Lac Du Bois – Sharp-tailed grouse

This project will examine the habitat requirements for sharp-tailed grouse found in Lac Du Bois. Over the years, there have been various birding surveys completed in the Lac Du Bois Grasslands Protected Area during projects called “wildlife species inventories”, or WSI’s. The provided data represents a merge of three datasets: the WSI telemetry observations, the WSI survey observations, and WSI incidental observations.

Your job is to create a map predicting the probability of finding sharp-tailed grouse in Lac Du Bois. The LAS file for this project is about 29.6 GB in size. Here are some broad first steps you will need to take with this file:

1. Tile the LAS file into smaller pieces (e.g.: 500m × 500m).
2. Perform ground point classification (use the CSF algorithm, specify “sloop\_smooth = TRUE”)
3. Develop a DEM raster image that is a 5m pixel resolution.
4. Produce various terrain-based layers from the DEM.
5. Extract the raster data where the points are located.
6. The material from question 5 becomes the data needed for modelling. Create a tuned ranger classification probability model using the mlr3 package, employing spatial cross validation in order to eliminate the effects of spatial autocorrelation.

Your predicted map should be saved as a .tif file, where you can load it into QGIS to get the look of your final map to include in your report. Provide details on how this map should be interpreted in your report.