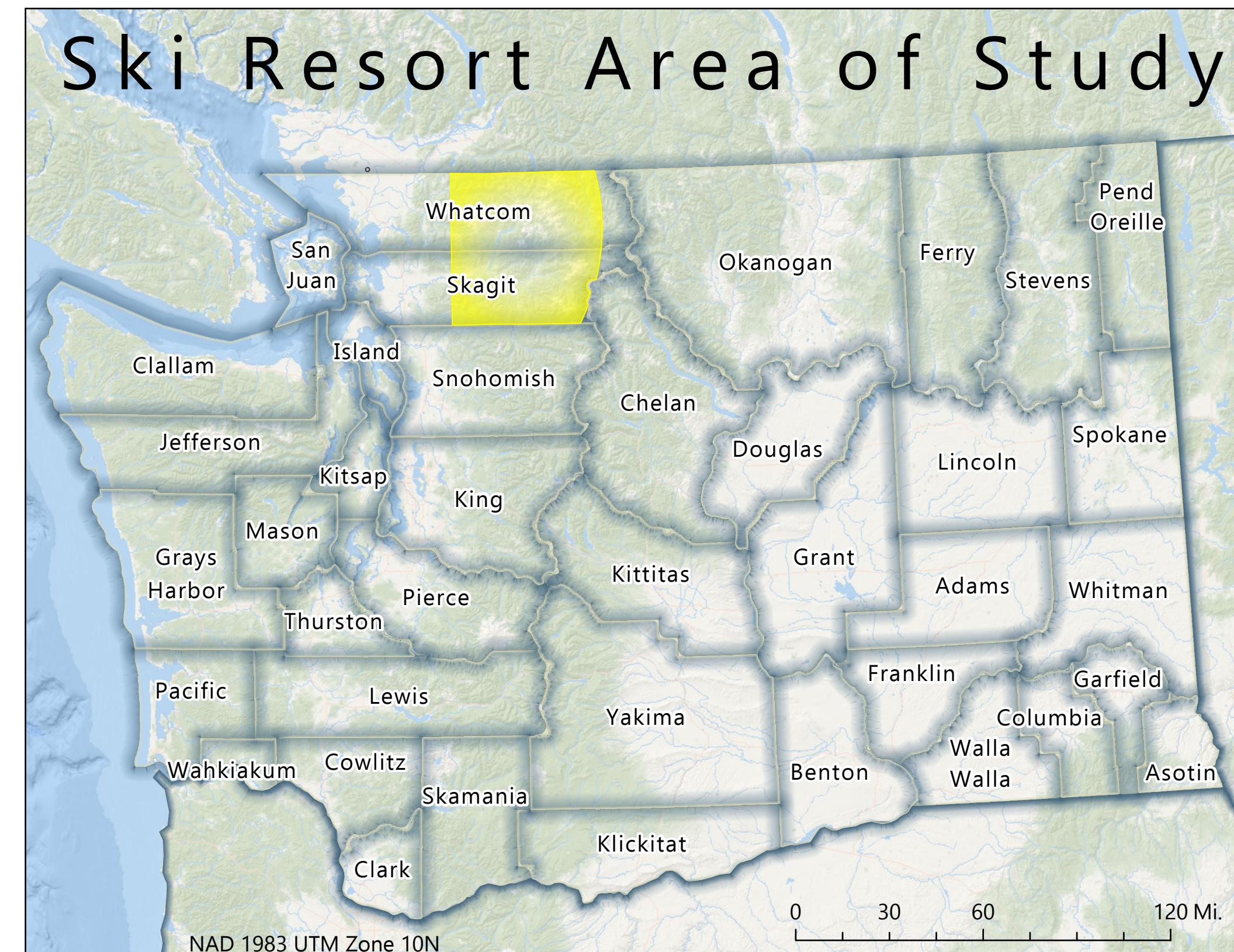
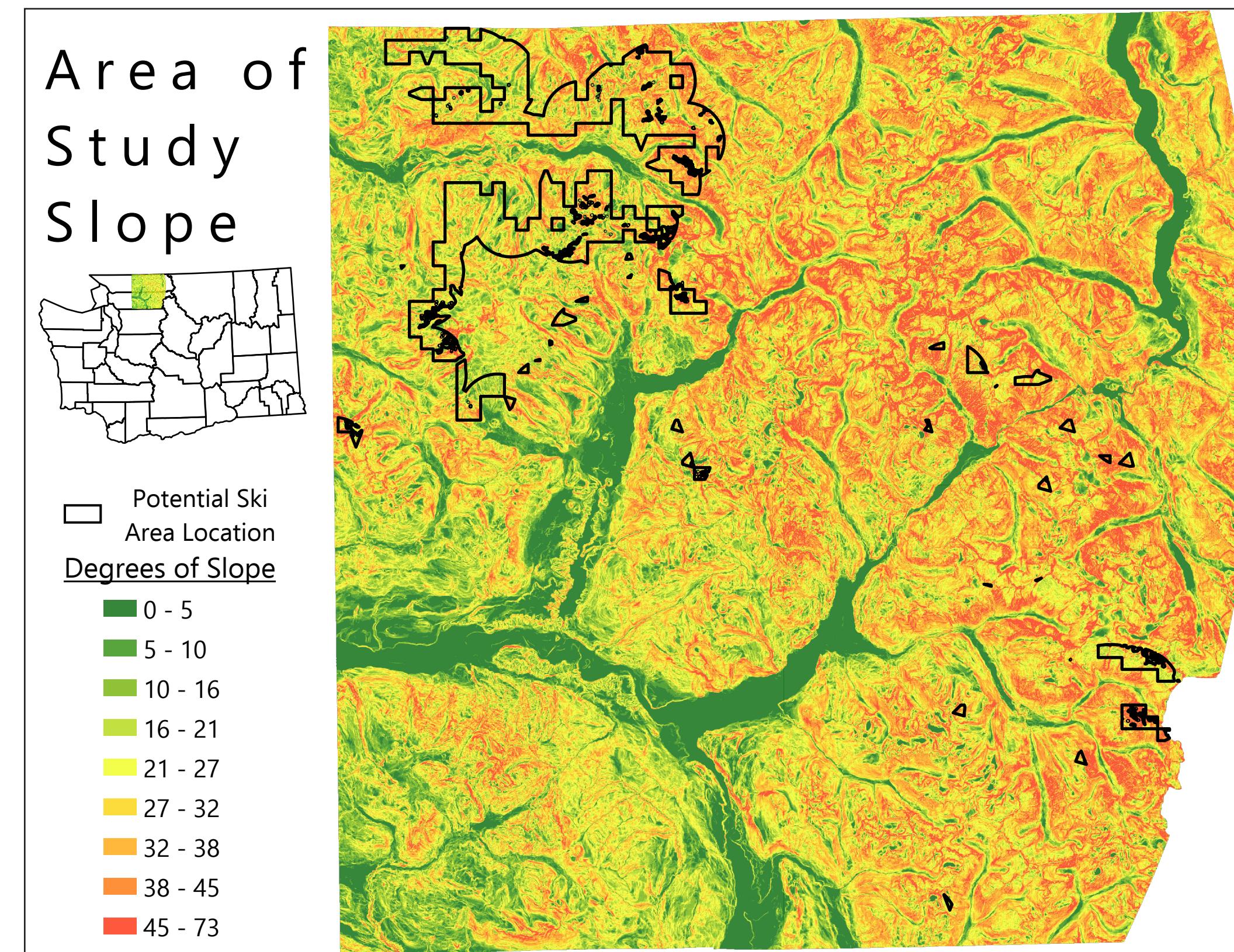


# Ski Resort Suitability Analysis in Northwestern Washington State

Austin Santamaria and Brice Fenske | ENVS 422 | Spring 2019



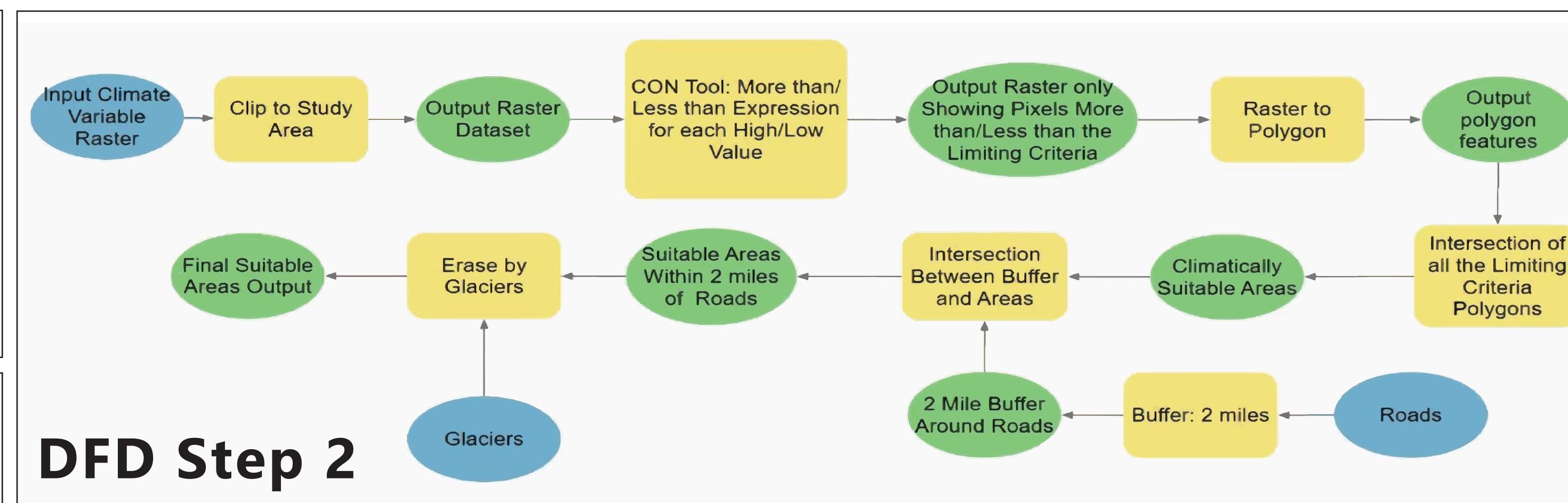
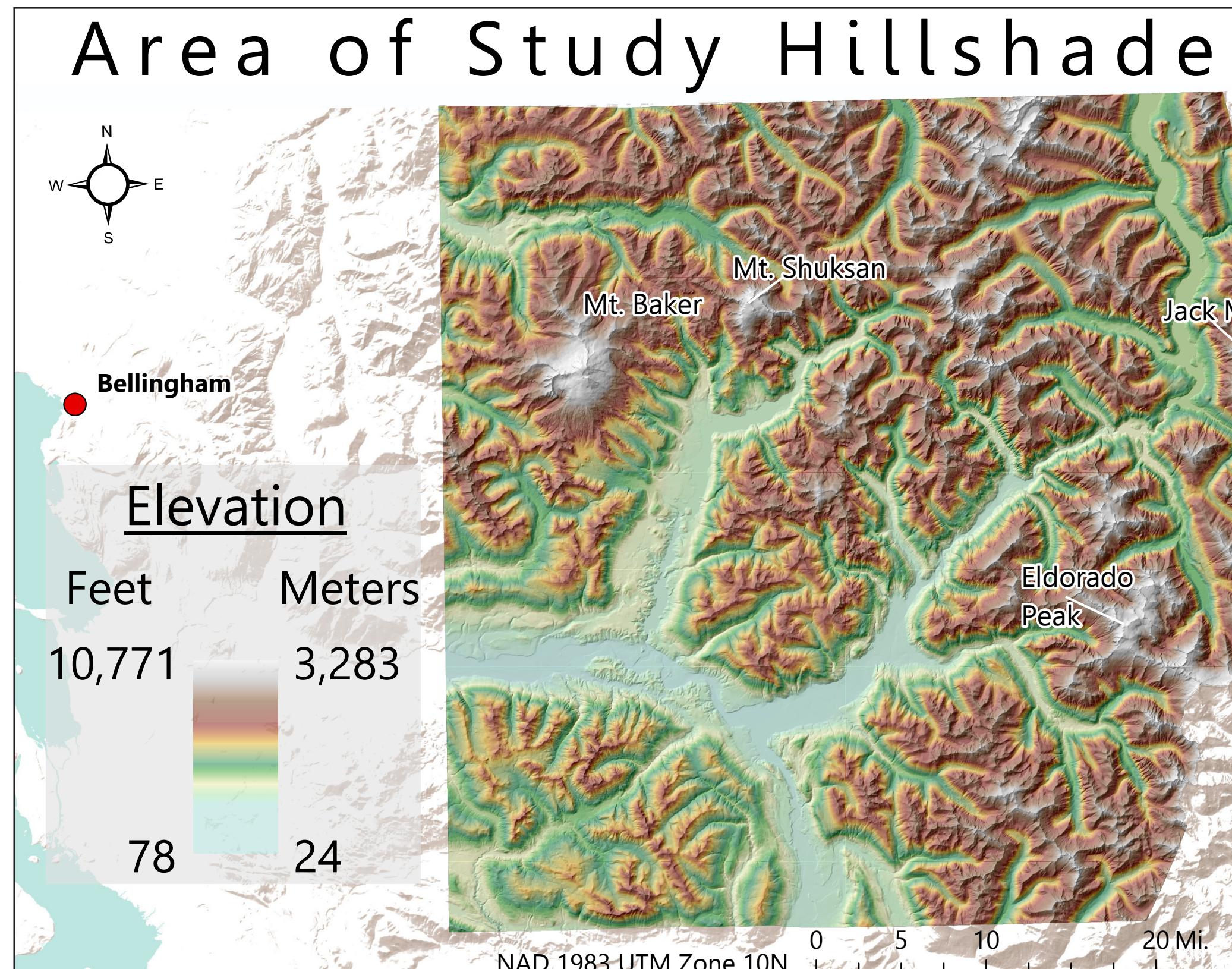
The purpose of this analysis was to find a suitable location for a potential ski resort for people who live in Bellingham, WA. We decided to look for an area that was within 70 miles, or a two hour drive from Bellingham without leaving Whatcom or Skagit Counties. That determined our area in yellow shown above.



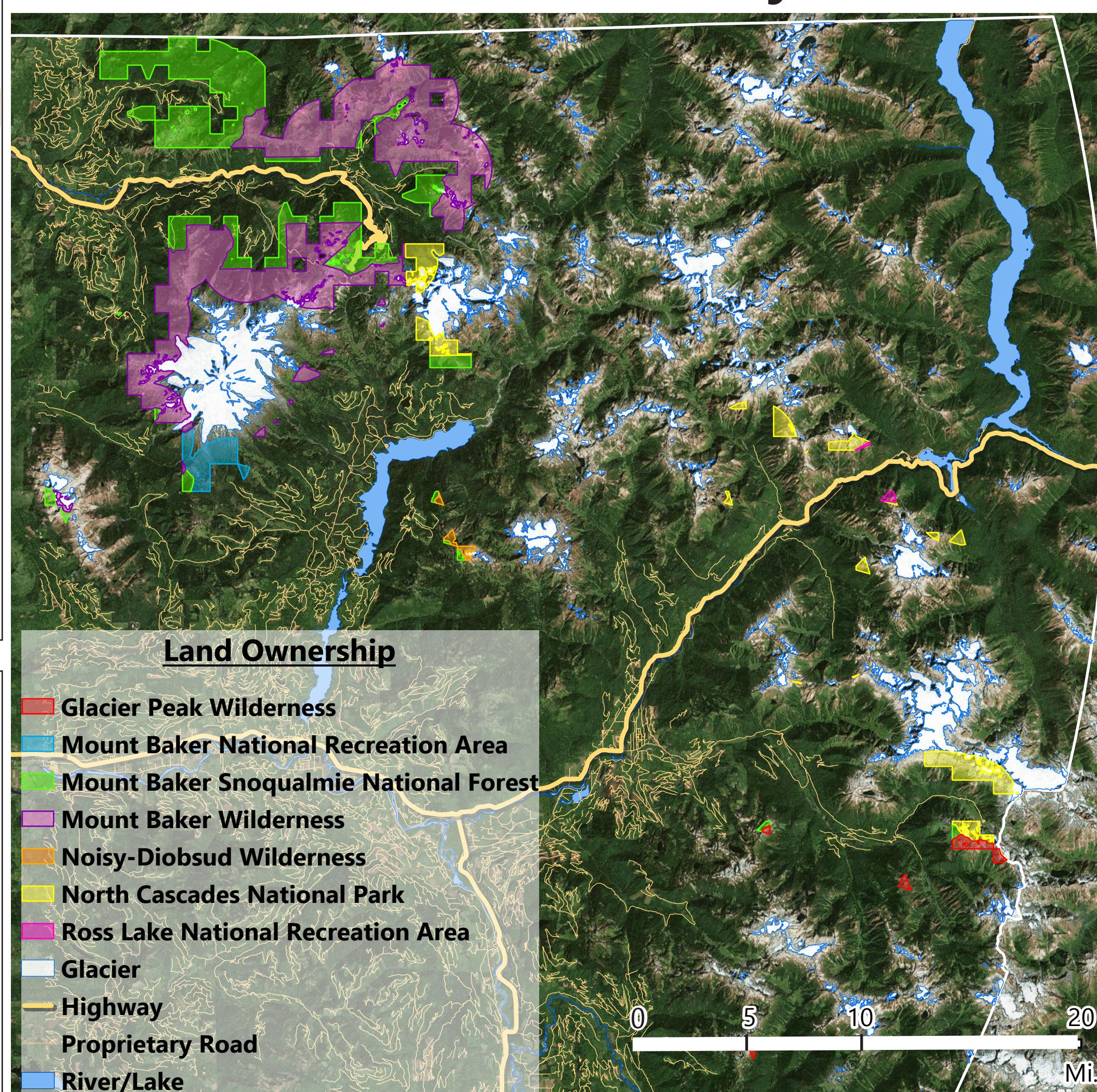
A separate zonal statistics analysis was done to determine the average slope of the five ski resorts in Washington State. This told us that the average slope was between the range of 11° and 29°. Overlayed on this slope map is our final locations of potential ski resort. Not taken into account, however, was the aspect of the mountains (cardinal direction) where the other ski resorts occupy.

All maps are shown and all analysis was performed in the NAD 1983 UTM Zone 10N Projected Coordinate System.

This area was also selected because it is home to part of the North Cascades National Park Complex. The North Cascades National Park features rugged mountain peaks, the most expansive glacial system in the contiguous United States, the headwaters of numerous waterways, and vast forests with the highest degree of flora biodiversity of any American national park.

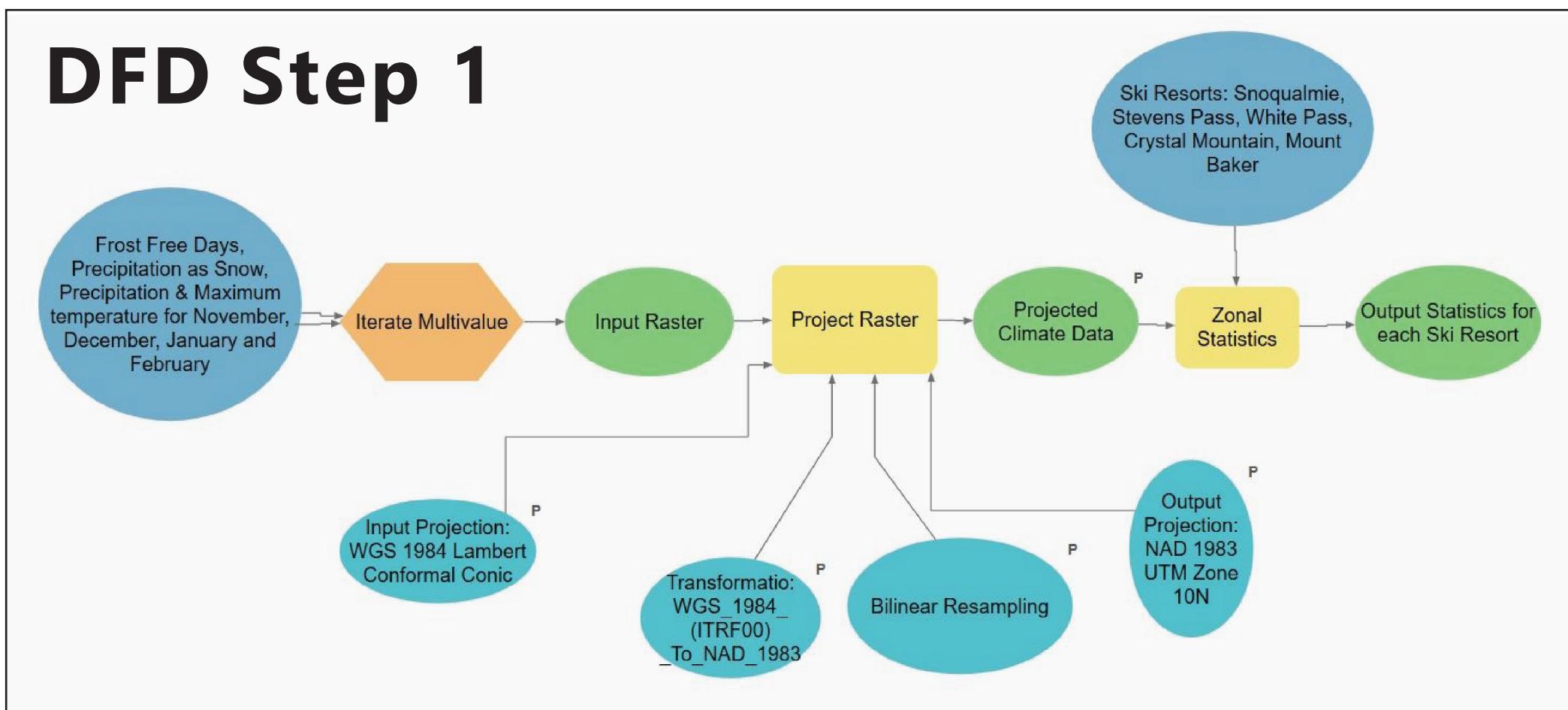


### Suitable Areas Classified by Land Ownership



### Results

Based on our area of study-climatic variables, terrain variables, and comparison to current ski resort conditions. Our suitable locations are shown to the left in yellow. All locations are within 2 miles of a road, do not touch a glacier or body of water, and meet all criteria. Not taken into account is land ownership.



### Ski Resort Climatic Variables

|               | Mount Baker | Snoqualmie Pass | Stevens Pass | White Pass | Crystal Mountain |
|---------------|-------------|-----------------|--------------|------------|------------------|
| PAS (mm)      | 856         | 1006            | 960          | 857        | 693              |
| Tmax Nov (°C) | 2.0         | 3.7             | 2.2          | 2.6        | 3.8              |
| Tmax Dec (°C) | -1.3        | -.4             | -.7          | 0          | .8               |
| Tmax Jan (°C) | -1.2        | .1              | -1.0         | -.2        | .5               |
| Tmax Feb (°C) | 1.6         | 2.6             | 1.1          | 1.6        | 2.3              |
| PPT Nov (mm)  | 270         | 399             | 315          | 331        | 335              |
| PPT Dec (mm)  | 327         | 388             | 352          | 249        | 241              |
| PPT Jan (mm)  | 300         | 424             | 352          | 291        | 298              |
| PPT Feb (mm)  | 237         | 324             | 243          | 212        | 209              |
| NFFD          | 159         | 181             | 153          | 162        | 132              |

This table shows the climatic variables from five different ski resorts in Washington State used to give us the range of suitable conditions for our proposed ski resort. All variables are averaged datasets from 1961 - 1990. **PAS** tells us precipitation as snow (mm), **Tmax** tells us the maximum temperature for a given month (°C), **PPT** tells us total precipitation for a given month (mm), and **NFFD** tells us the number of frost-free days.

Minimum Value      Maximum Value

### Data Sources

Western Washington University 2005 - 2019

University of Alberta Climate WNA

University of Washington DEM

Washington State Department of Natural Resources

United States Geological Survey

Google Maps

Washington State Geospatial Open Data

Environmental Systems Research Institute