

Floodplain Pilot Study- Status Update

Biochar Amendment of Floodplain Soil

Former DuPont Waynesboro Site, Virginia

Area of Concern (AOC) 4



April 5, 2016

AECOM

Agenda

- Phase II- *In Situ* Mesocosms
 - Overview
 - Findings
 - Conclusions and Path Forward
- Phase III- Field Application
 - Objectives
 - Approach
- Summary



Phase II- Overview

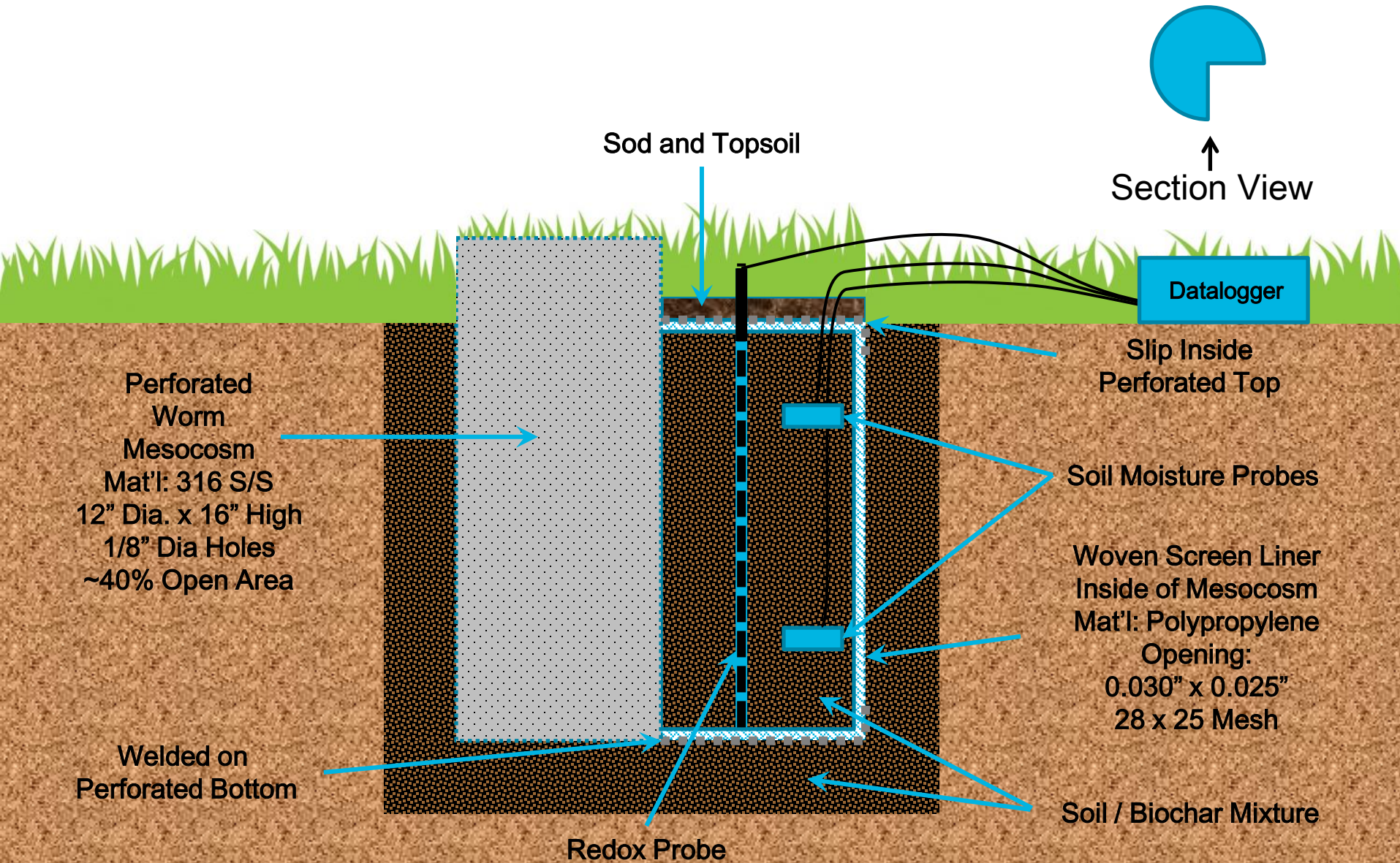
– Objective

- Assess potential effectiveness of *in situ* biochar amendments in reducing the bioavailability of Hg to transplanted terrestrial invertebrates

– 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- *In Situ* Mesocosm Cage Design



Notes:

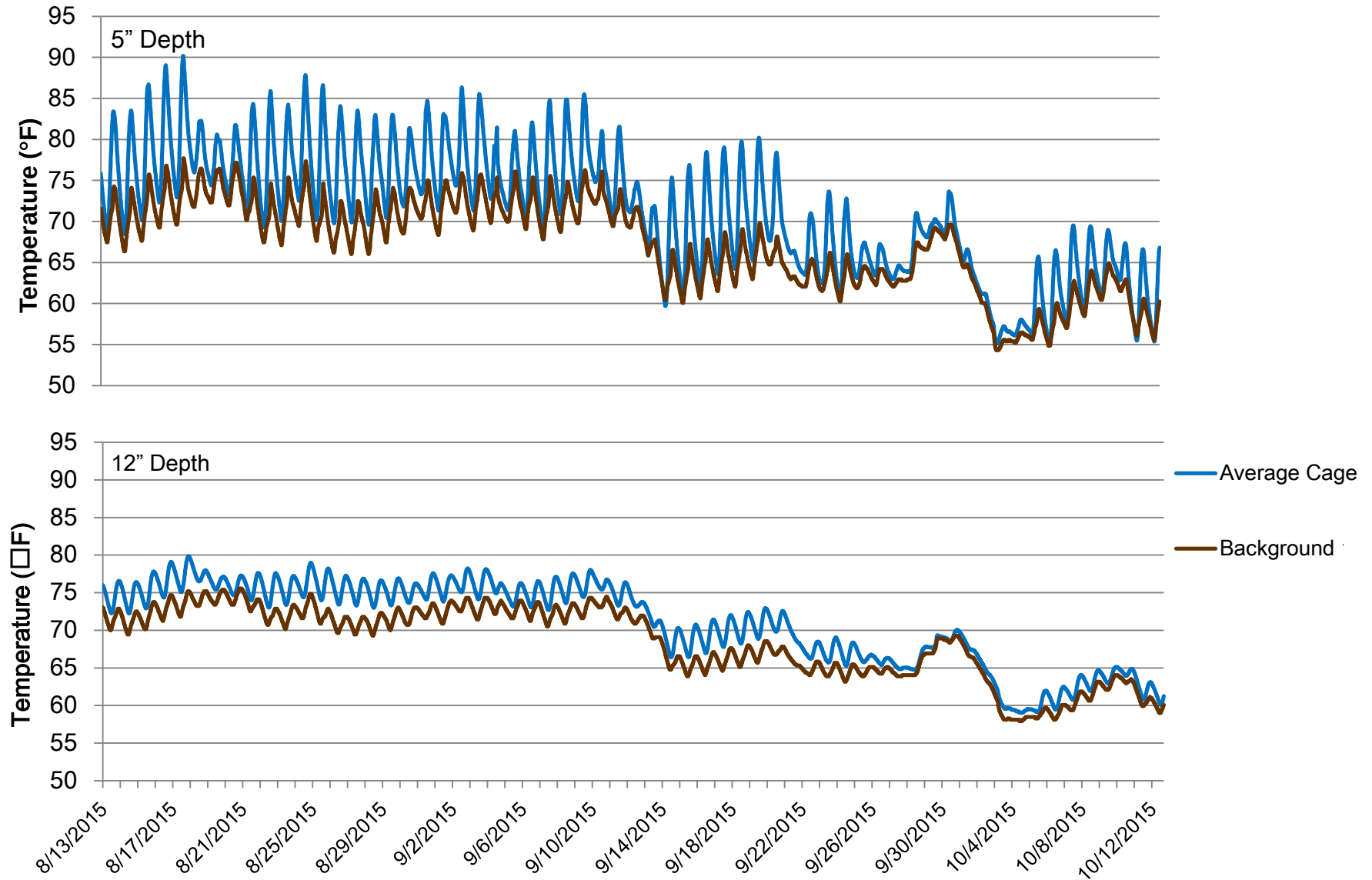
Dia = diameter, S/S= Stainless Steel

Phase II- Findings

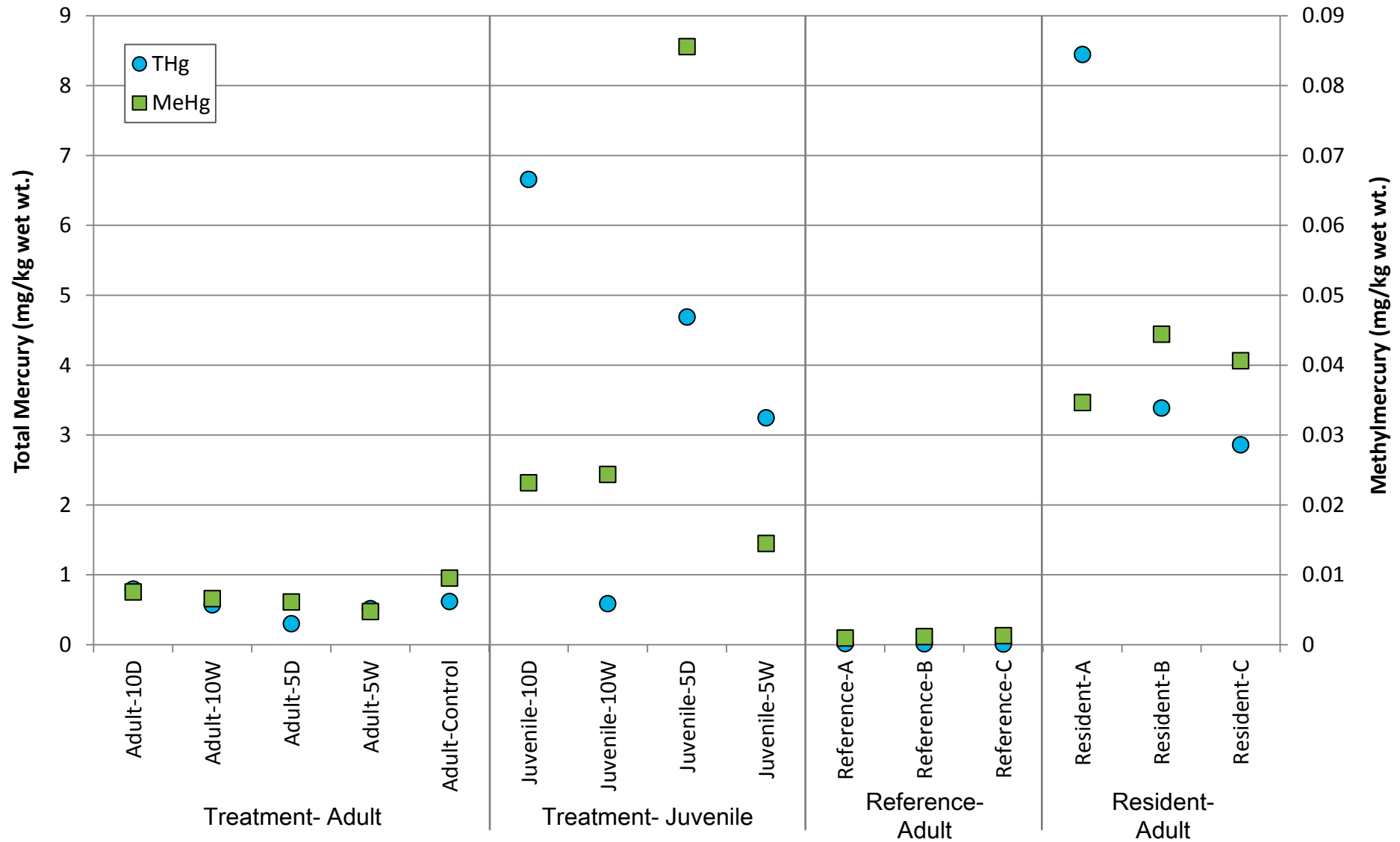
- Substantial differences between caged and ambient soil temperature and moisture
- Low Week 7 earthworm abundance
 - Mortality or emigration?
- Treated adult worms- Lower Hg than control and resident worms
- Juvenile Hg inversely correlated with worm mass



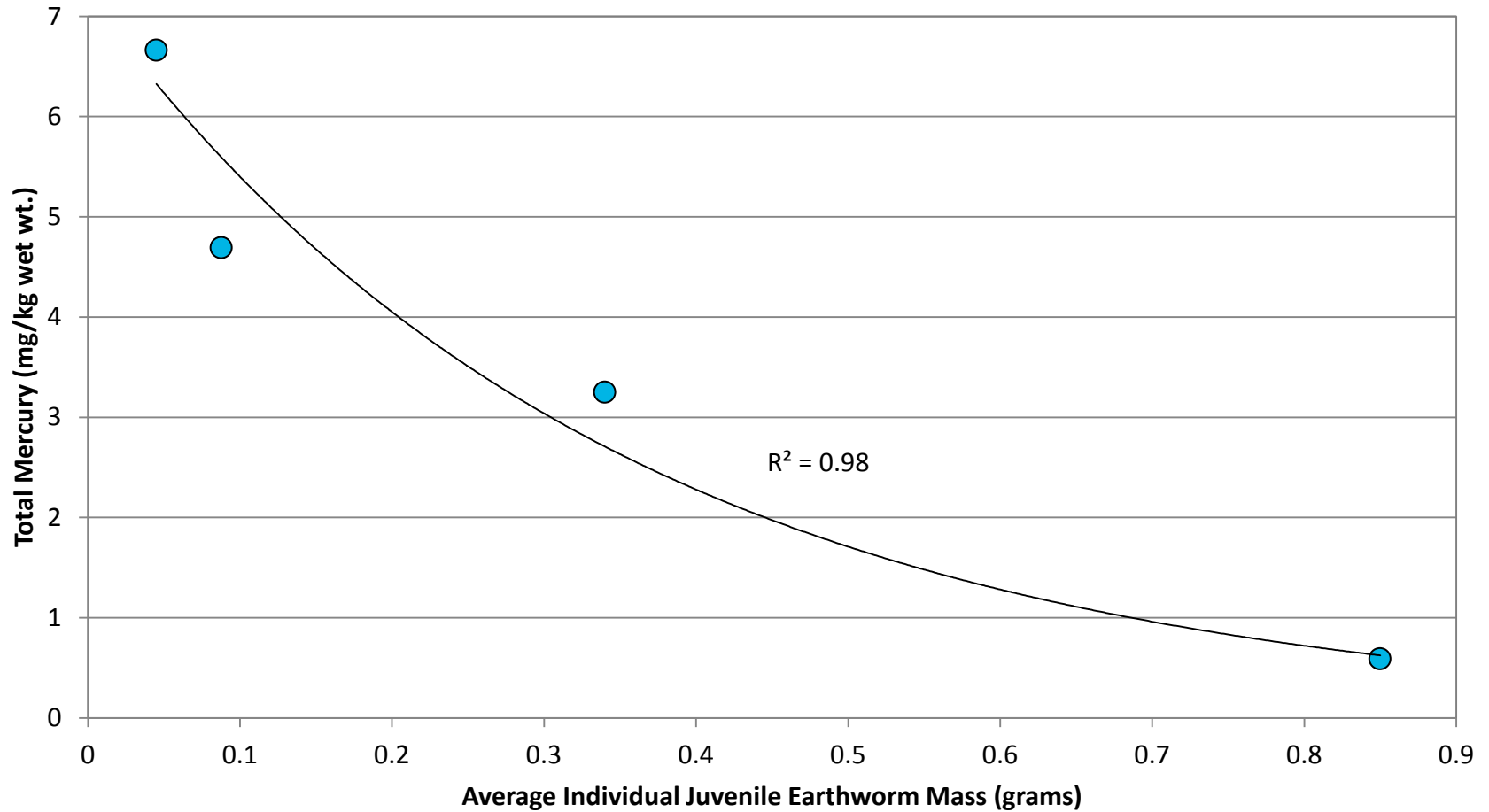
Phase II- Soil Temperature



Phase II- Earthworm Tissue Hg



Phase II- Juvenile Worm THg/Mass Relationship



Phase II- Conclusions and Path Forward

– Conclusions

- Study challenges- Complex variables
- Low worm yield- Minimal data
- Biochar likely reduces Hg bioavailability in worms

– Path Forward

- Decommission Phase II equipment
- Advance to Phase III (Field Application)



Phase III- Field Application

– Objectives

- Validate the effectiveness of *in situ* biochar amendments in reducing the bioavailability of Hg to resident terrestrial invertebrates
- Demonstrate progress toward innovative remedial strategies

– Approach

- Amendment material- Cowboy biochar and/or alternative
- Non-forested and Forested soils
- Monitor Hg in soil and resident invertebrate taxa (e.g., earthworms)
- Field application techniques to be tested prior to implementation



Phase III- Field Application Techniques



Summary

- Phase II complete
- Phase III
 - Amend forested and non-forested soils with Cowboy biochar and/or alternative
 - Feasibility of amendment techniques to be tested
- Schedule

Task	Date
Work Plan Development	Spring 2016
Application Technique Feasibility Test	Spring 2016
Amendment Application	Summer 2016
Post-Amendment Monitoring	2017
Data Evaluation and Reporting	2017/2018



Thank You

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