Identifying Cycling Routes to Selkirk College

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Introduction

Cycling is an excellent mode of transportation. Choosing to commute by bicycle helps to reduce emissions and noise, and alleviate road congestion. Situated in the mountains along the Columbia and Kootenay rivers, Castlegar and the surrounding area is an amazing place with many different roads and trails suitable for bike riding. Selkirk College students and staff should take advantage of this, and be aware of the recreation opportunities available in our backyard. The intention this project is to communicate the distance, elevation gain, and difficulty of cycling routes to Selkirk College. This project's purpose is to spark the idea that cycling to Selkirk College is a fun, accessible, and green way to get to school.

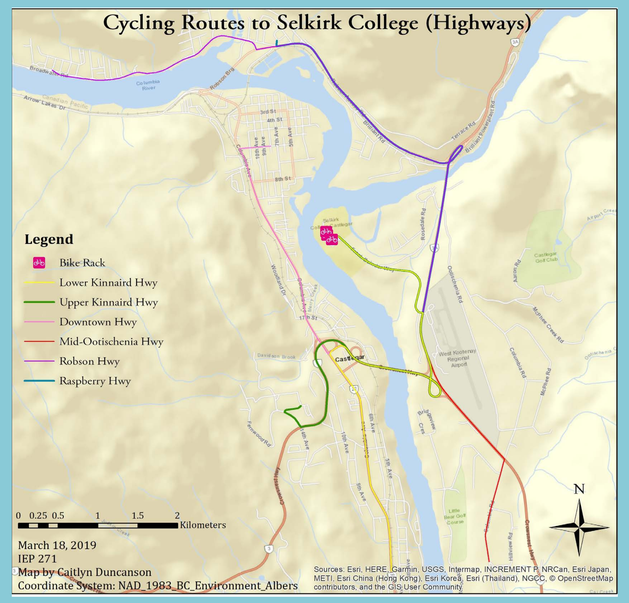
Methodology

- To create route layers I used the merge tool to combine existing trail and road layers retrieved from Selkirk College's O-drive
- Elevation profiles were created using the 3D spatial analyst interpolate line tool with a DEM layer
- To determine distance I used the attribute table's summarize function
- Determining shoulder availability required field work
- To calculate approximated, I used the formula: Time = Distance ÷ Speed. I used each route's distance divided by an average speed of 15.5km/h.
- To make all layers with important information easily visible and accessible, I uploaded my geodatabase to ArcGIS online and created an interactive Web App that is shareable to the public

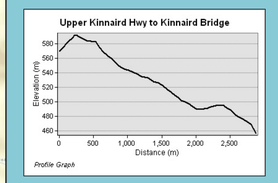
Limitations & Assumptions

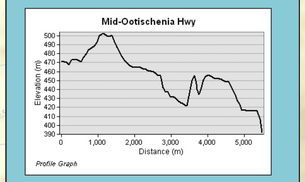
- Determining elevation was challenging, as the line interpolation tool in the 3D analyst is time consuming and limiting in terms of configurable options
- It is difficult to see the overlapping routes, and ArcMap is limited in correcting this
- Some parts of the elevation profile graphs are inaccurate – the elevation model layer shows the wrong elevation over some bridges
- Snow and ice covering shoulders and roads makes some of the routes above inaccessible in winter

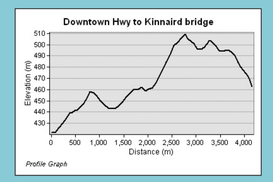
Route Name	Route Type	Distance (km)	Available Shoulder	Apprx. Time (mins)
Downtown Hwy	Hwy	8.1	Yes	31
Lower Kinnaird Hwy	Hwy	7.9	Yes	31
Mid-Ootischenia Hwy	Hwy	5.5	Yes	21
Raspberry Hwy	Hwy	7.4	Yes	28
Robson Hwy	Hwy	10.4	Yes	40
Kinnaird HwyRd	Hwy & Secondary	6.5	Most of the way	25
Upper Kinnaird HwyRd	Hwy & Secondary	5.9	Most of the way	23
Raspberry HwyRd	Hwy & Secondary	6.5	Part-Way	25
Robson HwyRd	Hwy & Secondary	9.2	Part-Way	36
Upper Kinnaird Hwy	Hwy & Secondary	6.8	Yes	26
Brilliant Rd	Secondary	4.4	No	17
Lower Kinnaird Rd	Secondary	6.4	Part-Way	25
Mid-Ootischenia Rd	Secondary	7.4	No	29
Upper Kinnaird Rd	Secondary	6.9	Part-Way	27
Upper Ootischenia Trail	Trail & Road	5.1	No	20
Lower Ootischenia Trail	Trail & Road	4.2	No	16
Mid-Ootischenia Trail	Trail & Road	5.6	No	22
Raspberry Trail	Trail & Road	6.3	Part-Way	24
Robson Trail	Trail & Road	9.3	Part-Way	36

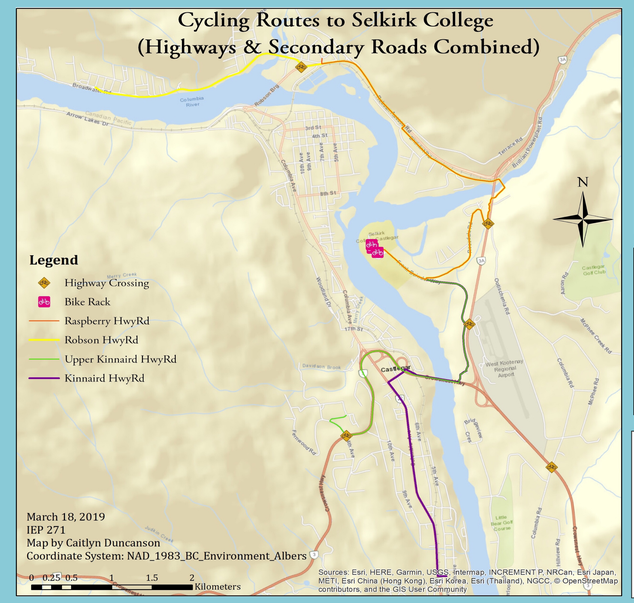


Profile graphs from highway routes:

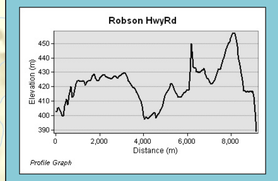


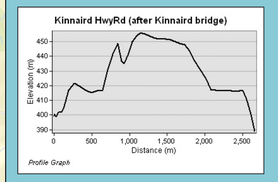


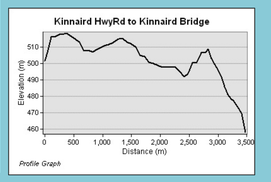


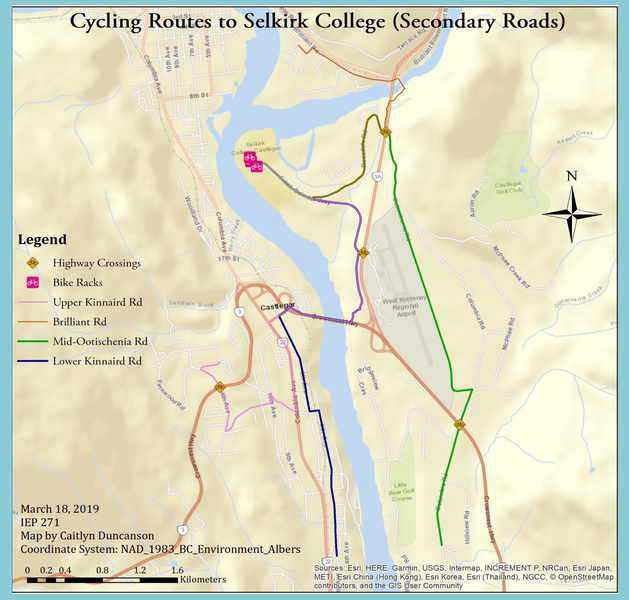


Profile graphs from highway & secondary routes:

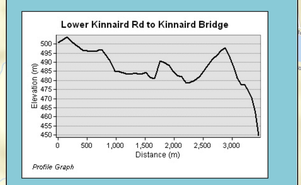


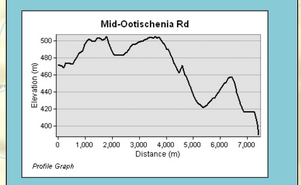


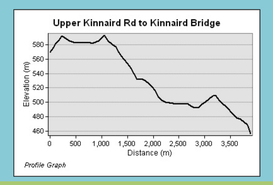


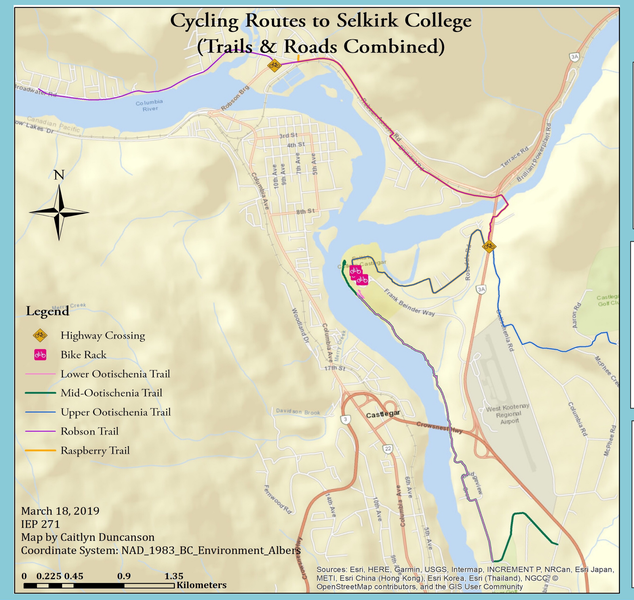


Profile graphs from secondary road routes:

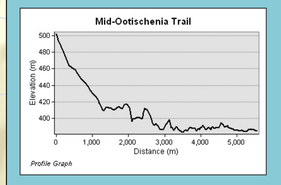


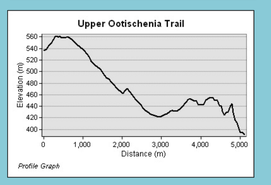


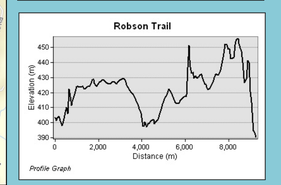




Profile graphs from trails & roads routes:







Results & Discussion

- Although some parts of the profile graphs are inaccurate, it is evident to see the difference in elevation gain and loss based on the which area of the Castlegar region the route starts, and the road type. There are many routes and trails available to cycle to Selkirk College.
- The longest distance and duration route is the Robson Hwy route, at 10.4km and takes 40 minutes. Highway routes are most suitable for someone who is comfortable biking next to traffic
- Ootischenia cycling routes to Selkirk College are the shortest routes. The Lower Ootischenia trail is the shortest at 4.2km and a 16 minute ride. Trail routes are best suited for individuals who ride mountain bikes. As evident by the profile graphs from some of these routes, the terrain on the commute to Selkirk College will be rugged.

Data sources

- DEM layer: Government of Canada: Geospatial Data Extraction: Canadian Digital Elevation Model
- Trail Layers: O:GISdata:prj_specific:castlegarfriendsofparksandtrails:data:original:selkirk:shape:oots_trails and O:GISData:campus:trails:2010selkirktrails
- Roads Layer: O:GISdata:infrastructure:transportation:dgtl_road_atlas.gdb_DGTL_ROAD_ATLAS_DPAR_S
- Orthophoto (for data analysis, not map): I:orthos:castlegar:orthophoto:castlegar_25cm_colour_sid

If you have an ArcGIS online account and want to use the Cycling Route Web App created for this project please visit: http://selkirk.maps.arcgis.com/home/item.html?id=4e2fc8fbe084492f8020a68cf4d8993a