

Transportation and Agriculture

Heidi Schweizer

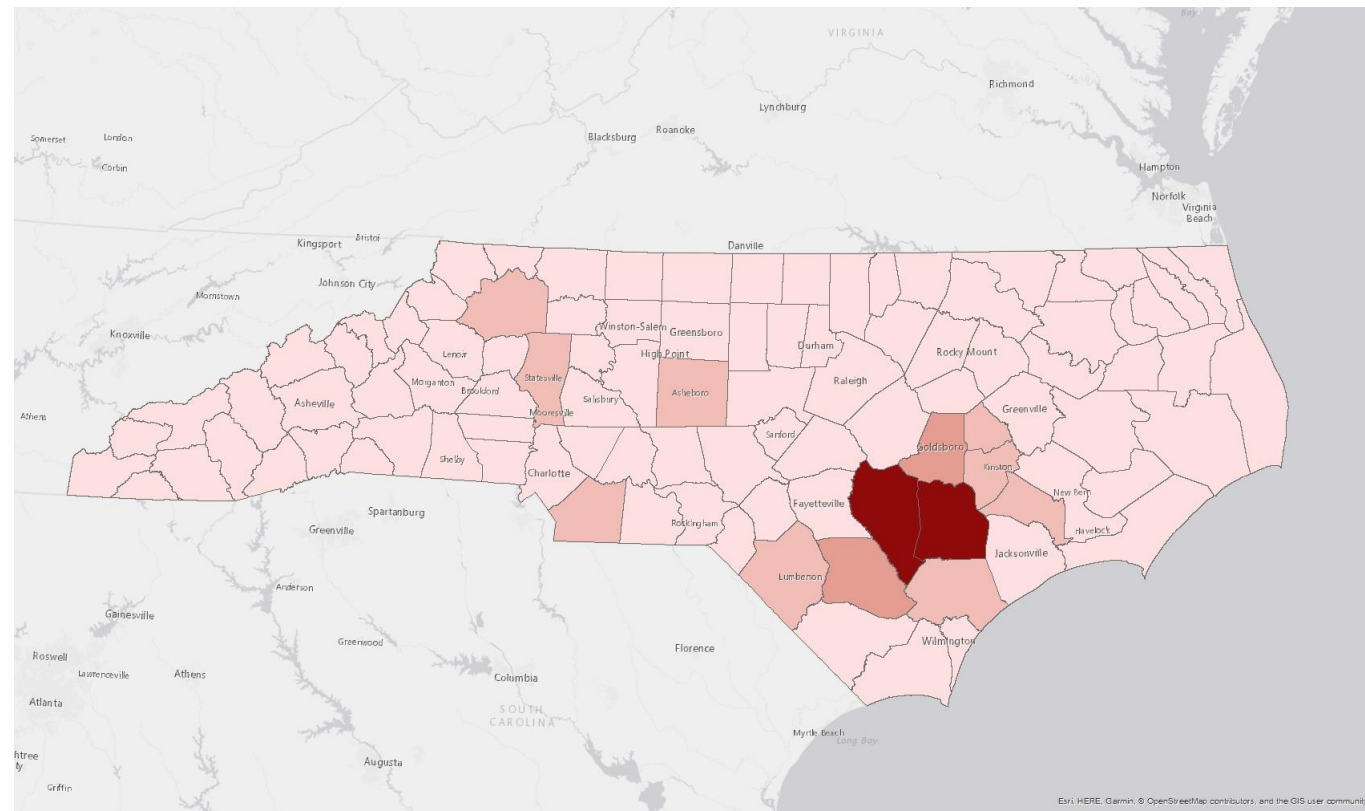
30 Oct 2019

State Extension Conference

Import Side

Feed Needs

- NC is feed deficit
- Color indicates the number of grain consuming animal units
- Sampson and Duplin counties jointly account for 29% of NC feed needs

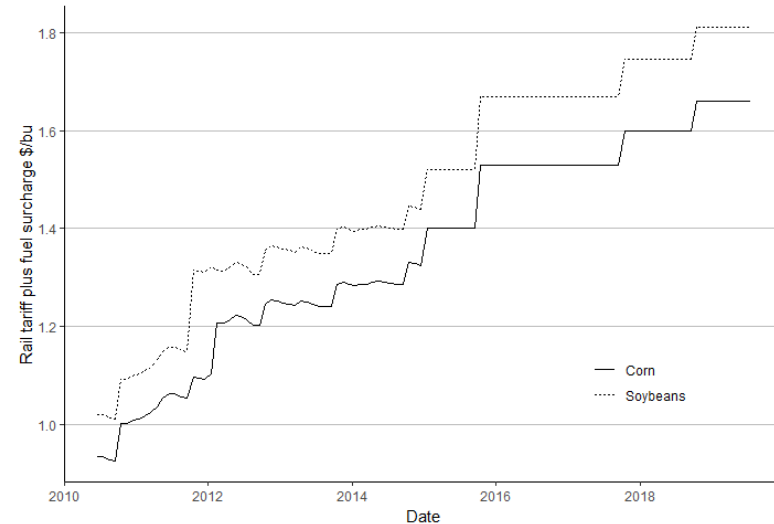


Data sources: 2016/17 livestock inventories are from USDA NASS, base map is from ERSI

Willingness to pay for local feedstuffs

maximum price in NC =
price in OH + rail freight

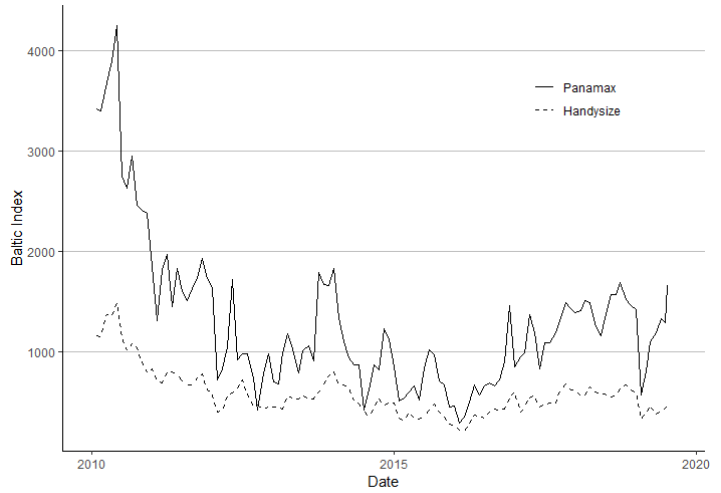
**Transportation is an
important determinant
of basis**



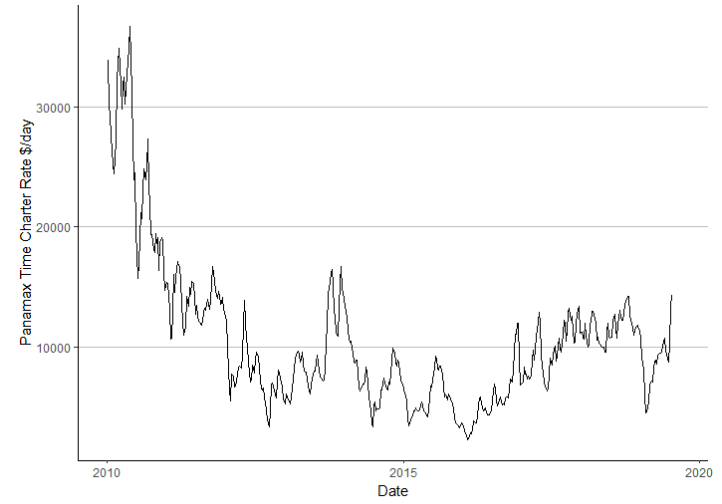
Corn rates are for unit trains originating in OH and terminating in NC.
Soybean rates are for unit trains originating in IN and terminating in NC.
These data are publicly posted rates from the USDA Grain Transportation Report. Rates under long-term contracts may be less.

Willingness to pay for local feedstuffs

maximum price in NC = price in Brazil + ocean freight

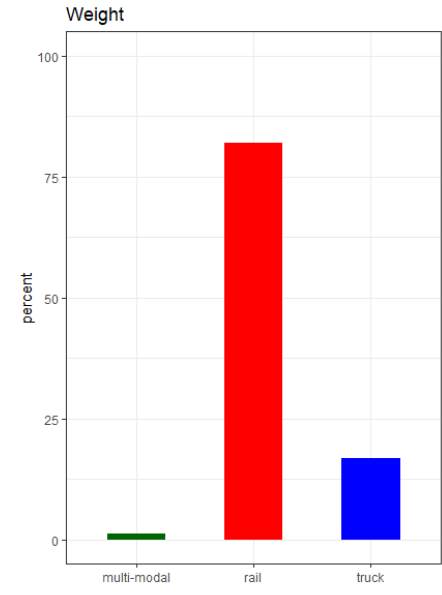
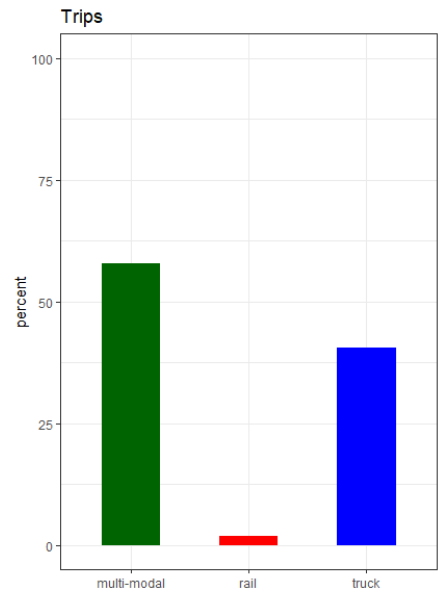


Data are from Bloomberg. Indices are calculated using rates for a set of common voyages.

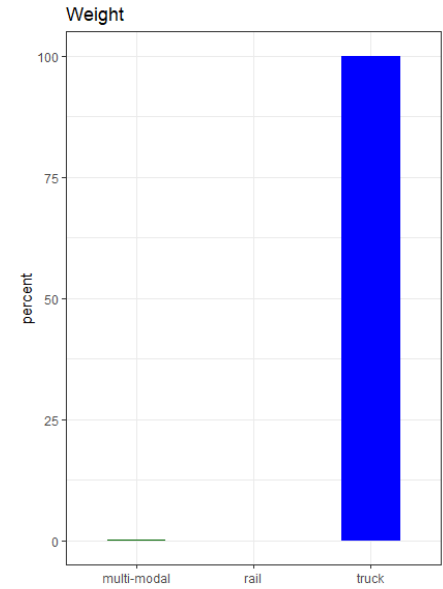
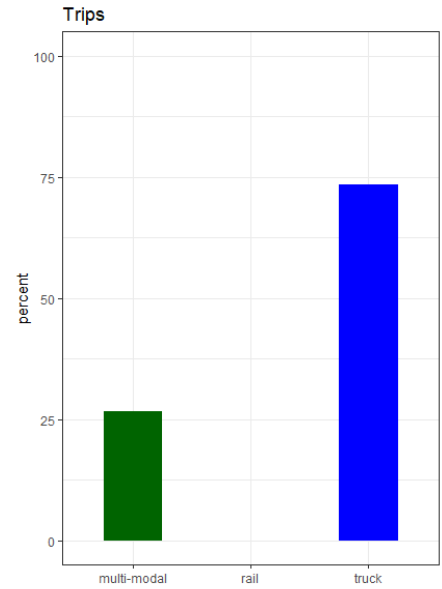


Data are from the Baltic Exchange via Bloomberg.

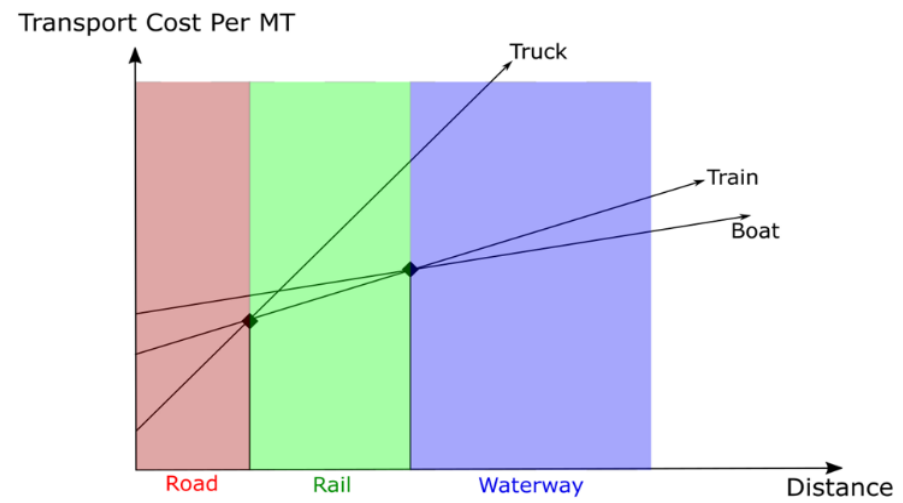
Grain and Oilseed Imports to NC



Grain and Oilseed Movements Within NC



Transportation Modes



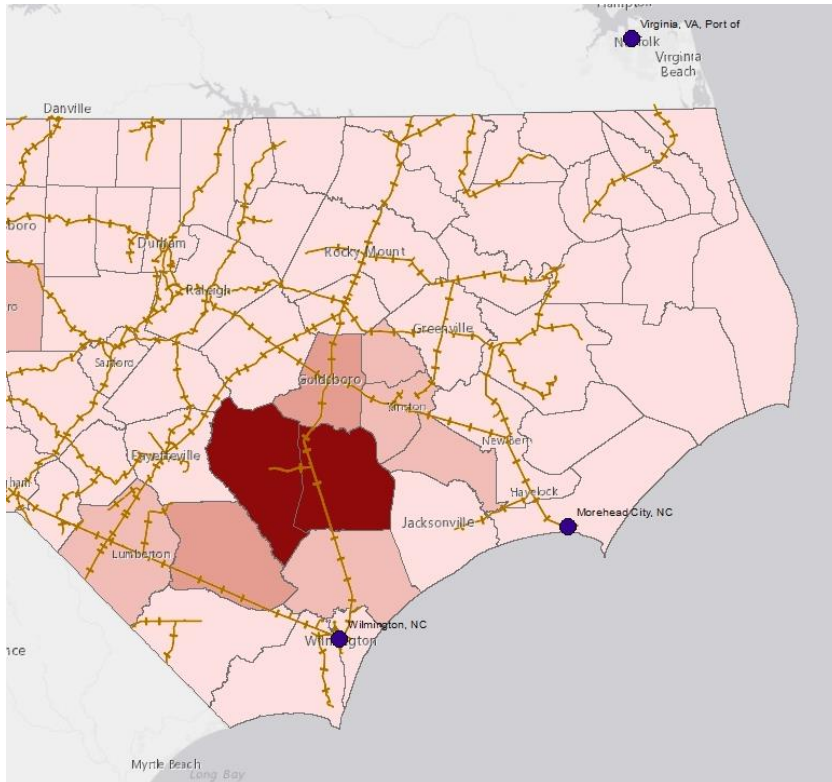
Mode	Capacity in bu corn
Truck	Up to 1,160
Railcar	Up to 5,107
Panamax vessel	Up to 2.1M

Actual capacity varies widely depending on the equipment used, and where it is used. The purpose of this chart is to depict the relative scale of each transportation mode.

Export Side

Ports

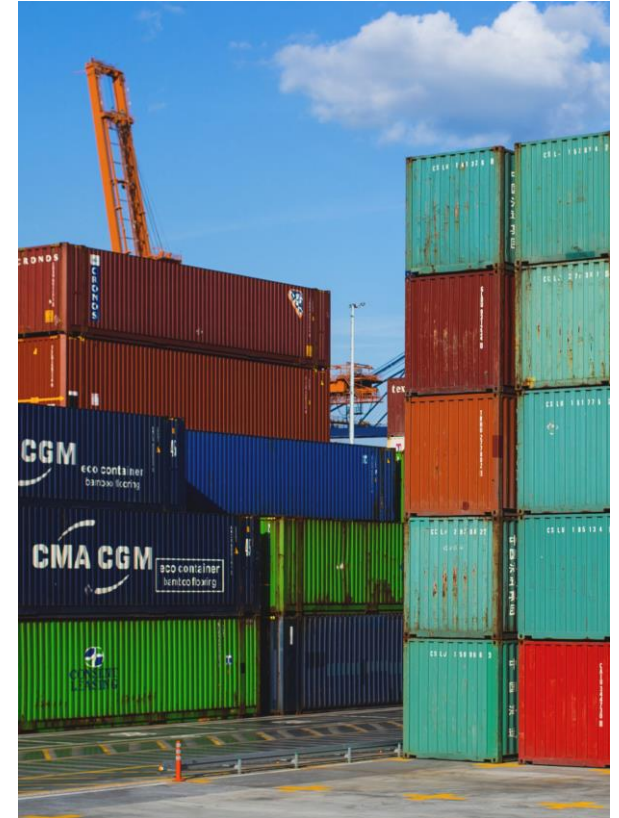
- **Wilmington, NC**
 - Served by CSX
- **Morehead City, NC**
 - Served by Norfolk Southern
- **Norfolk, VA**
 - Served by both CSX and Norfolk Southern



Data sources: 2016/17 livestock inventories are from USDA NASS, base map is from ERSI, rail lines are from NCDOT

Containerization?

- Containers must be modified for grain
 - Will have a bulkhead fitted to the doors
 - May have a plastic liner
 - Necessary for food grade shipments
- Inland transportation modes are rail and truck (not barge)
- Expands export options



Containers on Rail

Small but growing amount of U.S. grain shipped via container

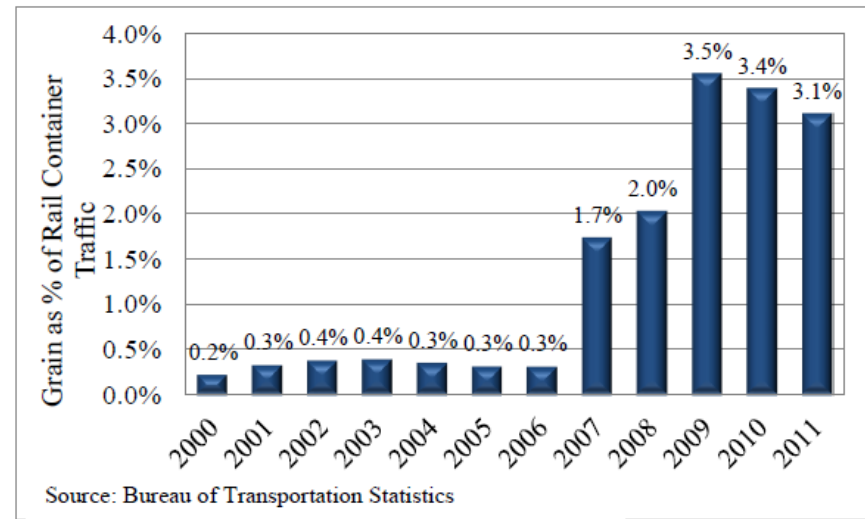


Figure 4.1 Farm Product STCC Group Share in All Rail Container Traffic

Containers on Ocean Freight



- New Orleans, LA
 - 1,232 TEU animal feed
- Houston, TX
 - 2,302 TEU animal feed
 - 2,232 TEU bulk grains
- **Savannah, GA**
 - **35,480 TEU animal feed**
 - Top shipping lines: Maersk, Mediterranean Shipping, MOL, CMA-CGM

[2015 data]

Container Exports

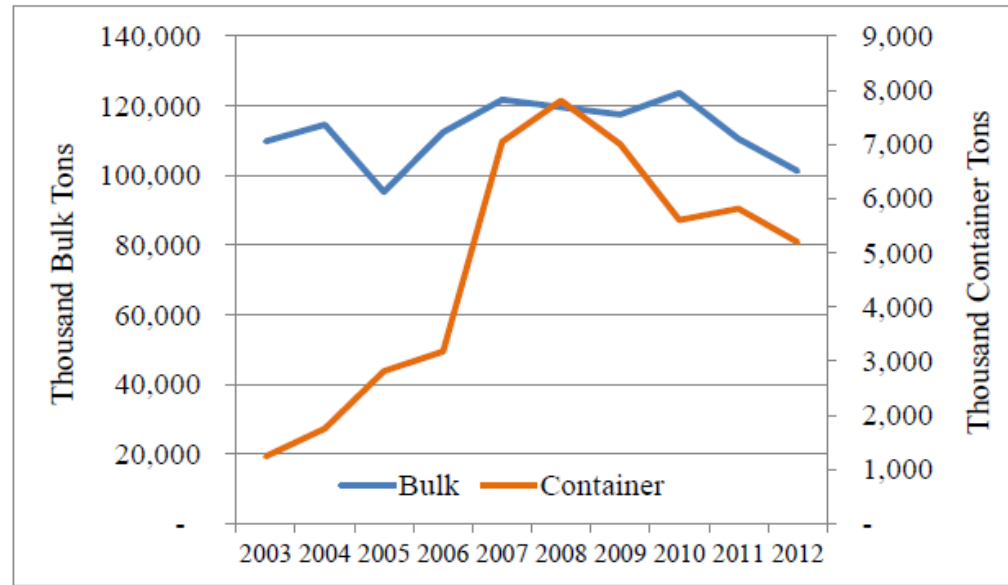


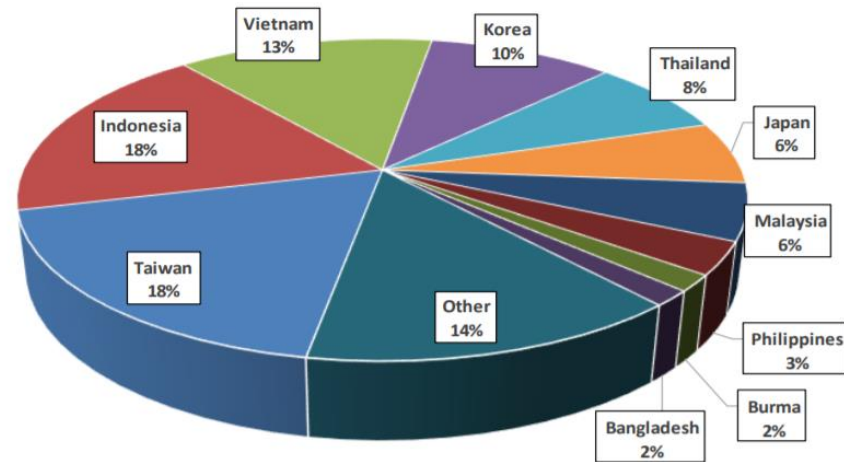
Figure 5.1 Grain Exports Shipments, Modal Trends

Figure source: UGPTI Marketing U.S. Grain and Oilseed by Container, No. 272. Sept 2014

Container Exports

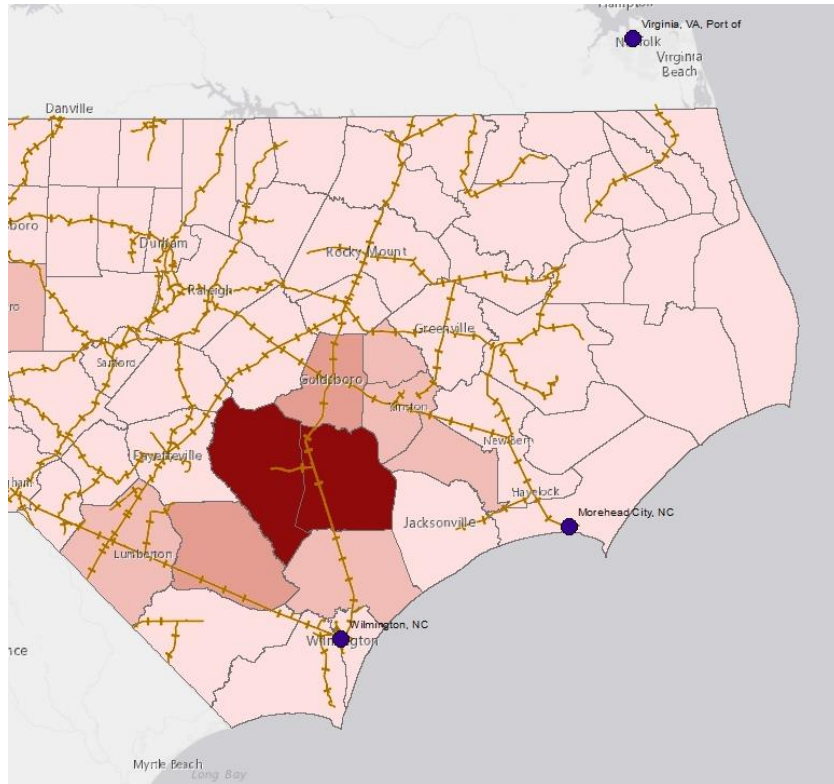
Figure 18

Top 10 destination markets for U.S. containerized grain exports, Jan-Jul 2019



Note: The following Harmonized Tariff Codes are used to calculate containerized grains movements: 1001, 100190, 1002, 1003, 100300, 1004, 100400, 1005, 100590, 1007, 100700, 1102, 110100, 230310, 110220, 110290, 1201, 120100, 230210, 230990, 230330, and 120810.

Source: USDA, Agricultural Marketing Service, Transportation Services Division analysis of PIERS data.



Data sources: 2016/17 livestock inventories are from USDA NASS, base map is from ERSI, rail lines are from NCDOT

Port of VA

Norfolk, VA dredging to begin January 2020

- Widening and deepening
 - Channel depth will be 55 ft
 - Will be deepest channel on the East Coast
- Projected completion is 2024
- Will be able to accommodate 2 vessels with capacity over 10,000 TEU at the same time
- Potential for new liner services

International Maritime Organization (IMO) Sulfur 2020

The IMO is a specialized agency of the United Nations

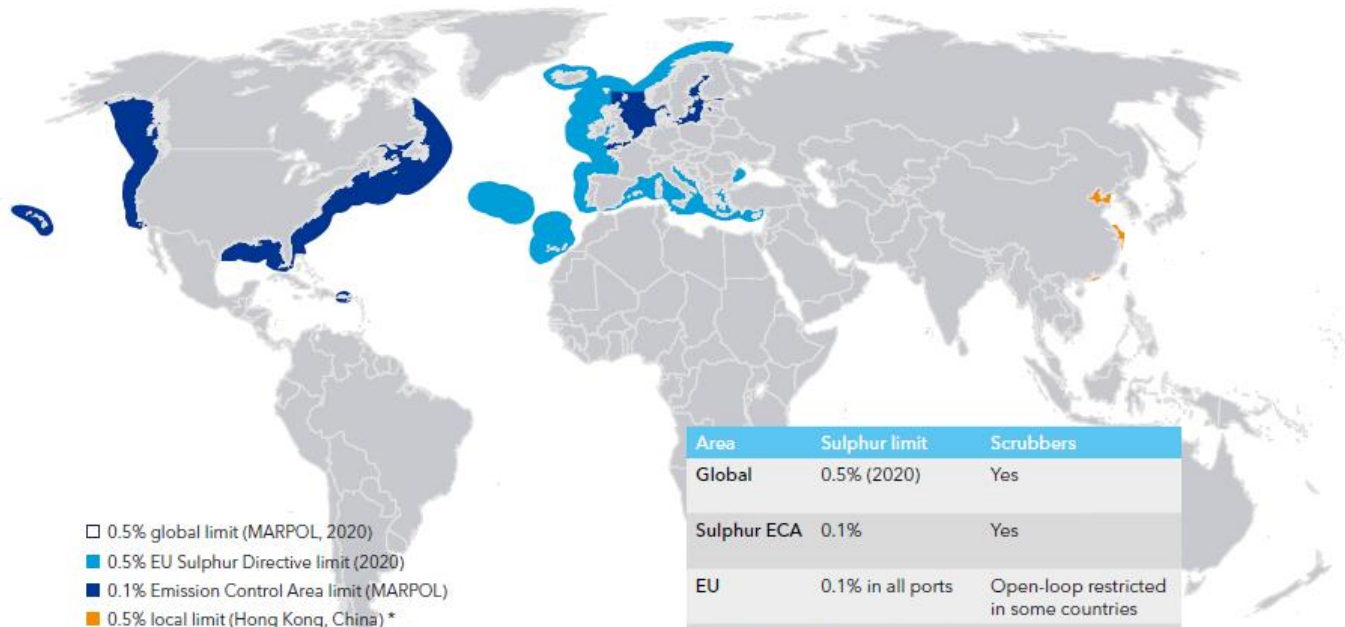
Regulation Purpose: reduce pollution

Currently: outside emissions control areas sulfur limit in bunker fuel is 3.5% (mass by mass)

Starting January 2020: outside emissions control areas sulfur limit in bunker fuel limited to 0.5%



IMO 2020 Emission Control Areas



- 0.5% global limit (MARPOL, 2020)
- 0.5% EU Sulphur Directive limit (2020)
- 0.1% Emission Control Area limit (MARPOL)
- 0.5% local limit (Hong Kong, China) *

* Note that China and Hong Kong may go down to 0.1% before 2020

Area	Sulphur limit	Scrubbers
Global	0.5% (2020)	Yes
Sulphur ECA	0.1%	Yes
EU	0.1% in all ports	Open-loop restricted in some countries
China	0.5% in selected areas	Yes
California	0.1% within 24 nm	No, only through research exemption

IMO 2020

Key Questions

Size of Impact?

- 3.5 million barrels high-sulfur resid fuel oil demanded per day in 2018 ([Mckinsey & Co](#))
- 70,000 vessels ([CME Group](#))

Who does this directly affect?

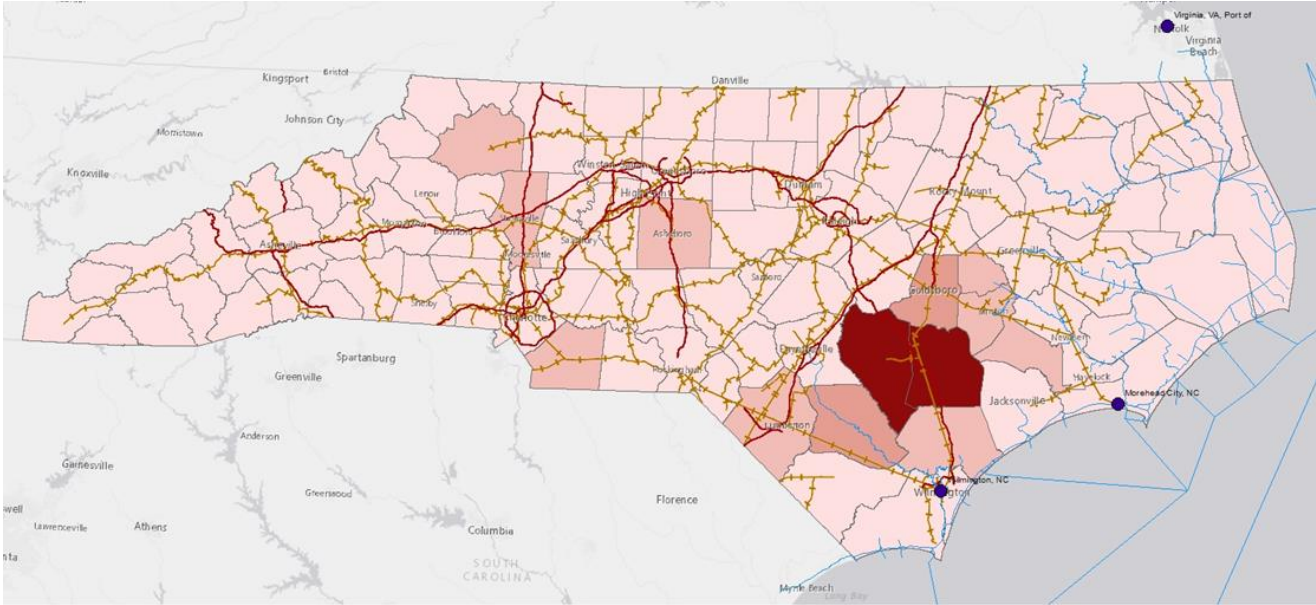
- Refiners (supply-side): typically use bunker fuel as place to dispose of high sulfur material
 - Will need to invest in hydrotreatment
- Shipowners and carriers (demand-side)

IMO 2020

Carrier Compliance Options

A carrier is company that transports goods and is liable during transit

1. Switch to marine gasoil (in the diesel range)
 - Minimal cost to switch engine, but fuel is significantly more expensive
2. Switch to liquefied natural gas (LNG)
 - High conversion cost and limited availability, but cheaper than marine gasoil
3. Install scrubbers
 - High conversion cost, but can still burn high sulfur fuel oil
4. Scrap vessels



Contact

Email: hschwei@ncsu.edu

Twitter: [@heidipschweizer](https://twitter.com/heidipschweizer)

Data sources: 2016/17 livestock inventories are from USDA NASS, base map is from ERSI, ports and navigable waterways are from USDOT, rail lines and highways are from NCDOT