TIMP GIS METHODS

Methodology:

To estimate the amount of snow cover on Timpanogos Glacier from 1985 to present, we analyzed the Canopy Adjusted Fractional Snow-Covered Area (Canopy adjusted fSCA) product courtesy of the U.S. Geological Survey [1]. Canopy adjusted fSCA is a product derived from Landsat Collection 2 satellites that provides fractional snow cover area. In mountainous environments, fSCA is used when pixels contain multiple land surface types (Selkowitz et al., 2014). Digital raster layers for this product are hosted on Earth Explorer. There are 62 raster layers within the allotted time frame containing our area of interest, each with a 30-meter resolution per pixel. Raster layers are then clipped to a shapefile of Timpanogos Glacier to attain accurate area calculations. To eliminate null values, a batch statistical analysis feature created a duplicate of the raster layers where all values are greater than 0.

The units of the canopy adjusted fractional snow-covered area raster layers are a fractional unit spanning from 0-1000. The area of snow cover for each year was calculated by:

(Value/1000) \* (Count) \* (900 m2)

Value is the fractional snow cover, count is the number of pixels containing this value, 900 m2 is the area per pixel. The summation of all pixel values is used to represent the area of ground snow cover for the raster for each year.