Nobody's Job: attending the birth of a new small-scale water tool for the Prairies

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Small-scale drainage on Canadian Prairie farmland can have larger impacts than might be imagined, especially by causing downstream flooding as redirected water rushes through ditches and culverts across roads and onto neighbours' land. In 2017 I was discussing farmland drainage with farmers and government officials at a conference in Regina. I realised from these conversations how the models we were developing would not give practitioners the answers that they needed. For example, they wanted to know the effect of draining a particular slough on the five year return period flow from a farm field – the annual peak flow exceeded one year in five. In 2015 the Government of Saskatchewan had passed legislation requiring that all existing and future drainage works be licensed, based on the effects of drainage on downstream return-period flows. Unfortunately, there were no tools, and there was no group assigned for the development of tools, that could answer the questions posed by the licensing regulations. Our models were large scale, but the problems were small scale. What was needed was a tool that could bridge this gap.

I realized then, that the models we were developing in Global Water Futures' Prairie Water project had the potential to help provide a solution to the problem and answer the practitioners' questions. With these issues in mind I proposed a new approach that would give hydrological practitioners the ability to generate small scale hydraulic simulations on their own, while applying GWF expertise to the unique challenges of Prairies hydrology, which are shifting with changes in the climate.

Initially it was challenging to get acceptance from the research community. I nearly quit. The turning point came when agricultural producers and other potential users showed interest in the proposal, and when a young graduate student demonstrated a proof of concept, showing that the approach could be used to optimise the design of culverts in a Saskatchewan rural road. Seeing this interest triggered enthusiasm within the academic community, and gave me energy to move forward.

Since then, progress has been rapid, largely due to the valuable tools developed by the GWF's Core Modelling Team. We can now make available the hydrological outputs for historical and future simulations that can be applied by government or consulting firm practitioners to determine the changes in return-period flows caused by small-scale drainage and climate change.

The future looks bright for this young tool. Work is ongoing to ensure that it is relevant and accessible to a wide variety of users. Currently we are working to validate the results by checking simulations against recorded flooded areas. Ongoing exchanges with consulting engineers will ensure that the results will be delivered in a format that they can use efficiently.

Find out more:

Prairie Hydrology Design and Analysis Product (PHyDAP)
https://gwf.usask.ca/prairiewater/tools-data-products1/prairie-hydrology-design-and-analysis-product.php