



PRAIRIE WATER ANNUAL PARTNERS MEETING 2022

“Collaborations and partnerships for successful water outcomes”

A primer for starting conversations



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1. Introduction

We are pleased and humbled to welcome all our returning partners and many new partners to this year's Prairie Water Annual Partners Meeting. It has been another difficult year for everyone, not just with Covid, but with the extremely dry conditions of 2021. Despite these challenges many of you have continued to be engaged with us and supported our progress. Partnership and co-development have been a foundational part of Prairie Water's research approach. As we move into the final two years of the project, partnerships and co-development will be more important than ever for us to achieve our goal of creating science-based products tailored to water management issues across the prairies.

The theme of this year's APM, therefore, is "Collaborations and partnerships for successful water outcomes". Our focus will be on starting conversations on how you have, or could use the knowledge we have produced so far, how we might integrate the findings from each of the research teams, and opportunities for pilot projects so we can learn together how to effectively apply the latest science to critical water issues in the prairies.

1.1 Document rationale & goal of APM

Our key goal for this year's meeting is to expand conversations with you on how we can accelerate the movement of research findings, data, and other products into the hands of you, our partners. However, we realise that before these conversations can happen, we need to provide a summary of those findings, data, and products. Rather than take up time at the APM delivering presentations, we have produced this short primer to share the key points of our research progress and outputs. We hope that by providing this primer, you will have some time to think about how Prairie Water research relates to your work, and that you will come to the meeting with questions. We have outlined some key questions we have at the end of this document as a guide. We look forward to a productive discussion, and hearing your questions as well, on February 17, 2022.

Our overall goal for this workshop is to provide a solid foundation for developing practical outlets for Prairie Water research.

1.2 Format of the APM

The meeting will feature:

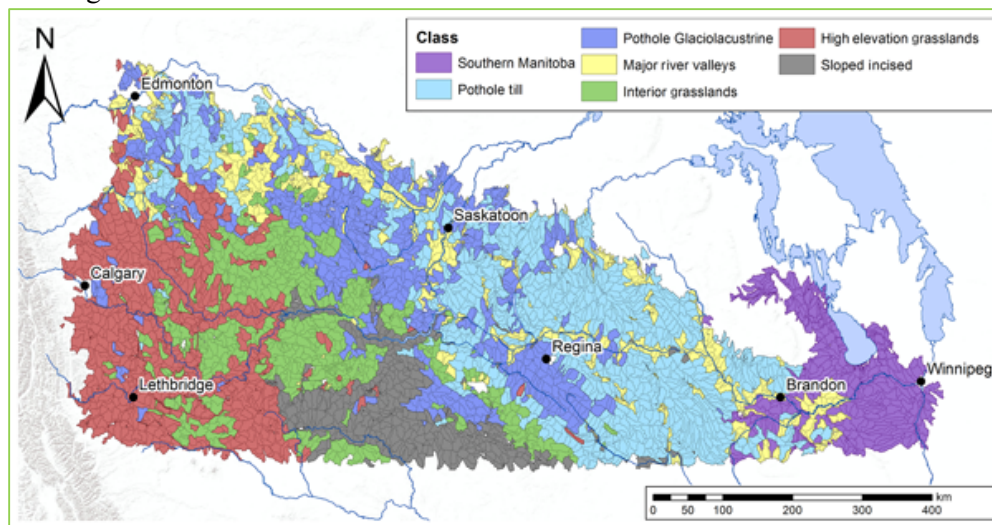
- Welcome and blessing from Elder Roland Duquette
- Introduction and opening remarks (15 min)
- A plenary session with brief research updates from each team, and opportunities to integrate findings and explore pilot applications (45–60 min)
- A short breakout session with 'themed' rooms for short discussions on water issues (10–15 min)
- A panel session with 3 to 4 panelists sharing their experience of working with Prairie Water (45 min)
- Soft close and blessing from Elder Roland Duquette
- An informal breakout session with 'themed' rooms where partners can chat about current water issues and how Prairie Water research connects to them (As long as the conversations last)

2. Project status report

2.1 Overall progress of Prairie Water

We are now entering the final two years of the Prairie Water project. Our activities increasingly reflect our move towards integration and application of the knowledge produced during the project's early stages. Synthesizing what our teams have learned and applying this to key operational issues experienced by our partners remains a focus. We have started exploring opportunities with partners to understand how we can craft and share our research outputs in useful, and usable ways. Highlights of our project level progress at present include:

- Biophysical classification of small Prairie watersheds ([article](#)), serving as a foundation for modelling



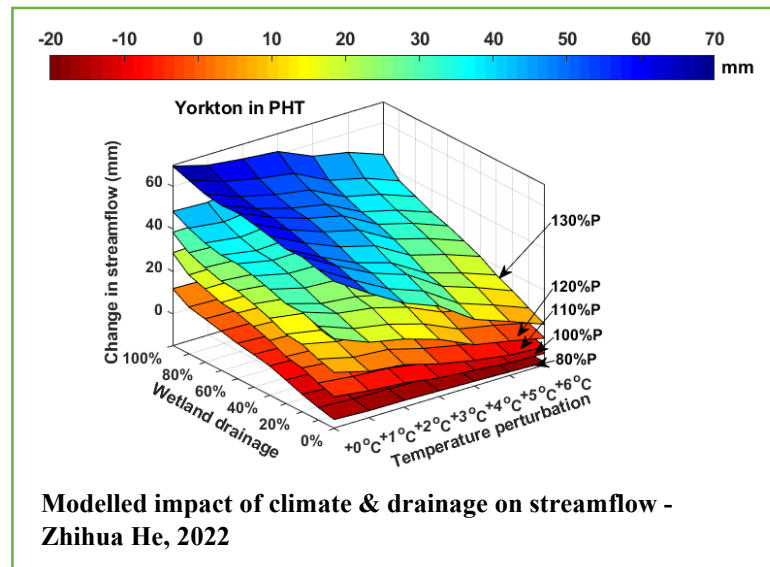
Prairie watershed classification, Wolfe et al., 2019

- A virtual watershed framework for modelling surface hydrology across the region ([manuscript](#)), and integrated modelling of watershed response to scenarios
- Partner engagement through workshops to design and drive pilot applications of our decision-support outputs (e.g. [workshop report](#) and [workshop presentations](#))
- Synthesis of the state of western science on expected impacts of wetland drainage in the Canadian Prairies ([article](#))
- Collaborations with multiple artists who have created work capturing Prairie Water research, including pieces installed at the National Hydrology Research Centre, and shared through GWF's Virtual Water Gallery
- Developed tool for economic assessment of wetland conservation costs
- Supporting emerging requests for information to support agricultural water management and drought preparedness planning
- Growing connections to network of Prairie stakeholder and rightsholders

2.2 Team A progress – Water Availability

The Water Availability team has made significant progress in several areas. Groundwater hydrology studies in Alberta have shown the importance of topographic depressions for groundwater recharge. This is significant as we have also found that groundwater in the prairies is not well connected to surface hydrology. The prairie basin classification system has allowed us to assess potential impacts of drainage and climate change on streamflow regimes, improves on existing hydrological modelling techniques, and can support better hydraulic design. Studies of historic and existing oil wells are shedding light on their risk to groundwater. These studies highlight that current groundwater monitoring and investigations are not adequate to assess the risk of contamination by the oil and gas industry. Our research outputs and activities include:

- Applying watershed classification system to create a classification-based virtual modelling framework ([article](#))
- Applying this framework to assess the impacts of wetland drainage and climate change on streamflow regimes in the Prairie Pothole Region
- Completed a preliminary assessment of groundwater resources in the Prairies that suggests much of our groundwater is thousands of years old and not well connected to the surface and near-surface hydrologic cycle



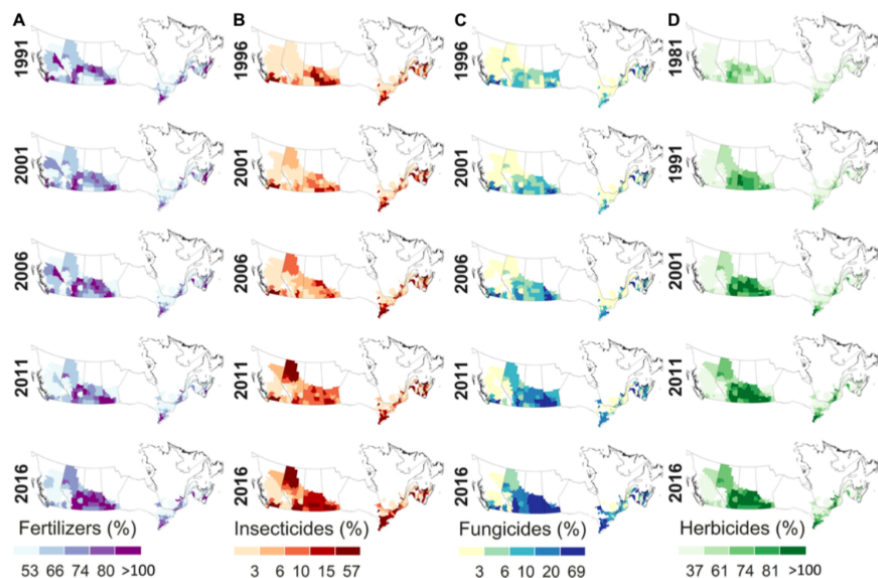
- Estimated the contribution of topographic depressions (potholes) to groundwater recharge over Alberta Prairies ([Manitoba Cooperator](#) and [Western Producer](#))
- We are extending the groundwater recharge model estimates to Saskatchewan
- Conducted a proximity analysis of spills from the oil industry and groundwater users in Saskatchewan; most spills occur within a 1 km of a water well
- Completed an analysis of abandoned oil wells revealing that older wells may pose a risk due to changes in abandonment standards over time ([article](#))
- Found that shallow injection wells operated by the oil industry in south-east and west-central Saskatchewan may pose a risk to overlying groundwater supplies ([article](#))

2.3 Team B progress – Aquatic Ecosystem Health

To date, our work on wetlands and aquatic ecosystem health has brought us a long way towards our initial goals. Many of these efforts are summarized below, and some new work (e.g. on pothole salinity) is now beginning. In the remaining stages of the project, we will work to connect the virtual modelling scenarios of surface hydrology with emerging information on aquatic ecosystems. This will allow us to explore how anticipated changes in hydrology associated with climate change can affect, for example, aquatic ecosystem services. This will include refining and advancing our integrated modelling work completed to date, working closely with the other teams, and including these outputs as part of a data visualization tool.

- In Alberta, climate changes that yield progressively warmer, wetter conditions are benefiting some bird groups, while riparian vegetation can buffer negative impacts of climate and water quality gradients on macroinvertebrate biodiversity ([article](#))

- Analysis of changing agrochemical use in Canada over 35 years highlights increases in fertilizers (21%), fungicides (412%), herbicides (58%), and insecticides (52%) applied in the Prairie Region ([article](#))



Distribution of agrochemicals calculated as percent of cropland treated with fertilizers (A), insecticides (B), fungicides (C), and herbicides (D) ([Malaj et al. 2020](#)).

- Found that simplified agricultural landscapes containing proportionately more cropland have increased in the last 20 years and are a strong predictor of rising pesticide use in the Prairies and Central regions of Canada ([article](#))
- Spatial analysis through wetland survey suggests potential links between land use and P levels in pothole ponds ([thesis](#))
- Nitrogen process rate measurements suggest pothole ponds have more limited capacity to remove nitrogen than previously thought, but are sites of extremely rapid nitrogen cycling
- Integrated modelling to link hydrological, biogeochemical and biodiversity impacts associated with pothole wetland drainage for Pothole Till watersheds highlights complex effects of drainage, including impacts on multiple ecosystem services

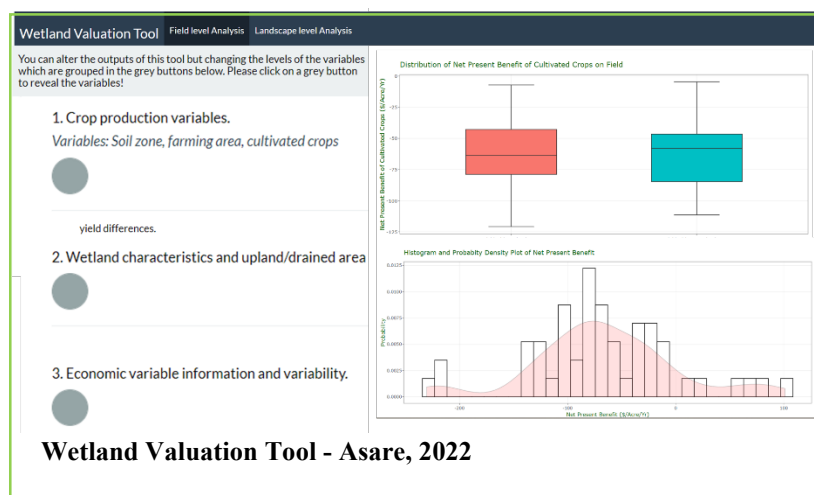
2.4 Team C Progress – Water Management Practices and Governance

The Water Management Practices and Governance team has been making steady progress toward the projects' goals. To better understand decisions involving water resources on the prairies, we have been developing participatory models, conducting economic analyses, implementing large-scale surveys, coordinating experimental decision labs, and conducting interviews. We are currently working on integrating our analyses with the other teams. Some specific highlights of our work include:

- Developed wetland conservation cost curves for an Alberta watershed to understand the spatial differences in wetland conservation costs and how these costs are associated with wetland classes ([article](#))

- Preliminary working version of a wetland conservation costs assessment webtool that allows users to input their own field or landscape level data.

- Surveyed 450 producers across the three Prairie Provinces in 2021 to better understand land-use decisions involving wetlands and preferences for conservation policy options.



- Examined how participatory modelling and mapping can enhance social learning for disaster risk reduction in Indigenous communities ([thesis](#))

- Developed Three Faucet Framework to demonstrate how stories, especially those told in informal settings, impact source water protection planning and implementation ([thesis](#))

- Preliminary analysis shows that experimental decision labs highlight different preferences for information selection among individuals and groups, but they do not appear to have significantly influenced individual or group choices about adaptation options.



- Systematic review of relevant policy documents for water security on the Prairies is ongoing.



3. KEY QUESTIONS FOR CONSIDERATION

To help keep discussions at the APM focused on how Prairie Water research has been, and might be used in practical applications, we would like you to consider the below questions. We need your help to work out what our research products can and cannot be used for, and how we need to present them to you so you can effectively use them.

We would love to hear from you before the meeting if possible. This will help us tailor the talks and discussions to your perspectives on how the knowledge being produced could and should be used.

We would like to know;

- How have you used Prairie Water research of data within your organisation?
- What research or data is most useful for you to use?
- What issues do you use Prairie Water research to inform decisions on?
- What do you need from Prairie Water in order to use the research and data being produced?
- What do you see as the key areas we need to build better partnerships?
- Are there any opportunities for collaboration & data sharing that we should be aware of?