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Project 2

Problem Statement

The objective of this project is to develop a Python script and toolbox in ArcGIS to extract elevation values for water boundary points derived from a raster (flood_2class.tif). The coordinates of these points are provided in a CSV file. Elevation data will be obtained from Digital Elevation Model through Google Earth Engine (GEE). Once extracted, these elevation values will be written to a shapefile. This will allow for visualization in ArcGIS.

Data Sources

The primary dataset for this project is a CSV file containing water boundary points. Preprocessing steps involve verifying the coordinate system, checking for data consistency, and potentially transforming coordinates to a geographic coordinate system (latitude and longitude) for compatibility with Google Earth Engine.

CSV points are collected from the flood raster file. Elevation data is sourced from the Google Earth Engine dataset.

Methods and Tools

The project will be implemented using Python as the core scripting language. Libraries such as GeoPandas will be used to manage spatial data and write the results to a shapefile. The Google Earth Engine Python API will be used to apply elevation values to the points. For integration with ArcGIS, ArcPy or the ArcGIS API for Python will be employed to create a toolbox interface. Creating code and scripts was completed in VS Code.

The workflow begins with loading the CSV points and verifying their coordinate system. A shapefile is then created to visualize elevation points. A Python toolbox is made to add an additional shapefile than can be used to construct a layout. Finally, a legend, arrow, and scale are added.

Challenges and Timeline

Potential challenges include properly converting the data into a shapefile. In addition, the data can be impacted based upon the size of the dataset.

Week 1 included analyzing the Excel dataset to convert to a shapefile toolbox and constructing an ArcGIS toolbox. Week 2 includes visualizing the data in ArcGIS and adding a layout among other visualization tools. Week 2 also will involve testing the script.

Conclusion and Future Directions

This project successfully creates a Python script to extract elevation values for water boundary points and store them in a shapefile using various tools and programs such as Google Earth Engine, GeoPandas, and ArcPy.

For future work, the workflow could be extended to handle larger datasets and other geographical descriptions such as slope.