

Impacts of Thermokarst Bank Degradation on Streambed Sediment Size in the McMurdo Dry Valleys

Zach Sudman and Michael Gooseff

Department of Civil and Environmental Engineering, Colorado State University

Abstract. The McMurdo Dry Valleys of Antarctica are a unique ice-free landscape that contain microbial ecosystems despite the harsh environment (<10cm water equivalent/yr, -20°C mean air temperature). Aquatic ecosystems are dependent on the ephemeral glacial runoff streams which feed closed basin perennially ice covered lakes. The upland zones of the Dry Valleys have been shown to have some of the slowest ground surface change rates in the world. However, recent observations in the coastal valley transition zones have shown that this area may be nearing a threshold of rapid landscape change. One of the observations that suggests this is extensive thermokarst (permafrost degradation) along the banks of Crescent Stream in Taylor Valley. In 2012, a large stretch of the west fork of Crescent Stream was found to have significant bank failures due to thawing permafrost, while the other branch was found to be unaffected. This presentation will illustrate the extent to which the impacts of the bank failures in 2012 are still impacting the sediment size characteristics of the stream.. We compare bed material sediment composition of the west branch (affected), east branch (unaffected), and downstream of the confluence of the two branches.