How to Build a Landscape—Topographic Map Exercise

Earth Science Essentials
by Russ Colson

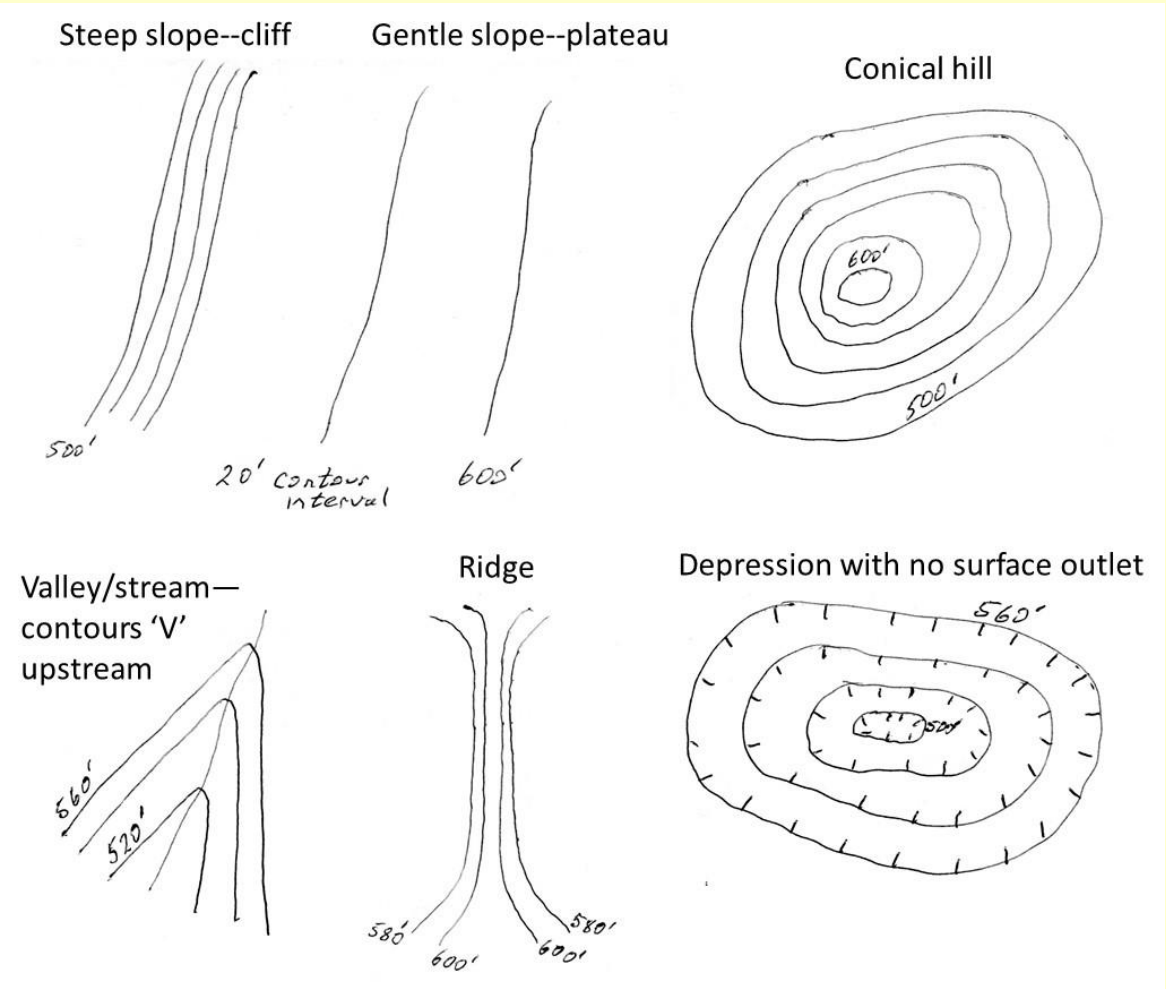
Introduction to Contour Maps:

Contour maps use curves drawn on the map (contour lines) to plot a third dimension of data onto a two-dimensional map. For example, topographic maps plot elevation contours, barometric maps plot pressure contours, temperature maps plot temperature contours, and so on.

Each contour line represents the set of points where the third dimensional data has a single value. For example, the 500-foot contour line for a topographic map connects points that have an elevation of 500 feet.

Each contour map has a contour interval that governs the spacing of the contour lines. For example, a topographic map with a 20-foot contour interval would have a curve for 500 feet, another for 520 feet and so on. Because each contour line represents a different elevation, contour lines of different elevation cannot cross each other.

By looking at a contour map, one can quickly assess how the third-dimensional data is changing with location. For example, topographic lines reveal where there are hills, rivers, cliffs, plains, and so on. Some example patterns are given below.



Identifying landscapes from topographic maps:

Consider each of the maps on the following four pages.
Match up each map with one of the following landscapes (one landscape for each map):

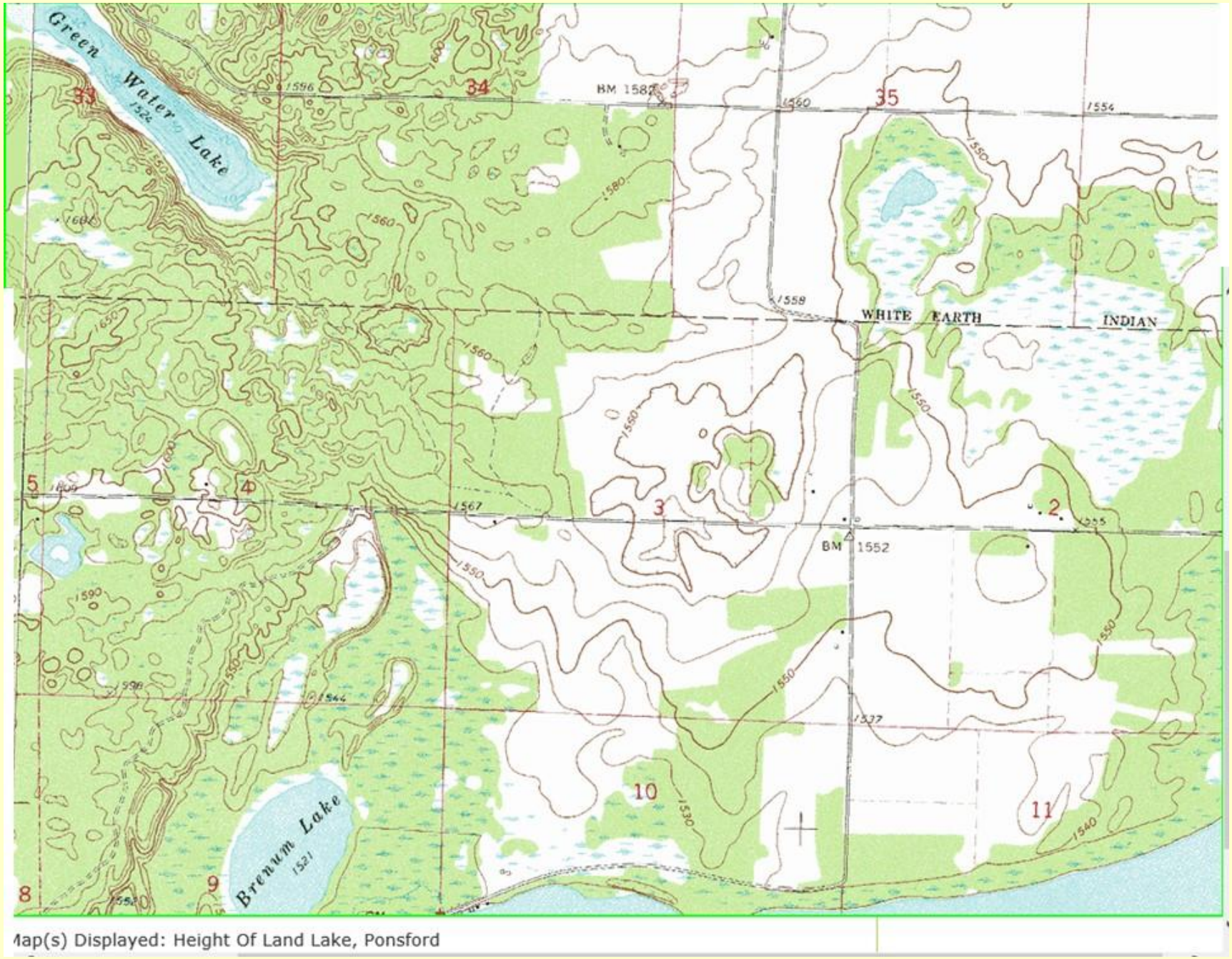
1) Alpine glaciation, with horns, arêtes, cirques, and tarns.
2) Continental glaciated terrain with lumpy, undrained topography, undrained depressions
3) Karst topography, with sinkholes and vanishing streams punctuating an otherwise dendritic drainage
4) Water-carved landscape, with dendritic drainage where water can always find a way downhill. The divide is the high area between drainage basins for different streams.

Find and mark on the appropriate map at least one of each of the features listed in the options above, including:
Horn, arête, cirque, tarn, lumpy hill, undrained depression, sinkhole, vanishing stream, dendritic drainage (on 2 maps), divide between drainage basins.

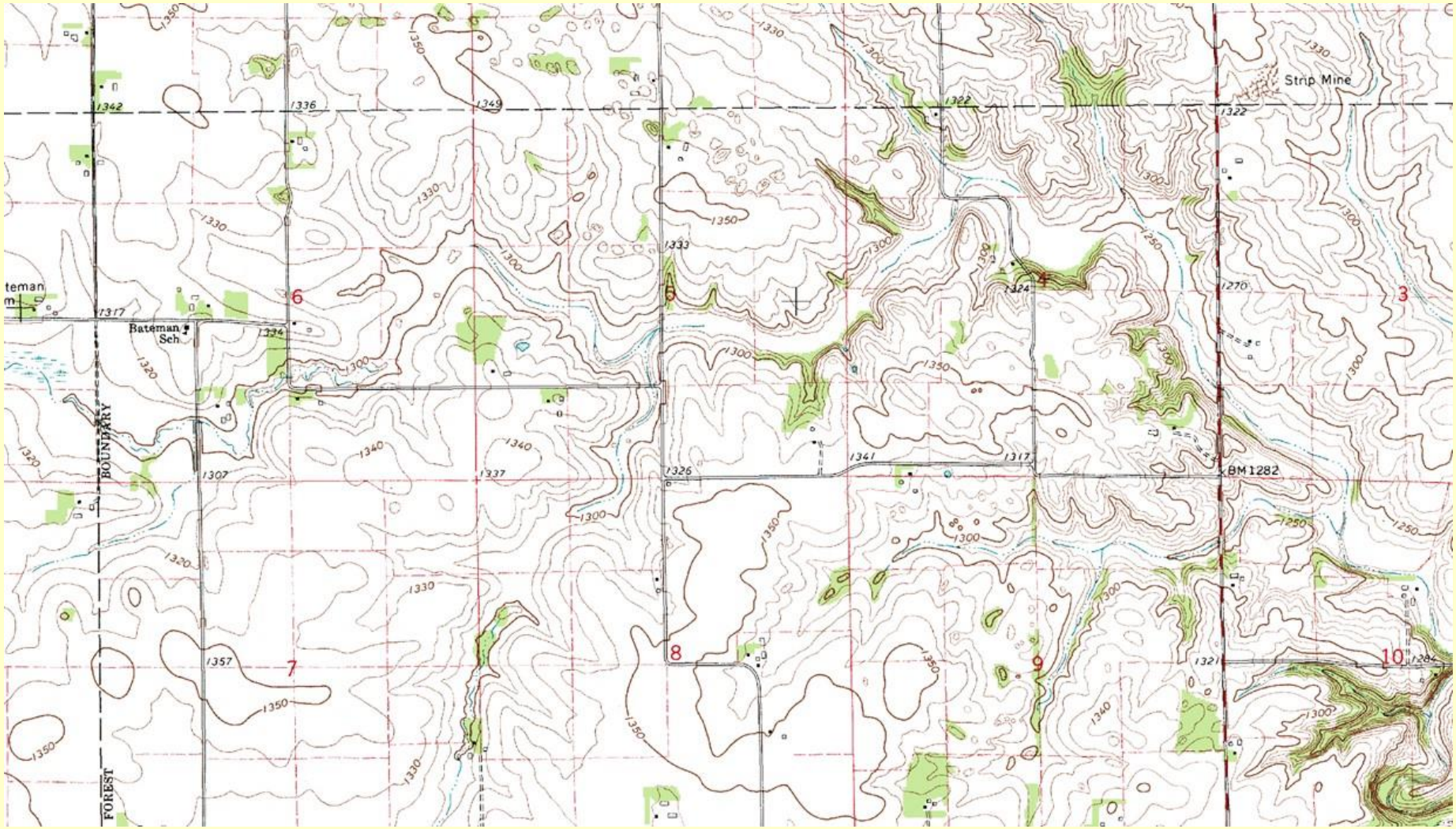
Note: the divide between drainage basins is the high ridgeline where a drop of water on one side drains into one basin and on the other side will drain into the other basin.

Note: This lab involves looking for things on a map when you don't quite know what to look for and are just beginning to think about how to read a topographic map. If this were a face-to-face lab, I would expect a lot of questions and I would give 'hints' of things to look for. Feel free to look for hints online or ask questions of people who might know.

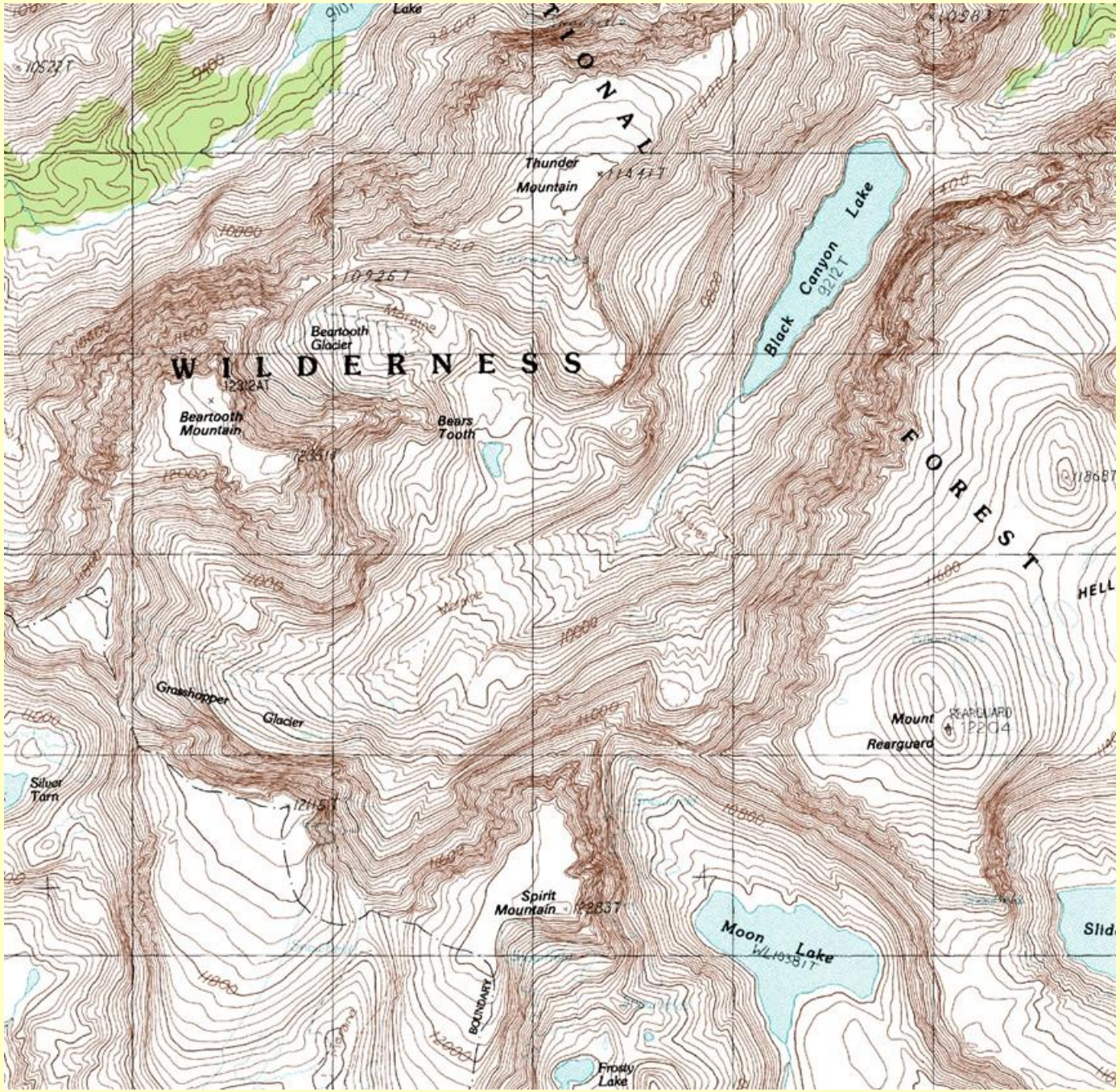
Becker Co, MN, from MN Department of Natural Resources after the USGS
Contour interval = 10 feet



Wykoff Quadrangle MN, United States Geological Survey
Countour interval = 10 feet



Silver Run Peak Quadrangle, MT, United State Geological Survey
Countour interval = 40 feet



Esbon Quadrangle, KS, United State Geological Survey
Countour interval = 20 feet