

Biofiltration Media Optimization: 2021 MSRC Mid Project Update

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Project Objectives

Identify a biofiltration media...

- ...that captures phosphorus
- ...that has an effective filtration rate
- ...that supports vegetation growth



Photo Courtesy: Andy Erickson

Phase II (May 2020– December 2022)

- Add **new mixes**: Layered systems, different media ratios, etc.
- Investigate the phosphate release in response to **road salt**
- Test plant growth in **low-organic content** (3% – 20%) mixes
 - 10 vegetation species and 5 media mixes



Photo Courtesy: Barbara Heitkamp

Mesocosm Experiments

14 simulated events in 2019 + 8 events in 2020
thru Thirty Mesocosms:

- 100% Clean Washed Sand
- 10% food residue compost
- 20% food residue compost
- 10% leaf compost
- 20% leaf compost
- 20% sphagnum peat
- 20% reed sedge peat
- 15% biochar + 20% leaf
- 5% spent lime + 20% leaf
- 5% iron + 20% leaf



Mesocosm Experiments

14 simulated events in 2019 + 8 events in 2020
thru Thirty Mesocosms:

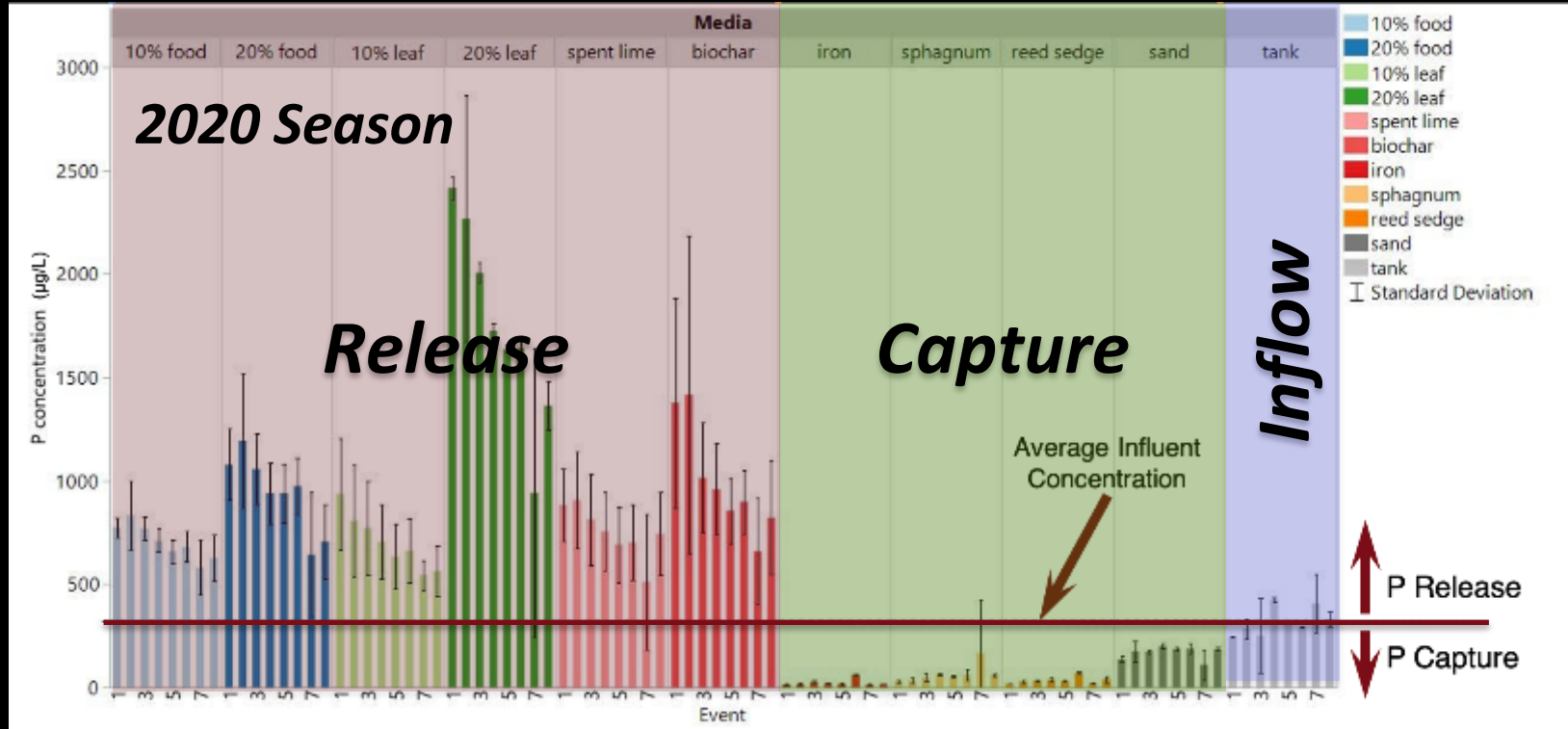
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- ~~10% food residue compost~~
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- ~~10% leaf compost~~
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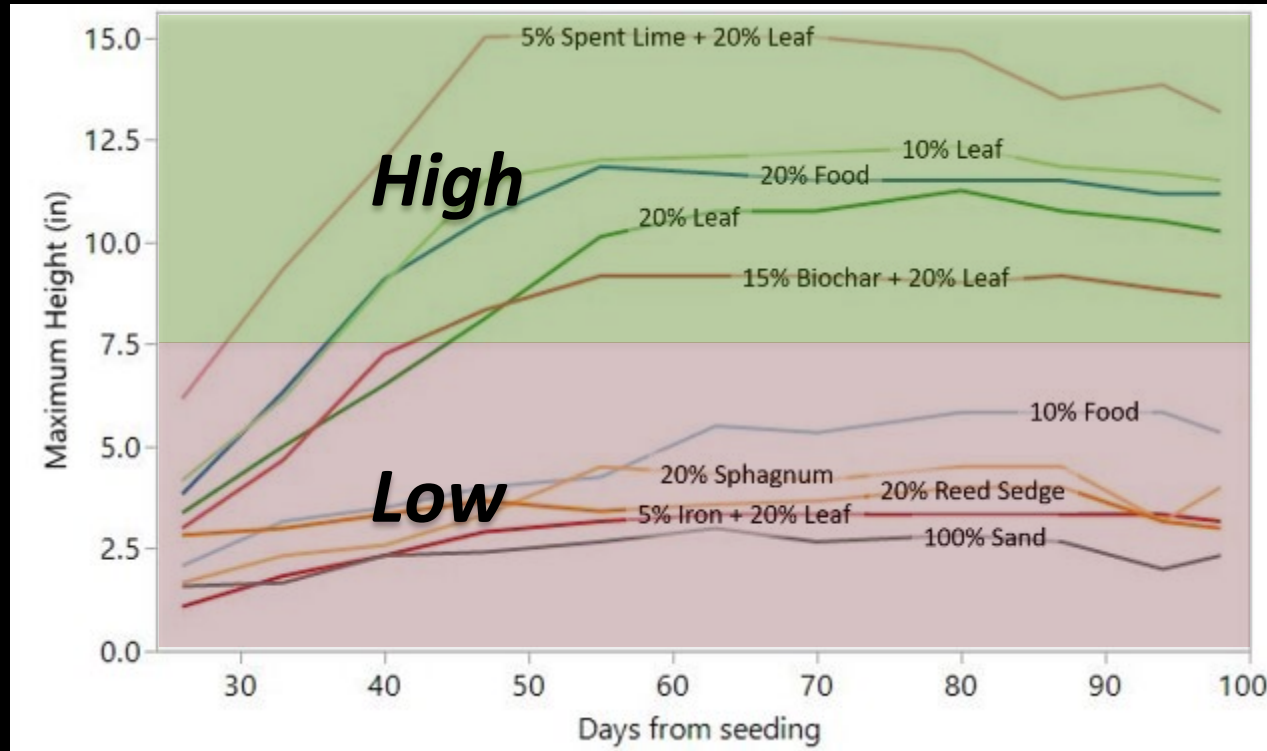
New for 2021:

- 100% Clean Washed Sand
- 10% leaf compost
- Layered 10% leaf compost (top half) OVER 5% iron (bottom half)
- 10% spent lime + 10% leaf compost
- 10% sphagnum peat + 10% leaf compost

Limiting Phosphate Release



Supporting Vegetation Growth



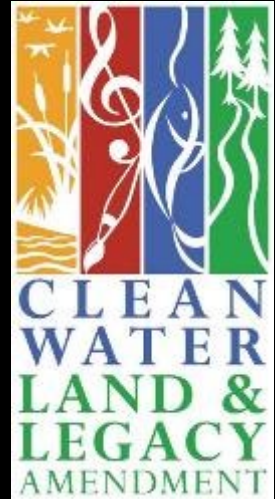
Key Takeaways so far...

Media	Filtration Rate	Vegetation Growth	Phosphate Capture
10% or 20% Leaf Compost	Same	More	Release
10% or 20% Food Residue Compost	Same	More	Release
5% Spent Lime + 20% Leaf Compost	Same	Most	Release
15% Biochar + 20% Leaf Compost	Same	More	Release
5% Iron + 20% Leaf Compost	Slightly Faster	Least	Capture
20% Peat (Sphagnum or Reed Sedge)	Same	Less	Capture
100% Sand	Same	Least	Minimal Capture

Full Phase I Report: Erickson, Andrew J.; Kozarek, Jessica L.; Kramarczuk, Kathryn A.; Lewis, Laura. (2021). *Biofiltration Media Optimization – Phase I Final Report*. Retrieved from the University of Minnesota Digital Conservancy, <https://hdl.handle.net/11299/218193>

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- For more information about the Center and the Council, visit <https://www.wrc.umn.edu/projects/storm-waste-water>
- For more information about the Minnesota Clean Water, Land and Legacy Amendment, visit <https://www.legacy.mn.gov/about-funds>



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Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the Water Resources Center or Minnesota Stormwater Research Council.

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Thanks for your attention!

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