Hydrologic Response Unit delineation of the Pond Inlet (Mittimatalik) Watershed for the purpose of Hydrological Modeling

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High Arctic watersheds fluxes of water, sediment, and nutrients are traditionally dominated by snowmelt. Projected climate changes are anticipated to impact winter snowpack and melt season conditions, which in turn will affect water quality and quantity. The water within these watersheds is both a key source of freshwater for northern communities, as well as a crucial component for local ecosystems. Understanding the current watershed dynamics and potential future trajectories are crucial to protecting source water. The overall objective of this study is to delineate and classify hydrological response units around the Pond Inlet (Mittimatalik) watershed, using publicly available data sources. The resulting hydrologic response units will be used as the spatial parameters for modeling current and projected hydrologic processes in the watershed using the Cold Regions Hydrological Model. These results will provide preliminary findings that can be used to assess the potential of the Cold Regions Hydrological model to model hydrologic processes under current and future climate scenarios. The results will provide a framework for determining potential source water catchment areas and for developing source water protection plans.

Keywords: High Arctic watershed, hydrological modeling, Hydrologic Response Units, Cold Regions Hydrological Model