

# RECENT DEVELOPMENTS IN CDF RECLAMATION RESEARCH

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# *PROBLEM*

- *CDFs are filling up*
- *Options*
  - *Stop Dredging*
  - *Open water disposal*
  - *Build new CDFs*
  - *Expand existing CDFs*
  - *Recover storage capacity thru beneficial use*

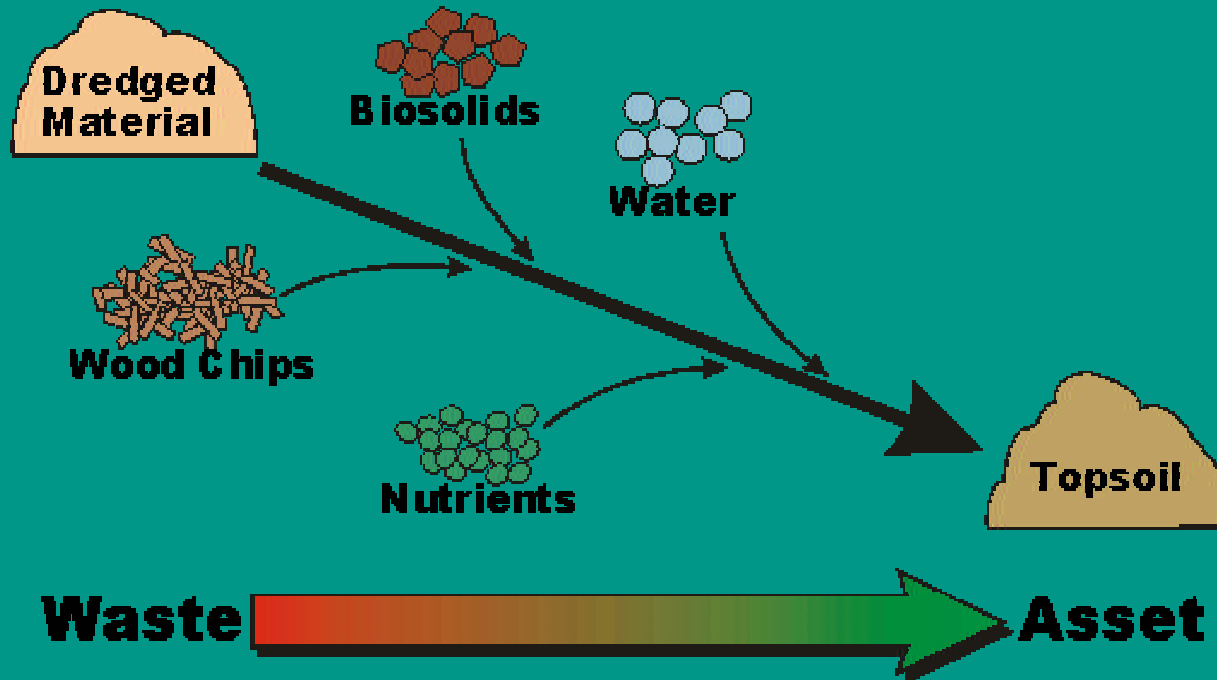


# *DOER CDF RECLAMATION: CURRENT EFFORTS*

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- *Solids-Separation: Trudy Olin-Estes, 601/634-2125*
- *Bioremediation: Tommy Myers, 601/634-3939*
- *Vegetation Management: Richard A. Price, 601/634-3636*
- *Manufactured Soil: Dick Lee, 601/634-3585*
- *Debris & Trash Removal: Tommy Myers*

# MANUFACTURED SOIL



# *Toledo, OH Demonstration Manufactured Soil*

- *Trommel Screen*
- *Dredged Material*
- *Yardwaste*
- *N-Viro Biosolids*
- *Patented Formula*
- *High Quality Topsoil*



*Herbert Hoover Dike  
Lake Debris, Bionsoil,  
Sandy Dredged Material  
Ram Grinder*



# *Soil Separation for CDF Capacity Recovery*

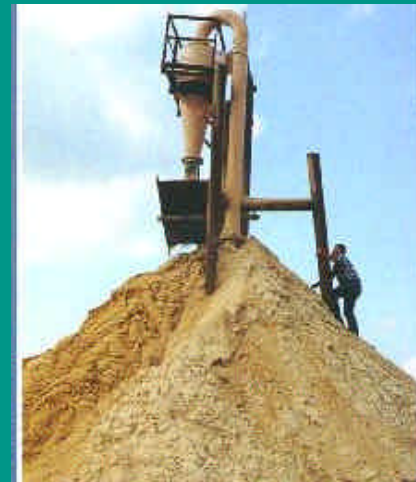
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- *Contaminants preferentially distributed by size and density*
- *Volume reduction – separation of most contaminated fractions*
- *Soil separation technologies*

# Separation Process Components



## 1. Material Characterization & Preparation



## 2. Separation



## 3. Dewatering



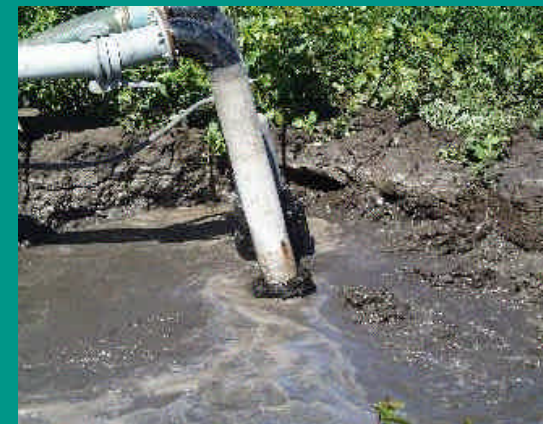
# *Green Bay 2000*

## *MetPro Maximum Density Separator*

- *Dewatered underflow*
- *1200 GPM/70 tons/hr capacity*
- *Slurried feed*



# *Green Bay 2000 – Hydraulic Excavation*

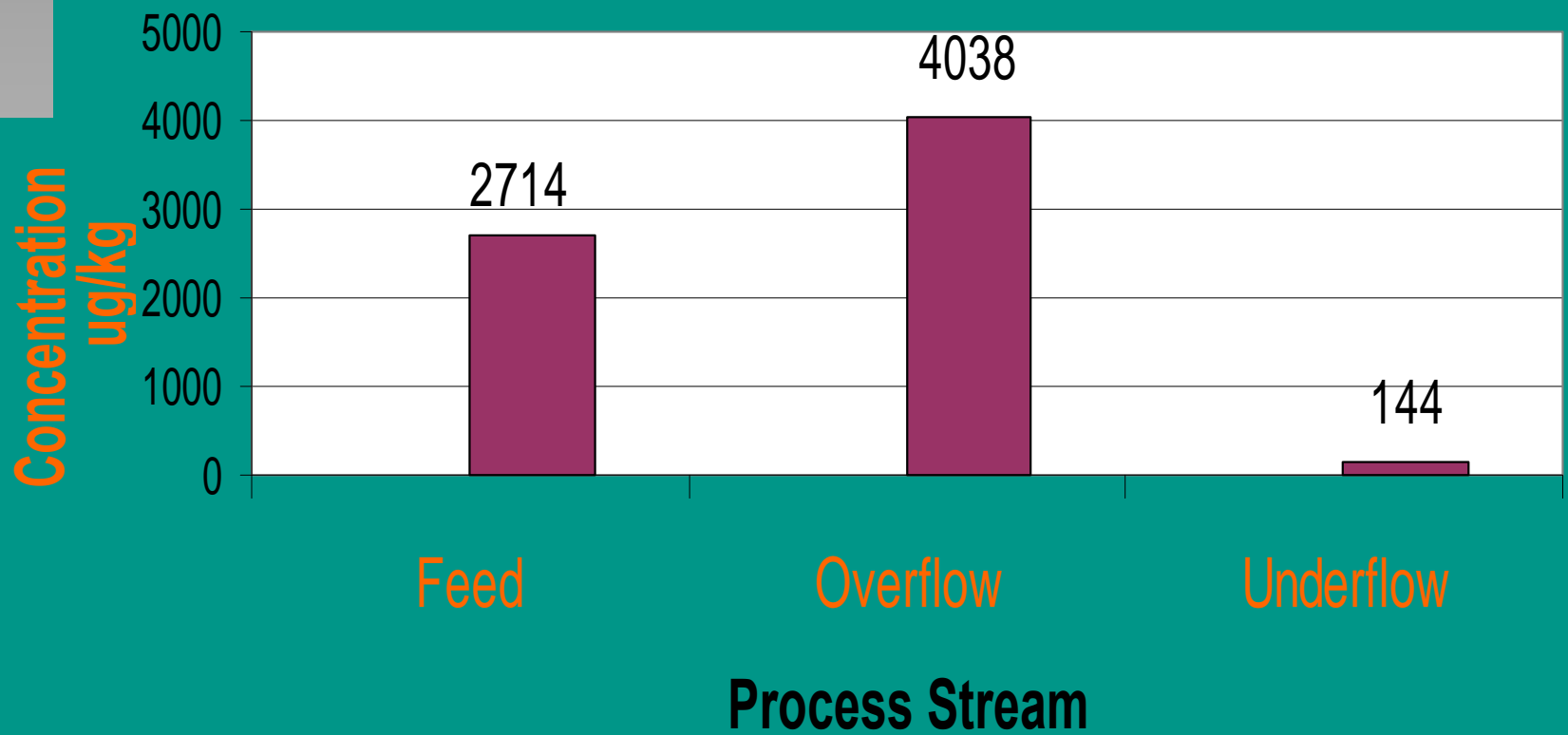


# *Green Bay 2000 - Results*

- *Underflow*
  - *< 7% fines*



## PCB 1242 Distribution Green Bay Demo Results



# *Future Inquiry*

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- *Excavation/Preprocessing*
  - *Logistics*
  - *Hydraulic excavation/Mini-dredge*
- *Dewatering*
- *Clay separation*
- *Cost/Benefit Analysis*

# *BIODEGRADATION STUDIES*



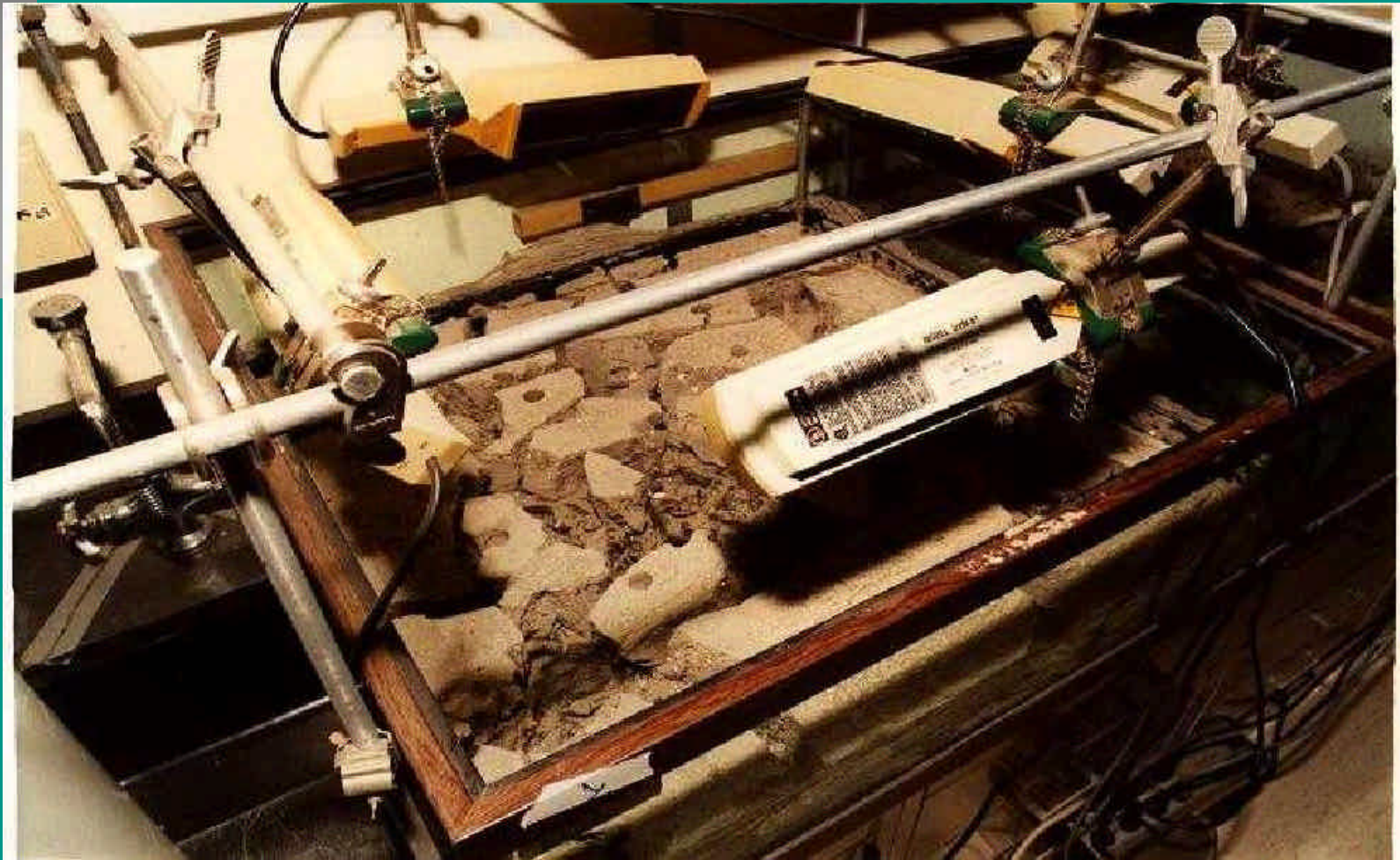
- *Study Scales: Laboratory, Pilot, and Field Demonstration*
- *Technologies: Composting, Land Treatment*
- *Sediments: NY/NJ Harbor, Saginaw R., Green Bay Harbor, Milwaukee Harbor*
- *Contaminants: PAHs, PCBs, PCDDs/PCDFs*

# *BIOREMEDIATION EXPERIMENTAL MATRIX*



| Scale | Sediment         | Contaminants           | Technology               |
|-------|------------------|------------------------|--------------------------|
| Lab   | NY/NJ            | PCBs, PAHs             | Land Treat<br>Land Treat |
|       | Saginaw<br>River | PCBs,<br>Dioxin/Furans |                          |
| Pilot | Saginaw<br>River | PCBs,<br>Dioxin/Furans | Land Treat               |
| Demo  | Milwaukee        | PCBs, PAHs             | Composting               |
|       | Green Bay        | PCBs, PAHs             | Composting               |

# *LAND TREATMENT LAB STUDY*





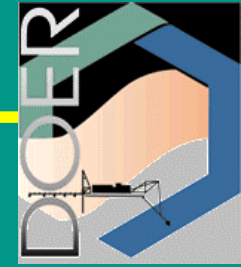


# SAGINAW CDF LAND TREATMENT PILOT

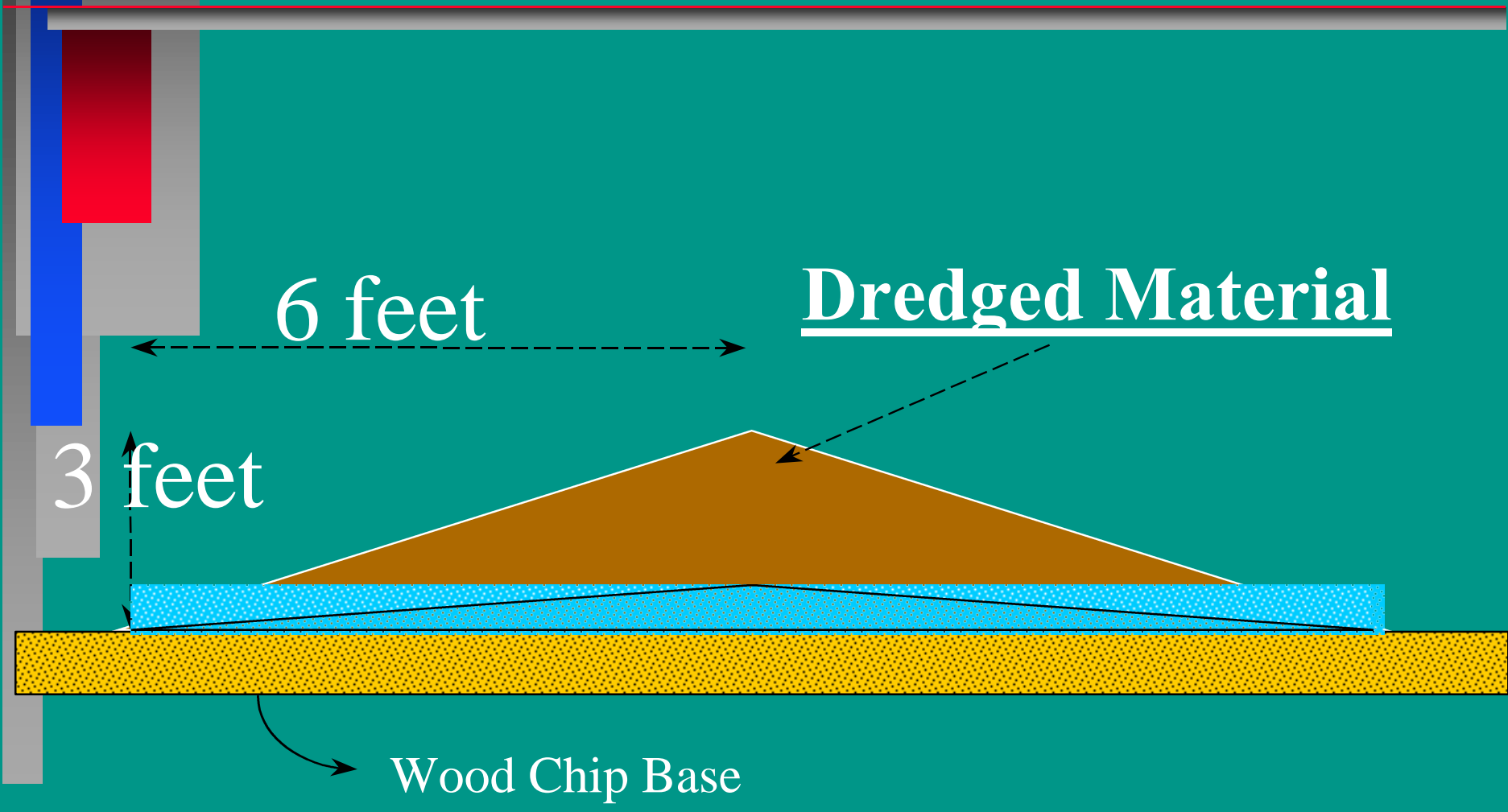




# Milwaukee Biomounds



## Cross-section



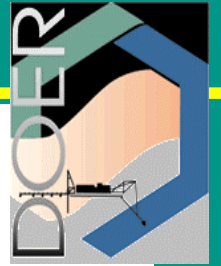


# *SCAT TURNER*

## *MILWAUKEE CDF*



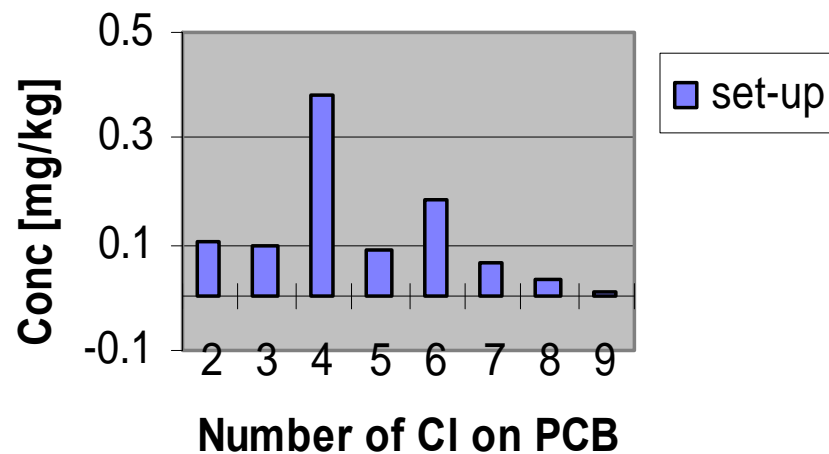




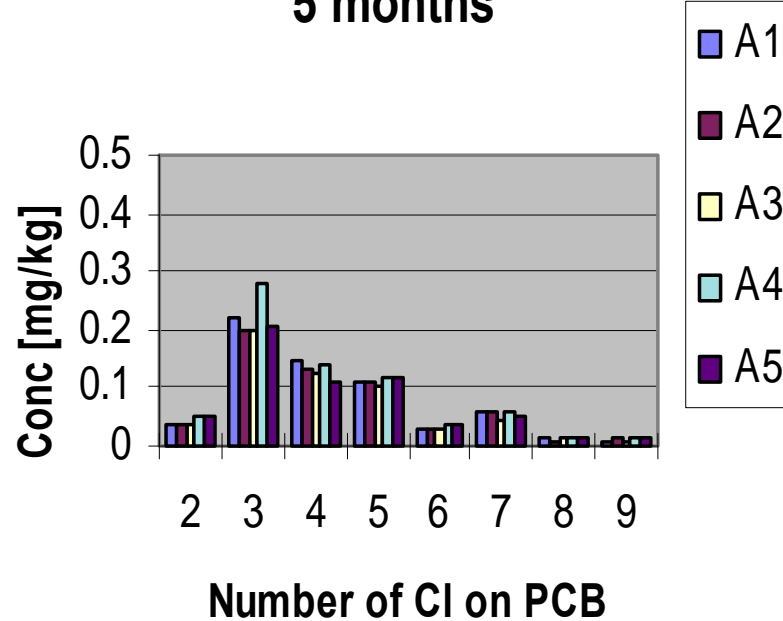
# NY/NJ DMMP LAB STUDY



## Set-up Day

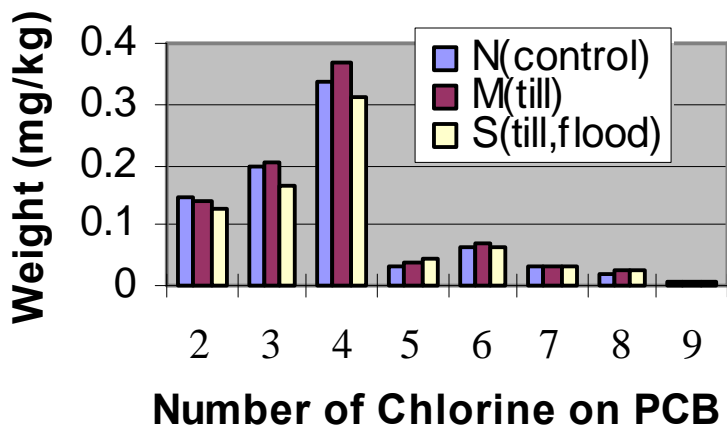


## 5 months

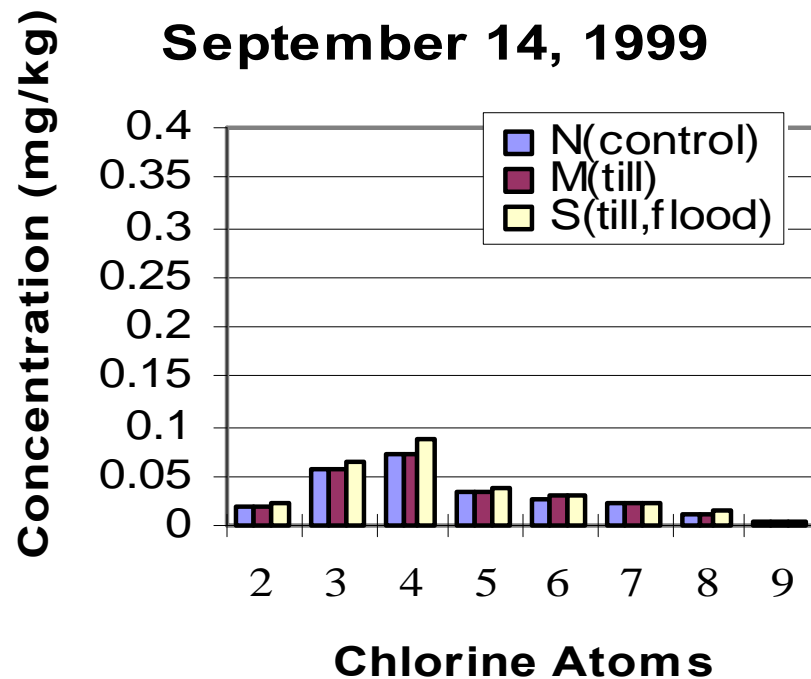


# SAGINAW PILOT STUDY

September 2, 1988



September 14, 1999





# TREATMENT EFFECTIVENESS

| CONTAMINANT   | SCALE | TECHNOLOGY | % DISAPPEARANCE |
|---------------|-------|------------|-----------------|
| PCBs          | Lab   | Land Treat | 20 - 40         |
|               | Pilot | Land Treat | 70              |
|               | Demo  | Composting | 0 - 30          |
| PAHs          | Lab   | Land Treat | Incomplete      |
|               | Demo  | Composting | Negligible      |
| PCDDs / PCDFs | Lab   | Land Treat | Negligible      |
|               | Pilot | Land Treat | Negligible      |





# *SUMMARY*

- *PCB Disappearance: 0 - 70%*
- *PAHs, PCDDS/PCDFS: Stable*
- *Too Early to Recommend a Technology*

# *Phytoreclamation: Milwaukee CDF*

- *Techniques to reduce PAH and PCB in DM*
- *Partners:*
  - *EPA SITE Program*
  - *SAIC, ARCADIS, Milwaukee Port Authority*
  - *Detroit CE*
  - *Purdue University*
  - *DOER Bioremediation WU*



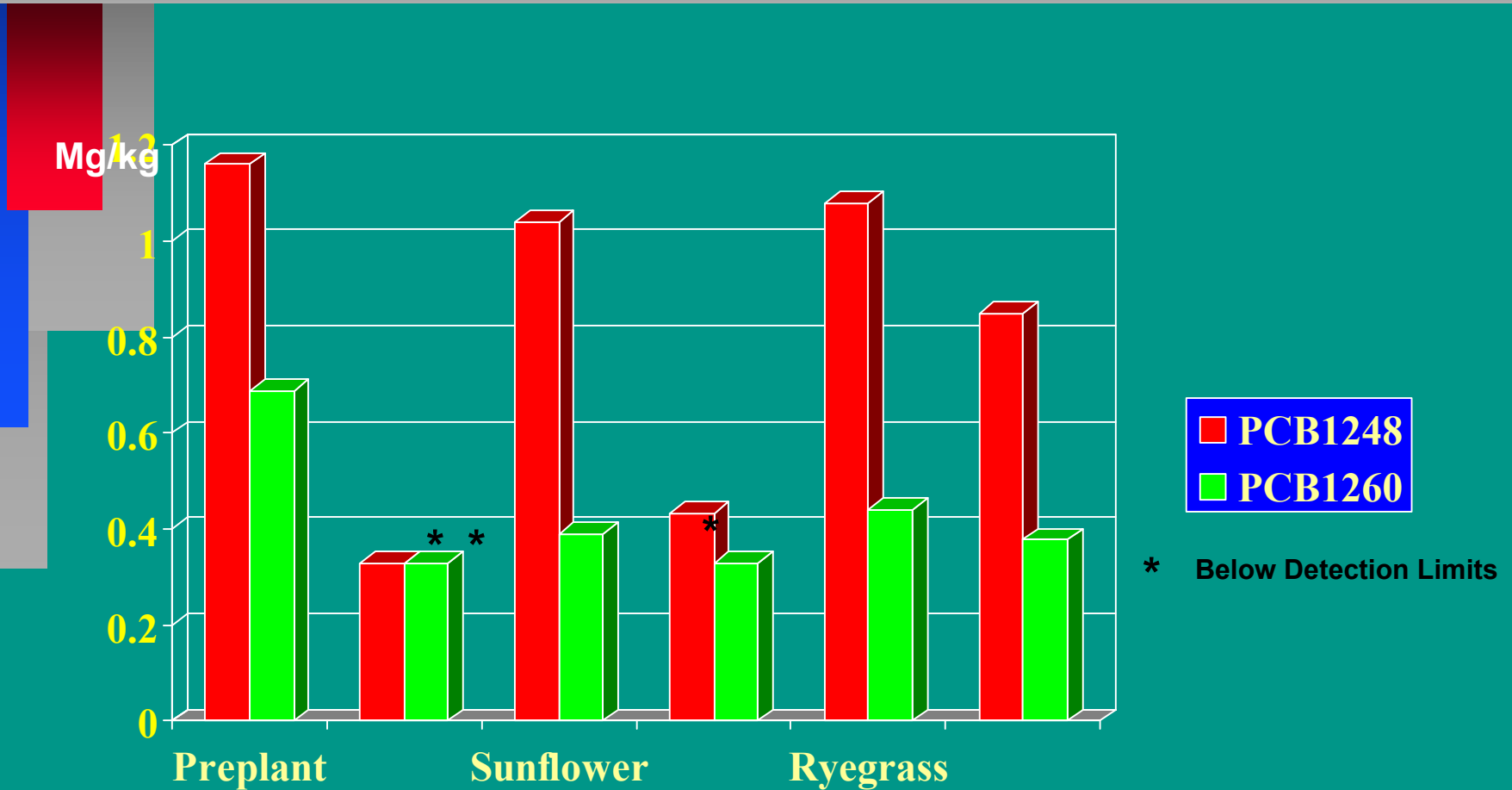
# *Greenhouse Studies*

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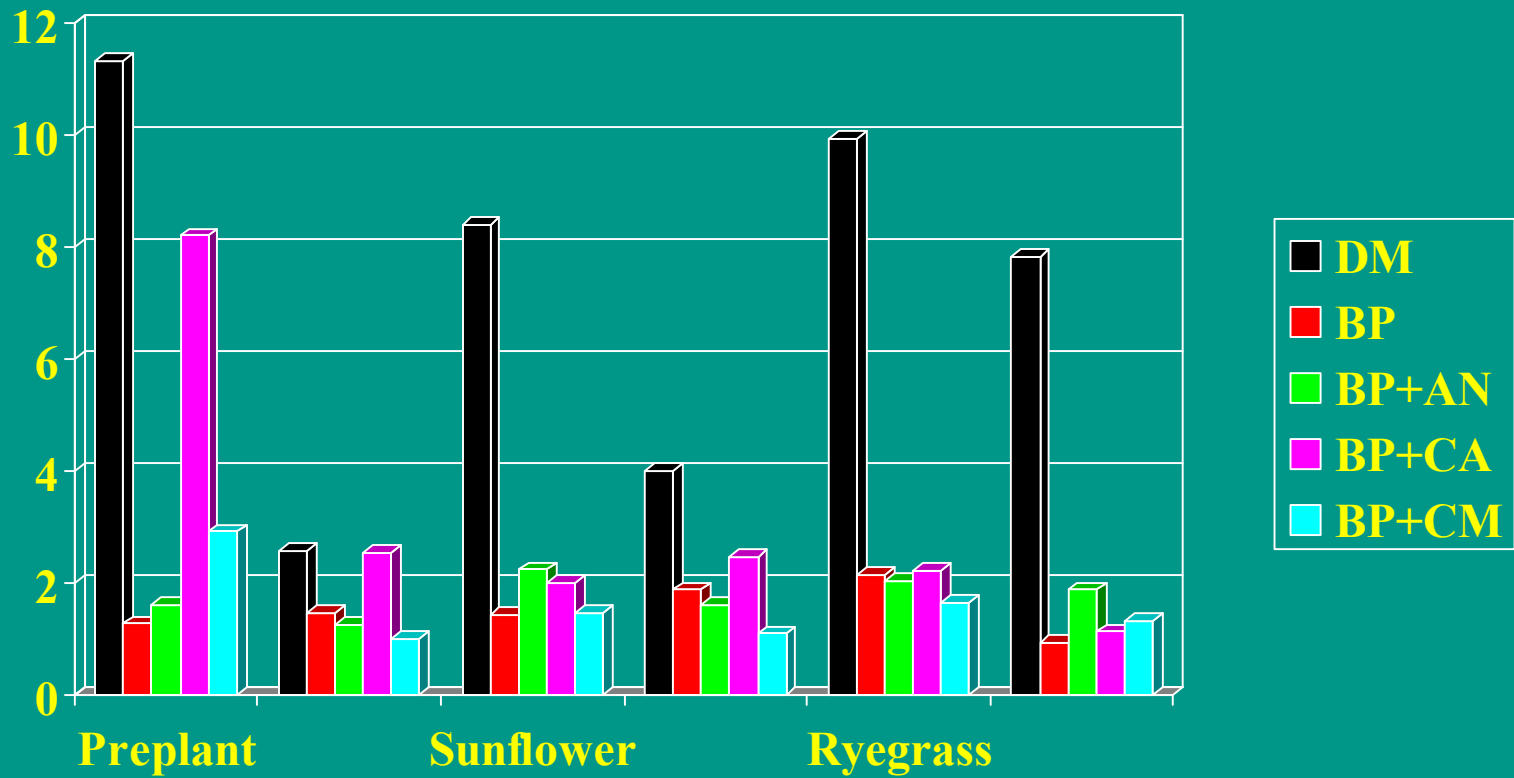
## ■ *Remediation of PAH and PCB*

- *Goal: Treatment of DM to meet State requirements for reuse*
- *Approach: Plant/soil amendment combinations to degrade organic contaminants*
- *Measure of Success: Meet concentration limits or verify limited bioavailability of recalcitrant compounds*

# PCB Reduction in Unamended Dredged Material



# *Effects of Treatment on Pyrene Reduction*





# *EPA PILOT DEMO*

*Phytoreclamation of Milwaukee  
Dredged Material*

# *Test Plot Preparation*



# *Treatment Plots*

- *No planting w/tillage and weed control*
- *Natural plant establishment*
- *Sandbar willow trees*
- *Corn/clover rotation*
  - *Each cell received a start-up fertilizer*
  - *Corn/clover cells receive additional fertilizer*
  - *Each cell is irrigated using water from Lake M.*



# *Corn and Natural Plants in Late Aug and Oct*



# *2002 Efforts*

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- *Continue the work initiated in 2001*
  - *Clover/corn rotations*
  - *Monitor soil chemical/physical conditions*
  - *Characterize vegetative cover*

# DEBRIS AND TRASH REMOVAL

- *Allow for BU*
- *Pre-processing for DM remediation*



# *DEBRIS & TRASH: DEFINITIONS*

- *Debris - large items such as railroad ties, concrete, tree trunks, and boulders and stones.*
- *Trash - small items of plastic, metal, glass, and wood.*



# *DEBRIS REMOVAL WITH A GRIZZLY*



# GRIZZLY W/POWER SCREEN



# *TROMMEL SCREEN*



# *UNRESOLVED ISSUES*

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- *Criteria for Beneficial Use*
- *Markets*
- *Bioavailability*
- *Toxicity Reduction*
- *Dredged Material Heterogeneity*



# *DOER PRODUCTS*

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- *Solids Separation - 3 Technical Notes*
- *Manufactured Soil – 3 Technical Notes*
- *Bioremediation – 4 Technical Notes*
- *Phytoremediation – 2 Technical Notes*
- *Debris & Trash – 2 Technical Notes*
- *[www.wes.army.mil/el/dots/doer](http://www.wes.army.mil/el/dots/doer)*



# *Cat Island in Green Bay*

