# Geologic Hazard Rankings
# Village of Mayo, Yukon
# (1:20 000 scale)

## HAZARD RANKING

The potential environmental changes identified in the preceding sections of this report can be used to identify current and future landscape hazards in the Mayo region. The combined properties of surficial material type, landform shape, slope, aspect, hydrological regime, climate regime, and permafrost conditions have been used to arrive at a set of hazard 'rankings' that can be used to assess the potential stability of landscape units around the Village of Mayo.

It is important to note that hazard rankings are based on general observations of surface materials, drainage, slope angle, vegetation and the presence of permafrost landforms; limited subsurface information was provided by Direct Current resistivity profiling, shallow drilling and probing of permafrost, and textural analyses. This has resulted in a projected risk ranking that will require geotechnical and/or engineering analyses to quantify.

In classifying polygons, we have taken a precautionary approach and applied a category of higher risk where we are not confident in lower categories. However, every polygon will contain zones of lower and higher risk than the overall polygon classification. It is for this reason that this map should serve only as an initial guide for planning purposes. Any development will still require detailed site investigations.

Based on processes acting on distinct geological units, a hazard ranking of low, medium, or high has been assigned to each geological unit in the hazard map area. Rankings are qualitatively assigned to reflect the following conditions:

Low: Stable landform. Unlikely to be affected by mass movement, thermokarst, subsidence, bank erosion, flooding or instability. These landforms typically consist of gravel or sand, are well drained and have shallow to moderate slopes. Low hazard landforms may contain little to no permafrost and are above the floodplain of the Stewart or Mayo rivers. Landforms with low rankings are unlikely to become unstable under predicted changes in climate.

Medium: Moderately stable landform. Unlikely to be affected by mass movement, thermokarst, subsidence, bank erosion, flooding or instability. These landforms typically consist of gravel, sand, glacial diamict or colluvial materials. They are well to moderately drained and have shallow to steep slopes. Medium hazard landforms may have moderate amounts of permafrost and may occur within an area of shallow groundwater. Landforms containing permafrost may be susceptible to ground subsidence which could be accelerated by thermal erosion in areas of shallow groundwater. Permafrost thaw may also cause slope instability in some landforms. Medium hazard landforms are likely to become either more or less stable under predicted changes in climate.

High: Unstable landform. Likely to be affected by mass movement, thermokarst, subsidence, bank erosion, flooding or instability. These landforms typically consist of glacial diamicts, colluvium, glaciolacustrine, lacustrine and fluvial deposits. They are generally moderately to poorly drained and have shallow to steep slopes. High hazard landforms may have a significant thickness of permafrost containing high ice contents, be prone to gravity-induced erosion, and occur within the floodplain of the Stewart or Mayo rivers. High hazard landforms are likely to become either more or less stable under predicted changes in climate.

## SYMBOLS

- contours
- water courses
- roads
- textural sample locations (see Appendix A)
- DC resistivity profile locations
- permafrost field sites
- *00* polygon identifiation number (see Appendix C and Table 1 below)

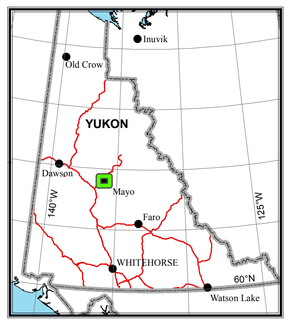
### Geological boundaries

- defined boundary
- approximate boundary
- assumed boundary

** NOTE: Linework for map is based on aerial photography from 1989 and may not match basedata (contours, streams) derived from 1:50 000 scale topographic maps.*

*Table 1. Hazard or combined hazards for individual polygons.*

| Polygon number | Landscape Hazards |
|---|---|
| 1 | flooding (Stewart River), permafrost |
| 2 | permafrost |
| 3 | flooding (Stewart River, Mayo River), permafrost |
| 4 | flooding (Mayo River), permafrost |
| 5 | flooding (Mayo River), permafrost |
| 6 | flooding (Stewart River, Mayo River), permafrost |
| 7 | flooding (Mayo River), permafrost |
| 8 | flooding (Mayo River), permafrost |
| 9 | mass movement (steep slope) |
| 10 | flooding (Mayo River), permafrost |
| 11 | flooding (Mayo River), permafrost |
| 12 | flooding (Mayo River), permafrost |
| 13 | flooding (Mayo River), permafrost, shallow groundwater table |
| 14 | permafrost |
| 15 | permafrost |
| 16 | permafrost |
| 17 | permafrost |
| 18 | permafrost |
| 19 | permafrost, mass movement (steep slope) |
| 20 | permafrost (thermokarst), shallow groundwater table |
| 21 | flooding (Stewart River), permafrost (thermokarst), shallow groundwater table |
| 22 | permafrost, shallow groundwater table |
| 23 | permafrost |
| 24 | permafrost, shallow groundwater table |
| 25 | permafrost |
| 26 | mass movement (steep slope) |
| 27 | flooding (Mayo River), permafrost |
| 28 | flooding (Mayo River), permafrost |
| 29 | permafrost, mass movement |
| 30 | permafrost, mass movement |
| 31 | mass movement (steep slope) |
| 32 | permafrost |
| 33 | permafrost |
| 34 | permafrost |
| 35 | flooding (Mayo River), permafrost |
| 36 | flooding (Mayo River), permafrost |
| 37 | permafrost |
| 38 | permafrost |
| 39 | flooding (Mayo River), permafrost |
| 40 | flooding (Mayo River), permafrost |
| 41 | permafrost |
| 42 | mass movement (steep slope) |
| 43 | mass movement (steep slope) |
| 44 | mass movement (steep slope) |
| 45 | permafrost |
| 46 | permafrost |
| 47 | permafrost |
| 48 | permafrost |
| 49 | permafrost, shallow groundwater table |
| 50 | permafrost |
| 51 | permafrost |
| 52 | flooding (Stewart River), permafrost |
| 53 | flooding (Stewart River), permafrost |
| 54 | flooding (Stewart River), mass movement, permafrost |
| 55 | flooding (Stewart River), permafrost |
| 56 | permafrost (thermokarst), shallow groundwater table |
| 57 | permafrost |
| 58 | permafrost |
| 59 | permafrost |
| 60 | permafrost |
| 61 | permafrost, mass movement (steep slope) |
| 62 | permafrost |
| 63 | permafrost, mass movement (steep slope) |
| 64 | permafrost |
| 65 | permafrost |
| 66 | permafrost, mass movement |
| 67 | permafrost, mass movement |
| 68 | permafrost |
| 69 | permafrost |
| 70 | permafrost |
| 71 | permafrost |
| 72 | permafrost, shallow groundwater table |
| 73 | permafrost, shallow groundwater table |
| 74 | mass movement |
| 75 | mass movement |
| 76 | permafrost, mass movement |
| 77 | permafrost, shallow groundwater table |
| 78 | permafrost, mass movement |
| 79 | permafrost |
| 80 | permafrost |
| 81 | permafrost |
| 82 | permafrost |
| 83 | permafrost |
| 84 | permafrost |
| 85 | permafrost |
| 86 | permafrost, mass movement |
| 87 | flooding (Stewart River), permafrost |
| 88 | flooding (Stewart River), permafrost |
| 89 | permafrost (thermokarst), shallow groundwater table |
| 90 | permafrost, mass movement |
| 91 | permafrost, mass movement |
| 92 | permafrost, mass movement |
| 93 | permafrost, shallow groundwater table |
| 94 | permafrost, shallow groundwater table |
| 95 | permafrost, shallow groundwater table |
| 96 | permafrost, shallow groundwater table, flooding (Mayo River) |
| 97 | permafrost (thermokarst), shallow groundwater table |
| 98 | permafrost (thermokarst), shallow groundwater table |
| 99 | permafrost (thermokarst), shallow groundwater table |
| 100 | permafrost (thermokarst), shallow groundwater table |
| 101 | permafrost (thermokarst), shallow groundwater table |
| 102 | mass movement (steep slope) |
| 103 | flooding (Mayo River), permafrost |
| 104 | mass movement, permafrost |
| 105 | permafrost |
| 106 | permafrost |
| 107 | mass movement (steep slope) |
| 108 | permafrost |
| 109 | flooding (Mayo River) |
| 110 | mass movement (steep slope) |




GEOLOGIC HAZARD RANKINGS

**VILLAGE OF MAYO, YUKON**

parts of NTS 105M/12

SCALE 1:20 000

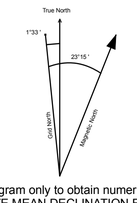
0 0.5 1 2 3 4

kilometres

ONE THOUSAND METRE GRID
Universal Transverse Mercator Projection
North American Datum 1983
Zone 8

CONTOUR INTERVAL 100 FEET
Elevations in feet above Mean Sea Level

| | | |
|---|---|---|
| 115P/09 MINTO LAKE | 105M/12 MAYO (MAP LOCATION) | 105M/11 WILLIAMSON LAKE |
| 115P/08 ETHEL LAKE | 105M/05 FRANCIS LAKE | 105M/06 NOGOLD CREEK |




Use diagram only to obtain numerical values
APPROXIMATE MEAN DECLINATION FEBRUARY 2010
FOR CENTRE OF MAP

*This map accompanies the report "Mayo Landscape Hazards: Geological Mapping for Climate Change Adaptation Planning" released in 2011 by the Northern Climate Exchange, Yukon Research Centre, Yukon College. For copies of the report, or additional information, please contact Lacia Kinnear at lkinnear@yukoncollege.yk.ca.*