

Waterborne Chemicals and the American Economy

Commodities Transported

The Inland Waterways System plays a major role in the transportation of chemicals, *building block* commodities which feed the American economy. Corps of Engineers data shows an average of 65 million tons of chemicals transported per year, which is about 10% of total traffic.

These chemicals range in value widely, from a low of \$56 to a high of more than \$1,000 per ton. The average value is \$555 per ton, and the total value of chemicals transported exceeds \$36 billion annually.

As listed in Table 1, there are a variety of chemicals transported in shallow draft vessels. This table lists 24 specific chemicals with their annual tons and current value, rank ordered by value.

Note that hydrocarbons and other chemicals that are inputs to heavy industry comprise a large portion in terms of both tons and value.

Asphalt is one of the leading commodities in tonnage although it ranks well down on the list in terms of value.

As a group, fertilizers comprise about 17% of tonnage, but only 7% of value.

Originating Traffic

Waterborne chemicals are loaded onto the inland waterway system in twenty-two states, as listed in Table 2 and shown graphically in Figure 1. Note that 45% of the tons and 57% of the value originate in Texas. Louisiana is second, with 39% of tons and 32% of value. The leading inland state is Illinois with 5% of tons and 3% of value. The other 19 states combine for 10.4% of tonnage and 7.6% of the total value of chemicals moved on the inland waterways system.

Figure 1

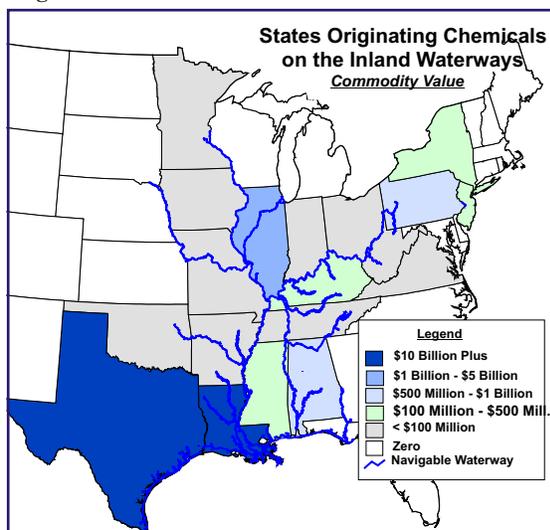


Table 1 - Waterborne Petroleum and Products

Commodity	Avg Annual Tons	2005 Value (\$Million)
Other Hydrocarbons	9,486,500	\$9,439.1
Alcohols	7,178,700	\$6,460.8
Benzene & Toluene	5,999,800	\$4,799.8
Naphtha & Solvents	5,735,000	\$3,899.8
Acyclic Hydrocarbons	2,328,900	\$1,909.7
Carboxylic Acids	1,519,300	\$1,572.5
Chemical Additives	3,324,900	\$1,542.7
Nitrogenous Fertilizer	6,166,400	\$1,479.9
Sodium Hydroxide	4,653,000	\$1,372.6
Asphalt, Tar & Pitch	7,187,400	\$826.5
Other Organic Compounds	929,500	\$688.7
Other Fertilizers & Mixes	2,404,700	\$553.1
Ammonia	914,900	\$258.0
Sulphur (Liquid)	688,400	\$254.7
Nitrogen Functional Compounds	1,018,100	\$244.3
Inorg. Elem., Oxides, & Halogen Salts	1,247,500	\$238.3
Potassic Fertilizers	1,144,700	\$223.2
Phosphatic Fertilizers	669,600	\$133.9
Metallic Salts	738,300	\$113.0
Sulphuric Acid	1,592,500	\$89.2
Other Chemical Products	231,800	\$85.8
Other Inorganic Chemicals	162,900	\$48.9
Organo - Inorganic Compounds	21,000	\$6.3
Plastics	1,700	\$0.9
Total	65,345,500	\$36,241.8

Table 2 - States of Origin of Waterborne Chemicals

Origin State	Avg Annual Tons	2005 Value (\$Million)
TX	30,801,200	\$21,058.9
LA	26,837,400	\$11,855.3
IL	3,293,900	\$1,138.3
PA	785,800	\$690.9
AL	1,258,100	\$546.4
KY	1,380,000	\$459.5
MS	1,257,700	\$315.5
NJ	364,000	\$201.6
NY	267,100	\$138.1
MN	396,100	\$65.1
IA	78,900	\$61.9
WV	91,500	\$56.1
AR	233,200	\$65.7
IN	213,400	\$49.2
TN	163,500	\$31.8
OK	178,300	\$39.7
MO	103,700	\$31.7
OH	165,800	\$19.1
VA	78,200	\$18.8
WA	8,000	\$5.5
DE	8,700	\$0.5
AK	1,200	\$0.4

Terminating Traffic

Waterborne chemicals are received in 24 states, as shown in Table 3 and Figure 2. The same three states which lead in shipped traffic also lead in received traffic – Texas, Louisiana and Illinois.

Texas is the leading state for received chemicals with 41% of tonnage and 48% of value received.

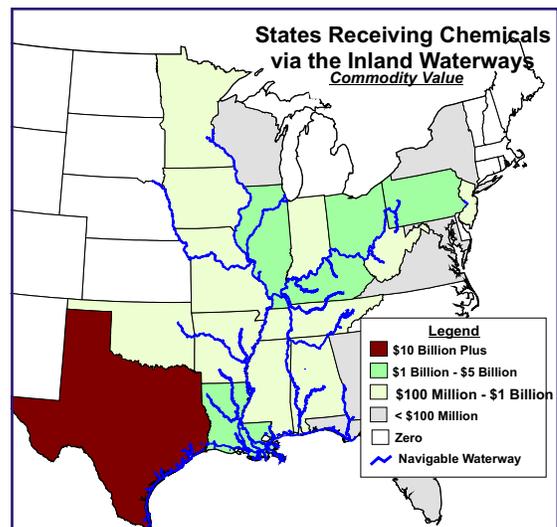
Louisiana is second at 17% of tonnage and 17% of value.

After the third ranking state, Illinois (9% of tons and 7.5% of value), the 21 remaining states account for 32.8% of tons and 26.1% of value transported. This is a wider distribution among the states than for shipped chemicals.

Table 3 - States Where Waterborne Chemicals Are Received

Destination State	Avg Annual Tons	2005 Value (\$Million)
TX	26,830,400	\$17,957.1
LA	11,148,900	\$6,208.5
IL	6,055,300	\$2,746.8
OH	3,662,500	\$1,936.7
PA	1,845,200	\$1,441.7
KY	2,187,500	\$1,254.9
AL	1,753,800	\$931.8
TN	2,418,200	\$674.1
WV	816,900	\$551.8
MS	1,232,800	\$547.3
IN	879,500	\$424.4
MO	1,850,900	\$446.8
NJ	651,900	\$333.6
MN	1,226,600	\$291.4
OK	1,092,500	\$243.2
IA	832,800	\$187.6
AR	716,800	\$170.4
NY	30,100	\$15.4
VA	94,600	\$15.2
WI	73,200	\$12.3
FL	27,600	\$10.3
MD	37,500	\$2.5
GA	6,700	\$1.6
AK	1,800	\$0.7

Figure 2



Economic Analysis

The value of chemicals moved by inland waterway – over \$36 billion – can be used in conjunction with input-output data and analysis to estimate its importance to the American economy. Using this form of economic analysis, output and jobs in the industries which produce and consume chemicals and in industries directly and indirectly linked to the these industries have been estimated. Corresponding value added totals and aggregate tax revenues have also been estimated.

This results of this analysis show the following:

There are 473,000 jobs directly associated with the production and consumption of chemicals transported on the inland waterways.

The Direct Output (a measure of business activity, similar to sales) that results from these 473,000 jobs has a value of \$130.9 billion.

The total number of associated jobs is 1,952,000, which includes indirectly linked jobs (in industries that directly and indirectly buy from and sell to any affected industries, including industries associated through employee expenditures).

The Total Output associated with these 1,952,000 jobs amounts to \$349.3 billion.

Direct Value Added is \$36.9 billion, while the Total Value Added is more than \$150 billion. Value Added is used by economists as a measure of the increase in the value of goods as a result of the production process. Value Added is sales less the cost of intermediate goods (materials) and services.

Impacted Industries

The analysis also shows output and employment associated with waterborne chemicals on each of the 505 industries which comprise the American economy, some of which are much more heavily impacted than others.

Table 4 shows the twenty most strongly linked industries in terms of employment. Note that there are a variety of industries which are directly linked. However, about half of these industries have no direct impacts, but are only indirectly linked with the directly associated industries.

Several of the most heavily impacted industries – Food Services; Employment Services; Real Estate; Hospitals – are not often associated with waterborne commerce. They show up because they are major concentrations of employment in the American economy and are linked to activity in many basic industries.

There are 54 separate industries with more than 10,000 jobs associated with waterway transportation of petroleum and petroleum products.

Table 4 - Most Strongly Linked Industries - Employment

Industry	Employment (Jobs)	
	Direct	Total
Agriculture and forestry support activities	103,760	125,132
Wholesale trade	0	99,937
Food services and drinking places	0	91,278
Truck transportation	35,215	66,375
All other crop farming	47,491	56,579
Employment services	0	41,888
Real estate	0	40,614
Management of companies and enterprises	0	38,021
Architectural and engineering services	0	33,039
Automotive repair and maintenance- except car wash	0	32,407
Cattle ranching and farming	19,705	32,221
Petrochemical manufacturing	31,899	31,899
Hospitals	0	31,538
Plastics material and resin manufacturing	27,780	30,928
Offices of physicians- dentists- and other health	0	29,411
Scenic and sightseeing transportation and support	13,195	28,805
Couriers and messengers	17,167	28,721
Other basic organic chemical manufacturing	22,916	28,075
Transit and ground passenger transportation	18,562	27,529
Other State and local government enterprises	16,757	25,790

The twenty most strongly linked industries in terms of output are listed in Table 5.

Note that the four most strongly linked industries, in both Direct and Total Output, are producers of chemicals in one way or another.

Half of the twenty industries are not directly linked but are high on the list because of indirect linkages.

Table 5 shows several of the most highly linked industries – Real Estate; Management; Automotive Repairs – that are not often associated with waterborne commerce. They are impacted through indirect linkages to many of the directly impacted industries.

Associated output is spread widely through the economy. There are 99 industries with Total Output associated with waterborne chemicals greater than \$500 million.

Table 5 - Most Strongly Linked Industries - Output

Industry	Output (\$Million)	
	Direct	Total
Other basic organic chemical manufacturing	\$31,538	\$38,638
Petroleum refineries	\$11,879	\$27,579
Plastics material and resin manufacturing	\$20,133	\$22,414
Petrochemical manufacturing	\$16,665	\$16,665
Oil and gas extraction	\$0	\$15,405
Wholesale trade	\$0	\$15,039
Truck transportation	\$4,719	\$8,894
Real estate	\$0	\$6,836
Owner-occupied dwellings	\$0	\$5,903
Paper and paperboard mills	\$4,930	\$5,881
Lessors of nonfinancial intangible assets	\$0	\$5,581
Management of companies and enterprises	\$0	\$5,019
Automotive repair and maintenance- except car wash	\$0	\$4,810
Monetary authorities and depository credit interme	\$0	\$4,642
Other State and local government enterprises	\$2,804	\$4,316
Food services and drinking places	\$0	\$3,955
Hospitals	\$0	\$3,896
All other crop farming	\$3,193	\$3,804
Agriculture and forestry support activities	\$3,062	\$3,692
Air transportation	\$2,696	\$3,671

Industrial Sectors

It is also useful to group the results for individual industries into industrial sectors.

The distribution of jobs associated with waterborne chemicals, by sector, is presented in Table 6. Note that the Manufacturing sector is the most strongly linked with nearly 285,000 total jobs associated with waterborne chemicals.

The sector which includes Agriculture follows with nearly 258,000 total jobs. This sector actually leads in Direct Employment, with 184,000 directly associated jobs.

Transportation & Warehousing is another industrial sector with a high number of jobs associated with waterborne chemicals.

Table 7 - Employment (Jobs) by Industrial Sector

Industrial Sector	Employment (Jobs)	
	Direct	Total
Agriculture, Forestry, Fishing & Hunting	184,075	257,713
Mining	0	41,072
Utilities	0	10,013
Construction	12,906	29,739
Manufacturing	143,432	284,572
Wholesale Trade	0	99,937
Transportation & Warehousing	103,833	207,768
Retail Trade	0	141,957
Information	0	35,953
Finance & Insurance	0	79,710
Real Estate & Rental	0	55,716
Professional - Scientific & Tech Services	0	132,030
Management of Companies	0	38,021
Administrative & Waste Services	7,308	110,704
Educational Services	0	24,496
Health & Social Services	0	117,141
Arts - Entertainment & Recreation	0	31,081
Accommodation & Food Services	0	106,010
Other Services	0	111,807
Government & Other	21,414	36,277
Total	472,968	1,951,716

Table 7 shows the distribution of Direct and Total Output associated with shipped and received waterborne chemicals.

Note that in terms of output, the Manufacturing sector is far ahead of any other sector. At \$157 billion, Manufacturing accounts for 45% of the total associated with waterborne chemicals.

Taxes

The analysis also resulted in estimates of tax payments tied to waterborne chemicals, as shown in Table 8.

The taxes paid in association with all linked activities amounts to about \$24.8 billion in federal taxes, and \$15.5 billion in state and local taxes, for a grand total of taxes associated with these waterborne chemicals of \$40.3 billion.

Table 7 - Output by Industrial Sector

Industrial Sector	Output (\$Million)	
	Direct	Total
Agriculture, Forestry, Fishing & Hunting	\$8,521	\$13,347
Mining	\$0	\$19,341
Utilities	\$0	\$5,839
Construction	\$1,316	\$2,863
Manufacturing	\$103,577	\$156,697
Wholesale Trade	\$0	\$15,039
Transportation & Warehousing	\$13,265	\$26,058
Retail Trade	\$0	\$7,849
Information	\$0	\$8,205
Finance & Insurance	\$0	\$14,662
Real Estate & Rental	\$0	\$14,621
Professional - Scientific & Tech Services	\$0	\$13,837
Management of Companies	\$0	\$5,019
Administrative & Waste Services	\$1,158	\$6,981
Educational Services	\$0	\$1,235
Health & Social Services	\$0	\$10,080
Arts - Entertainment & Recreation	\$0	\$1,598
Accommodation & Food Services	\$0	\$5,107
Other Services	\$0	\$9,591
Government & Other	\$3,035	\$11,306
Total	\$130,872	\$349,277

Table 8 - Associated Tax Payments

	Taxes Paid (\$Million)	
Federal Government		
Corporate Profits Tax	\$2,875	
Indirect Bus Tax: Custom Duty	\$375	
Indirect Bus Tax: Excise Taxes	\$1,206	
Indirect Bus Tax: Fed NonTaxes	\$426	
Personal Tax: Estate and Gift Tax	\$0	
Personal Tax: Income Tax	\$9,908	
Personal Tax: NonTaxes (Fines- Fees)	\$105	
Social Ins Tax- Employee Contribution	\$5,208	
Social Ins Tax- Employer Contribution	\$4,741	
Total - Federal Government		\$24,843
Corporate Profits Tax	\$491	
Dividends	\$7	
Indirect Bus Tax: Motor Vehicle Lic	\$100	
Indirect Bus Tax: Other Taxes	\$617	
Indirect Bus Tax: Property Tax	\$4,682	
Indirect Bus Tax: S/L NonTaxes	\$733	
Indirect Bus Tax: Sales Tax	\$5,842	
Indirect Bus Tax: Severance Tax	\$111	
Personal Tax: Estate and Gift Tax	\$0	
Personal Tax: Income Tax	\$2,166	
Personal Tax: Motor Vehicle License	\$124	
Personal Tax: NonTaxes (Fines- Fees)	\$415	
Personal Tax: Other Tax (Fish/Hunt)	\$31	
Personal Tax: Property Taxes	\$47	
Social Ins Tax- Employee Contribution	\$27	
Social Ins Tax- Employer Contribution	\$98	
Total - State / Local Government		\$15,491
Grand Total		\$40,334

Conclusion

This analysis shows the extent to which chemicals transported on the Nation's inland waterways system support economic activity throughout the industries that make up the American economy.

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