

Floodplain Pilot Study Update

Carbon Amendment of Floodplain Soil

AOC 4, Former DuPont Waynesboro Site, Virginia

South River Science Team Meeting

October, 21, 2015

Agenda

- Background
- Phase II Overview
- Phase II Progress
- Preliminary Observations
- Summary



Background

- Understand the potential for carbon amendments to reduce the bioavailability of methylmercury (MeHg) to floodplain soil invertebrates and plants
- **Floodplain Pilot Study Objectives:**
 - Test effectiveness of carbon amendments
 - Evaluate for potential unintended consequences



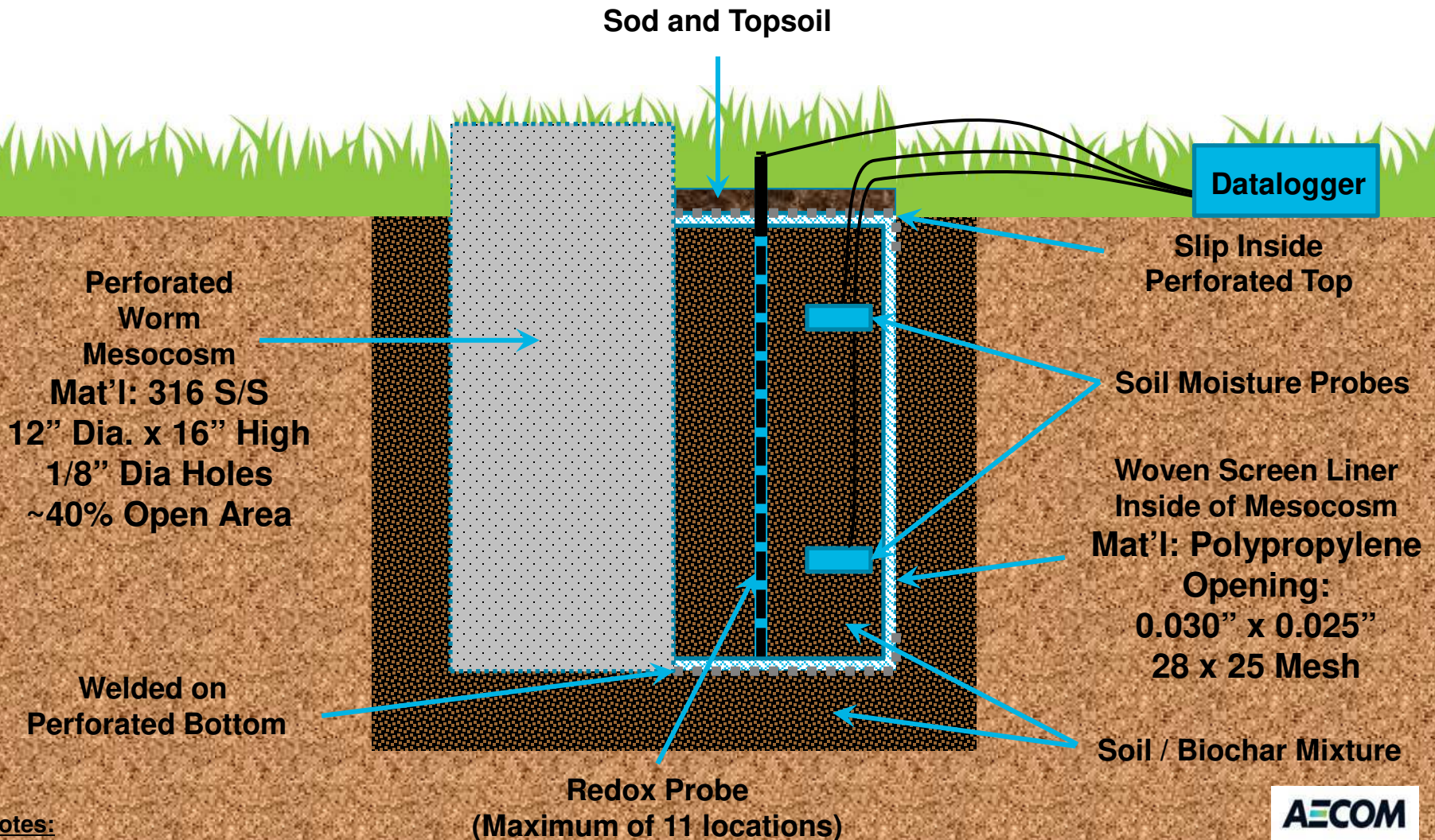
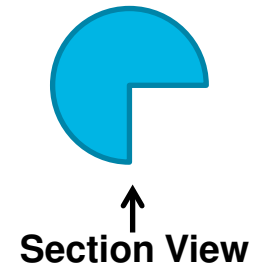
Study Phases:

- Phase I: Laboratory Pilot
(Completed 2014)
- Phase II: Field Pilot
(Spring/Summer 2015)

Phase II Overview

- Objective**- Validate the effectiveness and potential unintended consequences of using carbon amendments *in situ*
- Study Location**- RRM 11.8 (Augusta Forestry Center)
- Study Design**
 - Biochar amendment - 5% and 10% (unsaturated and saturated)
 - *In situ* mesocosm exposure cages
 - *In situ* soil moisture and redox potential monitoring
 - Earthworm survival, growth, reproduction, and Hg bioaccumulation

Phase II Overview- Mesocosm Cage Design



Phase II Progress- Mesocosm Cage Deployment (May)



Phase II Progress-

Earthworm Deployment (August)



Soil Geochemistry Monitoring Equipment Deployment (August)



Phase II Progress- Earthworm Sampling (Sept/Oct)

–Modified sampling schedule

- Heavy rainfall - Samples collected at Week 7, rather than Week 8



Phase II Progress- Earthworm Sampling (Sep/Oct)



Preliminary Observations

- Low earthworm abundance
- Juvenile abundance/size *vary* among treatments
- Adult abundance and size *similar* among treatments

Replicate	Earthworm Age Class	Week 7- Organisms Observed (Sampled)/ Treatment Type									
		Control		5% (Dry)		10% (Dry)		5% (Wet)		10% (Wet)	
		Sample Size (N)	Average Mass (g)	Sample Size (N)	Average Mass (g)	Sample Size (N)	Average Mass (g)	Sample Size (N)	Average Mass (g)	Sample Size (N)	Average Mass (g)
A	Adult	1	2.0	Soil Geochemistry Mesocosm		1	4.2	0	--	1	3.4
	Juvenile	0	--			3	0.04	0	--	0	--
B	Adult	1	3.2	2	2.4	1	4.6	1	4.7	Soil Geochemistry Mesocosm	
	Juvenile	1	0.01	3	0.05	3	0.05	1	0.4		
C	Adult	0	--	0	--	1	3.0	Soil Geochemistry Mesocosm		1	2.7
	Juvenile	1	0.01	2	0.1	0	--			1	0.9
D	Adult	Soil Geochemistry Mesocosm		1	3.4	Soil Geochemistry Mesocosm		1	1.6	1	5.1
	Juvenile			2	0.07			1	0.3	0	--
TOTAL	Adult	2	2.6	3	2.9	3	3.9	2	3.1	3	3.8
	Juvenile	2	0.01	7	0.09	6	0.05	2	0.3	1	0.9
Notes:											
--, Not Applicable											

Summary

- Phase II sampling complete
- Earthworms to be analyzed as composited samples per amendment type
- Soil analyses pending earthworm results
- Soil geochemistry data to be incorporated as part of evaluation





Questions?