

# Where's the P in Prairie Potholes?

## The role of wetlands in phosphorus retention and release

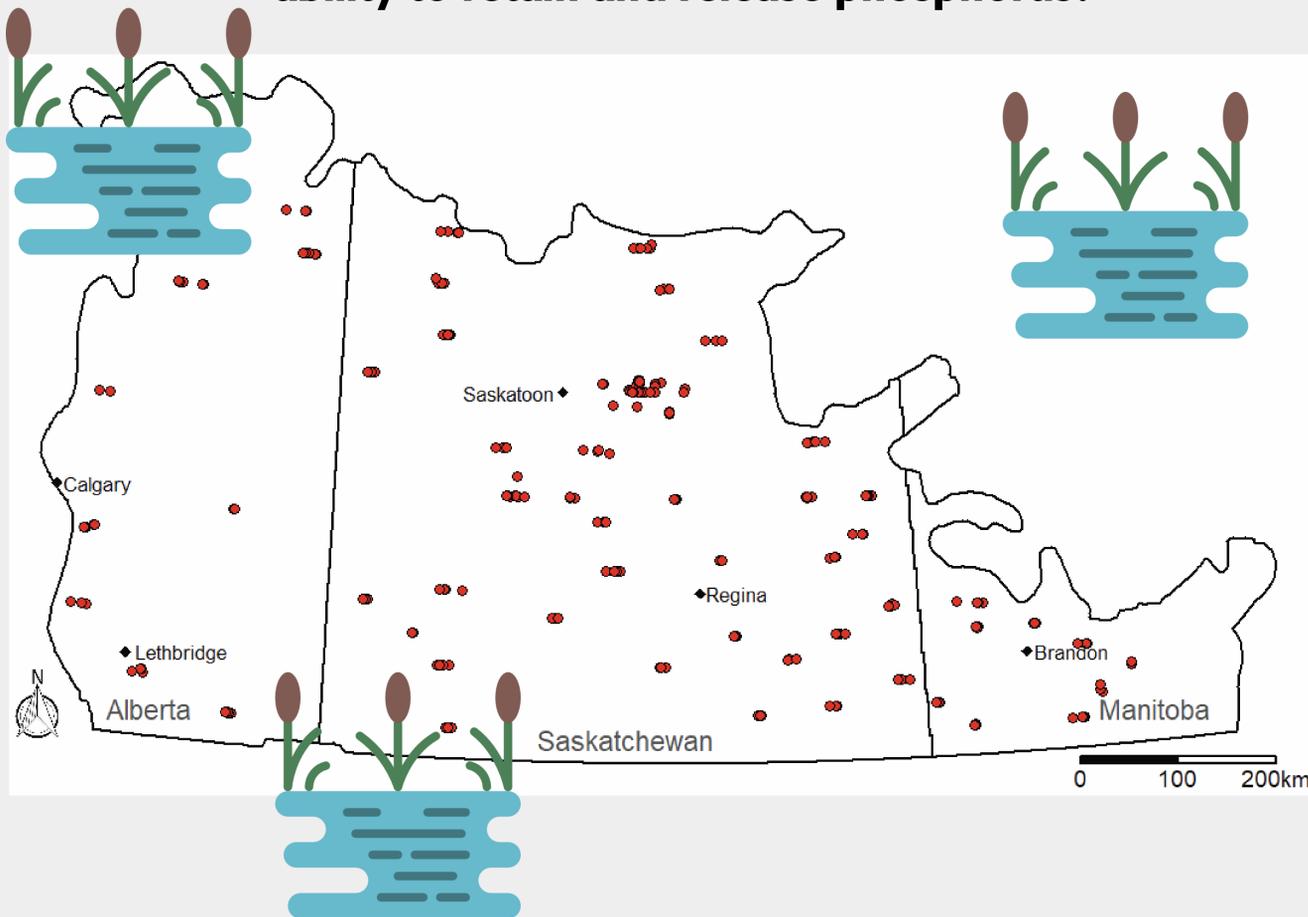
Laura McFarlan (laura.mcfarlan@usask.ca)<sup>a,b</sup>, Colin J. Whitfield<sup>a,b</sup>, Angela Bedard-Haughn<sup>a,b,c</sup>

<sup>a</sup> School of Environment and Sustainability, University of Saskatchewan, Saskatoon, SK ; <sup>b</sup> Global Institute for Water Security, Saskatoon, SK ; <sup>c</sup> College of Agriculture and Bioresources, University of Saskatchewan, Saskatoon, SK

### The Problem

- Wetlands in the Prairie Pothole Region have been disappearing at a rapid rate since the early 1900s
- As wetlands disappear the services they provide like habitat, carbon storage and nutrient retention disappear
- An excess of nutrients like phosphorus is causing algae blooms and decreasing water quality in water bodies across the Prairies
- We need to better understand the controls on phosphorus retention and release in Prairie wetlands and the differences in the properties linked to such controls

### How much difference is there in Prairie wetlands ability to retain and release phosphorus?



### Answering the Question

To answer this question, I will use a field and laboratory-based investigation that includes comprehensive data from > 100 pothole wetland sites.

Though this work I will tackle the following specific objectives:

- determine how concentrations of total P in wetland surface waters vary spatially in the Prairie ecozone
- determine if there are patterns of geomorphic, soil, and sediment properties and surface water characteristics driving observed variation,
- determine how the forms of P in wetland soils vary between freshwater and saline wetlands

### Implications and Applications

- Develop a well-rounded understanding of the variability of wetland phosphorus retention and release across the Prairies, while identifying the contributing controls
- Contribute to informed decisions in regards to wetland drainage and wetland preservation, by understanding the role specific types of wetlands play in phosphorus retention
- Facilitate predictions about the potential changes in rates of eutrophication should wetlands disappear



#### References

1. Van der Valk, A. Northern prairie wetlands. (1989).
2. Marton, J. M. et al. Geographically isolated wetlands are important biogeochemical reactors on the landscape. *Bioscience* 65, 408–418 (2015).
3. Schindler, D. W., Hecky, R. E. & McCullough, G. K. The rapid eutrophication of Lake Winnipeg: Greening under global change. *J. Great Lakes Res.* 38, 6–13 (2012).
4. Badiou, P., Page, B. & Akinremi, W. Phosphorus Retention in Intact and Drained Prairie Wetland Basins: Implications for Nutrient Export. *J. Environ. Qual.* 47, 902 (2018).
5. Icon made by Smashicons from www.flaticon.com