www.pwc.com/us/nes

Economic Contribution of the US Tugboat, Towboat, and Barge Industry

Economic Contribution of the US Tugboat, Towboat, and Barge Industry

May 10, 2017

Prepared for
the American Waterways Operators

The American Waterways Operators

U.S. Department of Transportation
Maritime Administration

Economic Contribution of the US Tugboat, Towboat, and Barge Industry

Table of Contents

This study was developed through a cooperative agreement between the U.S. Department of Transportation (DOT), Maritime Administration and The American Waterways Operators. [DTMA-91-H-2013-0005]. Opinions or points of view expressed in this document are those of the authors and do not necessarily reflect the official position of, or a position that is endorsed by, the U.S. Government, DOT, or any sub-agency thereof.

Economic Contribution of the US Tugboat, Towboat, and Barge Industry

Executive Summary

The US tugboat, towboat, and barge industry plays an important role in domestic commerce. Nearly 5,500 US-flag tugboats and towboats and more than 31,000 barges move an average of 763 million tons of cargo on the nation's waterways each year, including raw materials and commodities as well as finished consumer products. The industry provides tug and tow services in US ports and facilitates trade between ports in the US mainland, Hawaii, Alaska, Puerto Rico, and the US Virgin Islands. In addition to its role in domestic waterborne commerce, the industry also facilitates international trade by providing tugboat services to large containerships and other oceangoing vessels entering US ports.

The American Waterways Operators engaged PwC to quantify the economic contribution of the US tugboat, towboat, and barge industry in terms of employment, labor income, value added,[1] and taxes for 2014, the most recent year for which a consistent set of data is available. In describing these impacts, this report considers three separate channels -- the direct impact, the indirect impact, and the induced impact -- that in aggregate provide a measure of the total economic impact of the US tugboat, towboat, and barge industry:

- ***Direct impacts*** include the jobs, labor income, value added, and taxes *directly attributable* to the US tugboat, towboat, and barge industry.
- ***Indirect impacts*** include the jobs, labor income, value added, and taxes occurring *throughout the industry's supply chain*.
- ***Induced impacts*** include the jobs, labor income, value added, and taxes resulting from *household spending* of labor and proprietor's income earned either directly or indirectly from the US tugboat, towboat, and barge industry's spending.

This report quantifies the industry's ***operational impact*** (due to purchases of intermediate inputs and payments of labor compensation and dividends) and ***capital investment impact*** (due to its investment in new structures and equipment, including vessels) at the national level. Separate detail is also provided on the industry's ***operational impact*** for the 50 states and the District of Columbia.[2]

[1] Value added refers to the additional value created at a particular stage of production. It is a measure of the overall importance of an industry and represents the industry's portion of US gross domestic product ("GDP"). Value added consists of: employee compensation, proprietors' income, income to capital owners from property, and indirect business taxes (including excise taxes, property taxes, fees, licenses, and sales taxes paid by businesses).

[2] The industry's *capital investment impact* is not quantified at the state level due to the non-availability of capital expenditure data at the state level.

In estimating the industry's combined tax impact, all federal, state, and local taxes (other than personal taxes[3]) borne or collected by the industry are included. Taxes **borne** are taxes that are charged to a company, such as corporate income and property taxes. Taxes **collected** are taxes and fees that a company collects and administers on behalf of the government, such as employer's withholding of the employee share of payroll taxes individual income taxes, where the company is not the intended object of taxation.

These economic impacts represent all of the *backward linkages* of the US tugboat, towboat, and barge industry to its suppliers. They do not capture any *forward linkages* (i.e., the economic impact on production in sectors that use the industry's services as an input).

National Economic Contributions

In 2014, the US tugboat, towboat, and barge industry generated revenues of $15.9 billion, *directly* employed 50,480 workers, and paid out $4.7 billion in compensation (including wages and salaries and benefits), an average of $93,835 per worker. The industry also contributed $9.0 billion to US gross domestic product (GDP) and invested nearly $2.2 billion in property, plant, and equipment, including its purchases of vessels.

Table ES-1 – Total (Direct, Indirect, and Induced) Economic Contributions of the US Tugboat, Towboat, and Barge Industry, 2014

	Direct Impacts	Indirect and Induced Impacts		Total Impact
		Operational Impacts	Capital Investment Impacts	
Employment[a]	50,480	220,500	30,570	301,550
Labor Income ($ millions)[b]	4,737	12,768	1,891	19,397
Value Added ($ millions)	8,954	21,969	2,847	33,771
Tax Impact ($ millions)[c]	$1,173	$3,591	$464	$5,227

Source: PwC calculations using the IMPLAN modeling system (2013 database) and data from the US Bureau of Labor Statistics, the Census Bureau, and the Army Corps of Engineers.
Note: Details may not add to totals due to rounding.
[a] Employment is defined as the number of payroll and self-employed jobs, including part time jobs.
[b] Labor income is defined as wages and salaries and benefits as well as proprietors' income.
[c] Includes all types of taxes (other than personal taxes) borne and collected at the federal, state and local level.

In addition to 50,480 direct jobs, the US tugboat, towboat, and barge industry supported another 251,070 *indirect* and *induced* jobs in other sectors of the economy, approximately 5.0 additional jobs for each direct job in the industry. In total, combining both operational and capital investment impacts, the US tugboat, towboat,

[3] Personal taxes such as federal and state personal income taxes (including employer withholdings and personal income tax on business income), estate and gift taxes, state and local property taxes, motor vehicle licenses and other taxes, and licenses paid by individuals are excluded. See **Appendix A** for more detail.

and barge industry directly or indirectly supported 301,550 jobs in 2014 (see **Table ES-1**).

Counting direct, indirect, and induced impacts, the US tugboat, towboat, and barge industry's total impact on labor income (including proprietors' income) was $19.4 billion. The industry's total impact on US GDP was $33.8 billion in 2014.

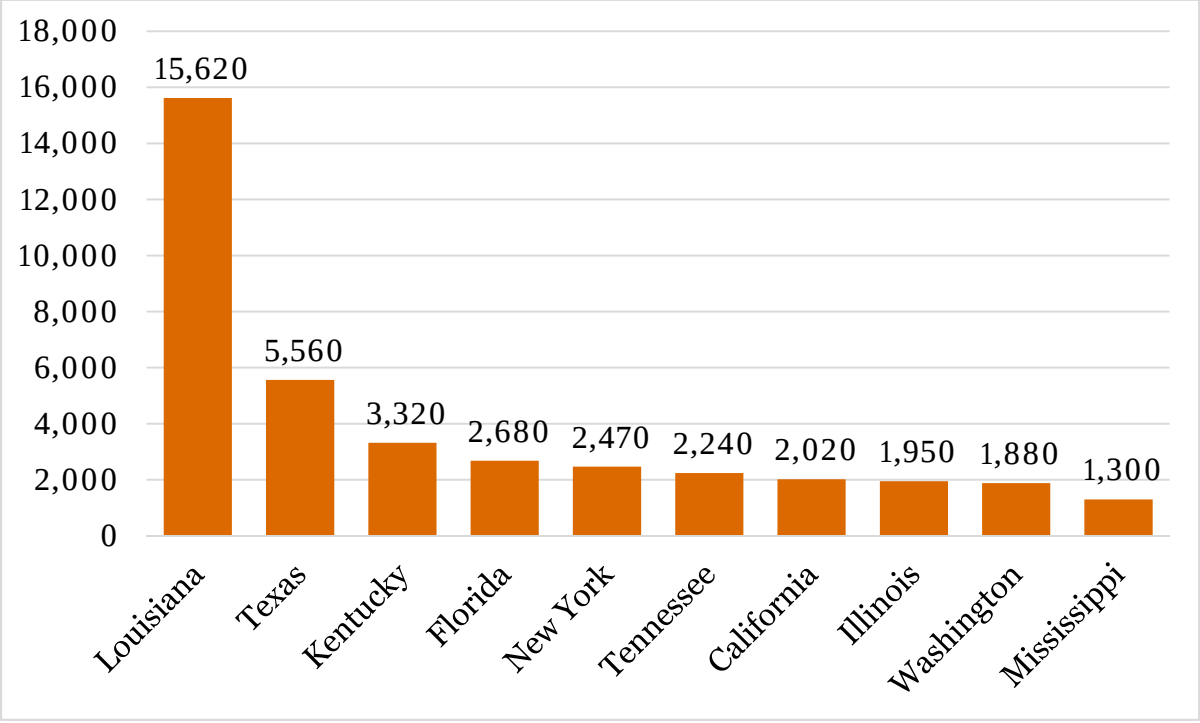
Nationwide, the US tugboat, towboat, and barge industry directly paid or collected nearly $1.2 billion in federal, state, and local taxes in 2014, including corporate income taxes, excise and sales taxes, and other taxes borne or collected by businesses. The industry indirectly supported an additional $4.1 billion in taxes borne and collected by suppliers. Including direct, indirect, and induced tax impacts, the US tugboat, towboat, and barge industry had a combined tax impact of more than $5.2 billion in 2014 (see **Table ES-1**).

State-Level Economic Contributions

The industry was active in 38 states in 2014, but had an impact on the economies of all 50 states plus the District of Columbia through its indirect and induced economic impacts.

Ranked by direct jobs in 2014, the industry is largest in Louisiana, Texas, Kentucky, Florida, and New York (see **Figure ES-1**). These five states accounted for 59 percent of all direct employment in the US tugboat, towboat, and barge industry.

Figure ES-1 – Direct Employment in the US Tugboat, Towboat, and Barge Industry, Top 10 States in 2014



The industry's total operational impact by state varies based on the level of direct activity and the share of the industry's supply chain in each state. In 2014, the total number of jobs *directly or indirectly* attributable to the US tugboat, towboat, and barge industry were highest in Louisiana, Texas, Kentucky, California, and New York (see **Table ES-2**). Combined these five states accounted for nearly 48 percent of all jobs and more than 50 percent of all GDP attributable to the US tugboat, towboat, and barge industry.

Table ES-2 – Total Economic Contributions of the US Tugboat, Towboat, and Barge Industry by State, 2014

State	Employment* Amount	Labor Income** ($ Million)	Value Added ($ Million)
Louisiana	52,810	$3,355	$5,900
Texas	30,550	$2,170	$4,003
Kentucky	15,340	$864	$1,532
California	15,310	$1,116	$1,926
New York	15,150	$1,303	$2,176
Florida	14,210	$784	$1,392
Tennessee	13,300	$771	$1,395
Illinois	11,320	$738	$1,247
Washington	7,920	$562	$1,005
Pennsylvania	6,880	$438	$713
Indiana	5,880	$324	$899
Maryland	5,810	$390	$682
Mississippi	5,530	$292	$517
Ohio	5,200	$299	$537
New Jersey	5,150	$388	$639
All other states	60,610	$3,711	$6,361
U.S. Total	**270,980**	**$17,505**	**$30,924**

Source: PwC calculations using IMPLAN modeling system (2013 database).
Results do not include capital investment impact (not quantified at the state level due to non-availability of data). Numbers may not add to total due to rounding.
* Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.
** Labor income is defined as wages and salaries and benefits as well as proprietors' income.

Other Impacts

In addition to its economic contributions, the US tugboat, towboat, and barge industry provides a number of other important benefits. A number of studies suggest that the industry provides an efficient, low-cost method for transporting a broad range of commodities. Furthermore, studies show that barge transport tends to be more fuel efficient and have a lower environmental footprint.[4]

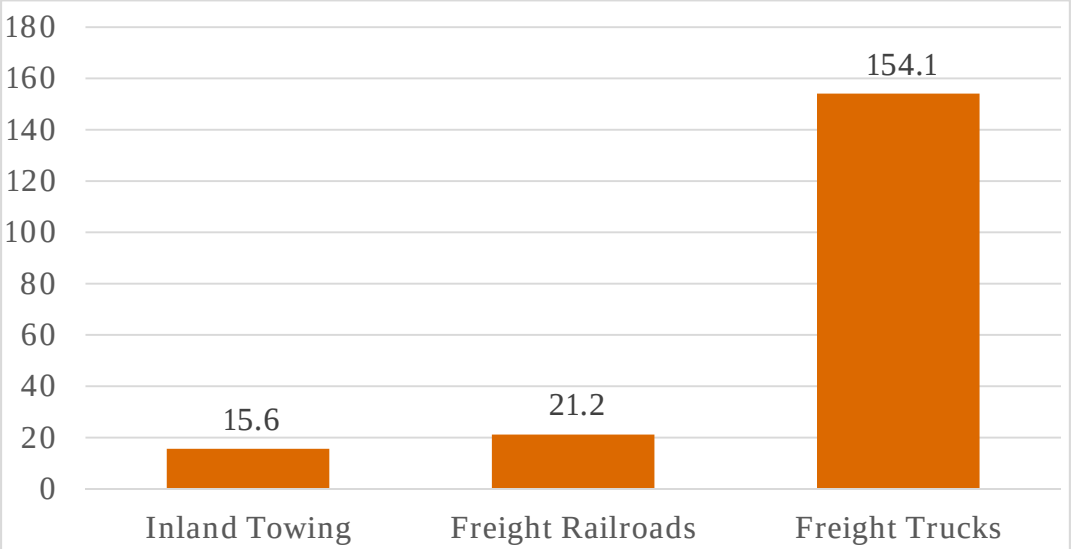
[4] See **Section IV** for a summary of the recent literature.

Barge traffic is able to move large volumes of cargo over long distances. A typical 15-barge tow can haul approximately 26,250 tons of cargo. To move the same amount of cargo would require 216 rail cars or 1,050 tractor trailers.[5]

In part due to its ability to move large volumes of cargo, studies indicate that the US tugboat, towboat, and barge industry provides a low-cost means of freight transportation. While there can be substantial differences in transportation costs by mode across commodity types or regions, estimates range between 1 and 2 cents per ton mile for barges and between 2.5 and 3 cents per ton-mile for rail. Highway freight cost estimates ranged from 5.4 to 42.3 cents per ton mile.[6] In fact, recent studies have found that barge traffic saves between $12.0 and $12.5 billion in transportations costs.[7] These cost savings likely translate into lower costs for consumers.

Studies also indicate that the US tugboat, towboat, and barge industry provides a fuel efficient means for transporting freight. In 2009, inland towing was able to move one ton of freight 647 miles on a single gallon of fuel, compared to 477 miles for freight railroads and just 145 miles for freight trucks.[8] As a result of better fuel efficiency and lower energy intensities, studies show that barge transport has lower greenhouse gas emissions than other forms of freight transportation (see **Figure ES-2**).

Figure ES-2 – Greenhouse Gas Emissions by Mode of Freight Transportation, 2014 [Metric Tons per Million Ton Mile]



Source: Texas Transportation Institute, "A Modal Comparison of Domestic Freight Transportation Effects of the General Public: 2001-2014," January 2017, Table 8.

[5] See http://www.iowadot.gov/compare.pdf
[6] See **Section IV** of this report for further details.
[7] See Texas Transportation Institute, "A Modal Comparison of Domestic Freight Transportation Effects on the General Public: 2001-2014," January 2017 and University of Kentucky and University of Tennessee, "Inland Navigation in the United States: An Evaluation of the Economic Impacts and the Potential Effects of Infrastructure Investment," November 2014.
[8] Texas Transportation Institute, "A Modal Comparison of Domestic Freight Transportation Effects on the General Public: 2001-2014," January 2017.

Introduction

Economic Contribution of the US Tugboat, Towboat, and Barge Industry

I. Introduction

The US tugboat, towboat, and barge industry plays an important role in domestic commerce. Nearly 5,500 US-flag tugboats and towboats and more than 31,000 barges move an average of 763 million tons of cargo on the nation's waterways each year, including raw materials and commodities as well as finished consumer products. The industry provides tug and tow services in US ports and facilitates trade between ports in the US mainland, Hawaii, Alaska, Puerto Rico, and the US Virgin Islands. In addition to its role in domestic waterborne commerce, the industry also facilitates international trade by providing tugboat services to large containerships and other oceangoing vessels entering US ports.

The American Waterways Operators engaged PwC to quantify the economic contribution of the US tugboat, towboat, and barge industry in terms of employment, labor income, value added, and taxes for 2014 using data from the federal government and customized input-output models built using the IMPLAN modeling system. [9]

In describing these impacts, this report considers three separate channels -- the direct impact, the indirect impact, and the induced impact -- that in aggregate provide a measure of the total economic impact of the US tugboat, towboat, and barge industry:

- ***Direct impacts*** include the jobs, labor income, value added, and taxes *directly attributable* to the US tugboat, towboat, and barge industry.
- ***Indirect impacts*** include the jobs, labor income, value added, and taxes occurring *throughout the industry's supply chain*.
- ***Induced impacts*** include the jobs, labor income, value added, and taxes resulting from *household spending* of labor and proprietor's income earned either directly or indirectly from the US tugboat, towboat, and barge industry's spending.

This report quantifies the industry's ***operational impact*** (due to purchases of intermediate inputs and payments of labor compensation and dividends) and ***capital investment impact*** (due to its investment in new structures and equipment, including vessels) at the national level. Separate detail is also provided on the industry's ***operational impact*** for the 50 states and the District of Columbia.[10]

[9] The IMPLAN input-output economic modeling system is supported by the IMPLAN Group LLC. Its users include academia, federal, state and local governments, and the private sector.
[10] The industry's *capital investment impact* is not quantified at the state level due to the non-availability of capital expenditure data at the state level.

The rest of this report is organized as follows. **Section II** provides an overview of the US tugboat, towboat, and barge industry. **Section III** provides PwC's estimates of the industry's total economic contributions at the national and state levels. Additional benefits of barge transportation, in terms of lower costs and lower emissions, are discussed in **Section IV**. The report also includes several appendices that provide detailed state level economic impacts, a description of the methodology, and additional detail on the industry's operations.

Overview of the US Tugboat, Towboat, and Barge Industry

II. Overview of the US Tugboat, Towboat, and Barge Industry

Tugboats, towboats, and barges operating on the nation's inland waterways, coasts, and harbors are a vital part of the US economy, providing an important means of transit for a variety of commodities and finished goods. This section of the report defines the US tugboat, towboat, and barge industry and provides an overview of its operations at the national, state, and waterway levels.

A. Industry Definition

Most economic activity directly associated with the US tugboat, towboat, and barge industry is included in North American Industry Classification System (NAICS) sectors 483113 ("Coastal and Great Lakes Freight Transportation") and 483211 ("Inland Water Freight Transportation"). These sectors comprise establishments primarily engaged in providing water transportation of cargo via rivers, coastal waters, intracoastal waterways, the Great Lakes System, and the deep seas between ports of the United States and US possessions and territories. Included within these sectors are the provision of tugboat and towboat services and the movement of cargo by barge for purposes of domestic commerce.[11]

The industry also includes a portion of NAICS sectors 488330 ("Navigational Services to Shipping") and 488390 ("Other Support Activities for Water Transportation"). Included within these sectors are the provision of tugboat and towboat services within harbors and ports. According to the 2012 *Economic Census*, approximately 69 percent of the revenues of sector 488330 and 1.5 percent of the revenues of sector 488390 were derived from tugboat and towboat services.[12] Additional shore jobs related to the vessel operations of the US tugboat, towboat, and barge industry are found in NAICS sectors 488310 ("Port and Harbor Operations") and 488320 ("Marine Cargo Handling")

B. Description of the Industry

In 2014, there were 5,476 tugboats, towboats, and push boats and 31,043 barges operating on the nation's waterways. According to the Army Corps of Engineers, the US barge fleet had a cargo capacity of more than 61 million tons and moved nearly 785 million tons of cargo on US waterways in 2014, including agricultural products, coal, petroleum products, and manufactured goods.

Measured by tonnage, barges accounted for 83.8 percent of all domestic waterborne commerce (i.e., waterborne commerce that originates and terminates at US harbors and ports) and 98.8 percent of commerce on internal waterways. The industry also

[11] These industries also include movement of freight via containership and other self-propelled vessels, as well as certain other freight transportation related activities. Throughout this paper, where possible, we have limited the data and analysis to the portion of these sectors that are part of the US tugboat, towboat, and barge industry.
[12] US Census Bureau, *2012 Economic Census*, Report EC1248SLLS1, "Transportation and Warehousing: Subject Series - Product Lines Statistics by Industry for the U.S.: 2012."

facilitates international trade by providing tugboat services to large containerships and other oceangoing vessels entering US ports.

1. Employment and Income

In 2014, the US tugboat, towboat, and barge industry employed 50,480 workers (including related shore jobs), approximately 38,600 of which were mariners on vessels operating on US waterways, and paid $4.7 billion in compensation (including wages and salaries and benefits).

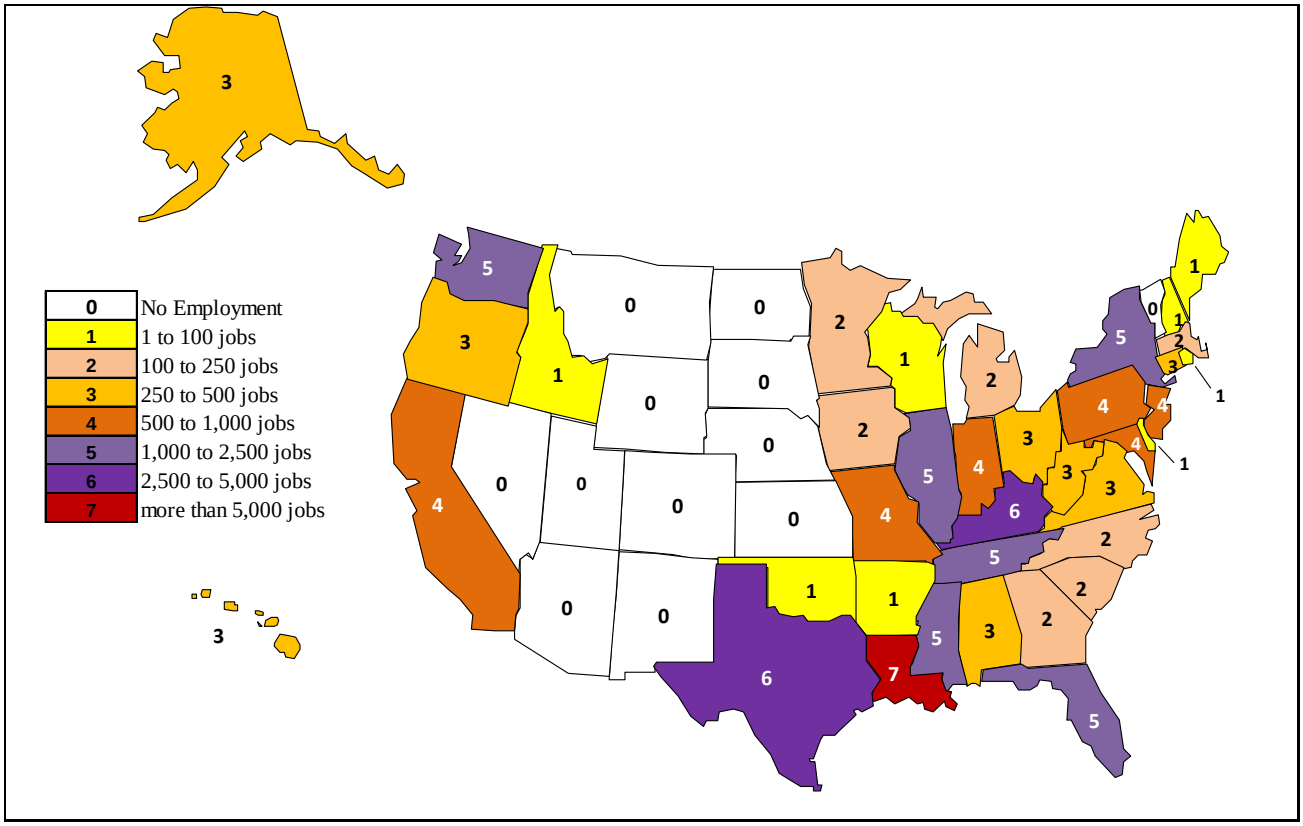
The industry employed workers in 38 states in 2014; however, five states (Louisiana, Texas, Kentucky, Florida, and New York) accounted for nearly 60 percent of all private sector employment in the industry (see **Table II-1** and **Figure II-1**).

Table II-1 – Total Private Sector Employment in the US Tugboat, Towboat, and Barge Industry, Top 10 States in 2014

State	Private Employment	Percent of U.S. Total
Louisiana	*15,620*	*30.9%*
Texas	*5,560*	*11.0%*
Kentucky	*3,320*	*6.6%*
Florida	*2,680*	*5.3%*
New York	*2,470*	*4.9%*
Tennessee	2,240	4.4%
California	2,020	4.0%
Illinois	1,950	3.9%
Washington	1,880	3.7%
Mississippi	1,300	2.6%
All other states combined	11,440	22.7%
US Total	**50,480**	**100%**

Source: PwC estimates based on data from the Bureau of Labor Statistics, Census Bureau, and the Army Corps of Engineers.
Note: Details may not add to total due to rounding.

Figure II-1 – Private Sector Employment in the US Tugboat, Towboat, and Barge Industry by State, 2014



Source: PwC estimates based on data from the Bureau of Labor Statistics, Census Bureau, and the Army Corps of Engineers.

In 2014, private employee compensation in the industry was over $4.7 billion, more than 60 percent of which was paid in five states (Louisiana, Texas, Kentucky, New York, and Florida) (see **Table II-2**).

Table II-2 – Total Private Employee Compensation in the US Tugboat, Towboat, and Barge Industry, Top 10 States in 2014
[Dollar Amounts in $ Millions]

State	Employee Compensation*	Percent of U.S. Total
Louisiana	*$1,551.2*	*32.7%*
Texas	*529.2*	*11.2%*
Kentucky	*293.6*	*6.2%*
New York	*290.1*	*6.1%*
Florida	*230.0*	*4.9%*
California	211.1	4.5%
Washington	198.5	4.2%
Tennessee	197.0	4.2%
Illinois	155.7	3.3%
Maryland	110.4	2.3%
All other states combined	970.0	20.5%
US Total	**$4,736.8**	**100%**

Source: PwC estimates based on data from the Bureau of Labor Statistics, Census Bureau, and the Army Corps of Engineers.
*Employee compensation includes wages and salaries and benefits.

2. Revenue and Output

In 2014, industry revenues were $15.9 billion from the movement of cargo on barges and the provision of tugboat and towboat services to self-propelled vessels (see **Table II-3**). Industry revenues exceed $1 billion in Louisiana ($4.6 billion), Texas ($1.7 billion), Kentucky ($1.4 billion), and Tennessee ($1.1 billion).

The industry's contribution to US GDP (i.e., value added) amounted to $9.0 billion in 2014 (see **Table II-4**). Industry value added exceeds $0.5 billion in Louisiana ($2.6 billion), Texas ($1.0 billion), Kentucky ($0.6 billion) and New York ($0.6 billion).

Table II-3 – US Tugboat, Towboat, and Barge Industry Revenues, Top 10 States in 2014 [Dollar Amounts in $ Millions]

State	Revenues	Percent of U.S. Total
Louisiana	$4,583	28.8%
Texas	1,689	10.6%
Kentucky	1,371	8.6%
Tennessee	1,068	6.7%
New York	980	6.1%
Florida	655	4.1%
Illinois	591	3.7%
Indiana	564	3.5%
Washington	540	3.4%
Mississippi	476	3.0%
All other states combined	3,417	21.4%
US Total	**$15,935**	**100%**

Source: PwC estimates based on data from the Bureau of Labor Statistics, Census Bureau, and the Army Corps of Engineers.

Table II-4 – US Tugboat, Towboat, and Barge Industry Contribution to GDP, Top 10 States in 2014 [Dollar Amounts in $ Millions]

State	Contribution to GDP	Percent of U.S. Total
Louisiana	$2,606	29.1%
Texas	987	11.0%
Kentucky	604	6.7%
New York	571	6.4%
Tennessee	482	5.4%
Florida	463	5.2%
Indiana	461	5.2%
Washington	349	3.9%
California	320	3.6%
Illinois	282	3.2%
All other states combined	1,830	20.4%
US Total	**$8,954**	**100%**

Source: PwC estimates based on data from the Bureau of Labor Statistics, Census Bureau, and the Army Corps of Engineers.

3. Capital Expenditures

We estimate the industry spent a total of $2.2 billion on new capital assets in 2014, including new vessels, structures, and equipment.[13]

In 2014, 66 new or rebuilt tugboats and towboats were added to the US fleet, along with 656 new or rebuilt barges (see **Table II-5**). In addition, the industry placed orders with US shipyards for 24 new tugboats and towboats and 10 new oceangoing barges in 2014, to be delivered in 2015, 2016, and 2017.[14]

Table II-5 – Summary of Fleet Construction
US Tugboat, Towboat, and Barge Industry, 2005 to 2014

Year	Tugboats and Towboats			Barges		
	New Vessels	Vessels Rebuilt	Total	New Vessels	Vessels Rebuilt	Total
2005	26	7	33	532	2	534
2006	51	11	62	826	5	831
2007	80	9	89	1,197	8	1,205
2008	97	9	106	1,092	10	1,102
2009	82	9	91	801	3	804
2010	50	10	60	1,094	4	1,098
2011	77	0	77	1,163	10	1,173
2012	72	8	80	1,157	5	1,162
2013	65	3	68	864	2	866
2014	62	4	66	655	1	656

Source: The Army Corps of Engineers, *Waterborne Transportation Lines of The United States, Calendar Year 2014 - Volume 1: National Summaries*, Table 3.

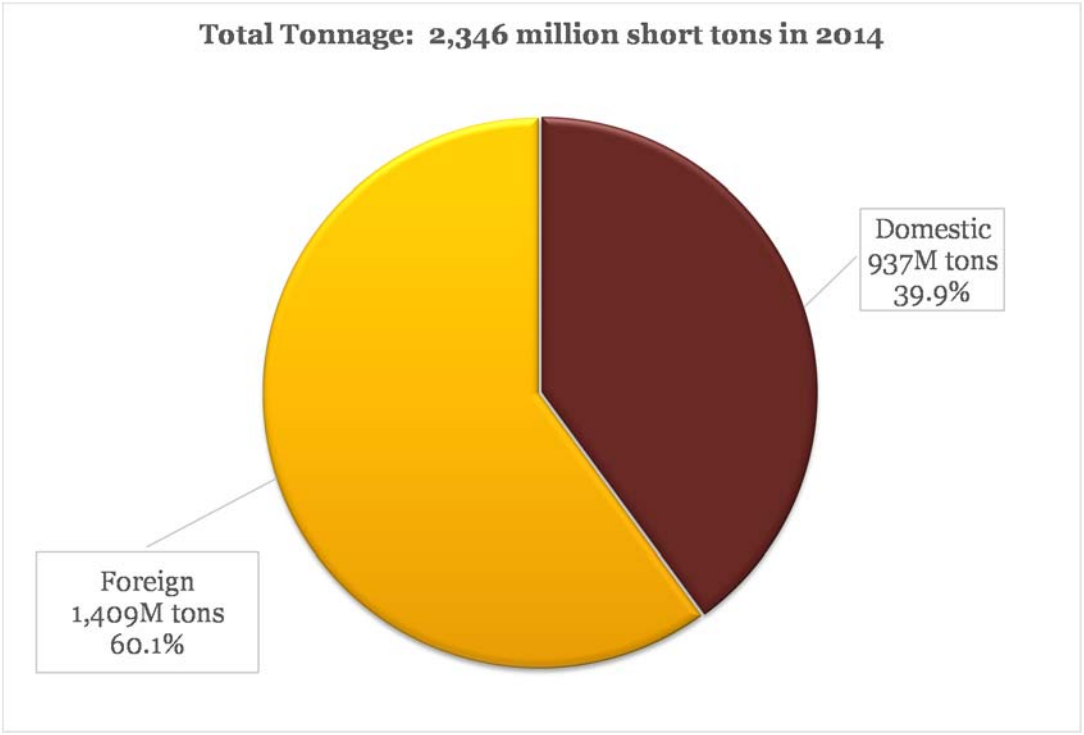
C. Domestic Waterborne Commerce

Over 2.3 billion tons of cargo moved through US ports and on US waterways in 2014 (see **Figure II-2**). International trade accounted for 60 percent (1.4 billion tons) of this cargo. The remaining 40 percent (937 million tons) was cargo moving on US waterways between domestic ports.

In 2014, 785 million tons of cargo were moved by barge, accounting for nearly 84 percent of all domestic waterborne commerce (see **Figure II-3**). In addition, the industry assists in both foreign and domestic trade by providing tugboat services to containerships and other self-propelled vessels, transporting goods to and from US ports.

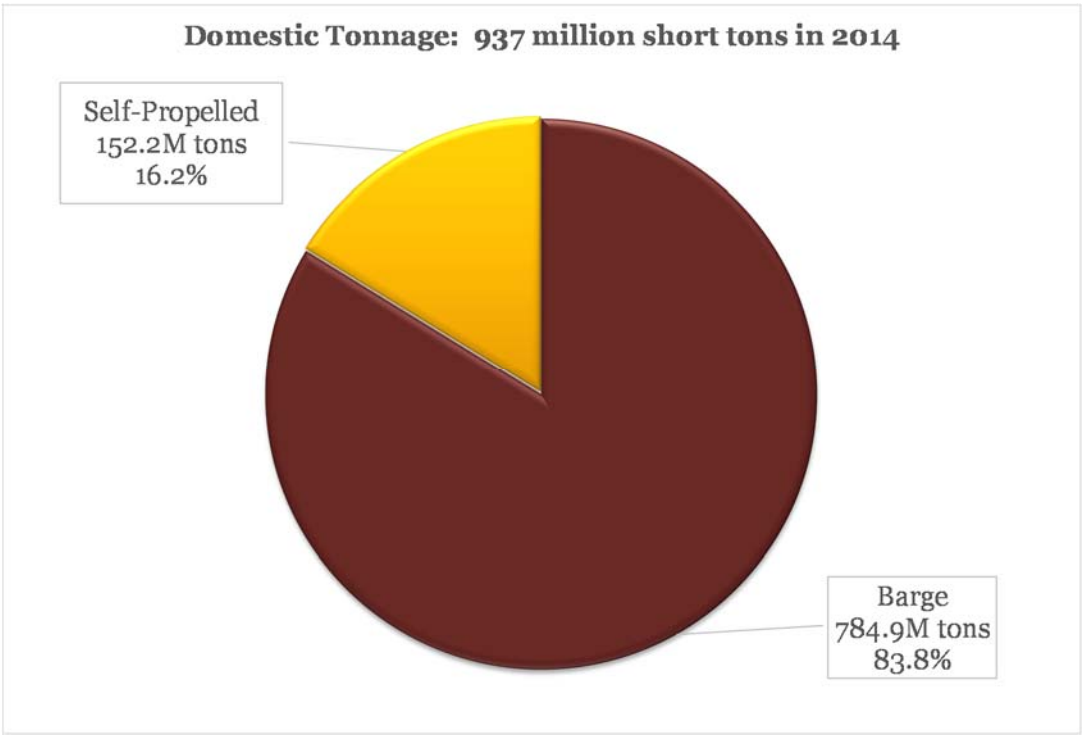
[13] PwC estimate based on industry data (see **Appendix A**).
[14] Data on the number of new inland barges ordered was not available. See, http://www.shipbuildinghistory.com/today/statistics/contracts2014.htm

Figure II-2 – Total US Waterborne Commerce, 2014 [Millions of Short Tons and Percentage of Total]



Source: The Army Corps of Engineers, *Waterborne Commerce of the United States*, Table 1-1.

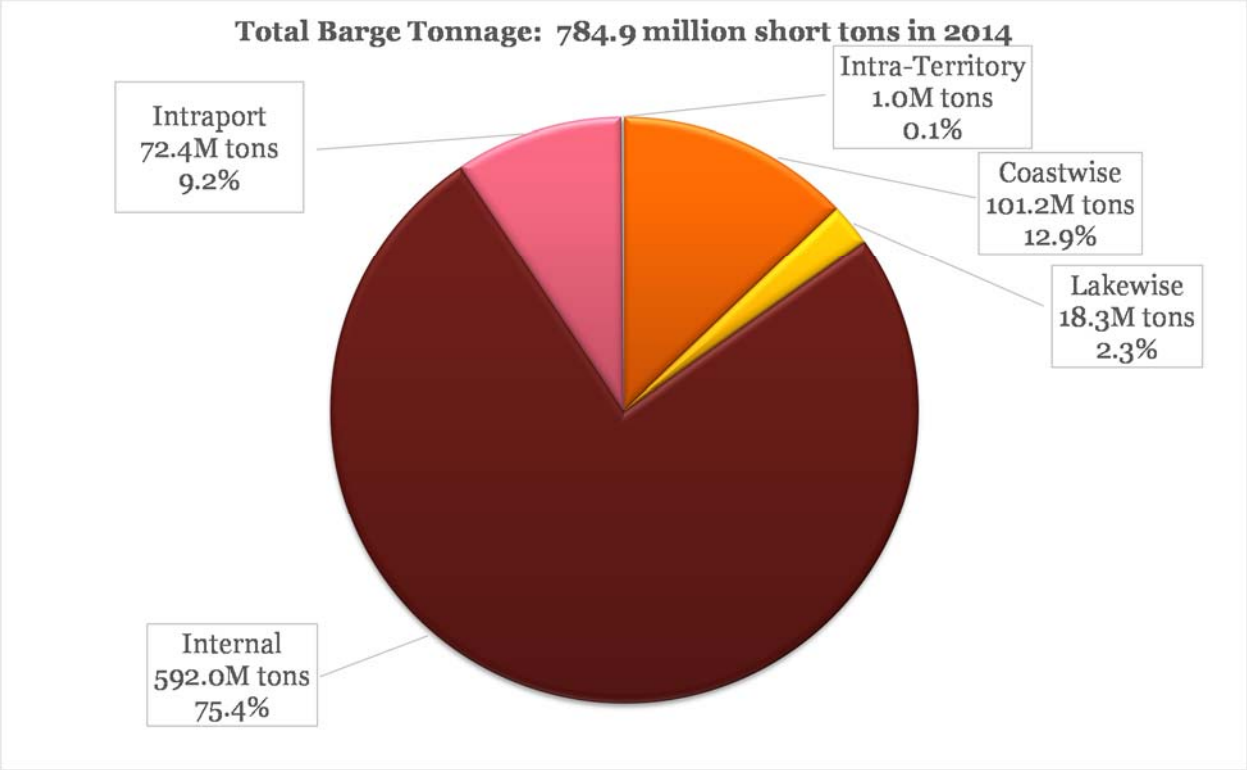
Figure II-3 – US Domestic Waterborne Commerce, 2014 [Millions of Short Tons and Percentage of Total]



Source: The Army Corps of Engineers, *Waterborne Commerce of the United States*, Table 1-12.

Barge traffic is most prevalent on internal waterways (i.e., trade between US ports along the nation's rivers and canals). As shown in **Figure II-4**, internal waterways accounted for 75 percent of the barge traffic in 2014, compared to 12 percent for trade between coastal ports ("coastwise trade") and 9 percent within US ports (i.e., "intraport" freight movement).

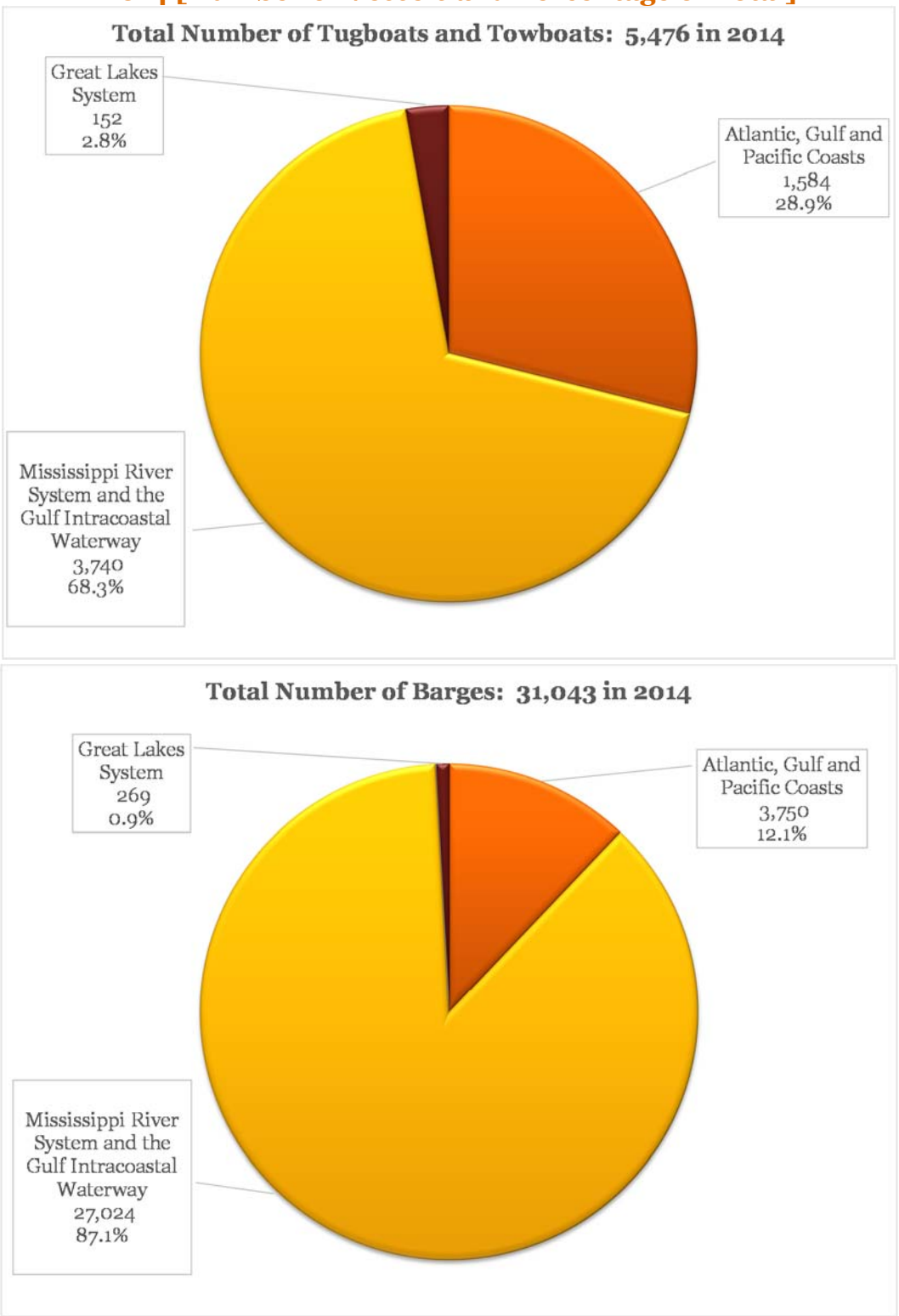
Figure II-4 – Domestic Barge Traffic, 2014
[Millions of Short Tons and Percentage of Total]



Source: The Army Corps of Engineers, *Waterborne Commerce of the United States*, Table 1-12.

In 2014, more than 3,700 tugboats and towboats and 27,000 barges operated on the Mississippi River System and the Gulf Intracoastal Waterway, accounting for 68 percent of all tugboats and towboats and 87 percent of the US barge fleet (see **Figure II-5**). Barges operating on the Mississippi River System and the Gulf Intracoastal Waterway had a total cargo capacity of 50.4 million tons in 2014, 82 percent of the total cargo capacity of the US barge fleet.

Figure II-5 – US Tugboat, Towboat, and Barge Industry Fleet by Region, 2014 [Number of Vessels and Percentage of Total]



Source: U.S. Army Corps of Engineers, *Waterborne Transportation Lines of the United States, Calendar Year 2014, Volume 1 National Summaries*, Table 1.

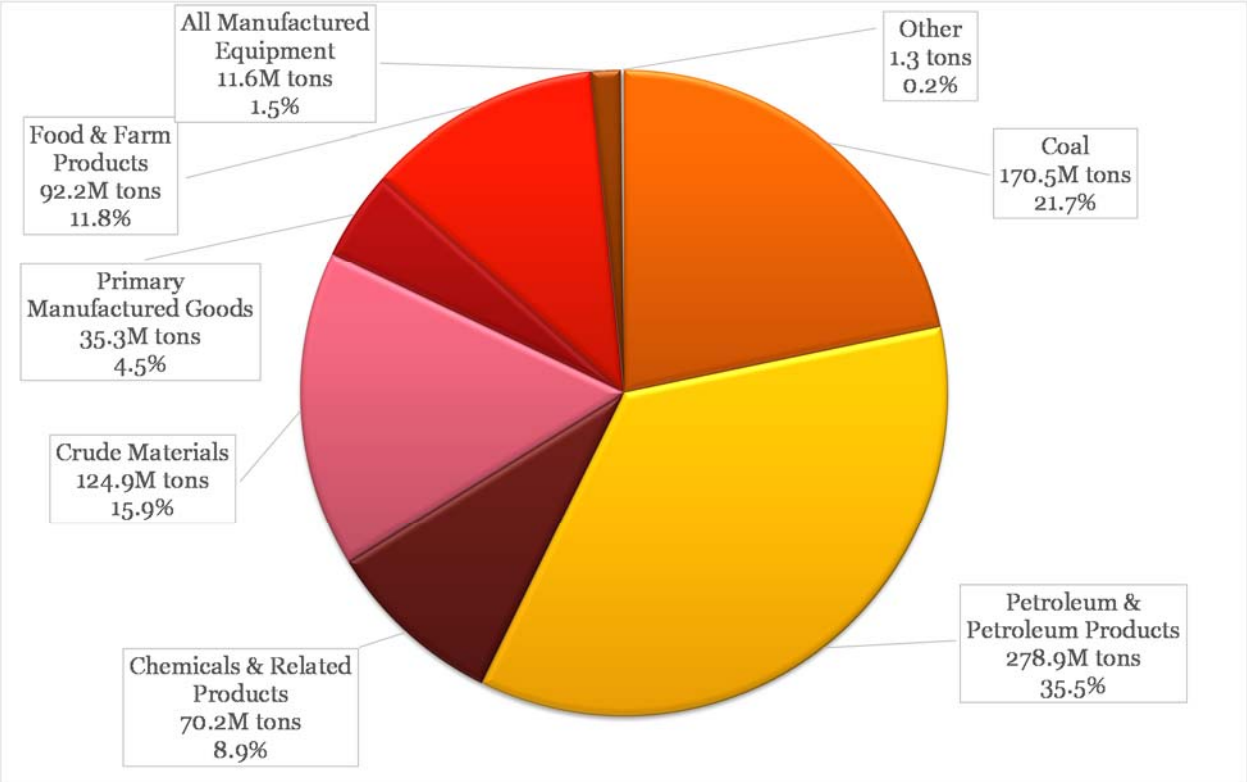
1. *Products Shipped*

The types of products shipped by barge include raw materials such as oil, coal, and ore; agriculture products; and manufactured goods. By volume, petroleum and petroleum products represent the largest single commodity shipped by barge, amounting to 279 million tons or 35.5 percent of the total volume of cargo moved by barge in 2014 (see **Figure II-6**).

Coal was the second largest commodity by volume, with 125 million tons shipped (16 percent of the total volume shipped by barge). Primary manufactured goods and manufactured equipment accounted for just 6 percent (47 million tons) of the volume of cargo shipped by barge between domestic ports.

Figure II-6 – Domestic Barge Traffic by Commodity Group, 2014
[Millions of Short Tons and Percentage of Total]

Total Barge Tonnage: 784.9 million short tons in 2014



Source: U.S. Army Corps of Engineers, *Waterborne Commerce of the United States, Calendar Year 2014, Part 5 – National Summaries*, Table 2-3.

For additional detail on domestic waterborne commerce via barge see **Appendix C**.

1. *Waterborne Commerce by State*[15]

In 2014, two states had total (domestic and international) waterway commerce tonnage in excess of 500 million short tons: Louisiana (544 million) and Texas (507 million) (see **Table II-6**).

Louisiana, Illinois, and Texas were the states with the highest levels of outgoing domestic tonnage in 2014 (see **Table II-7**). Louisiana and Texas primarily ship refined petroleum products. Illinois primarily ships food and food products. Louisiana was also the state with the most incoming domestic tonnage, primarily receiving food and food products. Ohio and Indiana ranked second and third in terms of the destination for domestic waterborne commerce, primarily receiving coal and iron, respectively.

Table II-8 provides estimates of the value of product shipments by water by state.[16] Combining domestic and international freight, the total value of commodities transported on our nation's waterways totaled more than $491 billion in 2014, of which $298 billion (61 percent) was related to domestic trade. Ranked by the total value of commodities transported, Texas ($142 billion), Louisiana ($81 billion), and California ($51 billion) were the largest states for domestic waterborne commerce.

For additional detail on waterborne commerce by state see **Appendix D**.

[15] Cargo volumes reported at the state-level include cargo transported by barge and cargo transported on self-propelled vessels. Separate breakouts for cargo transported by barge are not available. The data provided includes both outbound and inbound cargo for each state, as well as intrastate shipments. As such, summing cargo volumes and values across all states results in double counting of cargo shipped across state borders.

[16] Due to differences in coverage, the value of product shipments reported by the Bureau of Transportation Statistics is not directly comparable with volume data reported by the Army Corps of Engineers. For example, the Bureau of Transportation Statistics does not include the waterborne portion of mixed model freight transportation, while the Army Corps does. The Bureau of Transportation Statistics data also excludes intraport transportation unless there is a change in ownership of the freight. The Army Corps includes all intraport shipments.

Table II-6 – Total Waterborne Commerce by Type, 2014
[Ranked by Total Domestic Tonnage, millions of short tons]

State	Total Freight Traffic	Foreign Trade	Domestic Trade
US Total	**2,345.8**	**1,408.7**	**937.1**
Louisiana	544.0	238.6	305.4
Texas	506.6	346.4	160.2
Illinois	106.5	2.1	104.4
Kentucky	101.1	0.0	101.1
Ohio	97.4	10.9	86.5
Indiana	73.2	2.0	71.2
West Virginia	63.9	0.0	63.9
New Jersey	147.2	93.8	53.4
Michigan	60.0	8.7	51.4
Pennsylvania	65.0	15.8	49.2
Florida	98.7	51.9	46.8
Alabama	81.7	36.8	44.8
Minnesota	43.5	3.8	39.7
Missouri	38.8	0.0	38.8
Washington	119.2	80.5	38.7
Alaska	40.7	5.6	35.1
Tennessee	34.8	0.0	34.8
California	230.2	200.5	29.7
New York	38.4	10.7	27.7
Wisconsin	33.9	8.2	25.7
Mississippi	45.5	20.2	25.3
Arkansas	18.2	0.0	18.2
Hawaii	24.9	8.2	16.7
Oregon	32.1	18.1	14.1
Virginia	78.8	67.9	10.9
Maryland	41.0	30.5	10.5
Connecticut	13.3	3.7	9.6
Iowa	8.9	0.0	8.9
Delaware	14.4	7.9	6.5
Massachusetts	18.7	12.5	6.3
Oklahoma	6.2	0.0	6.2
Puerto Rico	20.7	14.8	5.9
Rhode Island	8.8	4.9	3.9
North Carolina	9.7	7.3	2.4
South Carolina	20.3	18.3	2.0
Georgia	37.6	36.2	1.4
Maine	12.0	10.6	1.3
Idaho	0.8	0.0	0.8
New Hampshire	2.8	2.3	0.5
Kansas	0.2	0.0	0.2
District of Columbia	0.1	0.0	0.1
Nebraska	0.01	0.0	0.01

Source: US Army Corps of Engineeers, *State to State Commodity Tonnages Public Domain Database.*
Note: Due to interstate commodity flows, state detail does not add to the national total.
Tonnage includes all commodities shipped and received including goods transpoted by barge and by containership. Data includes cargo moved for military agencies on commercial vessels, but excludes cargo moved on military vessels.

Table II-7 – Domestic Waterborne Commerce, Major Commodity* by State, 2014 [millions of short tons]

State	Shipments Originating in State[2]			Shipments Received by State		
	Total Tonnage	Major Commodity	Major / Total	Total Tonnage	Major Commodity	Major / Total
Alabama	28.4	Coal, Lignite, and Coal Coke	35%	16.5	Coal, Lignite, and Coal Coke	19%
Alaska	31.7	Crude Petroleum	71%	3.4	Manufactured Goods	44%
Arkansas	10.6	Food and Food Products	57%	7.5	Primary Metal Products	30%
California	15.7	Petroleum Products	65%	14.0	Crude Petroleum	73%
Connecticut	2.0	Petroleum Products	8%	7.5	Petroleum Products	82%
Delaware	4.2	Petroleum Products	79%	2.4	Petroleum Products	53%
District of Columbia	0.0	NA	NA	0.1	No Detail Available	100%
Florida	7.5	Manufactured Goods	19%	39.3	Petroleum Products	72%
Georgia	0.6	No Detail Available	100%	0.8	Petroleum Products	22%
Hawaii	11.0	Petroleum Products	11%	5.7	Petroleum Products	6%
Idaho	0.8	No Detail Available	100%	*	No Detail Available	100%
Illinois	85.8	Food and Food Products	35%	18.7	Chemical Fertilizers	17%
Indiana	24.4	Food and Food Products	29%	46.8	Iron Ore, Iron, and Steel Waste and Scrap	51%
Iowa	5.5	Food and Food Products	65%	3.3	Chemical Fertilizers	30%
Kansas	0.2	No Detail Available	100%	*	No Detail Available	100%
Kentucky	76.4	Coal, Lignite, and Coal Coke	55%	24.7	Coal, Lignite, and Coal Coke	25%
Louisiana	153.3	Petroleum Products	41%	152.1	Food and Food Products	49%
Maine	0.1	No Detail Available	100%	1.2	Petroleum Products	71%
Maryland	8.2	Sand, Gravel, Shells, Clay, Salt, and Slag	16%	2.4	Petroleum Products	50%
Massachusetts	0.5	Petroleum Products	52%	5.7	Petroleum Products	66%
Michigan	31.3	Sand, Gravel, Shells, Clay, Salt, and Slag	57%	20.0	Coal, Lignite, and Coal Coke	73%
Minnesota	32.1	Iron Ore, Iron, and Steel Waste and Scrap	83%	7.6	Sand, Gravel, Shells, Clay, Salt, and Slag	38%
Mississippi	15.1	Petroleum Products	41%	10.2	Sand, Gravel, Shells, Clay, Salt, and Slag	24%
Missouri	31.9	Sand, Gravel, Shells, Clay, Salt, and Slag	28%	6.9	Chemical Fertilizers	30%
Nebraska	0.0	NA	NA	*	No Detail Available	100%
New Hampshire	*	No Detail Available	100%	0.5	Petroleum Products	89%
New Jersey	41.6	Petroleum Products	75%	11.8	Crude Petroleum	49%
New York	13.4	Crude Petroleum	32%	14.3	Petroleum Products	81%
North Carolina	1.3	Primary Metal Products	22%	1.1	Iron Ore, Iron, and Steel Waste and Scrap	23%
Ohio	29.4	Coal, Lignite, and Coal Coke	47%	57.1	Coal, Lignite, and Coal Coke	50%
Oklahoma	3.1	Food and Food Products	60%	3.1	Chemical Fertilizers	52%
Oregon	7.3	Sand, Gravel, Shells, Clay, Salt, and Slag	29%	6.8	Petroleum Products	36%
Pennsylvania	19.6	Coal, Lignite, and Coal Coke	53%	29.5	Coal, Lignite, and Coal Coke	38%
Puerto Rico	2.4	NA	NA	3.6	Manufactured Goods	39%
Rhode Island	0.3	No Detail Available	100%	3.6	Petroleum Products	74%
South Carolina	0.7	No Detail Available	100%	1.3	Chemicals excluding Fertilizers	54%
Tennessee	9.0	Food and Food Products	44%	25.8	Coal, Lignite, and Coal Coke	50%
Texas	131.4	Petroleum Products	43%	28.9	Petroleum Products	57%
Virginia	7.7	Petroleum Products	20%	3.2	Petroleum Products	13%
Washington	20.6	Petroleum Products	36%	18.1	Crude Petroleum	74%
West Virginia	48.5	Coal, Lignite, and Coal Coke	81%	15.3	Coal, Lignite, and Coal Coke	42%
Wisconsin	18.4	Coal, Lignite, and Coal Coke	57%	7.3	Sand, Gravel, Shells, Clay, Salt, and Slag	36%

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

[1]The major commodity is the commodity with the largest tonnage leaving or coming into a state, excluding the other or unknown category. In some cases commodity detail was not available.

[2]Includes intrastate shipments and shipments to US territories and overseas military facilities. An asterisk (*) denotes less than 50,000 tons.

Table II-8 – Total Value of US Waterborne Commerce by Type, 2014
Ranked by Value of Domestic Waterborne Trade
[in $ millions]

State	Total	Foreign Trade	Domestic Trade
US Total	**$491,347**	**$193,723**	**$297,624**
Texas	$174,099	$31,912	$142,187
Louisiana	$113,688	$33,032	$80,656
California	$64,493	$13,293	$51,200
Alaska	$34,310	$3,068	$31,242
Florida	$25,336	$10,764	$14,573
Pennsylvania	$19,740	$8,477	$11,263
Kentucky	$10,528	$646	$9,881
Illinois	$31,760	$22,969	$8,791
New Jersey	$23,140	$15,300	$7,840
Missouri	$7,773	$141	$7,631
Mississippi	$10,477	$2,989	$7,488
Washington	$13,236	$6,045	$7,191
Tennessee	$4,869	$121	$4,748
West Virginia	$4,575	$0	$4,575
Alabama	$6,017	$1,703	$4,314
Ohio	$8,249	$4,120	$4,129
Georgia	$7,610	$4,290	$3,320
North Carolina	$5,212	$2,253	$2,959
Minnesota	$3,001	$654	$2,347
Indiana	$2,629	$429	$2,200
Hawaii	$2,226	$247	$1,979
Arkansas	$3,134	$1,222	$1,912
Oklahoma	$1,600	$9	$1,590
New York	$36,061	$34,600	$1,461
Delaware	$5,560	$4,234	$1,326
Maine	$3,934	$2,656	$1,278
Iowa	$2,384	$1,111	$1,273
Oregon	$1,631	$985	$646
Virginia	$7,359	$6,833	$526
Michigan	$10,509	$10,033	$476
South Carolina	$7,483	$7,237	$247
Wisconsin	$4,558	$4,338	$220
Maryland	$4,456	$4,364	$92
Kansas	$78	$0	$77
Connecticut	$8,519	$8,497	$22
Nebraska	$15	$0	$15
New Mexico	$3	$0	$3
North Dakota	$42	$41	$1
Colorado	$100	$100	$0
District of Columbia	$479	$479	$0
Massachusetts	$6,342	$6,342	$0
New Hampshire	$4,894	$4,894	$0
Rhode Island	$1,507	$1,507	$0
Vermont	$157	$157	$0

Source: Bureau of Transportation Statistics, *Freight Analysis Framework Version 4.*
Notes: Due to interstate commodity flows, state detail does not add to the national total. Data includes all commodities shipped and received including goods transported by barge and by containership but excludes the waterborne portion of mixed model freight transportation.
Data on Puerto Rico was not provided in the *Freight Analysis Framework Version 4* .

2. *Key Waterways and Ports*

Table II-9 (on the next page) summarizes foreign and domestic waterborne commerce for select US waterways. By volume, the Mississippi River System was the most important inland waterway for waterborne commerce with nearly 719 million tons of cargo moved in 2014, of which 509.1 million tons was shipped between US ports. PwC estimates that 96 percent of the domestic waterborne commerce on the Mississippi River System is transported by barge.

The US tugboat, towboat, and barge industry also plays an important role in the operation of our nation's ports, providing tug and tow services to containerships and other self-propelled vessels, transporting cargo by barge within the port, and providing a means to transport cargo inland via the nation's rivers. **Table II-10** lists the 15 largest US ports, ranked by total tonnage. Five of the largest US ports are found in Louisiana. These five ports handled more than 533 million tons of cargo in 2014 (including 295 million tons of cargo shipped from other US ports). Four of the top 15 US ports are located in Texas and handled more than 454 million tons of cargo (167 million of which were shipped from other US ports).

Table II-10 – 15 Largest US Ports by Total Tonnage, 2014
[millions of short tons]

Year	Total Tonnage	Domestic Trade	Foreign Trade		
			Total	Imports	Exports
South Louisiana, LA, Port of	267.4	141.6	125.8	40.4	85.5
Houston, TX	234.3	73.8	160.5	76.7	83.8
New York, NY and NJ	126.2	46.5	79.6	60.8	18.8
Beaumont, TX	87.3	34.3	52.9	39.2	13.8
Long Beach, CA	85.0	10.9	74.1	47.8	26.3
Corpus Christi, TX	84.9	40.2	44.7	26.5	18.3
New Orleans, LA	84.5	47.4	37.1	17.7	19.4
Baton Rouge, LA	69.2	42.8	26.4	12.9	13.5
Mobile, AL	64.3	27.5	36.8	18.3	18.5
Los Angeles, CA	61.0	5.8	55.2	34.3	21.0
Lake Charles, LA	56.8	28.1	28.7	20.0	8.7
Plaquemines, LA, Port of	55.5	35.3	20.2	2.3	17.9
Cincinnati-Northern KY, Ports	49.9	49.9	0	0	0
Norfolk Harbor, VA	48.0	6.0	42.0	10.5	31.5
Texas City, TX	47.9	18.8	29.0	15.5	13.6

Source: PwC estimates based on data from The Army Corps of Engineers, *Waterborne Commerce of the United States,* Table 5-2

For additional detail on select waterways see **Appendix E**.

Table II-9 – Total Waterborne Commerce by Type, Select US Waterways, 2014
[millions of short tons]

Waterway	Total Freight Traffic	Foreign Trade			Domestic Trade		
		Total	Imports	Exports	Total	Barges	Percent by Barge
Atlantic Coast							
Hudson River, NY	17.5	1.7	1.2	0.5	15.8	14.0	88.7%
James River, VA	2.6	0.4	0.1	0.3	2.2	2.2	98.3%
Gulf Coast							
Black Warrior and Tombigbee Rivers, AL	21.2	0	0	0	21.2	20.9	98.8%
Gulf Intercoastal Waterway, TX-FL	126.1	0	0	0	126.1	124.4	98.6%
Tennessee-Tombigbee Waterway, AL and MS	8.8	0	0	0	8.8	8.7	98.8%
Mississippi River System	**718.6**	**209.5**	**73.1**	**136.3**	**509.1**	**489.2**	**96.1%**
Cumberland River, KY and TN	22.4	0	0	0	22.4	22.1	98.8%
Illinois Waterway, IL	37.1	0	0	0	37.1	36.6	98.8%
Kanawha River, WV	13.5	0	0	0	13.5	13.3	98.8%
McClellan-Kerr Arkansas River, AK and OK	11.9	0	0	0	11.9	11.8	98.8%
Mississippi River Stem	536.2	209.5	73.1	136.3	326.8	309.1	94.6%
Ohio River System, PA, WV, OH, KY, IN, and IL	246.0	0	0	0	246.0	242.9	98.8%
Ohio River	220.8	0	0	0	220.8	218.1	98.8%
Tennessee River, TN, KY, MS, and AL	35.7	0	0	0	35.7	35.2	98.8%
The Great Lakes	**132.3**	**36.8**	**17.3**	**19.5**	**95.5**	**25.5**	**26.7%**
Pacific Coast							
Columbia River System, OR, WA, and ID	62.0	45.5	6.1	39.4	16.5	14.5	88.0%
Columbia River	61.7	45.5	6.1	39.4	16.2	14.2	87.8%
Snake River	4.4	0	0	0	4.4	4.3	98.8%

Source: PwC estimates based on data from The Army Corps of Engineers, *Manuscript Cargo Files* (http://www.navigationdatacenter.us/data/datawcus.htm).
Note: The percent by barge understates the role of the US tugboat, towboat, and barge industry in US waterborne commerce because it excludes tug and tow services related to international trade.

Economic Impact of the US Tugboat, Towboat, and Barge Industry

III. Economic Impact of the US Tugboat, Towboat, and Barge Industry

This section presents estimates of the total economic contributions of the US tugboat, towboat, and barge industry in 2014 at the national and state levels, in terms of employment, labor income, value added (i.e., contribution to GDP), and taxes:

- Employment is defined as the number of payroll and self-employed jobs, including part time jobs.
- Labor income is defined as wages and salaries and benefits as well as proprietors' income.
- Value added is the industry's contribution to gross domestic product (GDP).
- Taxes include all federal, state, and local taxes borne and collected, other than personal taxes.

The economic contributions of the US tugboat, towboat, and barge industry extends beyond vessel operations. The industry purchases goods and services as inputs from companies in other industries. In turn, those companies purchase other products to help meet the demand from the US tugboat, towboat, and barge industry. At each level of production, wages are paid to employees who then spend that money, generating additional economic impacts.

The total economic impact reported below includes the **direct impact** (the jobs, labor income, and value added within the US tugboat, towboat, and barge industry industry), the **indirect impact** (the jobs, labor income, and value added occurring throughout the industry's supply chain), and the **induced impact** (the jobs, labor income, and value added resulting from household spending of income earned either directly or indirectly from the industry's spending).

This report quantifies the industry's ***operational impact*** (due to purchases of intermediate inputs and payments of labor compensation and dividends) and ***capital investment impact*** (due to its investment in new structures and equipment, including vessels) at the national level. Separate detail is also provided on the industry's ***operational impact*** for the 50 states and the District of Columbia.[17]

Industry Definition

For purposes of this study, the US tugboat, towboat, and barge industry is defined to include all U.S.-flag tugboats, towboats, and barges that operate in whole or in part

[17] The industry's *capital investment impact* is not quantified at the state level due to the non-availability of capital expenditure data at the state level.

on the domestic waterways and ports of the United States, along with related shore jobs.

As described in **Table III-1**, economic activity directly associated with the US tugboat, towboat, and barge industry is captured within six industry subsectors defined by the North American Industrial Classification System ("NAICS").

Table III-1 – The US Tugboat, Towboat, and Barge Industry Industry Definition

NAICS Code	NAICS Description	Coverage
483113	Coastal and Great Lakes Freight Transportation	Towing Services Tugboat Services Freight Transportation (partial)
483211	Inland Water Freight Transportation	Towing Services Tugboat Services Freight Transportation (partial)
488310	Port and Harbor Operations	Related Shore Jobs
488320	Marine Cargo Handling	Related Shore Jobs
488330	Navigational Services to Shipping	Towing Services Tugboat Services Related Shore Jobs
488390	Other Support Activities for Water Transportation	Towing Services Tugboat Services Related Shore Jobs

The bulk of the industry's operations can be found in two subsectors: NAICS 483113 (Coastal and Great Lakes Freight Transportation) and NAICS 483211 (Inland Water Freight Transportation). These subsectors include tugboat and towboat services as well as waterborne freight transportation. Because waterborne freight transportation includes transportation of freight by both barge and by self-propelled vessels, data from the *2012 Economic Census* and the Army Corps of Engineers was used to allocate economic activity in these subsectors between the US tugboat, towboat, and barge industry and self-propelled vessels.[18]

NAICS 488330 and NAICS 488390 also contain some tugboat and towboat services. Data from the *2012 Economic Census* was used to allocate economic activity in these subsectors between the US tugboat, towboat, and barge industry and other industries.

[18] See **Appendix A** for details.

NAICS 488310, 488320, 488330, and 488390 also contain shore jobs related to the operation of vessels in the US tugboat, towboat, and barge industry.[19]

For purposes of this study, the manufacture and repair of tugboats, towboats, and barges is excluded from the definition above and estimates of the industry's direct economic impact. Instead, economic activity related to the manufacture and repair of tugboats, towboats, and barges is counted as part of the industry's indirect impacts.

National-Level Economic Contributions

In 2014, the US tugboat, towboat, and barge industry generated revenues of $15.9 billion, *directly* employed 50,480 workers, and paid out $4.7 billion in compensation (including wages and salaries and benefits), an average of $93,835 per worker. The industry also contributed $9.0 billion to US gross domestic product (GDP) and invested nearly $2.2 billion in property, plant, and equipment, including its purchases of vessels.

In addition to 50,480 direct jobs, the US tugboat, towboat, and barge industry supported an additional 251,070 *indirect* and *induced* jobs in other sectors of the economy, approximately 5.0 additional jobs for each direct job in the industry. In total, combining both operational and capital investment impacts, the US tugboat, towboat, and barge industry directly or indirectly supported 301,550 jobs in 2014 (see **Table III-2**).

Counting direct, indirect, and induced impacts, the US tugboat, towboat, and barge industry's total impact on labor income (including proprietors' income) was $19.4 billion. The industry's total (direct, indirect, and induced) impact on US GDP was $33.8 billion in 2014.

[19] See **Appendix A** for details on how related shore jobs were estimated.

Table III-2 – Total (Direct, Indirect, and Induced) Economic Contributions of the US Tugboat, Towboat, and Barge Industry, 2014

	Direct Impacts	Indirect and Induced Impacts		Total Impact
		Operational Impacts	Capital Investment Impacts	
Employment[a]	50,480	220,500	30,570	301,550
Labor Income ($ millions)[b]	4,737	12,768	1,891	19,397
Value Added ($ millions)	8,954	21,969	2,847	33,771
Tax Impact ($ millions)[c]	$1,173	$3,591	$464	$5,227

Source: PwC calculations using the IMPLAN modeling system (2013 database) and data from the US Bureau of Labor Statistics, the Census Bureau, and the Army Corps of Engineers.
Note: Details may not add to totals due to rounding.
[a] Employment is defined as the number of payroll and self-employed jobs, including part time jobs.
[b] Labor income is defined as wages and salaries and benefits as well as proprietors' income.
[c] Includes all types of taxes (other than personal taxes) borne and collected at the federal, state and local level.

Nationwide, the US tugboat, towboat, and barge industry directly paid or collected nearly $1.2 billion in federal, state, and local taxes in 2014, including corporate income taxes, excise and sales taxes, and other taxes borne or collected by businesses. Including direct, indirect, and induced tax impacts, the US tugboat, towboat, and barge industry had a combined tax impact of more than $5.2 billion in 2014.

Most of the indirect and induced economic impact of the US tugboat, towboat, and barge industry is associated with the industry's ongoing operations, as its capital expenditures account for approximately 12.0 percent of the industry's indirect and induced impact. The largest amount of indirect and induced economic activity associated with the industry occurs in the services sector of the economy, which accounts for nearly 45.0 percent of the operational impact, in terms of indirect and induced jobs (see **Table III-3**).

Table III-3 – Indirect and Induced Economic Impacts of the US Tugboat, Towboat, and Barge Industry, by Receiving Industry, 2014

Sector Description	Employment[a]	Labor Income ($ million)[b]	GDP ($ million)
Direct Impact	**50,480**	**$4,737**	**$8,954**
Indirect and Induced Impact on Other Industries	**251,070**	**$14,660**	**$24,816**
Operational Impact	***220,500***	***$12,768***	***$21,969***
Agriculture	2,320	$90	$146
Mining	4,570	$664	$1,527
Utilities	940	$133	$449
Construction	2,690	$181	$216
Manufacturing	10,800	$868	$2,147
Wholesale and retail trade	28,200	$1,376	$2,428
Transportation and warehousing	19,310	$1,087	$1,637
Information	4,390	$489	$1,126
Finance, insurance, real estate, rental and leasing	29,530	$1,617	$4,513
Services	97,570	$4,775	$5,945
Government	20,180	$1,488	$1,835
Capital Investment Impact	***30,570***	***$1,891***	***$2,847***
Total Economic Impact	**301,550**	**$19,397**	**$33,771**

Source: PwC calculations using IMPLAN modeling system (2013 database) and data from the US Bureau of Labor Statistics the Census Bureau, and the Army Corps of Engineers.
Numbers may not add to total due to rounding.
[a] Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.
[b] Labor income is defined as wages and salaries and benefits as well as proprietors' income.

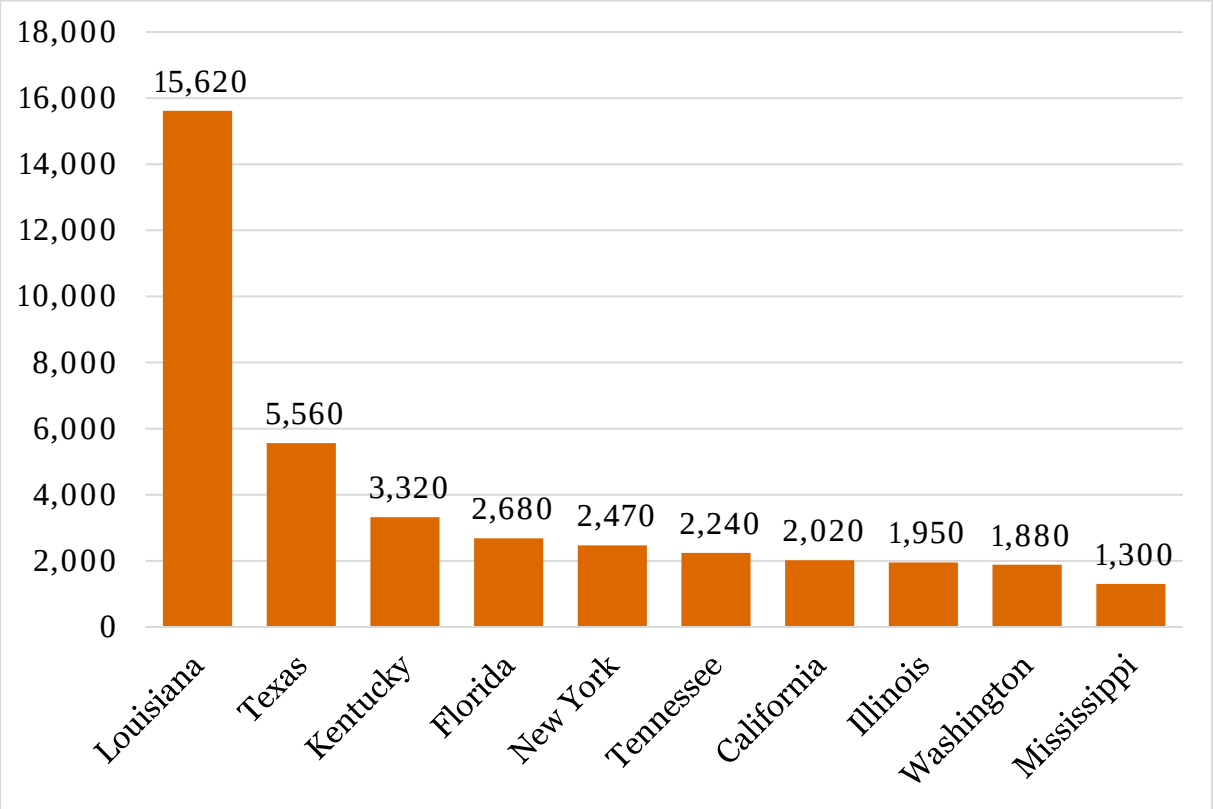
The transportation and warehousing sector also is a significant supplier of services to the US tugboat, towboat, and barge industry, providing cargo handling, navigational services, warehousing, and vessel cleaning and repair services to the industry.

State-Level Economic Contributions

In 2014, the US tugboat, towboat, and barge industry was active in 38 states. The industry, however, had an impact on the economies of all 50 states plus the District of Columbia through its indirect and induced economic impacts.

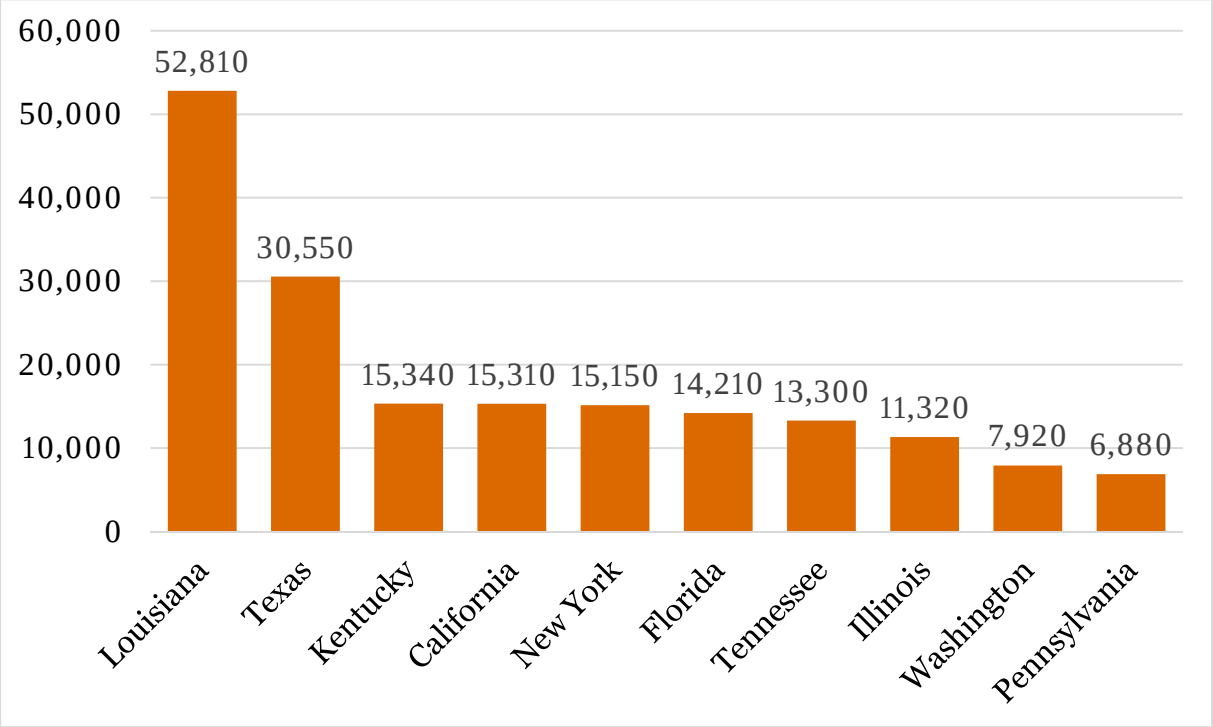
Figure III-1 provides the top ten states in terms of direct employment in the US tugboat, towboat, and barge industry in 2014. The total number of jobs directly attributable to the industry's operations (i.e., not counting any capital investment impacts) were highest in Louisiana (15,620 jobs), Texas (5,560 jobs), Kentucky (3,320 jobs), Florida (2,680 jobs), and New York (2,470 jobs). Combined these five states accounted for 58.7 percent of all employment in the US tugboat, towboat, and barge industry in 2014.

Figure III-1 – Direct Employment in the US Tugboat, Towboat, and Barge Industry, Top 10 States in 2014



The industry's total impact by state varies based on the level of direct activity and the share of the industry's supply chain in each state. In 2014, the total number of jobs *directly or indirectly* attributable to the US tugboat, towboat, and barge industry were highest in Louisiana, Texas, Kentucky, California, and New York (see **Figure III-2**). Combined these five states accounted for nearly 47.7 percent of all employment attributable to the US tugboat, towboat, and barge industry in 2014.

Figure III-2 – Total (Direct, Indirect, and Induced) Employment in the US Tugboat, Towboat, and Barge Industry, Top 10 States in 2014



The direct economic impact of the US tugboat, towboat, and barge industry is shown by state in **Table III-4**, below. The industry's total (direct, indirect, and induced) contribution is shown by state in **Table III-5**. Further detail on the industry's state-level economic impacts are provided in **Appendix B**.

Table III-4. – Direct Economic Contributions of the US Tugboat, Towboat, and Barge Industry by State, 2014

State	Direct Employment[a]		Direct Labor Income[b]		Direct GDP		Direct Taxes Borne & Collected ($ Million)
	Jobs	Percent of U.S. Total	($ Million)	Percent of U.S. Total	($ Million)	Percent of U.S. Total	
Alabama	530	1.1%	$48.9	1.0%	$100.9	1.1%	$19.0
Alaska	640	1.3%	65.1	1.4%	95.9	1.1%	10.4
Arkansas	120	0.2%	8.1	0.2%	13.0	0.1%	2.8
California	2,020	4.0%	211.1	4.5%	319.7	3.6%	25.2
Connecticut	340	0.7%	27.8	0.6%	56.4	0.6%	8.3
Delaware	110	0.2%	6.1	0.1%	9.6	0.1%	1.3
Florida	2,680	5.3%	230.0	4.9%	462.7	5.2%	49.4
Georgia	380	0.8%	22.8	0.5%	35.1	0.4%	4.1
Hawaii	540	1.1%	61.6	1.3%	121.0	1.4%	15.6
Idaho	10	0.0%	0.3	0.0%	0.4	0.0%	0.1
Illinois	1,950	3.9%	155.7	3.3%	282.2	3.2%	36.8
Indiana	930	1.8%	80.2	1.7%	461.2	5.2%	60.8
Iowa	250	0.5%	17.5	0.4%	36.2	0.4%	7.3
Kentucky	3,320	6.6%	293.6	6.2%	604.0	6.7%	79.1
Louisiana	15,620	30.9%	1,551.2	32.7%	2,605.7	29.1%	297.2
Maine	90	0.2%	6.2	0.1%	9.5	0.1%	1.8
Maryland	1,230	2.4%	110.4	2.3%	214.1	2.4%	28.3
Massachusetts	200	0.4%	19.7	0.4%	33.1	0.4%	3.5
Michigan	260	0.5%	27.1	0.6%	49.0	0.5%	8.4
Minnesota	140	0.3%	12.5	0.3%	23.5	0.3%	3.8
Mississippi	1,300	2.6%	105.0	2.2%	207.0	2.3%	32.8
Missouri	750	1.5%	59.8	1.3%	119.7	1.3%	15.7
New Hampshire	40	0.1%	2.6	0.1%	2.7	0.0%	*
New Jersey	920	1.8%	95.3	2.0%	160.1	1.8%	22.1
New York	2,470	4.9%	290.1	6.1%	570.9	6.4%	89.3
North Carolina	220	0.4%	11.9	0.3%	20.1	0.2%	2.2
Ohio	480	0.9%	36.0	0.8%	66.7	0.7%	9.3
Oklahoma	10	0.0%	0.8	0.0%	1.2	0.0%	0.6
Oregon	700	1.4%	63.3	1.3%	124.6	1.4%	18.3
Pennsylvania	950	1.9%	69.5	1.5%	118.7	1.3%	14.2
Rhode Island	90	0.2%	7.2	0.2%	11.9	0.1%	1.5
South Carolina	330	0.7%	23.7	0.5%	37.7	0.4%	4.4
Tennessee	2,240	4.4%	197.0	4.2%	481.6	5.4%	104.6
Texas	5,560	11.0%	529.2	11.2%	987.0	11.0%	117.7
Virginia	640	1.3%	46.1	1.0%	66.5	0.7%	7.5
Washington	1,880	3.7%	198.5	4.2%	349.4	3.9%	55.2
West Virginia	480	1.0%	40.0	0.8%	89.6	1.0%	12.9
Wisconsin	80	0.2%	4.9	0.1%	5.9	0.1%	0.9
U.S. Total	**50,480**	**100%**	**$4,737**	**100%**	**$8,954**	**100%**	**$1,173**

Source: PwC calculations using IMPLAN modeling system (2013 database) and data from the US Bureau of Labor Statistics, the Census Bureau, and the Army Corps of Engineers.

Numbers may not add to total due to rounding. * Indicates less than $0.5 million.

[a] Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

[b] Labor income is defined as wages and salaries and benefits as well as proprietors' income.

Table III-5. – Total Economic Contributions of the US Tugboat, Towboat, and Barge Industry by State, 2014

State	Employment[a]		Labor Income[b]		GDP		Combined Tax Impacts ($ Million)
	Amount	Percent of US Total	($ Million)	Percent of US Total	($ Million)	Percent of US Total	
Alabama	3,150	1.2%	$173.0	1.0%	$327.6	1.1%	$56.0
Alaska	2,040	0.8%	164.1	0.9%	314.4	1.0%	65.7
Arizona	1,850	0.7%	99.8	0.6%	165.5	0.5%	29.0
Arkansas	1,080	0.4%	55.0	0.3%	102.1	0.3%	17.9
California	15,310	5.6%	1,115.8	6.4%	1,925.8	6.2%	294.2
Colorado	1,890	0.7%	130.3	0.7%	210.5	0.7%	34.5
Connecticut	2,540	0.9%	190.4	1.1%	321.6	1.0%	47.2
Delaware	490	0.2%	30.9	0.2%	60.6	0.2%	8.5
District of Columbia	380	0.1%	42.4	0.2%	58.0	0.2%	7.7
Florida	14,210	5.2%	783.8	4.5%	1,391.5	4.5%	221.5
Georgia	3,590	1.3%	200.9	1.1%	341.4	1.1%	51.9
Hawaii	2,480	0.9%	185.2	1.1%	328.7	1.1%	53.6
Idaho	520	0.2%	23.4	0.1%	37.6	0.1%	6.2
Illinois	11,320	4.2%	738.3	4.2%	1,246.8	4.0%	190.5
Indiana	5,880	2.2%	323.5	1.8%	898.8	2.9%	125.9
Iowa	1,810	0.7%	97.5	0.6%	171.3	0.6%	27.9
Kansas	1,010	0.4%	64.3	0.4%	96.9	0.3%	15.4
Kentucky	15,340	5.7%	863.5	4.9%	1,532.3	5.0%	234.3
Louisiana	52,810	19.5%	3,355.5	19.2%	5,900.3	19.1%	808.1
Maine	760	0.3%	37.4	0.2%	59.2	0.2%	10.7
Maryland	5,810	2.1%	390.2	2.2%	682.1	2.2%	103.9
Massachusetts	2,940	1.1%	226.3	1.3%	348.9	1.1%	48.1
Michigan	3,800	1.4%	219.0	1.3%	369.4	1.2%	60.9
Minnesota	2,490	0.9%	153.6	0.9%	252.3	0.8%	39.8
Mississippi	5,530	2.0%	292.1	1.7%	516.6	1.7%	89.8
Missouri	4,460	1.6%	249.5	1.4%	432.0	1.4%	64.5
Montana	320	0.1%	15.8	0.1%	28.5	0.1%	5.0
Nebraska	640	0.2%	36.8	0.2%	63.1	0.2%	8.9
Nevada	1,080	0.4%	67.5	0.4%	111.8	0.4%	18.2
New Hampshire	490	0.2%	29.4	0.2%	43.6	0.1%	7.1
New Jersey	5,150	1.9%	387.8	2.2%	638.6	2.1%	105.3
New Mexico	570	0.2%	31.8	0.2%	65.5	0.2%	13.1
New York	15,150	5.6%	1,303.4	7.4%	2,176.5	7.0%	350.2
North Carolina	3,090	1.1%	165.4	0.9%	303.9	1.0%	50.7
North Dakota	330	0.1%	22.9	0.1%	42.7	0.1%	7.3
Ohio	5,200	1.9%	298.7	1.7%	537.0	1.7%	82.3
Oklahoma	1,390	0.5%	109.2	0.6%	168.9	0.5%	27.3
Oregon	3,390	1.3%	199.8	1.1%	356.5	1.2%	53.3
Pennsylvania	6,880	2.5%	438.2	2.5%	713.0	2.3%	111.5
Rhode Island	520	0.2%	32.7	0.2%	54.1	0.2%	9.4
South Carolina	1,940	0.7%	100.7	0.6%	168.5	0.5%	28.0
South Dakota	300	0.1%	15.3	0.1%	27.1	0.1%	4.0
Tennessee	13,300	4.9%	771.2	4.4%	1,394.7	4.5%	257.1
Texas	30,550	11.3%	2,170.5	12.4%	4,002.7	12.9%	585.8
Utah	920	0.3%	51.0	0.3%	91.9	0.3%	13.9
Vermont	220	0.1%	10.8	0.1%	17.4	0.1%	3.2
Virginia	3,540	1.3%	224.3	1.3%	362.7	1.2%	55.7
Washington	7,920	2.9%	562.1	3.2%	1,005.5	3.3%	175.0
West Virginia	2,280	0.8%	124.7	0.7%	230.4	0.7%	38.8
Wisconsin	2,060	0.8%	112.7	0.6%	180.7	0.6%	28.6
Wyoming	250	0.1%	17.2	0.1%	46.1	0.1%	10.4
Total Operational	**270,980**	**100.0%**	**$17,505**	**100.0%**	**$30,924**	**100.0%**	**$4,764**
Capital Investment Impact	30,570		1,891.4		2,847.2		463.6
U.S. Total	**301,550**		**$19,397**		**$33,771**		**$5,227**

Source: PwC calculations using IMPLAN modeling system (2013 database) and data from the US Bureau of Labor Statistics, the Census Bureau, and the Army Corps of Engineers.

Numbers may not add to total due to rounding.

[a] Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

[b] Labor income is defined as wages and salaries and benefits as well as proprietors' income.

Other Benefits of the US Tugboat, Towboat, and Barge Industry

IV. Other Benefits of the US Tugboat, Towboat, and Barge Industry

The US tugboat, towboat, and barge industry plays an important role in the movement of freight throughout the nation, moving nearly 785 million tons of freight in 2014. The industry is estimated to employ 50,480 workers across 38 states and support another 251,070 jobs in other sectors of the economy. The industry's total (direct, indirect, and induced) contribution to US GDP was $33.8 billion in 2014. In addition, the industry provides a number of other important benefits. As discussed below, studies show that the industry provides an efficient, low-cost method for transporting a broad range of commodities. Furthermore, a number of studies show that barge transport tends to be more fuel efficient and have a lower environmental footprint.

One of the main advantages of barge traffic is its ability to move large volumes of cargo over long distances. **Table IV-1** provides a comparison of the standard cargo capacities across freight transportation modes. A single dry cargo barge can haul 1,750 tons of cargo, the same amount of cargo as 16 bulk rail cars or 70 tractor trailers. Similarly, in order to move 27,500 bbl of liquid cargo it would take 144 tanker trucks or 46 rail cars, compared to a single barge.

Table IV-1 – Standard Cargo Capacity by Freight Transportation Mode

Modal Freight Unit	Cargo Capacity (in tons)	Cargo Capacity (in bbl)	Units Equal to 1 Barge	
			Dry Cargo	Liquid Cargo
Tractor Trailer	25	191	70	144
Bulk Rail Car	110	598	16	46
Dry Cargo Barge*	1,750	---	1	---
Liquid (Tank) Barge*	---	27,500	---	1

Source: Adapted from Texas Transportation Institute, "A Modal Comparison of Domestic Freight Transportation Effects on the General Public: 2001-2014," January 2017, Table ES-1 and Figure ES-1.

The capacity advantage of barge transportation is even more apparent when you consider that towboats generally push a number of connected barges (known as a tow). A tow may consist of as few as 4 or 6 barges lashed together on smaller waterways to as many as 40 barges on the Mississippi. A 15-barge tow is common on larger rivers and waterways. To haul the same amount of dry cargo as a 15-barge tow (26,250 tons) would require 216 rail cars or 1,050 tractor trailers.[20]

To put this in perspective, if all cargo transported by barge in 2014 had to be moved by rail it would require 7.1 million rail cars.[21] If this volume had to be moved by truck, it would require an 31.4 million tractor trailers[22], adding an additional burden to the already congested highway system. In fact, a recent study by the Texas Transportation

[20] See http://www.iowadot.gov/compare.pdf
[21] Estimated as 784.9 million tons divided by an average of cargo capacity of 110 tons per rail car.
[22] Estimated as 784.9 million tons divided by an average of cargo capacity of 25 tons per tractor trailer.

Institute found that diversion of waterway freight traffic to the nation's highway system would add 1,046 trucks per day per lane to the typical rural interstate (an increase of nearly 84 percent).[23] Similarly, for 2014, the same study found that diverting waterway freight traffic to the nation's railways would increase the total tonnage of freight moved by rail by nearly 16 percent.

Impact on Transportation Costs

In part due to its ability to move large volumes of cargo, these studies have consistently found that the cost per ton mile of moving cargo by barge is lower than the cost for other modes of freight transportation (see **Table IV-2** below). In all of the studies surveyed, barge/water freight transportation costs were lower than the cost to move freight by rail or highway. Most studies found transportation costs of 1-2 cents per ton mile for barges and 2.5-3 cents per ton-mile for rail. Highway freight cost estimates are 5.4-42.3 cents per ton mile. Not surprisingly, air freight was the most costly mode.[24]

Table IV-2. – Freight Transportation Costs for Alternative Modes [Cents per Ton-Mile]

Source/ Description	Transportation Mode			
	Barge/ Water	Rail	Highway	Air
Washington State Department of Transportation (2016)	0.72	2.24	26.61	n.a.
TRC Consulting, Ltd (2013) - Cost for grain movements	2.00	3.20	15.00	n.a.
Florida Department of Transportation (2008)	1.16	3.70	42.38	133.23
University of Missouri–Columbia (2007)	1.0 to 2.2	4.5 to 5.5	13.5 to 13.9	n.a.
Bureau of Transportation Statistics (2016) - Revenues per ton mile in 2004	1.83	2.35	14.24	62.23
Transportation Research Board (2002)	0.97	2.53	5.35	n.a.
R. Ballou (1998)	1.00	3.00	25.00	59.00

Sources/Notes:

Washington State Department of Transportation, "Wheat Supply Chain Data Collection," WA-RD 853.1, February 2016. See Table 2.

TRC Consulting, Ltd, "Maintaining A Track Record of Success: Expanding Rail Infrastructure to Accommodate Growth in Agriculture and Other Sectors," January 2013. See Table 27 for the cost per ton-mile of a "typical" grain shipment. It is important to note that the lower bound estimate for the cost of rail transport was less than the upper bound estimate for the cost of barge transport. The cost per ton mile for truck transport was 15 cents for the first 25 miles and 6 to 7 cents per ton-mile there after.

Florida Department of Transportation, "The Effect of Rising Fuel Costs on Goods Movement Mode Choice and Infrastructure Needs," October 2008. See Table 1. Fuel costs were similar for rail (0.89 cents per ton-mile) and water (0.84 cents per ton-mile), while other costs were significantly lower for waterborne freight transportation.

Food and Agricultural Policy Research Institute at the University of Missouri–Columbia, "Impact of a Lock Failure on Commodity Transportation on the Mississippi or Illinois Waterway," FAPRI-MU Report #30-07, September 2007. Ranges represent differential costs for various commodity groups.

Bureau of Transportation Statistics, "National Transportation Statistics," Table 3-21 (updated January 2016). 2004 was the most recent year for which barge data were available. Since 2004, revenues per ton-mile have risen for the other modes to 4.05 cents per ton-mile for rail in 2013, 16.54 for truck in 2007, and 136.95 for air in 2013.

Transportation Research Board, "Comparison of Inland Waterways and Surface Freight Modes," TR News 221, July-August 2002.

R. Ballou, *Business Logistics Management* , 4th ed., Prentice Hall, 1998.

[23] Texas Transportation Institute, "A Modal Comparison of Domestic Freight Transportation Effects on the General Public: 2001-2014," January 2017.

[24] It should be noted that barge transport is one component of the larger freight transportation network and is not available in all regions or states. According to the Army Corps of Engineers, the nation's inland waterway system is comprised of approximately 12,000 miles of navigable waterways servicing 38 states.

A recent study prepared by the University of Kentucky and University of Tennessee, compared transportation and related costs faced by current waterway users to the costs they would face if they were forced to use the "next best" transportation alternative (see **Table IV-3** below).[25] Cost savings from transporting goods by water ranged from a low of 84 cents per ton (for miscellaneous commodities shipped from origins along the lower Mississippi River to destinations along the Gulf Intracoastal Waterway) to $56.18 per ton (for chemicals shipped from origins along the upper Mississippi River to destinations along the along the lower Mississippi River).[26] The study found that, on average, across all regions and commodities, the average cost saving from water transportation was $22.56 per ton.

The University of Kentucky and University of Tennessee study concludes that the inland waterway system saved roughly $12.5 billion in transportation costs. Using data from the Army Corps of Engineers and Bureau of Transportation Statistics, the Texas Transportation Institute estimated that, in 2014, waterborne cargo transportation resulted in an average cost savings of $20 per ton, which translates to more than $12.0 billion of transportation cost savings.[27] These cost savings make possible lower costs for consumers.

[25] University of Kentucky and University of Tennessee, "Inland Navigation in the United States: An Evaluation of the Economic Impacts and the Potential Effects of Infrastructure Investment," November 2014.
[26] Iron and Steel shipped between destinations along the gulf intracoastal waterway had a negative cost saving, suggesting that it is more costly to ship this commodity by water within the region.
[27] Texas Transportation Institute, "A Modal Comparison of Domestic Freight Transportation Effects on the General Public: 2001-2014," February 2017.

Table IV-3. – Cost Savings from Water Transportation, by Commodity [2012 Dollars per Ton Moved]

Commodity	Origin	Destination			
		Upper Mississippi	Lower Mississippi	Ohio	Gulf Intracoastal
Aggregates	Upper Mississippi	6.58	18.93	8.46	37.50
	Lower Mississippi	28.50	4.40	9.10	7.57
	Ohio	7.11	15.29	9.22	26.62
	Gulf Intracoastal	45.76	6.59	21.01	11.29
All Other	Upper Mississippi	15.96	30.33	25.88	47.79
	Lower Mississippi	26.01	25.15	11.48	0.84
	Ohio	28.83	23.07	18.39	27.78
	Gulf Intracoastal	48.02	18.20	21.52	10.77
Chemicals	Upper Mississippi	24.73	56.18	19.19	38.85
	Lower Mississippi	9.76	17.11	10.65	12.99
	Ohio	17.96	25.81	17.91	36.13
	Gulf Intracoastal	49.49	25.35	52.27	15.27
Coal & Coke	Upper Mississippi	7.33	39.32	10.04	44.81
	Lower Mississippi	41.23	29.76	15.67	6.30
	Ohio	14.02	13.09	9.22	20.39
	Gulf Intracoastal	45.62	24.24	52.68	12.86
Grains	Upper Mississippi	7.97	17.44	20.21	24.71
	Lower Mississippi	26.94	9.06	14.20	16.67
	Ohio	15.21	15.90	10.53	18.27
	Gulf Intracoastal	28.09	31.63	30.93	10.98
Iron & Steel	Upper Mississippi	13.54	25.64	19.71	44.30
	Lower Mississippi	18.61	15.06	14.19	25.39
	Ohio	29.43	25.11	16.37	47.90
	Gulf Intracoastal	40.50	24.03	20.45	-1.11
Minerals & Ores	Upper Mississippi	20.12	18.95	8.94	27.09
	Lower Mississippi	12.20	10.90	25.88	
	Ohio	16.59	14.26	15.14	42.21
	Gulf Intracoastal	45.44	27.20	40.95	8.35
Petroleum Fuels	Upper Mississippi	11.16	16.90	16.03	22.32
	Lower Mississippi	36.40	15.64	22.68	23.78
	Ohio	32.71		19.38	44.98
	Gulf Intracoastal	34.50	17.24	39.54	17.24

Source: University of Kentucky and University of Tennessee, "Inland Navigation in the United States: An Evaluation of the Economic Impacts and the Potential Effects of Infrastructure Investment," November 2014. See Table 3-1.

Fuel Efficiency and Greenhouse Gas Emissions

Barges compare favorably to other modes of freight transportation in terms of fuel efficiency and emissions. **Table IV-4**, provides estimates of the average energy usage by mode of freight transport. In 2012, the most recent year for which data were available, the amount of energy required to move one ton of freight one mile, was lowest for waterborne freight and highest for trucks. Over the 10-year period from 2002 to 2012, energy efficiency increased significantly in waterborne and rail freight, but decreased for truck freight transportation.

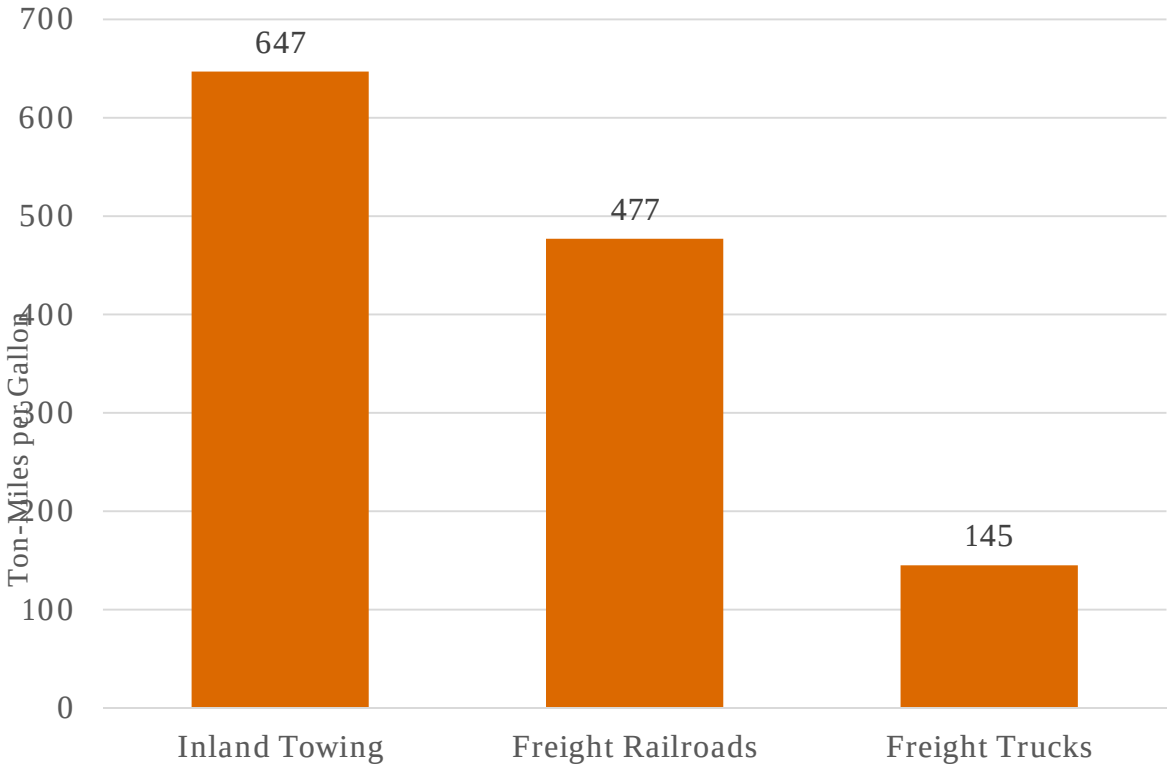
Table IV-4. – Average Energy Usage in Freight Transportation, by Mode [BTU per Ton-Mile]

	Water	Rail	Truck
2002	253	345	3,171
2007	225	320	3,194
2012	210	294	3,785

Source: Transportation Energy Data Book, Edition 35, October 2016 (Table 2-17). Truck numbers converted from BTU per vehicle mile using the ratio of vehicle-miles to ton-miles.

A large part of energy consumption in the transportation sector are fuels. **Figure IV-1** provides fuel efficiency comparisons for inland towing, freight railroads, and freight trucks for 2014.

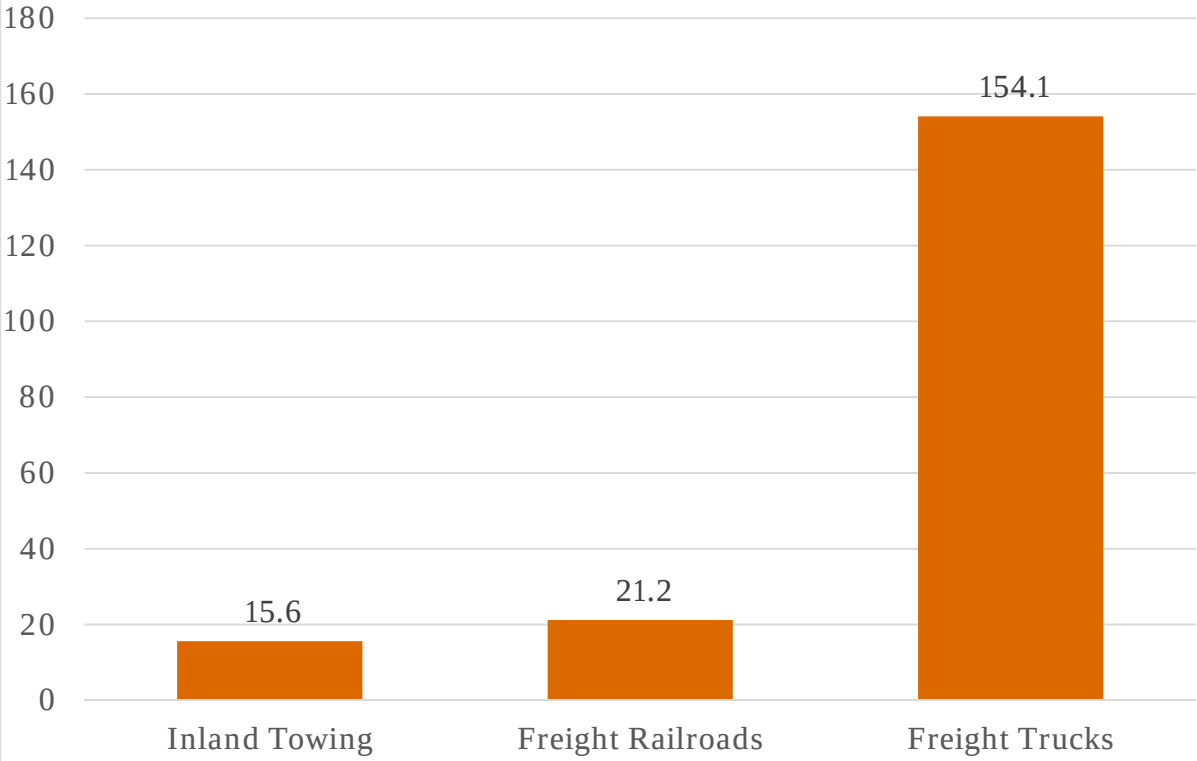
Figure IV-1. – Average Fuel Efficiencies for Freight Transportation by Mode, 2014 [Ton-Miles per Gallon]



Source: Texas Transportation Institute, "A Modal Comparison of Domestic Freight Transportation Effects of the General Public: 2001-2014," January 2017, Figure ES-4.

The US tugboat, towboat, and barge industry provides a fuel efficient means for transporting freight. For 2014, inland towing was able to move one ton of freight 647 miles on a single gallon of fuel, compared to 477 miles for freight railroads and just 145 miles for freight trucks. As a result of better fuel efficiency, barge transport has lower greenhouse gas emissions than other forms of freight transportation (see **Figure IV-2**).

Figure IV-2. – Greenhouse Gas Emissions of Freight Transportation by Mode, 2014 [Metric Tons per Million Ton Mile]



Source: Texas Transportation Institute, "A Modal Comparison of Domestic Freight Transportation Effects of the General Public: 2001-2014," January 2017.

Inland towing provides the lowest emissions per ton mile for five key pollutants (see **Table IV-5**).[28] For example, inland towing emitted 15.6 grams of carbon dioxide (CO2) per ton-mile in 2014, compared to 21.2 grams for freight rail and 154.1 grams for trucks. Furthermore, emissions have been declining. Between 2005 and 2014, CO2 emissions declined by nearly 11 percent for inland towing and by 13 percent for freight rail. CO2 emissions for freight trucking declined by 10.0 percent between 2005 and 2014.[29]

[28] Early studies have found a similar pattern of emissions. For example, see: Transportation Research Board, "Comparison of Inland Waterways and Surface Freight Modes," TR News 221, July-August 2002 and Table 4 in Government Accountability Office, "Surface Freight Transportation: A Comparison of the Costs of Road, Rail, and Waterways Freight Shipments That Are Not Passed on to Consumers," GAO-11-134, January 2011.

[29] See Table ES-3 in the Texas Transportation Institute Report.

Table IV-5. – Detail on Emissions by Freight Transportation Mode, 2014 [Grams per Ton-Mile]

Mode	Hydro-Carbons*	Carbon Monoxide	Carbon Dioxide	Nitrous Oxide	PM-10**
Inland towing	0.0094	0.0411	15.62	0.209	0.006
Freight railroad	0.0128	0.0558	21.19	0.283	0.008
Freight trucks	0.0800	0.2700	154.08	0.940	0.050

Source: Texas Transportation Institute, "A Modal Comparison of Domestic Freight Transportation Effects on the General Public: 2001-2014," January 2017, Table 8.
*Volatile Organic Compounds (VOC) are reported for trucks.
**PM-10 stands for Particulate Matter of diameter 10 micrometers or less.

Safety Impacts

As compared to waterborne freight, over the 2001-2014 period, the injury rate per million ton miles was 81 times higher for freight rail and 696 times higher for freight truck (see **Table IV-6**). Over the same period, as compared to waterborne freight, the fatality rate per million ton miles was 8 times higher for freight railroad, and 30 times higher for freight truck.

Table IV-6. – Injury and Fatality Rates by Mode of Freight Transportation, 2001-2014 [per Million Ton-Miles]

	Annual Average Ton-Miles (billions)	Average Annual Injuries	Injury Rate per Billion Ton-Miles
Freight Truck	2,552	104,286	40.86
Freight Railroad	1,678	7,962	4.75
Waterborne Freight	273	16	0.06
	Annual Average Ton-Miles (Billions)	**Average Annual Fatalities**	**Fatality Rate per Billion Ton-Miles**
Freight Truck	2,552	4,452	1.74
Freight Railroad	1,678	807	0.48
Waterborne Freight	273	6	0.02

Source: PwC calculations based on data from Texas Transportation Institute, "A Modal Comparison of Domestic Freight Transportation Effects on the General Public: 2001-2014," January 2017.

Appendix A: Methodology and Data Sources

Appendix A: Methodology and Data Sources

This appendix describes the methodology and data sources used to derive the direct, indirect, and induced contributions of the US tugboat, towboat, and barge industry. It first describes the data sources used to develop estimates of the industry's direct employment and employee compensation. It then describes PwC's approach to estimating the remaining direct impacts as well as the industry's indirect and induced impacts.

Direct Impacts

As described in **Section III** of this report, for purposes of quantifying the industry's economic contributions, the US tugboat, towboat, and barge industry is defined based on the North American Industrial Classification System (NAICS) and includes employment from six separate NAICS subsectors:

1. NAICS 483113 – Coastal and Great Lakes Freight Transportation,
2. NAICS 483211 – Inland Water Freight Transportation,
3. NAICS 488310 – Port and Harbor Operations,
4. NAICS 488320 – Marine Cargo Handling,
5. NAICS 488330 – Navigational Services to Shipping, and
6. NAICS 488390 – Other Support Activities for Water Transportation.

While each of these industries includes tugboat and towboat services (including related shore jobs), they all contain other economic activities as well. For example, NAICS codes 483113 and 483211 include transportation of freight by barge and containership, while NAICS codes 488330 and 488390 include marine salvaging services, radio beacon services, routine maintenance and repairs of ships, and drydock services. Shore jobs related to the operation of vessels other than tugboats and towboats also are included in NAICS sectors 488310, 488320, 488330, and 488390.

Vessel Direct Impacts: PwC collected data on employment and compensation in each of these industries from the US Bureau of Labor Statistics' *Quarterly Census of Employment and Wages*. Information was obtained for the United States and each of the 50 states and the District of Columbia. In some cases, the count of employees was suppressed because of the small number of establishments in an industry in a given state. Relying on employment counts available for the industry at the national-level and for higher-level industries at the state-level, a two-stage "raking" process was used to estimate the state-level employee count. The raking process uses information from known sectors within a state and across states to impute information for the sectors with suppressed data.[30] A similar process was used to fill in missing values for employee compensation. Employee compensation was adjusted to include fringe benefits using data from the US Bureau of Economic Analysis.

[30] Oh, H.L. and Scheuren, F. (1987). Modified Raking Ratio Estimation. Survey Methodology, vol. 13, no. 2, pp. 209-219.

To estimate the portion of the employment in each of these industries that is tugboat, towboat, or barge employment, PwC used data on revenues by line of business from the *2012 Economic Census*. Employment in a given NAICS industry and state were allocated between freight transportation, tug and towboat services, and other employment based on each business line's share of industry revenues. Freight transportation was allocated between international and domestic trade and between barge and containership using data from the Army Corps of Engineers. Domestic barge freight jobs were added to jobs related to tug and towboat services to derive our estimate of direct employment. Employee compensation for tugboats, towboats, and barges was estimated by applying the industry-wide compensation per employee to direct employment on tugboats, towboats, and barges. A final adjustment was made to assure consistency with data from the Army Corps of Engineers.

Value added (i.e., GDP) was then estimated by allocating GDP for the water transportation sector within a state, as reported by the U.S. Bureau of Economic Analysis (BEA), to the US tugboat, towboat, and barge industry based on the industry's share of direct labor income in the water transportation sector.

Taxes borne and collected by the industry were estimated using the IMPLAN model (described below). **Taxes borne** are taxes that are charged to the company, such as corporate income and property taxes. **Taxes collected** are taxes and fees that the company collects and administers on behalf of the government, such as employer's withholding of the employee share of payroll taxes individual income taxes, where the company is not the intended object of taxation. For purposes of this study, all federal, state, and local taxes (other than personal taxes[31]) borne or collected by the industry are included. The analysis excludes personal income taxes on labor income earned by employees of the industry and its supply chain, as well as personal income taxes on business income earned by business owners in the industry and its supply chain.

Related Shore Jobs and Associated Direct Impacts: As discussed below, the IMPLAN model was used to estimate indirect impacts associated with the industry's vessel operations including shore jobs. The portion of the indirect impacts that are attributable to the industry's shore jobs was estimated based on revenue data from (1) the Census Bureau's *Service Annual Survey* and (2) freight data from the Army Corp of Engineers. Indirect impacts from related shore jobs were then reclassified as direct impacts rather than indirect impacts. (This does not affect the number of jobs associated with the industry, only their classification as direct vs. indirect.)

Capital Impacts

To quantify the US tugboat, towboat, and barge industry's capital investment impact, PwC obtained data on the industry's purchases on new vessels in 2014 from the US

[31] Personal taxes excluded include federal and state personal income taxes, including employer withholdings and personal income tax on business income, estate and gift taxes, state and local property taxes, motor vehicle licenses and other taxes and licenses paid by individuals.

Maritime Administration and the average cost per vessel type from industry sources. Based on this information, PwC estimates that the industry spent nearly $2.2 billion on new vessels in 2014. Additional data from the Census Bureau was used to check the reasonableness of this estimate.[32] For the impact analysis, capital spending was mapped into purchases of capital assets by type through the use of the so-called "capital flow matrix" from the BEA.

Indirect and Induced Impacts

Estimates of the indirect and induced economic impacts of the US tugboat, towboat, and barge industry were derived using IMPLAN models for the US as a whole and for each of the 50 states and the District of Columbia.

The IMPLAN model is built around an "input-output" table that relates the purchases that each industry has made from other industries to the value of the output of each industry.[33] To meet the demand for goods and services from an industry, purchases are made in other industries according to the patterns recorded in the input-output table. These purchases in turn lead to still more purchases by the industry's suppliers, and so on. Additionally, employees and business owners make personal purchases out of the additional income that is generated by this process, sending additional demands rippling through the economy. Multipliers describe these iterations.

The Type I multiplier measures the direct and indirect effects of a change in economic activity. It captures the supply chain effects only, i.e., industries buying from other local industries. The Type II (Social Accounting Matrix or SAM) multiplier captures the direct and indirect effects and, in addition, induced effects (i.e., changes in spending by households as income increases or decreases due to the changes in production). The indirect and induced impacts by the US tugboat, towboat, and barge industry on other sectors of the economy in terms of employment, labor income, value added, and taxes were calculated through the multiplier process built into the model.[34]

IMPLAN state models capture only the indirect and induced effects within that state and exclude the indirect and induced effects crossing state borders ("cross-state spillover effects"). PwC estimated and allocated the cross-state indirect and induced employment, labor income, and value added impacts for each industry across the 50 states and the District of Columbia in proportion to each state's share of national employment, labor income, and value added in each industry, respectively.

[32] Data from the Annual Survey of Manufacturers indicates that US shipbuilders delivered $3.5 billion of nonpropelled vessels and platforms during 2014. This number includes exports.
[33] For more information on the IMPLAN model see http://implan.com/
[34] Adjustments are made to the initial indirect and induced impact estimates to prevent double-counting.

Appendix B: Detail on State-Level Economic Contributions

Appendix B: Detail on State-Level Economic Contributions

Table B-1, below, provides a state-by-state breakout of industry revenues. **Tables B-2**, **B-3**, and **B-4** provide additional state-by-state detail on the direct, indirect, and induced impacts associated with the operations of the US tugboat, towboat, and barge industry. Total operational impacts by state exclude capital investment impacts due to the non-availability of state-level data. **Table B-5** provides additional detail on the industry's combined tax impact by state.

Table B-1. – US Tugboat, Towboat, and Barge Industry Revenues, 2014

State	Amount ($ millions)
Alabama	$179.2
Alaska	208.3
Arizona	-
Arkansas	19.2
California	384.9
Colorado	-
Connecticut	132.6
Delaware	17.5
District of Columbia	-
Florida	655.2
Georgia	54.9
Hawaii	244.5
Idaho	6.8
Illinois	590.8
Indiana	564.4
Iowa	78.0
Kansas	-
Kentucky	1,371.3
Louisiana	4,582.7
Maine	26.6
Maryland	412.9
Massachusetts	75.3
Michigan	84.8
Minnesota	50.2
Mississippi	476.4
Missouri	224.2
Montana	-
Nebraska	-
Nevada	-
New Hampshire	6.1
New Jersey	215.1
New Mexico	-
New York	979.8
North Carolina	37.0
North Dakota	-
Ohio	139.2
Oklahoma	1.6
Oregon	202.8
Pennsylvania	241.6
Rhode Island	17.8
South Carolina	53.6
South Dakota	-
Tennessee	1,067.9
Texas	1,689.1
Utah	-
Vermont	-
Virginia	91.4
Washington	540.5
West Virginia	197.2
Wisconsin	13.6
Wyoming	-
US Total	**$15,935**

Source: PwC estimates based on data from the US Census Bureau, IMPLAN, and the Army Corps of Engineers.

Table B-2. – Employment Associated with the US Tugboat, Towboat, and Barge Industry's Operations, 2014

State	Direct Employment	Indirect Employment	Induced Employment	Total Contribution
Alabama	530	1,320	1,300	3,150
Alaska	640	890	510	2,040
Arizona	-	720	1,130	1,850
Arkansas	120	370	590	1,080
California	2,020	4,950	8,340	15,310
Colorado	-	790	1,090	1,890
Connecticut	340	1,050	1,150	2,540
Delaware	110	160	230	490
District of Columbia	-	140	240	380
Florida	2,680	5,330	6,190	14,210
Georgia	380	1,200	2,010	3,590
Hawaii	540	1,250	690	2,480
Idaho	10	200	310	520
Illinois	1,950	4,580	4,790	11,320
Indiana	930	2,540	2,410	5,880
Iowa	250	690	870	1,810
Kansas	-	400	610	1,010
Kentucky	3,320	7,260	4,760	15,340
Louisiana	15,620	21,370	15,820	52,810
Maine	90	320	350	760
Maryland	1,230	2,340	2,240	5,810
Massachusetts	200	1,120	1,620	2,940
Michigan	260	1,510	2,040	3,800
Minnesota	140	940	1,410	2,490
Mississippi	1,300	2,590	1,650	5,530
Missouri	750	1,760	1,950	4,460
Montana	-	110	210	320
Nebraska	-	210	430	640
Nevada	-	490	590	1,080
New Hampshire	40	170	280	490
New Jersey	920	1,810	2,420	5,150
New Mexico	-	230	340	570
New York	2,470	6,080	6,590	15,150
North Carolina	220	1,000	1,870	3,090
North Dakota	-	150	180	330
Ohio	480	2,020	2,710	5,200
Oklahoma	10	650	730	1,390
Oregon	700	1,260	1,440	3,390
Pennsylvania	950	2,600	3,330	6,880
Rhode Island	90	180	260	520
South Carolina	330	650	960	1,940
South Dakota	-	100	200	300
Tennessee	2,240	6,450	4,610	13,300
Texas	5,560	13,190	11,800	30,550
Utah	-	350	570	920
Vermont	-	80	140	220
Virginia	640	1,090	1,810	3,540
Washington	1,880	2,930	3,120	7,920
West Virginia	480	1,060	750	2,280
Wisconsin	80	730	1,240	2,060
Wyoming	-	120	120	250
U.S. Total	**50,480**	**109,500**	**111,000**	**270,980**

Source: PwC calculations using IMPLAN modeling system (2013 database) and data from the US Bureau of Labor Statistics, the Census Bureau, and the Army Corps of Engineers. Numbers may not add to total due to rounding. Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

Table B-3. – Labor Income Associated with the US Tugboat, Towboat, and Barge Industry's Operations, 2014 [in $ Millions]

State	Direct Labor Income	Indirect Labor Income	Induced Labor Income	Total Contribution
Alabama	$48.9	$69.3	$54.8	$173.0
Alaska	65.1	71.4	27.6	164.1
Arizona	0.0	45.4	54.4	99.8
Arkansas	8.1	21.7	25.2	55.0
California	211.1	417.7	487.0	1,115.8
Colorado	0.0	72.4	57.9	130.3
Connecticut	27.8	88.9	73.6	190.4
Delaware	6.1	12.1	12.7	30.9
District of Columbia	0.0	20.2	22.2	42.4
Florida	230.0	280.5	273.3	783.8
Georgia	22.8	77.9	100.2	200.9
Hawaii	61.6	90.7	32.9	185.2
Idaho	0.3	10.0	13.1	23.4
Illinois	155.7	323.1	259.5	738.3
Indiana	80.2	136.6	106.7	323.5
Iowa	17.5	37.8	42.1	97.5
Kansas	0.0	34.5	29.7	64.3
Kentucky	293.6	374.6	195.3	863.5
Louisiana	1,551.2	1,147.4	656.9	3,355.5
Maine	6.2	16.3	14.9	37.4
Maryland	110.4	161.6	118.2	390.2
Massachusetts	19.7	101.7	104.9	226.3
Michigan	27.1	95.4	96.5	219.0
Minnesota	12.5	65.0	76.0	153.6
Mississippi	105.0	123.2	63.9	292.1
Missouri	59.8	100.6	89.1	249.5
Montana	0.0	7.4	8.4	15.8
Nebraska	0.0	14.2	22.6	36.8
Nevada	0.0	39.4	28.2	67.5
New Hampshire	2.6	12.1	14.8	29.4
New Jersey	95.3	145.1	147.4	387.8
New Mexico	0.0	17.1	14.7	31.8
New York	290.1	578.1	435.2	1,303.4
North Carolina	11.9	63.1	90.3	165.4
North Dakota	0.0	12.5	10.4	22.9
Ohio	36.0	129.7	133.0	298.7
Oklahoma	0.8	72.2	36.1	109.2
Oregon	63.3	71.9	64.6	199.8
Pennsylvania	69.5	190.6	178.1	438.2
Rhode Island	7.2	11.8	13.7	32.7
South Carolina	23.7	35.7	41.4	100.7
South Dakota	0.0	5.5	9.7	15.3
Tennessee	197.0	355.1	219.1	771.2
Texas	529.2	1,048.7	592.6	2,170.5
Utah	0.0	25.7	25.4	51.0
Vermont	0.0	4.6	6.1	10.8
Virginia	46.1	81.4	96.8	224.3
Washington	198.5	201.0	162.6	562.1
West Virginia	40.0	54.0	30.6	124.7
Wisconsin	4.9	47.2	60.6	112.7
Wyoming	0.0	11.3	5.9	17.2
U.S. Total	**$4,737**	**$7,231**	**$5,537**	**$17,505**

Source: PwC calculations using IMPLAN modeling system (2013 database) and data from the US Bureau of Labor Statistics, the Census Bureau, and the Army Corps of Engineers. Numbers may not add to total due to rounding. Labor income includes wages and salaries and benefits as well as proprietors' income.

Table B-4. – GDP Associated with the US Tugboat, Towboat, and Barge Industry's Operations, 2014 [in $ Millions]

State	Direct GDP	Indirect GDP	Induced GDP	Total Contribution
Alabama	$100.9	$128.9	$97.7	$327.6
Alaska	95.9	165.9	52.6	314.4
Arizona	0.0	70.3	95.2	165.5
Arkansas	13.0	40.9	48.3	102.1
California	319.7	753.8	852.4	1,925.8
Colorado	0.0	111.8	98.6	210.5
Connecticut	56.4	140.9	124.3	321.6
Delaware	9.6	23.4	27.6	60.6
District of Columbia	0.0	24.9	33.1	58.0
Florida	462.7	460.9	467.9	1,391.5
Georgia	35.1	129.9	176.5	341.4
Hawaii	121.0	150.2	57.5	328.7
Idaho	0.4	15.2	22.0	37.6
Illinois	282.2	522.4	442.2	1,246.8
Indiana	461.2	242.4	195.3	898.8
Iowa	36.2	60.8	74.3	171.3
Kansas	0.0	46.5	50.4	96.9
Kentucky	604.0	593.6	334.7	1,532.3
Louisiana	2,605.7	2,150.2	1,144.4	5,900.3
Maine	9.5	25.0	24.7	59.2
Maryland	214.1	261.7	206.3	682.1
Massachusetts	33.1	148.9	166.8	348.9
Michigan	49.0	153.5	166.9	369.4
Minnesota	23.5	106.1	122.6	252.3
Mississippi	207.0	198.7	110.9	516.6
Missouri	119.7	158.9	153.4	432.0
Montana	0.0	14.0	14.5	28.5
Nebraska	0.0	23.9	39.3	63.1
Nevada	0.0	61.4	50.4	111.8
New Hampshire	2.7	17.0	24.0	43.6
New Jersey	160.1	229.2	249.3	638.6
New Mexico	0.0	37.7	27.7	65.5
New York	570.9	866.1	739.5	2,176.5
North Carolina	20.1	110.7	173.2	303.9
North Dakota	0.0	25.9	16.7	42.7
Ohio	66.7	234.5	235.8	537.0
Oklahoma	1.2	106.6	61.1	168.9
Oregon	124.6	117.7	114.1	356.5
Pennsylvania	118.7	299.4	294.9	713.0
Rhode Island	11.9	18.9	23.3	54.1
South Carolina	37.7	58.5	72.3	168.5
South Dakota	0.0	10.0	17.2	27.1
Tennessee	481.6	560.8	352.3	1,394.7
Texas	987.0	1,976.3	1,039.4	4,002.7
Utah	0.0	44.8	47.1	91.9
Vermont	0.0	7.1	10.3	17.4
Virginia	66.5	127.0	169.2	362.7
Washington	349.4	363.2	292.9	1,005.5
West Virginia	89.6	87.0	53.9	230.4
Wisconsin	5.9	72.5	102.3	180.7
Wyoming	0.0	32.3	13.7	46.1
U.S. Total	**$8,954**	**$12,388**	**$9,581**	**$30,924**

Source: PwC calculations using IMPLAN modeling system (2013 database) and data from the US Bureau of Labor Statistics, the Census Bureau, and the Army Corps of Engineers. Numbers may not add to total due to rounding.

Table B-5. –Combined Tax Impact Associated with the US Tugboat, Towboat, and Barge Industry's Operations, 2014 [in $ Millions]

State	Direct Taxes Paid		Indirect Taxes Supported		Induced Taxes Supported		Combined Tax Impact	
	Borne	Collected	Borne	Collected	Borne	Collected	Borne	Collected
Alabama	$11.4	$7.7	$11.2	$8.1	$8.1	$9.5	$30.7	$25.3
Alaska	8.1	2.4	39.2	6.6	7.4	2.2	54.6	11.1
Arizona	-	-	6.5	4.8	8.5	9.3	14.9	14.0
Arkansas	1.4	1.3	3.8	2.8	4.0	4.6	9.1	8.8
California	17.2	8.0	83.7	47.3	75.1	63.0	176.0	118.2
Colorado	-	-	10.8	7.5	8.4	7.8	19.3	15.3
Connecticut	5.8	2.5	12.5	7.0	10.8	8.6	29.1	18.1
Delaware	0.9	0.4	2.5	0.9	2.6	1.2	6.1	2.4
District of Columbia	-	-	1.8	1.2	2.6	2.1	4.4	3.3
Florida	34.5	15.0	49.1	35.0	43.3	44.7	126.9	94.6
Georgia	2.5	1.6	12.1	7.7	14.4	13.6	29.1	22.8
Hawaii	8.8	6.8	14.5	11.9	4.7	6.8	28.0	25.6
Idaho	0.0	0.0	1.4	1.0	1.9	1.8	3.4	2.8
Illinois	26.1	10.7	52.1	27.7	42.1	31.9	120.3	70.2
Indiana	48.8	12.0	17.7	14.6	16.0	16.6	82.5	43.3
Iowa	4.8	2.5	5.4	3.5	6.2	5.6	16.4	11.6
Kansas	-	-	3.7	3.2	4.2	4.2	8.0	7.4
Kentucky	56.5	22.6	52.8	39.7	30.2	32.5	139.4	94.8
Louisiana	195.3	101.8	177.4	130.0	90.2	113.5	462.9	345.2
Maine	1.2	0.6	2.7	1.5	2.6	2.1	6.4	4.3
Maryland	19.8	8.5	25.3	15.8	18.6	15.9	63.6	40.3
Massachusetts	2.5	1.0	13.3	7.1	14.0	10.1	29.8	18.2
Michigan	5.5	3.0	14.3	8.8	15.5	13.9	35.3	25.6
Minnesota	2.5	1.3	9.6	5.9	10.4	10.1	22.5	17.3
Mississippi	21.7	11.1	19.1	15.3	10.5	12.1	51.3	38.4
Missouri	10.8	4.9	13.8	9.5	12.9	12.5	37.5	27.0
Montana	-	-	1.9	0.7	1.5	0.9	3.4	1.6
Nebraska	-	-	2.0	1.1	3.1	2.6	5.2	3.7
Nevada	-	-	5.1	3.7	4.4	5.0	9.6	8.7
New Hampshire	*	*	2.1	1.0	2.6	1.4	4.7	2.4
New Jersey	15.7	6.5	27.0	13.7	25.3	17.2	67.9	37.4
New Mexico	-	-	4.4	3.4	2.5	2.8	6.9	6.2
New York	64.8	24.5	84.7	49.8	72.1	54.4	221.6	128.6
North Carolina	1.4	0.8	11.1	6.9	15.8	14.7	28.3	22.3
North Dakota	-	-	3.3	1.3	1.5	1.1	4.8	2.5
Ohio	6.1	3.1	22.2	12.6	20.3	17.8	48.7	33.6
Oklahoma	0.3	0.3	8.7	7.8	4.8	5.4	13.8	13.5
Oregon	13.7	4.6	12.1	6.0	10.5	6.4	36.3	17.0
Pennsylvania	9.7	4.5	29.5	18.8	25.8	23.2	65.0	46.5
Rhode Island	1.0	0.5	2.3	1.3	2.4	1.9	5.7	3.7
South Carolina	3.0	1.5	6.5	4.1	7.0	6.1	16.4	11.6
South Dakota	-	-	0.9	0.5	1.3	1.3	2.1	1.8
Tennessee	63.6	41.0	47.9	38.4	29.6	36.7	141.1	116.0
Texas	81.2	36.5	183.5	111.1	90.3	83.2	355.0	230.8
Utah	-	-	3.9	2.5	3.9	3.6	7.7	6.1
Vermont	-	-	0.8	0.5	1.1	0.9	1.9	1.4
Virginia	4.8	2.8	12.7	6.9	16.3	12.3	33.8	22.0
Washington	32.6	22.6	35.3	28.2	25.4	30.8	93.3	81.7
West Virginia	9.0	3.9	8.8	6.5	5.2	5.4	23.0	15.8
Wisconsin	0.5	0.4	6.9	3.9	9.4	7.5	16.8	11.8
Wyoming	-	-	5.3	2.3	1.6	1.1	7.0	3.4
US Total	**794**	**379**	**1,185**	**758**	**849**	**800**	**2,827**	**1,936**

Source: PwC calculations using the IMPLAN modeling system (2013 database).
* Indicates less than $0.5 million.

Appendix C: Detail on Waterborne Commerce in the United States

Appendix C: Detail on Waterborne Commerce in the United States

The US Tugboat, Towboat, and Barge Industry in the US-Flagged Fleet

- The US-flagged fleet declined by 2.3 percent between 2005 and 2014, a decline of nearly 950 vessels (see **Table C-1**).
- Over the same period, the number of tugboats and towboats increased by 3.5 percent.
- The total number of barges declined by 3.1 percent, but the number of tank barges increased by 17.3 percent (718 vessels), more than any other vessel type.

Table C-1. – Summary of the U.S. Flag Vessels by Vessel Type, 2005 and 2014

Type of Vessels	2005	2014	Percent Change
Self-Propelled Total*	**8,968**	**9,039**	**0.8%**
Tugboats and Towboats	5,290	5,476	3.5%
Tankers	100	61	-39.0%
Offshore Support Vessels	1,768	1,692	-4.3%
Passenger Vessels	841	853	1.4%
Dry Bulk Cargo Vessels	77	54	-29.9%
Containerships	70	71	1.4%
General Cargo Vessels	200	128	-36.0%
Specialized Vessels	622	593	-4.7%
Non-Self-Propelled Total	**32,052**	**31,043**	**-3.1%**
Dry Cargo Barges	27,876	26,153	-6.2%
Tank Barges	4,151	4,869	17.3%
Railroad Car Floats	25	21	-16.0%
Grand Total*	**41,028**	**40,082**	**-2.3%**

* Detail does not add to total due to unclassified vehicles.
Sources: Army Corps of Engineers, *Wareborne Transportation Lines of the United States, Volume 1 - National Summaries*, Table 1, various years.

- The US tugboat, towboat, and barge industry accounted for 91 percent of the US-flagged fleet in 2014 (see **Figure C-1**).
- Barges accounted for nearly 85 percent of the US-flagged fleet's cargo capacity in that same year (see **Figure C-2**).

Figure C-1. – Summary of the US-Flagged Fleet by Vessel Type, 2014

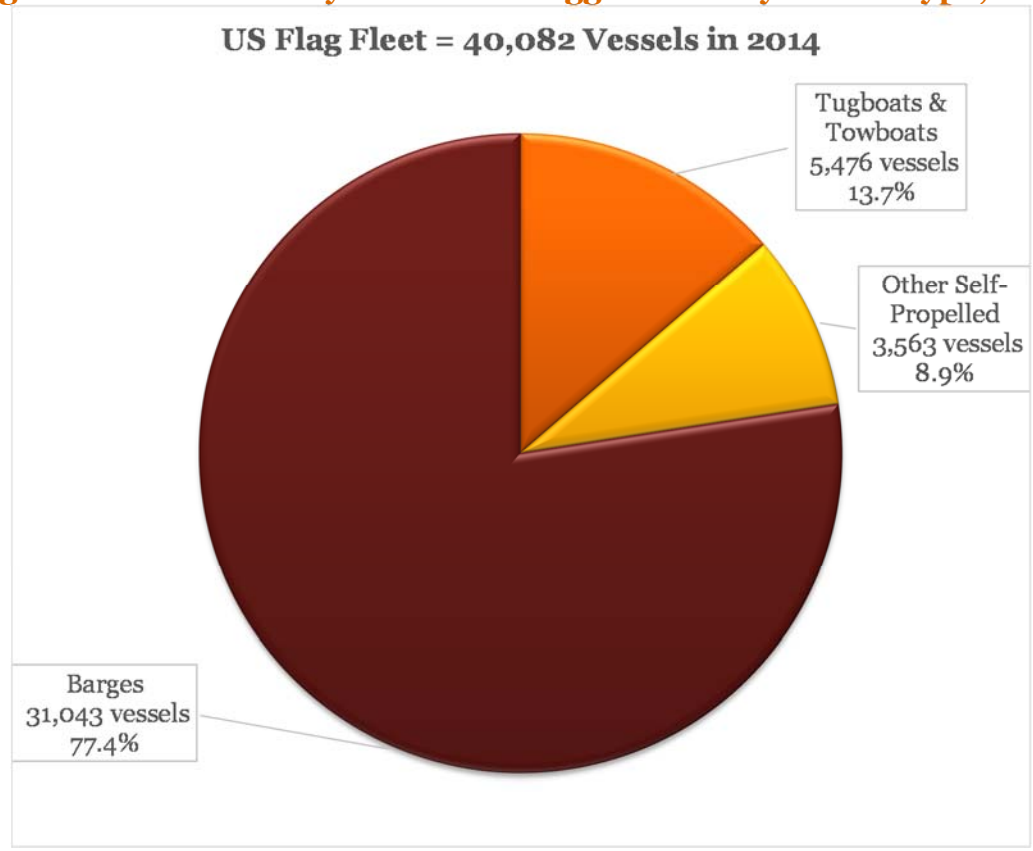
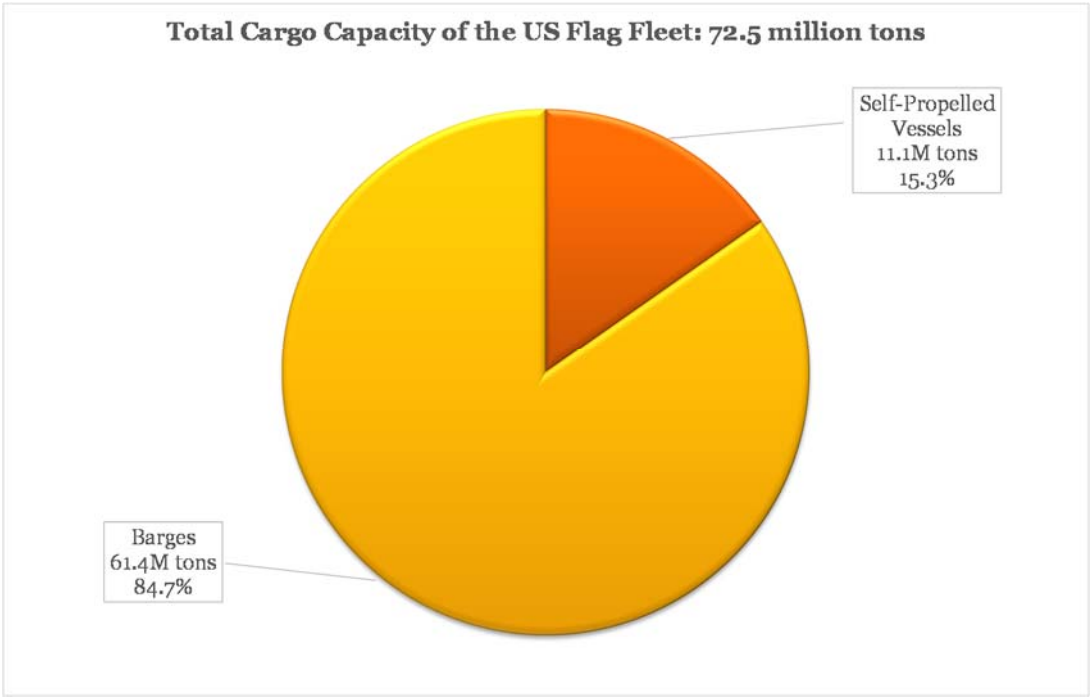


Figure C-2. – Cargo Capacity of the US-Flagged Fleet by Vessel Type, 2014



The US Tugboat and Towboat Industry in US Waterborne Commerce

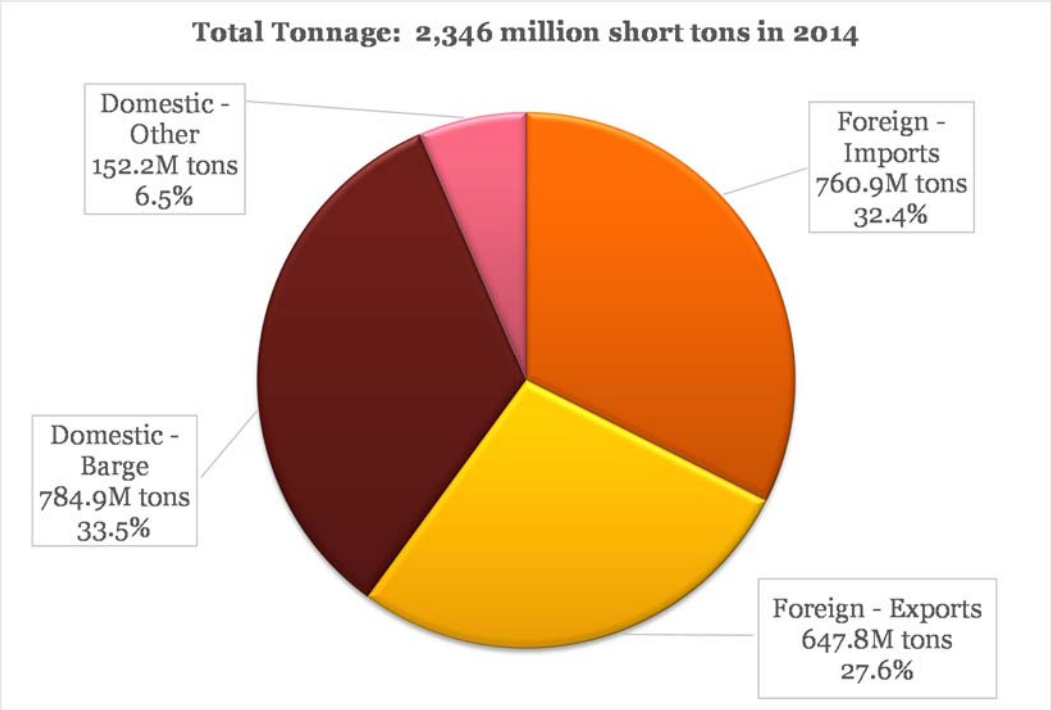
- Measured by total tons, the combined international and domestic waterborne commerce of the United States declined by 182 million tons (or 7.2 percent) between 2005 and 2014 (see **Table C-2**).
- Domestic trade by barge declined by 3.5 percent over the same period, compared to 8.9 percent for all domestic waterborne trade.
- The share of domestic waterborne commerce transported by barge increased from 79 percent in 2005 to nearly 84 percent in 2014.

Table C-2. – Total Foreign and Domestic Waterborne Commerce, 2005-2014 [millions of short tons]

Year	Total Freight Traffic	Total Foreign Trade	Domestic Trade		
			All Vessels	Barges	Percent by Barge
2005	2,527.6	1,498.7	1,028.9	813.2	79.0%
2006	2,588.4	1,564.9	1,023.5	818.1	79.9%
2007	2,564.0	1,542.5	1,021.5	819.1	80.2%
2008	2,477.1	1,550.8	956.3	767.3	80.2%
2009	2,210.8	1,353.7	857.1	701.6	81.9%
2010	2,334.4	1,440.9	893.5	725.2	81.2%
2011	2,367.5	1,479.5	887.9	721.8	81.3%
2012	2,306.9	1,421.9	884.9	737.7	83.4%
2013	2,274.8	1,383.6	891.2	744.9	83.6%
2014	2,345.8	1,408.7	937.1	784.9	83.8%
2005-14	-181.8	-90.0	-91.8	-28.3	
% Change	-7.2%	-6.0%	-8.9%	-3.5%	

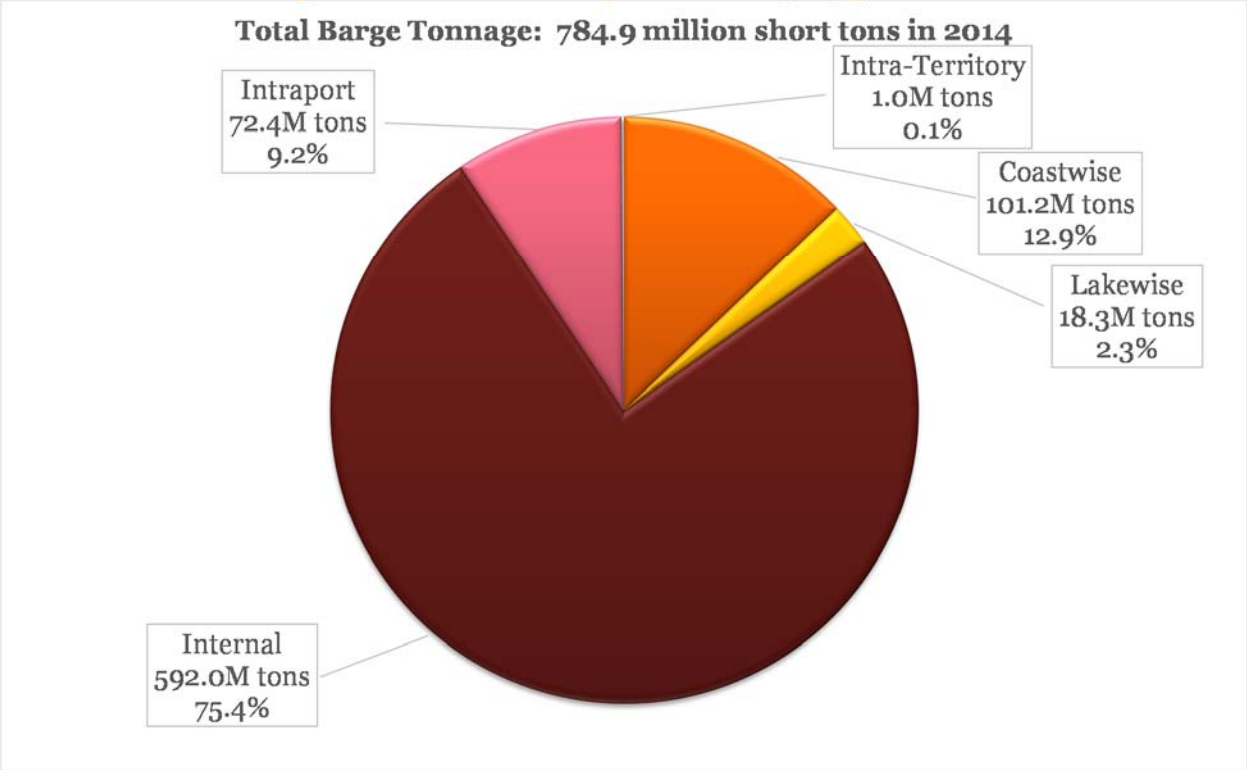
Source: PwC estimates based on data from The Army Corp. of Engineers, *Waterborne Commerce of the United States, Part 5 - National Summaries*, Tables 1-5, 1-6, 1-8, and 1-12 (various years).

Figure C-3. – US Waterborne Commerce by Type, 2014



- 75 percent (592 million tons) of domestic barge commerce is conducted on inland waterways (see **Figure C-4**).
- Coastwise barge traffic amounted to 101 million tons in 2014, 13 percent of all barge traffic.

Figure C-4. – US Barge Traffic by Type, 2014



Source: Army Corps of Engineers, *Waterborne Commerce of the United States, Part 5 – National Summaries*, 2014, Table 1-3.

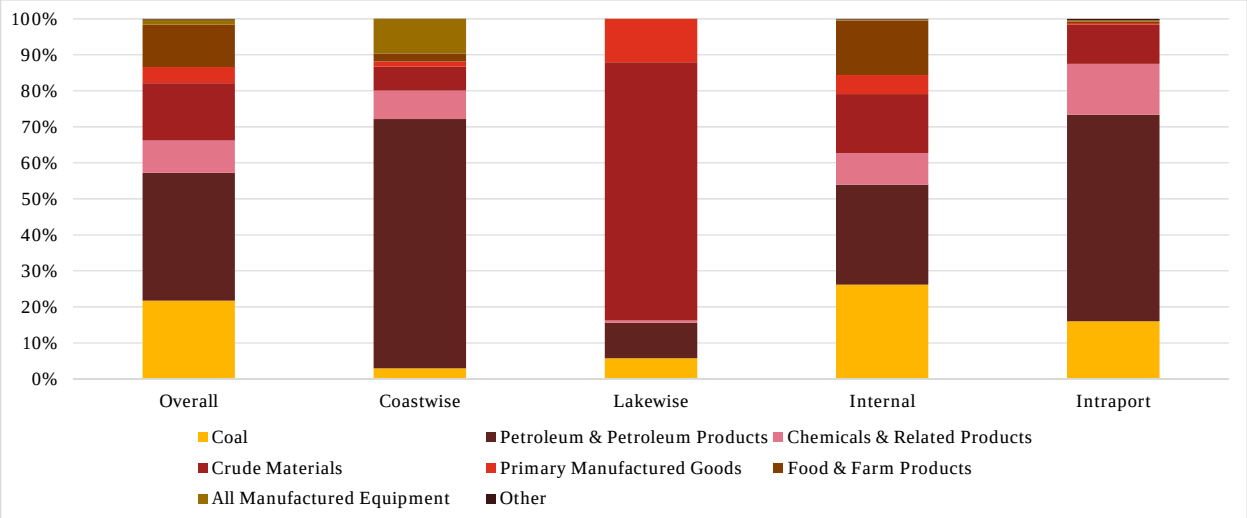
- By volume, petroleum and petroleum products represent the largest commodity group moved on US waterways. In 2014, 338 million tons of petroleum and petroleum products were shipped between US ports, 82.4 percent (279 million tons) of which was transported by barge (see **Table C-3**).
- Coal was the second largest commodity group transported on US waterways with 189 million tons moved (170 million tons or 90 percent transported by barge).
- Crude materials, including lumber, stone, and various metal ores, was the only other commodity group with more than 100 million tons moved between US ports in 2014. 125 million tons of crude materials were transported by barge in 2014, 69 percent of all crude materials moved by water in the US.
- Key industries served by the US tugboat, towboat, and barge industry include: coal mining (166.4 million tons moved by barge), gasoline and fuel refineries (159.2 million tons), oil and gas extraction (71.9 million tons), sand and gravel quarrying (46.2 million tons), Corn farming (35.2 million tons), limestone quarrying (32.7 million tons), and soybean farming (29.3 million tons).

Table C-3. –Domestic Waterborne Commerce by Type, 2014 [millions of short tons]

Commodity Group	Domestic Total	Barge Traffic	Percent by Barge	Barge Traffic			
				Coastwise	Lakewise	Internal	Intraport
Total	**937.1**	**784.9**	**83.8%**	**101.2**	**18.3**	**592.0**	**72.4**
Coal	189.1	170.5	90.2%	2.9	1.1	154.9	11.6
Petroleum & Petroleum Products	338.2	278.9	82.4%	70.0	1.8	164.4	41.6
Chemicals & Related Products	72.6	70.2	96.7%	8.0	0.1	51.8	10.2
Crude Materials	181.7	124.9	68.8%	6.7	13.1	97.2	7.9
Primary Manufactured Goods	37.0	35.3	95.5%	1.5	2.2	31.3	0.3
Food & Farm Products	94.9	92.2	97.2%	2.3	-	89.7	0.3
All Manufactured Equipment	22.2	11.6	52.2%	9.7	0.0	1.6	0.3
Other	1.4	1.3	99.4%	0.0	-	1.0	0.3

Source: U.S. Army Corps of Engineers, *Waterborne Commerce of the United States, Calendar Year 2014, Part 5 - National Summaries*, Table 2-1 and Table 2-3.
Excludes intra-territory shipments. Intra-territory shipments by barge totals just 1 million tons in 2014, mostly fuel oil shipped between US territories and possessions.

Figure C-5. –Domestic Barge Traffic by Principal Commodity, 2014



Source: US Army Corps of Engineers, *Waterborne Commerce of the United States, Calendar Year 2014, Part 5 - National Summaries*, Table 2-1. Excludes intra-territory shipments.

Appendix D: Detail on Waterborne Commerce by State

Appendix D: Detail on Waterborne Commerce by State

The following tables provide detail on foreign and domestic waterborne commerce by commodity in the 37 states with at least 1 million tons of total waterborne commerce in 2014, as well as Puerto Rico. The state tables are presented in order of each state's total waterborne commerce, measured by total tonnage.

Table D-1. – Waterborne Commerce in Louisiana, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	23,927	10,360	134	10,226	13,567	10,642	603	2,322
Crude Petroleum	69,542	33,376	31,462	1,914	36,166	22,976	3,597	9,593
Petroleum Products	135,708	55,614	14,963	40,651	80,094	17,166	36,354	26,573
Chemical Fertilizers	24,410	9,936	9,457	479	14,474	157	13,475	842
Chemicals excluding Fertilizers	29,221	9,621	4,543	5,078	19,600	3,902	9,421	6,277
Lumber, Logs, Wood Chips, and Pulp	744	744	422	321	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	31,606	9,560	9,404	156	22,046	7,626	10,455	3,965
Iron Ore, Iron, and Steel Waste and Scrap	6,011	4,048	3,540	508	1,963	400	1,486	77
Non-Ferrous Ores and Scrap	8,833	5,954	5,371	583	2,878	387	2,318	174
Primary Non-Metal Products	1,704	571	300	272	1,132	1,032	94	6
Primary Metal Products	20,482	9,696	9,322	374	10,786	182	10,409	194
Food and Food Products	164,148	85,215	2,340	82,876	78,933	73,934	1,338	3,660
Manufactured Goods	6,058	1,404	834	570	4,654	1,380	3,134	140
Unknown and Not Elsewhere Classified Products	21,607	2,536	1,286	1,250	19,071	12,310	6,761	-
Total	**544,000**	**238,636**	**93,378**	**145,258**	**305,364**	**152,094**	**99,446**	**53,824**

Source: US Army Corps of Engineeers, *State to State Commodity Tonnages Public Domain Database.*

Table D-2. – Waterborne Commerce in Texas, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	2,188	2,125	1	2,124	63	-	-	63
Crude Petroleum	170,879	124,930	117,794	7,136	45,949	1,096	26,419	18,435
Petroleum Products	186,354	113,947	18,783	95,164	72,407	16,317	15,938	40,151
Chemical Fertilizers	2,538	1,940	1,479	461	598	297	178	123
Chemicals excluding Fertilizers	63,148	34,449	8,849	25,600	28,699	4,237	8,644	15,818
Lumber, Logs, Wood Chips, and Pulp	1,675	1,675	918	757	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	10,788	9,119	7,820	1,298	1,670	1,079	33	558
Iron Ore, Iron, and Steel Waste and Scrap	1,937	684	99	585	1,253	34	1,219	-
Non-Ferrous Ores and Scrap	11,606	11,540	9,410	2,130	67	67	-	-
Primary Non-Metal Products	3,878	3,082	2,764	318	796	796	-	-
Primary Metal Products	14,431	13,350	12,510	841	1,081	439	355	287
Food and Food Products	18,630	18,007	2,664	15,343	623	412	176	35
Manufactured Goods	7,409	7,147	3,813	3,334	262	23	43	196
Unknown and Not Elsewhere Classified Products	11,139	4,376	2,118	2,259	6,763	4,073	2,642	48
Total	**506,602**	**346,371**	**189,022**	**157,349**	**160,230**	**28,870**	**55,647**	**75,713**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-3. – Waterborne Commerce in California, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	4,765	4,765	3	4,762	-	-	-	-
Crude Petroleum	56,723	46,495	46,495	-	10,228	10,228	-	-
Petroleum Products	36,219	23,167	7,423	15,744	13,052	2,848	1,103	9,100
Chemical Fertilizers	1,192	1,192	1,119	73	-	-	-	-
Chemicals excluding Fertilizers	10,088	9,981	4,714	5,267	107	-	82	25
Lumber, Logs, Wood Chips, and Pulp	9,262	9,262	971	8,291	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	7,704	5,847	4,840	1,007	1,857	-	-	1,857
Iron Ore, Iron, and Steel Waste and Scrap	4,387	4,387	21	4,366	-	-	-	-
Non-Ferrous Ores and Scrap	836	836	266	570	-	-	-	-
Primary Non-Metal Products	5,354	5,354	4,693	661	-	-	-	-
Primary Metal Products	12,704	12,704	10,186	2,518	-	-	-	-
Food and Food Products	28,512	28,371	10,200	18,171	140	122	-	18
Manufactured Goods	43,484	43,332	37,147	6,185	151	-	-	151
Unknown and Not Elsewhere Classified Products	9,000	4,793	2,400	2,392	4,207	838	3,365	4
Total	**230,228**	**200,485**	**130,477**	**70,009**	**29,743**	**14,037**	**4,550**	**11,156**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-4. – Waterborne Commerce in New Jersey, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	3	3	1	1	-	-	-	-
Crude Petroleum	32,372	21,728	21,728	-	10,644	5,766	4,879	-
Petroleum Products	56,808	21,926	16,905	5,021	34,882	3,807	24,714	6,360
Chemical Fertilizers	85	85	66	19	-	-	-	-
Chemicals excluding Fertilizers	9,729	6,561	4,912	1,649	3,168	-	2,822	347
Lumber, Logs, Wood Chips, and Pulp	4,112	4,112	435	3,677	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	3,479	3,472	3,428	44	7	-	-	7
Iron Ore, Iron, and Steel Waste and Scrap	3,424	2,290	2	2,289	1,134	1,035	99	-
Non-Ferrous Ores and Scrap	275	275	58	217	-	-	-	-
Primary Non-Metal Products	3,641	3,641	3,004	637	-	-	-	-
Primary Metal Products	4,649	4,649	3,711	938	-	-	-	-
Food and Food Products	10,264	10,264	8,682	1,582	-	-	-	-
Manufactured Goods	12,338	12,338	9,280	3,058	-	-	-	-
Unknown and Not Elsewhere Classified Products	6,057	2,498	1,724	775	3,558	1,187	1,625	746
Total	**147,237**	**93,844**	**73,936**	**19,907**	**53,393**	**11,795**	**34,139**	**7,460**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-5. – Waterborne Commerce in Washington, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	92	92	91	1	-	-	-	-
Crude Petroleum	16,520	3,088	3,088	-	13,432	13,432	-	-
Petroleum Products	16,528	7,037	1,257	5,780	9,492	2,053	5,446	1,993
Chemical Fertilizers	387	387	218	169	-	-	-	-
Chemicals excluding Fertilizers	2,257	2,213	1,133	1,079	44	23	22	-
Lumber, Logs, Wood Chips, and Pulp	11,791	8,962	758	8,204	2,828	717	155	1,957
Sand, Gravel, Shells, Clay, Salt, and Slag	7,058	3,077	2,721	356	3,981	29	1,247	2,705
Iron Ore, Iron, and Steel Waste and Scrap	1,967	1,875	677	1,198	92	92	-	-
Non-Ferrous Ores and Scrap	1,272	1,272	806	466	-	-	-	-
Primary Non-Metal Products	3,028	2,814	2,075	739	214	16	190	8
Primary Metal Products	2,945	2,718	2,327	391	226	13	214	-
Food and Food Products	38,455	37,798	938	36,860	657	359	298	-
Manufactured Goods	9,768	7,661	6,165	1,496	2,106	384	1,700	23
Unknown and Not Elsewhere Classified Products	7,182	1,545	679	866	5,637	1,031	3,104	1,502
Total	**119,249**	**80,539**	**22,935**	**57,604**	**38,710**	**18,149**	**12,374**	**8,186**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-6. – Waterborne Commerce in Illinois, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	23,354	-	-	-	23,354	1,345	20,783	1,226
Crude Petroleum	4,315	-	-	-	4,315	-	4,298	18
Petroleum Products	10,698	18	18	-	10,680	2,264	6,490	1,926
Chemical Fertilizers	3,461	-	-	-	3,461	3,146	198	117
Chemicals excluding Fertilizers	4,038	2	2	-	4,036	1,918	1,856	262
Lumber, Logs, Wood Chips, and Pulp	143	-	-	-	143	143	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	8,519	1,449	1,449	-	7,070	3,017	1,103	2,950
Iron Ore, Iron, and Steel Waste and Scrap	731	144	139	5	587	53	534	-
Non-Ferrous Ores and Scrap	182	26	26	-	156	156	-	-
Primary Non-Metal Products	2,196	0	0	-	2,196	1,859	337	-
Primary Metal Products	2,956	384	384	-	2,572	2,512	48	12
Food and Food Products	30,376	21	21	-	30,355	598	29,710	47
Manufactured Goods	25	25	25	-	-	-	-	-
Unknown and Not Elsewhere Classified Products	15,522	9	9	-	15,513	1,655	13,846	12
Total	**106,518**	**2,079**	**2,074**	**5**	**104,440**	**18,667**	**79,202**	**6,571**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-7. – Waterborne Commerce in Kentucky, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	47,868	-	-	-	47,868	6,166	23,532	18,170
Petroleum Products	4,634	-	-	-	4,634	2,400	1,817	417
Chemical Fertilizers	633	-	-	-	633	633	-	-
Chemicals excluding Fertilizers	1,680	-	-	-	1,680	1,227	453	-
Sand, Gravel, Shells, Clay, Salt, and Slag	26,646	-	-	-	26,646	4,006	16,405	6,235
Iron Ore, Iron, and Steel Waste and Scrap	1,158	-	-	-	1,158	799	8	351
Non-Ferrous Ores and Scrap	1,126	-	-	-	1,126	1,126	-	-
Primary Non-Metal Products	142	-	-	-	142	142	-	-
Primary Metal Products	1,369	-	-	-	1,369	1,220	149	-
Food and Food Products	5,291	-	-	-	5,291	77	5,214	-
Manufactured Goods	6	-	-	-	6	6	-	-
Unknown and Not Elsewhere Classified Products	10,558	-	-	-	10,558	6,935	3,244	379
Total	**101,111**	**-**	**-**	**-**	**101,111**	**24,737**	**50,822**	**25,552**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-8. – Waterborne Commerce in Florida, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	2,913	2,913	2,912	1	-	-	-	-
Crude Petroleum	-	-	-	-	-	-	-	-
Petroleum Products	37,368	8,467	8,333	134	28,901	28,441	-	459
Chemical Fertilizers	4,607	4,607	325	4,282	-	-	-	-
Chemicals excluding Fertilizers	8,071	4,009	2,464	1,545	4,062	3,850	132	80
Lumber, Logs, Wood Chips, and Pulp	2,572	2,572	597	1,975	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	7,517	7,517	7,435	82	-	-	-	-
Iron Ore, Iron, and Steel Waste and Scrap	406	320	3	317	86	-	86	-
Non-Ferrous Ores and Scrap	141	141	73	68	-	-	-	-
Primary Non-Metal Products	3,456	3,456	2,279	1,177	-	-	-	-
Primary Metal Products	2,533	2,510	1,582	928	22	22	-	-
Food and Food Products	6,861	6,068	3,795	2,273	792	-	792	-
Manufactured Goods	9,108	7,280	3,978	3,301	1,829	437	1,392	-
Unknown and Not Elsewhere Classified Products	13,197	2,052	479	1,573	11,145	6,591	4,520	35
Total	**98,747**	**51,911**	**34,256**	**17,655**	**46,837**	**39,341**	**6,922**	**574**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-9. – Waterborne Commerce in Ohio, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	46,670	4,379	11	4,368	42,290	28,388	9,526	4,377
Crude Petroleum	-	-	-	-	-	-	-	-
Petroleum Products	1,698	46	-	46	1,652	1,181	374	97
Chemical Fertilizers	913	63	63	-	850	850	-	-
Chemicals excluding Fertilizers	1,414	2	2	-	1,412	1,391	21	-
Lumber, Logs, Wood Chips, and Pulp	63	63	63	-	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	17,550	2,014	1,848	166	15,536	9,164	3,785	2,587
Iron Ore, Iron, and Steel Waste and Scrap	12,392	1,134	1,035	99	11,259	11,044	214	-
Non-Ferrous Ores and Scrap	182	182	182	-	-	-	-	-
Primary Non-Metal Products	1,025	638	635	2	388	388	-	-
Primary Metal Products	2,447	979	961	18	1,468	1,468	-	-
Food and Food Products	3,167	1,250	236	1,015	1,917	-	1,917	-
Manufactured Goods	10	10	10	0	-	-	-	-
Unknown and Not Elsewhere Classified Products	9,873	110	90	20	9,762	3,214	2,742	3,806
Total	**97,402**	**10,869**	**5,135**	**5,734**	**86,533**	**57,088**	**18,578**	**10,867**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-10. – Waterborne Commerce in Alabama, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	29,005	15,869	2,892	12,977	13,136	3,071	1,507	8,557
Crude Petroleum	8,929	5,518	5,518	-	3,411	2,928	483	-
Petroleum Products	4,604	180	13	168	4,424	824	2,431	1,168
Chemical Fertilizers	419	320	238	82	99	99	-	-
Chemicals excluding Fertilizers	3,684	796	327	469	2,888	2,158	602	129
Lumber, Logs, Wood Chips, and Pulp	2,530	2,473	591	1,883	57	-	57	-
Sand, Gravel, Shells, Clay, Salt, and Slag	2,160	882	848	34	1,278	519	425	335
Iron Ore, Iron, and Steel Waste and Scrap	3,202	1,316	943	373	1,886	1,091	58	737
Non-Ferrous Ores and Scrap	181	154	148	6	27	27	-	-
Primary Non-Metal Products	389	254	63	191	136	9	127	-
Primary Metal Products	14,071	6,369	5,726	643	7,701	1,318	1,998	4,386
Food and Food Products	3,828	1,506	189	1,317	2,322	1,369	822	131
Manufactured Goods	779	748	538	210	30	8	18	4
Unknown and Not Elsewhere Classified Products	7,887	441	275	166	7,446	3,043	3,513	890
Total	**81,667**	**36,827**	**18,308**	**18,518**	**44,841**	**16,463**	**12,041**	**16,337**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-11. – Waterborne Commerce in Virginia, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	41,108	41,108	12	41,096	-	-	-	-
Crude Petroleum	485	-	-	-	485	-	485	-
Petroleum Products	2,499	495	424	71	2,004	428	550	1,027
Chemical Fertilizers	1,161	1,161	356	804	-	-	-	-
Chemicals excluding Fertilizers	2,271	2,271	1,034	1,237	-	-	-	-
Lumber, Logs, Wood Chips, and Pulp	4,038	4,038	400	3,639	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	1,733	698	609	89	1,035	-	-	1,035
Iron Ore, Iron, and Steel Waste and Scrap	81	81	1	80	-	-	-	-
Non-Ferrous Ores and Scrap	146	146	50	96	-	-	-	-
Primary Non-Metal Products	1,501	1,501	927	574	-	-	-	-
Primary Metal Products	1,431	1,431	908	523	-	-	-	-
Food and Food Products	9,023	8,017	2,115	5,902	1,005	-	297	708
Manufactured Goods	5,769	5,769	3,730	2,039	-	-	-	-
Unknown and Not Elsewhere Classified Products	7,532	1,168	482	686	6,363	2,767	3,163	434
Total	**78,777**	**67,885**	**11,049**	**56,837**	**10,892**	**3,195**	**4,494**	**3,203**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-12. – Waterborne Commerce in Indiana, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	9,434	-	-	-	9,434	3,734	5,699	-
Crude Petroleum	-	-	-	-	-	-	-	-
Petroleum Products	1,881	6	-	6	1,875	247	1,628	-
Chemical Fertilizers	628	37	37	-	591	511	80	-
Chemicals excluding Fertilizers	90	-	-	-	90	-	90	-
Lumber, Logs, Wood Chips, and Pulp	-	-	-	-	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	12,434	481	481	-	11,952	5,061	4,915	1,976
Iron Ore, Iron, and Steel Waste and Scrap	24,815	824	824	-	23,991	23,965	25	-
Non-Ferrous Ores and Scrap	-	-	-	-	-	-	-	-
Primary Non-Metal Products	-	-	-	-	-	-	-	-
Primary Metal Products	1,716	615	615	-	1,101	775	326	-
Food and Food Products	7,208	22	-	22	7,186	207	6,979	-
Manufactured Goods	31	29	29	-	2	2	-	-
Unknown and Not Elsewhere Classified Products	14,966	24	24	-	14,941	12,263	1,899	779
Total	**73,203**	**2,039**	**2,011**	**28**	**71,164**	**46,766**	**21,644**	**2,755**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-13. – Waterborne Commerce in Pennsylvania, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	21,811	112	-	112	21,700	11,290	5,648	4,762
Crude Petroleum	11,168	3,897	3,897	-	7,271	7,271	-	-
Petroleum Products	7,488	1,200	502	698	6,288	1,853	3,559	876
Chemical Fertilizers	519	482	476	5	38	38	-	-
Chemicals excluding Fertilizers	2,194	542	352	189	1,652	882	-	770
Lumber, Logs, Wood Chips, and Pulp	393	393	299	94	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	6,424	1,100	1,096	4	5,324	3,805	387	1,132
Iron Ore, Iron, and Steel Waste and Scrap	571	391	30	360	180	-	180	-
Non-Ferrous Ores and Scrap	148	25	13	12	123	123	-	-
Primary Non-Metal Products	955	946	793	153	9	9	-	-
Primary Metal Products	3,672	2,975	2,836	139	697	697	-	-
Food and Food Products	2,734	2,734	2,589	146	-	-	-	-
Manufactured Goods	797	797	588	209	-	-	-	-
Unknown and Not Elsewhere Classified Products	6,077	188	132	56	5,889	3,558	2,323	9
Total	**64,952**	**15,780**	**13,602**	**2,177**	**49,172**	**29,526**	**12,098**	**7,548**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-14. – Waterborne Commerce in West Virginia, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	45,533	-	-	-	45,533	6,383	25,883	13,266
Crude Petroleum	1,308	-	-	-	1,308	-	1,308	-
Petroleum Products	2,574	-	-	-	2,574	602	448	1,524
Chemical Fertilizers	96	-	-	-	96	96	-	-
Chemicals excluding Fertilizers	549	-	-	-	549	549	-	-
Lumber, Logs, Wood Chips, and Pulp	-	-	-	-	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	6,759	-	-	-	6,759	5,570	1,127	62
Iron Ore, Iron, and Steel Waste and Scrap	139	-	-	-	139	139	-	-
Non-Ferrous Ores and Scrap	-	-	-	-	-	-	-	-
Primary Non-Metal Products	-	-	-	-	-	-	-	-
Primary Metal Products	127	-	-	-	127	127	-	-
Food and Food Products	-	-	-	-	-	-	-	-
Unknown and Not Elsewhere Classified Products	6,766	-	-	-	6,766	1,873	4,881	12
Total	**63,850**	**-**	**-**	**-**	**63,850**	**15,339**	**33,648**	**14,863**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-15. – Waterborne Commerce in Michigan, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	15,009	329	320	10	14,679	14,679	-	-
Petroleum Products	494	301	258	43	192	-	-	192
Chemical Fertilizers	89	89	89	-	-	-	-	-
Chemicals excluding Fertilizers	60	60	1	58	-	-	-	-
Lumber, Logs, Wood Chips, and Pulp	-	-	-	-	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	23,109	4,340	2,803	1,537	18,769	863	11,989	5,916
Iron Ore, Iron, and Steel Waste and Scrap	12,466	2,258	-	2,258	10,208	3,815	6,393	-
Non-Ferrous Ores and Scrap	24	24	-	24	-	-	-	-
Primary Non-Metal Products	3,649	831	698	133	2,819	-	2,196	623
Primary Metal Products	309	309	309	-	-	-	-	-
Food and Food Products	-	-	-	-	-	-	-	-
Manufactured Goods	24	16	16	-	8	-	-	8
Unknown and Not Elsewhere Classified Products	4,797	113	113	-	4,684	662	853	3,168
Total	**60,030**	**8,671**	**4,608**	**4,063**	**51,359**	**20,020**	**21,431**	**9,908**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-16. – Waterborne Commerce in Mississippi, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	1,670	163	-	163	1,507	1,507	-	-
Crude Petroleum	10,703	9,411	9,411	-	1,292	743	549	-
Petroleum Products	15,430	7,303	683	6,620	8,127	1,888	6,131	108
Chemical Fertilizers	1,282	461	429	32	821	552	268	-
Chemicals excluding Fertilizers	2,188	421	345	76	1,767	776	991	-
Lumber, Logs, Wood Chips, and Pulp	141	55	2	53	86	-	86	-
Sand, Gravel, Shells, Clay, Salt, and Slag	2,859	435	429	7	2,423	2,413	11	-
Iron Ore, Iron, and Steel Waste and Scrap	43	0	0	-	43	37	6	-
Non-Ferrous Ores and Scrap	341	341	341	0	-	-	-	-
Primary Non-Metal Products	809	466	4	461	343	343	-	-
Primary Metal Products	667	10	8	2	658	658	-	-
Food and Food Products	5,760	812	693	119	4,948	133	4,815	-
Manufactured Goods	292	292	124	168	1	-	1	-
Unknown and Not Elsewhere Classified Products	3,326	65	11	54	3,260	1,111	1,911	238
Total	**45,512**	**20,235**	**12,479**	**7,756**	**25,277**	**10,161**	**14,769**	**346**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-17. – Waterborne Commerce in Minnesota, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	79	33	-	33	45	45	-	-
Petroleum Products	446	-	-	-	446	-	446	-
Chemical Fertilizers	1,660	-	-	-	1,660	1,660	-	-
Chemicals excluding Fertilizers	87	-	-	-	87	87	-	-
Lumber, Logs, Wood Chips, and Pulp	-	-	-	-	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	3,144	248	208	39	2,896	2,896	-	-
Iron Ore, Iron, and Steel Waste and Scrap	29,923	3,180	-	3,180	26,744	-	26,744	-
Non-Ferrous Ores and Scrap	26	26	-	26	-	-	-	-
Primary Non-Metal Products	149	149	149	-	-	-	-	-
Primary Metal Products	121	12	12	-	108	108	-	-
Food and Food Products	2,755	147	19	128	2,607	32	2,575	-
Manufactured Goods	5	5	5	-	-	-	-	-
Unknown and Not Elsewhere Classified Products	5,070	1	1	-	5,069	2,761	1,045	1,264
Total	**43,465**	**3,802**	**396**	**3,406**	**39,663**	**7,589**	**30,809**	**1,264**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-18. – Waterborne Commerce in Maryland, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	13,794	13,794	61	13,733	-	-	-	-
Crude Petroleum	-	-	-	-	-	-	-	-
Petroleum Products	2,768	1,086	1,014	71	1,682	1,169	311	203
Chemical Fertilizers	324	324	321	3	-	-	-	-
Chemicals excluding Fertilizers	956	784	629	155	171	171	-	-
Lumber, Logs, Wood Chips, and Pulp	1,507	1,507	604	903	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	4,362	3,016	3,012	4	1,346	-	-	1,346
Iron Ore, Iron, and Steel Waste and Scrap	920	754	485	269	166	-	166	-
Non-Ferrous Ores and Scrap	375	375	334	41	-	-	-	-
Primary Non-Metal Products	915	915	789	126	-	-	-	-
Primary Metal Products	1,660	1,660	1,425	235	-	-	-	-
Food and Food Products	2,098	1,801	1,630	171	297	297	-	-
Manufactured Goods	3,820	3,820	2,436	1,384	-	-	-	-
Unknown and Not Elsewhere Classified Products	7,482	630	352	278	6,852	717	3,351	2,784
Total	**40,980**	**30,465**	**13,091**	**17,374**	**10,515**	**2,354**	**3,828**	**4,332**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-19. – Waterborne Commerce in Alaska, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	554	554	-	554	-	-	-	-
Crude Petroleum	23,121	620	490	130	22,502	-	22,502	-
Petroleum Products	4,102	1,487	911	576	2,616	684	424	1,508
Chemical Fertilizers	1	1	1	-	-	-	-	-
Chemicals excluding Fertilizers	100	11	11	0	89	22	23	44
Lumber, Logs, Wood Chips, and Pulp	736	619	1	618	117	84	22	11
Sand, Gravel, Shells, Clay, Salt, and Slag	89	52	52	-	37	23	-	13
Iron Ore, Iron, and Steel Waste and Scrap	92	-	-	-	92	-	92	-
Non-Ferrous Ores and Scrap	1,183	1,183	-	1,183	-	-	-	-
Primary Non-Metal Products	615	138	137	0	478	190	16	272
Primary Metal Products	278	9	9	0	269	214	13	43
Food and Food Products	1,624	730	9	722	893	298	359	236
Manufactured Goods	2,319	91	42	49	2,228	1,507	343	378
Unknown and Not Elsewhere Classified Products	5,893	109	43	65	5,784	420	3,067	2,298
Total	**40,707**	**5,602**	**1,706**	**3,896**	**35,104**	**3,442**	**26,860**	**4,803**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-20. – Waterborne Commerce in Missouri, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	735	-	-	-	735	735	-	-
Crude Petroleum	406	-	-	-	406	-	406	-
Petroleum Products	836	-	-	-	836	697	139	-
Chemical Fertilizers	2,187	-	-	-	2,187	2,071	116	-
Chemicals excluding Fertilizers	474	-	-	-	474	269	204	-
Lumber, Logs, Wood Chips, and Pulp	-	-	-	-	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	10,029	-	-	-	10,029	975	5,090	3,965
Iron Ore, Iron, and Steel Waste and Scrap	-	-	-	-	-	-	-	-
Non-Ferrous Ores and Scrap	963	-	-	-	963	576	387	-
Primary Non-Metal Products	4,971	-	-	-	4,971	-	4,386	585
Primary Metal Products	261	-	-	-	261	228	33	-
Food and Food Products	7,976	-	-	-	7,976	14	7,962	-
Manufactured Goods	-	-	-	-	-	-	-	-
Unknown and Not Elsewhere Classified Products	9,923	-	-	-	9,923	1,342	8,562	19
Total	**38,761**	**-**	**-**	**-**	**38,761**	**6,908**	**27,285**	**4,568**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-21. – Waterborne Commerce in New York, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	0	0	0	0	-	-	-	-
Crude Petroleum	4,432	145	145	-	4,287	-	4,287	-
Petroleum Products	18,832	3,671	3,321	351	15,160	11,551	2,311	1,298
Chemical Fertilizers	56	56	55	1	-	-	-	-
Chemicals excluding Fertilizers	1,449	663	426	237	786	586	67	133
Lumber, Logs, Wood Chips, and Pulp	134	134	51	83	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	4,778	2,443	2,436	6	2,336	-	-	2,336
Iron Ore, Iron, and Steel Waste and Scrap	1,290	255	0	254	1,035	-	1,035	-
Non-Ferrous Ores and Scrap	32	32	29	3	-	-	-	-
Primary Non-Metal Products	707	529	486	43	178	-	-	178
Primary Metal Products	269	269	229	40	-	-	-	-
Food and Food Products	1,123	1,123	786	337	-	-	-	-
Manufactured Goods	946	946	647	299	-	-	-	-
Unknown and Not Elsewhere Classified Products	4,367	438	287	151	3,929	2,187	1,651	91
Total	**38,415**	**10,704**	**8,898**	**1,806**	**27,711**	**14,324**	**9,352**	**4,036**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-22. – Waterborne Commerce in Georgia, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	170	170	169	1	-	-	-	-
Crude Petroleum	-	-	-	-	-	-	-	-
Petroleum Products	1,160	995	943	53	164	164	-	-
Chemical Fertilizers	340	340	328	12	-	-	-	-
Chemicals excluding Fertilizers	2,838	2,838	1,231	1,607	-	-	-	-
Lumber, Logs, Wood Chips, and Pulp	5,836	5,836	492	5,344	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	3,001	3,001	965	2,036	-	-	-	-
Iron Ore, Iron, and Steel Waste and Scrap	39	39	9	30	-	-	-	-
Non-Ferrous Ores and Scrap	287	287	242	45	-	-	-	-
Primary Non-Metal Products	2,929	2,929	896	2,033	-	-	-	-
Primary Metal Products	2,361	2,361	1,928	432	-	-	-	-
Food and Food Products	6,832	6,832	2,348	4,484	-	-	-	-
Manufactured Goods	9,246	9,246	6,835	2,412	-	-	-	-
Unknown and Not Elsewhere Classified Products	2,575	1,361	496	865	1,214	590	193	431
Total	**37,613**	**36,234**	**16,882**	**19,353**	**1,378**	**754**	**193**	**431**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-23. – Waterborne Commerce in Tennessee, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	12,951	-	-	-	12,951	12,951	-	-
Crude Petroleum	-	-	-	-	-	-	-	-
Petroleum Products	3,404	-	-	-	3,404	1,581	1,795	28
Chemical Fertilizers	748	-	-	-	748	748	-	-
Chemicals excluding Fertilizers	704	-	-	-	704	611	93	-
Lumber, Logs, Wood Chips, and Pulp	-	-	-	-	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	7,047	-	-	-	7,047	5,517	11	1,519
Iron Ore, Iron, and Steel Waste and Scrap	850	-	-	-	850	93	756	-
Non-Ferrous Ores and Scrap	147	-	-	-	147	70	-	77
Primary Non-Metal Products	1,215	-	-	-	1,215	1,215	-	-
Primary Metal Products	786	-	-	-	786	786	-	-
Food and Food Products	4,619	-	-	-	4,619	660	3,944	14
Manufactured Goods	-	-	-	-	-	-	-	-
Unknown and Not Elsewhere Classified Products	2,335	-	-	-	2,335	1,577	719	39
Total	**34,805**	**-**	**-**	**-**	**34,805**	**25,809**	**7,318**	**1,677**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-24. – Waterborne Commerce in Wisconsin, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	14,341	2,078	-	2,078	12,263	1,847	10,416	-
Petroleum Products	38	38	22	16	-	-	-	-
Chemical Fertilizers	85	-	-	-	85	85	-	-
Chemicals excluding Fertilizers	51	51	0	51	-	-	-	-
Lumber, Logs, Wood Chips, and Pulp	-	-	-	-	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	4,615	1,975	1,975	-	2,640	2,640	-	-
Iron Ore, Iron, and Steel Waste and Scrap	8,230	2,743	-	2,743	5,487	-	5,487	-
Non-Ferrous Ores and Scrap	-	-	-	-	-	-	-	-
Primary Non-Metal Products	1,338	-	-	-	1,338	1,338	-	-
Primary Metal Products	327	218	218	-	109	109	-	-
Food and Food Products	1,826	1,048	16	1,033	777	11	767	-
Manufactured Goods	4	1	1	-	3	-	-	3
Unknown and Not Elsewhere Classified Products	3,022	16	16	-	3,006	1,300	1,687	19
Total	**33,877**	**8,169**	**2,248**	**5,921**	**25,708**	**7,330**	**18,357**	**22**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-25. – Waterborne Commerce in Oregon, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	0	0	0	-	-	-	-	-
Crude Petroleum	1,158	-	-	-	1,158	-	1,158	-
Petroleum Products	3,893	48	48	0	3,845	2,460	1,385	-
Chemical Fertilizers	2,808	2,808	276	2,532	-	-	-	-
Chemicals excluding Fertilizers	2,818	2,818	217	2,602	-	-	-	-
Lumber, Logs, Wood Chips, and Pulp	3,163	2,279	149	2,130	884	70	695	118
Sand, Gravel, Shells, Clay, Salt, and Slag	4,327	989	953	35	3,339	1,223	29	2,086
Iron Ore, Iron, and Steel Waste and Scrap	191	191	0	191	-	-	-	-
Non-Ferrous Ores and Scrap	24	24	0	23	-	-	-	-
Primary Non-Metal Products	622	622	548	74	-	-	-	-
Primary Metal Products	681	681	671	10	-	-	-	-
Food and Food Products	6,691	6,691	125	6,566	-	-	-	-
Manufactured Goods	827	827	647	180	-	-	-	-
Unknown and Not Elsewhere Classified Products	4,942	91	28	63	4,851	3,032	990	828
Total	**32,145**	**18,068**	**3,661**	**14,407**	**14,077**	**6,786**	**4,258**	**3,033**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-26. – Waterborne Commerce in Hawaii, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	786	786	786	-	-	-	-	-
Crude Petroleum	4,392	4,392	4,392	-	-	-	-	-
Petroleum Products	3,511	1,908	1,026	882	1,603	349	151	1,103
Chemical Fertilizers	1	1	1	0	-	-	-	-
Chemicals excluding Fertilizers	194	49	41	8	145	82	-	63
Lumber, Logs, Wood Chips, and Pulp	27	27	4	24	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	301	301	298	4	-	-	-	-
Iron Ore, Iron, and Steel Waste and Scrap	107	107	-	107	-	-	-	-
Non-Ferrous Ores and Scrap	2	2	-	2	-	-	-	-
Primary Non-Metal Products	529	400	399	1	129	-	-	129
Primary Metal Products	33	33	11	22	-	-	-	-
Food and Food Products	210	88	65	23	122	-	122	-
Manufactured Goods	338	104	96	8	234	193	41	-
Unknown and Not Elsewhere Classified Products	14,504	25	19	6	14,479	5,123	571	8,784
Total	**24,935**	**8,224**	**7,136**	**1,088**	**16,711**	**5,747**	**886**	**10,079**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-27. – Waterborne Commerce in Puerto Rico, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	1,687.8	1,687.8	1,687.8	-	-	-	-	-
Crude Petroleum	-	-	-	-	-	-	-	-
Petroleum Products	10,289.3	10,289.3	9,352.2	937.1	-	-	-	-
Chemical Fertilizers	16.8	16.8	16.8	0.0	-	-	-	-
Chemicals excluding Fertilizers	368.3	235.9	214.6	21.3	132.5	132.5	-	-
Lumber, Logs, Wood Chips, and Pulp	94.7	94.7	48.3	46.4	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	113.4	113.4	88.2	25.2	-	-	-	-
Iron Ore, Iron, and Steel Waste and Scrap	203.0	203.0	3.8	199.2	-	-	-	-
Non-Ferrous Ores and Scrap	12.0	12.0	0.0	12.0	-	-	-	-
Primary Non-Metal Products	401.5	401.5	379.5	22.0	-	-	-	-
Primary Metal Products	254.5	254.5	232.5	22.0	-	-	-	-
Food and Food Products	1,741.1	948.6	934.0	14.6	792.4	792.4	-	-
Manufactured Goods	2,274.7	446.2	386.6	59.6	1,828.5	1,391.8	436.7	-
Unknown and Not Elsewhere Classified Products	3,266.3	83.0	71.0	12.0	3,183.3	1,255.0	854.7	1,073.6
Total	**20,723.5**	**14,786.8**	**13,415.3**	**1,371.5**	**5,936.7**	**3,571.7**	**1,291.5**	**1,073.6**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-28. – Waterborne Commerce in South Carolina, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	295	295	294	1	-	-	-	-
Crude Petroleum	-	-	-	-	-	-	-	-
Petroleum Products	875	630	610	20	246	246	-	-
Chemical Fertilizers	53	53	44	9	-	-	-	-
Chemicals excluding Fertilizers	2,978	2,288	1,246	1,043	690	690	-	-
Lumber, Logs, Wood Chips, and Pulp	1,701	1,701	310	1,391	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	772	772	695	77	-	-	-	-
Iron Ore, Iron, and Steel Waste and Scrap	988	988	984	5	-	-	-	-
Non-Ferrous Ores and Scrap	535	535	486	49	-	-	-	-
Primary Non-Metal Products	1,101	1,101	341	760	-	-	-	-
Primary Metal Products	1,719	1,719	1,373	347	-	-	-	-
Food and Food Products	1,641	1,641	430	1,211	-	-	-	-
Manufactured Goods	5,675	5,675	3,560	2,114	-	-	-	-
Unknown and Not Elsewhere Classified Products	2,006	905	476	428	1,101	352	469	280
Total	**20,339**	**18,303**	**10,849**	**7,454**	**2,037**	**1,287**	**469**	**280**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-29. – Waterborne Commerce in Massachusetts, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	410	410	410	-	-	-	-	-
Crude Petroleum	-	-	-	-	-	-	-	-
Petroleum Products	11,679	7,583	7,583	0	4,096	3,814	88	193
Chemical Fertilizers	1	1	1	0	-	-	-	-
Chemicals excluding Fertilizers	742	92	65	27	649	649	-	-
Lumber, Logs, Wood Chips, and Pulp	532	532	15	518	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	1,753	1,753	1,752	1	-	-	-	-
Iron Ore, Iron, and Steel Waste and Scrap	608	608	0	607	-	-	-	-
Non-Ferrous Ores and Scrap	51	51	2	48	-	-	-	-
Primary Non-Metal Products	118	118	81	37	-	-	-	-
Primary Metal Products	92	92	66	26	-	-	-	-
Food and Food Products	531	531	454	77	-	-	-	-
Manufactured Goods	590	590	433	157	-	-	-	-
Unknown and Not Elsewhere Classified Products	1,628	94	78	16	1,534	1,276	213	45
Total	**18,733**	**12,454**	**10,941**	**1,513**	**6,279**	**5,739**	**302**	**238**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-30. – Waterborne Commerce in Arkansas, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	96	-	-	-	96	96	-	-
Crude Petroleum	-	-	-	-	-	-	-	-
Petroleum Products	1,543	-	-	-	1,543	672	871	-
Chemical Fertilizers	719	-	-	-	719	719	-	-
Chemicals excluding Fertilizers	52	-	-	-	52	52	-	-
Lumber, Logs, Wood Chips, and Pulp	-	-	-	-	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	2,334	-	-	-	2,334	114	48	2,173
Iron Ore, Iron, and Steel Waste and Scrap	2,255	-	-	-	2,255	2,033	98	124
Non-Ferrous Ores and Scrap	173	-	-	-	173	173	-	-
Primary Non-Metal Products	-	-	-	-	-	-	-	-
Primary Metal Products	2,230	-	-	-	2,230	2,230	-	-
Food and Food Products	6,130	-	-	-	6,130	42	6,088	-
Manufactured Goods	-	-	-	-	-	-	-	-
Unknown and Not Elsewhere Classified Products	2,632	-	-	-	2,632	1,415	1,159	58
Total	**18,164**	**-**	**-**	**-**	**18,164**	**7,545**	**8,263**	**2,355**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-31. – Waterborne Commerce in Delaware, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	-	-	-	-	-	-	-	-
Crude Petroleum	1,764	1,651	1,651	-	113	-	113	-
Petroleum Products	6,407	1,876	694	1,183	4,530	1,251	2,271	1,009
Chemical Fertilizers	12	12	11	0	-	-	-	-
Chemicals excluding Fertilizers	183	40	36	4	143	143	-	-
Lumber, Logs, Wood Chips, and Pulp	6	6	3	3	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	1,558	1,558	1,557	1	-	-	-	-
Iron Ore, Iron, and Steel Waste and Scrap	173	173	19	154	-	-	-	-
Non-Ferrous Ores and Scrap	36	36	36	0	-	-	-	-
Primary Non-Metal Products	134	134	5	129	-	-	-	-
Primary Metal Products	110	110	110	1	-	-	-	-
Food and Food Products	2,052	2,052	2,022	30	-	-	-	-
Manufactured Goods	41	41	21	19	-	-	-	-
Unknown and Not Elsewhere Classified Products	1,909	171	136	35	1,737	976	761	-
Total	**14,384**	**7,861**	**6,301**	**1,560**	**6,523**	**2,369**	**3,144**	**1,009**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-32. – Waterborne Commerce in Connecticut, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	741	741	741	-	-	-	-	-
Crude Petroleum	-	-	-	-	-	-	-	-
Petroleum Products	8,195	1,832	1,832	-	6,363	6,205	56	102
Chemical Fertilizers	-	-	-	-	-	-	-	-
Chemicals excluding Fertilizers	485	-	-	-	485	485	-	-
Lumber, Logs, Wood Chips, and Pulp	-	-	-	-	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	659	659	659	-	-	-	-	-
Iron Ore, Iron, and Steel Waste and Scrap	150	150	-	150	-	-	-	-
Non-Ferrous Ores and Scrap	-	-	-	-	-	-	-	-
Primary Non-Metal Products	11	11	11	-	-	-	-	-
Primary Metal Products	306	306	306	-	-	-	-	-
Food and Food Products	0	0	0	-	-	-	-	-
Manufactured Goods	10	10	10	-	-	-	-	-
Unknown and Not Elsewhere Classified Products	2,755	31	31	-	2,724	844	634	1,246
Total	**13,313**	**3,740**	**3,590**	**150**	**9,572**	**7,535**	**690**	**1,348**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-33. – Waterborne Commerce in Maine, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	84	84	84	-	-	-	-	-
Crude Petroleum	4,592	4,592	4,592	-	-	-	-	-
Petroleum Products	5,031	4,167	4,167	-	864	864	-	-
Chemical Fertilizers	-	-	-	-	-	-	-	-
Chemicals excluding Fertilizers	382	109	109	-	274	274	-	-
Lumber, Logs, Wood Chips, and Pulp	266	266	1	265	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	1,184	1,184	1,184	-	-	-	-	-
Iron Ore, Iron, and Steel Waste and Scrap	1	1	1	-	-	-	-	-
Non-Ferrous Ores and Scrap	1	1	1	-	-	-	-	-
Primary Non-Metal Products	83	83	83	-	-	-	-	-
Primary Metal Products	5	5	5	-	-	-	-	-
Food and Food Products	46	46	46	-	-	-	-	-
Manufactured Goods	7	7	7	-	-	-	-	-
Unknown and Not Elsewhere Classified Products	281	69	69	-	212	78	60	75
Total	**11,964**	**10,614**	**10,349**	**265**	**1,350**	**1,216**	**60**	**75**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-34. – Waterborne Commerce in North Carolina, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	-	-	-	-	-	-	-	-
Petroleum Products	464	243	242	1	222	140	82	-
Chemical Fertilizers	889	889	887	2	-	-	-	-
Chemicals excluding Fertilizers	1,621	1,621	922	699	-	-	-	-
Lumber, Logs, Wood Chips, and Pulp	1,174	1,174	189	984	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	446	446	432	14	-	-	-	-
Iron Ore, Iron, and Steel Waste and Scrap	475	210	210	0	265	265	-	-
Non-Ferrous Ores and Scrap	91	91	80	12	-	-	-	-
Primary Non-Metal Products	152	152	42	111	-	-	-	-
Primary Metal Products	821	546	485	61	275	-	-	275
Food and Food Products	691	691	510	180	-	-	-	-
Manufactured Goods	940	940	555	384	-	-	-	-
Unknown and Not Elsewhere Classified Products	1,919	285	207	78	1,634	726	79	829
Total	**9,683**	**7,287**	**4,760**	**2,527**	**2,396**	**1,131**	**161**	**1,104**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-35. – Waterborne Commerce in Iowa, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	717	-	-	-	717	717	-	-
Petroleum Products	175	-	-	-	175	175	-	-
Chemical Fertilizers	1,008	-	-	-	1,008	1,008	-	-
Chemicals excluding Fertilizers	124	-	-	-	124	124	-	-
Lumber, Logs, Wood Chips, and Pulp	-	-	-	-	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	620	-	-	-	620	620	-	-
Iron Ore, Iron, and Steel Waste and Scrap	32	-	-	-	32	32	-	-
Non-Ferrous Ores and Scrap	-	-	-	-	-	-	-	-
Primary Non-Metal Products	-	-	-	-	-	-	-	-
Primary Metal Products	80	-	-	-	80	80	-	-
Food and Food Products	3,562	-	-	-	3,562	-	3,562	-
Manufactured Goods	-	-	-	-	-	-	-	-
Unknown and Not Elsewhere Classified Products	2,537	-	-	-	2,537	594	1,732	211
Total	**8,854**	**-**	**-**	**-**	**8,854**	**3,350**	**5,293**	**211**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-36. – Waterborne Commerce in Rhode Island, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	160	160	160	-	-	-	-	-
Petroleum Products	5,663	3,019	3,019	-	2,644	2,644	-	-
Chemical Fertilizers	-	-	-	-	-	-	-	-
Chemicals excluding Fertilizers	226	33	33	-	193	193	-	-
Lumber, Logs, Wood Chips, and Pulp	1	1	1	-	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	367	367	367	0	-	-	-	-
Iron Ore, Iron, and Steel Waste and Scrap	879	879	-	879	-	-	-	-
Non-Ferrous Ores and Scrap	25	25	25	-	-	-	-	-
Primary Non-Metal Products	41	41	41	-	-	-	-	-
Primary Metal Products	7	7	7	0	-	-	-	-
Food and Food Products	-	-	-	-	-	-	-	-
Manufactured Goods	334	334	328	6	-	-	-	-
Unknown and Not Elsewhere Classified Products	1,052	22	22	-	1,030	732	268	30
Total	**8,754**	**4,887**	**4,002**	**885**	**3,867**	**3,569**	**268**	**30**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-37. – Waterborne Commerce in Oklahoma, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	-	-	-	-	-	-	-	-
Crude Petroleum	-	-	-	-	-	-	-	-
Petroleum Products	203	-	-	-	203	-	203	-
Chemical Fertilizers	1,645	-	-	-	1,645	1,645	-	-
Chemicals excluding Fertilizers	32	-	-	-	32	32	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	155	-	-	-	155	114	41	-
Iron Ore, Iron, and Steel Waste and Scrap	240	-	-	-	240	-	240	-
Non-Ferrous Ores and Scrap	-	-	-	-	-	-	-	-
Primary Non-Metal Products	-	-	-	-	-	-	-	-
Primary Metal Products	359	-	-	-	359	359	-	-
Food and Food Products	2,069	-	-	-	2,069	209	1,859	-
Manufactured Goods	-	-	-	-	-	-	-	-
Unknown and Not Elsewhere Classified Products	1,545	-	-	-	1,545	789	756	-
Total	**6,248**	**-**	**-**	**-**	**6,248**	**3,148**	**3,100**	**-**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Table D-38. – Waterborne Commerce in New Hampshire, 2014
[thousands of short tons]

Commodity	Total Freight	Foreign Trade			Domestic Trade			
		Total	Imports	Exports	Total	Inbound	Outbound	Intrastate
Coal, Lignite, and Coal Coke	104	104	104	-	-	-	-	-
Petroleum Products	1,311	879	879	-	433	433	-	-
Chemicals excluding Fertilizers	4	4	4	-	-	-	-	-
Lumber, Logs, Wood Chips, and Pulp	-	-	-	-	-	-	-	-
Sand, Gravel, Shells, Clay, Salt, and Slag	1,115	1,115	1,115	-	-	-	-	-
Iron Ore, Iron, and Steel Waste and Scrap	171	171	-	171	-	-	-	-
Primary Non-Metal Products	-	-	-	-	-	-	-	-
Primary Metal Products	-	-	-	-	-	-	-	-
Food and Food Products	-	-	-	-	-	-	-	-
Manufactured Goods	13	13	13	-	-	-	-	-
Unknown and Not Elsewhere Classified Products	86	30	30	-	55	52	3	-
Total	**2,803**	**2,315**	**2,144**	**171**	**488**	**485**	**3**	**-**

Source: US Army Corps of Engineeers, State to State Commodity Tonnages Public Domain Database.

Appendix E: Detail on Waterborne Commerce for Select US Waterways

Appendix E: Detail on Waterborne Commerce for Select US Waterways

The Mississippi River System

- Combined international and domestic waterborne commerce on the Mississippi River System was 6.0 percent (41 million tons) higher in 2014 than in 2005 (see **Table E-1**).
- All of this increase is accounted for with an increase in foreign trade transported on the Mississippi River System, which increased by 44 million tons over the 2005 to 2014 period.
- The amount of domestic waterborne commerce transported by barge increased by 4 million tons, from 95 percent of domestic waterborne commerce along the system in 2005 to 96 percent in 2014.

Table E-1. – Total Foreign and Domestic Waterborne Commerce on the Mississippi River System, 2005-2014 [millions of short tons]

Year	Total Freight Traffic	Total Foreign Trade	Domestic Trade		
			All Vessels	Barges	Percent by Barge
2005	678.0	165.5	512.6	485.0	94.6%
2006	702.1	184.3	517.8	491.2	94.9%
2007	699.0	187.2	511.8	483.4	94.5%
2008	681.6	191.6	489.9	462.7	94.4%
2009	622.1	167.9	454.1	429.5	94.6%
2010	663.2	189.0	474.3	452.6	95.4%
2011	672.5	201.6	471.1	451.8	95.9%
2012	683.5	203.8	479.7	462.2	96.3%
2013	670.0	194.0	476.0	457.9	96.2%
2014	718.6	209.4	509.1	489.2	96.1%
2005-14	40.6	43.9	-3.5	4.2	
% Change	6.0%	26.5%	-0.7%	0.9%	

Source: PwC estimates based on data from The Army Corp. of Engineers, *Waterborne Commerce of the United States, Part 5 - National Summaries*, Table 3-16 and 1-12 (various years).

- By volume, coal represents the largest commodity group moved on the Mississippi River System. In 2014, 155 million tons of coal was shipped between US ports along the Mississippi River System, 97.8 percent (151 million tons) of which was transported by barge (see **Table E-2**).

Table E-2. –Domestic Waterborne Commerce on the Mississippi River System by Commodity, 2005-2014 [millions of short tons]

Commodity Group	Total Domestic Traffic	Barge Traffic	Percent by Barge
Coal	154.7	151.3	97.8%
Petroleum & Petroleum Products	113.7	101.9	89.6%
Chemicals & Related Products	42.6	41.4	97.2%
Crude Materials	89.6	87.6	97.7%
Primary Manufactured Goods	24.9	24.6	98.8%
Food & Farm Products	83.1	81.8	98.4%
Other	0.5	0.5	98.8%
Total	**509.1**	**489.0**	**96.1%**

Source: PwC estimates based on data from The Army Corp. of Engineers, *Waterborne Commerce of the United States - Calendar Year 2014*, Tables 3-4 and 1-12.

The Ohio River System

- All waterborne commerce along the Ohio River System is domestic waterborne commerce.
- Domestic waterborne commerce on the Ohio River System declined by 12 percent (34 million tons) between 2005 and 2014 (see **Table E-3**).
- The share of domestic waterborne commerce transported by barge increased from 97.4 percent to 98.8 percent over the same period.

Table E-3. – Total Foreign and Domestic Waterborne Commerce on the Ohio River System, 2005-2014 [millions of short tons]

Year	Total Freight Traffic	Domestic Trade		
		All Vessels	Barges	Percent by Barge
2005	280.1	280.1	272.9	97.4%
2006	270.7	270.7	263.3	97.3%
2007	260.2	260.2	253.3	97.4%
2008	259.2	259.2	251.8	97.2%
2009	229.5	229.5	224.0	97.6%
2010	245.2	245.2	240.8	98.2%
2011	239.6	239.6	236.3	98.6%
2012	239.1	239.1	236.0	98.7%
2013	239.4	239.4	236.1	98.6%
2014	246.0	246.0	243.0	98.8%
2005-14	-34.1	-34.1	-29.9	
% Change	-12.2%	-12.2%	-11.0%	

Source: PwC estimates based on data from The Army Corp. of Engineers, *Waterborne Commerce of the United States, Part 5 - National Summaries*, Table 3-16 and 1-12 (various years).

- By volume, coal represents the largest commodity group moved on the Ohio River System. In 2014, 133 million tons of coal was shipped between US ports along the

Ohio River System, 98.8 percent (132 million tons) of which was transported by barge (see **Table E-4**).

Table E-4. –Domestic Waterborne Commerce on the Ohio River System by Commodity, 2005-2014 [millions of short tons]

Commodity Group	Total Domestic Traffic	Barge Traffic	Percent by Barge
Coal	133.1	131.5	98.8%
Petroleum & Petroleum Products	17.0	16.8	98.8%
Chemicals & Related Products	10.1	10.0	98.8%
Crude Materials	54.3	53.6	98.8%
Primary Manufactured Goods	10.4	10.3	98.8%
Food & Farm Products	21.1	20.8	98.8%
Other	0.1	0.1	98.8%
Total	**246.0**	**243.1**	**98.8%**

Source: PwC estimates based on data from The Army Corp. of Engineers, *Waterborne Commerce of the United States - Calendar Year 2014*, Tables 3-9 and 1-12.

The Great Lakes

- Total foreign and domestic waterborne commerce on the Great Lakes declined significantly during the recession but has begun to pick up again. Total waterborne commerce in 2014 remains 22 percent (37 million tons) lower than in 2005 (see **Table E-5**).
- The decline in foreign trade was larger than the decline in domestic waterborne commerce.
- The share of domestic waterborne commerce transported by barge increased slightly from 25.1 percent to 26.8 percent over this period.

Table E-5. – Total Foreign and Domestic Waterborne Commerce on the Great Lakes, 2005-2014 [millions of short tons]

Year	Total Freight Traffic	Total Foreign Trade	Domestic Trade		
			All Vessels	Barges	Percent by Barge
2005	169.4	61.6	107.8	27.1	25.1%
2006	173.0	63.6	109.3	26.2	24.0%
2007	161.0	55.3	105.6	25.1	23.8%
2008	152.4	53.1	99.3	24.0	24.1%
2009	108.7	38.1	70.5	19.0	27.0%
2010	129.5	40.9	88.6	22.1	25.0%
2011	134.7	37.8	96.9	24.7	25.4%
2012	126.8	34.6	91.4	23.4	25.7%
2013	127.6	36.0	94.5	23.4	24.8%
2014	132.3	36.8	95.5	25.6	26.8%
2005-14	-37.1	-24.8	-12.3	-1.5	
% Change	-21.9%	-40.3%	-11.4%	-5.6%	

Source: PwC estimates based on data from The Army Corp. of Engineers, *Waterborne Commerce of the United States, Part 5 - National Summaries*, Table 3-16 and 1-12 (various years).

- By volume, crude materials (including iron ore and limestone) represent the largest commodity group moved on the Great Lakes. In 2014, 70 million tons of coal was shipped between US ports along the Great Lakes, 26.3 percent (18 million tons) of which was transported by barge (see **Table E-6**).

Table E-6. –Domestic Waterborne Commerce on the Great Lakes by Commodity, 2005-2014 [millions of short tons]

Commodity Group	Total Domestic Traffic	Barge Traffic	Percent by Barge
Coal	17.7	3.7	21.0%
Petroleum & Petroleum Products	3.0	1.4	47.5%
Chemicals & Related Products	0.4	0.3	71.1%
Crude Materials	69.7	18.3	26.3%
Primary Manufactured Goods	4.3	1.5	35.2%
Food & Farm Products	0.4	0.2	59.8%
All Manufactured Equipment	0.1	0.02	21.6%
Other	0.1	0.004	4.2%
Total	**95.5**	**25.5**	**26.7%**

Source: PwC estimates based on data from The Army Corp. of Engineers, *Waterborne Commerce of the United States - Calendar Year 2014*, Tables 3-12 and 1-12.

The Gulf Intracoastal Waterway

- All waterborne commerce along the Gulf Intracoastal Waterway is domestic waterborne commerce (see **Table E-7**).
- Domestic waterborne commerce on the Gulf Intracoastal Waterway was 8.6 percent higher in 2014 than in 2005.
- Transportation of cargo on self-propelled vessels along the Gulf Intracoastal Waterway declined over this period, while barge traffic increased by 10 percent (11 million tons).
- The share of domestic waterborne commerce transported by barge increased from 97.3 percent to 98.6 percent over this period.

Table E-7. – Total Waterborne Commerce along the Gulf Intracoastal Waterway, 2005-2014 [millions of short tons]

Year	Total Freight Traffic	Domestic Trade		
		All Vessels	Barges	Percent by Barge
2005	116.1	116.1	113.0	97.3%
2006	122.6	122.6	119.2	97.2%
2007	125.1	125.0	121.6	97.3%
2008	115.9	115.9	112.5	97.1%
2009	108.1	108.2	105.5	97.5%
2010	116.2	116.2	114.0	98.1%
2011	112.6	112.5	110.8	98.5%
2012	113.8	113.8	112.3	98.7%
2013	115.4	115.4	113.6	98.4%
2014	126.1	126.1	124.3	98.6%
2005-14	10.0	10.0	11.4	
% Change	8.6%	8.6%	10.1%	

Source: PwC estimates based on data from The Army Corp. of Engineers, *Waterborne Commerce of the United States, Part 5 - National Summaries*, Table 3-16 and 1-12 (various years).

- By volume, petroleum and petroleum products represent the largest commodity group moved on the Gulf Intracoastal Waterway, amounting to 76 million tons (of which 98.6 percent was transported by barge, see **Table E-8**).

Table E-8. –Domestic Waterborne Commerce along the Gulf Intracoastal Waterway by Commodity, 2005-2014 [millions of short tons]

Commodity Group	Total Domestic Traffic	Barge Traffic	Percent by Barge
Coal	4.0	3.9	97.9%
Petroleum & Petroleum Products	75.7	74.6	98.6%
Chemicals & Related Products	21.1	20.8	98.7%
Crude Materials	17.8	17.6	99.0%
Primary Manufactured Goods	4.9	4.8	98.2%
Food & Farm Products	1.6	1.5	96.3%
All Manufucatured Equipment	0.4	0.4	90.5%
Other	0.7	0.7	93.5%
Total	**126.1**	**124.4**	**98.6%**

Source: PwC estimates based on data from The Army Corp. of Engineers, *Waterborne Commerce of the United States - Calendar Year 2014*, Tables 3-15 and 1-12.

The Columbia River

- Combined international and domestic waterborne commerce on the Columbia River was 20 percent (10 million tons) higher in 2014 than in 2005 (see **Table E-9**).
- Much of this increase is accounted for with an increase in foreign trade transported on the Columbia River.

- The amount of domestic waterborne commerce transported by barge declined significantly during the recession but has since picked up. In 2014 the share of domestic waterborne commerce on the Columbia River that was transported by barge was 88 percent.

Table E-9. – Total Foreign and Domestic Waterborne Commerce on the Columbia River, 2005-2014 [millions of short tons]

Year	Total Freight Traffic	Total Foreign Trade	Domestic Trade		
			All Vessels	Barges	Percent by Barge
2005	51.5	33.9	17.5	14.5	82.6%
2006	52.3	34.4	17.9	15.0	83.7%
2007	58.1	39.7	18.5	15.7	84.8%
2008	54.8	41.1	13.7	11.6	84.7%
2009	46.0	32.7	13.2	11.2	84.9%
2010	54.7	41.5	13.3	11.4	85.6%
2011	54.2	41.2	13.1	11.5	87.9%
2012	56.8	43.3	13.5	12.1	89.4%
2013	55.3	40.2	15.1	13.3	88.0%
2014	61.7	45.5	16.2	14.2	87.7%
2005-14	10.2	11.6	-1.3	-0.3	
% Change	19.8%	34.2%	-7.4%	-1.8%	

Source: PwC estimates based on data from US Army Corp. of Engineers, *Waterborne Commerce of the United States, Part 5 - National Summaries*, Table 3-16 and 1-12 (various years).

- By volume, petroleum and petroleum products represent the largest commodity group moved on the Columbia River. In 2014, 5.5 million tons of petroleum and petroleum products were shipped between US ports along the Columbia River, 72 percent (3.9 million tons) of which was transported by barge (see **Table E-10**).

Table E-10. –Domestic Waterborne Commerce on the Columbia River by Commodity, 2005-2014 [millions of short tons]

Commodity Group	Total Domestic Traffic	Barge Traffic	Percent by Barge
Coal	0.0	0.0	0.0%
Petroleum & Petroleum Products	5.5	3.9	71.7%
Chemicals & Related Products	0.2	0.2	91.8%
Crude Materials	4.7	4.5	95.3%
Primary Manufactured Goods	0.0	0.0	0.0%
Food & Farm Products	5.3	5.2	98.1%
All Manufactured Equipment	0.2	0.1	58.0%
Other	0.3	0.3	86.9%
Total	**16.2**	**14.2**	**87.6%**

Source: PwC estimates based on data from The Army Corp. of Engineers, *Waterborne Commerce of the United States - Calendar Year 2014*, Tables 3-18 and 1-12.