

A collage of three images: an airplane flying in the sky, a line of semi-trucks on a highway with overhead signs for 'EXIT 143 A-B', 'EXIT 143 C', and 'Flagstaff 1/2 MILE', and a train of freight cars on a track in a desert landscape.

Draft Memo

Arizona State Freight Plan

(ADOT MPD 085-14)

Identification of Top 10 Economic Sectors for Focus

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Arizona Department of Transportation

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Memo

The purpose of this memo is to propose the “top 10” economic sectors for focused analysis in Phase 3 of the Arizona State Freight Plan study (Phase 3: Assess Arizona’s Freight Characteristics and Economic Context).^{*} Once these sectors have been agreed with the Arizona Department of Transportation, the team will undertake a more detailed analysis of the transportation performance needs and constraints of these focus sectors^{**}.

^{*}This memo is the output of Task 3.1 of CPCS proposal work plan (Triangulate top 20 commodity flow volumes, values, and sector employment data to identify focus sector/commodity groups).

^{**}Corresponding to Task 3.2 of the CPCS proposal work plan (For top 10 key sectors/commodity groups, develop Working Paper)

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Memo

To enhance Arizona’s economic competitiveness and growth, the Arizona State Freight Plan should focus on addressing the transportation performance needs of the freight sectors that drive Arizona’s economy.

To this end, we propose to focus on the transportation performance needs and constraints of a cross-section of “top 10” freight sectors in Arizona.

- Wholesale and Retailers
- Food and Beverage
- High-Tech Manufacturing
- General Manufacturing
- Transportation Equipment Manufacturing
- Transportation and Logistics
- Mining (except oil and gas)*
- Energy (oil and gas)*
- Agriculture*
- Forestry*

*Also included are the focus sectors identified in MAP-21¹ and FHWA Guidance².

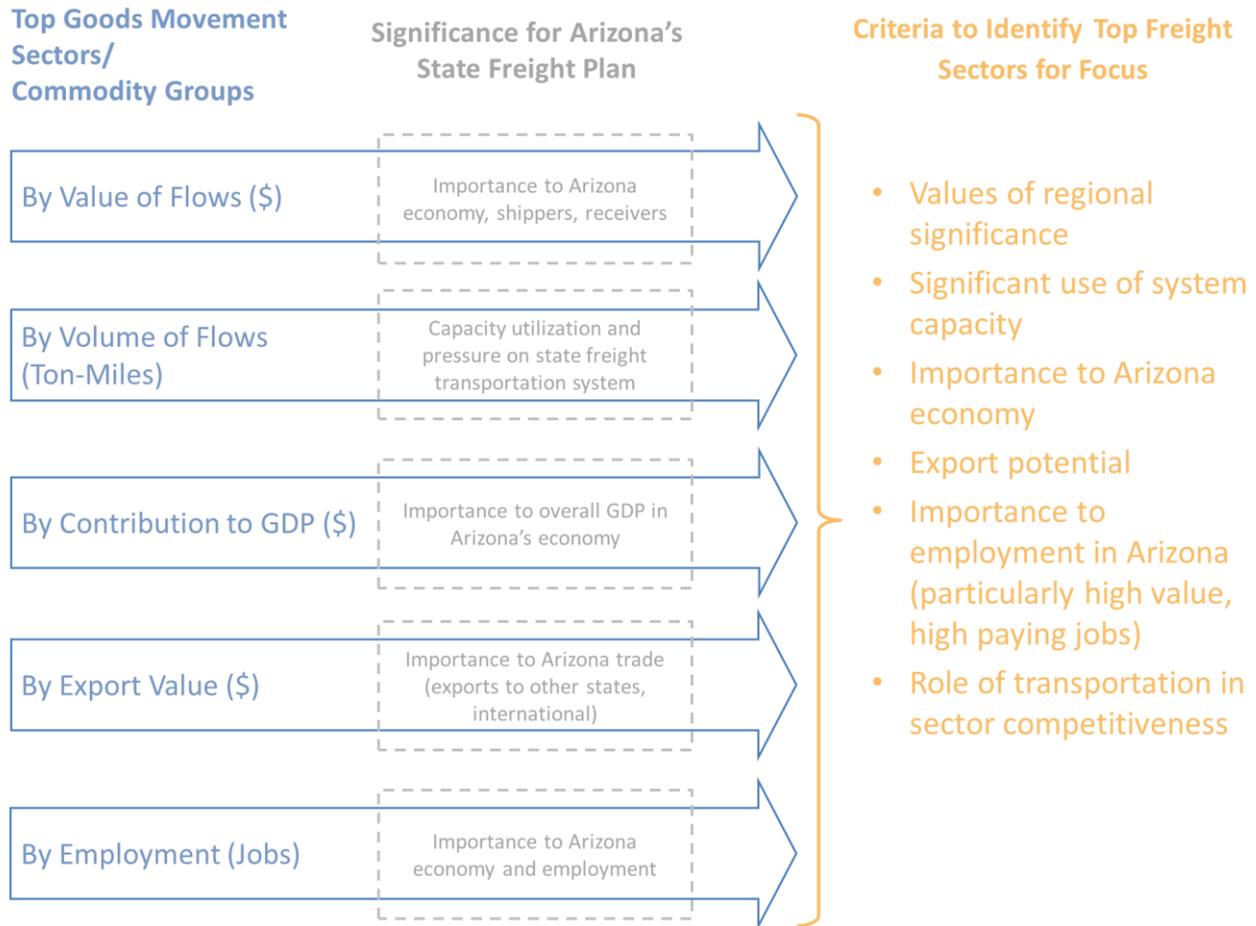
These top 10 sectors were identified based on an assessment of top freight sectors in terms of volumes and values of traffic, contribution to GDP, trade and employment (Appendix A)³, and based on criteria informed by the economic competitiveness goals and objectives of the Arizona State Freight Plan, summarized in the figure on the following page.

¹ MAP-21 Section 1118(b)(5) “in the case of routes on which travel by heavy vehicles (including mining, agricultural, energy cargo or equipment, and timber vehicles) is projected to substantially deteriorate the condition of roadways, a description of improvements that may be required to reduce or impede the deterioration”

² FHWA Guidance: State freight plans also include mining, agriculture, energy, and timber industries by defining the assets that support those industries and how the state’s freight improvement strategy will affect the routes supporting the mining, agriculture, energy, and timber industry.

³ “Top” goods movement sectors and commodity groups in Arizona differ by metric, as do their use of the freight transportation system, impact, and, most importantly, their transportation performance requirements.

Figure 1: Identifying “Top 10” Economic Sectors for Focus



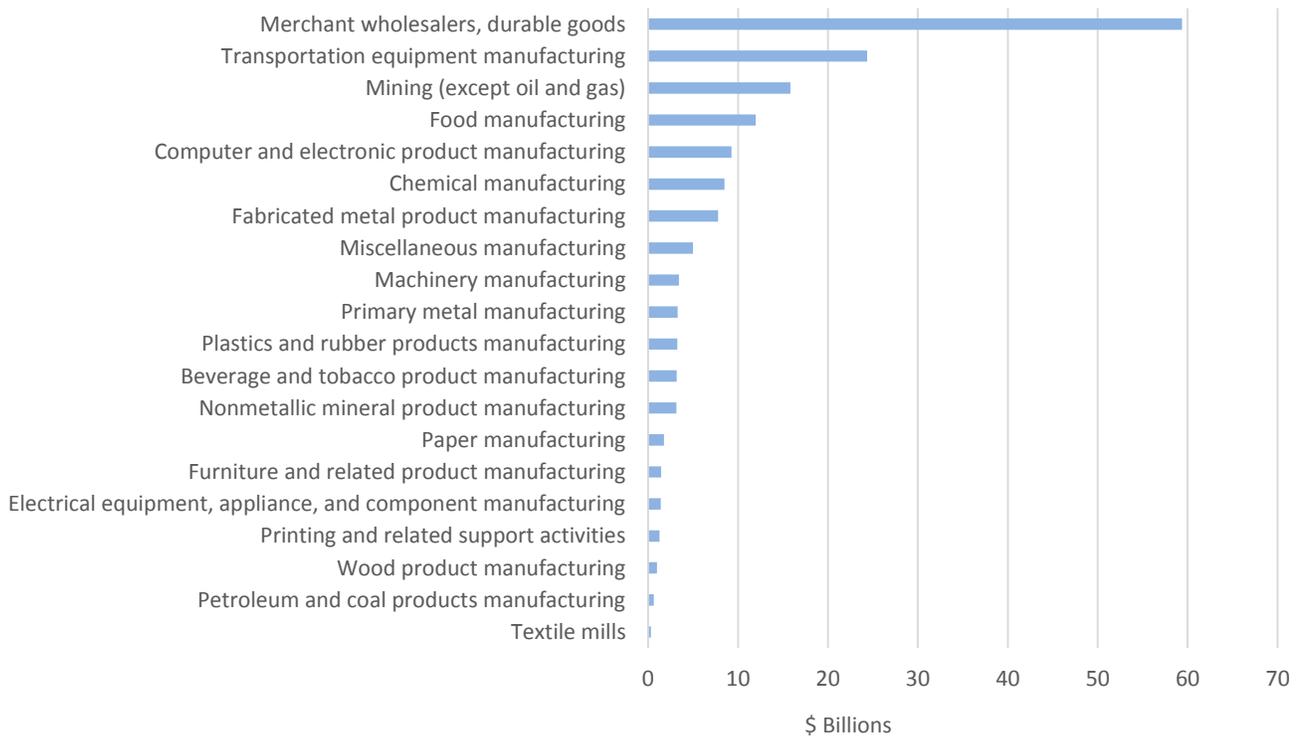
Source: CPCS

Appendix A: Top Freight Sectors, by Different Metrics

A-1: Value of Flows (\$)

Manufacturing sectors comprise the most significant values of freight flows in Arizona.

Figure 2: Value of Commodities Shipped by Industry



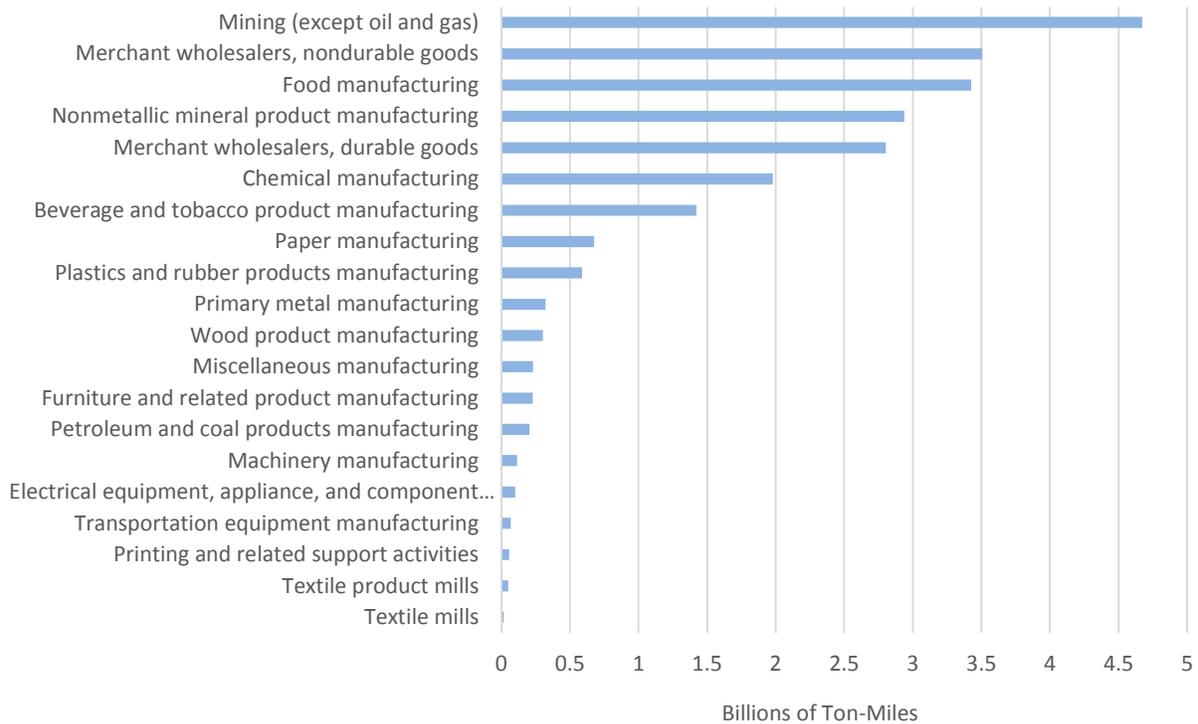
NAICS Code	Industry Name
316	Merchant wholesalers, nondurable goods
315	Merchant wholesalers, durable goods
314	Transportation equipment manufacturing
313	Mining (except oil and gas)
324	Food manufacturing
321	Computer and electronic product manufacturing
323	Chemical manufacturing
335	Fabricated metal product manufacturing
337	Miscellaneous manufacturing
322	Machinery manufacturing
327	Primary metal manufacturing
312	Plastics and rubber products manufacturing
326	Beverage and tobacco product manufacturing
331	Nonmetallic mineral product manufacturing
333	Paper manufacturing
339	Furniture and related product manufacturing
332	Electrical equipment, appliance, and component manufacturing
325	Printing and related support activities
334	Wood product manufacturing
311	Petroleum and coal products manufacturing

Source: CPCS analysis of United States Census Bureau. 2012 Commodity Flow Survey.

A-2: Volume of Flows (Ton-Miles)

The mining sector, followed by wholesalers and manufacturing, comprise the sectors that generate the largest volume of freight flows over Arizona’s transportation system.

Figure 3: Ton-Miles of Commodities Shipped by Industry



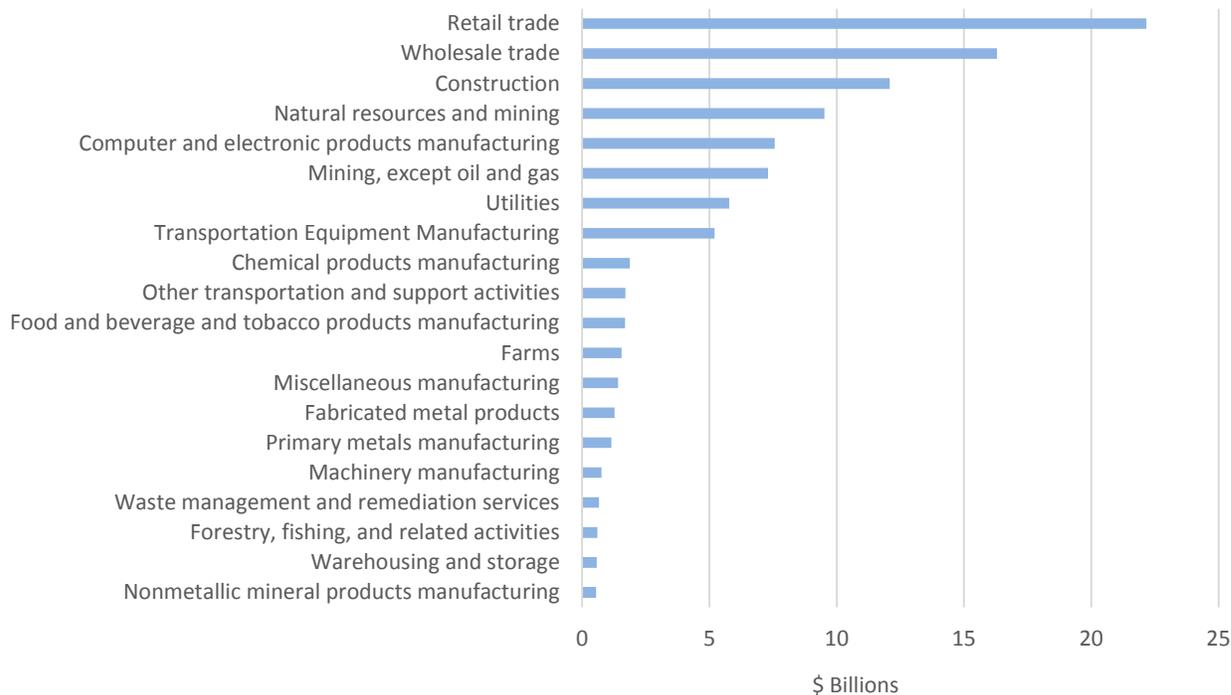
NAICS Code	Industry
315	Mining (except oil and gas)
316	Merchant wholesalers, nondurable goods
334	Food manufacturing
332	Nonmetallic mineral product manufacturing
313	Merchant wholesalers, durable goods
314	Chemical manufacturing
323	Beverage and tobacco product manufacturing
336	Paper manufacturing
335	Plastics and rubber products manufacturing
333	Primary metal manufacturing
324	Wood product manufacturing
337	Miscellaneous manufacturing
339	Furniture and related product manufacturing
321	Petroleum and coal products manufacturing
331	Machinery manufacturing
326	Electrical equipment, appliance, and component manufacturing
322	Transportation equipment manufacturing
312	Printing and related support activities
325	Textile product mills
423	Textile mills

Source: CPCS Analysis of United States Census Bureau. 2012 Commodity Flow Survey

A-3: Contribution to Arizona’s GDP

Among freight sectors, retail trade and wholesale trade are the two most significant contributors to Arizona’s GDP. Construction, mining, and computer electronics products are also significant contributors to Arizona’s GDP.

Figure 4: Contribution to Arizona’s GDP by Industry



Note: Only those sectors that generate freight traffic are analyzed here (for example, the financial services sector is excluded from analysis).

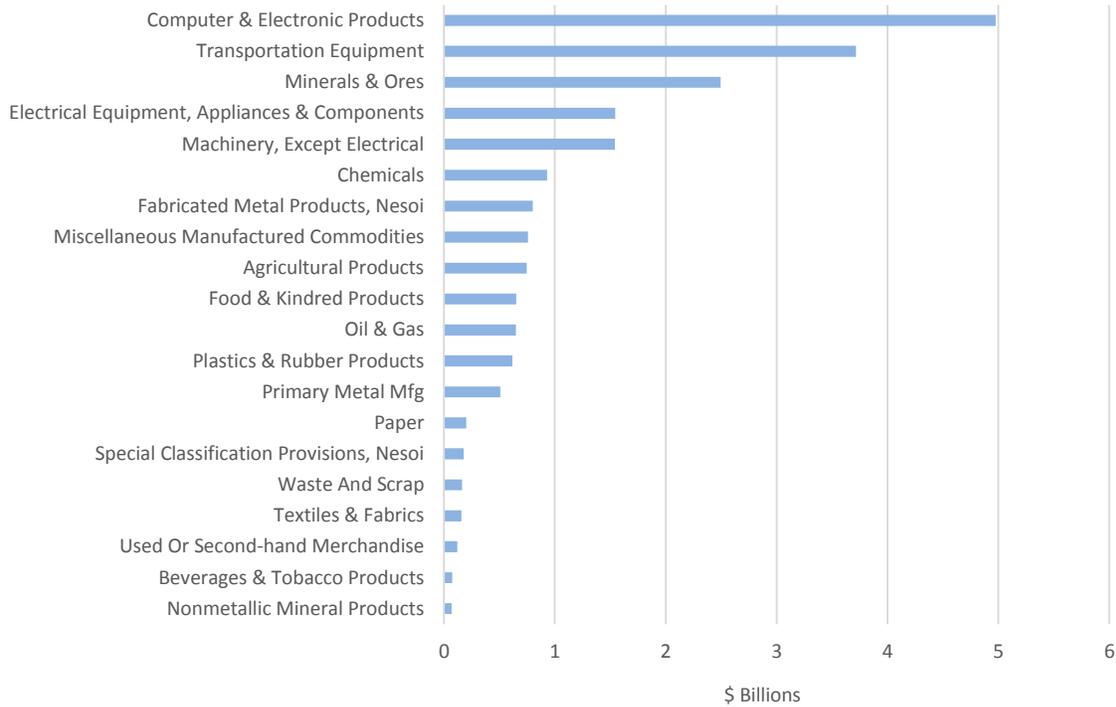
NAICS Code	Industry
44-45	Retail trade
42	Wholesale trade
23	Construction
11, 21	Natural resources and mining
334	Computer and electronic products manufacturing
212	Mining, except oil and gas
22	Utilities
336	Transportation Equipment Manufacturing
325	Chemical products manufacturing
487-488, 492	Other transportation and support activities
311-312	Food and beverage and tobacco products manufacturing
111-112	Farms
339	Miscellaneous manufacturing
332	Fabricated metal products
331	Primary metals manufacturing
333	Machinery manufacturing
562	Waste management and remediation services
113-115	Forestry, fishing, and related activities
493	Warehousing and storage
327	Nonmetallic mineral products manufacturing

Source: CPCS analysis of Bureau of Economic Analysis

A-4: Exports Value (\$)

Transportation equipment, computers and electronics, machinery, energy and agricultural products make up the largest sectors in terms of value of exports.

Figure 5: Value of Arizona Exports by Sector



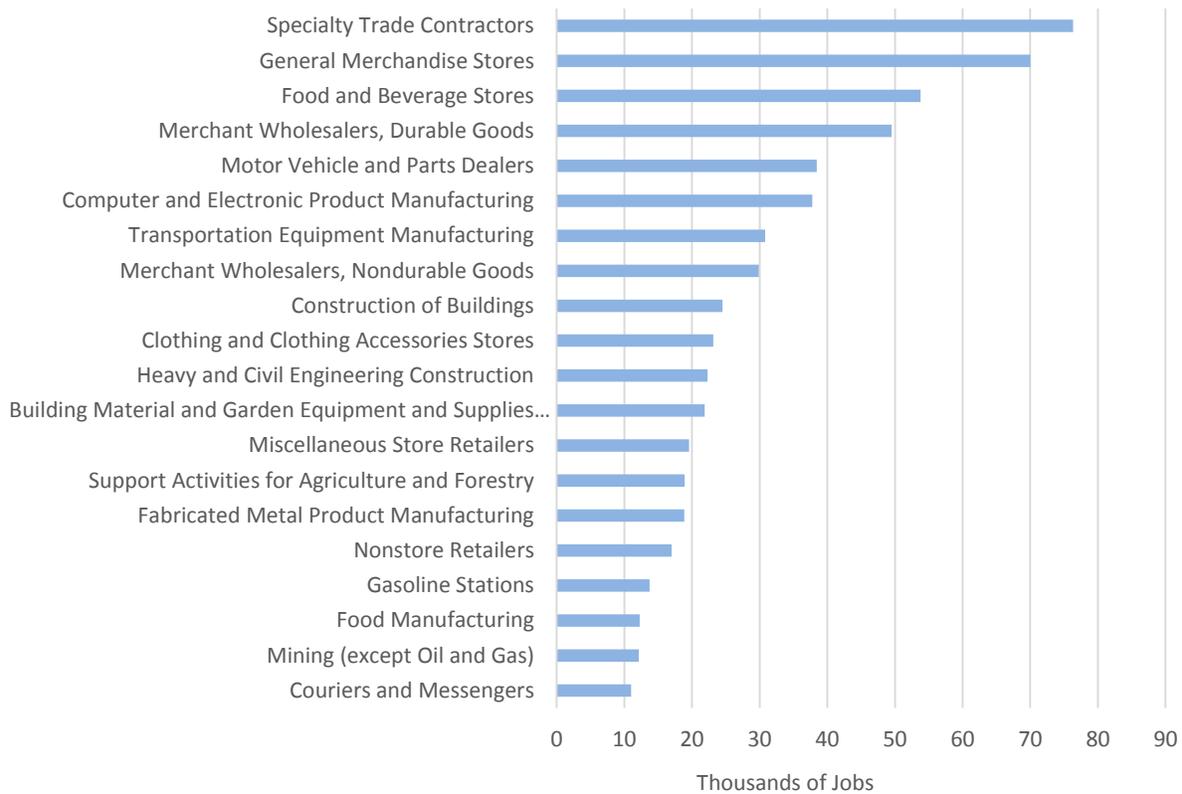
NAICS Code	Industry
334	Computer & Electronic Products
336	Transportation Equipment
212	Minerals & Ores
335	Electrical Equipment, Appliances & Components
333	Machinery, Except Electrical
325	Chemicals
332	Fabricated Metal Products
339	Miscellaneous Manufactured Commodities
111	Agricultural Products
311	Food & Kindred Products
211	Oil & Gas
326	Plastics & Rubber Products
331	Primary Metal Mfg
322	Paper
990	Special Classification Provisions, Nesoi
910	Waste And Scrap
313	Textiles & Fabrics
930	Used Or Second-hand Merchandise
312	Beverages & Tobacco Products
327	Nonmetallic Mineral Products

Source: CPCS analysis of United States Trade Data Online

A-5: Employment (Jobs)

Contractors, retail, food and beverage, wholesalers and vehicle and electronic manufacturing make up some of the largest employers, among freight generating sectors, in Arizona.

Figure 6: Employment in Arizona by Industry



NAICS Code	Industry
238	Specialty Trade Contractors
452	General Merchandise Stores
445	Food and Beverage Stores
423	Merchant Wholesalers, Durable Goods
441	Motor Vehicle and Parts Dealers
334	Computer and Electronic Product Manufacturing
336	Transportation Equipment Manufacturing
424	Merchant Wholesalers, Nondurable Goods
236	Construction of Buildings
448	Clothing and Clothing Accessories Stores
237	Heavy and Civil Engineering Construction
444	Building Material and Garden Equipment and Supplies Dealers
453	Miscellaneous Store Retailers
115	Support Activities for Agriculture and Forestry
332	Fabricated Metal Product Manufacturing
454	Nonstore Retailers
447	Gasoline Stations
331	Food Manufacturing
212	Mining (except Oil and Gas)
492	Couriers and Messengers

Source: CPCS analysis of United States Census

Appendix B: Consolidating Ranking of Top Sectors

Figure 7: Consolidated Rankings of Top Industries

Industry	Value of Commodity Flow	Ton-Miles	Employ.	Exports (\$)	GDP (\$)
Merchant wholesalers, nondurable goods	1	2	8		
Merchant wholesalers, durable goods	2	5	4		
Transportation equipment manufacturing	3	17	7	6	8
Mining (except oil and gas)	4	1	19	3	6
Food manufacturing	5	3		10	
Computer and electronic product manufacturing	6		6	1	5
Chemical manufacturing	7	6		6	9
Fabricated metal product manufacturing	8		15	7	14
Miscellaneous manufacturing	9	12		8	13
Machinery manufacturing	10	15		5	16
Primary metal manufacturing	11	10	18	13	15
Plastics and rubber products manufacturing	12	9		12	
Beverage and tobacco product manufacturing	13	7		19	
Nonmetallic mineral product manufacturing	14	4		20	20
Paper manufacturing	15	8		14	
Furniture and related product manufacturing	16	13			
Electrical equipment, appliance, and component manufacturing	17	16		4	
Printing and related support activities	18	18			
Wood product manufacturing	19	11			
Petroleum and coal products manufacturing	20	14			
Textile product mills		19			
Textile mills		20		17	
Retail trade					1
Wholesale trade					2
Construction					3
Natural resources and mining					4
Utilities					7
Other transportation and support activities					10
Food and beverage and tobacco products manufacturing					11
Farms					12
Waste management and remediation services					17
Forestry, fishing, and related activities					18
Warehousing and storage					19
Agricultural Products				9	
Oil & Gas				11	
Special Classification Provisions				15	
Waste And Scrap				16	
Used Or Second-hand Merchandise				18	
Specialty Trade Contractors			1		
General Merchandise Stores			2		
Food and Beverage Stores			3		
Motor Vehicle and Parts Dealers			5		
Construction of Buildings			9		
Clothing and Clothing Accessories Stores			10		
Heavy and Civil Engineering Construction			11		
Building Material and Garden Equipment and Supplies Dealers			12		
Miscellaneous Store Retailers			13		
Support Activities for Agriculture and Forestry			14		
Nonstore Retailers			16		
Gasoline Stations			17		
Couriers and Messengers			20		

Source: CPCS Analysis

Appendix C: Top 10 Sector Concordance

The proposed “top 10” economic sectors for focus represent a cross section of top freight sectors, based on different metrics (per Appendix A), and economic competitiveness goals and objectives of Arizona’s State Freight Plan. Many economic sectors or sub-sectors have similarities, either in terms of their upstream/downstream linkages, or in terms of the nature of their supply chains. We have grouped similar or related sectors and sub-sectors for the purpose of the “top 10” economic sectors for focus.

Figure 8: Recommended top 10 Sectors Based on top Industries

Industry (NAICS)	NAICS ID	Recommended Top 10 Sectors									
		Wholesalers and Retailers	Food and Beverage	High-Tech Manufacturing	General Manufacturing	Transportation Equipment	Transportation and Logistics	Mining (except oil and gas)	Energy (oil and gas)	Agriculture	Forestry
Merchant wholesalers, nondurable goods	424	✓									
Merchant wholesalers, durable goods	423	✓									
Transportation equipment manufacturing	336					✓					
Mining (except oil and gas)	212						✓				
Food manufacturing	311		✓								
Computer and electronic product manufacturing	334			✓							
Chemical manufacturing	325				✓						
Fabricated metal product manufacturing	332				✓						
Miscellaneous manufacturing	339				✓						
Machinery manufacturing	333				✓						
Primary metal manufacturing	331				✓						
Plastics and rubber products manufacturing	326				✓						
Beverage and tobacco product manufacturing	312		✓								
Nonmetallic mineral product manufacturing	327				✓						
Paper manufacturing	322										✓
Furniture and related product manufacturing	337				✓						
Electrical equipment, appliance, and component manufacturing	335			✓							
Printing and related support activities	323										
Wood product manufacturing	321										✓
Petroleum and coal products manufacturing	324							✓			
Textile product mills	314				✓						
Textile mills	313				✓						
Retail trade	44-45	✓									
Wholesale trade	42	✓									
Construction	23										
Natural resources and mining	11, 21						✓				

Industry (NAICS)	NAICS ID	Recommended Top 10 Sectors									
		Wholesalers and Retailers	Food and Beverage	High-Tech Manufacturing	General Manufacturing	Transportation Equipment	Transportation and Logistics	Mining (except oil and gas)	Energy (oil and gas)	Agriculture	Forestry
Utilities	22										
Other transportation and support activities	487-488, 492						✓				
Food and beverage and tobacco products manufacturing	311-312		✓								
Farms	111-112									✓	
Waste management and remediation services	562										
Forestry, fishing, and related activities	113-115										✓
Warehousing and storage	493						✓				
Agricultural Products	111									✓	
Oil & Gas	211							✓			
Special Classification Provisions	990										
Waste And Scrap	910										
Used Or Second-hand Merchandise	930										
Specialty Trade Contractors	238										
General Merchandise Stores	452	✓									
Food and Beverage Stores	445		✓								
Motor Vehicle and Parts Dealers	441					✓					
Construction of Buildings	236										
Clothing and Clothing Accessories Stores	448	✓									
Heavy and Civil Engineering Construction	237										
Building Material and Garden Equipment and Supplies Dealers	444	✓									
Miscellaneous Store Retailers	453	✓									
Support Activities for Agriculture and Forestry	115									✓	
Nonstore Retailers	454	✓									
Gasoline Stations	447							✓			
Couriers and Messengers	492						✓				

Source: CPCS

Figure 9: Summary of Recommended Top 10 Sectors

	Proposed Sector	NAICS Code (from industries in top 20's)
1	Wholesalers and Retailers	424, 423, 312, 44, 45, 42, 452, 448, 444, 453, 454
2	Food and Beverage	311, 312, 445
3	High-Tech Manufacturing	334, 335
4	General Manufacturing	325, 332, 339, 333, 331, 326, 327, 337, 314, 313
5	Transportation Equipment	336, 441
6	Transportation and Logistics	487, 488, 492, 493
7	Mining (except oil and gas)	221, 21,
8	Energy (oil and gas)	324, 211, 447
9	Agriculture	111, 112, 115
10	Forestry	113, 322, 321