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Environmental Impact Assessment of the proposed Garibaldi at Squamish project

Project background:

The Garibaldi at Squamish project is a proposal that aims to construct and operate an all-seasons destination ski resort at Brohm Ridge near Squamish, BC. The opponents to the project, such as the BC Environmental Assessment Office, stated in its 2010 report suggesting that the project lack information in environmental considerations. The Resort-Municipality of Whistler also opposes the project due to economic viability and impact of the project. I am a natural resource planner tasked by the proponent (Northland Properties and Aquilini Investment Group of Vancouver) to evaluate on the criticisms by the opponents, and to make recommendation as to how to proceed with the project considering the priorities of the different issues at hand. I will use a variety of GIS analysis tools to evaluate different sets of spatial data for the proposed project, and produce a map with different elements showing the areas that negatively affect the proposed ski hill/resort. I will first begin by explaining the steps I took for this geospatial analysis, followed by a discussion of the results and the recommendation for the course of actions.

Data:

Firstly, I acquired all the necessary spatial and tabular data such as the Digital Elevation Model (DEM) for elevation, the area for Ungulate winter range and Old growth management, and other necessary spatial data like rivers, roads, contours, project boundary, and park boundaries to determine the range of the project. The data was obtained primarily from UBC Geography department database, as well as DataBC. I then organize the data into a geodatabase and ensured that all relevant metadata (e.g. Datum, Projection, Units, etc.) were appropriate for this project area.

Analysis:

- 1) Areas that are prone to a lack of snow (<555m in elevation).

-I used the reclassify tool to classify the DEM layer into the appropriate classes, using 555m as a break for the values. I changed the values for above 555m to 'no data', so that I can focus only on the areas that are less than 555m. I then converted the raster to vector layer afterwards.

2) Ungulate winter range and old growth management areas.

- I used the attribute table to determine the sum of the area of old growth management and ungulate winter range, and compared it to the total project area to find a percentage.

3) Red-listed ecosystems

-I used the select by attribute tools to select all the areas that are considered to be red-listed ecosystems, by building a query to select all the relevant values (e.g. species name, biogeoclimatic unit, etc.) associated with a red-listed ecosystem. I then created a new layer from all the selected items to determine all the red-listed ecosystem areas.

4) Riparian area/ Fish habitat

-For this project, I assumed that streams above 555m (elevation) are less likely to be fish bearing streams, and hence a smaller buffer area is required. For this, I had to create a variable multi width buffer for the river layer, and I did a line and polygon overlay with the elevation layer (<555m) by using the spatial join analysis tool. Thereafter, I reselected the different values based on their attributes (<555m and >555m), and used the field calculator to add a buffer for the two separate class (50m for >555m and 100m for <555m).

5) Combining all the different factors for consideration

- I used the union analysis tool to combine all the relevant layers, and used the dissolve command to determine the total area of the project that is protected. The areas shown will represent the regions within the project boundary which are off-limits to the construction of the ski resort.

Results and discussions:

The proposed project area is approximately 54,717,275 m², and the area is adjacent to the Garibaldi Park. 55.5% of the proposed project area falls within a protected area, which is a little

over half of the entire project area. Approximately 30% of the project area is less than 555m, which is considered to be less suitable for the implementation of the ski resort due to the lack of snow. Old growth forest accounts for 7% of the project area, Ungulate winter range is about 8%, red-listed ecosystem areas accounts for roughly 25%, and riparian areas is around 30%. Although around half of the proposed area (55.5%) is considered to be unsuitable for the proposed ski hill and resort, there are still potential areas within the project area that may accommodate the requirements of this project.

The two greatest environmental concerns to the project development are:

- 1) Pollution from the construction and development of the project affecting adjacent streams, riparian habitats, and other surrounding ecosystems.

Possible solutions - regular assessment of the status of adjacent ecosystems and habitats, and also monitoring the ecological impacts of the project during and after the construction of the ski resort.

- 2) The fragmentation of key habitats and ecosystem in the region, for instance the interference of migration corridors for species, etc.

Possible solutions – incorporating environmental concepts and knowledge in the process of the design of the new ski resort. For example, we could include migratory corridors for plants and biodiversity to stay connected despite of the project boundary.

Recommendations:

The project should first consider the proximity to protected areas (e.g. riparian habitat, ungulate habitat, old growth forest, and red-listed ecosystems), followed by considering the elevation, and lastly the accessibility to the potential site.

The site of the project should not intersect with any protected regions (see attached map), so that local ecosystems and habitat are kept intact. I propose that the project should be located at areas above 555m in elevation, as these areas are more likely to receive snowfall during ski season. This reduces the economic efforts in the transportation of snow to the project site in the event of a drought, and also reduces the environmental impacts associated with this project (e.g. emissions by transportation and extraction of snow, altering local scale climate like reducing albedo effects from other areas, etc.) Accessibility is another concern for the project, and we

should look at areas where there are major road networks etc. This will also reduce the costs of the project, in terms of economic and environmental costs.