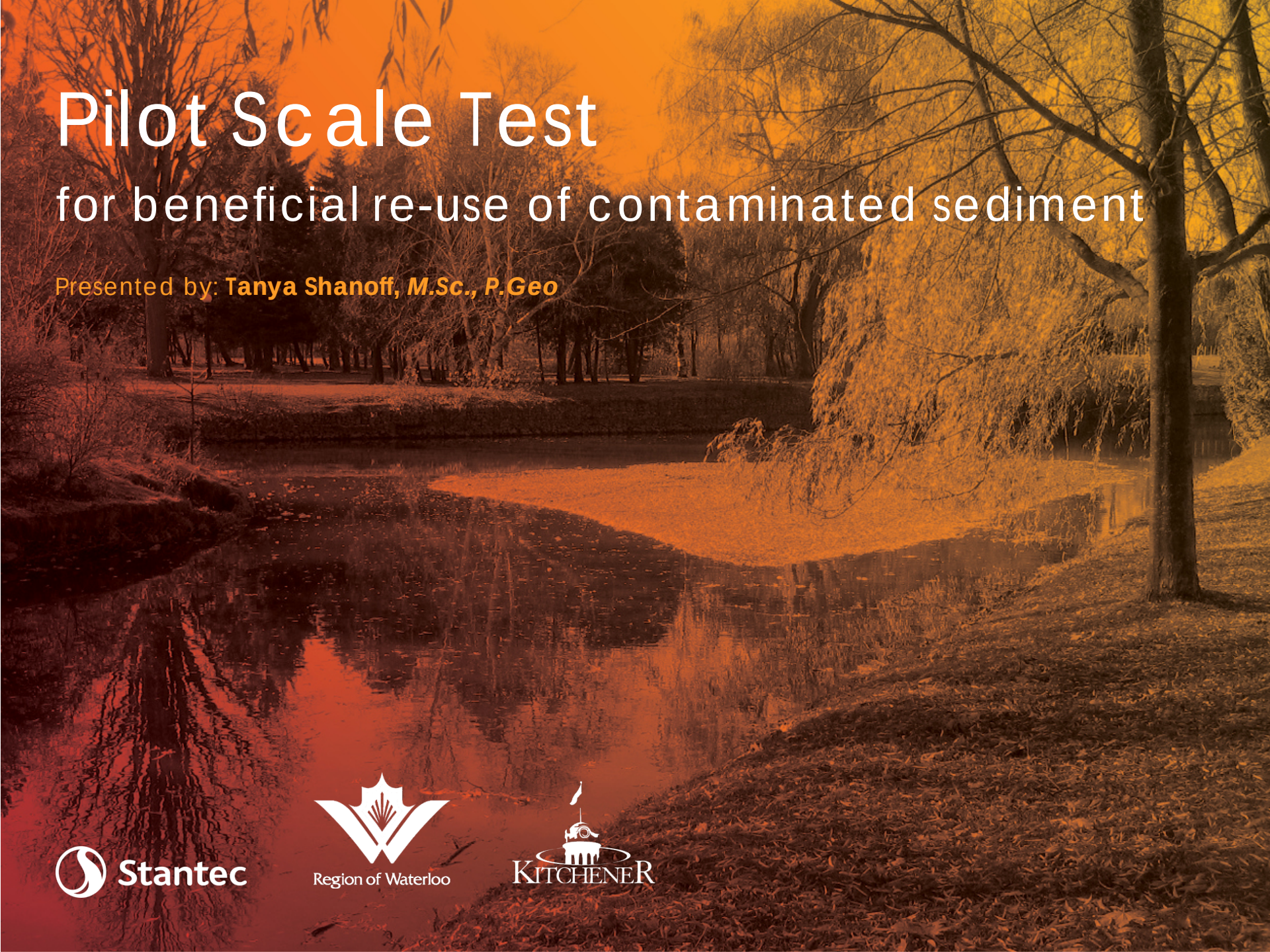

Pilot Scale Test

for beneficial re-use of contaminated sediment

Presented by: **Tanya Shanoff, *M.Sc., P.Geo***

Stantec

Region of Waterloo

KITCHENER

Presentation Layout

1 Study Background & Context

2 Project Background

3 Test Program Set-up and Methodology

4 Study Results to Date

5 Next Steps & Conclusions

6 Questions

7 Acknowledgements

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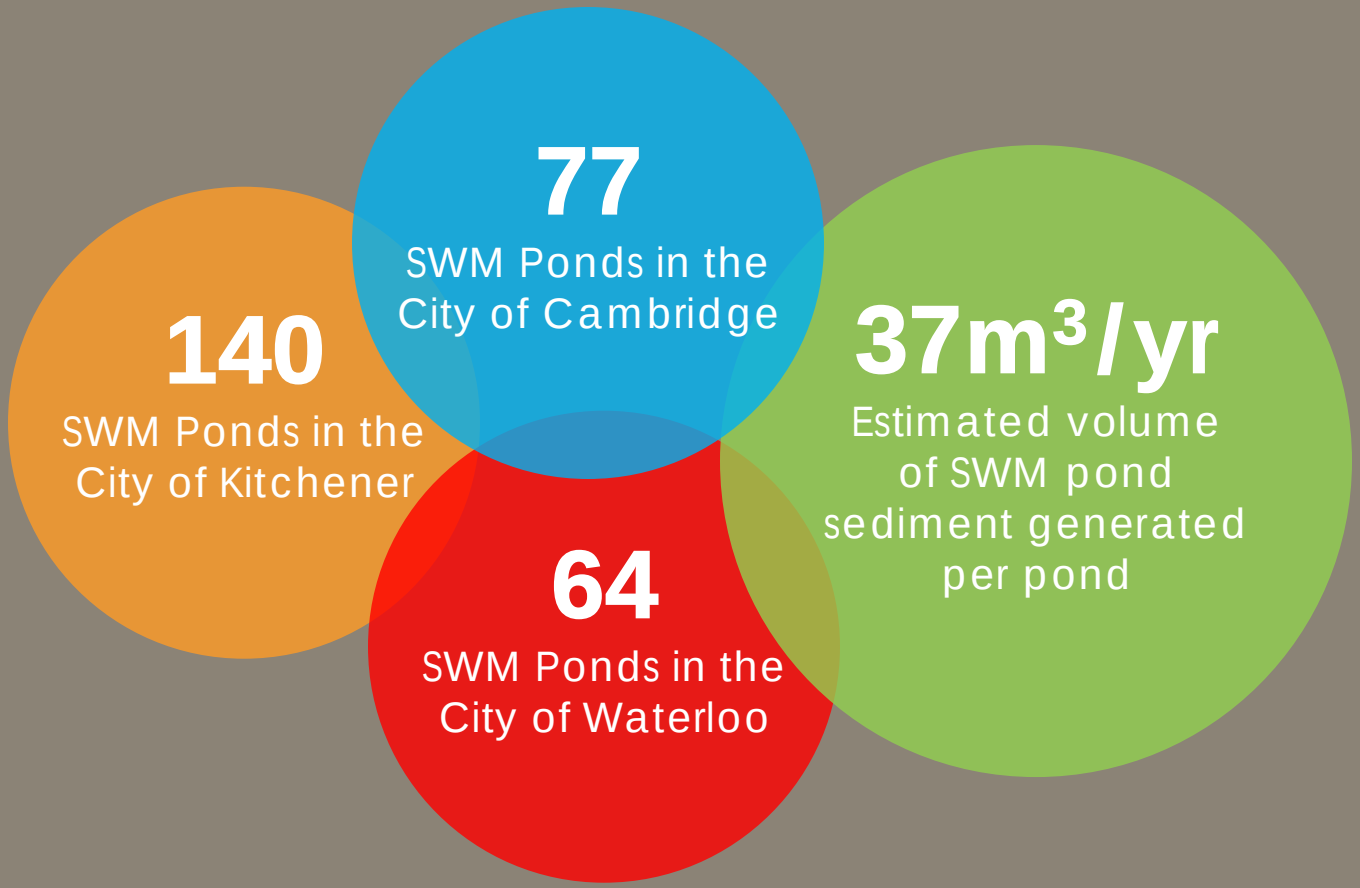
1 Study Background & Context



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1 Study Background & Context

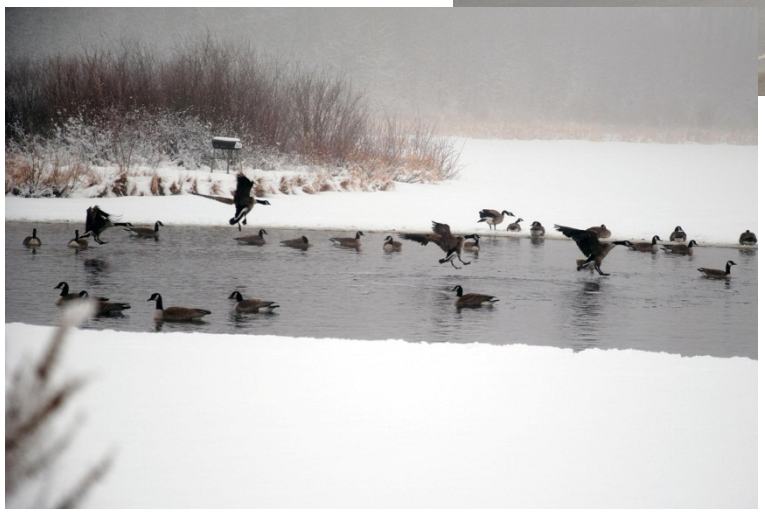
Primary COCs in SWM Pond Sediment:

PAHs

PHCs

NaCl

Organic Nitrogen



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1 Study Background & Context

Numerous studies on SWM ponds and sediment management

Non-impacted SWM pond sediment management options

Impacted SWM pond sediment management options

BMPs

References: Minnesota Pollution Control Agency (June 2012),Marsalek, Watt and Anderson (2008), MOE (4328a)

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1 Study Background & Context

Many studies to date on options for treating low level PAHs impacts in sediment/soil

PAHs are transferred, degraded and sequestered

Aerobic degradation
Anaerobic degradation
Cometabolism
Biostimulation
Composting
Landfarming
Phytoremediation

References: Boving and Neary (2007), Eick, Haus, Sukkariyah, Haering & Daniels (2011), Johnsen, Wick and Harms (2005), Haritash & Kawshik (2009)

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1 Study Background & Context

Regulatory Environment

Ontario Regulation 153/04
Draft Guidance Soil Management
Compost Guidelines

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2 Project Background

Rehabilitation of Victoria Park Lake in Downtown Kitchener, Ontario

Work included:

- Environmental Assessment Study
- Detailed Design and Construction
  - including management of >55,000 tonnes of impacted sediment in the Lake

Stantec approached Kitchener and the Region on innovative approach

Kitchener and the Region entered into an agreement and received funding from MOE

Funding for this project was provided by the Showcasing Water innovation Grant through the Ontario Ministry of Environment (MOE). Such support from the MOE does not indicate endorsement by the Government of Ontario of the contents of this material

?

Questions we asked ourselves

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2 Project Background

Broader scale applications may include:

Minimize
Reuse Soil and Material
Establish
Stockpile
Treat & Manage
Reuse Treated vs. Recycling Products

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2 Project Background

Project elements:
Excavation
Stabilization

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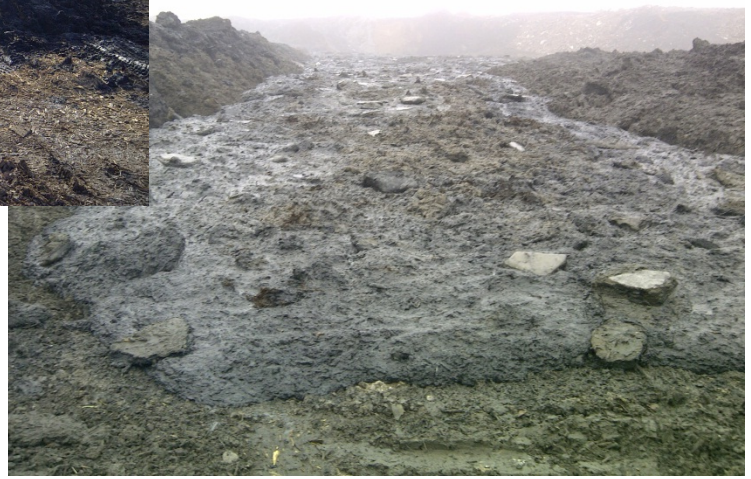
2 Project Background

Project elements:
Sampling

In situ
Ex situ
At study site



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3 Test Program Set-up and Methodology

Stockpiles: Untreated, Nutrient Added, Compost

Sampling Program

Reduction in concentrations of COCs

Planned Beneficial End Use

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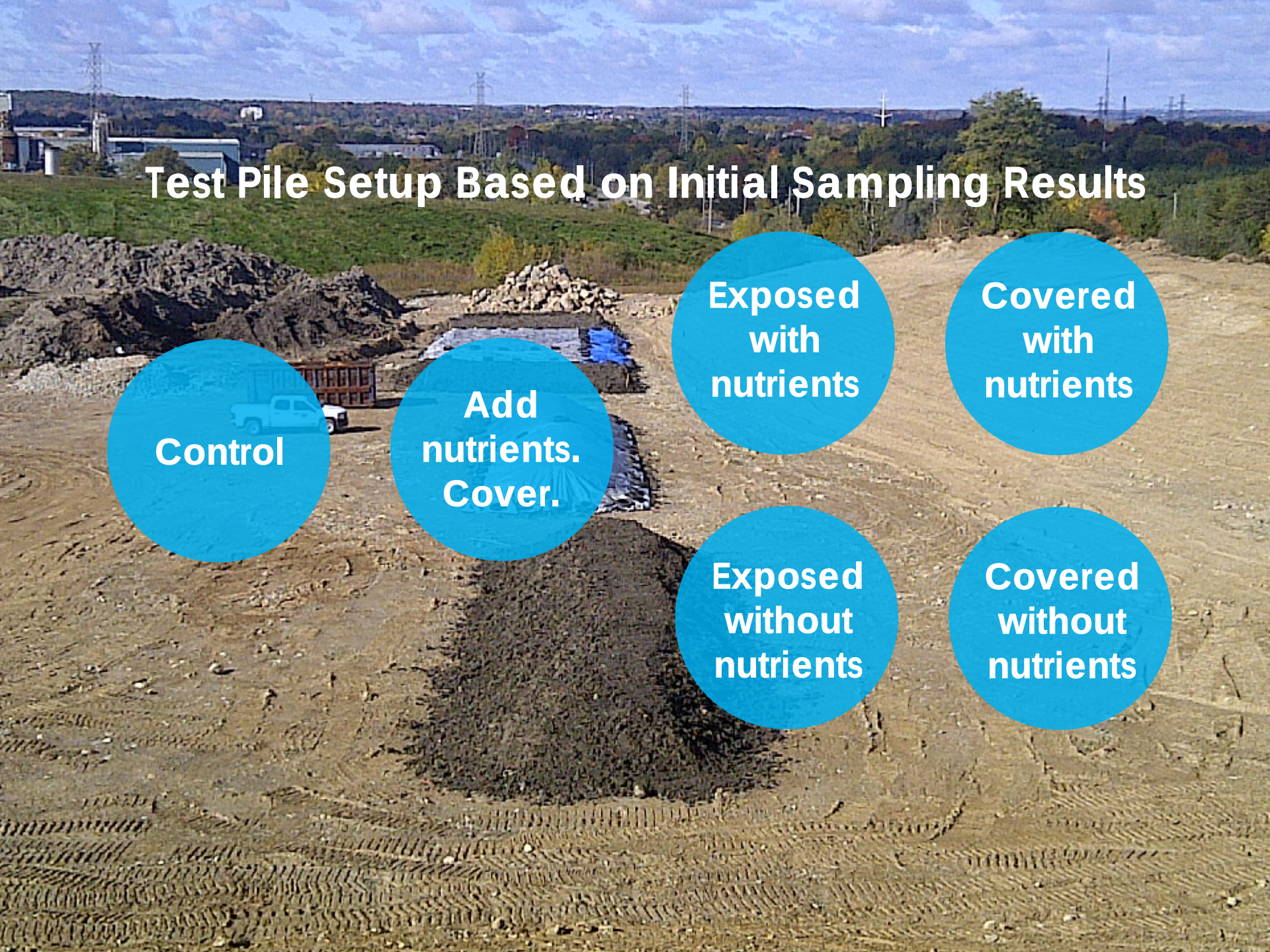
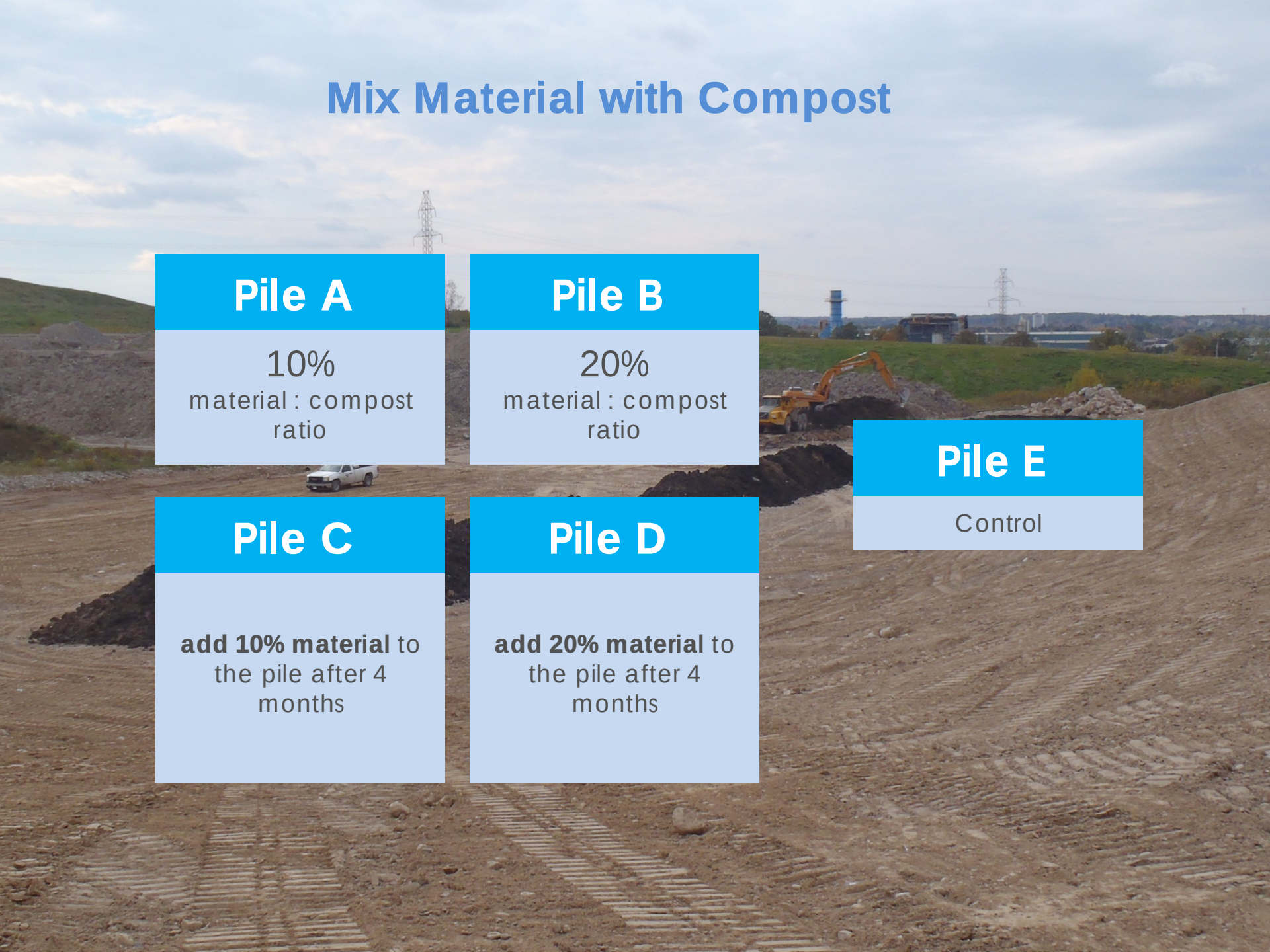
9
large stockpiles
+
4
small stockpiles
Reorganized piles for study program


Test Pile Setup Based on Initial Sampling Results
Control
Add nutrients. Cover.
Exposed with nutrients
Covered with nutrients
Exposed without nutrients
Covered without nutrients

Mix Material with Compost



Pile A

10%
material : compost ratio

Pile B

20%
material : compost ratio

Pile C

add 10% material to the pile after 4 months

Pile D

add 20% material to the pile after 4 months

Pile E

Control

3 Test Program Set-up and Methodology

Sampling Program Design

Composites

Appropriate Volume

Representativeness

Reference: Lame, Honders, Derksen and Gadella (2005)

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3 Test Program Set-up and Methodology

Challenges

Funding

Material State

Winter Conditions

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4 Study Results to Date

In situ vs. ex situ

Elevated SAR

Elevated organic nitrogen

Elevated PHCs and PAHs

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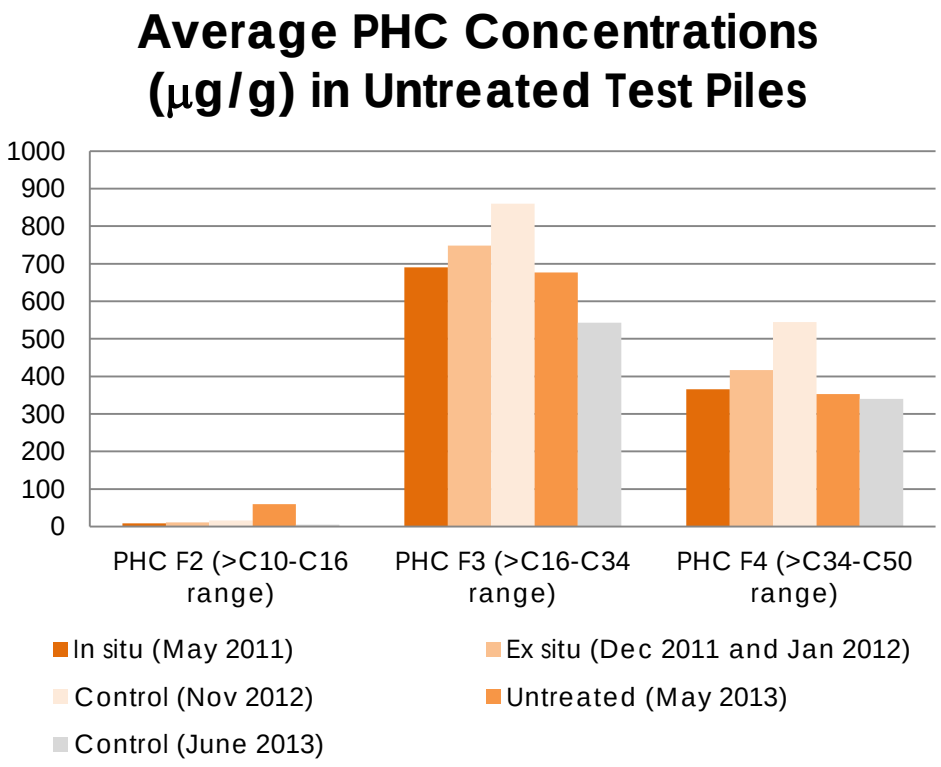
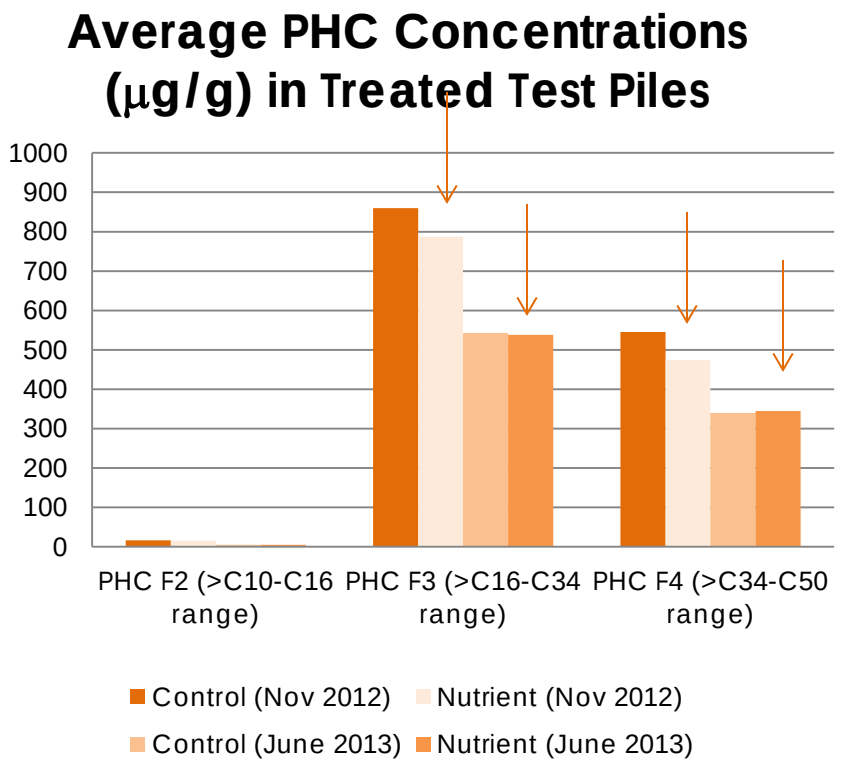
4 Study Results to Date





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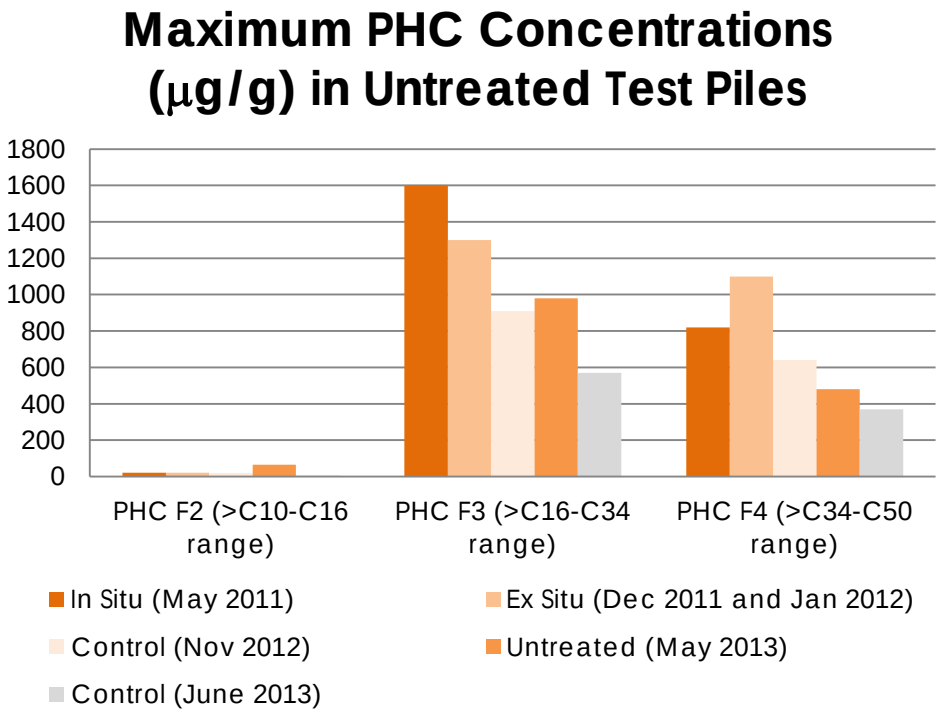
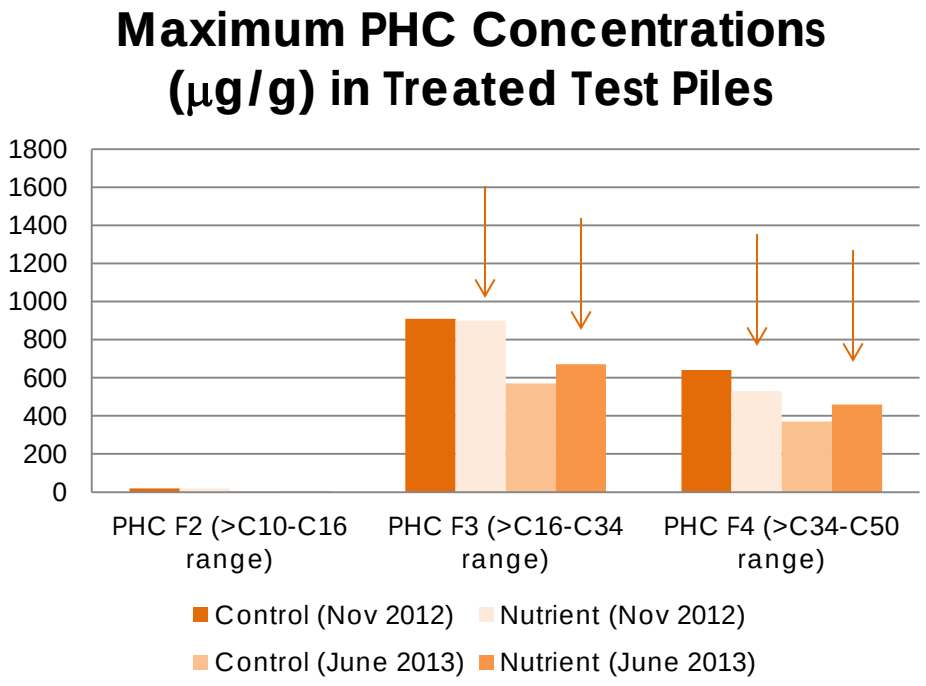
4 Study Results to Date





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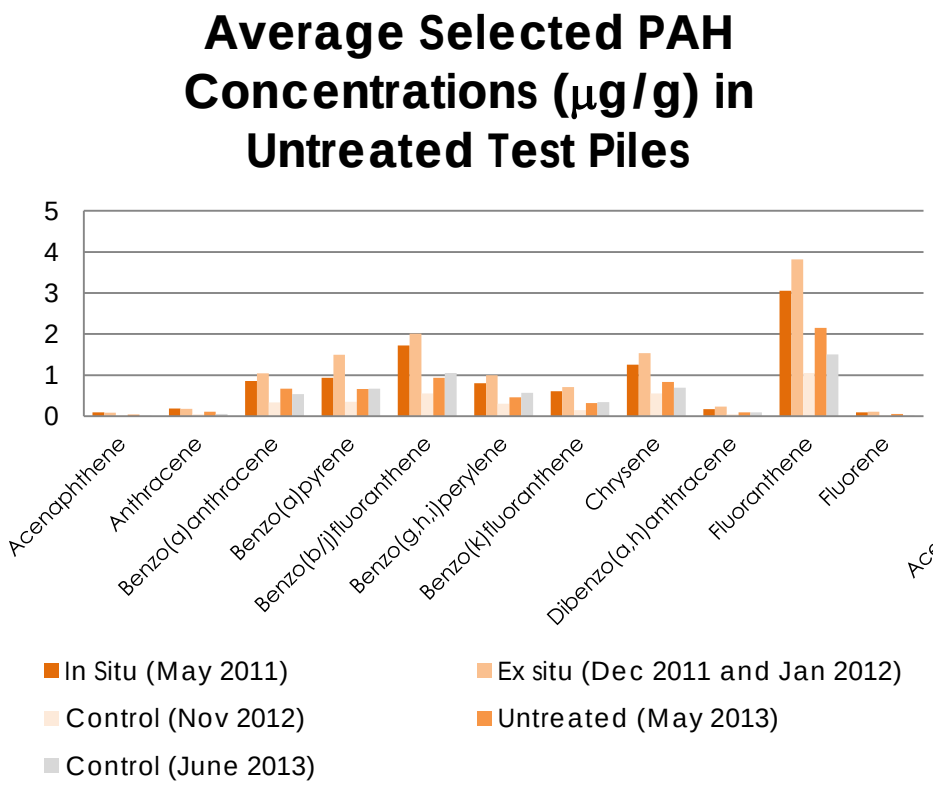
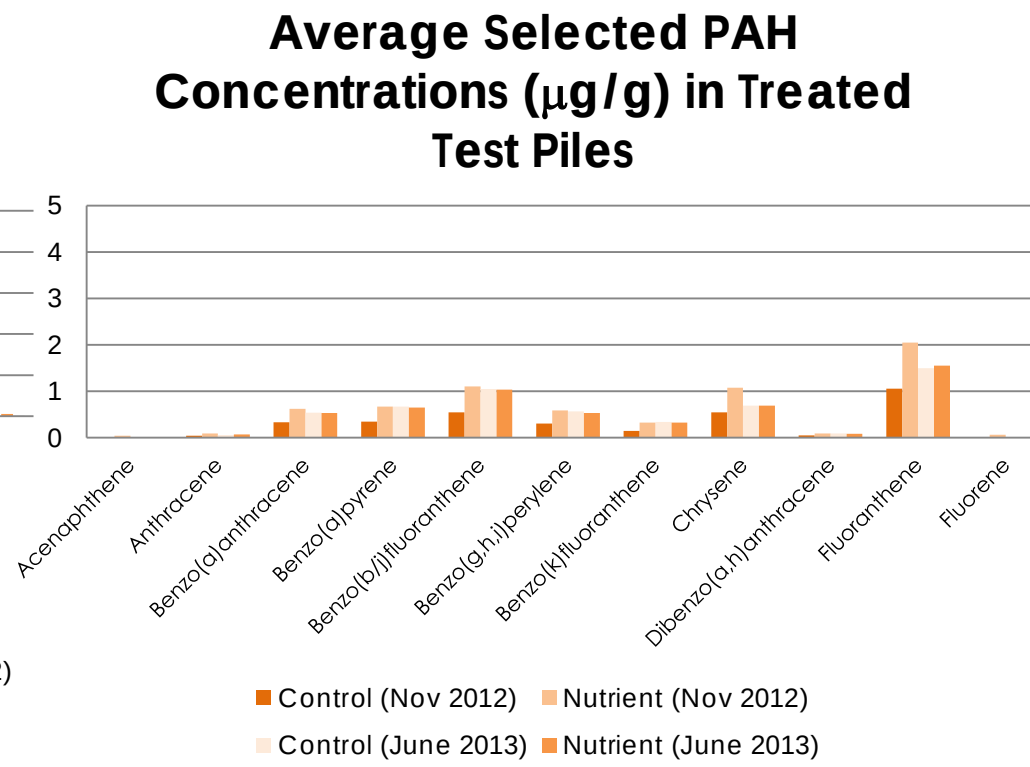
4 Study Results to Date





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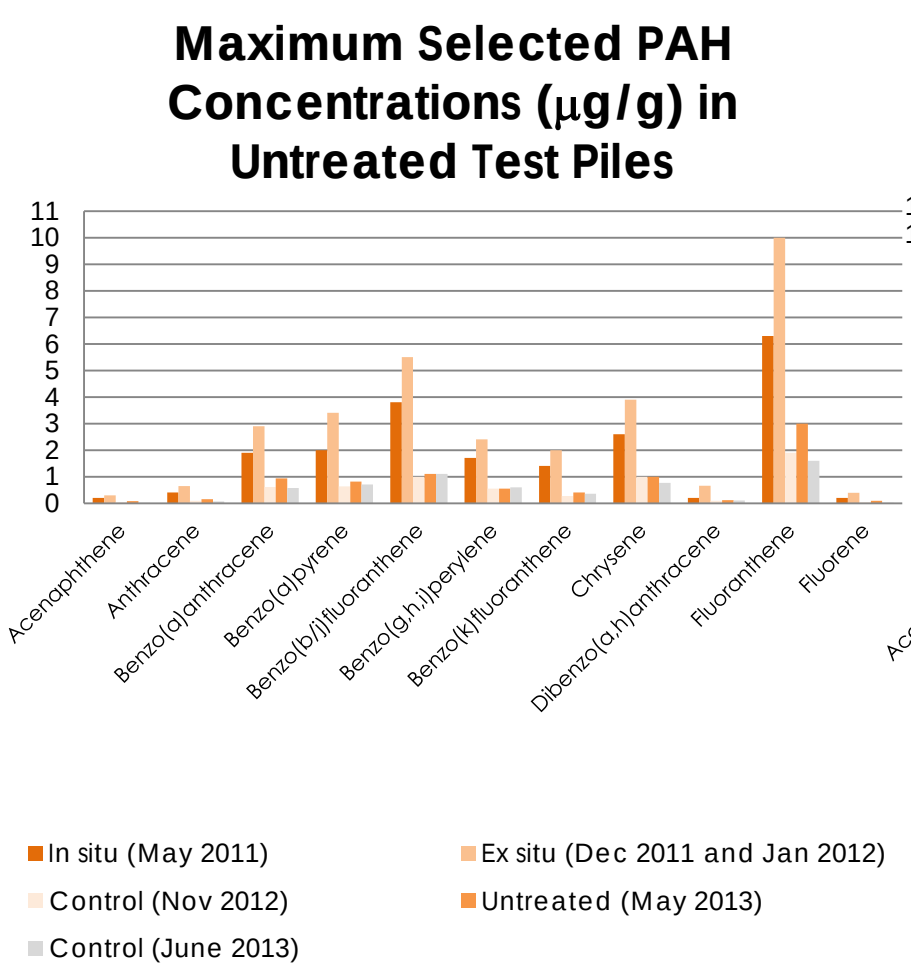
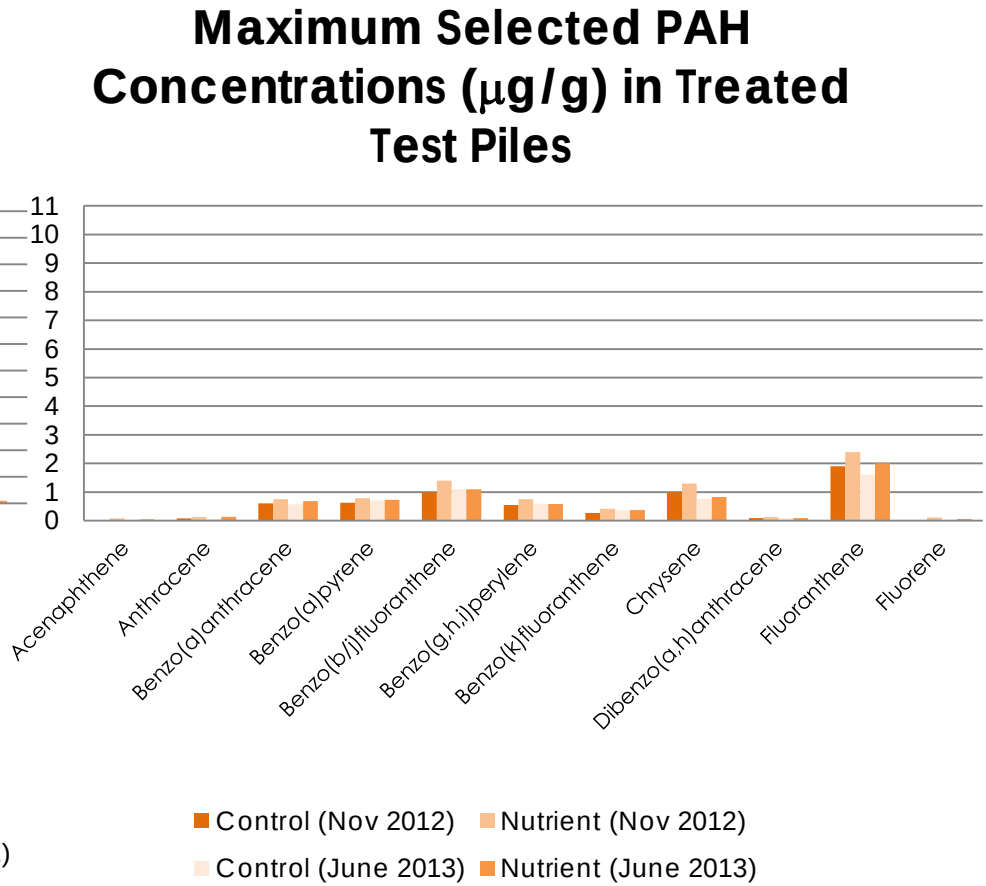
4 Study Results to Date





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4 Study Results to Date

Summary

Nutrient Value

Reductions in PHCs, PAHs, & SAR

Impact on Compost Quality

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4 Study Results to Date

Summary

Analysis/Sampling of study stockpiles – on going

Compost study – on going

Discussion on options for soil management in the Region – on going

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5 Next Steps & Conclusions

Additional sampling in 2013
Comparison of results
Determination of end use

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7 Questions

8 Acknowledgements

Thanks to:

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Melissa Ryan & Nick Gollan (City of Kitchener)

Tiana Robinson, Mike Charles & David Wilson
(Stantec)

Region of Waterloo

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