**Lab Report**

Title: Lab 2 (Part 2)

Notice: Dr. Bryan Runck

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**Project Repository:** <https://github.com/mgisselbeck/GIS5571>

**Google Drive Link:** N/A

**Time Spent:** 15 hours

**Abstract**

Problem Statement

The objective of this analysis is to “create a surface that shows places where Dory would more or less prefer to walk in order to get to the park, within Dory’s preferences

Required Data and Input Data

Methods

Results

Results Verification

Discussion and Conclusion

**Problem Statement**

The objective of this analysis is to “create a surface that shows places where Dory would more or less prefer to walk in order to get to the park, within Dory’s preferences: (1) Dory prefers to not walk through any farm fields, (2) she doesn’t like crossing water bodies if there isn’t a bridge (though sometimes she doesn’t mind if she’s wearing her waders), and (3) prefers a path with the most gradual slope” (Runck, 2022).

*Table 1. Required Data*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **#** | **Requirement** | **Defined As** | **(Spatial) Data** | **Attribute Data** | **Dataset** | **Preparation** |
| 1 | County Boundaries in Minnesota | Wabasha, Winona, and Olmstead County | .shp (Vector) | N/A | [Minnesota Geospatial Commons](https://gisdata.mn.gov/dataset/bdry-counties) | ETL |
| 2 | 2012 Assessed Streams | Assessed Streams for Minnesota in 2012 | .shp (Vector) | N/A | [Minnesota Geospatial Commons](https://gisdata.mn.gov/dataset/env-assessed-streams-2012) | ETL |
| 3 | NCLD 2019 Land Cover, Minnesota | Land Cover Classification for Minnesota | TIFF (Raster) | Land Cover Classification | [Minnesota Geospatial Commons](https://gisdata.mn.gov/dataset/biota-landcover-nlcd-mn-2019) | ETL |
| 4 | Minnesota Digital Elevation Model - 30 Meter Resolution | Elevation (Wabasha, Winona, and Olmsted County) | TIFF (Raster) | Elevation | [Minnesota Geospatial Commons](https://gisdata.mn.gov/dataset/elev-30m-digital-elevation-model) | ETL |
| 5 | Roads, Minnesota, 2012 | Road Centerlines for all Public Roads in Minnesota | .shp (Vector) | N/A | [Minnesota Geospatial Commons](https://gisdata.mn.gov/dataset/trans-roads-mndot-tis) | ETL |

**Input Data**

*Describe the data in two paragraphs max. Fill out the table.*

*Table 2. Input Data*

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Title** | **Purpose in Analysis** | **Link to Source** |
| 1 | County Boundaries in Minnesota | To be used in the cost surface equation to find the most optimal route for Dory | [Minnesota Geospatial Commons](https://gisdata.mn.gov/dataset/bdry-counties) |
| 2 | 2012 Assessed Streams | To be used in the cost surface equation to find the most optimal route for Dory | [Minnesota Geospatial Commons](https://gisdata.mn.gov/dataset/env-assessed-streams-2012) |
| 3 | NCLD 2019 Land Cover, Minnesota | To be used in the cost surface equation to find the most optimal route for Dory | [Minnesota Geospatial Commons](https://gisdata.mn.gov/dataset/biota-landcover-nlcd-mn-2019) |
| 4 | Minnesota Digital Elevation Model - 30 Meter Resolution | To calculate the slope and add the output into the cost surface analysis to find the most optimal route for Dory | [Minnesota Geospatial Commons](https://gisdata.mn.gov/dataset/elev-30m-digital-elevation-model) |
| 5 | Roads, Minnesota, 2012 | To be used in the cost surface equation to find the most optimal route for Dory | [Minnesota Geospatial Commons](https://gisdata.mn.gov/dataset/trans-roads-mndot-tis) |

**Methods**

*Include a data flow diagram or screenshot from model builder. Do references in line (Rammankutty, 2033). Document any and all steps that you did to the input data in the data flow diagram. Provide natural language description of the most important steps, giving a narrative arc and provide well formatting screenshots with a boarder and centered throughout.*

*Resources on Data Flow Diagrams:*

* [*https://www.visual-paradigm.com/tutorials/data-flow-diagram-dfd.jsp*](https://www.visual-paradigm.com/tutorials/data-flow-diagram-dfd.jsp)
* [*https://www.lucidchart.com/pages/data-flow-diagram/how-to-make-a-dfd*](https://www.lucidchart.com/pages/data-flow-diagram/how-to-make-a-dfd)

*Figure 1. Data flow diagram.*

*If appropriate, add in pseudo-code describing model algorithms and/or objects. If using mathematical equations, create a clear mapping between the reference equation, pseudo-code, and actual implementation in a programming language.*

**Results**

*Show the results in figures and maps. Describe how they address the problem statement.*

*Follow best practice for map design, coloring, etc.*

**Results Verification**

*How do you know your results are correct? This can be a qualitative or quantitative verification.*

**Discussion and Conclusion**

*What did you learn? How does it relate to the main problem?*

**References**

Runck, B. 2022. GIS 5571: Lab 2.

**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 |  |
| **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 |  |
| **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 |  |
| **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 |  |
|  |  | 100 |  |