Lab Report

Title: Lab 00
Notice: Dr. Bryan Runck
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Date: 09/22/21

Project Repository: https://github.com/mmarsole/GIS5571
Google Drive Link: *<if applicable with data, notebooks, etc.>*
Time Spent: 20 hrs (it took 14 hours to finish all the Esri trainings)

Abstract

The Goal was to compare and contrast three Esri product environments by repeating the same process in ArcPro, ArcPro Notebooks, and ArcOnline Notebooks. Using MN trail data I performed a 5 meter buffer in each of the environments and found that ArcPro the most user friendly, ArcPro Notebooks was simple and conveniently already present within my ArcPro Project, while ArcOnline was the most difficult to use.
Overall, each product offers functionality, but if you prefer seeing and manipulating your data visually, I'd recommend ArcPro. If you value documentation, have some coding experience, and need a platform that can replicate past tasks I'd recommend either of the Notebook environments. Between the two notebooks, ArcOnline Notebooks has access to web-based data, a one stop and shop experience potentially if their data meets your needs, otherwise you can add your own data as a web layer.

Problem Statement

"The Esri ecosystem has many different ways that you can access the same underlying functionality. Our objective is to compare and contrast performing the same simple activity - buffer a network dataset - using three different tools: ArcPro, Jupyter Notebooks in ArcPro, Jupyter Notebooks in ArcOnline." -sourced from Lab0 directions

Table 1. Buffering

#	Requirement	Defined As	(Spatial) Data	Attribute Data	Dataset	Preparation
1	Buffer	Adding a 5 meter buffer (left and right) around a Mn trail Data	Trail geometry (lines)	NA	Minnesota Trails	None

Input Data

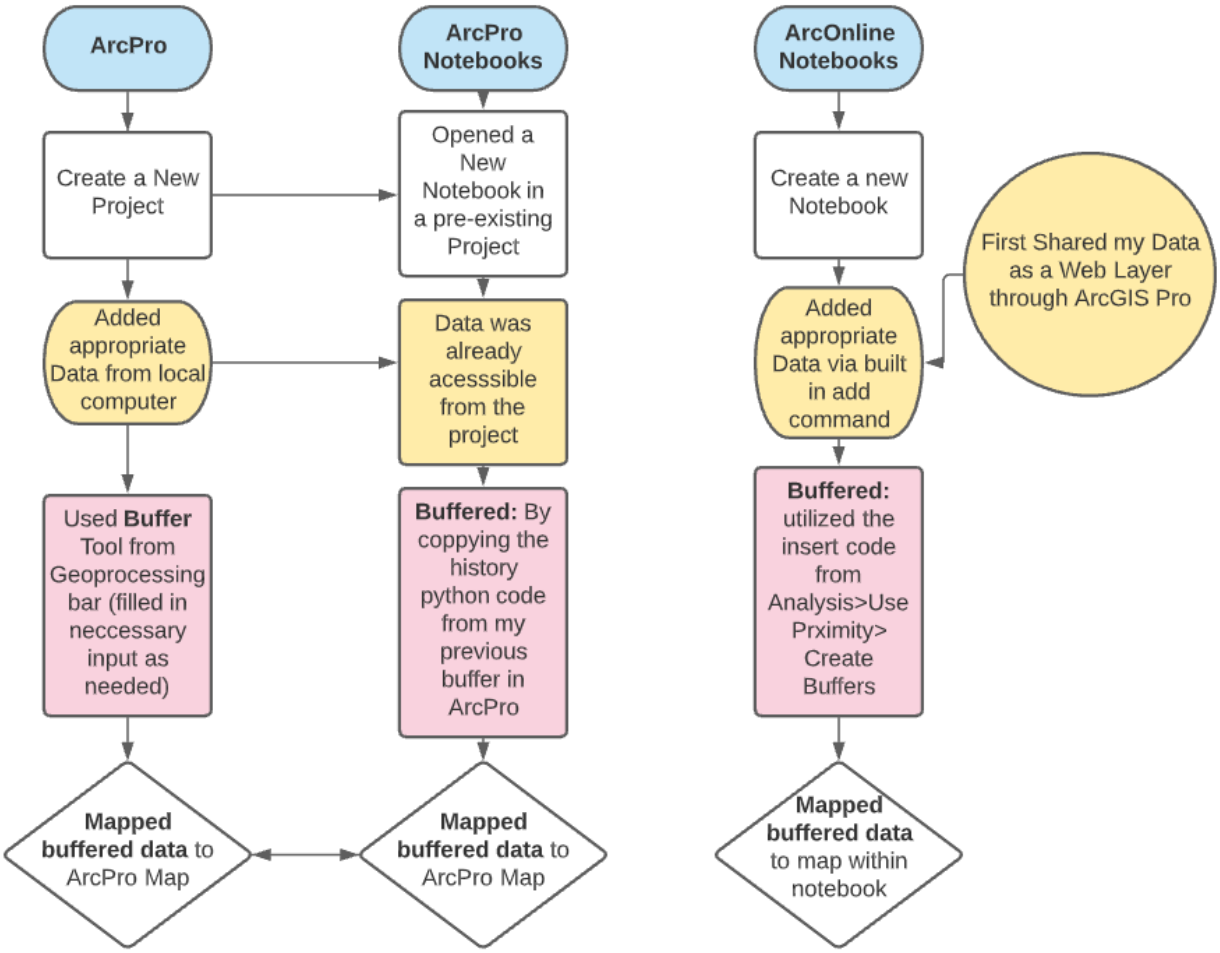
The Minnesota State Trail and Roads data is a collection of trail and roads throughout Minnesota maintained by the DNR Division of Parks and Trails. It is updated consistently and contains information regarding trail/road names, users (horse, bike, hiker, etc.), width, length, etc.

Table 2. Data

#	Title	Purpose in Analysis	Link to Source
1	Minnesota State Parks Trails and roads	Data used to perform 5-meter Buffer (for comparing different Esri environments)	Minnesota Trails

Methods

Figure 1. Esri operation Diagram.



Results

	ArcGIS Pro	ArcPro Notebooks	ArcOnline Notebooks
Pros	• Familiar interface (have prior experience in pro) • Visual map is Key to data manipulation (can visually select data) • No need for coding	• Can automate repetitive tasks • Can copy the code for functions/tools directly from the ArcPro's history • Still have access to the Visual Map that is integral to ArcPro	• Built in code shortcuts (helps insert function/tools) • Can share Notebook to others easily (this can be helpful in relaying initial analysis of data to others) • Have access to web data (produced by esri or others)
Cons	• Must repeat repetitive tasks (if I need to rasterize data several times, it	• Need some knowledge of coding (Python)	• Don't have access to the regular packages that I am used to

	needs my attention for all inputs)	• More likely to result in errors (have to check for syntax or input errors)	(folium maps, geopandas) • Need a better understand how to use Esri's packages • Loading data has to come from the web

Results Verification

Since I performed the same tasks in three different environments, I was able to validate the buffer. See the following images to compare:

Figure 2. State extant for buffered layers from two environments (ArcPro and ArcPro Notebooks)

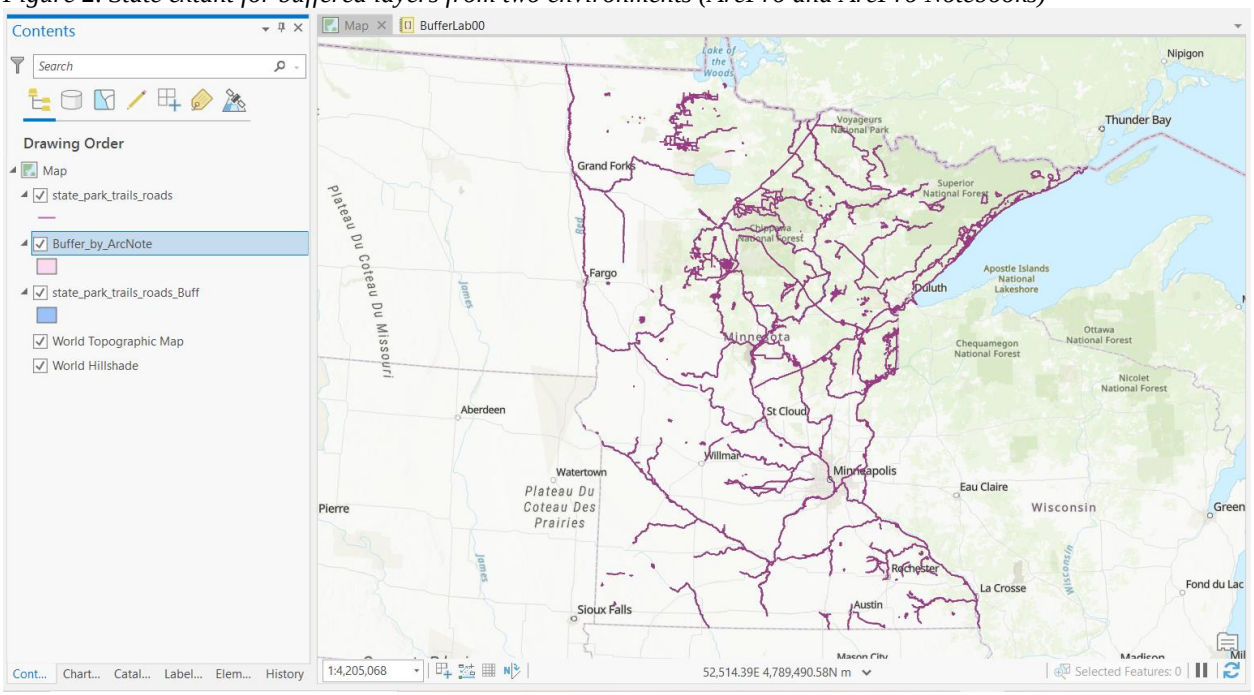
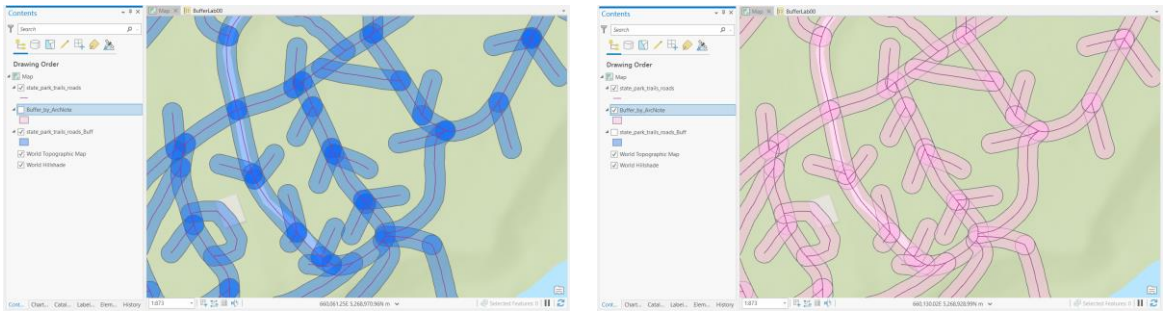


Figure 3. Zoomed in extents



The left shows the buffered result from ArcPro the right shows the same extant results from the ArcPro Notebook.

Figure 4. ArcOnline Notebooks state extant

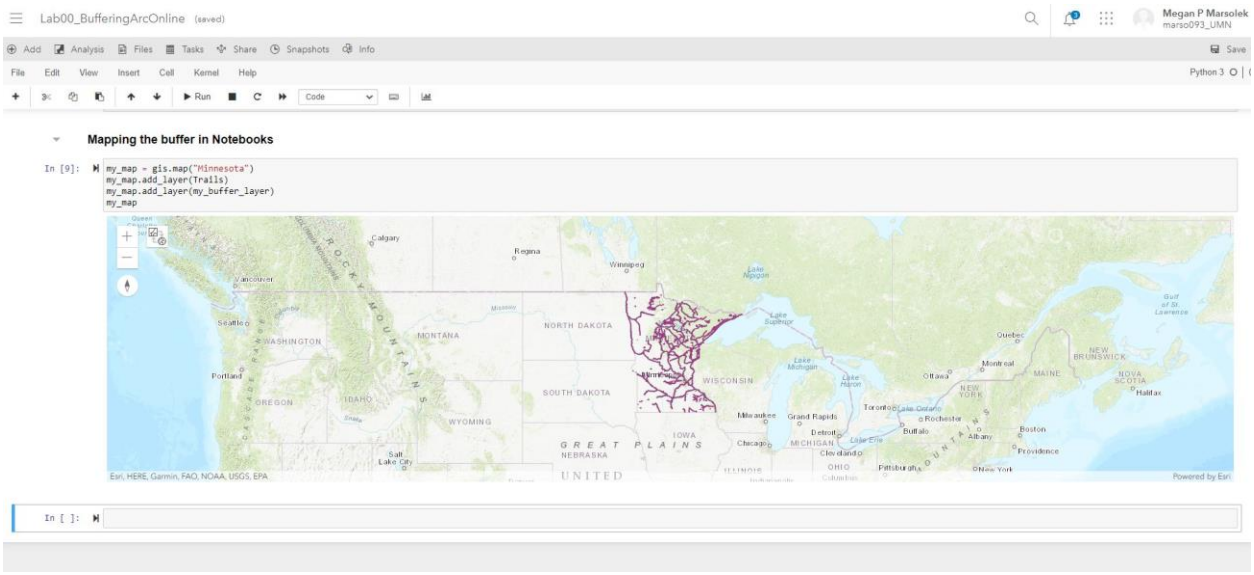
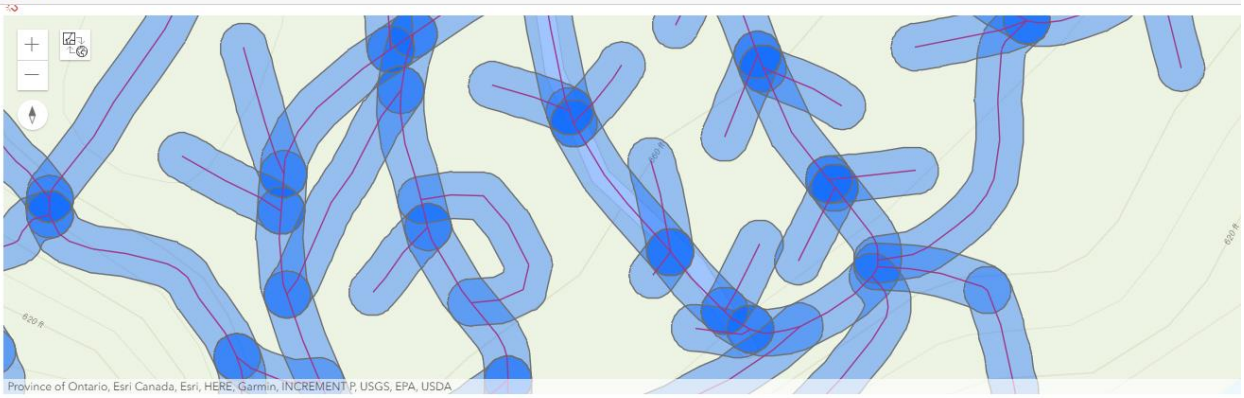


Figure 5. Zoomed in extant for ArcOnline Notebooks

```
my_map = gis.map("Minnesota")
my_map.add_layer(Trails)
my_map.add_layer(my_buffer_layer)
my_map
```



This image is the same area as seen within ArcPro, but the Visuals are difficult to match precisely (window size is more rectangular here).

Discussion and Conclusion

GitHub

Creating my account and repositories were simple enough in GitHUb, but I did (and still do) have a few issues searching and exploring other repositories. I realized that the general search bar will search within an opened repository instead of the general GitHub (a little confusing at first). My other issue was learning how to merge two branches within my repository. I accidentally pushed repo changes to a new branch and was trying to learn how to merge this branch with the main branch, but never successfully figured out how…Instead I made the same edits under the correct branch name and pushed it forward.

Esri

I have worked within ArcGIS Pro and Online before but had no idea that there were Python Notebook capabilities integrated into these interfaces. I am familiar with Jupyter Notebooks and was excited to try coding within Esri, but soon became a little confused and annoyed. I am not familiar with the Arcpy package or the other Esri proprietary

packages. I do appreciate the built-in shortcuts for adding certain code to these notebooks but am still unfamiliar with their packages and thus find filling in the appropriate function parameters challenging.
Between Notebooks in ArcPro and ArcOnline, I found ArcOnline a little harder to use. Since ArcPro Notebooks are an addition to a Project I have the ability to copy python commands from my project's history (which ensured working code), but in the Online platform, I struggled with coding and understanding the packages functions and its parameters. Online also doesn't have the automatic display interface (map) that is present in Pro, which meant I had to try and learn how to code the map into Notebooks.

References

Add items to a notebook—ArcGIS Online Help | Documentation. (n.d.). Doc.arcgis.com; esri. Retrieved September 16, 2021, from https://doc.arcgis.com/en/arcgis-online/create-maps/add-layers-and-web-tools-to-your-notebook.htm

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Notebook Viewer. (2019, June 25). Umn.maps.arcgis.com; esri. https://umn.maps.arcgis.com/home/notebook/notebook.html?id=44cb2b96893d472c8a5456e4f7baadcc

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Self-score

Category	Description	Points Possible	Score
Structural Elements	All elements of a lab report are included **(2 points each)**: Title, Notice: Dr. Bryan Runck, Author, Project Repository, Date, Abstract, Problem Statement, Input Data w/ tables, Methods w/ Data, Flow Diagrams, Results, Results Verification, Discussion and Conclusion, References in common format, Self-score	28	**28**
Clarity of Content	Each element above is executed at a professional level so that someone can understand the goal, data, methods, results, and their validity and implications in a 5 minute reading at a cursory-level, and in a 30 minute meeting at a deep level **(12 points)**. There is a clear connection from data to results to discussion and conclusion **(12 points)**.	24	**22**
Reproducibility	Results are completely reproducible by someone with basic GIS training. There is no ambiguity in data flow or rationale for data operations. Every step is documented and justified.	28	**26**
Verification	Results are correct in that they have been verified in comparison to some standard. The standard is clearly stated **(10 points)**, the method of comparison is clearly stated **(5 points)**, and the result of verification is clearly stated **(5 points)**.	20	**18**
		100	**94**