Pilot Studies Update

Former DuPont Waynesboro Site, Virginia

Area of Concern (AOC) 4

south river SCIENCE TEAM

December 11, 2018

AECOM

Agenda

- Floodplain Pilot
- South River Pilot
- Knotweed Pilot

Floodplain Pilot

Objective:

- Evaluation of an *in situ* floodplain carbon amendment to reduce MeHg bioavailability to terrestrial invertebrates

Floodplain Pilot

- No unintended consequences
- Trend in reduced soil Hg (F1-3) 6 months post-amendment was not sustained over time
- No difference in earthworm tissue Hg

South River Pilot

Objectives:

- Evaluation of an *in situ* carbon amendment to adsorb THg and MeHg from the water column and the sediment - surface water interface

South River Pilot

- Revised analytical *method* to account for intrinsic properties of biochar
- Optimized biochar analytical *strategy* to focus on THg
- Negligible reduction of Hg in surface water and clam tissue

South River Pilot

- Mid-channel BFS adsorbed ~**10 mg THg (1.8 mg THg/ CF biochar)** over 5-week period
- Surface area and deployment location are key design elements

Knotweed Pilot

Objectives:

- Evaluation of best methods for knotweed removal and control for remediated areas
- Compare 2 types of herbicide treatment

Knotweed Pilot

- April 2018 – Knotweed density plot survey
- June 2018 – Cutting knotweed test plots
- August 2018 Herbicide treatment
- September 2018 – Post-treatment assessments performed at all test plots

Pre-Treatment Spring 2018

Post-Treatment Fall 2018

Knotweed Pilot

Live Stem Density of Test Plots		
Treatment Type	Pre-Treatment	
	Knotweed Density (# stems/m^3)	Average Stem Height (ft)
1 - Cut and Injection	43.6	3
2 - Injection Only	52.4	2.8
3 - Cut and Foliar Application	48.8	2.5
4 - Foliar Application Only	35.2	2.7

- Both methods of herbicide treatment are effective; all plants died after treatment
- Stem diameter >¾" for foliar application
- Essential to apply treatments both early and often


Thank You!
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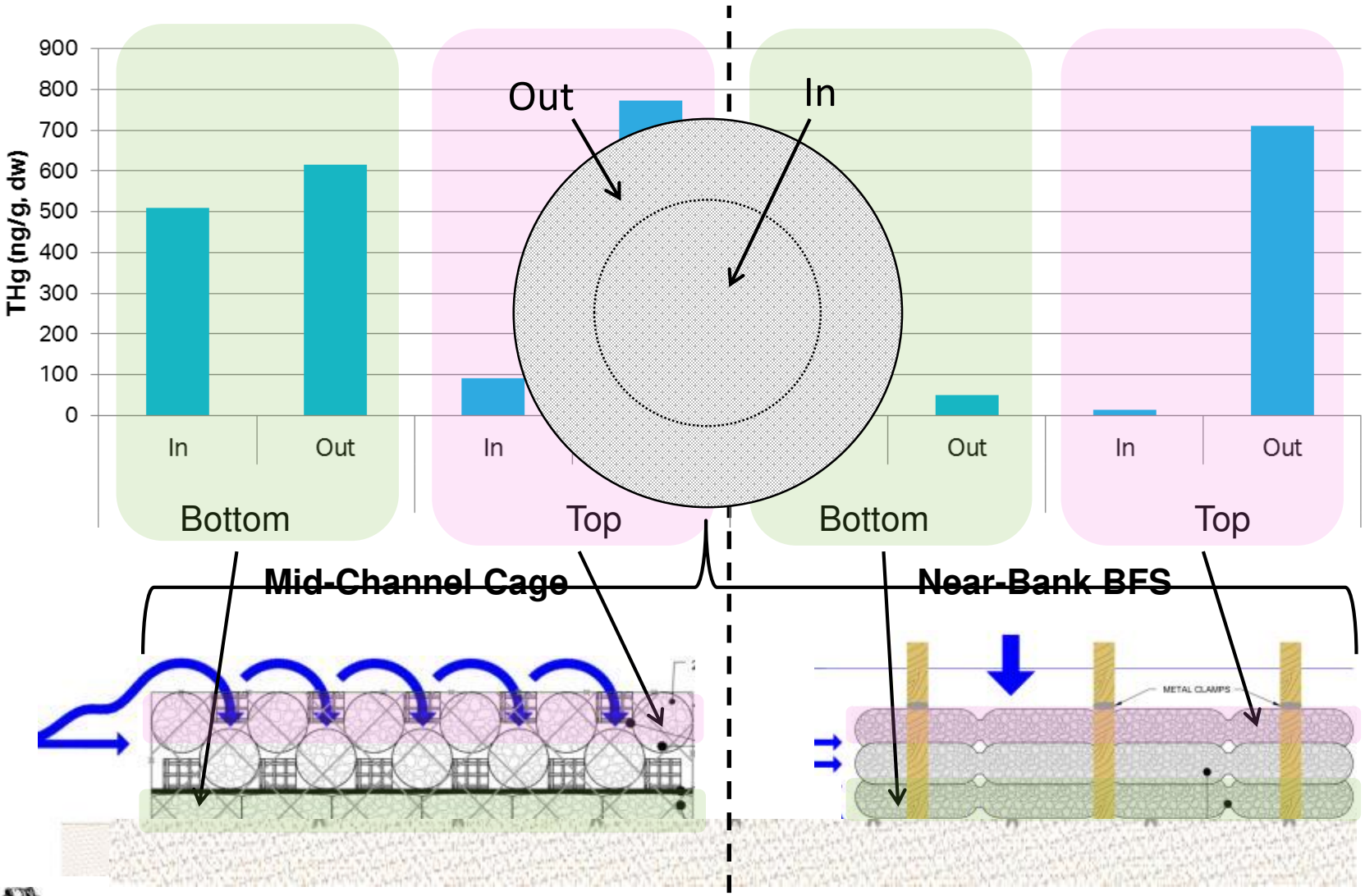
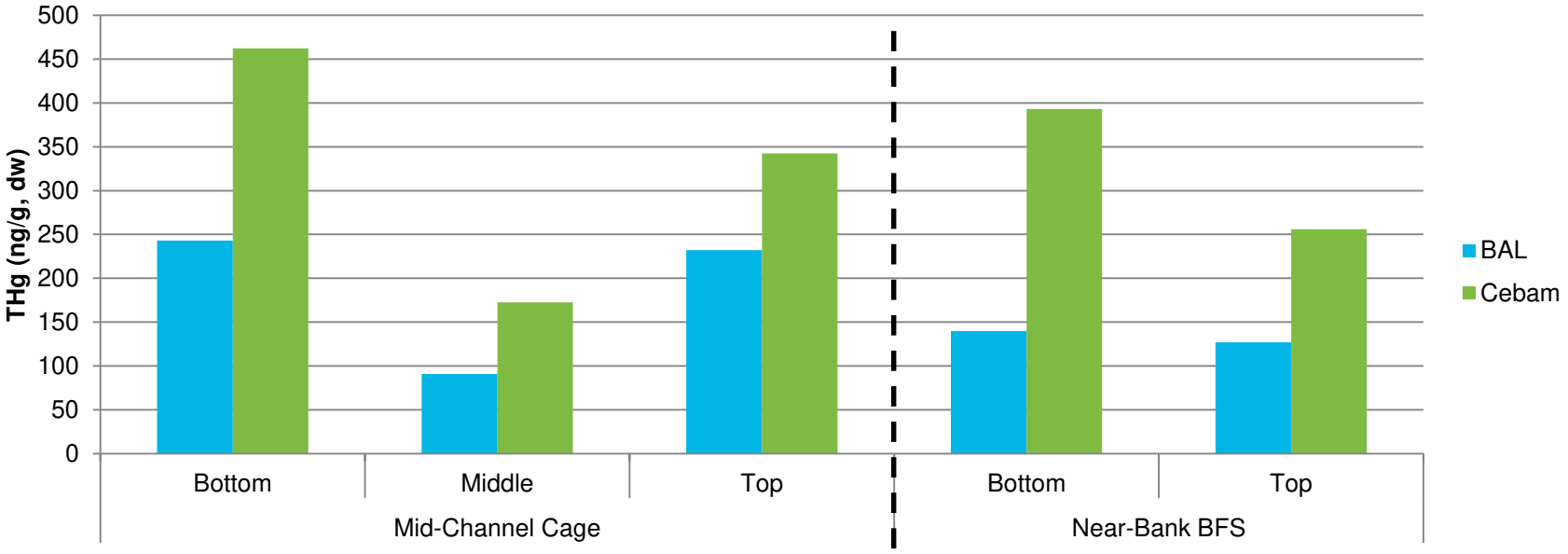
EXTRA SLIDES

South River Pilot- Biochar Data



Comparison of BAL and Cebam Biochar Data

- Composited biochar samples
- Cebam data 30-60% higher than BRL data, with similar profile



Floodplain Pilot- Baseline

–Pairwise Comparisons; Bonferroni post hoc (p<0.05)

Monitoring		Baseline (Compared to Control)			
Media	Parameter	Chip		Medium	
		5%	10%	5%	10%
Adult Earthworm	THg	↑	-	-	-
	MeHg	-	-	↑	-
Soil	THg	-	-	-	-
	Seq. Extraction (THg)	-	-	-	-

– No Sig. Diff. ↑ Increase ↓ Decrease

Floodplain Pilot- 6 Month

–Pairwise Comparisons; Bonferroni post hoc ($p<0.05$)

Monitoring		6 Month Post-Amendment (Compared to Control)			
Media	Parameter	Chip		Medium	
		5%	10%	5%	10%
Adult Earthworm	THg	-	-	-	-
	MeHg	-	-	-	-
Soil	THg	-	↓	-	↓
	Seq. Extraction (THg)	↓	↓	↓	↓

– No Sig. Diff. ↑ Increase ↓ Decrease

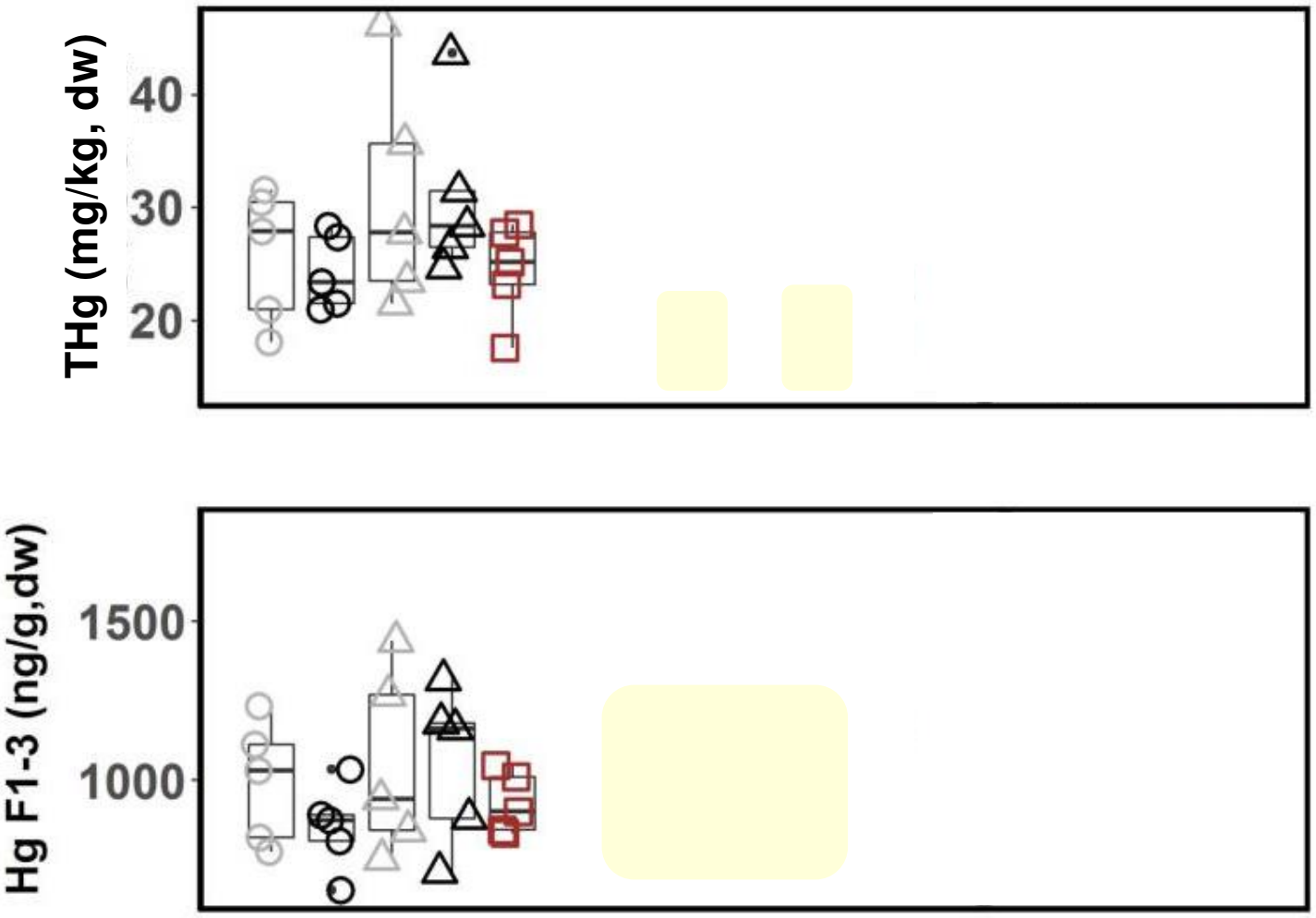
Floodplain Pilot- 12 Month

–Pairwise Comparisons; Bonferroni post hoc (p<0.05)

Monitoring		12 Month Post-Amendment (Compared to Control)			
Media	Parameter	Chip		Medium	
		5%	10%	5%	10%
Adult Earthworm	THg	-	-	-	-
	MeHg	-	-	-	-
Soil	THg	-	-	-	-
	Seq. Extraction (THg)	-	-	-	-

– No Sig. Diff. ↑ Increase ↓ Decrease

Floodplain Pilot- Soil



Test plots versus control- Pairwise Comparisons; Bonferroni post hoc ($p<0.05$)

Floodplain Pilot- Earthworms

Test plots versus control- Pairwise Comparisons; Bonferroni post hoc ($p<0.05$)

5% Chip
10% Chip
5% Medium
10% Medium
Control

Knotweed Pilot

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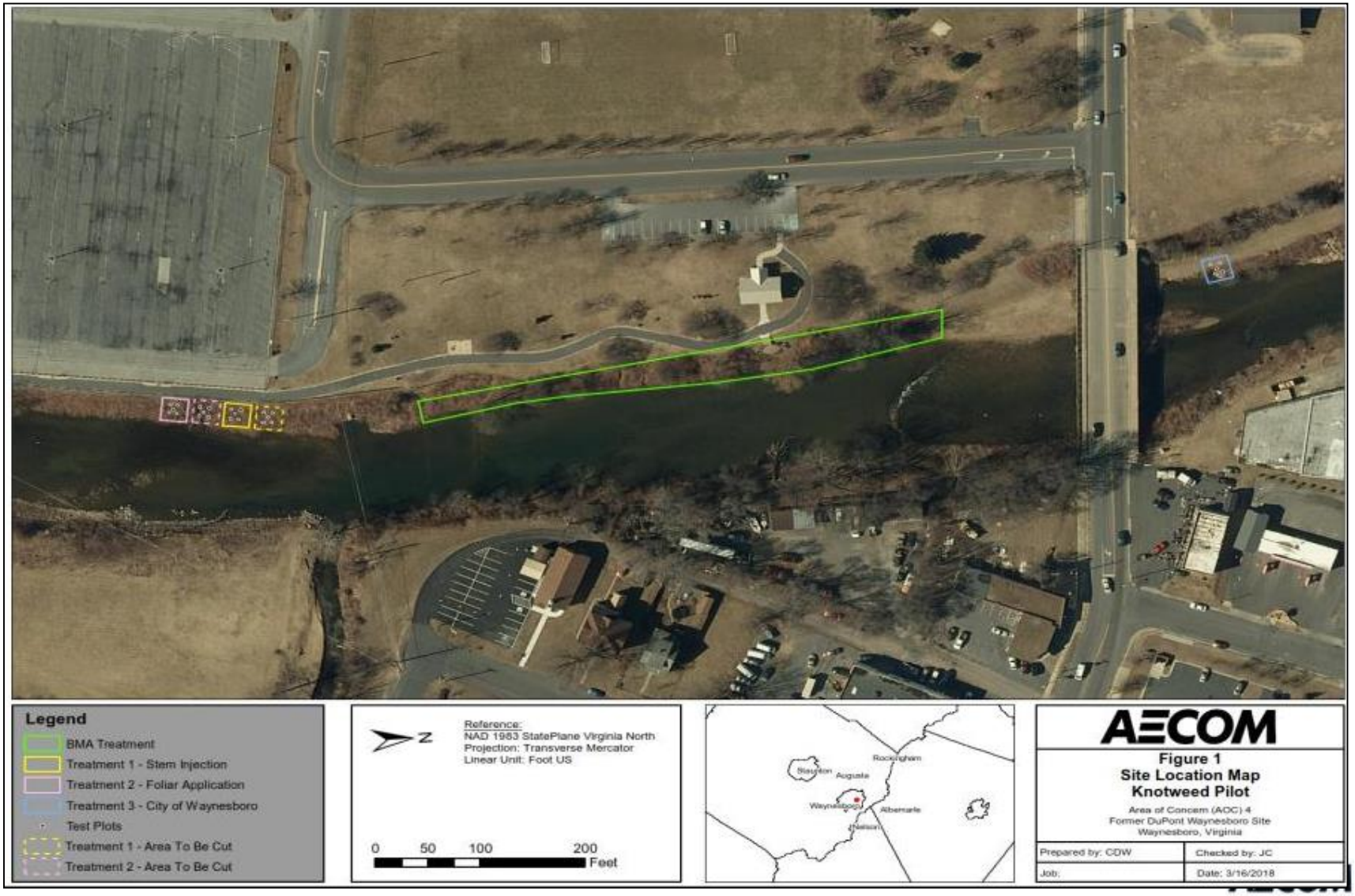


Knotweed Pilot

Pre-Treatment Spring 2018

Cut and Injection

Post-Treatment Fall 2018

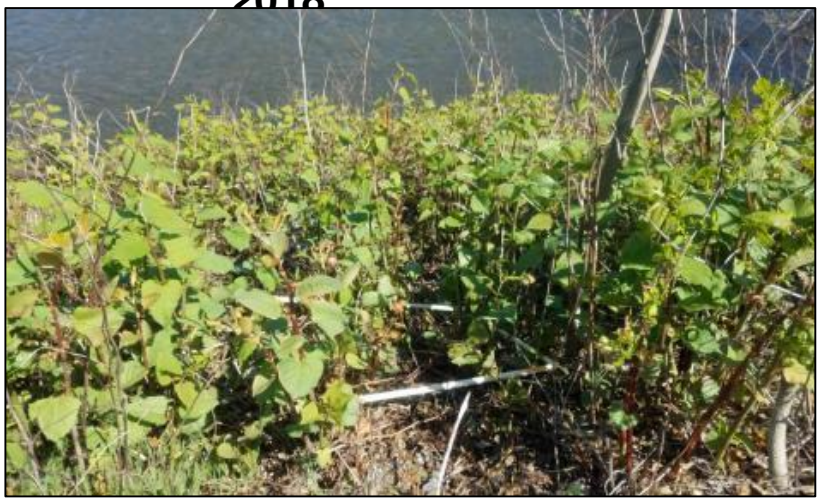
Injection Only

Knotweed Pilot

Pre-Treatment Spring 2018

Cut and Foliar Application

Post-Treatment Fall 2018



Foliar Application Only

Knotweed Pilot

City of Waynesboro

Pre-Treatment Spring 2018

Post-Treatment Fall 2018