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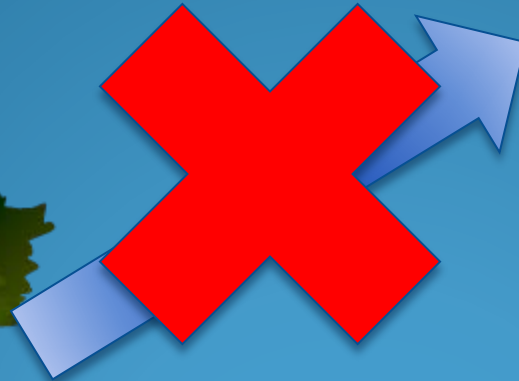
Use of soil amendments to reduce phosphorus release to floodwater from waterlogged, anoxic soils in Manitoba

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Photo credit: David Lobb

Brief overview of the project

Phosphorus is beneficial
when on land



A threat to freshwater bodies



Effect of flooding



Photo:
David Lobb

- ❏ Prolonged flooding is common with spring snowmelt
- ❏ Results in anaerobic conditions in soils
- ❏ May enhance phosphorus release to floodwater

Objective

- ✚ To investigate the effectiveness of different soil amendments in reducing phosphorus release from soils to floodwater
- ✚ Laboratory and field studies with simulated flooding

Activities

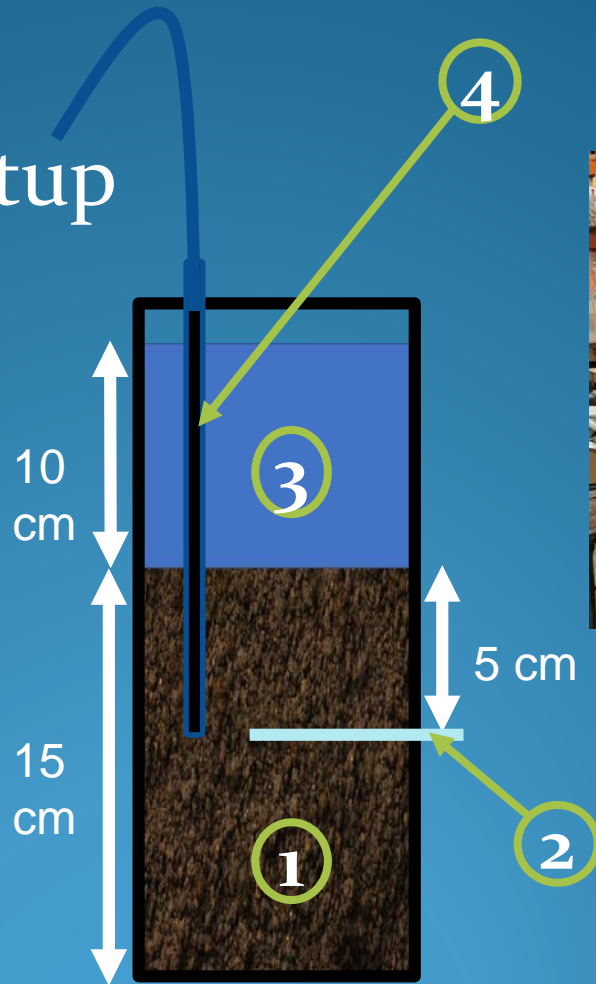
- ✚ Completed the first laboratory study comparing two soil amendments; gypsum and alum
- ✚ Used intact soil columns (15 cm depth) from eight fields representing intensive agricultural areas in the Red River Valley



Activities

Experimental Setup

- ① Soil
- ② Rhizon flex sampler
- ③ DI water
- ④ Pt Redox probe



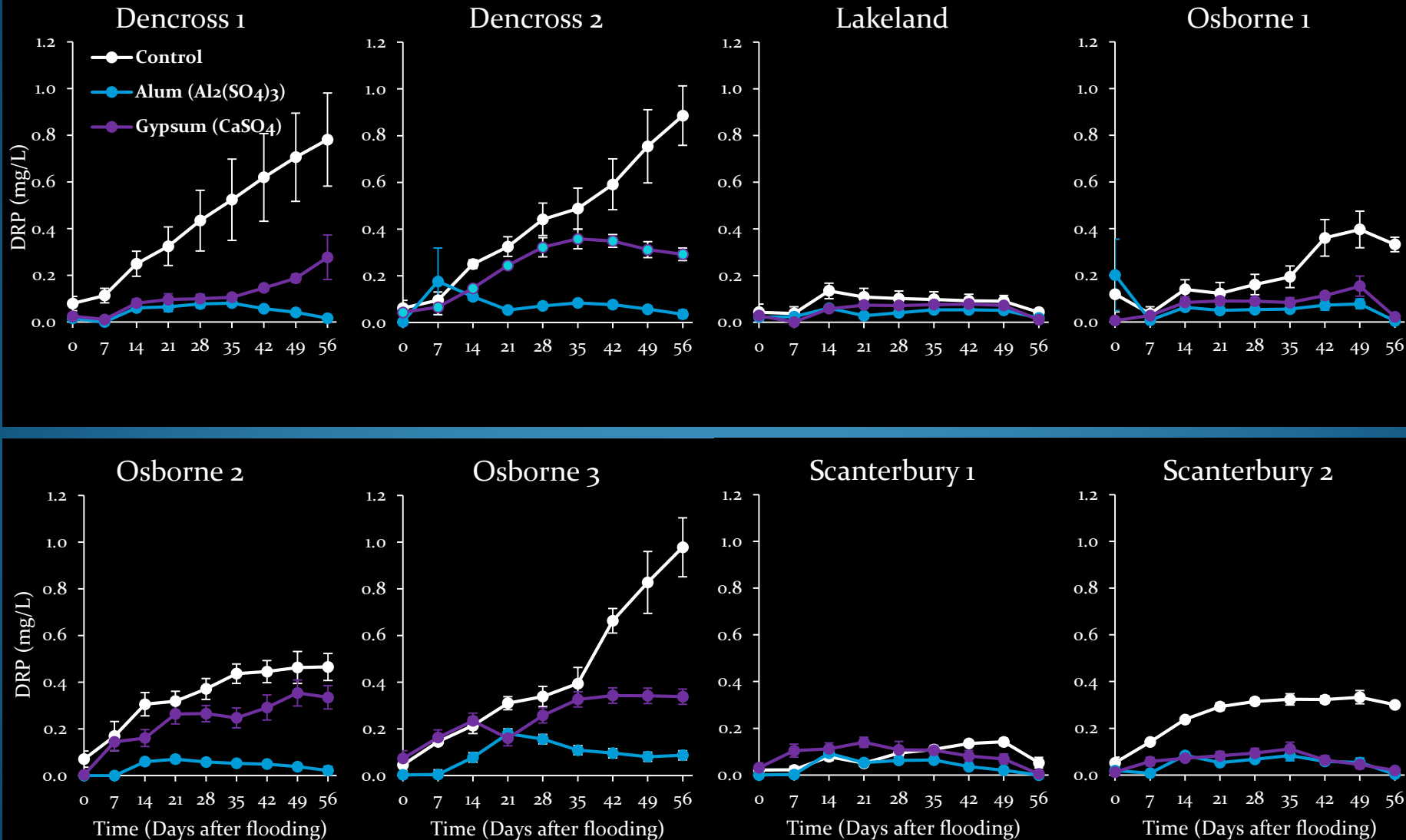
Activities

- Treatments
 - ✗ Control/ no amendment
 - ✗ Alum
 - ✗ Gypsum } 5 t/ha
- Incubation conditions
 - ✗ Temperature – 4 °C
 - ✗ Duration – 8 weeks
- Weekly collection and analysis of floodwater and pore water for dissolved reactive P



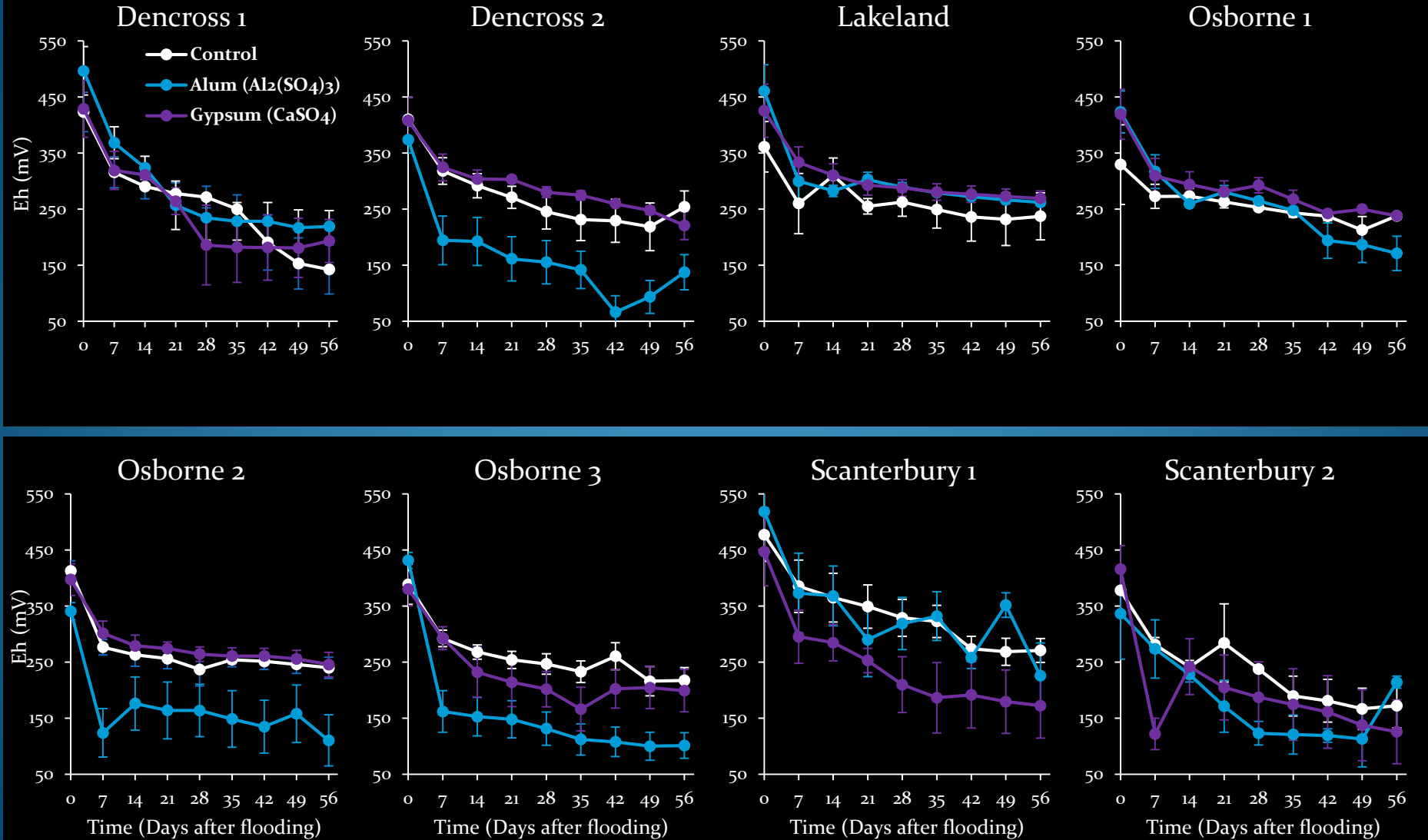
Early successes of the project

Floodwater Dissolved reactive P concentration



Early successes of the project

Soil redox potential



Early successes of the project

- ✚ Both alum and gypsum were effective in reducing pore and floodwater DRP concentrations in most of the soils
- ✚ Floodwater DRP decreased by 74-99% with alum and by 65-99% with gypsum
- ✚ Now conducting a similar study exploring the effectiveness of magnesium sulfate as a possible soil amendment

Challenges/gaps and next steps

- 📊 Simulated snowmelt conditions; not real field conditions
- 📊 A field study is being set up; to be started soon
- 📊 Identifying the mechanisms using phosphorus speciation and fractionation studies

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Thank you!

