# Trail Proposal for Pukaskwa National Park's Tip Top Mountain, Ontario.

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TipTop Mountain

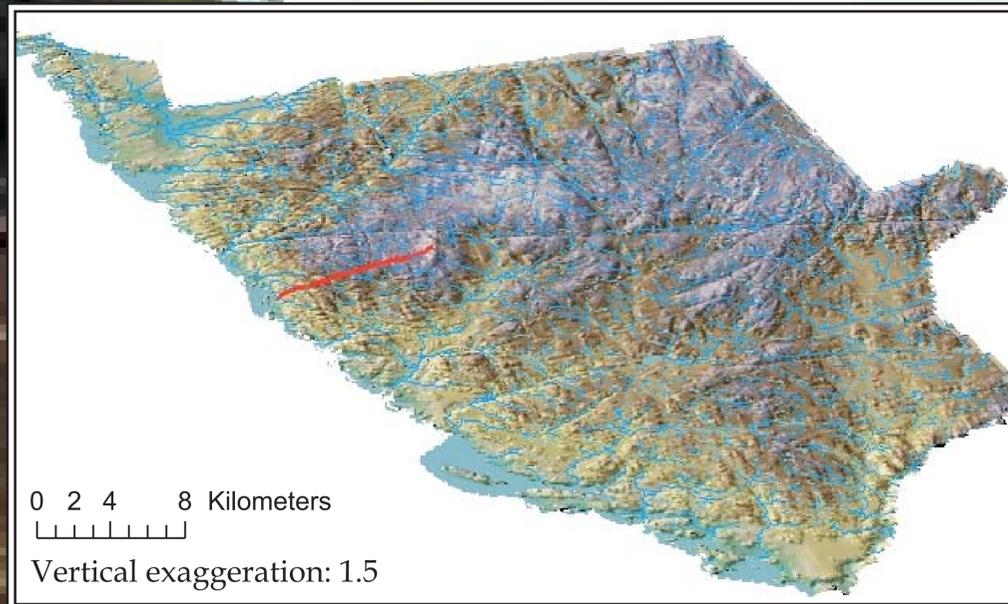Pukaskwa National Park

0  1.25  2.5  5 Kilometers
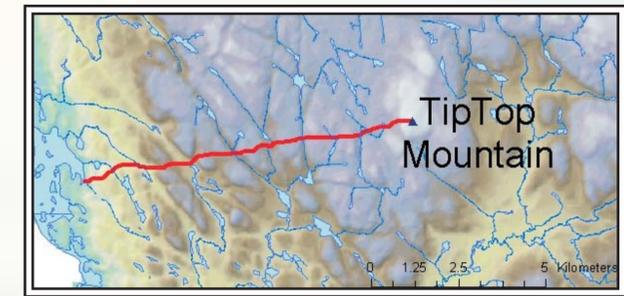
## Purpose

The purpose of this project is to propose the best location for a backpacking trail going at the top of Tiptop Mountain in Pukaskwa National Park using a least cost path analysis. The results of this analysis will show the best path location for a backpacking trail considering slope angle, landcover, lakes and rivers.

## Background

Pukaskwa is a national park located on the northern shore of Lake Superior in Ontario. When Parks Canada created Pukaskwa National Park, one of their objective was to create a trail, which will reach the summit of TipTop Mountain, located at 640m a.s.l. (Parks Canada, 1982). Still today, no trail has been created.

When analysing the best location for a trail, some physical characteristics has to be considered. For example, the trail shouldn't go up a hill which has an angle greater than 25°. Furthermore, sensitive areas should not be disturbed. The trail should not go over a lake to avoid building a large bridge. Dense forest are also more expensive to cut through than sparse forest. All these will be taken into consideration when weighting the area for future analysis.



Pukaskwa National Park

0  5  10  20 Kilometers

## Data

### DMTI:
- Ontario Roads 1:50K (*.shp file)
- Canadian Parks Boundaries 1:250K (*.shp file)
- 30m DEM (ASCII file)
    - derive slope from DEM

### OGDE:
- 25m landcover (*.rrd file)

### NTDB:
- NTS #: 42C/4; 42C/5; 42D/1; 42D/8; 42D/9
- Scale (1:50,000)
- Lakes and Rivers (*.shp)

## Data

### Analysis Projection:
- NAD83 UTM16
- Choice justification:
    Initial projection used in National Topographic Database.

### Analysis Resolution:
- 15 meters
- Choice justification:
    This resolution allows a good representation of roads, lakes and rivers when converted into Arc/Info grid format.

## Conclusion

The trail path excludes higher slope angles. Also, it doesn't go through lakes or sensitive areas. This demonstrates that the areas set as NoData were excluded from the analysis. The least costly trail starts from Superior Lake. It is important to note that there is already a trail ending approximately at the same region and that travelers are sent back to the initial point by boat. Therefore, the trail will be accessed by boat. The trail is about 16 kilometers long. This means that there should be one camp site near Lake Superior and one near Tiptop Mountain peak.

The resulting trail is a general possibility. The resolution is still at 15 meters. Consequently, the trail could be modified once on the field according to smaller features.



0  2  4  8  Kilometers

Vertical exaggeration: 1.5

## Methodology
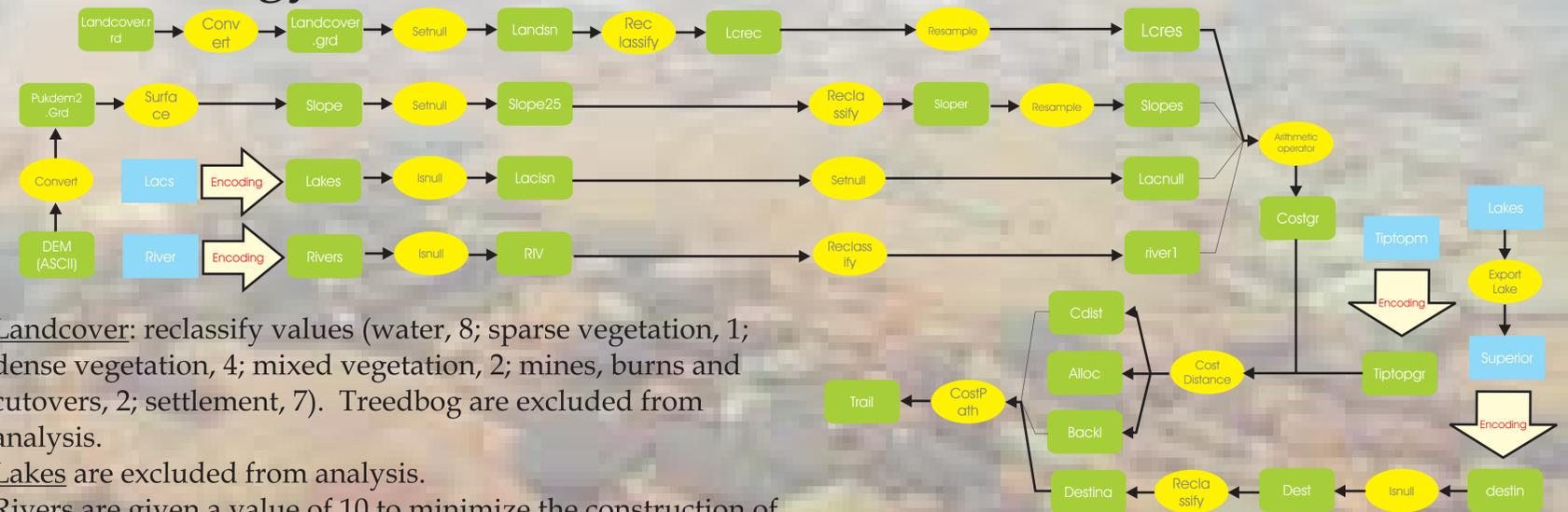


Landcover: reclassify values (water, 8; sparse vegetation, 1; dense vegetation, 4; mixed vegetation, 2; mines, burns and cutovers, 2; settlement, 7). Treedbog are excluded from analysis.

Lakes are excluded from analysis.

Rivers are given a value of 10 to minimize the construction of bridges.

Slope angle: Angles greater than 25° are excluded from analysis. Reclassify values (0-5, 1; 6-10, 2; 11-15, 3; 16-20, 4; 21-25, 5).

Formulas:
- cdist = costdistance([tiptopgr],[costgr],backl,alloc)
- trail = costpath([destina],[cdist],[backl],byzone)
- isnull(<grid>)
- setnull(ingrid1,ingrid2)

## Reference

Data: DMTI, OGDE, NRCan (NTDB)
Parks Canada, 1982. Pukaskwa National Park Management Plan. Parks Canada, Marathon, Ontario.