

Freight Analysis – Deriving Value From Waybill Data, Traffic Volumes, and the Integration of Both

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Goal and Objectives

A one-stop source of freight data

All modes in one dashboard



Goal:

- Generate data-driven solutions to assist NCDOT with freight planning.

Objectives:

- Inform planners and non-planners about freight flows in North Carolina;
- Create a dashboard which combines different data sources;
- Allow planners to filter, query and export data from the dashboard; and
- Formulate links between different data.

NC DOT Challenges



Collecting data from
different sources

Balancing different
needs and perspectives

- Relevant data located in various departments within the organization
- Unable to analyze all available freight vehicle data in conjunction
- Data sparsity
 - Vehicle counts inconsistently collected
 - Weigh-in-motion data incomplete
 - Difficulty linking summarized vehicle count data with actual time of collection
- Files too large to open on local computers
 - Spreadsheets would fail when attempting to view Waybill datasets

SAS Process



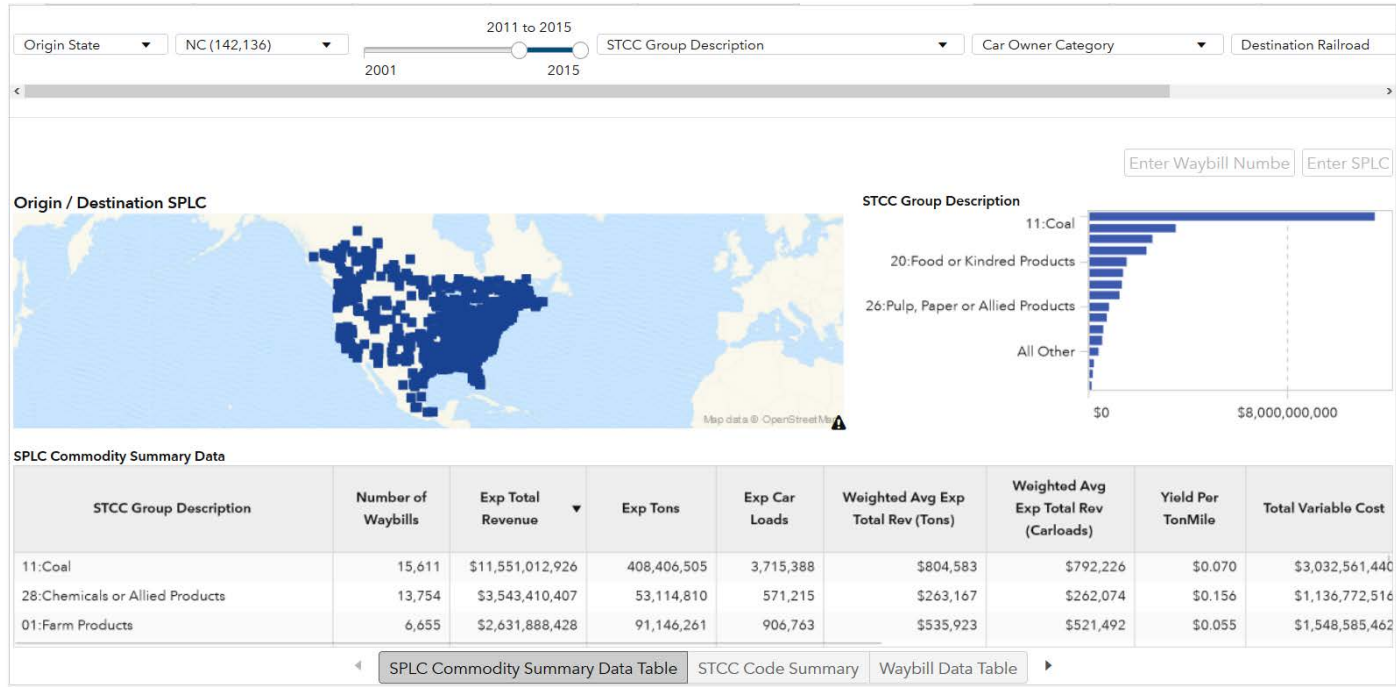
- (1) Work began in October 2016
- (2) Three dashboards created and in production
- (3) Additional work is currently in progress

- Freight, rail, weigh-in-motion, port, and traffic data sources captured and analyzed
- Dashboards were created using SAS Visual Analytics software to enable users to view and gain insights from their data in various dimensions
 - Waybill, Vehicle Counts, Amtrak and NC Port data
- Each dashboard has filtering, querying, and exporting capabilities



Waybill Dashboard

- Waybill metrics now available through mapping reports
- Linked vehicle count data with nearby rail stations
- Forecast models to monitor commodity trends currently under development





Waybill Dashboard

2008 to 2015

NC (7,901) NC (7,901) 2001 2015

STCC Group Description Car Owner Category Destination Railroad

Enter Waybill Num Enter SPLC

Origin / Destination SPLC

STCC Group Description

SPLC Commodity Summary Data

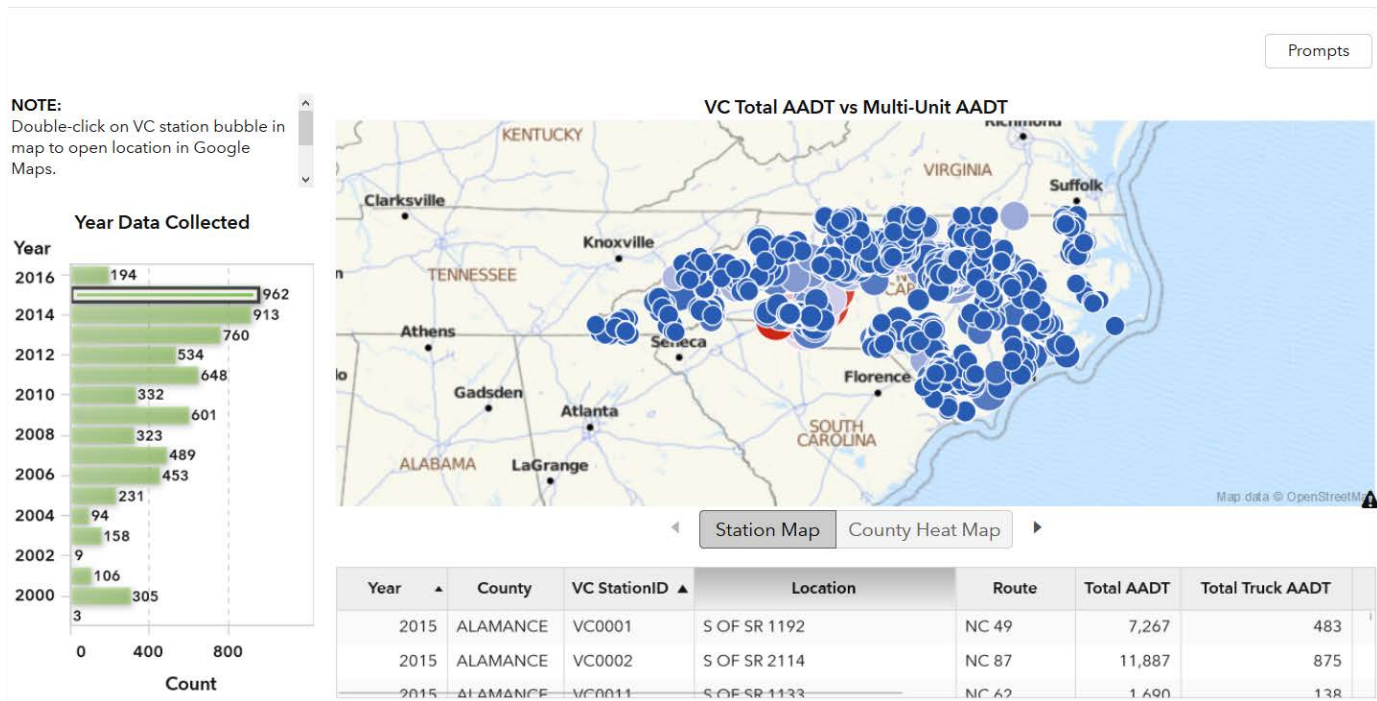
STCC Group Description	Number of Waybills	Exp Total Revenue	Exp Tons	Exp Car Loads	Weighted Avg Exp Total Rev (Tons)	Weighted Avg Exp Total Rev (Carloads)	Yield Per TonMile	Total Variable Cost
14:Nonmetallic Minerals; except Fuels	2,088	\$169,883,334	17,988,416	177,848	\$100,574	\$100,279	\$0.099	\$93,786,913
24:Lumber or Wood Products; except Furniture - see Major Industry Group 25	2,157	\$117,322,032	7,489,956	89,320	\$57,688	\$56,513	\$0.110	\$71,811,907
28:Chemicals or Allied Products	1,419	\$109,862,928	6,293,672	64,784	\$84,052	\$84,060	\$0.715	\$39,359,536

SPLC Commodity Summary Data Table STCC Code Summary Waybill Data Table

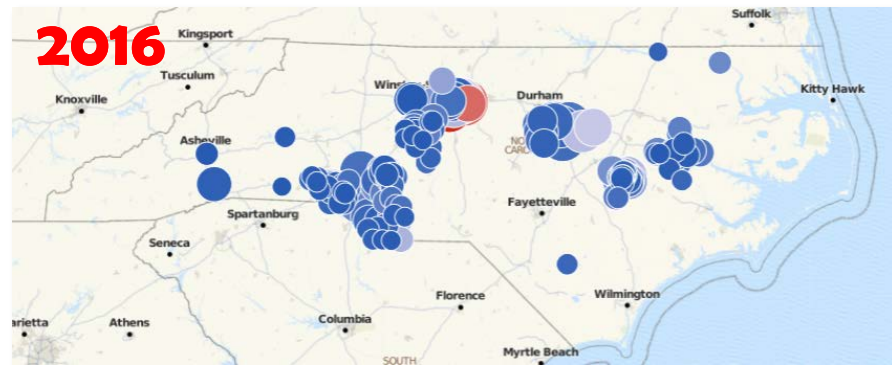
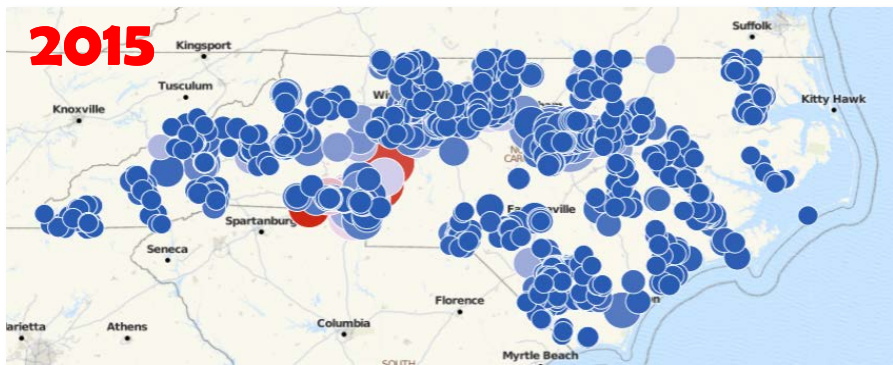
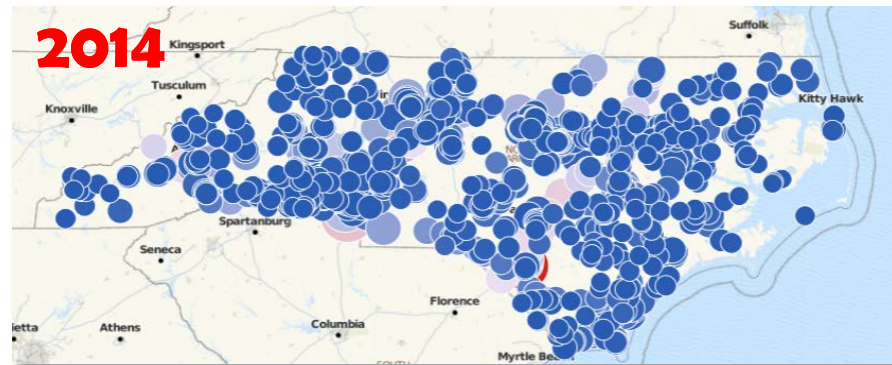
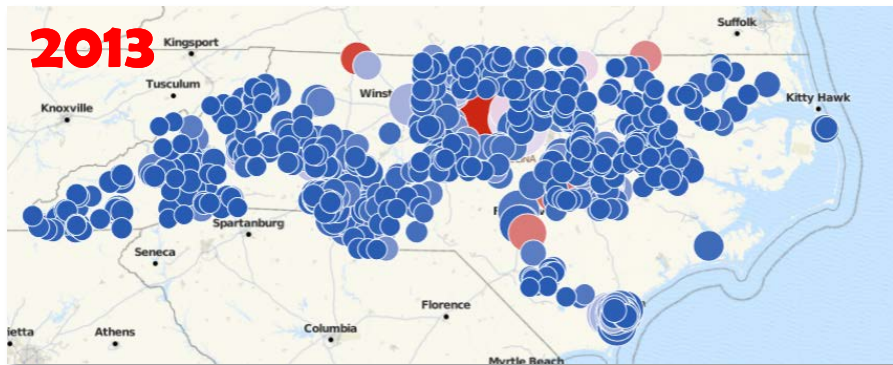


Vehicle Counts Dashboard

- Visualizing metrics for historical and current count stations
- Clustered stations based on similar hourly profiles
- Data completeness preventing appropriate time series analysis



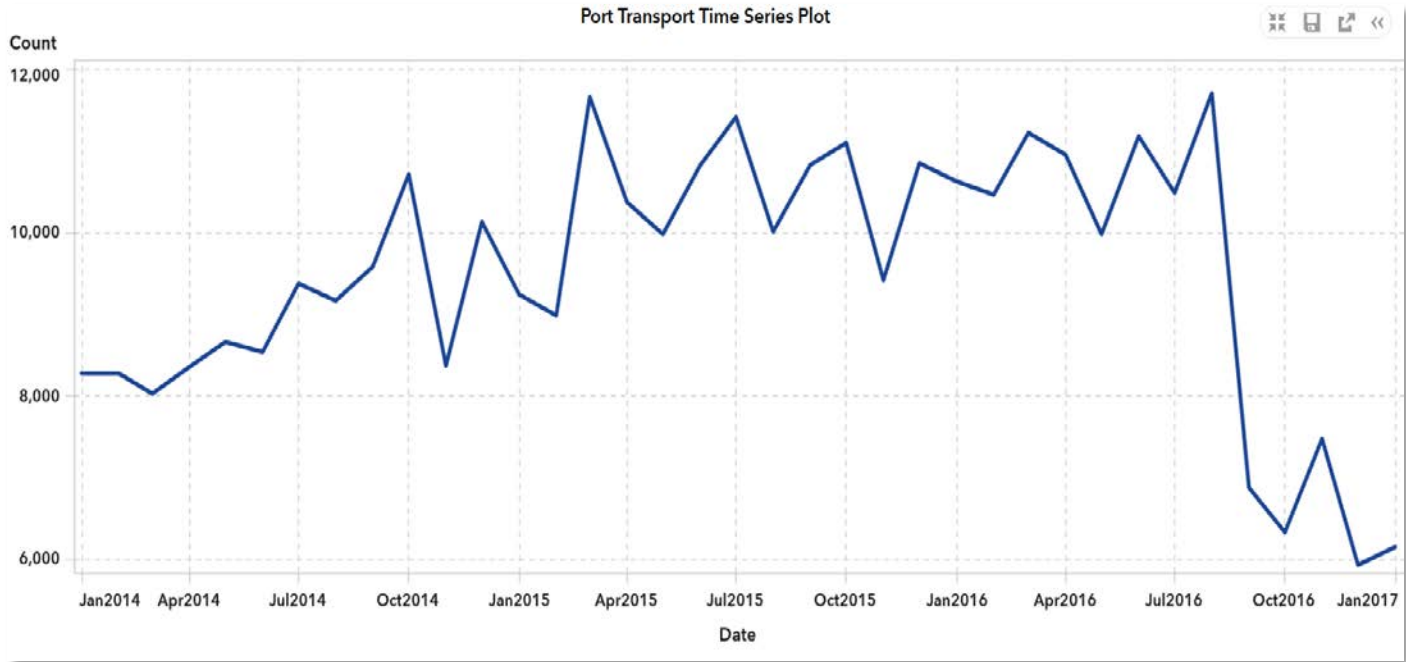
Vehicle Counts Yearly Comparison



Port Data (Wilmington)



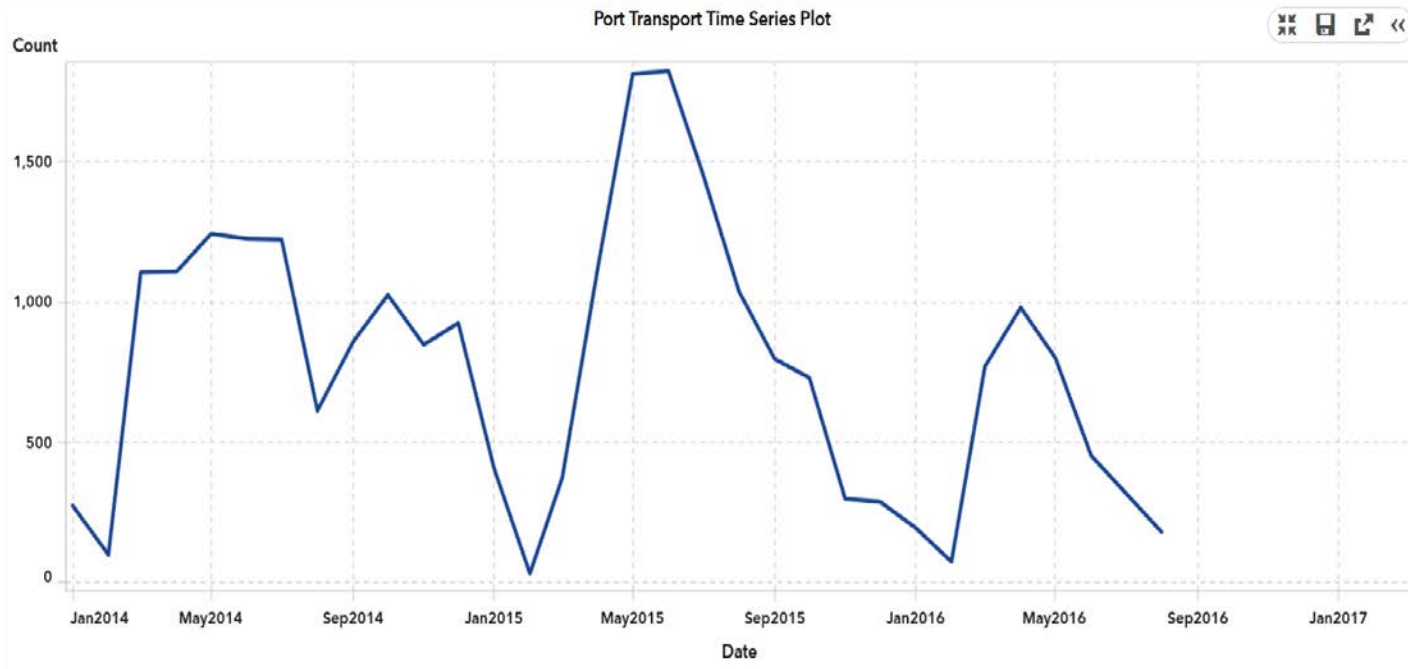
- Shipments of containers out of Wilmington port
- Number of shipments abruptly drops in August 2016



Port Data (Morehead City)



- Count of shipments of woodchips out of Morehead City port
- Data stops at August
- Peaks occur in May



Lessons Learned & Next Steps



Lessons Learned:

- Data collection requires more consistency
- Data summarization needs improvement along with proper supplemental documentation explaining the processes used
- Analytical results are dependent on quality of data

Next Steps:

- Projections for 5 and 30-year rail plans – forecast commodity revenues by rail route
- Monitor travel time reliability for major truck corridors
- Analyze origin/destination of commodity after leaving a port

Questions?

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