Field	Response
1. Contact Information | Name	Walter A. Illman
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1. Contact Information | Phone	519-888-4567 ext 38341
2. Please indicate the alignment of your research expertise to one or more of the following GWF objectives/ deliverables:	Improve disaster warning – develop scientific knowledge, monitoring and modelling technologies, and national forecasting capacity to predict the risk and severity of extreme events Predict water futures – use Big Data to make informed decisions, better models to assess change in human/natural land and water systems
3.1 Please indicate the alignment of your research expertise to the GWF Science Pillar 1 – Diagnosing and Predicting Change in Cold Regions:	Hydrology and Terrestrial Ecosystems – improve understanding and prediction of hydrological and terrestrial processes and watershed hydrology and how processes and systems will evolve and interact under a changing climate
3.2 Please indicate the alignment of your research expertise to the GWF Science Pillar 2 – Developing Big Data and Decision Support Systems:	Big Data for Water – sensors, sensing, instrumented river basins, data analysis systems Decision Support Systems – predictive and diagnostic modelling system development and deployment for hydrology, water quality and water resources
3.3 Please indicate the alignment of your research expertise to the GWF Science Pillar 3 – Designing User Solutions:	Water Environment – ecosystem health and conservation, water management Energy & Natural Resources – including mining and hydroelectricity Other Industry – Including Insurance, Finance, Measurement and Engineering sectors Urban and Rural Communities

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4. Please indicate the alignment of your research expertise to one or more of the following user needs:	Model development to support climate change impact assessment, including regional climate change modeling, hydrological and ecological modeling, specifically involving improvements in forecasting and predictive capacity, downscaling, and scenario development of water futures. Complex system modeling and analyses reflect the growing awareness of interacting dynamics in human-natural coupled systems. These studies emphasize the inter-relationships between water resources and transportation systems, infrastructure, energy generation, mining, food production, and source water protection.
5. Please list regions of Canada and the biomes (e.g. mountains, boreal forest, Great Lakes-St Lawrence), watersheds, and/or river basins where you are interested in conducting research for GWF:	Grand River Basin or any other watershed or basin with abundant surface water level and groundwater monitoring wells.

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	My students and I would like to contribute to the GWF programme through joint inverse modelling of surface water levels and corresponding groundwater levels at the basin scale. We have been working on a new approach called "hydraulic tomography" over the last decade, which has conclusively shown that the joint interpretation of pumping tests in highly heterogeneous aquifers leads to reliable hydraulic parameter estimates of the subsurface.
6. Please list any other expertise or recent experience (subjects, river basins, technology) not covered by above query that could help us in assessing your alignment with the GWF programme:	Through the GWF programme, we would like to expand the hydraulic tomography concept to river basins. Instead of using pumping tests, we propose to utilize river flood pulses as sources of signals detected in groundwater monitoring wells (i.e., river stage tomography). This information could be utilized for mapping the subsurface hydraulic parameter distributions and surface water/groundwater exchange parameters of the river basin.

Improved delineation of parameters should lead to more accurate coupled surface water/groundwater models. More accurate models will ultimately lead to better decision making and help fulfill GWF programme goals. |