**William Rossell, C E 581, November 29, 2017**

**Geospatial Study of Sustainable Freight Transportation by Diverting up to 90% Truck Freight to Rail, or Diverting up to 50% of Rail Freight to Truck.**

**Motivation and Goals:** The driving motivation of this study, and goal thereafter, is to attempt to optimize the transportation of domestic cotton product within the state of Mississippi, maximizing profit while minimizing emissions and time delay.

**Objectives and Scope:**

* Observe whether or not the current methods of freight transportation are optimal and sustainable from an environmental point of view.
* Decide whether any improvements in delivery speed and rate of emission by use of multi-modal transport, rather than a dependence on rail, are fiscally feasible.
* Analyze emissions currently produced by rail freight transportation of cotton.
* Analyze freight travel demand after 10 years assuming a 2% growth rate.
* Value engineering of B-C analysis for any proposed improvements to transportation methods.
* The scope of this study will be from Tupelo, MS, to Gulfport, MS.

**Spatial Data: T**his study will make use of a database provided by the MDOT for a previous study that has information about locations of railways. Information will be gathered from sources such as the USDA website, US Census, American FactFinder, and other databases.

**Software Tools:** This study will make use of GeoMedia, Google Earth, and Microsoft Excel. Any other software used during the course of this study will be listed in the final project presentation.

**Analysis Methodology:**

* Find data tabulating the amount of cotton shipped from MS by truck and by rail within the last 10 years.
* Create a GeoWorkspace Profile including a buffer of a major railway between two MS locales, namely Tupelo to Gulfport.
* Using the buffered network, compile spatial data about the distance of the railway versus that of an alternate road.
* Measure the cost efficiency of rail versus truck transport of cotton based on values from the past and forecasting into the future.
* Measure emissions, such as: CO2, NOx, PM­2.5, and PM10.

**Expected Output Results:** Results of this study are expected to show the most optimal use of railway freight transportation when referenced by cost, emissions, and freight delivery time. Added benefits of this study will be to possibly diminish the amount of time spent by passenger vehicle at railway crossings.

**Benefits and Lessons to Be Learnt:** Benefits of this study will be a more cost efficient freight delivery system, a decrease in harmful emissions by freight vehicles by methods of diverting freight to other modes when at a borderline distance such as 300 miles, and minimizing delivery time.

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