To the Graduate Council:

I am submitting herewith a thesis written by Tammara Leigh Cole entitled "Cost and Dependability of Moving Grain to the Southeast." I have examined the final paper copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agriculture Economics.

Daniel De La Torre Ugarte, Major Professor

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and recommend its acceptance:

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COST AND DEPENDABILITY OF MOVING GRAIN TO THE SOUTHEAST

A Thesis
Presented for the
Master of Science
Degree
The University of Tennessee, Knoxville

Tammara Leigh Cole
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ABSTRACT

The Jones Act and other United States' cabotage laws are a complex support system for the domestic maritime industry. As the maritime industry expands and changes, the Jones Act is repeatedly challenged. One such change may be the opening of a new grain receiving facility at the Port of Wilmington, North Carolina. With it, N.C. hog and poultry producers will expand their transportation options for feed grains. This study illustrates that during some months of the year grain can be imported from South America at a lower cost than domestic grain, which is presently moved by rail. It also shows that U.S. grain interest may be protected by loosening Jones Act legislation under certain market conditions to allow foreign ships to move grain from U.S. port to U.S. port.

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CHAPTER I

INTRODUCTION

For livestock feeders, the cost of transporting agricultural commodities to their facilities is as important as the purchase price of the commodity itself. This is particularly true for producers in a state like North Carolina, which does not produce enough grain to meet the need of its hog and poultry industries. As a result, these North Carolina must bring corn in from other areas. Historically, these producers have purchased their corn from the major corn producing states in the Midwest (Figure 1-1) and arranged for transportation to their facilities in North Carolina, making the cost of transportation a significant factor in calculating their feed costs. Operating costs for these producers are sensitive to changes in transportation costs and provide these producers with an incentive to utilize the lowest cost transportation mode available.

Bulk commodities generally have three transportation options: railroad, truck or vessel. In the past, corn has been shipped from the Midwest to North Carolina by railroad. North Carolina shippers complain of lapses in service and dependability, though. The rail industry can exercise near monopoly power in this area because other long distance shipping alternatives do not exist. Truck is not a shipping alternative for any distance over 100 miles because of capacity limitations. Until now, bulk vessels could not be utilized due to a lack of receiving infrastructure. In the summer of 2002, a new grain receiving facility is scheduled to open in Wilmington, North Carolina, adding new shipping alternatives to the region.

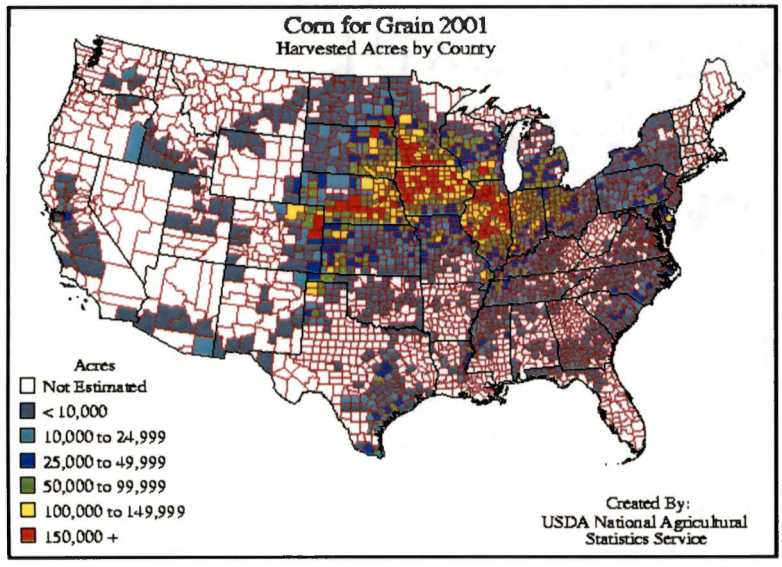

Figure1-1 Major U.S. Corn Growing Counties. This map illustrates the difference between harvested acres in North Carolina and the major corn growing areas in the U.S.

Current maritime laws, known collectively as the Jones Act, will limit the ability of foreign ships to operate in North Carolina's waters. The Jones Act, or Merchant Marine Act of 1920 (46 App. U.S.C. #883) and other maritime statutes comprise a series of laws that prohibit foreign vessel from competing with U.S. maritime shipping. "The Jones Act states that no merchandise transported by water between U.S. ports is to be carried in any other vessel than a vessel built and documented under the laws of the United States and owned by persons who are citizens of the United States"[1] The Jones Act is actually several protectionary laws grouped together by subject. They include provisions for employee safety, shipping regulation, and environmental protection. Statutes such as the Jones Act are called cabotage laws and have been around throughout the history of the United States. According to the Maritime Cabotage Task Force, laws similar to the Jones Act are found in more than 40 major maritime nations around the

[1] Farm Bureau

world. The new shipping options for grain consumers in North Carolina will soon bring attention to the current maritime legislation.

In North Carolina, the hog, turkey and poultry industries make up a significant part of overall commodity sales and are vital to the state's economy. The hog industry accounts for 18% of total agricultural cash receipts and poultry (including turkeys) accounts for 33% of total commodity sales. According to the North Carolina Department of Agriculture and Consumer Services (NCDA), North Carolina ranks second nationally in hog and turkey production with 9.3 million and 41 million head, respectively. North Carolina also ranks third in poultry and egg product sales ($2,170 million) and fourth nationally in broiler production (4,051 million pounds). (Table 1-1)

Vertical shifts in the hog industry have increased production dramatically. Structurally, numerous small farms have been replaced by fewer high intensity operations. "In 1986, the state [North Carolina] had 15,000 hog farms. Of these operations, 13,000 had less than 100 hogs and pigs, and only 800 operations had more than 500 hogs and pigs. Total hog inventory was 2.4 million head. By 2000, the total operations with hogs and pigs had decreased to 3,600. Operations that had less than 100 head controlled less

Table 1-1: North Carolina National Rank in Poultry, Turkey and Hog Commodities

Rank	Hogs	Poultry & Egg Products	Broilers	Turkeys
1	Iowa	Arkansas	Georgia	Minnesota
2	North Carolina	Georgia	Arkansas	North Carolina
3	Minnesota	North Carolina	Alabama	Arkansas
4	Illinois	Pennsylvania	North Carolina	Missouri

than 1 percent of the total inventory of 9.6 million head. The 1,500 operations with more than 1,000 hogs controlled nearly 99 percent of the inventory, nearly 9.5 million of the June 1, 2000 total inventory."[2] As seen in Table 1-2, North Carolina grain production has decreased from 128 million bushels in 1985 to 74 million bushels in 2000. Expansion of the livestock industries coupled with this decrease in corn production has increased demand for grain in excess of what the state can produce. This deficit is filled by Midwest grain producers via rail transport.

The major rail lines serving the eastern United States are CSX and Norfolk Southern. Norfolk Southern transports grain mainly to the poultry industry of middle and western North Carolina, while CSX lines service the hog and turkey industries of eastern North Carolina.[3] Because CSX has ownership rights to the existing tracks to the eastern North Carolina, the hog producers are a captive customer of CSX if they wish to receive grain.

The hog industry of North Carolina complains of a lack of dependable rail service. Storage difficulties and extra expenses are incurred because feed mills must stock a minimum of a two-week supply of corn. Even with dedicated trains, corn receivers cannot depend on trains to arrive at specific times or intervals. As a result, they must compensate for this uncertainty by stocking additional grain. At present, this can cost between 2 cents and 4 cents per bushel

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[2] North Carolina Department of Agriculture and Consumer Sciences website: Agricultural overview
[3]Dager

Table 1-2. Feed Corn Deficits Between Production and Consumption from 1995-2000, North Carolina (Bu.).[a] Calculations are based on livestock inventories and their corn consumption for the given years.

Year	Corn Production	Corn Consumption	Deficit
1985	128,375,000	238,036,838	109,661,838
1986	93,840,000	251,952,666	158,112,666
1987	74,800,000	276,424,567	201,624,567
1988	81,480,000	282,191,969	200,711,969
1989	88,350,000	289,044,980	200,694,980
1990	72,760,000	304,523,792	231,763,792
1991	85,500,000	336,114,691	250,614,691
1992	98,800,000	371,004,178	272,204,178
1993	55,250,000	408,815,786	353,565,786
1994	81,900,000	463,059,050	381,159,050
1995	74,900,000	506,859,951	431,959,951
1996	85,500,000	537,897,659	452,397,659
1997	77,430,000	535,527,468	458,097,468
1998	53,900,000	530,958,343	477,058,343
1999	51,200,000	519,356,508	468,156,508
2000	74,240,000	513,598,677	439,358,677

Livestock Inventories from USDA - NASS, NCDA - Ag. Statistics Division

a) The deficit is calculated by subtracting corn consumption, as based on livestock and poultry inventories, from corn production. A hogs diet consists primarily from corn and soybean meal. During it's six-month lifespan, a hog will consume about 3.2 lbs of feed per pound of growth. For market pigs, this includes 70% corn and 25% soybean meal with the remaining 5% comprised of vitamin and mineral supplements. Including the amount fed through the lactating sow, each hog consumes an average of 12 bushels of corn over its lifetime. A breeding sow's diet deviates slightly with 80% of its diet coming from corn. (Matthew) Poultry consume varying amounts of feed depending on their size and purpose. A laying hen consumes around 60-70 grams of corn per day while broilers will consume around 5.2 kg over their 52 day feeding period. Male turkeys will have eaten around 48 kg of corn at a 24 week slaughter and females around 25 kg. at 20 weeks. Poultry rations consist of 60%-70% corn with the remainder being soybean meal and vitamins and supplements. (Grizzel)

Figure 1-2 illustrates grain stocking activity in response to erratic deliveries. Ideally, trains would deliver grain at specific intervals. A feed mill would start with a set amount of grain, then utilize that grain to depletion. At the time of depletion, a new delivery would arrive and grain stores would be returned to their original amounts. In the presence of erratic delivery patterns, (Figure 1-2, b) a feed mill must keep a buffer stock of grain for late deliveries. If scheduled delivery is late then the buffer stock must be tapped into. If the delivery is early, (Figure 1-2, a) additional storage is needed for the unexpected grain. If the grain were to be delivered with an ideal flow, buffer stocks could be lowered (Figure 1-2, c). The resulting buffer stocks would only be needed in times of catastrophe when it is impossible to ship grain by any method.

Future grain transportation plans include a new ship receiving facility at the Port of Wilmington in North Carolina. The facility will give corn consumers additional options when buying grain. South American grain via vessel will be one new option. Other options will include more transportation choices when buying domestic grain. According to Gervis et al., a rail line has natural monopoly power until a new form of competition is introduced. This facility will add a source of competition to the area.

The new building will hold approximately 50,000 metric tons of grain. Bulkheads will be capable of holding different commodities at the same time. The major hog and turkey producing counties within the state are within 50-75 miles of the new facility. For now, plans are to truck the grain to the individual feed mills. Presently, foreign grain is not an alternative due to a lack of receiving capability.

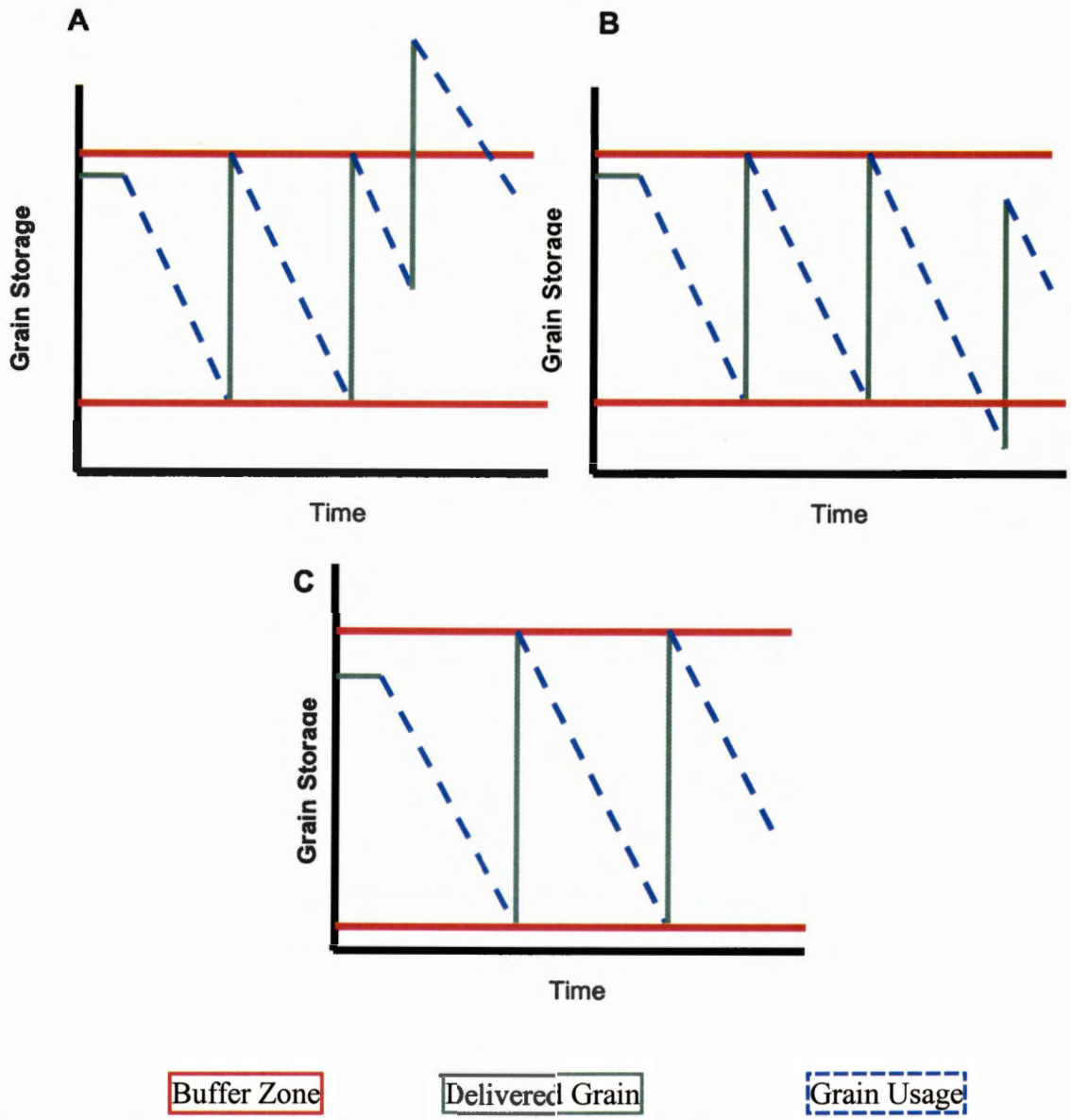

Figure 1-2: Model of Grain Storage as Compensation for Erratic Interval Rail Deliveries. Graph A: represents an early arrival of a grain shipment and the effect it has on storage levels. Graph b illustrates that feed mills will have to have a large buffer amount of corn in case of late deliveries. In graph c, lower buffer stocks can be utilized when rail deliveries arrive on a consistent basis.

The study's objective is to estimate the cost of shipping grain from several alternative locations and analyze the information to determine the least cost location. Locations to be included are Illinois, Indiana, Michigan and Ohio, for rail transport. For vessel transport, the ports of Buenos Aires, New Orleans, and Toledo are included.

CHAPTER II

PREVIOUS RESEARCH

2.1 Introduction

Previous research of this issue fell into three categories: 1) rail competition with itself and other forms of transportation, 2) rail deregulation and awareness and 3) informative papers concerning the Jones Act. Most information on the Jones Act as related to agricultural shipping came from political groups such as Farm Bureau and the Maritime Cabatoge Task Force.

2.2 Rail Competition

Ample information is available about intramodal and intermodal competition with rail and how deregulation has affected this competition. Klindworth explains that while the rail industry has become much more concentrated, what is important to shippers is the number of competing rail lines to which they have access. During times of high demand, the railroads tend to serve customers who have another shipping alternative first in order to retain their business. Therefore, agricultural shippers who are captive to one line will pay higher rates and will have worse service.

Fulton and Gray investigated the effects of competition after deregulation of the rail industry. The rail industry has unique characteristics that make regulation policy difficult. Rail has natural monopoly tendencies because of barriers to entry but strong

regulations cause costly inefficiencies. One example used in the paper was that of Montana freight rates. A lack of barge and other rail alternatives leads to rates twice as high as states with rail competition. One policy alternative may be to encourage entry into the industry and thus competition.

Wilson et al. used different econometric models to analyze intermodal demand for shipping. The introduction of the Staggers Act of 1980 reduced the effect of rail cost on rail rates and increased the effect of competition on rail rates.

A waterway infrastructure is vital to the Midwestern grain producers, according to Fruin. Barge costs and shipping rates are much lower than rail in this area. Lower costs are attributable to greater cargo capacity and the efficiency of movement over downstream water. If barge transport did not exist, the rail industry would have to provide another two 100 unit car train for every 15-barge tow moving on the rivers.

A theoretical model was used by Gervis et al. to analyze rail's monopoly power. Rail's monopoly power does not come from economies of scale and scope alone, cost subadditivity and an elastic demand curve also contribute. Given an intramodal competition framework, railroads are natural monopolies when one railroad serves a shipper. If multiple railroads or other modes of transportation are present, railroads lose their monopoly power. In his opinion, one alternative to regulating the rail industry is to promote competition between shippers.

2.3 Deregulation of Rail Industry

According to Brennan, deregulation of the railroads has led to greater freedoms, so that the railroads are free to set prices and market their services. Railroads are

consolidating and intramodal competition is decreasing. Mergers have led to a loss of competition and service failures in western railroads. In his opinion, if railroads continue to increase their market power then railroad service failures will lead to future re-regulation.

A Wilson and Wilson paper focused on innovations and efficiencies resulting from railroad deregulation. Wilson used an empirical model to determine that rail miles had a negative effect on price per ton. Therefore, efficiencies and lower rates are found when more grain is hauled over longer distances. In their research, a one percent increase in ton-miles reduced rail rates by 25 percent. A one percent increase in average length of haul resulted in a 0.66 percent change in price. In addition, commodity price affected rail rate charged. A one percent change in commodity price, increased rail prices by 0.24 percent for corn.

Sun et al. examined historical rail mergers in terms of stock market performance. Gains to the stockholders of acquiring firms are seen in market power gains. If a merger fails to pass Interstate Commerce Commission, [now called Surface Transportation Board], approval, then the opposite effect is seen and stock prices of both firms fall dramatically.

2.4 Jones Act Legislation

Most papers on this subject were short informative articles provided by groups such as the Farm Bureau. They have periodic articles in their Voice of Agriculture reports. Articles are provided by Spangler, Lipton and Lane, and also, Thorton and Lane. These article all give background on the Jones Act issue and call for legislation to

increase competition. On the other side, the Maritime Cabatoge Task Force has produced statistics showing that the Jones Act is the foundation of the domestic maritime industry. Their claim is that the Jones Act's purpose is to promote the healthy growth of U.S. commerce and protect national security.

Quartel wrote an explanatory paper on the counter productive nature of the Jones Act. He explains that the major arguments for the Jones Act are national defense and protection of a weak industry. These points to him are mute because during times of war, the United States government cannot ask an industry to stop receiving income. In addition, many of the ships under Jones Act legislation are not suitable for carrying military cargo. He perceives the U.S. maritime fleet in trouble because of the Jones Act instead of being protected by its coverage.

CHAPTER III

THE TRANSPORTATION INDUSTRIES

3.1 Present Rail Situation

Some commodities transported by rail have a high seasonal demand. The increase in demand for cars is not sufficient to warrant increased investment by the rail roads. Many industries using rail as a form of shipment, experience capacity constraints during the peak fall season.[4] Seasonality is caused by short-term increased demand by industries ranging from construction, import container shipments for Christmas, citrus, automobile manufacturers, coal and the Midwest grain harvest. The rail companies prefer the excessive demand for a short period to buying additional rail cars that will not be fully utilized for the remainder of the year. If a company requiring the commodity is not willing to invest capital in rail cars then they can be subject to car shortage delays.

Contributing to the lack of supply is the loss of competing rail lines. The recent trend of large railroads acquiring small railroads has left the industry with only eight Class I (classified as having revenue of over $250 million) railroads. "Smaller railroads, which must typically rely on the Class I carriers for car supply and interchange, cannot compete effectively with the Class I carriers. In fact, the role of the short line is better thought of as providing competition to trucking firms." (Klindworth, p. 2) Of these eight,

[4] Jennings

only four account for the bulk of Class I traffic in the United States. Norfolk Southern and CSX are the only two that service the eastern United States.[5]

During short term increases in demand, shippers with the high revenue generally receive priority service. Lower revenue shipments, such as agriculture commodities, and shippers without alternatives may receive second priority. The lack of rail competition plays a large role not only in pricing but also in service received. "When the demand for railroad transportation services exceeds what can be supplied by railroads in the short term, railroads tend to serve those customers with competitive alternatives rather than those shippers captive to rail. Those shippers without competitive alternatives not only pay the highest rates, but also receive the worse service."[6]

3.2 Present Maritime Situation

Currently, most grain movements by barge or vessel within the United States are bound for export. Grain shipped via the interior U.S. waterways move down river but will mainly be combined with other grain and loaded onto larger vessels for export. The interior river system shuttled approximately 52 million tons of grain during 1999, at an average spot barge rate ranging from $9.16 per ton from the Upper Missouri to $4.43 per ton for travel down the lower Mississippi. 95% of this grain was inspected at port for export.[7] Presently, the U.S. Jones Act fleet consists of 1,894 large commercial vessels and 30,000 barges.[8]

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[5] USDA
[6] Klindworth
[7] USDA Grain Transportation Report
[8] www.icaships.com

There is an increasing trend toward replacing truck and rail with cargo vessels. One vessel can replace many units of another transportation type such as barge, rail car or truck. Container ships are increasing their shuttle of cargo between east coast ports. "As surface transportation problems worsen, there is growing interest in development of coastwise feeder services that move freight by barge, ship or fast ferry." (Bonney, 1) This helps alleviate some of the gridlock down the I-95 corridor, saves money and increases road safety. A 40,000 DWT vessel, as is used in this study, carrying grain has the same capacity as 26 barges, 396 covered hopper rail cars or 1600 trucks.(Figure 3-1)

3.3 Economic Issue

North Carolina is currently receiving adequate shipments of corn, but few shipping alternatives exist. Hog producers have no substitutable alternatives to rail

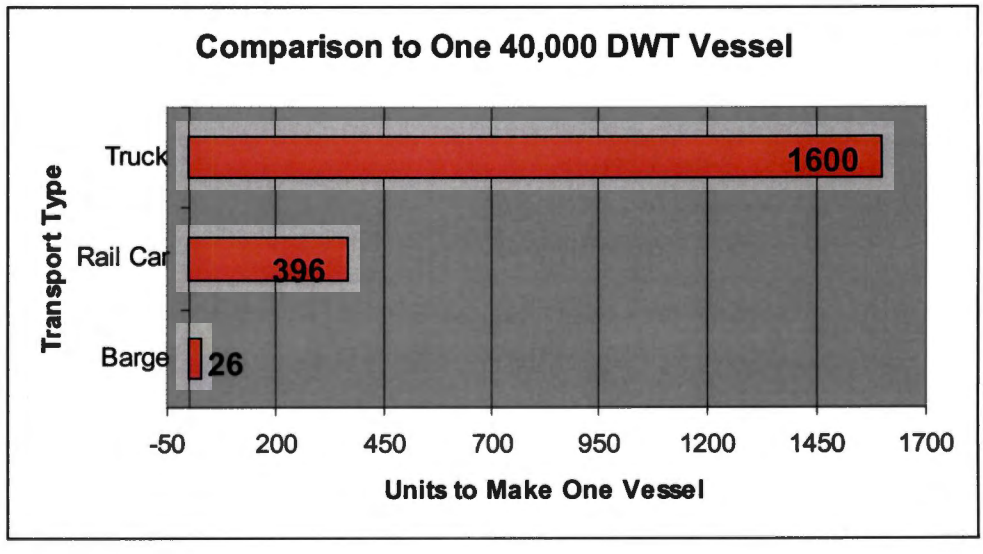

Figure 3-1: Truck, Barge, and Rail Cargo Capacity Comparison. The capacity of one 40,000 DWT vessel is equivalent to 26 barges, 396 rail car or 1600 trucks.

service. Trucking cannot compete price wise with rail given the distance and volume requirements. In essence, trucking provides a price ceiling for rail rates. "When railways are not faced with competition from other railways or from other forms of transportation such as barges, the evidence suggests railways will price freight services at or near truck competitive rates."[9] Truck competition is not a consideration for any distance over 100 miles.[10]

In eastern North Carolina, five major companies own and produce the majority of pork in the state. They all ship grain via rail car from the Midwest with extra amounts bought from North Carolina grain producers. Together, they have negotiated a shipping price with CSX. Ninety-eight percent of the CSX shipped corn originates from Ohio, Michigan and Indiana. The corn is shipped directly to each company's individual mills on 65 car unit trains. Each rail car holds approximately 100 tons of grain compared to trucks, which carry around 25 tons. The major challenge faced by the hog companies is scheduling reliability. Although a company may have one or more trains dedicated to their shipping, they are not sure when trains will arrive. The companies usually keep a 2-3 week supply of grain in storage.[11]

For example: Prestage Farms runs two trains. Each train takes two weeks to make a round trip. Prestage Farms hopes to get one delivery of grain every week. However, they cannot predict when the grain will arrive. In addition, they may receive two shipments in one week and then have to wait two more weeks for the next shipment. As a result, more storage space is required at additional costs. Prestage Farm's two-week

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[9] Fulton and Gray, p.2
[10] Dager
[11] Johnson

supply is approximately between 800,000 and 900,000 bushels. Murphy's however, requires close to 1 million bushels per week.[12]

Even were there adequate receiving facilities capable of holding all the grain demanded, there might be a cost disadvantage as a result of the Jones Act. Current plans in North Carolina are for the new grain receiving facility in Wilmington to be operational by the spring of 2002. This additional storage capacity will give the hog industry the freedom to buy foreign grain. Grain buyers will also benefit from the addition of transportation competition. The facility will not be able to solely meet the grain demand for North Carolina but the ability to receive grain from another transportation source will be a negotiation tool for future rail tariffs on grain shipments.

[12] Saunders

CHAPTER IV

DATA AND METHODOLOGY

Two factors that determine the cost of delivered corn is the origin price of the grain and the cost of transportation. This study takes into account both the cost of different shipping options and seasonal cost of corn at its origin.

4.1 Corn Prices

Grain prices were examined for a seven year period from 1995 –2001. The data were broken down into weighted monthly averages by state for Illinois, Indiana, Michigan and Ohio. The NASS corn prices were based on total sales in U.S. dollars for individual states divided by the quantity sold in the state. Similar data were also collected for the port price at Buenos Aires and for the U.S. Gulf price. To observe seasonal patterns, these prices were graphed by month for each year. Corn price data for the states and the Gulf were provided by USDA's National Agriculture Statistics Service (NASS) historical data. For Argentina, corn price data were obtained from the Secretaría de Agricultura, Ganadería, Pesca y Alimentación website. (See Appendix 1)

The price data do not show a predominate yearly pattern. The year 1996 is the highest price year of this series with prices ranging between $91.43 and $175 per ton ($2.56-$4.90 per bushel). The year 2000 had the lowest set of prices; ranging from $53.93 -$89.81 ($1.51-$2.51 per bushel). Argentina, which lies in the southern

hemisphere, has the opposite growing season to the U.S. in the northern hemisphere. Argentina and the Gulf prices are higher than the Midwestern states for each year.

A continually upward slope characterized the monthly pattern for 1995, without any denotable lag in price during the U.S. harvest months. In 1996, prices rose quickly then dropped quickly during the months of August and September. 1997 and 1998 are of medium volatility in terms of monthly movement but remain lower than the 1996 prices. During the period between 1999 and 2001, prices remain low and relatively flat from month to month.

For this study, corn prices for 2000 (Table 4-1, Figure 4-1) were added to the transportation cost to generate a delivered corn price. In 2000, the Midwest state's prices had little variation throughout the year. Seasonality there was a peak in May and a trough in August and September. After a slight increase in price during May, Argentina mirrors the U.S. price trend for the remainder of the year. The Argentine price is consistent with the U.S. prices but is the highest overall.

Table 4-1: 2000 Corn Prices for Study States, U.S. Gulf and Argentina ($/short ton). Prices represent weighted monthly averages for the study origin areas.

	Illinois	Indiana	Michigan	Ohio	Gulf	Argentina
January	70.36	70.36	66.07	71.79	84.28	89.81
February	72.50	73.57	69.64	74.29	86.31	87.09
March	75.36	74.29	74.29	75.36	86.45	82.55
April	72.14	76.79	72.50	76.43	86.68	79.83
May	78.57	76.79	74.29	78.21	86.77	82.55
June	67.50	69.64	68.21	70.00	76.11	76.20
July	59.29	58.93	62.86	63.21	68.11	71.67
August	55.00	58.21	53.93	56.79	68.26	70.76
September	58.57	59.64	56.79	56.79	72.80	70.76
October	64.29	62.50	62.14	62.50	76.86	74.39
November	68.57	65.36	66.43	66.79	80.71	76.20
December	72.50	73.57	67.14	72.14	87.51	85.28

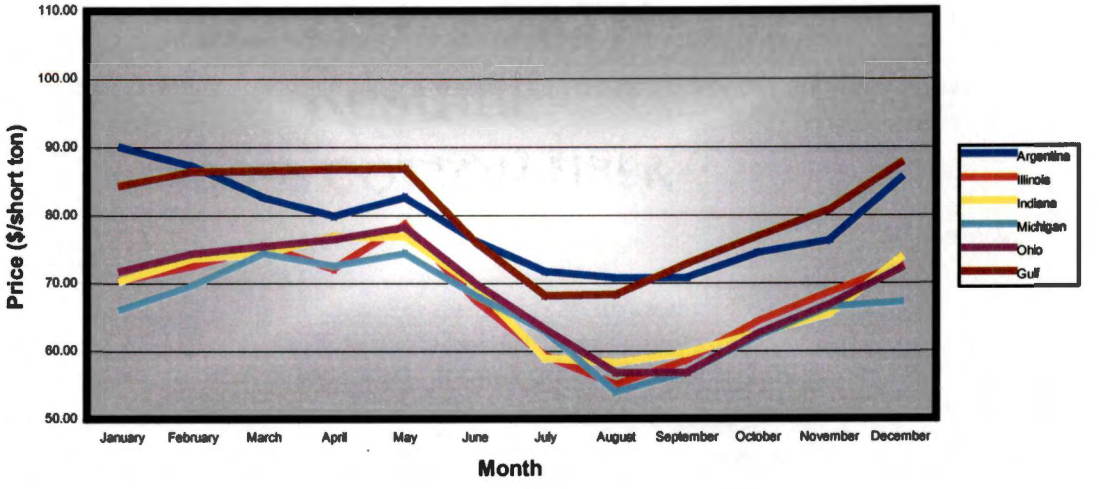

Figure 4-1: Graph of Table 4-1, 2000 Corn Prices ($/Ton). Prices represent weighted monthly averages for the study origin areas

4.2 Rail Cost Model

The Reebie Rail Costing Analysis Model (RCAM),[13] released third quarter 2000 was used to calculate rail rate transportation costs for corn originating in the states of Illinois, Indiana, Michigan and Ohio. Reebie is a model developed and updated by the consulting firm Transportation Management Consultants. The Reebie model[14] calculates shipping revenue summaries based on input information such as Standard Transportation Commodity Code (STCC), origin and destination location, length of transport, number of cars per shipment and other figures from the Bureau of Transportation Statistics Waybill

[13] "RCAM/PC V5.0 is an enhanced personal computer application of the Interstate Commerce Commission's Uniform Rail Costing System (URCS) methodology. The URCS methodology produces a data file for each Class I railroad which contains all the unit costs and operating factors used in the costing process. These data files are combined with user supplied inputs within RCAM/PC V5.0 to produce estimates of the costs of providing specific rail services." – Excerpt from the Reebie Users Manual

[14] Access to Reebie Rail Model provided by TVA River Operations Group

Data . For each output, Reebie provides information on per car and per ton full cost, variable cost and net carrier revenue.

The model can be illustrated as:

$$C_R = f(C_1, F, C_2, O, D, P, T, M, N)$$

Where:

C_R = Cost per ton of rail service
C_1 = Standard Transportation Commodity Code (STCC)
F = Fuel costs (provided by model builder)
C_2 = Carrier
O = Origin City
D = Destination City
P = Percent of variable costs (STB Waybill)
T = Car type
M = Tons per car
N = Number of cars per train

Transportation costs were calculated between the states of Michigan, Ohio, Illinois, and Indiana to eastern North Carolina.

The city of Warsaw, North Carolina was used as the destination for each model calculation because Warsaw is centrally located in the chief hog producing area of North Carolina. For each state, four representative elevators were chosen to serve as origin shipping cities for the model (See Appendix 1). The criteria for elevator choice was based on individual track capacity and how well it represented different areas within the state equally. Calculations for tariff rates included varying distances for single carload shipments, multi-car shipments (2-10 cars) and unit train shipments (more than 65 cars). The elevators were chosen from The Official Railway Guide's.[15]

[15] 2000 Grain Issue

4.3 Water Vessel Cost Model

The vessel model assesses the cost of water vessel transportation from the ports of Toledo, New Orleans and Buenos Aires. These three ports represent the Great Lakes area, the Gulf area and South America, respectively. Domestic and foreign vessels' transportation costs were determined using the Department of Defense's topographical "Distances Between Ports" and cost guides based on cost per ocean mile. The Army Corp of Engineers' "Deep Draft Vessel Costs" calculates the cost of vessel transportation in terms of typical fixed and variable costs by day.[16] The vessel costs represent typical averages on a U.S. dollar per mile basis in accordance to typical operating vessels. By multiplying the average costs by distance miles, an estimate of the vessel cost was derived. To complete the estimate of a cost per ton tariff; port, tugboat and river pilot fees were added to take into account additional costs to a vessel.

Information was obtained from the Port of Wilmington concerning port fees and the average cost for using tugs boats and river pilot fees. Port information from Toledo, New Orleans, and Buenos Aires were provided by a combination or port literature and website information.(Table 4-2) Bunker fuel (maritime fuel) prices were collected from the website: www.bunkerworld.com.

According to the Port of Wilmington, only vessels with a draft of less than 38 feet could access the port entrance. This excludes any deep draft vessels over 40,000 metric dead weight tons (DWT). This amount is less than the new receiving facility can accept and acts as a constraint unless future dredging of the port occurs. To limit the

[16] Model uses 345 working days per year; remaining days are set aside for repair and maintenance.

Table 4-2: Additional Port Related Fees added to "Deep Draft Vessel Costs" Model for Selected Ports. Collected from port information.

	Toledo	New Orleans	Buenos Aires	Wilmington	St. Lawrence Seaway
Distance from Wilmington	2488 nm[a]	1285 nm	5805 nm		
Trip Length	10 days	4 days	17 days		
Dockage Fees	$1340/day	$3100 / day	$100/day, $0.03/ton	$4700 / day	
Tug fee	$750 / hour	$850 / hour	$400 / hour	$8,000	
River Pilot Fee		$10/draft ft, $0.03/ton		$4,000	
IFO 180 Price	$157	$108	$108		
MDO Price	$218	$173	$215		
Other	$1,450 / line				$0.679/ton[b]

a) Nautical Mile
b) Denotes Metric Ton

number of alternative vessel sizes, this model is based on the largest vessel possible based on allowable port depth. Both the Port of Buenos Aires and the Port of New Orleans can accommodate a vessel with a draft greater than 37 feet. Consequently, the 40,000 DWT bulker calculations were used for these two originations. The St. Lawrence Seaway (SLS) constrains shipments from the Great Lake region. For this calculation, a 35,000 DWT bulker with 13,000 tons of grain travels through the SLS and then completes the load by adding an additional 12,000 tons at the Port of Montreal. DWT encompasses both registered cargo tons aboard, fuel, lube and supplies aboard. While a vessel will carry varying amounts of fuel and lube, these calculations assume 10,000 DWT of fuel and lube per vessel. Therefore, a 40,000 DWT vessel will carry 30,000 tons of grain.

To assess the impact of relaxing the Jones Act legislation, two additional calculations were made to reflect the cost to corn shippers if foreign vessels were allowed to move between U.S. ports. Holding all other variables constant, foreign vessel costs were exchanged for domestic vessel costs in the New Orleans to Wilmington calculation. This was repeated for the Toledo to Wilmington vessel cost calculation. These two new calculations model the costs of a foreign vessel to pick up domestic corn at a U.S. port and deliver it to the Port of Wilmington receiving facility.

Based on this information, the following model was used to estimate vessel cost:

$$F = (X_1 + X_2 + X_3 + X_4 + X_5) / 345$$

$$C_V = [(F+B)(D_P) + (F+B)(D_T)] + P$$

Where:

C_V = Cost per ton of vessel transport
X_1 = Annual Capital Cost
X_2 = Annual Crew Cost
X_3= Total Daily Annual Fixed Costs
X_4 = Annual repair, maintenance, insurance
X_5 = Annual Administration
F= Fixed Daily Operating Costs
B= Fuel consumption per day times cost per gallon
P = Port fees
D_P = Days in port
D_T = Day in transit

4.4 Fuel Costs

Fuel data were obtained from Department of Energy historical data. The rail 9industry uses Number 2 diesel for their engines and the maritime vessels use Marine Diesel Oil (MDO) and Residual Fuel Oil (IFO). The original data for No. 2 diesel were divided into daily spot prices which were further broken down regionally; the Gulf Coast,

Los Angeles, California, and New York, New York. For usability, daily spot prices for the Gulf Coast and New York were averaged simply by month from 1996-2001. The IFO fuel was in a daily spot price format and was also averaged for each month between 1994-2001. For a sensitivity analysis, these monthly averages were examined to determine if any trends in fuel costs exist. For No. 2 Diesel, 1998 prices were the generally the lowest and 2000 prices were generally the highest for the six year data both on the West Coast and for the Gulf region.(Figure 4-3) For Residual fuel, 1998 and 2000 prices were respectively the same.

When compared to each other domestically, the IFO fuel follows the year trends of Diesel fuel.(Figure 4-4) Their predominate peaks and troughs coincide through all seven years.

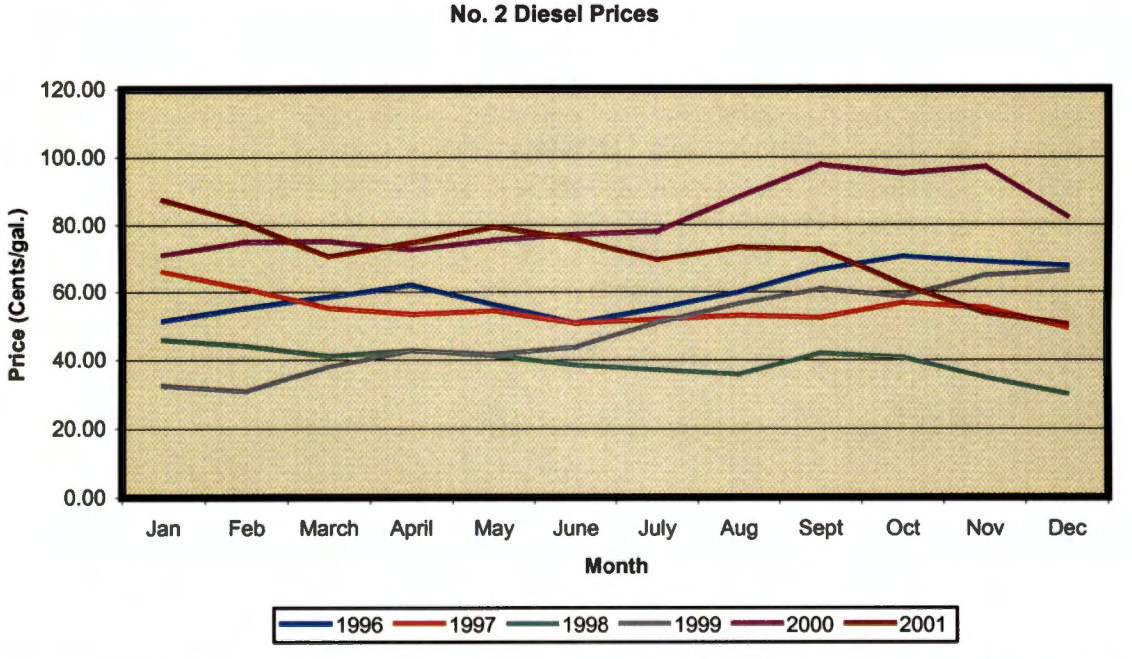

Figure 4-3: U.S. Monthly Domestic Diesel Prices for 1996 – 2001. Averaged by month from daily spot prices.

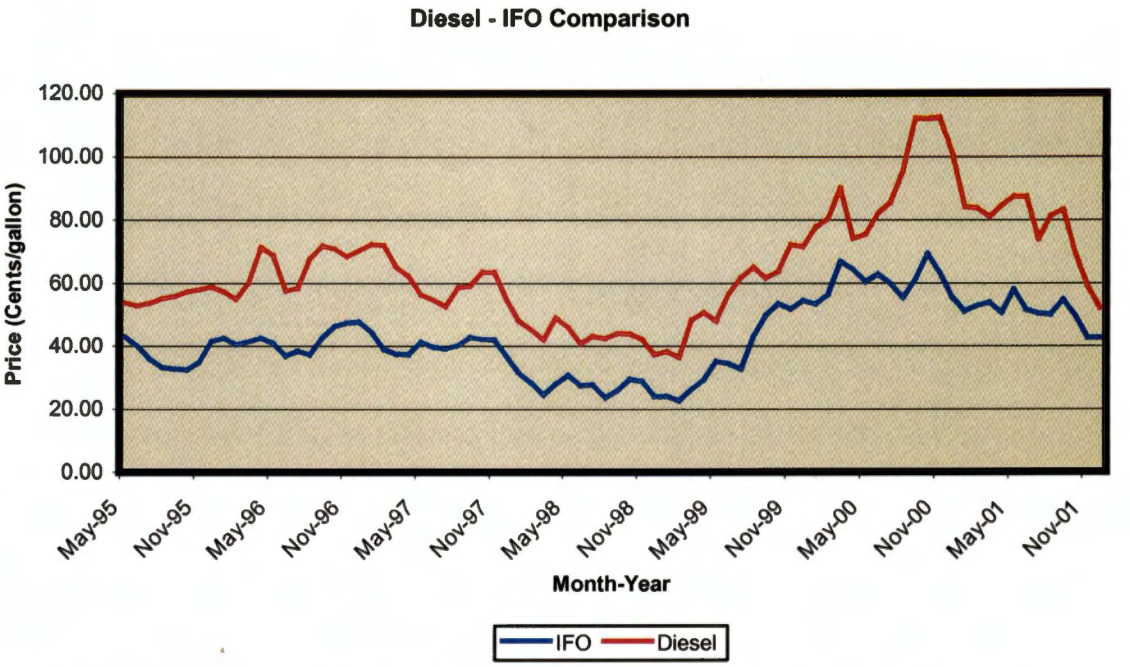

Figure 4-4: Comparison of Domestic Diesel Prices to Domestic Residual Fuel Prices. Prices compared on a monthly basis from May 1995 to November 2001

4.5 Sensitivity Scenarios

Four scenarios were developed to examine the sensitivity of the baseline results. To evaluate corn price sensitivity, the first scenario assumed the corn price pattern that occurred in 2001 rather than the 2000 prices. Scenario 2 examined the cost of delivered corn if the Jones Act legislation were relaxed and foreign vessels were allowed to move grain between U.S. ports, assuming 2000 corn price distributions using the Deep Draft Vessel Cost model for a foreign ship.

The third scenario furthered the corn price analysis by increasing all prices by 100% to simulate the effect of increased world markets given recent corn price patterns. All prices were doubled except for the Gulf price. Since transportation fees to the gulf area were a component of this price, an averaged price for the Midwest corn was

subtracted from the gulf price to determine a transportation component. The component was then added to the four state average to get an adjusted Gulf price. This added step avoided doubling the inherent transportation cost portion of the Gulf price.

Finally, fuel prices were examined by changing fuel cost plus or minus 50%. Because 2000 fuel prices were the highest for the past six years, an increase or decrease from this baseline price gives a good representation of potential fuel price activity. A regression of IFO price on diesel price showed an adjusted R^2 of 0.7986, indicating that movement in IFO price will be similar to the change in diesel price. Therefore, fuel prices were increased equivalently for rail and vessel.

CHAPTER V

RESULTS

5.1 Baseline Analysis: Cost by Rail

Results from the Reebie model indicate in Table 5-1 that rail tariff rates decrease as the number of cars per shipment increase. Over a four state average, the cost per ton decreases $1.07 when changing from a single car shipment to a multi-car shipment. Between a multi-car shipment and a unit train shipment, a $5.41 per ton average cost decrease is estimated. Reebie breaks cost down into net carrier revenue, variable cost and full cost. Net carrier revenue represents 108% of full cost and simulated a price to shipper.

Table 5-1: Reebie Rail Model Output for Study States. Reflects a four origin elevator average ($/short ton)

	State	Net Revenue	Variable Cost	Full Cost	Net Revenue / Bushel
Single Car	Illinois	31.43	20.28	29.01	0.88
	Indiana	28.42	18.33	26.23	0.80
	Michigan	30.33	19.57	27.99	0.85
	Ohio	24.92	16.08	23.00	0.70
Multi-Car	Illinois	31.44	20.29	29.02	0.88
	Indiana	27.31	17.62	25.21	0.76
	Michigan	29.53	19.05	27.26	0.83
	Ohio	23.21	14.98	21.42	0.65
Unit Train	Illinois	24.90	16.06	22.98	0.70
	Indiana	25.52	16.46	23.55	0.71
	Michigan	23.89	15.41	22.05	0.67
	Ohio	20.42	13.17	19.26	0.57

Except for the unit train, each average cost increases as mileage increases. For both single car and multi-car, Ohio has the lowest net carrier revenue at $24.92and $23.21per ton respectively. Illinois has the highest net revenue at $31.43 and $31.44 per ton. For the unit train, Ohio has the smallest net revenue, but Indiana has the largest net revenue.

5.2 Baseline Analysis: Cost by Water Vessel

Calculations from the Deep Draft Vessel Costs show in Table 5-2 that Toledo has the highest cost per ton cost at $21.90 while Buenos Aires has the smallest cost per ton at $12.81. These cost are calculated on 25,000 DWT for Toledo originated vessel and 30,000 DWT for both the New Orleans and Buenos Aires vessels.

The cost differential between domestic and foreign vessels may be in part attributable to crew costs. The vessels originating in United States' ports are required by the Jones Act to have an American crew. For a 40,000 DWT domestic vessel the crew cost is $3,102,502 annually. The 35,000 DWT domestic vessel has a cost of $3,087,971 annually which is much higher than the 35,000 DWT foreign vessel's crew cost of $705,819 annually.

Table 5-2: Deep Draft Vessel Costs for Study Ports for Various Cargo Capacities ($/ton)

Origin Port	Vessel Cargo Capacity	Price per Metric Ton	Price per Short Ton
	(short tons of grain)	---------- ($/ton) ----------	
Toledo	25,000	24.05	21.82
New Orleans	30,000	14.41	13.07
Buenos Aires	30,000	14.12	12.81

5.3 2000 Baseline Total Cost Comparison

The lowest cost alternative under current law changes depending on season, as seen in Table 5-3. In December through February, before the South American harvest, Michigan has the lowest per ton delivered rate by rail. South America has the cost advantage during March through June when their supply is highest. In July, Gulf grain via vessel is lowest at $81.18 per ton. From August through the end of the November, the Ohio grain by rail has the lowest total cost.

5.4 Sensitivity Scenarios

5.4.1 2001 Total Cost Comparison

The 2001 corn price analysis, shows a strong reaction to a change in corn prices (Table 5-4). Ohio corn by rail transport has become the least cost alternative for seven months of the year. Instead of just being the least cost alternative for August through

Table 5-3: 2000 Baseline Total Cost Comparison between The Four Rail Origins and Three Vessel Origins. (lowest cost alternative in yellow) ($/short ton)

	Rail				Vessel		
	Illinois	Indiana	Michigan	Ohio	Great Lakes	Gulf	South America
January	95.26	95.88	89.96	92.21	N/A	97.35	102.62
February	97.40	99.09	93.53	94.71	N/A	99.38	99.90
March	100.26	99.81	98.18	95.78	97.26	99.52	95.36
April	97.04	102.31	96.39	96.85	98.33	99.75	92.64
May	103.47	102.31	98.18	98.63	100.11	99.84	95.36
June	92.40	95.16	92.10	90.42	91.90	89.18	89.01
July	84.19	84.45	86.75	83.63	85.11	81.18	84.48
August	79.90	83.73	77.82	77.21	78.69	81.33	83.57
September	83.47	85.16	80.68	77.21	78.69	85.87	83.57
October	89.19	88.02	86.03	82.92	84.40	89.93	87.20
November	93.47	90.88	90.32	87.21	88.69	93.78	89.01
December	97.40	99.09	91.03	92.56	N/A	100.58	98.09

Table 5-4: 2001 Total Cost Comparison Between The Four Rail Origins and The Three Vessel Origins. (lowest cost alternative in yellow) ($/short ton)

	Rail				Vessel		
	Illinois	Indiana	Michigan	Ohio	Great Lakes	Gulf	South America
January	95.26	98.02	96.75	94.71	N/A	99.50	95.36
February	96.33	97.31	93.89	92.21	N/A	98.07	89.01
March	96.33	97.66	93.53	91.85	91.54	97.00	89.01
April	93.47	96.23	91.75	87.92	89.76	96.28	85.38
May	91.33	95.16	90.32	85.78	88.33	94.86	87.20
June	90.26	91.23	86.39	84.71	84.40	93.43	87.20
July	94.54	95.88	91.39	90.06	89.40	93.78	92.64
August	95.97	97.31	93.89	92.21	91.90	94.50	94.46
September	94.19	94.45	92.82	90.78	90.83	94.50	93.55
October	90.97	90.88	88.89	86.85	86.90	94.14	92.64
November	93.11	91.23	86.39	86.85	84.40	94.14	97.18
December	98.47	94.09	91.75	91.49	N/A	94.50	101.71

November, Ohio is now the least cost alternative for May through October and January. Argentina is now only the least expensive cost supplier in February, March and April. Toledo corn also becomes a least cost choice during some months that the St Lawrence Seaway is open.

5.4.2 Domestic Grain moved by Foreign Vessel

Were the Jones Act to be relaxed, the previous baseline least cost alternatives would not apply. A foreign vessel originating in New Orleans would have a price per ton of $6.88. This is much lower than the New Orleans' baseline price per ton of $14.41. Yearly crew costs for a domestic 40,000 DWT vessel are $2,396,683 more than a foreign 40,000 DWT vessel. This becomes important on a cost per day basis because the Buenos Aires to Wilmington trip is 13 days longer than the New Orleans to Wilmington trip.

Table 5-5 shows a price savings differential between the baseline and scenario 2 ranges between a cost of $6.83 less to $2.72 more for the New Orleans vessel.

5.4.3 Additional Change in Corn Price Comparisons

Because the total cost comparison showed such a strong reaction to a different year's prices, additional calculations were conducted to ascertain if an increase in world market would change the optimal choice for any months. (See Appendix 5). The corn prices for each year (1995-2001) were doubled according to their specific price pattern for that year. This calculation resulted in Argentina not being a least cost alternative in any month for 2000 or 2001 (Table 5-6). When the corn price component of total cost is increased, Argentina looses its low transport cost advantage.

Table 5-5: Price Savings Differential Between Least Cost Alternative and Delivered Price of Corn from Domestic Ports from Foreign Vessels ($/ short ton)

	Least Cost Alternative	Foreign Vessel from New Orleans	Foreign Vessel from Toledo
January	92.21	-1.69	N/A
February	93.53	-0.98	N/A
March	95.36	-2.67	-9.41
April	92.64	0.28	-5.62
May	95.36	-2.35	-6.56
June	89.01	-6.66	-8.42
July	81.18	-6.83	-7.38
August	77.21	-2.71	-9.83
September	77.21	1.83	-9.83
October	82.92	0.18	-9.83
November	87.21	-0.26	-9.83
December	91.03	2.72	N/A

Table 5-6: 2001 Total Cost Comparison Between The Four Rail Origins and The Three Vessel Origins Given Increased World Market Corn Prices ($/ton)

	Rail				Vessel		
	Illinois	Indiana	Michigan	Ohio	Great Lakes	Gulf	South America
January	165.61	170.52	169.60	168.99	170.39	172.00	177.92
February	167.76	169.09	163.89	163.99	165.39	169.32	165.22
March	167.76	169.80	163.17	163.28	164.68	168.16	165.22
April	162.04	166.95	159.60	155.42	156.82	164.94	157.96
May	157.76	164.80	156.75	151.13	152.53	161.82	161.59
June	155.61	156.95	148.89	148.99	150.39	157.89	161.59
July	164.18	166.23	158.89	159.70	161.10	163.07	172.47
August	167.04	169.09	163.89	163.99	165.39	165.66	176.10
September	163.47	163.38	161.75	161.13	162.53	163.87	174.29
October	157.04	156.23	153.89	153.28	154.68	159.85	172.47
November	161.33	156.95	148.89	153.28	154.68	159.85	181.55
December	172.04	162.66	159.60	162.56	163.96	164.77	190.62

5.4:4 Change in Fuel Price

Fuel prices were increased and decreased by 50% based on the 2000 baseline total cost comparison. To change the fuel costs for the Reebie output, a 50% of present fuel cost was calculated based on the output sheets for the four study states. (Appendix 3) This cost was then increased by 8% to reflect the 8% increase in full cost that is the net carrier revenue. This new amount was then added and subtracted from the baseline comparison to produce Table 5-7 and Table 5-8. For vessel cost, the per day fuel cost was multiplied by trip days to arrive at a fuel cost per shipment. For the analysis this amount was in was increased and decreased by 50%.

Very little change was seen from the baseline comparison to the increase or decrease comparisons. In January, Michigan by rail became the least cost alternative rather then Ohio by rail for both changes in fuel prices. In June, the Gulf replaced

Table 5-7: 2000 Baseline Total Cost Comparison between the Four Rail Origins and the Three Vessel Origins with a 50% Fuel Price Increase ($/ton)

	Rail				Vessel		
	Illinois	Indiana	Michigan	Ohio	Great Lakes	Gulf	South America
January	96.23	96.91	90.91	93.00	N/A	97.66	103.81
February	98.37	100.12	94.48	95.50	N/A	99.69	101.09
March	101.23	100.84	99.13	96.57	98.41	99.83	96.55
April	98.01	103.34	97.34	97.64	99.48	100.06	93.83
May	104.44	103.34	99.13	99.42	101.26	100.15	96.55
June	93.37	96.19	93.05	91.21	93.05	89.49	90.20
July	85.16	85.48	87.70	84.42	86.26	81.49	85.67
August	80.87	84.76	78.77	78.00	79.84	81.64	84.76
September	84.44	86.19	81.63	78.00	79.84	86.18	84.76
October	90.16	89.05	86.98	83.71	85.55	90.24	88.39
November	94.44	91.91	91.27	88.00	89.84	94.09	90.20
December	98.37	100.12	91.98	93.35	N/A	100.89	99.28

Table 5-8: 2000 Baseline Total Cost Comparison between the Four Rail Origins and The Three Vessel Origins with a 50% Fuel Price Decrease ($/ton)

	Rail				Vessel		
	Illinois	Indiana	Michigan	Ohio	Great Lakes	Gulf	South America
January	94.29	94.85	89.01	91.42	N/A	97.04	101.43
February	96.43	98.06	92.58	93.92	N/A	99.07	98.71
March	99.29	98.78	97.23	94.99	96.11	99.21	94.17
April	96.07	101.28	95.44	96.06	97.18	99.44	91.45
May	102.50	101.28	97.23	97.84	98.96	99.53	94.17
June	91.43	94.13	91.15	89.63	90.75	88.87	87.82
July	83.22	83.42	85.80	82.84	83.96	80.87	83.29
August	78.93	82.70	76.87	76.42	77.54	81.02	82.38
September	82.50	84.13	79.73	76.42	77.54	85.56	82.38
October	88.22	86.99	85.08	82.13	83.25	89.62	86.01
November	92.50	89.85	89.37	86.42	87.54	93.47	87.82
December	96.43	98.06	90.08	91.77	N/A	100.27	96.90

Buenos Aires as the least cost alternative when fuel prices increase by 50%. All other months remained consistent with the original comparison.

CHAPTER VI

CONCLUSIONS

North Carolina's hog, poultry and turkey industries consume over 400 million more bushels of corn per year than North Carolina produces. Additional grain comes from high corn production states such as: Illinois, Indiana, Michigan and Ohio via CSX rail lines. Starting in the summer of 2002, a new shipping option will be available with the completion of a grain receiving facility at the Port of Wilmington. This facility may help alleviate some consumer frustration by acting as an alternative receiving and storage site for grains in addition to their present shipments. Present frustrations stem from a perceived lack of rail dependability. The new facility will allow vessels to bring corn amounts equivalent to many unit train in one shipment.

Rail tariffs are negotiated by private contract and are not public information. Therefore, a rail cost model was used to determine an estimated per ton tariff price of shipping corn by rail. The per ton costs ranged from $13.17 to $31.43, depending on month, origin state and number of cars per shipment. Overall, the least cost rail option was to bring corn from Ohio via a unit train of 65 cars or more. The most expensive rail rate belonged to a single car shipment from Illinois. According to Dager, savings in rail rates occur when more units can be spread over rail administrative, employee and engine costs. A unit train will have a marginal advantage over single or multi-car (10-65) hauls.

This study's vessel rates represent hypothetical shipments from the ports of Buenos Aires, Toledo and New Orleans. The calculations take into account the size of

shipment, length of travel, and port related fees in addition to vessel costs. The most expensive vessel shipment was from Toledo at $21.90 per short ton and the least expensive was a foreign vessel from Buenos Aires at $12.81.

Shipment cost must be combined with origin corn prices to get the true picture of total price. Over a seven-year period, no specific pattern emerged for corn prices. Each year's prices were a culmination of many variables both foreign and domestic. A total cost comparison for 2000 combined corn prices with shipping cost to determine the least cost alternative by month. Predominately, Ohio grain by rail had the lowest cost. Low corn prices, for the months or March through June, lowered Buenos Aires' inclusive price enough to make it the least cost alternative.

Note that these comparisons are looking at a rail price with a build-in profit of 8% but the vessel costs only show costs to ship owner. Profit and backhaul allowances must be provided by the differential between the vessel alternative cost and the next best alternative cost. For example, for the month of March, the best alternative is corn from Buenos Aires via vessel at a cost of $95.36 per ton. The next best alternative is grain from Ohio via rail at a cost of $95.78 per ton. The difference between these prices is $0.42 per ton. The savings for a 40,000 metric ton (33,069 short tons of corn) vessel is $13,900. If total cost of using this vessel were $423,491, (See Appendix 4) the remainder provides a 3% margin for profit and backhaul expenses. With such a small margin, ship owners will want to place their vessels so that backhaul revenue is available.

The 2000 baseline comparison was checked for sensitivity to changes in corn price, fuel prices and Jones Act legislation. The biggest impact was prompted by a hypothetical change in the Jones Act that would allow foreign vessels to move from US.

port to US. port. Under relaxed legislation, the best choice for North Carolina would be would be to ship grain from the Port of Toledo in foreign vessels except for those months in which the St. Lawrence Seaway was inaccessible. This scenario couples a low domestic corn price with low shipping costs and produces a price $5.62 - $9.83 per ton lower than any other option.

The 2000 baseline comparison was also affected by a change in corn price. In 2001, low Ohio corn prices determined the Great Lakes to be the least cost alternative during June, July and August. Buenos Aires grain was the dominate choice for February, March, and April, which was a shift upward from the baseline analysis. Low domestic grain prices make the South American markets less appealing. Cost saving from low shipping rates are offset if Argentine grain prices are significantly higher than U.S. prices.

The opposite potentially could be true for high domestic grain prices. A year where decreases in the supply of corn drives prices high, South American corn could be an attractive option for North Carolina feed corn consumers. Were this scenario to happen, one way to discourage South American grain usage would be to loosen the restrictions on foreign vessel use between U.S. ports. This would lower shipping costs in the short run enough to make foreign corn not the least cost alternative. Legislators would have to weigh the effects to the grain industry versus the effects to the maritime industry for short term Jones Act changes. Once contacts are established, future trade with South American grain providers will be more easily accessible.

Overall, results indicate that with the construction of a grain handling facility at the Port of Wilmington, South American corn could become a least cost alternative for

some months out of the year given the right market conditions. The implementation of this facility will offer the livestock industry an additional economically viable source of corn. The volume of its use, though, will depend more on the reliability of the current rail system than on a slight potential savings.

Future research could examine the issue of barge and vessel availability foreign and domestically. Since the new facility will have both import and export capabilities, other study should examine the export potential of the Port of Wilmington. Backhaul availability and its effect on vessel rates would also be a suitable extension of this research.

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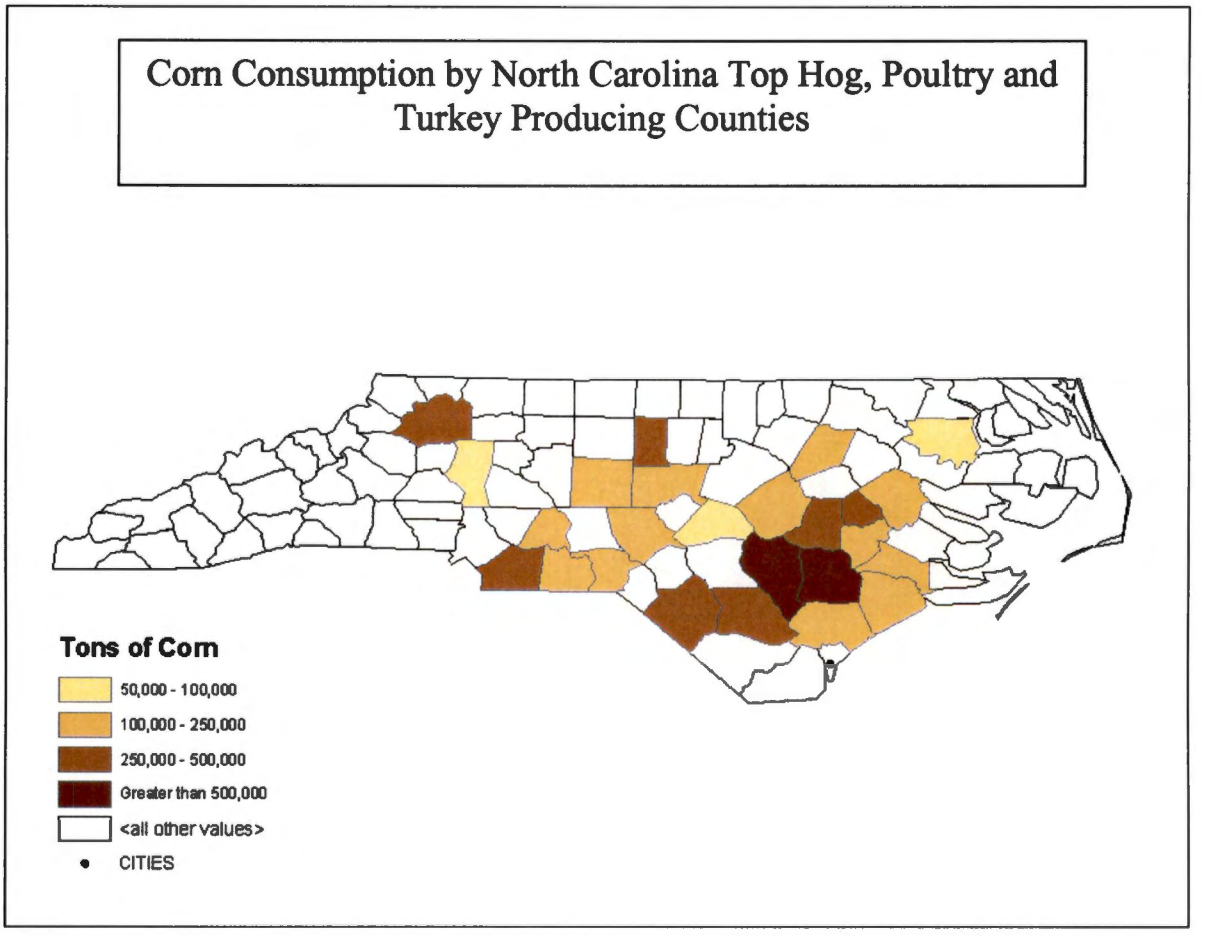
APPENDICES

Appendix 1 North Carolina Hog and Poultry Count, Corn Usage by County

Top Ten Producing Counties in the State

2000 Top Ten Producing Counties							
Hogs		**Broilers**		**All Chickens**		**Turkeys**	
Leading Counties	**Number**	**Leading Counties**	**Number**	**Leading Counties**	**Number**	**Leading Counties**	**Number**
Duplin	2,084,000	Wilkes	82,000,000	Iredell	1,900,000	Sampson	9,700,000
Sampson	1,873,000	Union	79,500,000	Nash	1,433,000	Wayne	4,300,000
Bladen	703,000	Randolph	52,200,000	Randolph	1,310,000	Onslow	2,650,000
Wayne	551,000	Chatham	36,700,000	Alexander	1,300,000	Union	2,550,000
Greene	400,000	Moore	36,500,000	Union	1,260,000	Lenoir	2,050,000
Robeson	361,000	Duplin	31,800,000	Wilkes	1,200,000	Stanly	1,450,000
Lenior	275,000	Anson	28,100,000	Yadkin	850,000	Greene	1,300,000
Pitt	263,000	Richmond	27,200,000	Chatham	770,000	Johnston	1,050,000
Pender	252,000	Harnett	24,000,000	Duplin	670,000	Bladen	900,000
Jones	250,000	Bertie	22,200,000	Sampson	510,000	Pender	900,000



Increase in Corn Consumption in North Carolina based on Livestock Inventories from 1985-2000

	All chicken Inventory	All chicken consumption	Hog Inventory	Hog Consumpt.	Turkeys Raised	Turkey Consumpt.	Broilers Raised	Broiler Consumpt.	Total Consumption	
	(head)	(tons)	(head)	(tons)	(head)	(tons)	(head)	(tons)	(tons)	(bushels)
1985	*21,250,000*	511,913	2,350,000	1,316,000	31,850,000	887,612	447,300,000	1,535,134	4,250,658	238,036,838
1986	*21,560,000*	519,380	2,400,000	1,344,000	39,100,000	1,089,658	450,500,000	1,546,116	4,499,155	251,952,666
1987	*20,940,000*	504,445	2,580,000	1,444,800	48,350,000	1,347,442	477,700,000	1,639,466	4,936,153	276,424,567
1986	*19,755,000*	475,898	2,700,000	1,512,000	47,900,000	1,334,901	500,100,000	1,716,343	5,039,142	282,191,969
1989	*19,620,000*	472,646	2,570,000	1,439,200	52,200,000	1,454,736	523,000,000	1,794,936	5,161,518	289,044,980
1990	*19,465,000*	468,912	2,800,000	1,568,000	58,000,000	1,616,373	520,000,000	1,784,640	5,437,925	304,523,792
1991	*19,305,000*	465,057	3,650,000	2,044,000	58,000,000	1,616,373	546,800,000	1,876,618	6,002,048	336,114,691
1992	*19,000,000*	457,710	4,500,000	2,520,000	62,000,000	1,727,847	559,300,000	1,919,518	6,625,075	371,004,178
1993	*19,300,000*	464,937	5,400,000	3,024,000	61,000,000	1,699,979	615,200,000	2,111,366	7,300,282	408,815,786
1994	*19,440,000*	468,310	7,000,000	3,920,000	60,000,000	1,672,110	643,500,000	2,208,492	8,268,912	463,059,050
1995	*18,835,000*	453,735	8,200,000	4,592,000	61,200,000	1,705,552	670,100,000	2,299,783	9,051,071	506,859,951
1996	*16,671,000*	401,604	9,300,000	5,208,000	59,500,000	1,658,176	681,100,000	2,337,535	9,605,315	537,897,659
1997	*17,175,000*	413,746	9,600,000	5,376,000	53,500,000	1,490,965	665,000,000	2,282,280	9,562,991	535,527,468
1998	*17,222,000*	414,878	9,700,000	5,432,000	50,000,000	1,393,425	653,000,000	2,241,096	9,481,399	530,958,343
1999	*17,135,000*	412,782	9,500,000	5,320,000	44,000,000	1,226,214	674,600,000	2,315,227	9,274,223	519,356,508
2000	*17,596,000*	423,888	9,300,000	5,208,000	41,000,000	1,142,609	698,400,000	2,396,909	9,171,405	513,598,677

Corn Consumption in Top Hog, Turkey and Poultry Producing Counties

County	Broilers	Layers	Turkeys	Hogs	Corn Amt Broilers	Corn Amt Layers	Corn Amt Turkeys	Corn Amt Hogs	Avg. Corn Usage
	# of animals				TONS				
Alexander	82,000,000	1300000	0	0	281,424	31,317	0	0	**312,741**
Anson	28,100,000	235000	0	64,000	96,439	5,661	0	35,840	**137,940**
Bladen	3,500,000	0	900000	703,000	12,012	0	25,082	393,680	**430,774**
Bertie	22,200,000	0	0	32,000	76,190	0	0	17,920	**94,110**
Chatham	36,700,000	770000	0	5,900	125,954	18,549	0	3,304	**147,808**
Duplin	31,800,000	670000	9150000	2,084,000	109,138	16,140	254,997	1,167,040	**1,547,315**
Greene	4,600,000	0	1300000	400,000	15,787	0	36,229	224,000	**276,016**
Harnett	24,000,000	0	0	6,000	82,368	0	0	3,360	**85,728**
Iredell	1,300,000	1900000	500000	0	4,462	45,771	13,934	0	**64,167**
Johnston	11,400,000	0	1050000	205,000	39,125	0	29,262	114,800	**183,187**
Jones	0	0	0	250,000	0	0	0	140,000	**140,000**
Lenoir	4,100,000	235000	2050000	275,000	14,071	5,661	57,130	154,000	**230,863**
Moore	36,500,000	330000	0	40,000	125,268	7,950	0	22,400	**155,618**
Nash	8,600,000	1433000	0	67,000	29,515	34,521	0	37,520	**101,556**
Onslow	0	0	2650000	181,000	0	0	73,852	101,360	**175,212**
Pender	0	0	900000	252,000	0	0	25,082	141,120	**166,202**
Pitt	4,800,000	0	0	263,000	16,474	0	0	147,280	**163,754**
Randolph	52,200,000	1310000	0	29,300	179,150	31,558	0	16,408	**227,116**
Richmond	27,200,000	0	0	55,000	93,350	0	0	30,800	**124,150**
Robeson	17,500,000	0	850000	361,000	60,060	0	23,688	202,160	**285,908**

Sampson	12,500,000	510000	9700000	1,873,000	42,900	12,286	270,324	1,048,880	**1,374,390**
Stanley	10,900,000	940000	1450000	3,100	37,409	22,645	40,409	1,736	**102,199**
Union	79,500,000	1260000	2550000	32,000	272,844	30,353	71,065	17,920	**392,182**
Wayne	17,100,000	420000	4300000	551,000	58,687	10,118	119,835	308,560	**497,200**
Wilkes	82,000,000	1200000	0	0	281,424	28,908	0	0	**310,332**
Yadkin	4,200,000	850000	0	7,800	14,414	20,477	0	4,368	**39,259**
									7,765,726

Notes for Calculations

Broilers

- 5.2 kg per bird at 52 day harvest = 11.44 lbs of feed over lifetime
- 60%-70% corn

Layers

- 100g. feed per day
- 36.5 K. per year = 80.5 lbs of feed

Turkeys

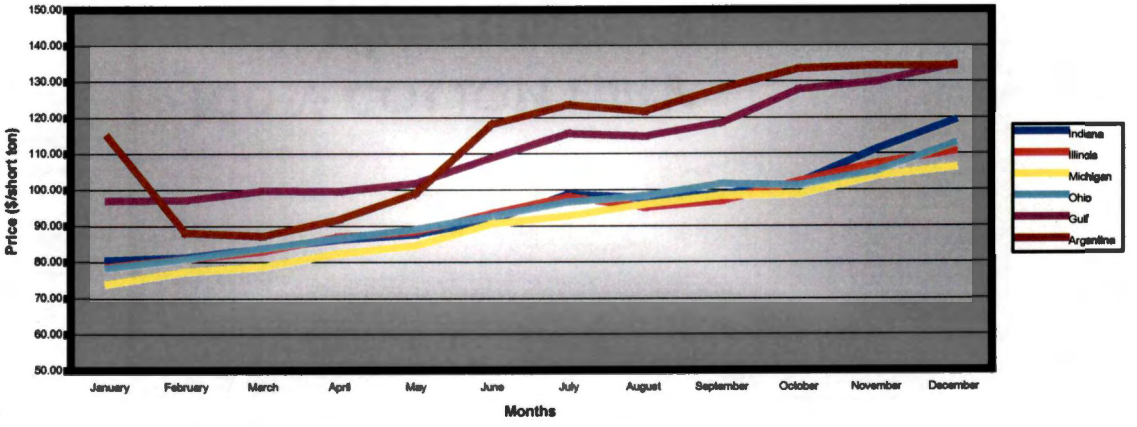
- Males – 48.5kg at 20 week harvest, 68.69k at 24 week harvest
- Females – 36k at 20 week harvest
- Average 20 week – 42.22kg, 60% corn = 25.34 kg per bird = 55.74 lbs per bird

Hogs

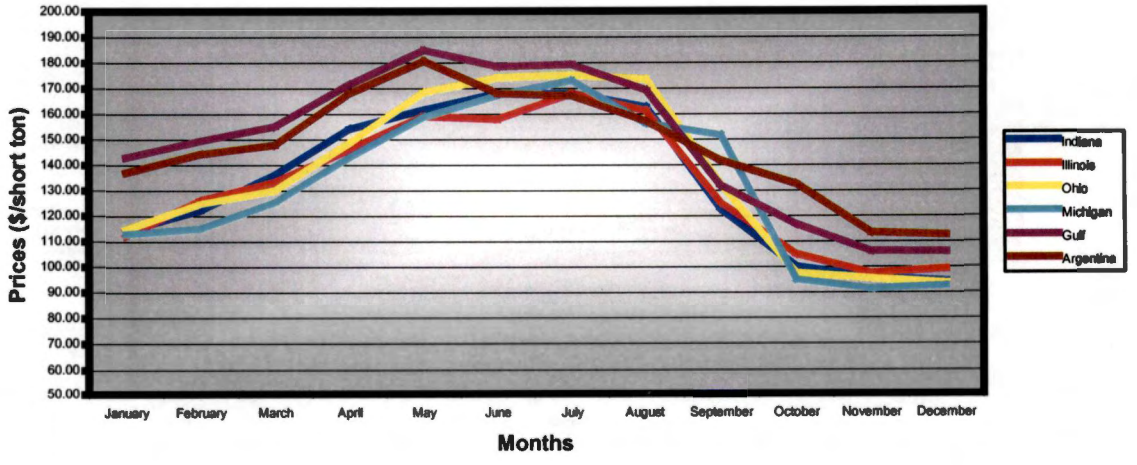
- Consumption = 1568 lbs. For breeding sows
- Consumption = 672 lbs. For market pigs
- Average Consumption = 1120 lbs per animal

Appendix 2 Corn Prices

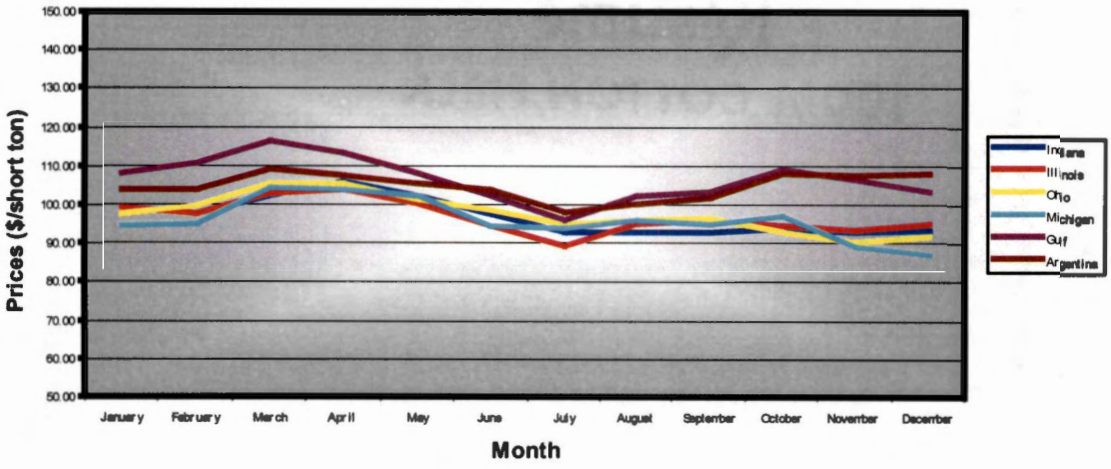
1995 Corn Prices



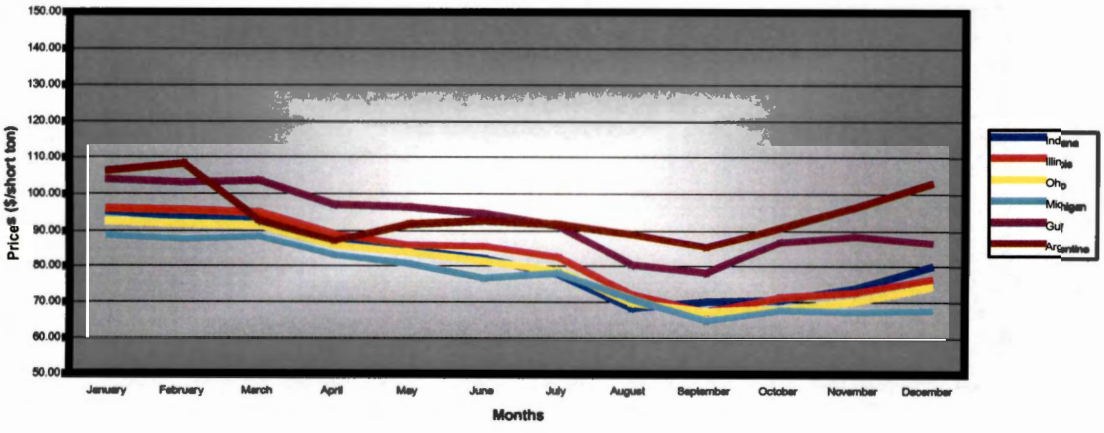
1996 Corn Prices



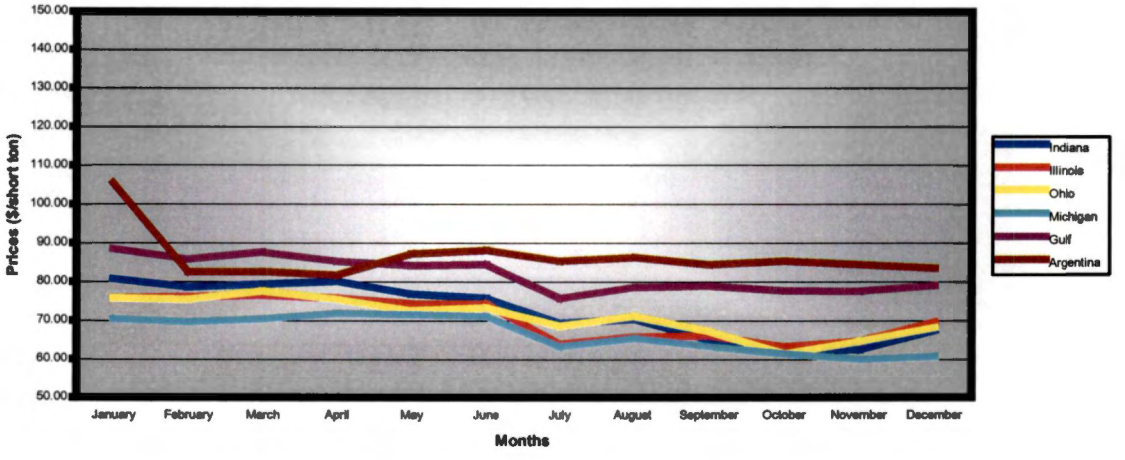
1997 Corn Prices



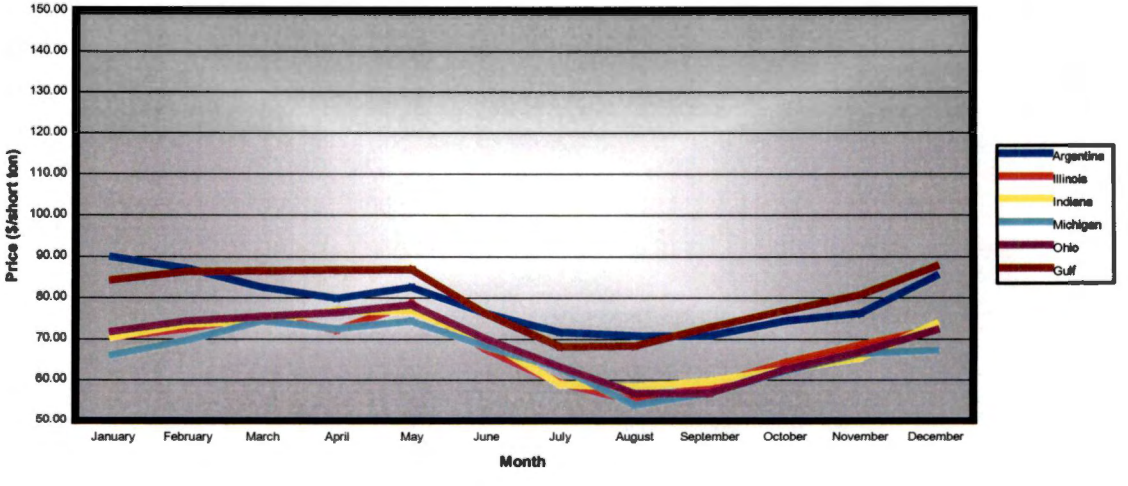
1998 Corn Prices

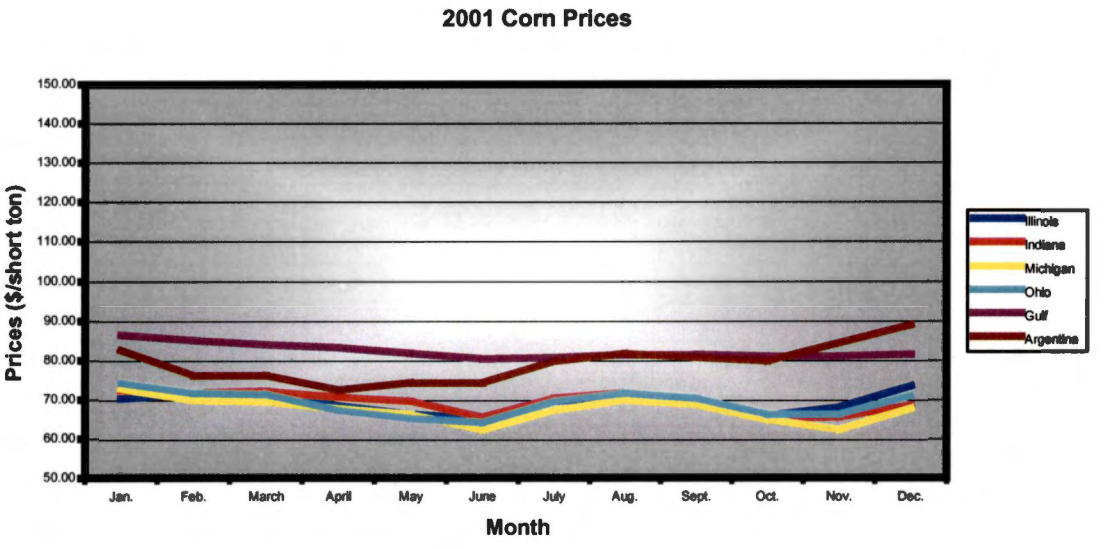


1999 Corn Prices



2000 Corn Prices





1995 Corn Prices

	Illinois	Indiana	Michigan	Ohio	Gulf	Argentina
January	78.57	80.36	73.93	78.21	96.87	114.31
February	80.71	81.07	77.14	80.71	97.00	88.00
March	82.86	83.57	78.57	83.57	99.59	87.09
April	86.79	86.07	82.14	86.43	99.49	91.63
May	88.21	87.50	84.29	88.93	101.58	98.88
June	93.21	91.43	90.36	92.50	108.74	117.93
July	97.86	98.57	92.50	96.43	115.32	123.38
August	95.00	97.50	95.71	98.21	114.57	121.56
September	96.78	98.57	98.21	101.43	118.40	127.91
October	102.14	101.78	98.57	101.07	127.59	133.36
November	107.14	111.07	103.57	105.00	129.76	134.26
December	110.36	118.93	106.07	112.50	134.40	134.26

1996 Corn Pries

	Illinois	Indiana	Michigan	Ohio	Gulf	Argentina
January	112.14	114.28	112.86	114.64	142.91	136.98
February	126.07	122.14	115.00	124.64	149.39	144.24
March	133.21	136.07	125.36	130.00	155.11	147.87
April	146.07	153.93	142.86	148.57	171.49	167.83
May	158.93	161.43	158.57	168.21	184.73	180.53
June	157.86	167.86	167.14	173.93	178.39	167.83
July	167.86	167.86	172.86	175.00	179.16	166.92
August	161.07	162.50	156.07	173.21	169.07	156.94
September	125.00	122.50	151.43	132.14	131.76	141.52
October	105.00	100.00	95.00	97.50	116.66	132.45
November	97.50	96.07	91.43	95.36	106.11	113.40
December	99.28	94.28	92.50	93.57	106.01	112.49

1997 Corn Prices

	Illinois	Indiana	Michigan	Ohio	Gulf	Argentina
January	98.93	98.93	94.28	97.50	107.79	103.42
February	97.14	97.50	95.00	99.28	110.17	103.42
March	102.50	102.14	103.93	105.00	116.00	108.86
April	103.57	105.71	103.57	105.00	113.11	107.05
May	100.00	102.14	102.14	101.07	107.62	105.23
June	94.28	97.50	94.28	98.57	102.14	103.42
July	88.93	92.50	93.93	94.64	95.89	97.98
August	94.64	92.86	95.71	95.71	102.06	99.79
September	95.71	92.86	95.00	96.43	102.94	101.60
October	94.28	93.57	96.78	92.50	109.05	107.95
November	93.21	92.86	89.29	90.36	106.48	107.05
December	94.64	93.21	87.14	91.43	103.31	107.95

1998 Corn Prices

	Illinois	Indiana	Michigan	Ohio	Gulf	Argentina
January	95.71	95.00	88.57	92.50	103.67	106.14
February	95.36	93.57	87.50	91.78	102.91	107.95
March	94.64	93.21	88.21	91.43	103.29	92.53
April	88.93	87.86	82.86	85.71	96.79	87.09
May	85.71	84.29	80.36	83.57	96.14	91.63
June	85.36	81.79	76.43	81.07	94.42	92.53
July	82.14	77.50	77.86	78.57	91.21	91.63
August	71.79	68.21	70.71	69.64	80.16	88.90
September	67.14	70.00	64.64	67.14	77.95	85.28
October	71.07	70.36	67.50	67.86	86.61	90.72
November	72.50	73.57	67.14	70.00	88.32	96.16
December	76.07	79.64	67.50	73.93	86.51	102.51

1999 Corn Prices

	Illinois	Indiana	Michigan	Ohio	Gulf	Argentina
January	75.71	80.71	70.36	75.71	88.39	105.23
February	76.07	78.57	69.64	75.36	85.79	82.55
March	76.43	79.29	70.36	77.50	87.49	82.55
April	75.71	80.00	71.79	75.36	85.23	81.65
May	74.29	76.79	71.43	72.50	84.08	87.09
June	74.29	75.71	71.07	73.21	84.35	88.00
July	63.93	69.29	63.21	68.57	75.71	85.28
August	65.71	70.36	65.36	71.07	78.51	86.18
September	66.07	65.00	63.21	67.14	78.85	84.37
October	63.21	62.14	61.43	61.43	77.63	85.28
November	64.64	62.50	60.00	64.64	77.53	84.37
December	69.64	67.50	60.71	68.21	79.01	83.46

2000 Corn Prices

	Illinois	Indiana	Michigan	Ohio	Gulf	Argentina
January	70.36	70.36	66.07	71.79	84.28	89.81
February	72.50	73.57	69.64	74.29	86.31	87.09
March	75.36	74.29	74.29	75.36	86.45	82.55
April	72.14	76.79	72.50	76.43	86.68	79.83
May	78.57	76.79	74.29	78.21	86.77	82.55
June	67.50	69.64	68.21	70.00	76.11	76.20
July	59.29	58.93	62.86	63.21	68.11	71.67
August	55.00	58.21	53.93	56.79	68.26	70.76
September	58.57	59.64	56.79	56.79	72.80	70.76
October	64.29	62.50	62.14	62.50	76.86	74.39
November	68.57	65.36	66.43	66.79	80.71	76.20
December	72.50	73.57	67.14	72.14	87.51	85.28

2001 Corn Prices

	Illinois	Indiana	Michigan	Ohio	Gulf	Argentina
January	70.36	72.50	72.86	74.29	86.43	82.55
February	71.43	71.79	70.00	71.79	85.00	76.20
March	71.43	72.14	69.64	71.43	83.93	76.20
April	68.57	70.71	67.86	67.50	83.21	72.57
May	66.43	69.64	66.43	65.36	81.79	74.39
June	65.36	65.71	62.50	64.29	80.36	74.39
July	69.64	70.36	67.50	69.64	80.71	79.83
August	71.07	71.79	70.00	71.79	81.43	81.65
September	69.29	68.93	68.93	70.36	81.43	80.74
October	66.07	65.36	65.00	66.43	81.07	79.83
November	68.21	65.71	62.50	66.43	81.07	84.37
December	73.57	68.57	67.86	71.07	81.43	88.90

Appendix 3 Rail Cost Calculations

Reebie Outputs and Output Averages by State – gray areas represent a four-elevator average per state ($/ton)

		Net Revenue	Variable Cost	Full Cost	Mileage
	Single Car	32.04	20.67	29.57	1107
		30.82	19.88	28.44	1058
		31.43	20.28	29.01	1083
	Multiple Car	30.71	19.82	28.35	1097
		31.91	20.59	29.45	1145
		31.55	20.35	29.12	1130
Illinois		31.60	20.39	29.16	1132
		31.44	20.29	29.02	1126
	Unit Train	21.90	14.13	20.21	1095
		26.00	16.77	24.00	1138
		25.83	16.66	23.84	1130
		25.87	16.69	23.88	1132
		24.90	16.06	22.98	1124
	Single Car	26.74	17.25	24.68	895
		30.09	19.41	27.77	1029
		28.42	18.33	26.23	962
	Multiple Car	24.76	15.98	22.85	859
		31.55	20.35	29.12	1130
		27.53	17.76	25.41	970
Indiana		25.40	16.39	23.44	884
		27.31	17.62	25.21	961
	Unit Train	24.80	16.00	22.89	1082
		26.47	17.08	24.43	1160
		27.18	17.53	25.08	1193
		23.62	15.24	21.80	1029
		25.52	16.46	23.55	1116
	Single Car	30.62	19.75	28.26	1050
		30.04	19.38	27.72	1027
		30.33	19.57	27.99	1039
	Multiple Car	29.55	19.06	27.27	1050
		28.97	18.69	26.74	1027
		30.40	19.61	28.06	1084
Michigan		29.20	18.84	26.95	1036
		29.53	19.05	27.26	1049
	Unit Train	23.81	15.36	21.98	1036
		24.11	15.56	22.25	1050
		22.79	14.70	21.03	988
		24.84	16.03	22.93	1084
		23.89	15.41	22.05	1040

-	Single Car	25.14	16.22	23.20	831
-		24.69	15.93	22.79	813
-		24.92	16.08	23.00	822
-	Multiple Car	22.51	14.52	20.77	769
-		23.23	14.99	21.44	798
-		23.48	15.15	21.67	807
Ohio		23.63	15.24	21.80	813
-		23.21	14.98	21.42	797
-	Unit Train	21.41	13.82	21.41	924
-		19.03	12.28	17.57	813
-		21.29	13.73	19.64	918
-		19.94	12.86	18.40	855
-		20.42	13.17	19.26	878

2000 Price of Delivered Corn Including Rail Freight and Corn Price ($/ton)

	Ohio				Illinois				Indiana				Michigan			
	Corn Cost ($/ton)	Single Car w/Corn	Multi-Car w/Corn	Unit Train w/corn	Corn Cost ($/ton)	Single Car w/Corn	Multi-Car w/Corn	Unit Train w/corn	Corn Cost ($/ton)	Single Car w/Corn	Multi-Car w/Corn	Unit Train w/corn	Corn Cost ($/ton)	Single Car w/Corn	Multi-Car w/Corn	Unit Train w/corn
January	71.79	94.79	93.21	91.05	70.36	99.37	99.38	93.34	70.36	96.59	95.57	93.91	66.07	94.06	93.33	88.12
February	74.29	97.29	95.71	93.55	72.50	101.51	101.52	95.48	73.57	99.80	98.78	97.12	69.64	97.63	96.90	91.69
March	75.36	98.36	96.78	94.62	75.36	104.37	104.38	98.34	74.29	100.52	99.50	97.84	74.29	102.28	101.55	96.34
April	76.43	99.43	97.85	95.69	72.14	101.15	101.16	95.12	76.79	103.02	102.00	100.34	72.50	100.49	99.76	94.55
May	78.21	101.21	99.63	97.47	78.57	107.58	107.59	101.55	76.79	103.02	102.00	100.34	74.29	102.28	101.55	96.34
June	70.00	93.00	91.42	89.26	67.50	96.51	96.52	90.48	69.64	95.87	94.85	93.19	68.21	96.20	95.47	90.26
July	63.21	86.21	84.63	82.47	59.29	88.30	88.31	82.27	58.93	85.16	84.14	82.48	62.86	90.85	90.12	84.91
August	56.79	79.79	78.21	76.05	55.00	84.01	84.02	77.98	58.21	84.44	83.42	81.76	53.93	81.92	81.19	75.98
September	56.79	79.79	78.21	76.05	58.57	87.58	87.59	81.55	59.64	85.87	84.85	83.19	56.79	84.78	84.05	78.84
October	62.50	85.50	83.92	81.76	64.29	93.30	93.31	87.27	62.50	88.73	87.71	86.05	62.14	90.13	89.40	84.19
November	66.79	89.79	88.21	86.05	68.57	97.58	97.59	91.55	65.36	91.59	90.57	88.91	66.43	94.42	93.69	88.48
December	72.14	95.14	93.56	91.40	72.50	101.51	101.52	95.48	73.57	99.80	98.78	97.12	67.14	95.13	94.40	89.19

Reebie Rail Model Output

= Cole Thesis =

RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

- - - - - - - - - - - - - - - SHIPMENT DESCRIPTION - - - - - - - - - - PAGE 1

Commodity : Corn
From : Hume IL
To : Warsaw NC
Car Type : Hopper - Covered (100% RR)
Svc Type : Single Car
Cars/Ship : 5

STCC Code : 0113200
Net Tons/Car : 101.0
Total Miles : 1107.0
Empty Return : 100.0%
Transit Days : 7.2
Car Cycle Days: 18.5

Routing : CSX
Miles : 1107
Junction :

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	3236	32.04	1.60	Rate Descrip :	
3Q2001 Variable Cost :	2088	20.67	1.03	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2987	29.57	1.48	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	350	350
Train Operations	118	118
Fuel	223	223
Locomotives	265	265
Track & R.O.W	431	431
Yard & Terminal	121	121
Car	542	542
Clerical	33	33
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	2088	2088
Fixed Cost	899	899
Fully Allocated Cost	2987	2987
Net Rail Revenue	3236	3236
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Carlyle IL	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 1097.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Multi Car	Transit Days	: 7.2
Cars/Ship	: 25	Car Cycle Days	: 18.4

Routing : CSX
Miles : 1097
Junction :

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	3102	30.71	1.54	Rate Descrip :	
3Q2001 Variable Cost :	2001	19.82	0.99	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2863	28.35	1.42	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	347	347
Train Operations	117	117
Fuel	221	221
Locomotives	263	263
Track & R.O.W	427	427
Yard & Terminal	77	77
Car	536	536
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	2001	2001
Fixed Cost	862	862
Fully Allocated Cost	2863	2863
Net Rail Revenue	3102	3102
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Dwight IL	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 1145.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Multi Car	Transit Days	: 7.4
Cars/Ship	: 25	Car Cycle Days	: 18.9

Routing	:	CSX
Miles	:	1145
Junction	:	

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT			
Net Carrier Revenue	: 3223	31.91	1.60	Rate Descrip	:	
3Q2001 Variable Cost	: 2080	20.59	1.03	Rev/Var Cost	:	155.0%
3Q2001 Full Cost	: 2975	29.45	1.47	Rev/Full Cost	:	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	362	362
Train Operations	122	122
Fuel	231	231
Locomotives	274	274
Track & R.O.W	446	446
Yard & Terminal	78	78
Car	554	554
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	2080	2080
Fixed Cost	895	895
Fully Allocated Cost	2975	2975
Net Rail Revenue	3223	3223
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 1/08/2002

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Commodity	: Corn	STCC Code	: 0113200
From	: Hoopeston, Illinois	Net Tons/Car	: 101.0
To	: Warsaw, North Carolina	Total Miles	: 1130.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Multi Car	Transit Days	: 7.4
Cars/Ship	: 15	Car Cycle Days	: 18.8

Routing : CSX
Miles : 1130
Junction :

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	3186	31.55	1.58	Rate Descrip :	
3Q2001 Variable Cost :	2056	20.35	1.02	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2941	29.12	1.46	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	357	357
Train Operations	120	120
Fuel	228	228
Locomotives	270	270
Track & R.O.W	440	440
Yard & Terminal	78	78
Car	548	548
Clerical	10	10
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	2056	2056
Fixed Cost	885	885
Fully Allocated Cost	2941	2941
Net Rail Revenue	3186	3186
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 1/08/2002

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Commodity	: Corn	STCC Code	: 0113200
From	: Seneca, Illinois	Net Tons/Car	: 101.0
To	: Warsaw, North Carolina	Total Miles	: 1132.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Multi Car	Transit Days	: 7.4
Cars/Ship	: 15	Car Cycle Days	: 18.8

Routing : CSX
Miles : 1132
Junction :

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - - -

	CAR	TON	CWT			
Net Carrier Revenue	: 3191	31.60	1.58	Rate Descrip	:	
3Q2001 Variable Cost	: 2059	20.39	1.02	Rev/Var Cost	:	155.0%
3Q2001 Full Cost	: 2945	29.16	1.46	Rev/Full Cost	:	108.4%

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	358	358
Train Operations	120	120
Fuel	228	228
Locomotives	271	271
Track & R.O.W	441	441
Yard & Terminal	78	78
Car	549	549
Clerical	10	10
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	2059	2059
Fixed Cost	886	886
Fully Allocated Cost	2945	2945
Net Rail Revenue	3191	3191
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Chicago IL	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 1095.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Unit Train	Transit Days	: 3.1
Cars/Ship	:100	Car Cycle Days	: 8.2

Routing : CSX
Miles : 1095
Junction :

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2212	21.90	1.10	Rate Descrip :	
3Q2001 Variable Cost :	1427	14.13	0.71	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2042	20.21	1.01	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	203	203
Train Operations	77	77
Fuel	152	152
Locomotives	166	166
Track & R.O.W	426	426
Yard & Terminal	24	24
Car	365	365
Clerical	8	8
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1427	1427
Fixed Cost	614	614
Fully Allocated Cost	2042	2042
Net Rail Revenue	2212	2212
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: East St Louis IL	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 1138.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Unit Train	Transit Days	: 3.2
Cars/Ship	: 65	Car Cycle Days	: 8.4

Routing : CSX
Miles : 1138
Junction :

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT			
Net Carrier Revenue :	2626	26.00	1.30	Rate Descrip :		
3Q2001 Variable Cost :	1694	16.77	0.84	Rev/Var Cost :	155.0%	
3Q2001 Full Cost :	2424	24.00	1.20	Rev/Full Cost :	108.4%	

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	324	324
Train Operations	103	103
Fuel	191	191
Locomotives	219	219
Track & R.O.W	443	443
Yard & Terminal	24	24
Car	377	377
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1694	1694
Fixed Cost	729	729
Fully Allocated Cost	2424	2424
Net Rail Revenue	2626	2626
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Hoopeston IL	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 1130.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Unit Train	Transit Days	: 3.1
Cars/Ship	: 65	Car Cycle Days	: 8.3

Routing : CSX
Miles : 1130
Junction :

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2609	25.83	1.29	Rate Descrip :	
3Q2001 Variable Cost :	1683	16.66	0.83	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2408	23.84	1.19	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	322	322
Train Operations	102	102
Fuel	190	190
Locomotives	217	217
Track & R.O.W	440	440
Yard & Terminal	24	24
Car	375	375
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1683	1683
Fixed Cost	725	725
Fully Allocated Cost	2408	2408
Net Rail Revenue	2609	2609
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 1/08/2002

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Commodity	: Corn	STCC Code	: 0113200
From	: Seneca, Illinois	Net Tons/Car	: 101.0
To	: Warsaw, North Carolina	Total Miles	: 1132.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Unit Train	Transit Days	: 3.1
Cars/Ship	: 65	Car Cycle Days	: 8.3

Routing : CSX
Miles : 1132
Junction :

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2613	25.87	1.29	Rate Descrip :	
3Q2001 Variable Cost :	1686	16.69	0.83	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2412	23.88	1.19	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	323	323
Train Operations	102	102
Fuel	190	190
Locomotives	218	218
Track & R.O.W	441	441
Yard & Terminal	24	24
Car	375	375
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1686	1686
Fixed Cost	726	726
Fully Allocated Cost	2412	2412
Net Rail Revenue	2613	2613
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Brownstown IN	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 895.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Single Car	Transit Days	: 6.2
Cars/Ship	: 3	Car Cycle Days	: 16.5

Routing	:	CSX
Miles	:	895
Junction	:	

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

		CAR	TON	CWT			
Net Carrier Revenue	:	2701	26.74	1.34	Rate Descrip	:	
3Q2001 Variable Cost	:	1742	17.25	0.86	Rev/Var Cost	:	155.0%
3Q2001 Full Cost	:	2493	24.68	1.23	Rev/Full Cost	:	108.4%

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	286	286
Train Operations	95	95
Fuel	181	181
Locomotives	215	215
Track & R.O.W	349	349
Yard & Terminal	115	115
Car	464	464
Clerical	33	33
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1742	1742
Fixed Cost	750	750
Fully Allocated Cost	2493	2493
Net Rail Revenue	2701	2701
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 1/08/2002

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Commodity	: Corn	STCC Code	: 0113200
From	: Shelburn, Indiana	Net Tons/Car	: 101.0
To	: Warsaw, North Carolina	Total Miles	: 1029.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Single Car	Transit Days	: 6.9
Cars/Ship	: 1	Car Cycle Days	: 17.8

Routing : CSX
Miles : 1029
Junction :

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	3039	30.09	1.50	Rate Descrip :	
3Q2001 Variable Cost :	1961	19.41	0.97	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2805	27.77	1.39	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	327	327
Train Operations	109	109
Fuel	208	208
Locomotives	246	246
Track & R.O.W	401	401
Yard & Terminal	119	119
Car	513	513
Clerical	33	33
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1961	1961
Fixed Cost	844	844
Fully Allocated Cost	2805	2805
Net Rail Revenue	3039	3039
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Connersville IN	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 859.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Multi Car	Transit Days	: 6.1
Cars/Ship	: 35	Car Cycle Days	: 16.2

Routing : CSX
Miles : 859
Junction :

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2501	24.76	1.24	Rate Descrip :	
3Q2001 Variable Cost :	1613	15.98	0.80	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2308	22.85	1.14	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	275	275
Train Operations	92	92
Fuel	174	174
Locomotives	206	206
Track & R.O.W	335	335
Yard & Terminal	70	70
Car	449	449
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1613	1613
Fixed Cost	695	695
Fully Allocated Cost	2308	2308
Net Rail Revenue	2501	2501
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Rensselaer IN	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 1130.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Multi Car	Transit Days	: 7.4
Cars/Ship	: 15	Car Cycle Days	: 18.8

Routing : CSX
Miles : 1130
Junction :

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	3186	31.55	1.58	Rate Descrip :	
3Q2001 Variable Cost :	2056	20.35	1.02	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2941	29.12	1.46	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	357	357
Train Operations	120	120
Fuel	228	228
Locomotives	270	270
Track & R.O.W	440	440
Yard & Terminal	78	78
Car	548	548
Clerical	10	10
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	2056	2056
Fixed Cost	885	885
Fully Allocated Cost	2941	2941
Net Rail Revenue	3186	3186
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Princeton IN	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 970.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Multi Car	Transit Days	: 6.6
Cars/Ship	: 38	Car Cycle Days	: 17.2

Routing : CSX
Miles : 970
Junction :

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2781	27.53	1.38	Rate Descrip :	
3Q2001 Variable Cost :	1794	17.76	0.89	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2567	25.41	1.27	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	309	309
Train Operations	103	103
Fuel	196	196
Locomotives	233	233
Track & R.O.W	378	378
Yard & Terminal	73	73
Car	489	489
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1794	1794
Fixed Cost	772	772
Fully Allocated Cost	2567	2567
Net Rail Revenue	2781	2781
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Morristown IN	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 884.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Multi Car	Transit Days	: 6.2
Cars/Ship	: 15	Car Cycle Days	: 16.4

Routing : CSX
Miles : 884
Junction :

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2565	25.40	1.27	Rate Descrip :	
3Q2001 Variable Cost :	1655	16.39	0.82	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2368	23.44	1.17	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	283	283
Train Operations	94	94
Fuel	179	179
Locomotives	212	212
Track & R.O.W	344	344
Yard & Terminal	71	71
Car	458	458
Clerical	10	10
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1655	1655
Fixed Cost	713	713
Fully Allocated Cost	2368	2368
Net Rail Revenue	2565	2565
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Brookston IN	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 1082.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Unit Train	Transit Days	: 3.0
Cars/Ship	: 65	Car Cycle Days	: 8.1

Routing : CSX
Miles : 1082
Junction :

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2505	24.80	1.24	Rate Descrip :	
3Q2001 Variable Cost :	1616	16.00	0.80	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2312	22.89	1.14	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	308	308
Train Operations	98	98
Fuel	182	182
Locomotives	208	208
Track & R.O.W	421	421
Yard & Terminal	24	24
Car	362	362
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1616	1616
Fixed Cost	696	696
Fully Allocated Cost	2312	2312
Net Rail Revenue	2505	2505
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Medaryville IN	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 1160.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Unit Train	Transit Days	: 3.2
Cars/Ship	: 65	Car Cycle Days	: 8.4

Routing	:	CSX
Miles	:	1160
Junction	:	

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT			
Net Carrier Revenue :	2674	26.47	1.32	Rate Descrip :		
3Q2001 Variable Cost :	1725	17.08	0.85	Rev/Var Cost :	155.0%	
3Q2001 Full Cost :	2467	24.43	1.22	Rev/Full Cost :	108.4%	

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	330	330
Train Operations	105	105
Fuel	195	195
Locomotives	223	223
Track & R.O.W	452	452
Yard & Terminal	24	24
Car	383	383
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1725	1725
Fixed Cost	743	743
Fully Allocated Cost	2467	2467
Net Rail Revenue	2674	2674
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 1/08/2002

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Commodity	: Corn	STCC Code	: 0113200
From	: Frankfort,Indiana	Net Tons/Car	: 101.0
To	: Warsaw, North Carolina	Total Miles	: 1193.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Unit Train	Transit Days	: 3.3
Cars/Ship	: 65	Car Cycle Days	: 8.6

Routing : CSX
Miles : 1193
Junction :

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2745	27.18	1.36	Rate Descrip :	
3Q2001 Variable Cost :	1771	17.53	0.88	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2533	25.08	1.25	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	340	340
Train Operations	108	108
Fuel	201	201
Locomotives	229	229
Track & R.O.W	465	465
Yard & Terminal	24	24
Car	392	392
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1771	1771
Fixed Cost	762	762
Fully Allocated Cost	2533	2533
Net Rail Revenue	2745	2745
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Akron MI	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 1050.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Single Car	Transit Days	: 7.0
Cars/Ship	: 10	Car Cycle Days	: 18.0

Routing : CSX
Miles : 1050
Junction :

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	3092	30.62	1.53	Rate Descrip :	
3Q2001 Variable Cost :	1995	19.75	0.99	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2854	28.26	1.41	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	333	333
Train Operations	112	112
Fuel	212	212
Locomotives	251	251
Track & R.O.W	409	409
Yard & Terminal	120	120
Car	521	521
Clerical	33	33
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1995	1995
Fixed Cost	859	859
Fully Allocated Cost	2854	2854
Net Rail Revenue	3092	3092
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 1/08/2002

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Commodity	: Corn	STCC Code	: 0113200
From	: Grand Ledge, Michigan	Net Tons/Car	: 101.0
To	: Warsaw, North Carolina	Total Miles	: 1027.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Single Car	Transit Days	: 6.9
Cars/Ship	: 1	Car Cycle Days	: 17.8

Routing : CSX
Miles : 1027
Junction :

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	3034	30.04	1.50	Rate Descrip :	
3Q2001 Variable Cost :	1957	19.38	0.97	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2800	27.72	1.39	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	326	326
Train Operations	109	109
Fuel	207	207
Locomotives	246	246
Track & R.O.W	400	400
Yard & Terminal	119	119
Car	513	513
Clerical	33	33
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1957	1957
Fixed Cost	843	843
Fully Allocated Cost	2800	2800
Net Rail Revenue	3034	3034
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Akron MI	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 1050.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Multi Car	Transit Days	: 7.0
Cars/Ship	: 15	Car Cycle Days	: 18.0

Routing : CSX
Miles : 1050
Junction :

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT			
Net Carrier Revenue :	2985	29.55	1.48	Rate Descrip :		
3Q2001 Variable Cost :	1925	19.06	0.95	Rev/Var Cost :	155.0%	
3Q2001 Full Cost :	2754	27.27	1.36	Rev/Full Cost :	108.4%	

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	333	333
Train Operations	112	112
Fuel	212	212
Locomotives	251	251
Track & R.O.W	409	409
Yard & Terminal	75	75
Car	519	519
Clerical	10	10
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1925	1925
Fixed Cost	829	829
Fully Allocated Cost	2754	2754
Net Rail Revenue	2984	2984
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 1/08/2002

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Commodity	: Corn	STCC Code	: 0113200
From	: Grand Ledge, Michigan	Net Tons/Car	: 101.0
To	: Warsaw, North Carolina	Total Miles	: 1027.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Multi Car	Transit Days	: 6.9
Cars/Ship	: 15	Car Cycle Days	: 17.8

Routing	: CSX
Miles	: 1027
Junction	:

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2926	28.97	1.45	Rate Descrip :	
3Q2001 Variable Cost :	1888	18.69	0.93	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2701	26.74	1.34	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	326	326
Train Operations	109	109
Fuel	207	207
Locomotives	246	246
Track & R.O.W	400	400
Yard & Terminal	75	75
Car	510	510
Clerical	10	10
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1888	1888
Fixed Cost	813	813
Fully Allocated Cost	2701	2701
Net Rail Revenue	2926	2926
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 1/08/2002

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Commodity	: Corn	STCC Code	: 0113200
From	: Pigeon, Michigan	Net Tons/Car	: 101.0
To	: Warsaw, North Carolina	Total Miles	: 1084.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Multi Car	Transit Days	: 7.1
Cars/Ship	: 15	Car Cycle Days	: 18.3

Routing	:	CSX
Miles	:	1084
Junction	:	

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	CAR	TON	CWT		
Net Carrier Revenue :	3070	30.40	1.52	Rate Descrip :	
3Q2001 Variable Cost :	1981	19.61	0.98	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2834	28.06	1.40	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	343	343
Train Operations	115	115
Fuel	219	219
Locomotives	259	259
Track & R.O.W	422	422
Yard & Terminal	76	76
Car	531	531
Clerical	10	10
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1981	1981
Fixed Cost	853	853
Fully Allocated Cost	2834	2834
Net Rail Revenue	3070	3070
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Carrollton MI	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 1036.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Multi Car	Transit Days	: 6.9
Cars/Ship	: 15	Car Cycle Days	: 17.9

Routing	:	CSX
Miles	:	1036
Junction	:	

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

		CAR	TON	CWT			
Net Carrier Revenue	:	2949	29.20	1.46	Rate Descrip	:	
3Q2001 Variable Cost	:	1903	18.84	0.94	Rev/Var Cost	:	155.0%
3Q2001 Full Cost	:	2722	26.95	1.35	Rev/Full Cost	:	108.4%

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	329	329
Train Operations	110	110
Fuel	209	209
Locomotives	248	248
Track & R.O.W	404	404
Yard & Terminal	75	75
Car	514	514
Clerical	10	10
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1903	1903
Fixed Cost	819	819
Fully Allocated Cost	2722	2722
Net Rail Revenue	2949	2949
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Elkton MI	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 1036.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Unit Train	Transit Days	: 3.0
Cars/Ship	: 65	Car Cycle Days	: 8.0

Routing : CSX
Miles : 1036
Junction :

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2405	23.81	1.19	Rate Descrip :	
3Q2001 Variable Cost :	1552	15.36	0.77	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2220	21.98	1.10	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	295	295
Train Operations	94	94
Fuel	174	174
Locomotives	199	199
Track & R.O.W	403	403
Yard & Terminal	24	24
Car	349	349
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1552	1552
Fixed Cost	668	668
Fully Allocated Cost	2220	2220
Net Rail Revenue	2405	2405
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Newaygo MI	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 1050.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Unit Train	Transit Days	: 3.0
Cars/Ship	: 65	Car Cycle Days	: 8.0

Routing : CSX
Miles : 1050
Junction :

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2436	24.11	1.21	Rate Descrip :	
3Q2001 Variable Cost :	1571	15.56	0.78	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2248	22.25	1.11	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	299	299
Train Operations	95	95
Fuel	177	177
Locomotives	202	202
Track & R.O.W	409	409
Yard & Terminal	24	24
Car	353	353
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1571	1571
Fixed Cost	676	676
Fully Allocated Cost	2248	2248
Net Rail Revenue	2436	2436
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Webberville MI	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 988.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Unit Train	Transit Days	: 2.9
Cars/Ship	: 65	Car Cycle Days	: 7.8

Routing : CSX
Miles : 988
Junction :

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2301	22.79	1.14	Rate Descrip :	
3Q2001 Variable Cost :	1485	14.70	0.74	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2124	21.03	1.05	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	281	281
Train Operations	89	89
Fuel	166	166
Locomotives	190	190
Track & R.O.W	385	385
Yard & Terminal	24	24
Car	336	336
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1485	1485
Fixed Cost	639	639
Fully Allocated Cost	2124	2124
Net Rail Revenue	2301	2301
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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Commodity	: Corn	STCC Code	: 0113200
From	: Pigeon, Michigan	Net Tons/Car	: 101.0
To	: Warsaw, North Carolina	Total Miles	: 1084.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Unit Train	Transit Days	: 3.1
Cars/Ship	: 65	Car Cycle Days	: 8.2

Routing : CSX
Miles : 1084
Junction :

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

		CAR	TON	CWT			
Net Carrier Revenue	:	2509	24.84	1.24	Rate Descrip	:	
3Q2001 Variable Cost	:	1619	16.03	0.80	Rev/Var Cost	:	155.0%
3Q2001 Full Cost	:	2316	22.93	1.15	Rev/Full Cost	:	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	309	309
Train Operations	98	98
Fuel	182	182
Locomotives	208	208
Track & R.O.W	422	422
Yard & Terminal	24	24
Car	362	362
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1619	1619
Fixed Cost	697	697
Fully Allocated Cost	2316	2316
Net Rail Revenue	2509	2509
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Butler OH	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 831.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Single Car	Transit Days	: 5.9
Cars/Ship	: 3	Car Cycle Days	: 15.9

Routing	:	CSX
Miles	:	831
Junction	:	

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2539	25.14	1.26	Rate Descrip :	
3Q2001 Variable Cost :	1638	16.22	0.81	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2344	23.20	1.16	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	267	267
Train Operations	89	89
Fuel	168	168
Locomotives	200	200
Track & R.O.W	324	324
Yard & Terminal	114	114
Car	441	441
Clerical	33	33
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1638	1638
Fixed Cost	705	705
Fully Allocated Cost	2344	2344
Net Rail Revenue	2539	2539
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 1/08/2002

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Commodity	: Corn	STCC Code	: 0113200
From	: North Bend, Ohio	Net Tons/Car	: 101.0
To	: Warsaw, North Carolina	Total Miles	: 813.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Single Car	Transit Days	: 5.8
Cars/Ship	: 1	Car Cycle Days	: 15.7

Routing : CSX
Miles : 813
Junction :

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2494	24.69	1.23	Rate Descrip :	
3Q2001 Variable Cost :	1609	15.93	0.80	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2302	22.79	1.14	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	261	261
Train Operations	87	87
Fuel	164	164
Locomotives	195	195
Track & R.O.W	317	317
Yard & Terminal	113	113
Car	434	434
Clerical	33	33
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1609	1609
Fixed Cost	693	693
Fully Allocated Cost	2302	2302
Net Rail Revenue	2494	2494
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113200
From	: Columbus OH	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 769.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Multi Car	Transit Days	: 5.6
Cars/Ship	: 50	Car Cycle Days	: 15.3

Routing : CSX
Miles : 769
Junction :

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2273	22.51	1.13	Rate Descrip :	
3Q2001 Variable Cost :	1467	14.52	0.73	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2098	20.77	1.04	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	248	248
Train Operations	82	82
Fuel	156	156
Locomotives	185	185
Track & R.O.W	300	300
Yard & Terminal	68	68
Car	416	416
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1467	1467
Fixed Cost	631	631
Fully Allocated Cost	2098	2098
Net Rail Revenue	2273	2273
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

- - - - - - - - - - - - - - - - SHIPMENT DESCRIPTION - - - - - - - - - - PAGE 1

Commodity	: Corn	STCC Code	: 0113000
From	: Cincinnati OH	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 798.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Multi Car	Transit Days	: 5.8
Cars/Ship	: 50	Car Cycle Days	: 15.6

Routing : CSX
Miles : 798
Junction :

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2347	23.23	1.16	Rate Descrip :	
3Q2001 Variable Cost :	1514	14.99	0.75	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2166	21.44	1.07	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	257	257
Train Operations	85	85
Fuel	161	161
Locomotives	192	192
Track & R.O.W	311	311
Yard & Terminal	68	68
Car	426	426
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1514	1514
Fixed Cost	652	652
Fully Allocated Cost	2166	2166
Net Rail Revenue	2347	2347
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

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Commodity	: Corn	STCC Code	: 0113000
From	: Washington Courthouse OH	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 807.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Multi Car	Transit Days	: 5.8
Cars/Ship	: 15	Car Cycle Days	: 15.7

Routing :	CSX
Miles :	807
Junction :	

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2371	23.48	1.17	Rate Descrip :	
3Q2001 Variable Cost :	1530	15.15	0.76	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2188	21.67	1.08	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	259	259
Train Operations	86	86
Fuel	163	163
Locomotives	194	194
Track & R.O.W	314	314
Yard & Terminal	69	69
Car	430	430
Clerical	10	10
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1530	1530
Fixed Cost	659	659
Fully Allocated Cost	2188	2188
Net Rail Revenue	2371	2371
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 1/08/2002

- - - - - - - - - - - - - - - SHIPMENT DESCRIPTION - - - - - - - - - - PAGE 1

Commodity	: Corn	STCC Code	: 0113200
From	: North Bend, Ohio	Net Tons/Car	: 101.0
To	: Warsaw, North Carolina	Total Miles	: 813.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Multi Car	Transit Days	: 5.8
Cars/Ship	: 15	Car Cycle Days	: 15.7

Routing : CSX
Miles : 813
Junction :

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2386	23.63	1.18	Rate Descrip :	
3Q2001 Variable Cost :	1540	15.24	0.76	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	2202	21.80	1.09	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	261	261
Train Operations	87	87
Fuel	164	164
Locomotives	195	195
Track & R.O.W	317	317
Yard & Terminal	69	69
Car	432	432
Clerical	10	10
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1540	1540
Fixed Cost	663	663
Fully Allocated Cost	2202	2202
Net Rail Revenue	2386	2386
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

- - - - - - - - - - - - - - - SHIPMENT DESCRIPTION - - - - - - - - - - PAGE 1

Commodity	: Corn	STCC Code	: 0113200
From	: Napoleon OH	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 924.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Unit Train	Transit Days	: 2.7
Cars/Ship	: 65	Car Cycle Days	: 7.5

Routing	:	CSX
Miles	:	924
Junction	:	

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT			
Net Carrier Revenue :	2163	21.41	1.07	Rate Descrip :		
3Q2001 Variable Cost :	1395	13.82	0.69	Rev/Var Cost :	155.0%	
3Q2001 Full Cost :	1996	19.76	0.99	Rev/Full Cost :	108.4%	

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	263	263
Train Operations	83	83
Fuel	155	155
Locomotives	178	178
Track & R.O.W	360	360
Yard & Terminal	24	24
Car	319	319
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1395	1395
Fixed Cost	601	601
Fully Allocated Cost	1996	1996
Net Rail Revenue	2163	2163
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 1/08/2002

- - - - - - - - - - - - - - - SHIPMENT DESCRIPTION - - - - - - - - - - PAGE 1

Commodity	: Corn	STCC Code	: 0113200
From	: North Bend, Ohio	Net Tons/Car	: 101.0
To	: Warsaw, North Carolina	Total Miles	: 813.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Unit Train	Transit Days	: 2.5
Cars/Ship	: 65	Car Cycle Days	: 7.1

Routing : CSX
Miles : 813
Junction :

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	1923	19.03	0.95	Rate Descrip :	
3Q2001 Variable Cost :	1240	12.28	0.61	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	1774	17.57	0.88	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	232	232
Train Operations	73	73
Fuel	137	137
Locomotives	156	156
Track & R.O.W	317	317
Yard & Terminal	24	24
Car	289	289
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1240	1240
Fixed Cost	534	534
Fully Allocated Cost	1774	1774
Net Rail Revenue	1923	1923
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

- - - - - - - - - - - - - - - SHIPMENT DESCRIPTION - - - - - - - - - - PAGE 1

Commodity	: Corn	STCC Code	: 0113200
From	: Lima OH	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 918.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Unit Train	Transit Days	: 2.7
Cars/Ship	: 65	Car Cycle Days	: 7.5

Routing : CSX
Miles : 918
Junction :

- - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2150	21.29	1.06	Rate Descrip :	
3Q2001 Variable Cost :	1387	13.73	0.69	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	1984	19.64	0.98	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	262	262
Train Operations	83	83
Fuel	154	154
Locomotives	177	177
Track & R.O.W	357	357
Yard & Terminal	24	24
Car	317	317
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1387	1387
Fixed Cost	597	597
Fully Allocated Cost	1984	1984
Net Rail Revenue	2150	2150
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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RCAM V6.2 RAILROAD COST ANALYSIS 12/07/01

- - - - - - - - - - - - - - - SHIPMENT DESCRIPTION - - - - - - - - - - PAGE 1

Commodity	: Corn	STCC Code	: 0113200
From	: Fostoria OH	Net Tons/Car	: 101.0
To	: Warsaw NC	Total Miles	: 855.0
Car Type	: Hopper - Covered (100% RR)	Empty Return	: 100.0%
Svc Type	: Unit Train	Transit Days	: 2.6
Cars/Ship	: 65	Car Cycle Days	: 7.3

Routing : CSX
Miles : 855
Junction :

- - - - - - - - - - - - - - SHIPMENT REVENUE SUMMARY - - - - - - - - - - - - -

	CAR	TON	CWT		
Net Carrier Revenue :	2013	19.94	1.00	Rate Descrip :	
3Q2001 Variable Cost :	1299	12.86	0.64	Rev/Var Cost :	155.0%
3Q2001 Full Cost :	1858	18.40	0.92	Rev/Full Cost :	108.4%

- - - - - - - - - - - - - - DETAILED CARRIER SUMMARY - - - - - - - - - - - - -

COMPONENT	TOTAL	CSX
Train Crew	244	244
Train Operations	77	77
Fuel	144	144
Locomotives	164	164
Track & R.O.W	333	333
Yard & Terminal	24	24
Car	300	300
Clerical	9	9
Special Services	0	0
Special Charges	0	0
Loss & Damage	4	4
Variable Cost	1299	1299
Fixed Cost	559	559
Fully Allocated Cost	1858	1858
Net Rail Revenue	2013	2013
Revenue/Var. Cost	155%	155%
Revenue/Full Cost	108%	108%

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Appendix 4: Water Vessel Cost Calculations

35,000 DWT – DOMESTIC FROM LEAVING TOLDEO

Annual Capital Cost	$5,549,059
Annul. Crew cost	$3,087,971
Annul. Lubes & Stores	$171,191
Annul. Repair / Maintenance.	$531,186
Annul. Insurance	$411,490
Annul. Administration	$308,461
Fixed An. Operation Costs	$4,510,299
Total Annual Fixed Costs	$10,059,358
Total Daily Fixed Cost	**$29,158**
Fuel Price (IFO180)	**$157**
Fuel Consumption (tpd)	**32**
Fuel Price (MDO)	**$218**
Aux. Fuel Consumption	**2**
Cargo Capacity	**25,000 MT**
Daily Fuel cost at sea	**$5,459**
Daily Fuel cost at port	**$435**

Cost at Sea		
	Fixed Costs	**$29,158**
	Fuel Cost	**$5,453**
Daily		**$34,611**
Cost at Port		
	Fixed Costs	**$29,158**
	Fuel Cost	**$435**
Daily		**$29,593**

Total cost: trip from Toledo to Wilmington	
Toledo Port Fees	**$12,426**
Ship costs while Loading	**$118,372**
10 day trip	**$346,110**
Ship costs while unloading	**$88,779**
Wilmington Port/Tug/Pilot fees	**$35,500**
Total	**$601,187**

Price per ton **$24.05**

based on 345 working days per year
606 nautical miles: Toledo and Montreal
1882 nautical miles between Montreal and Wilmington
4-5 days travel time between Toledo and open sea
Toledo dockage fees:$1340 / day + $1450 tie-up, release fees
60 hours unloading time
St. Lawrence Seaway fees = $0.3744 / metric ton
Tug rates: $750/hour - 4 hour min

40,000 DWT - DOMESTIC VESSEL FROM NEW ORLEANS

Annual Capital Cost	**$5,776,731**
Annul. Crew cost	**$3,102,502**
Annul. Lubes & Stores	**$174,594**
Annul. Repair / Maintenance	**$544,497**
Annul. Insurance	**$455,185**
Annul. Administration	**$310,984**
Fixed An. Operation Costs	**$4,577,761**
Total Annual Fixed Costs	**$10,354,492**
Total Daily Fixed Cost	**$30,013**
Fuel Price (IFO180)	**$108**
Fuel Consumption (tpd)	**33**
Fuel Price (MDO)	**$173**
Aux. Fuel Consumption	**2**
Cargo Capacity	**30,000 MT**
Daily Fuel cost at sea	**$3,893**
Daily Fuel cost at port	**$345**

Cost at Sea		
	Fixed Costs	**$30,013**
	Fuel Cost	**$3,893**
Daily		**$33,906**
Cost at Port		
	Fixed Costs	**$30,013**
	Fuel Cost	**$345**
Daily		**$30,358**

Total cost: trip from NO. to Wilmington	
New Orleans Port Fees	**$18,340**
Ship costs while Loading	**$121,432**
4 day trip	**$135,624**
Ship costs while unloading	**$121,432**
Wilmington Port/Tug/Pilot fees	**$35,500**
Total	**$432,328**

Price per ton **$14.41**

based on 345 working days per year
New Orleans dockage fees: $5.10 per ft for 608 = $3100 / day
Pilot fees: $10 per foot draft and $0.03/gross ton = $1450
Tug fees: $5000
Assume 4 days prep. and loading in Port of New Orleans
1285 nautical miles between New Orleans and Wilmington
Assume 4 days to unload

40,000 DWT - FOREIGN VESSEL FROM BUENOS ARIES

Annual Capital Cost	$2,310,692
Annul. Crew cost	$705,819
Annul. Lubes & Stores	$174,594
Annul. Repair / Maintenance	$239,579
Annul. Insurance	$255,079
Annul. Administration	$173,143
Fixed An. Operating Costs	$1,548,214
Total Annual Fixed Costs	$3,858,906
Total Daily Fixed Cost	**$11,185**
Fuel Price (IFO180)	$108
Fuel Consumption (tpd)	33
Fuel Price (MDO)	$215
Aux. Fuel Consumption	2
Cargo Capacity	30,000 MT
Daily Fuel cost at sea	**$3,993**
Daily Fuel cost at port	**$429**

Cost at Sea		
	Fixed Costs	**$11,185**
	Fuel Cost	**$3,993**
Daily		**$15,178**
Cost at Port		
	Fixed Costs	**$11,185**
	Fuel Cost	**$429**
Daily		**$11,614**

Total cost: trip from BA. to Wilmington	
Buenos Aries Port Fees	**$29,300**
Ship costs while Loading	**$44,740**
17 day trip	**$258,026**
Ship costs while unloading	**$55,925**
Wilmington Port/Tug/Pilot fees	**$35,500**
Total	**$423,491**

Price per ton **$14.12**

5805 nautical miles between Wilmington, NC and Buenos Aries
14 miles per hour service speed at sea
4 days loading time
17 days travel time
$4000 River Pilot; $6500 Tug fee; $4700/day docking fee
4 days unloading time, 1 day for fumigation, inspection
3 hours from open sea to Wilmington dock

35,000 DWT – FOREIGN VESSEL LEAVING TOLEDO

Annual Capital Cost	$2,219,624	**Cost at Sea**		
			Fixed Costs	**$10,825**
Annul. Crew cost	$702,513		**Fuel Cost**	**$5,453**
Annul. Lubes & Stores	$171,191	**Daily**		**$16,278**
Annul. Repair / Maintenance	$233,722			
Annul. Insurance	$235,773	**Cost at Port**		
Annul. Administration	$171,738		**Fixed Costs**	**$10,825**
Fixed An. Operating Costs	$1,514,936		**Fuel Cost**	**$435**
Total Annual Fixed Costs	$3,734,560	**Daily**		**$11,260**
Total Daily Fixed Cost	**$10,825**			

	Total cost: trip from Toledo to Wilmington		
Fuel Price (IFO180)	**$157**	**Toledo Port Fees**	**$12,426**
Fuel Consumption (tpd)	**32**	**Ship costs while Loading**	**$45,040**
Fuel Price (MDO)	**$218**	**10 day trip**	**$162,780**
Aux. Fuel Consumption	**2**	**Ship costs while unloading**	**$33,780**
Cargo Capacity	**25,000 MT**	**Wilmington Port/Tug/Pilot fees**	**$35,500**
		Total	**$289,526**
Daily Fuel cost at sea	**$5,459**		
Daily Fuel cost at port	**$435**	**Price per ton**	**$11.58**

Calculation reflects Toledo fuel prices, trip time and dock fees combined with foreign vessel daily costs.

based on 345 working days per year
606 nautical miles: Toledo and Montreal
1882 nautical miles between Montreal and Wilmington
4-5 days travel time between Toledo and open sea
Toledo dockage fees:$1340 / day + $1450 tie-up, release fees
60 hours unloading time
St. Lawrence Seaway fees = $0.3744 / metric ton
Tug rates: $750/hour - 4 hour min

40,000 DWT – FOREIGN VESSEL LEAVING NEW ORLEANS

Annual Capital Cost	**$2,310,692**	**Cost at Sea**		
	-		**Fixed Costs**	**$11,185**
Annul. Crew cost	**$705,819**		**Fuel Cost**	**$3,893**
Annul. Lubes & Stores	**$174,594**	**Daily**		**$15,078**
Annul. Repair / Maintenance	**$239,579**			
Annul. Insurance	**$255,079**	**Cost at Port**		
Annul. Administration	**$173,143**		**Fixed Costs**	**$11,185**
Fixed An. Operation Costs	**$1,548,213**		**Fuel Cost**	**$345**
Total Annual Fixed Costs	**$3,858,905**	**Daily**		**$11,530**
Total Daily Fixed Cost	**$11,185**			
		Total cost: trip from NO. to Wilmington		
Fuel Price (IFO180)	**$108**	**New Orleans Port Fees**		**$18,340**
Fuel Consumption (tpd)	**33**	**Ship costs while Loading**		**$46,120**
Fuel Price (MDO)	**$173**		**4 day trip**	**$60,312**
Aux. Fuel Consumption	**2**	**Ship costs while unloading**		**$46,120**
Cargo Capacity	**30,000 MT**	**Wilmington Port/Tug/Pilot fees**		**$35,500**
		Total		**$206,392**
Daily Fuel cost at sea	**$3,893**			
			Price per ton	**$6.88**
Daily Fuel cost at port	**$345**			

Calculation reflects New Orleans fuel prices, trip time and dock fees combined with foreign vessel daily costs.

based on 345 working days per year
New Orl. dockage fees: $5.10 per ft for 608 = $3100 / day
Pilot fees: $10 per foot draft and $0.03/gross ton = $1450
Tug fees: $5000
Assume 4 days prep. and loading in Port of New Orleans
Assume 4 days lead time
1285 nautical miles between New Orleans and Wilmington

Appendix 5: Additional Corn Cost Comparisons

Doubled 1995 Prices

	Rail				Vessel		
	Illinois	Indiana	Michigan	Ohio	Great Lakes	Gulf	South America
January	182.04	186.23	171.75	176.85	178.25	187.70	241.42
February	186.33	187.66	178.17	181.85	183.25	189.98	188.80
March	190.61	192.66	181.03	187.56	188.96	194.80	186.99
April	198.47	197.66	188.17	193.28	194.68	197.91	196.06
May	201.33	200.52	192.46	198.28	199.68	201.89	210.58
June	211.33	208.38	204.60	205.42	206.82	213.68	248.68
July	220.61	222.66	208.89	213.28	214.68	224.73	259.56
August	214.90	220.52	215.32	216.85	218.25	224.25	255.94
September	218.47	222.66	220.32	223.28	224.68	230.22	268.64
October	229.18	229.09	221.03	222.56	223.96	241.55	279.52
November	239.18	247.66	231.03	230.42	231.82	249.53	281.34
December	245.61	263.38	236.03	245.42	246.82	259.43	281.34

Doubled 1996 Prices

	Rail				Vessel		
	Illinois	Indiana	Michigan	Ohio	Great Lakes	Gulf	South America
January	249.18	254.09	249.60	249.70	251.10	269.46	286.78
February	277.04	269.80	253.89	269.70	271.10	284.42	301.29
March	291.33	297.66	274.60	280.42	281.82	299.34	308.55
April	317.04	333.37	309.60	317.56	318.96	332.41	348.47
May	342.75	348.37	341.03	356.85	358.25	359.59	373.87
June	340.61	361.23	358.17	368.27	369.67	358.15	348.47
July	360.61	361.23	369.60	370.42	371.82	363.12	346.65
August	347.04	350.52	336.03	366.85	368.25	345.36	326.70
September	274.90	270.52	326.74	284.70	286.10	277.60	295.85
October	234.90	225.52	213.89	215.42	216.82	229.11	277.71
November	219.90	217.66	206.75	211.13	212.53	214.27	239.61
December	223.47	214.09	208.89	207.56	208.96	213.99	237.79

Doubled 1997 Prices

	Rail				Vessel		
	Illinois	Indiana	Michigan	Ohio	Great Lakes	Gulf	South America
January	222.76	223.38	212.46	215.42	216.82	218.27	219.65
February	219.18	220.52	213.89	218.99	220.39	220.47	219.65
March	229.90	229.80	231.75	230.42	231.82	232.46	230.53
April	232.04	236.95	231.03	230.42	231.82	230.64	226.91
May	224.90	229.80	228.17	222.56	223.96	222.03	223.28
June	213.47	220.52	212.46	217.56	218.96	211.37	219.65
July	202.76	210.52	211.75	209.70	211.10	201.46	208.76
August	214.18	211.23	215.32	211.85	213.25	209.86	212.39
September	216.33	211.23	213.89	213.28	214.68	211.01	216.02
October	213.47	212.66	217.46	205.42	206.82	216.40	228.72
November	211.33	211.23	202.46	201.13	202.53	210.98	226.91
December	214.18	211.95	198.17	203.28	204.68	207.98	228.72

Doubled 1998 Prices

	Rail				Vessel		
	Illinois	Indiana	Michigan	Ohio	Great Lakes	Gulf	South America
January	216.33	215.52	201.03	205.42	206.82	209.69	225.09
February	215.61	212.66	198.89	203.99	205.39	208.03	228.72
March	214.18	211.95	200.32	203.28	204.68	208.24	197.88
April	202.76	201.23	189.60	191.85	193.25	196.20	186.99
May	196.33	194.09	184.60	187.56	188.96	192.69	196.06
June	195.61	189.09	176.75	182.56	183.96	188.65	197.88
July	189.18	180.52	179.60	177.56	178.96	183.29	196.06
August	168.47	161.95	165.32	159.70	161.10	163.32	190.62
September	159.18	165.52	153.17	154.70	156.10	158.25	183.36
October	167.04	166.23	158.89	156.13	157.53	168.88	194.25
November	169.90	172.66	158.17	160.42	161.82	172.19	205.13
December	177.04	184.80	158.89	168.28	169.68	173.86	217.83

Doubled 1999 Prices

	Rail				Vessel		
	Illinois	Indiana	Michigan	Ohio	Great Lakes	Gulf	South America
January	176.33	186.95	164.60	171.85	173.25	177.09	223.28
February	177.04	182.66	163.17	171.13	172.53	173.77	177.92
March	177.76	184.09	164.60	175.42	176.82	176.45	177.92
April	176.33	185.52	167.46	171.13	172.53	174.01	176.10
May	173.47	179.09	166.75	165.42	166.82	170.90	186.99
June	173.47	176.95	166.03	166.85	168.25	170.99	188.80
July	152.76	164.09	150.32	157.56	158.96	155.03	183.36
August	156.33	166.23	154.60	162.56	163.96	159.71	185.18
September	157.04	155.52	150.32	154.70	156.10	157.27	181.55
October	151.33	149.80	146.75	143.28	144.68	152.75	183.36
November	154.18	150.52	143.89	149.70	151.10	153.55	181.55
December	164.18	160.52	145.32	156.85	158.25	158.60	179.73

Doubled 2000 Prices

	Rail				Vessel		
	Illinois	Indiana	Michigan	Ohio	Great Lakes	Gulf	South America
January	165.61	166.23	156.03	163.99	165.39	166.99	192.43
February	169.90	172.66	163.17	168.99	170.39	171.88	186.99
March	175.61	174.09	172.46	171.13	172.53	174.34	177.92
April	169.18	179.09	168.89	173.28	174.68	174.21	172.47
May	182.04	179.09	172.46	176.85	178.25	176.80	177.92
June	159.90	164.80	160.32	160.42	161.82	158.02	165.22
July	143.47	143.38	149.60	146.85	148.25	142.25	156.15
August	134.90	141.95	131.75	133.99	135.39	137.32	154.33
September	142.04	144.80	137.46	133.99	135.39	143.81	154.33
October	153.47	150.52	148.17	145.42	146.82	152.78	161.59
November	162.04	156.23	156.75	153.99	155.39	160.56	165.22
December	169.90	172.66	158.17	164.70	166.10	171.92	183.36

Doubled 2001 Prices

	Rail				Vessel		
	Illinois	Indiana	Michigan	Ohio	Great Lakes	Gulf	South America
January	165.61	170.52	169.60	168.99	170.39	172.00	177.92
February	167.76	169.09	163.89	163.99	165.39	169.32	165.22
March	167.76	169.80	163.17	163.28	164.68	168.16	165.22
April	162.04	166.95	159.60	155.42	156.82	164.94	157.96
May	157.76	164.80	156.75	151.13	152.53	161.82	161.59
June	155.61	156.95	148.89	148.99	150.39	157.89	161.59
July	164.18	166.23	158.89	159.70	161.10	163.07	172.47
August	167.04	169.09	163.89	163.99	165.39	165.66	176.10
September	163.47	163.38	161.75	161.13	162.53	163.87	174.29
October	157.04	156.23	153.89	153.28	154.68	159.85	172.47
November	161.33	156.95	148.89	153.28	154.68	159.85	181.55
December	172.04	162.66	159.60	162.56	163.96	164.77	190.62

VITA

Tammara Leigh Cole was born in Sylva, North Carolina on November 3, 1994 to Kenneth and Marilyn Cole. Upon graduating from T.C. Roberson High School in Skyland, North Carolina, she entered North Carolina State University in Raleigh. In May 1998 she received a Bachelor of Science in Agri-Business Management. After three year of working in the public sector, she enter the Master's program in Agricultural Economics at The University of Tennessee. Tammara received her Master of Science degree in August of 2002