

# PROOF OF CONCEPT: AGENT BASED MODELING AS A TOOL TO INVESTIGATE INDIGENOUS HEALTH IMPACTS OF FLOODING

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## Science Question: To what extent can agent-based models of floods and health effects on reserves support community planning for disasters and adaptations for managing risks?

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SDG6: We will enhance Indigenous community planning for changing water futures and strengthen the participation of local communities in improving water and sanitation management (i.e., by examining risks of floods to primary and secondary water sources, cisterns, wastewater systems, traditional practices, and community wellbeing).

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SDG10: We will reduce inequalities in accessing advanced scientific tools for supporting community-level preparations and adaptation to changing water futures. We aim to reduce the number of deaths and illnesses from water pollution and contamination from flood events. We will strengthen the capacity of Indigenous communities for early warning, risk reduction and management of health risks related to flooding

### Why? CONTEXT

Flooding is a serious issue for many Indigenous communities in Canada. More effort is needed to advance health, social, infrastructural, and emergency plans in reserve communities. We are piloting the use of ABMs as an informative tool to support planning and coordination for improved flood and health risk management and decision making in two Saskatchewan reserve communities.

### How? TRANSDISCIPLINARY PARTICIPATORY APPROACH, METHODS AND TOOLS

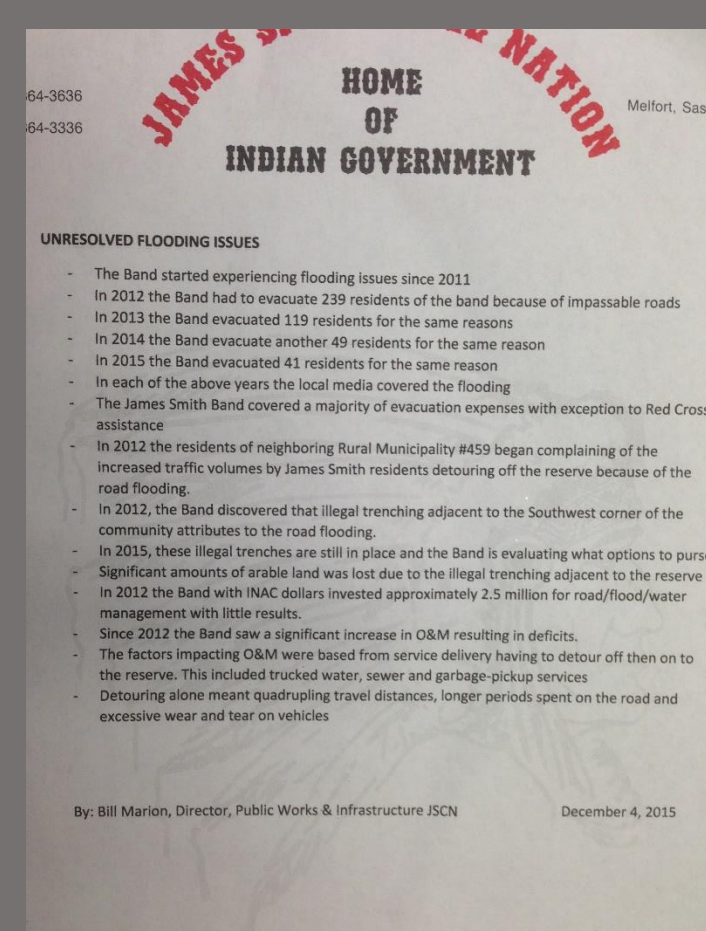
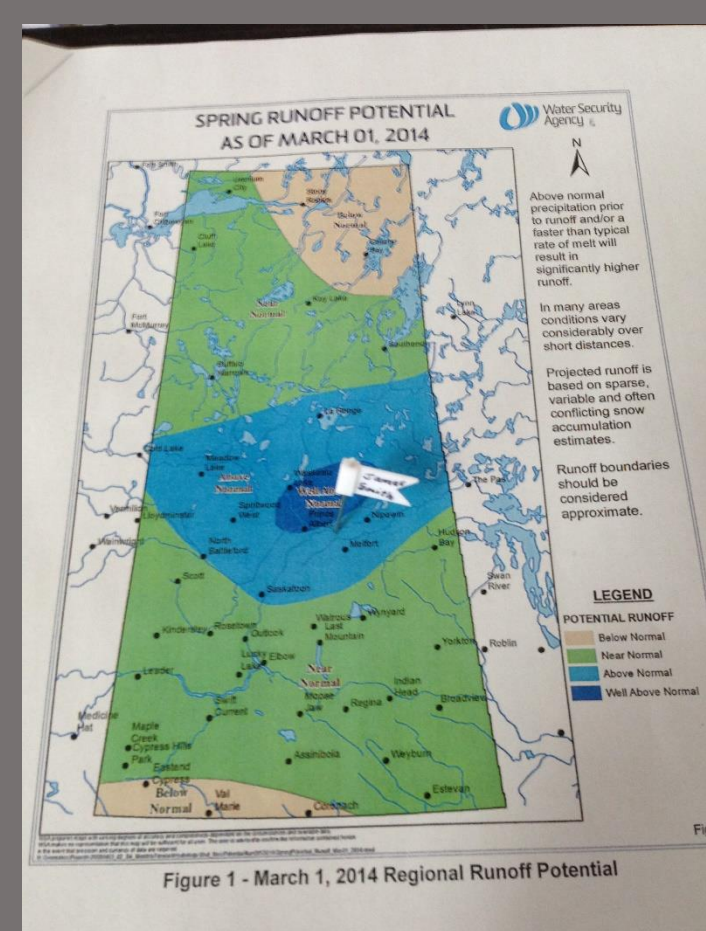
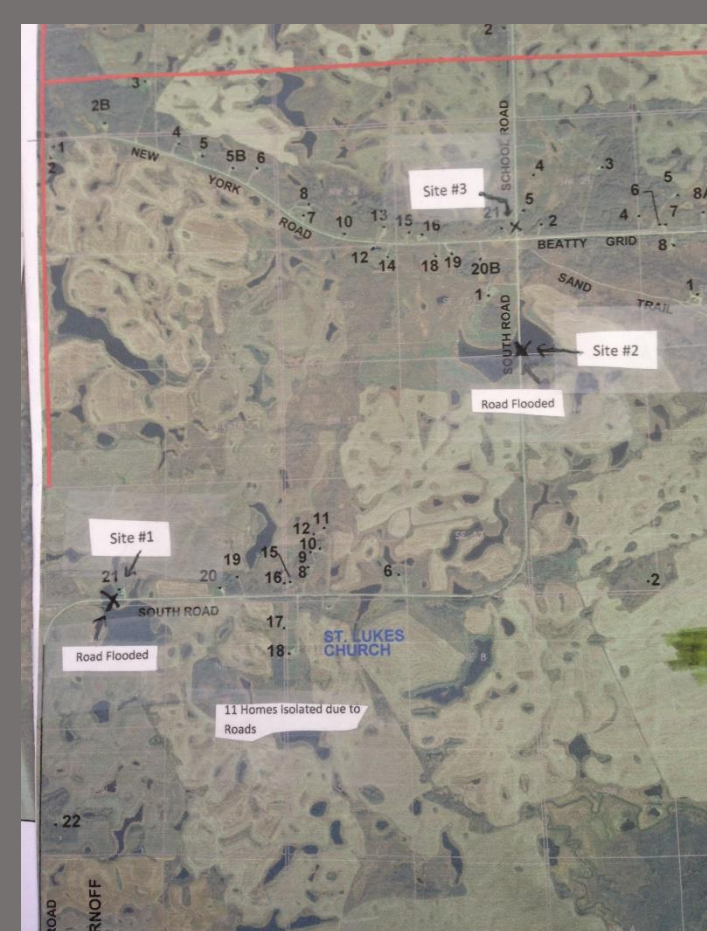
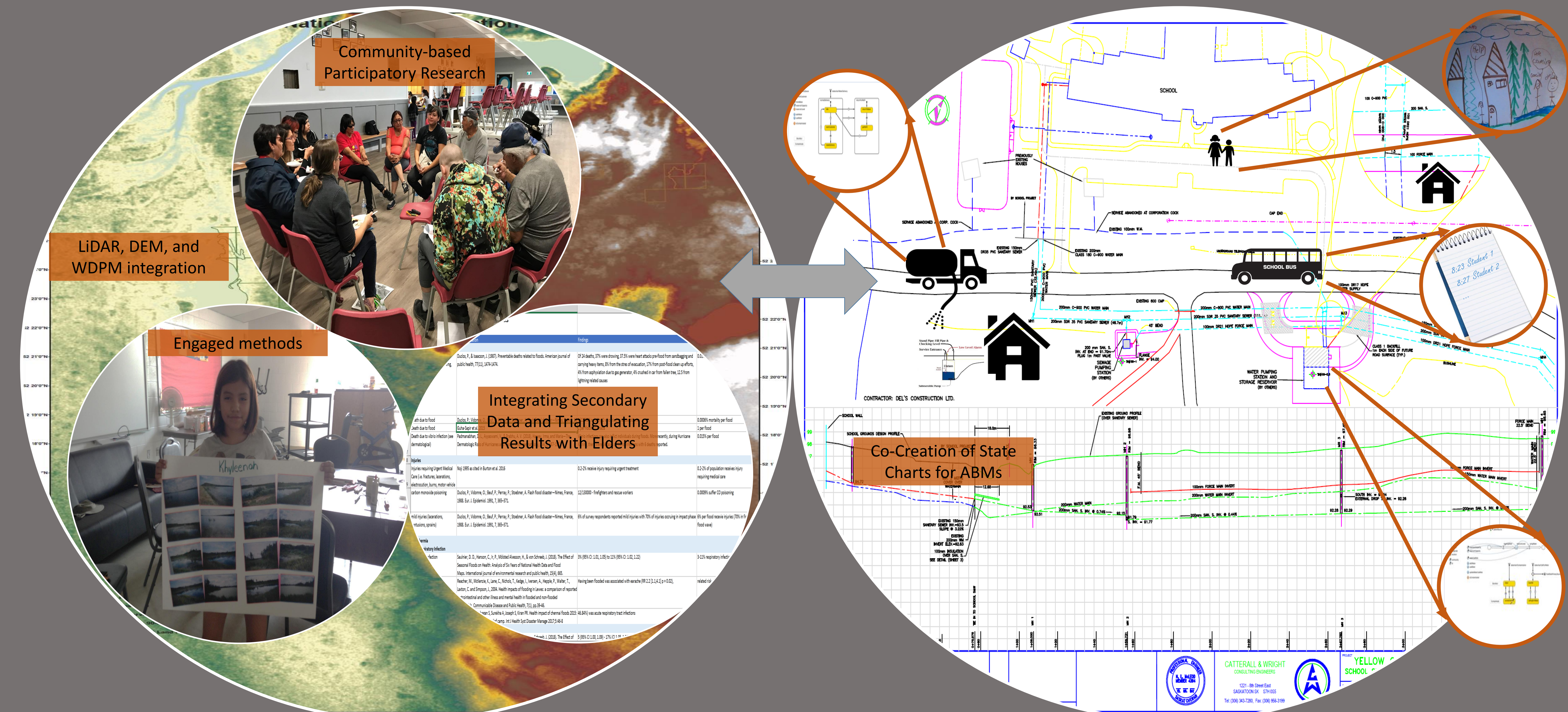
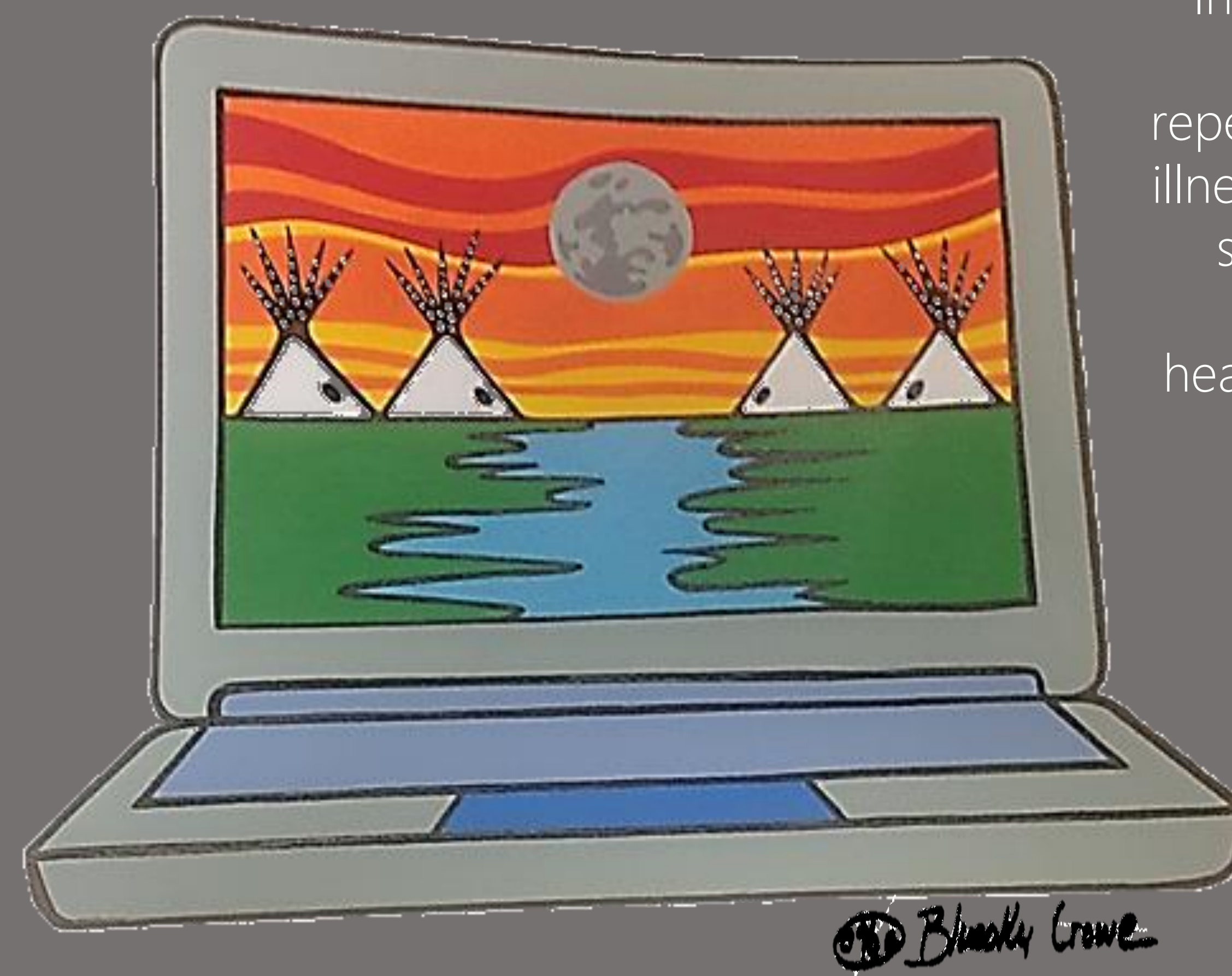
We are uniting community leaders and members, Elders, and interdisciplinary researchers using an iterative multi-method design to create practical and technical outputs which support community level planning and decision making.

### What? PRELIMINARY RESULTS

In two partnering communities, flooding presents different risks to health and wellbeing. In Yellow Quill First Nation, repeated annual flooding results in complaints of respiratory illnesses, mold in homes, financial burden, and high levels of stress and isolation. In James Smith Cree Nation, flooding results in evacuations, particularly of Elders, which draws health workers away from the community and leaves others vulnerable. During evacuations, Elders report loneliness, disruption, stress, poor nutrition, lack of activity, lack of ceremony and lack of 'community.'

### Next? BUILDING ABMs

LiDAR, DEM, and infrastructural specifications are being used along with focus groups, sharing circles, interviews, Photovoice, rich pictures and other results to build agents and state charts in ABM simulations of the community and their flooding experiences. These models will be used to explore scenarios of interest of the community, and revise planning documents.



Photos: Bill Marion

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