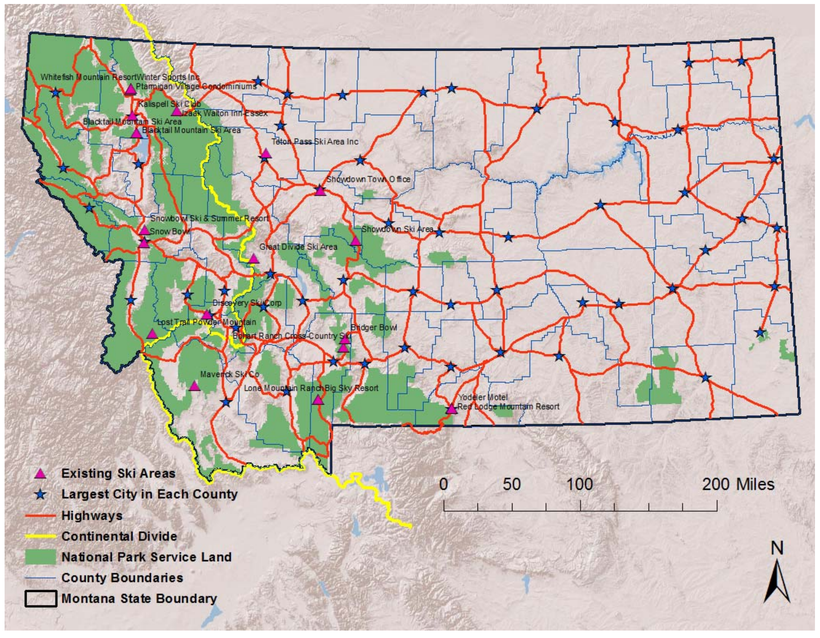
SUITABILITY ANALYSIS OF POTENTIAL NEW SKI AREA LOCATIONS IN MONTANA

Background

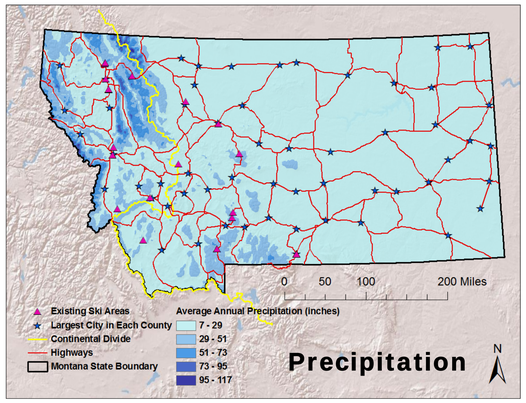
Ski mountains are, by their very nature, spatial entities. They exist in specific and well thought-out geographical locations and have well-defined boundaries. Their success depends on adequate and unrelenting snowfall and persistent low temperatures, which are factors of both global climate and local/regional weather patterns. There are currently 21 ski areas in the state of Montana, all located in the west and west-central portions of the state, where the Rocky Mountains and the Absaroka, Lewis and Bitterroot mountain ranges are located. While there are thus already quite a few ski areas in the state, there are undoubtedly other potentially suitable locations that could be developed for this recreational purpose in the future. The goal of this project is to identify potentially suitable locations for new ski areas in Montana, based on 6 factors, namely average annual precipitation, average winter temperature, elevation, proximity to the nearest highway, siting in National Park Service land, and proximity to large population centers.

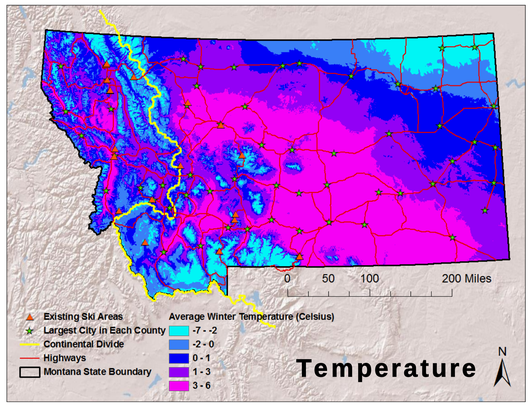


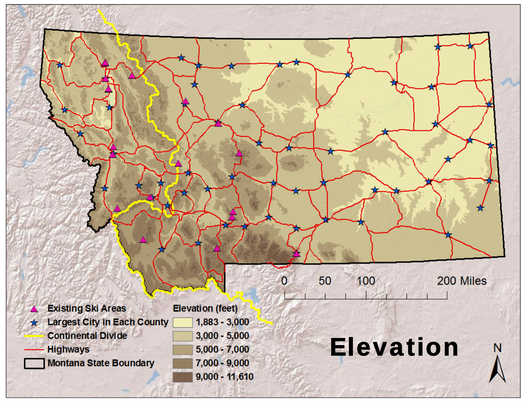
Methodology

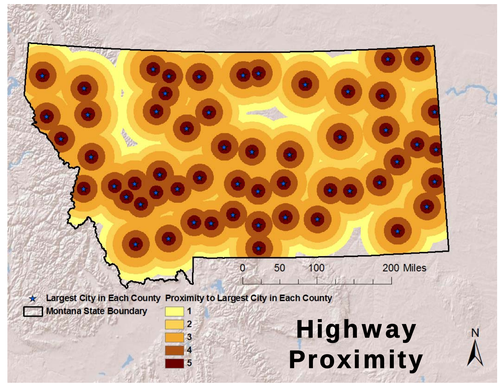
In order to plot existing ski areas, which are logically disqualified from future ski area development, I used existing ski resort data to plot all these points. Before performing my analysis, I had to prepare my data. My temperature data had to be converted from text format to raster format. Once each of my four winter months of temperature data were in my map, I then calculated the mean of these four monthly averages to create one Average Winter Temperature layer. Another preparatory step was putting all layers into the same coordinate system and setting the geoprocessing environment settings. Since most of my layers with already in the NAD 1983 State Plane Montana FIPS 2500 coordinate system, I converted the rest of the layers to this system.

For my suitability analysis, I used raster-based overlay analysis to qualify or disqualify all locations in the state for potential ski area development, with the final goal of combining all factors to identify locations that fulfill all necessary qualifications, and ranking them accordingly. Some of my layers called for high to low suitability rankings, while others were simply suitable or were not suitable. I used the Euclidean Distance tool to determine distance to population centers and highways, the minimum distance being 50 miles and 25 miles, respectively. I then reclassified all my data sets into the appropriate criteria – e.g., 1-5 for preferences and 1 or 0 for absolute requirements. Finally, I used the Raster Calculator function to weigh and then combine all data layers and find locations that intersected acceptable suitability for all factors.



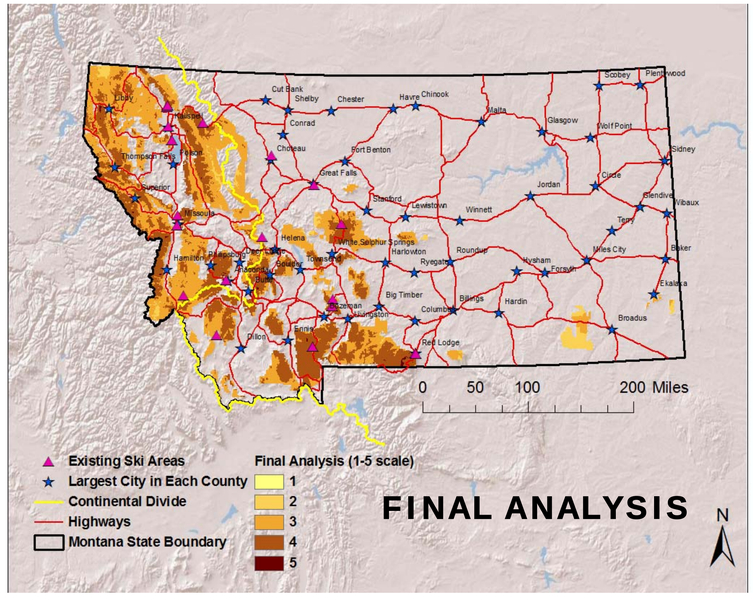






Results

For my final product, I was able to plot on a scale of 1 through 5 all locations in the state of Montana that are theoretically suitable for ski area development. In the end, it appears that there are ample locations in the western mountainous portions of the state where ski areas could potentially be sited in the future. Some notable locations are to the northeast of Missoula (the second largest city in the state) and east of Thompson Falls in the Lewis Range Mountains directly to the west of the Continental Divide, in the Absaroka Range mountains to the southeast of Bozeman and west of Red Lodge along the southern border of the state, as well as many spots in the northwest corner of the state from Superior up through Libby. However, barely any locations were identified with a suitability ranking of 5, indicating that there are no locations that are completely ideal, according to my factors considered. In order to further pursue the endeavor of actually trying to create a new ski area in Montana, and aside from further GIS analysis, each potential location could only truly be evaluated with on-site field research.



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Data Sources: NHP, NRCS, NRIS, & USGS through the Montana GIS Clearinghouse,, ReferenceUSA, & Tufts GIS Data Server

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