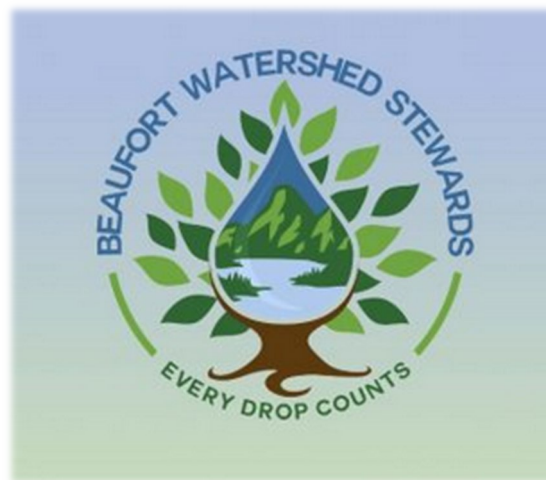Vancouver Island University
Geography Department
Advanced Diploma in GIS Applications

Beaufort Watershed Stewards

Geodatabase and Interactive Web Mapping Creation Project

Recommendations for further GIS projects

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Introduction

The Beaufort Watershed Stewards is an organization that specializes in monitoring water quality and health. Since 2018, the organization has been collecting water quality data on a biweekly basis for a handful of streams that stem from the Beaufort mountain range. In that time, BWS has grown and increased from sampling three streams to thirteen. Apart from just expanding their sampling sites, they have also been involved in different projects around the area that are related to watershed health. As the organization continues to grow and expand their data, it is important for them to maintain effective planning techniques.

GIS mapping can be a useful tool to aid in data organisation, and can be used as the primary tool for certain types of data collection. This document provides an outline for some further GIS related tasks that the organisation could complete in the future.

Field Maps App

Introduction

Currently, the data collected in the field for stream sampling is recorded on paper and later transcribed onto a Microsoft Excel table. There is a need to streamline this data recording process to be uploaded instantly from the field to digital format.

Goals

To design and create a simple smartphone app that allows the user to input data in the field and upload it automatically to the organizations database for further analysis. The data should ideally be viewable from the current web map on the BWS website.

Specifications

This project can be completed by using AGOLs Field Map App service. This field collection app needs to be simple for use in the field by those with only basic GIS knowledge.

Currently, BWS uses an AGOL web map to display sampling data from previous years. The field data app should aim to be linked to this web map so that users can view the results immediately after it has been collected. This could potentially require a restructure of the web map to allow this functionality.

NDVI Watershed Analysis

Introduction

NDVI is a remote sensing tool used to understand vegetation density. Using red and near infrared light, the analyst can determine the health of a forest, as well as the amount of deforestation over a specified time period.

Goals

To use NDVI remote sensing to determine a) the health of the forest, and b) the amount of deforestation over time for the all the watersheds in Beaufort mountain range.

Specifications

This project will use multiband satellite imagery to index the entire Beaufort range. Using Catalyst Focus, a raster of NDVI values could be created, and then overlayed by the Watersheds polygon layer in ArcGIS Pro. The NDVI value for each watershed could then be determined and displayed on the BWS Web Map.

Using similar processes, the area of deforestation could be determined for each watershed polygon over a specified time period. This project entirely depends on the availability of the multiband satellite imagery.

Map Printout

Introduction

Online maps and electronic mapping systems are extremely useful for analysis and mapping techniques, but in terms of communication, a physical map can be a very useful tool. This simple project involves creating one or more several large printout maps that show the Beaufort Mountain range and its watersheds for use in meetings/outreach projects.

Goals

To create and print a large poster sized map of the watersheds that stem from the Beaufort Mountain Range. Ideally, a second large map will be printed showing the bedrock depths at the BWS VES locations.

Specifications

Using ArcGIS Pro, create several large map layouts in poster size (A1 or A0). Using standard cartography principles, the first of these maps needs to show the watershed polygons overlayed onto a satellite image of the Beaufort Range. The map needs to include labels of the watersheds. Optionally, the map can include the stream sampling locations.

The second of these maps should be a able to help with bedrock mapping. It should have a plain background, and show the VES and Groundwater well location points. These points should be labelled with the bedrock elevations at each point. Ideally, it can also show ground elevation contours using the DEM file.

3D Printed Beaufort Range

Introduction

Communication and education is a big part of non-profit organizations. In community outreach programs, having a physical model of the Beaufort range would be a very useful tool to have.

Goals

To create a 3D printed model of the Beaufort Mountain range, using the DEM file. Ideally, it would have the watershed polygons printed on it, to emphasize how terrain affects the watershed regions.

Specifications

Using the DEM of the region, the area must be organized and clipped to be appropriate size. Then, using the *DEMto3D* plugin from QGIS, create an STL file that can be exported to a 3D printer. Ideally, this model would be 50cm x 25cm, which might be too large for a standard printer. Therefore, it would have to be split into multiple files and joined together after the printing process is complete.