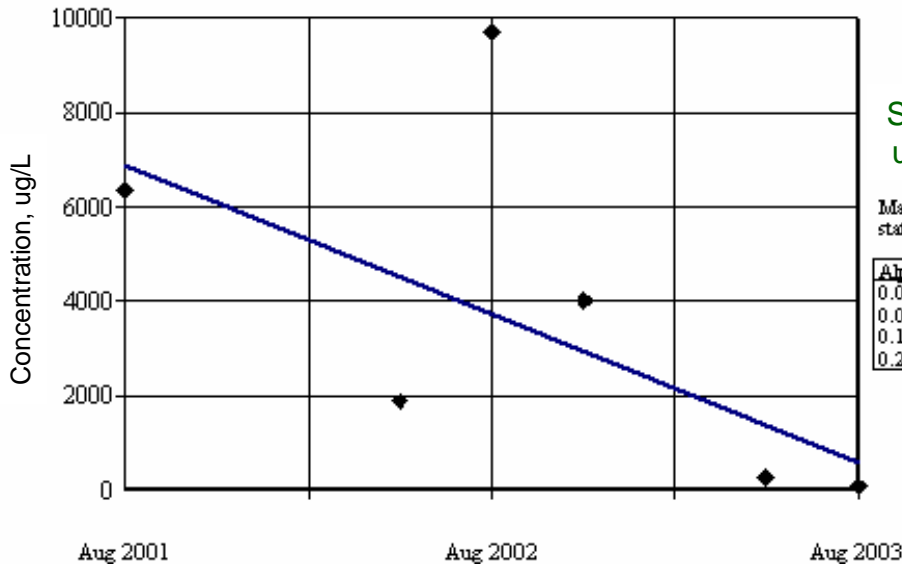
Mann Kendall  
statistic = -4

Alpha	Critical	Signif.
0.01	-8	No
0.05	-8	No
0.1	-6	No
0.2	-6	No





### SEN'S SLOPE ESTIMATOR MW3



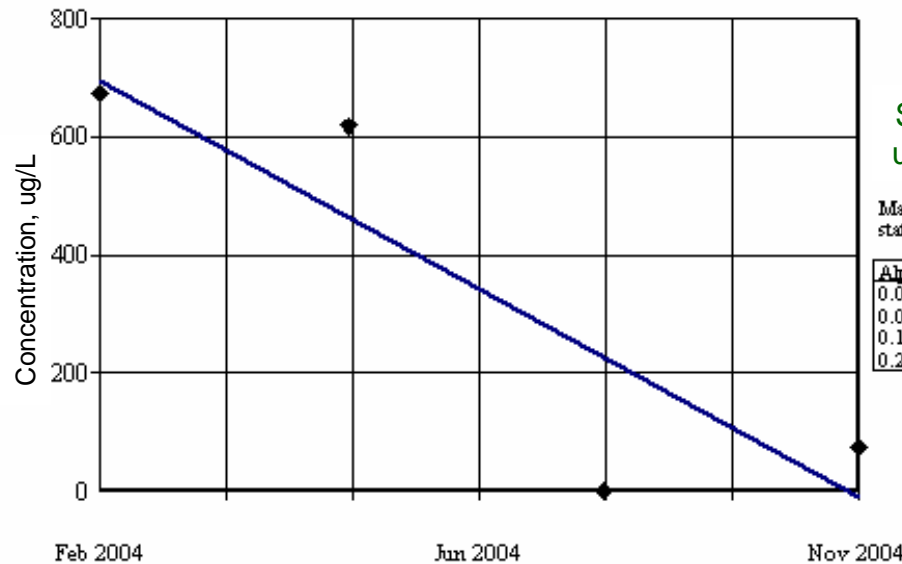
Slope = -3144  
ug/L per year

Mann Kendall  
statistic = -9

Alpha	Critical	Signif.
0.01	-14	No
0.05	-12	No
0.1	-10	No
0.2	-9	Down

Xylenes concentration in groundwater is trending downward at MW3.

### SEN'S SLOPE ESTIMATOR MW3R



Slope = -942  
ug/L per year

Mann Kendall  
statistic = -4

Alpha	Critical	Signif.
0.01	-8	No
0.05	-8	No
0.1	-6	No
0.2	-6	No





# *Conclusions*









