

# GIS8 Path Finder

Luc Girod – GEO(3|4)460 – Spring 2025

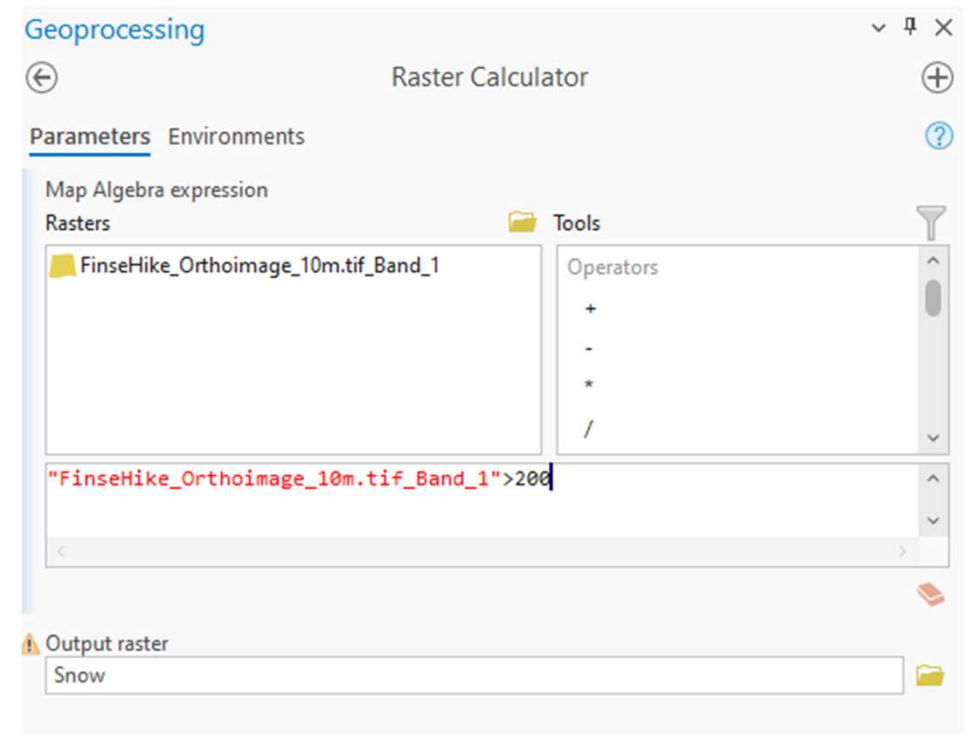
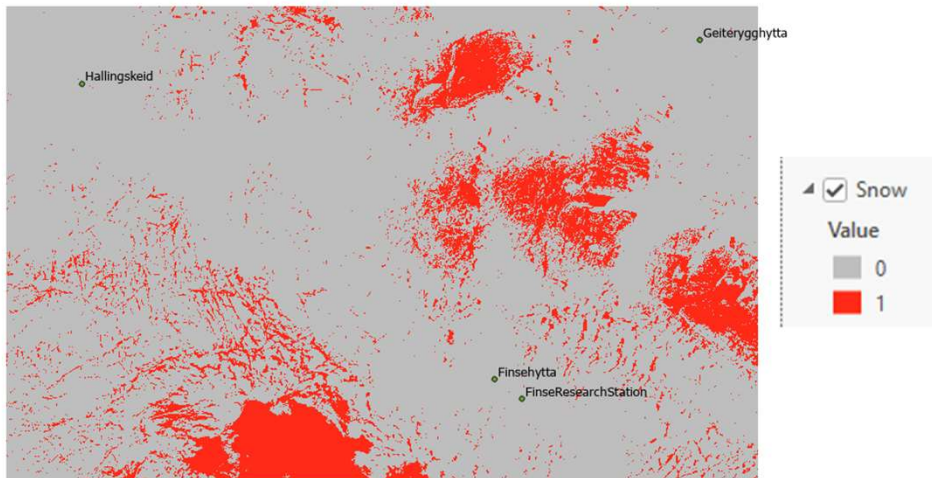
# Task: finding the best route between cabins

- Starting from a cabin, what is the best route to reach another one?
- Use terrain and snow as cost functions
- Use lakes as barriers



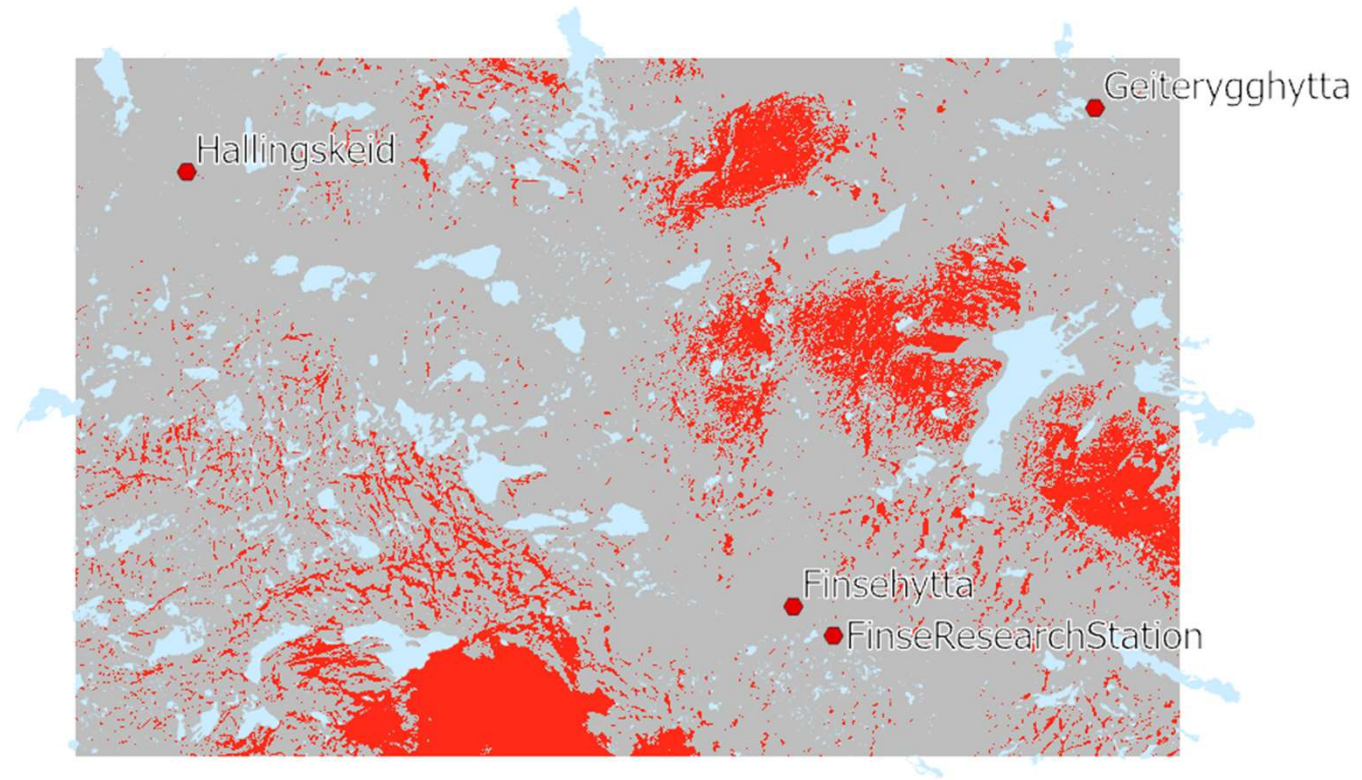
# Finding snow, which slows down a hike

- Load the ortho-image, band 1 (red)
- Snow is bright white
- Threshold to  $>200$  should select snow areas



# Finding lakes, that are impassable

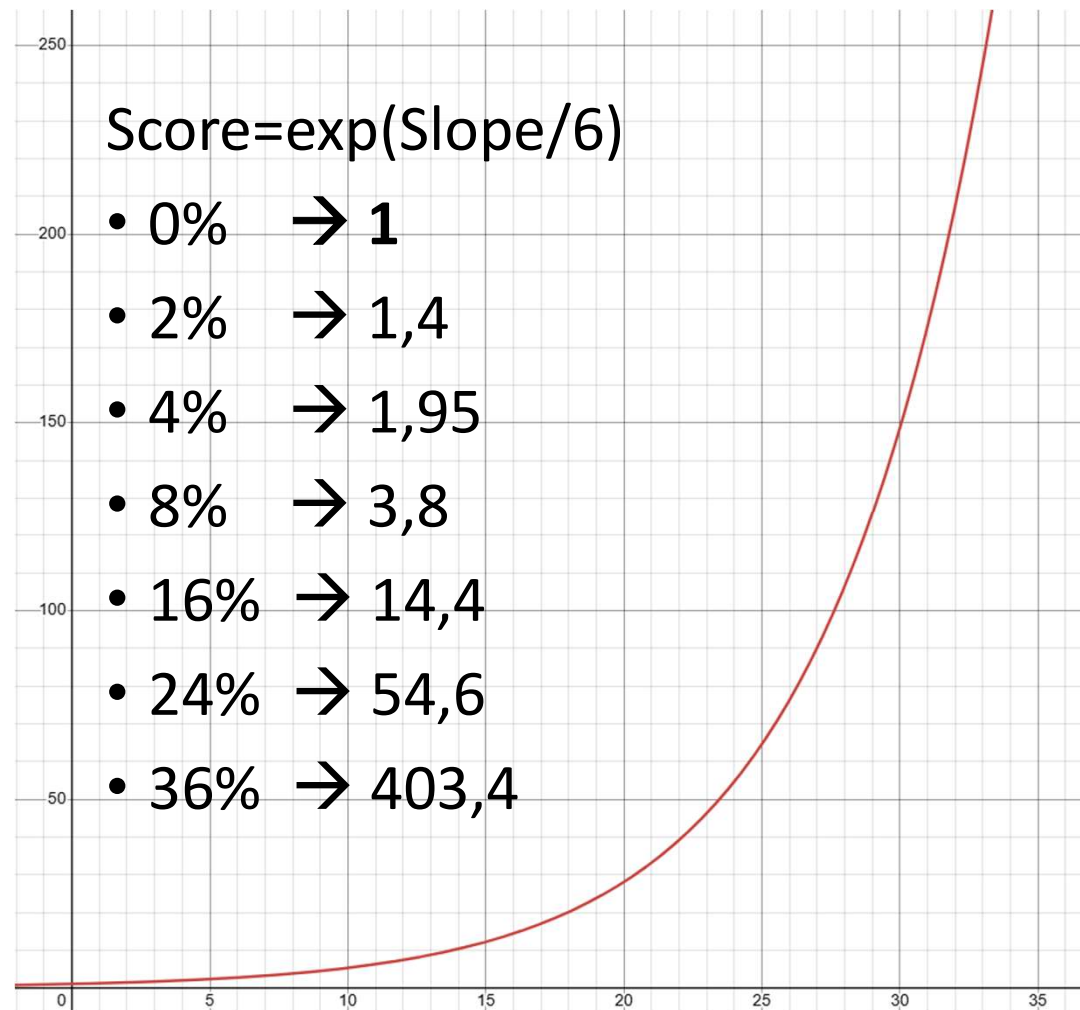
- Load the N50\_Lake.shp layer
  - extracted from N50\_Arealdekke\_omrade (Innsjø)



# Slope – easier to walk on flat terrain

## Gradient - Steepness

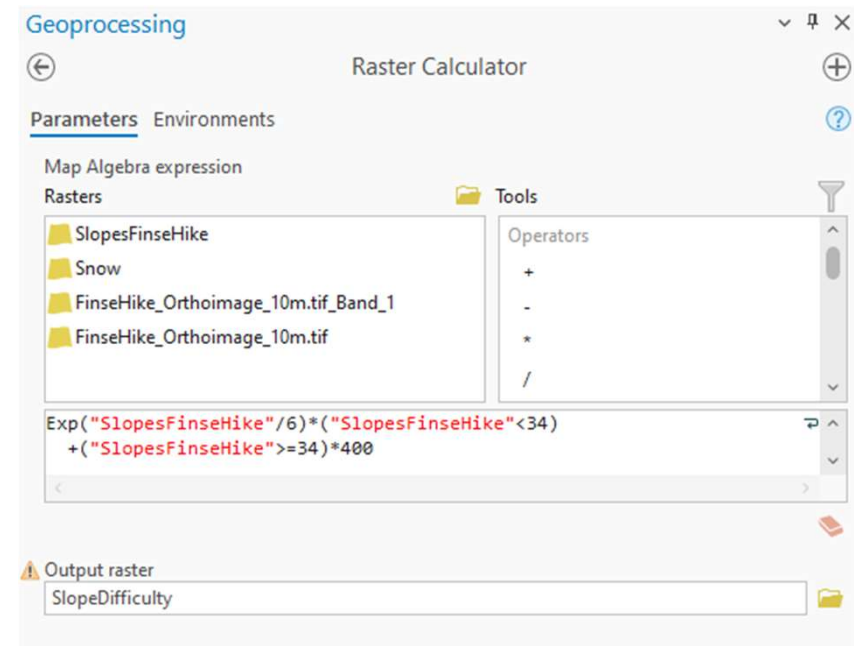
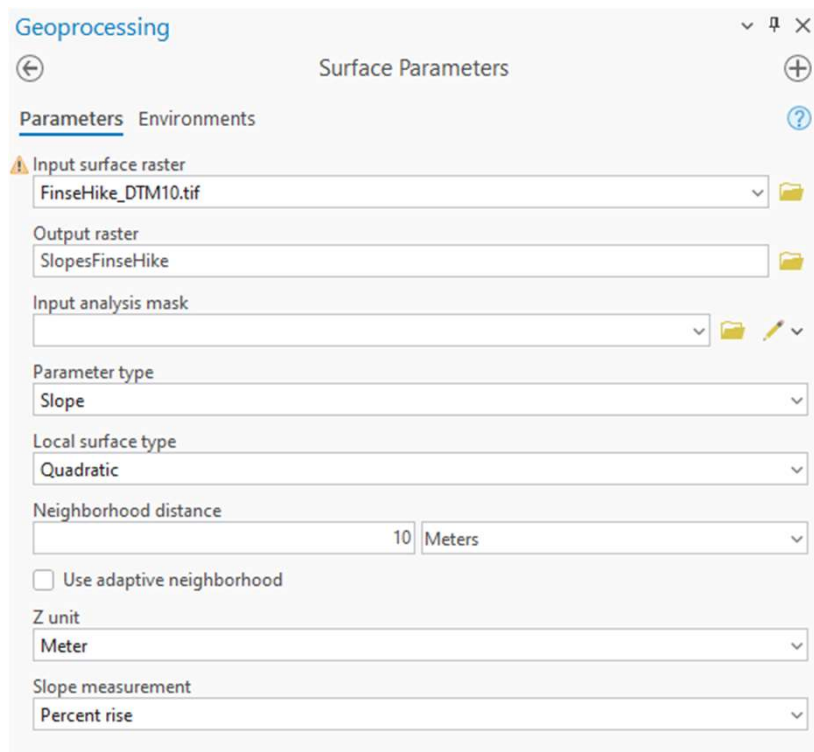
- 0% - **Flat**
- 2% - **Gradual**
- 4% - **Gentle Slope**
- 8% - **Moderately Steep**
- 16% - **Steep**
- 24% - **Very Steep**
- 36% - **Terrifying**





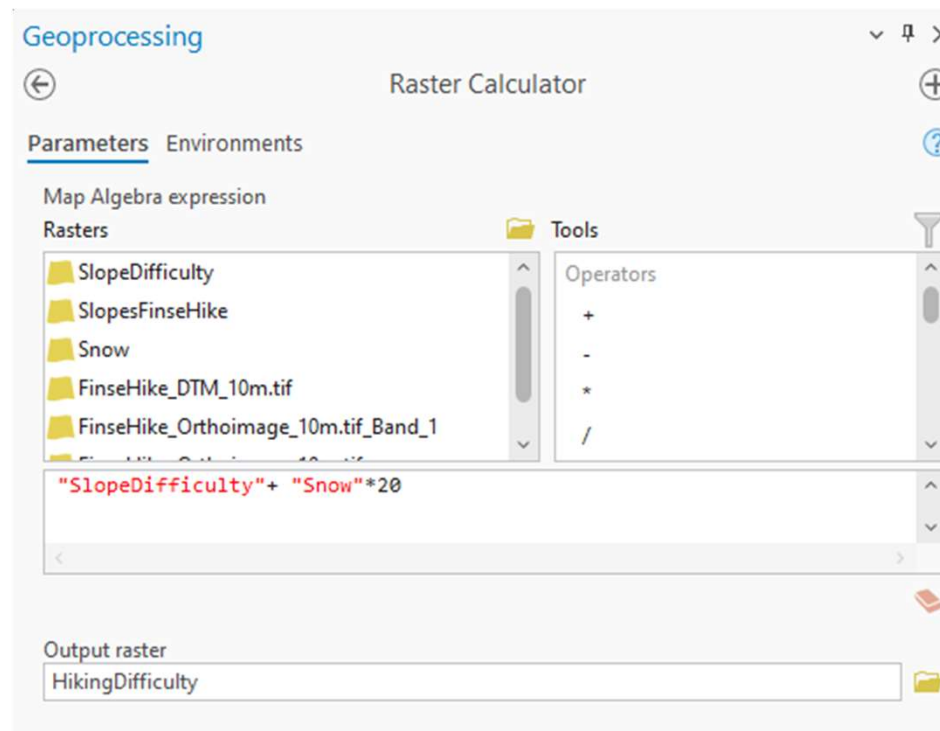
# Slope – easier to walk on flat terrain

- Compute the slope using the Surface parameter tool
- Use Percent rise
- Compute the slope difficulty score using the Raster calculator
- Use a logic to cap the score at 400



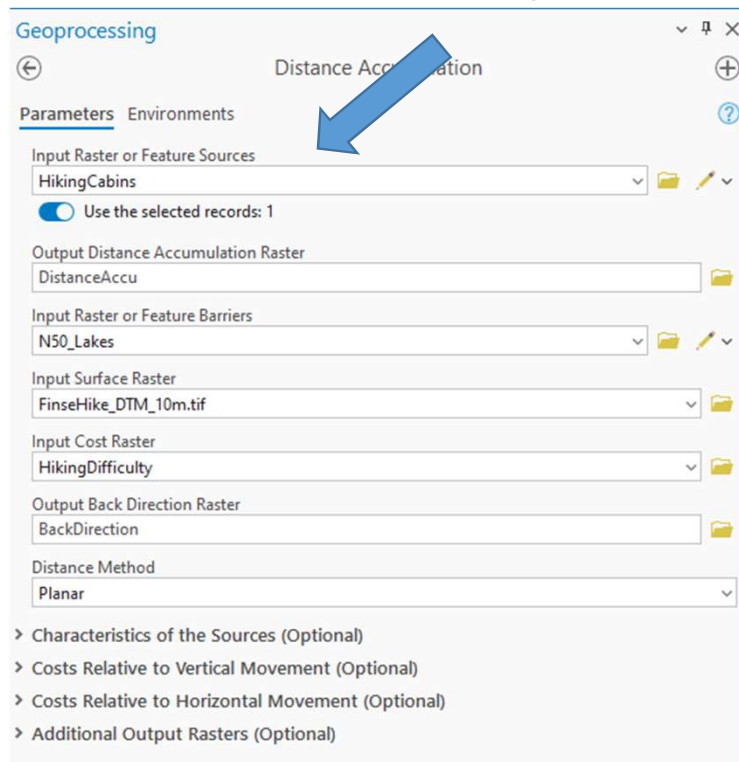
# Combine slope and snow to a 'Total hiking difficulty score'

- Use the Raster Calculator to combine both difficulty factors  
→ 'Total hiking difficulty' =  $\text{SlopeDifficulty} + \text{Snow} * 20$



# Put the best path

## Select FinseHytta



Geoprocessing

Distance Accumulation

Parameters Environments

Input Raster or Feature Sources  
HikingCabins

☒ Use the selected records: 1

Output Distance Accumulation Raster  
DistanceAccu

Input Raster or Feature Barriers  
N50\_Lakes

Input Surface Raster  
FinseHike\_DTM\_10m.tif

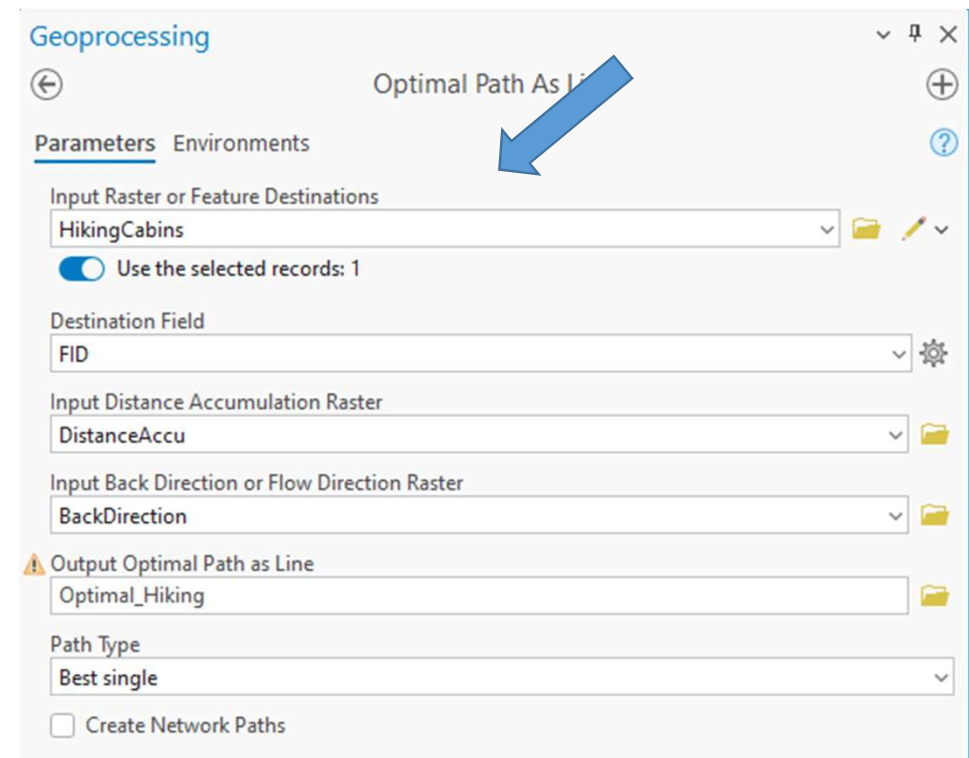
Input Cost Raster  
HikingDifficulty

Output Back Direction Raster  
BackDirection

Distance Method  
Planar

- > Characteristics of the Sources (Optional)
- > Costs Relative to Vertical Movement (Optional)
- > Costs Relative to Horizontal Movement (Optional)
- > Additional Output Rasters (Optional)

## Select GeiteryggHytta



Geoprocessing

Optimal Path As Line

Parameters Environments


Input Raster or Feature Destinations  
HikingCabins

☒ Use the selected records: 1

Destination Field  
FID

Input Distance Accumulation Raster  
DistanceAccu

Input Back Direction or Flow Direction Raster  
BackDirection

 Output Optimal Path as Line  
Optimal\_Hiking

Path Type  
Best single

☐ Create Network Paths



# Hiking path found!

It does cross rivers quite a lot, an improvement here would be to add the rivers either as barriers (but it might make the hike impossible), or as a rasterized layer with high costs



# Lab report

- Turn the steps in this lab into a Toolbox using the Model Builder
- Apply your toolbox to another location!