

Furman Dining Hall: Potential Local Produce Sources and CO₂ Emissions

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Abstract

As Furman University becomes more concerned with becoming a sustainable institution, it is important to consider the carbon emissions embedded in the transportation of our food to get an idea of some of the environmental costs in bringing food to the table at Furman. It has been argued that the Dining Hall could reduce its carbon footprint by making more local purchasing decisions. Using produce as a case study, this project aims to quantify the environmental costs of the transportation of food to the Dining Hall by examining both food sources and travel paths, and to identify potential local sources to reduce these costs. This study found that, on the whole, carbon dioxide emissions were lower for food produced locally. Additionally, the region contains a considerable amount of local purchasing options.

Background/Introduction

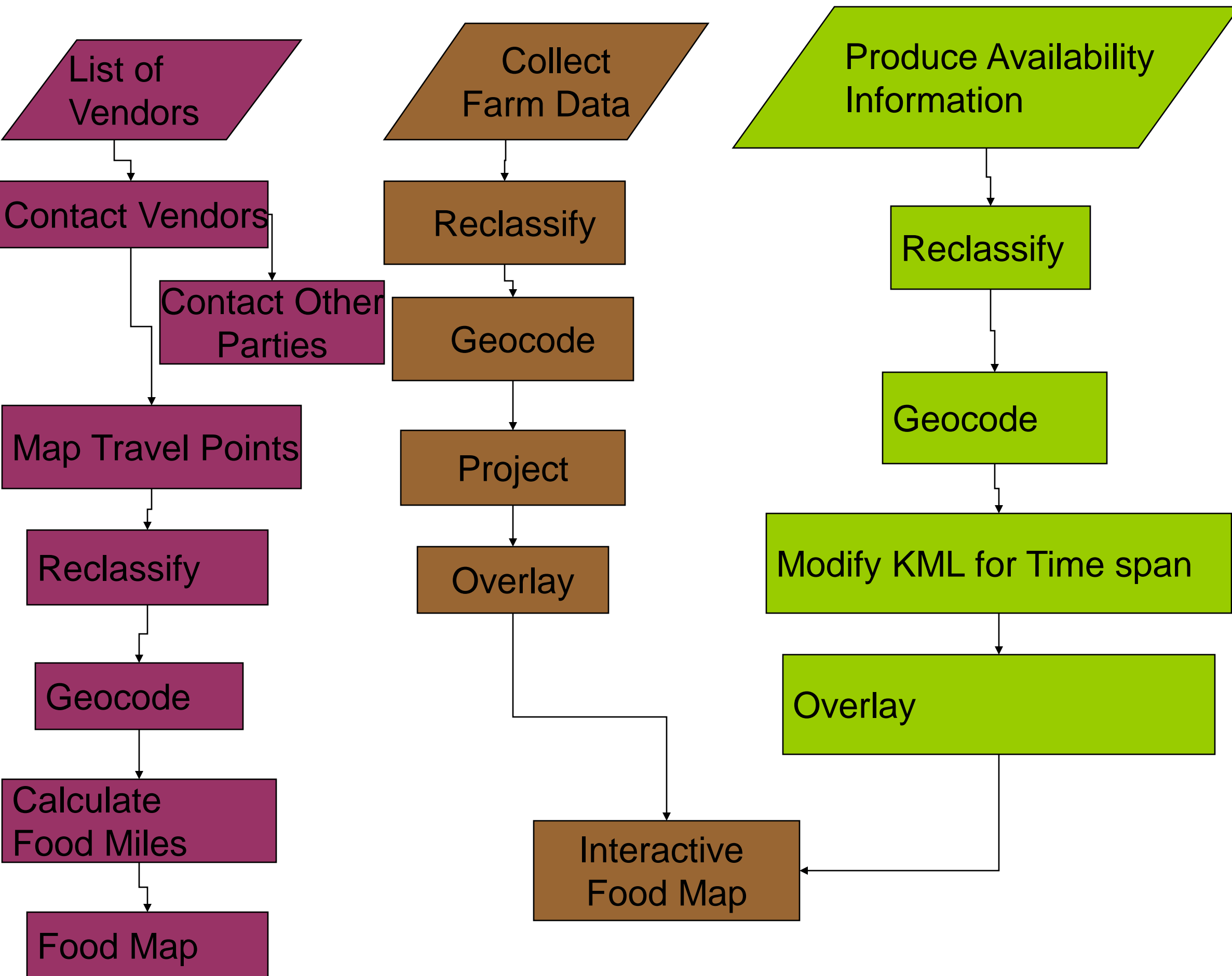
To know the complete environmental cost of our Dining Hall food, we would have to measure the embodied emissions from extraction, production, and transportation of purchased goods (Pimentel). It is very difficult to assess emissions from agricultural extraction and production, but easier to measure emissions from the transportation of food (Garnett). For this reason, I decided to track the travel paths of local and non-local food and measure the embedded emissions of carbon dioxide in their transport.

While paying particular attention to the former student Chris Bradt and Middlebury College's attempts to track sources and travel paths of university dining hall food, I decided produce would be the simplest case study because it has one production stage and because the transportation of produce is a significant portion of the embedded carbon dioxide emissions in its supply chain. There is also a greater potential to purchase produce locally.

While Aramark, Furman's catering service, makes an effort to purchase produce locally when it is available, it recognizes that the majority of its produce still comes from California, Arizona, Mexico, and Central America. Aramark's definition of 'local' is 150 miles from campus, and they often purchase regionally to include surrounding states (Summer). During my research, I found that there was a need for comprehensive list of regional farms, and the goods they produce as a resource for identifying potential local purchases.

In my calculations, I used the average gas mileage for a FreshPoint tractor trailer and the pounds of carbon dioxide emitted per gallon of diesel fuel to calculate the transportation of each produce item. I compiled a list of farms that were both large enough and offered the option of purchasing directly from farm to consumer to make my time sequence.

Methodology



Results/Discussion

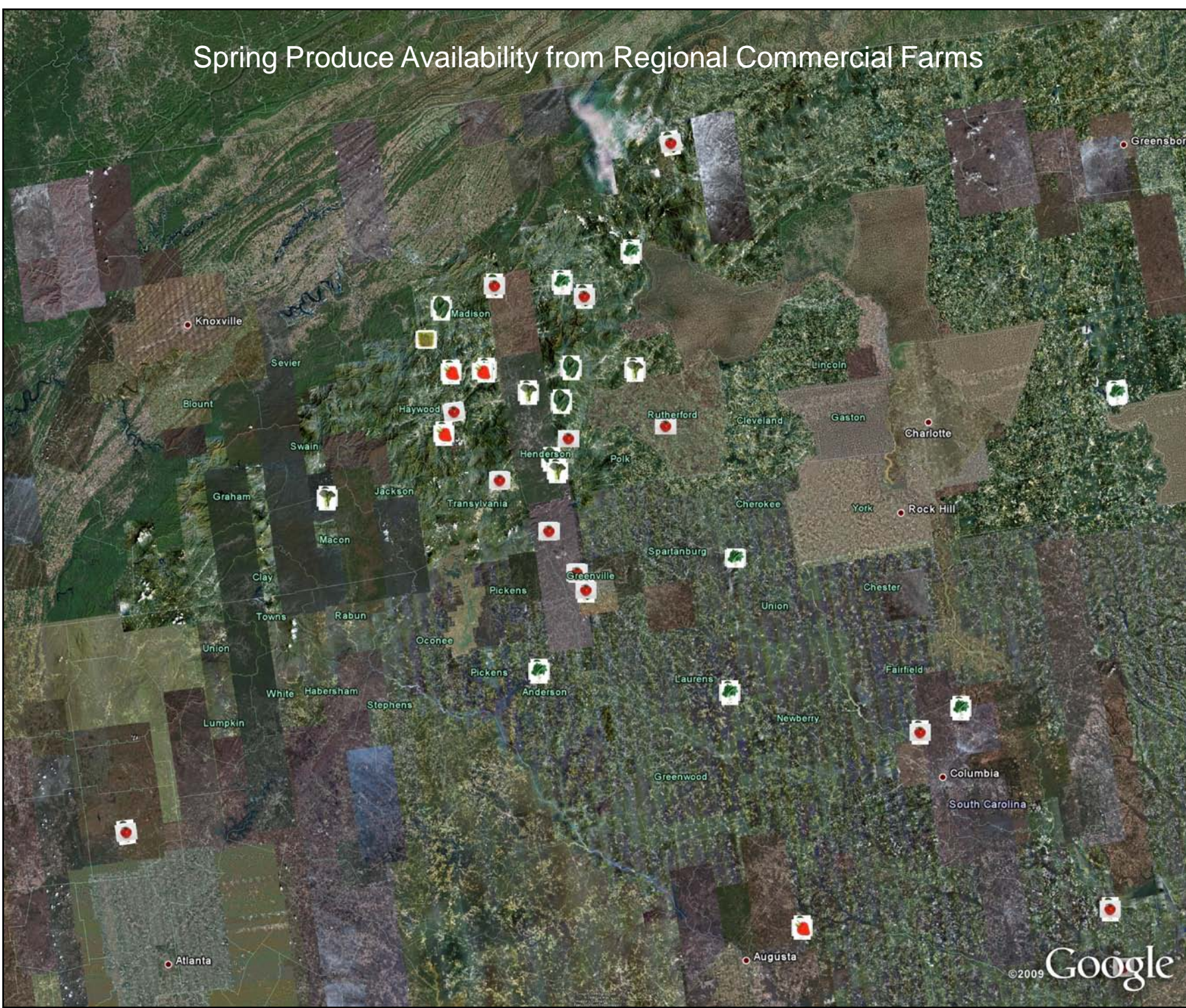


Figure 1



Figure 2

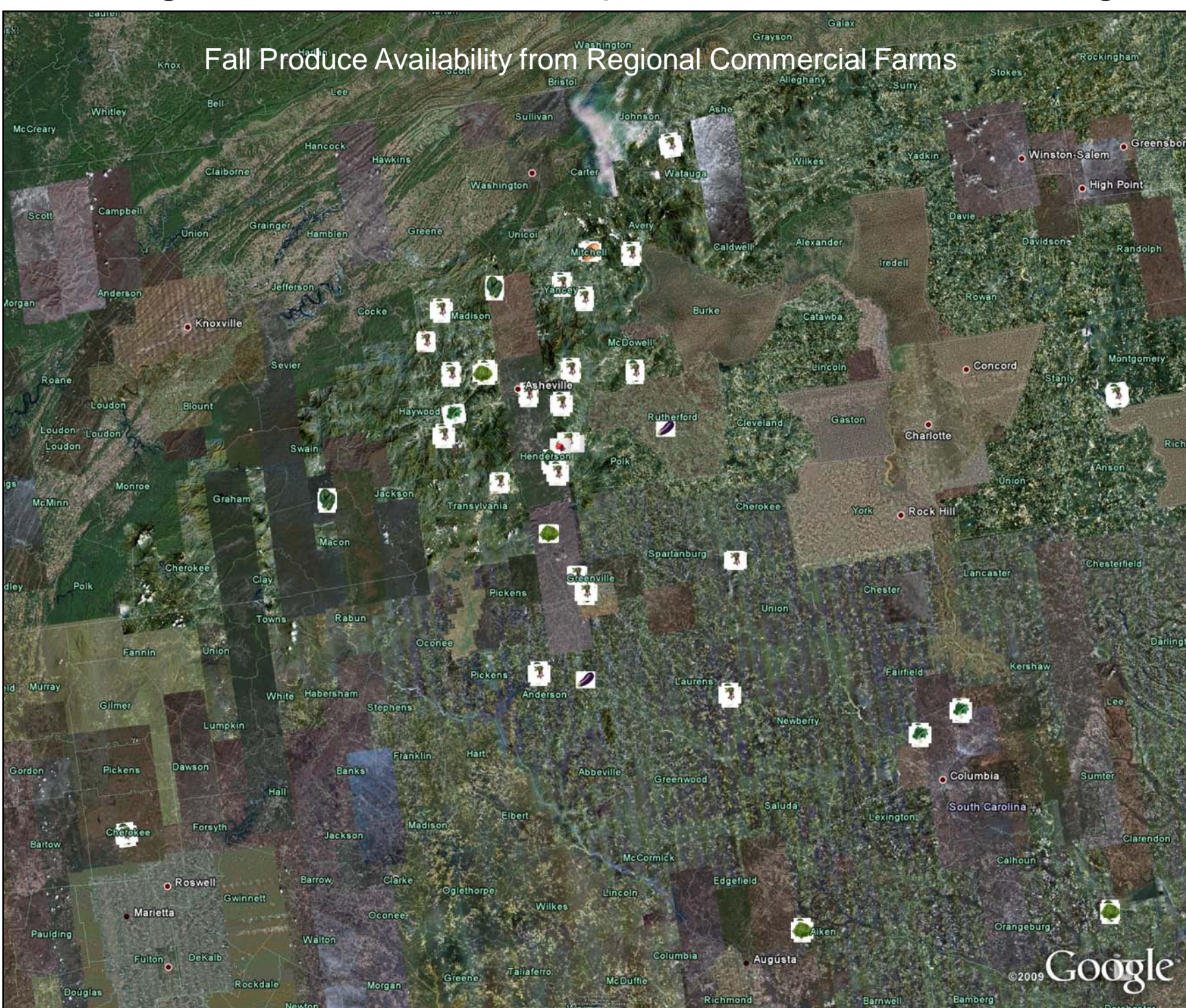


Figure 3



Figure 4

Produce	January	February	March	April	May	June	July	August	September	October	November	December
Apples												
Beets												
Broccoli												
Carrots												
Collards												
Cucumbers												
Eggplant												
Green Beans												
Okra												
Onions												
Peppers, Sweet												
Potatoes												
Potatoes, Sweet												
Salad												
Spinach												
Sprouts												
Strawberries												
Squash, Summer												
Squash, Winter												
Sweet Corn												
Tomatoes												
Zucchini												

Table 1

Table 1 is a seasonal availability chart for the Appalachian region. The seasons shown in this chart were used in the time sequence to show the availability of produce by season in the region.

Data Sources/References

Background and Methodology:

1. Bradt, Chris. "Sources of Food in Furman's Dining Hall: The Environmental Costs of Industrial Agriculture." Fall 2007.
2. 4.D. Pimentel et al. "The Impact of Energy Use on the Environment." *Food Energy and Society*. Edited by Pimentel et al. CO: University Press of Colorado, 1996.
3. Garnett, Tara. "Cooking Up a Storm: Food, Greenhouse Gas Emissions, and Our Changing Climate." Center for Environmental Statistics. September 2008.
4. Google Earth KML Tutorial
5. Hedgerman, Bill. "Google Earth Tutorial: Food We Eat." October 30, 2008.
6. Smith, Alison, Watkiss, Paul et al. "The Validity of Food Miles as an Indicator of Sustainable Development." Final Report produced for DEFRA. AEA Technology, Volume 7; July 2005.
7. Summer, Adam. Personal Interview with James Wilkins and Angela Halfacre. September 24, 2008.
8. Weber, Christopher L. and H. Scott Matthews. "Food-Miles and the Relative Climate Impacts of Food Choices in the United States". Environmental Science & Technology v. 42 no. 10 (May 15 2008) p. 3508-13. Furman University Libraries. OMNIFile.

Local Farm Data:

1. Appalachian Sustainable Agriculture Project. "Local Food Guide: Fresh Foods from the Farms of Southern Appalachians." 2008-2009. A
2. Appalachian Sustainable Agriculture Project. <http://www.buyappalachian.org/>
3. Carolina Farm Stewardship Association. "Seasonal Availability Chart." *Carolina Guide to Local and Organic Food and More*. 2007-2008.

Produce Availability Chart:

6. Eastern Carolina Organics. "Carolina Guide to Eating." <http://www.placergrown.org/pdf/HarvestCalendar1.pdf>

Gas mileage for tractor trailers:

Freshpoint Representative
CO2 Emissions: Energy Information Administration <http://www.eia.doe.gov/oiaf/1605/coefficients.html>

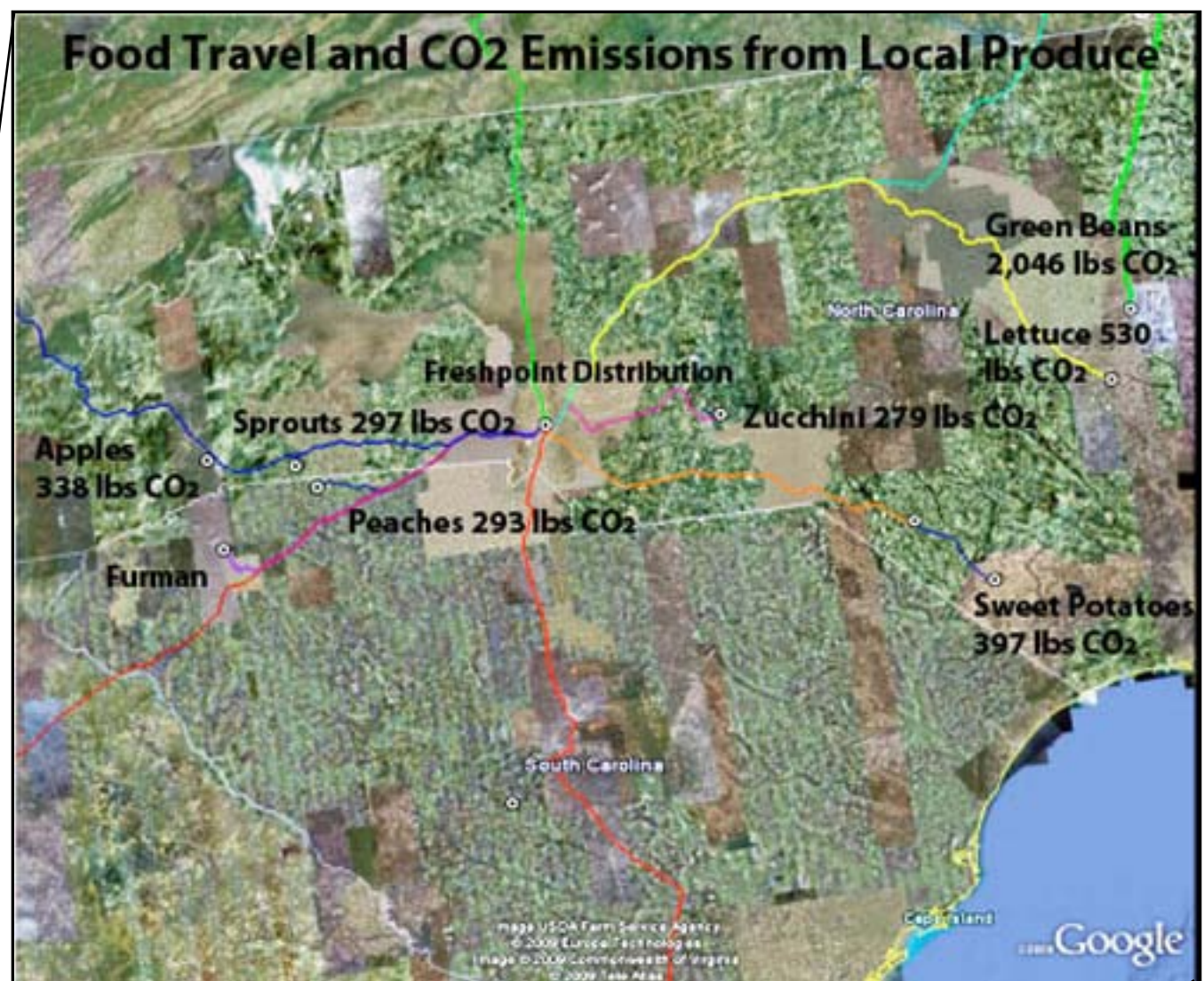


Figure 6

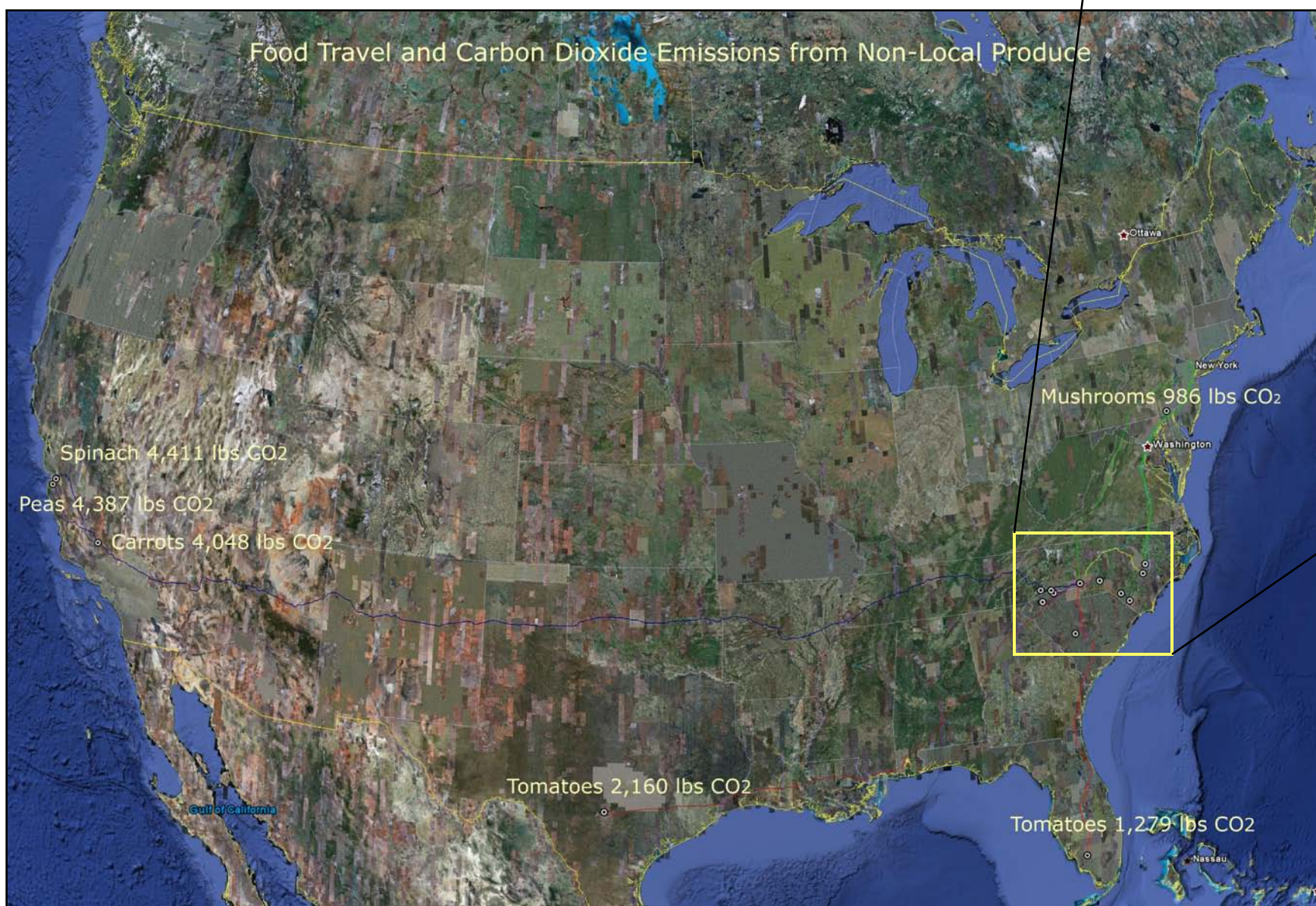


Figure 5

Figures 5 and 6 illustrate the travel paths of produce coming to our Dining Hall. Figure 6 focuses on produce purchased locally while it is in season, while Figure 5 shows the routes of produce purchased either year-round or when local produce is out of season. On the whole, food purchased locally has lower carbon dioxide emissions due to transportation, but there were a few surprises. For example, green beans grown in Goldsborough, NC, are shipped to Mahwah, NJ, to be packaged before they are sent to FreshPoint. While purchasing these green beans is advantageous because it supports a local farmer, it is still an environmentally costly purchase. In addition, requiring that every produce shipment go through FreshPoint also adds additional miles to the transport.

I was unable to obtain the names and exact locations of many of the vendors from whom Aramark purchase out of season produce, namely farms in Mexico and Central America, which left me with an incomplete picture of all the produce purchases the Dining Hall makes. Additionally, most farms I spoke with packaged their own produce, but knew little about where it went once it left their warehouses. Because it is impossible to know the exact routes the food travels, most of the calculations are an estimate.

Conclusion

Humans have become increasingly removed from their food sources. The environmental costs due solely to the transport of produce have a negative effect on the environment. Often, food transportation follows erratic pathways, which result in unnecessary carbon dioxide emissions. Although the measures are not exact, the food mile calculations provide a way to evaluate the benefits of purchasing locally.

Aramark has local and regional produce purchasing options. Although purchasing locally is dependent upon the ability of farmer's to meet demand and health and safety regulations of Aramark, and some of these farms will not meet all these standards, there are plenty of farms in the area with the potential to provide Furman with produce when it is in season. While purchasing locally has the potential to reduce carbon emissions, it may not always do so, as the Dining Hall might have to purchase a single produce item from multiple farmers to meet demand.

Acknowledgements

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