Understanding the Impact of Permafrost on the Prediction of Water Availability in the Horn River Basin

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Ecosystem changes related to permafrost thaw affect topography, vegetation, hydrology and land use. Along Canada’s southern permafrost boundary, permafrost thaw has been occurring over the last 100 to 150 years. As permafrost thaws, raised tree-covered plateaus subside and convert to permafrost free and treeless wetlands. The rate of this ecosystem change has accelerated in recent decades. In the Scotty Creek Research Basin (SCB), 140 km to the north of the AB-BC-NWT border vertex, the permafrost cover in a 1 km2 representative study area decreased from 70% to 43% between 1947 and 2008 (Figure 1). Subsequent analyses indicate such changes are occurring at a regional scale throughout the southern margin of permafrost. The percentage cover of permafrost has not been measured in northeast BC even though regional thaw is likely to impact freshwater availability, infrastructure logistics

(pipeline and road) and caribou migration patterns in areas of oil and gas development. Preliminary assessment of aerial imagery indicates substantial changes are occurring similar to those documented in the SCB.