Phosphate treatment of lead contaminated soil: effects on water quality, plant uptake and lead speciation

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3 Supplemental Figures

1 Supplemental Table
**Supplemental Figure S1.** Rainfall simulation test beds after filling with washed and sieved sand, prior to filling with lifts of control and treated soils. The v-notch on the front of the test bed funnels surface runoff effluents to a central collection point during rainfall simulation.
Supplemental Figure S2. Arithmetic mean of total lead concentration in above ground tissue of tall fescue (*Festuca arundinacea*) one month after planting. Values followed by different lowercase letters are significantly different between treatment classes determined using a one-way ANOVA and Fisher’s Least Significant Difference means separation test ($\alpha=0.05$). Error bars represent standard error.
Supplemental Figure S3. Normalized and first derivative of normalized x-ray absorption near edge structure (XANES) spectroscopy spectra of reference samples employed as model components for linear combination fitting.

Lead Sorption Complexes:

Lead will form strong inner-sphere sorption complexes with a variety of common soil mineral constituents (Bargar et al., 1997a, b; Elzinga et al., 2006; Grafe et al., 2007; Lee et al., 2006; Manceau et al., 1996; Qin et al., 2006; Rouff et al., 2004, 2005; Scheckel and Ryan, 2004; Strawn and Sparks, 1999; Trivedi et al., 2003; Xia et al., 1997; Xiong et al., 2013). For the current study we selected several common soil mineral constituents as model compounds for soil lead sorption complexes. Lead forms inner-sphere surface complexes with iron hydroxides predominately through bidentate surface complexes, while forming both inner and outer-sphere surface complexes with kaolinite (Bargar et al., 1997b; Christophi and Axe, 2000; Grafe et al., 2007; Trivedi et al., 2003). Similarly, previous research has shown that lead also for strong complexes with humic and fulvic acid through direct coordination with organic functional groups (Qin et al., 2006; Xia et al., 1997; Xiong et al., 2013).
### Supplemental Table S1. Water, sediment, and mass lost results from the first and second rainfall simulation events.

<table>
<thead>
<tr>
<th>Rainfall Simulation and Treatment Class</th>
<th>Mass Total (soil + sediment) g</th>
<th>Sediment Mass g</th>
<th>Sediment Volume cm³</th>
<th>Water Only g</th>
<th>Total Volume L</th>
<th>Total P mg</th>
<th>Total Cd µg L⁻¹</th>
<th>Total Pb µg L⁻¹</th>
<th>Total Zn µg L⁻¹</th>
<th>Runoff Area m²</th>
<th>P loss mg/m²</th>
<th>Cd loss mg/m²</th>
<th>Pb loss mg/m²</th>
<th>Zn loss mg/m²</th>
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<tbody>
<tr>
<td>RFS1-Control</td>
<td>2672.2</td>
<td>13.43</td>
<td>2658.8</td>
<td>5.07</td>
<td>2.66</td>
<td>1.03</td>
<td>34.93</td>
<td>8657</td>
<td>1797</td>
<td>0.15</td>
<td>18.29</td>
<td>0.620</td>
<td>153.738</td>
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<td>11.17</td>
<td>2502.6</td>
<td>4.22</td>
<td>2.51</td>
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<td>10802</td>
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References


