

### **3. ANALYSIS BY TRANSPORTATION MODE**

There were 5 (five) transportation modes evaluated during this study: air, highway, marine, pipeline and railroad. A brief discussion of fixed facilities is also presented.

#### **3.1 Air**

Shipments of hazardous materials via aircraft represent three (3) percent of the total shipments in the data evaluated. This percentage may be underestimated because data on hazardous materials shipped by air was provided by only one of over 30 carriers operating in the State of Alaska. The data on air transport of hazardous materials documented the number of hazardous materials air shipments, but lacked specific detail regarding the volume and type of hazardous materials.<sup>25</sup> While it was stated that all classes of hazardous materials may be shipped via air, in general the primary commodities include batteries and battery fluid, corrosive cleaning supplies, vehicles (cars, trucks, ATVs, and snow mobiles), engines (of all varieties but limited to internal combustion, liquid powered), gasoline, and ammunition for hunting.<sup>26</sup>

The primary hazard classes transported by one Air Cargo Carrier included Class 1 Explosive Materials (ammunition), Class 3 Flammable Liquid Materials (gasoline), Class 8 Corrosive Materials (corrosive cleaning supplies and batteries with fluid), and Class 9 Miscellaneous Materials (engines and vehicles). These materials were transported to 13 primary destinations throughout the State and also included two other backhaul routes (Backhaul Anchorage and Backhaul Fairbanks) where commodities were shipped from the 13 primary destinations back to Anchorage and from other charter locations within Alaska back to Fairbanks.

Total shipments for the time period evaluated in this study were 12,415 (average of 4,140 per year). A sharp rise in the number of hazardous materials shipments between 2007 and 2008 (Figure 3-1) may be attributable to the increase in the Alaska Permanent Fund Dividend checks for that year, which resulted in a significant increase in snow mobiles, ATV's, outboard boat motors, and other equipment. being purchased and shipped to remote communities. Additionally, the sharp increase in shipments to Emmonak between 2007 and 2008 is likely a reporting bias resulting from the fact that another airline reduced their service into that destination, replaced by the one airline that provided the most data for this study. A relative breakdown of hazardous materials shipments by total volume across the State is shown below in Figure 3-1 for comparison purposes only.

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<sup>25</sup> 7/9/10 Conversation with Mr. John Landis, FAA Regional Hazmat Contact: "Although the Federal Aviation Administration (FAA) requires airlines to track hazardous material shipments and to maintain those HAZMAT shipment records for the previous year, the regional FAA agency does not maintain any type of database that would yield the number, type and volume of hazardous materials shipments within the respective region over a given period of time."

<sup>26</sup> 7/20/10 conversation with Air Cargo / Hazardous Material Cargo Manager.

Figure 3-1. Statewide Relative Breakdown of Air Cargo Hazardous Material Shipments by Total Volume (lbs), 2007-2009

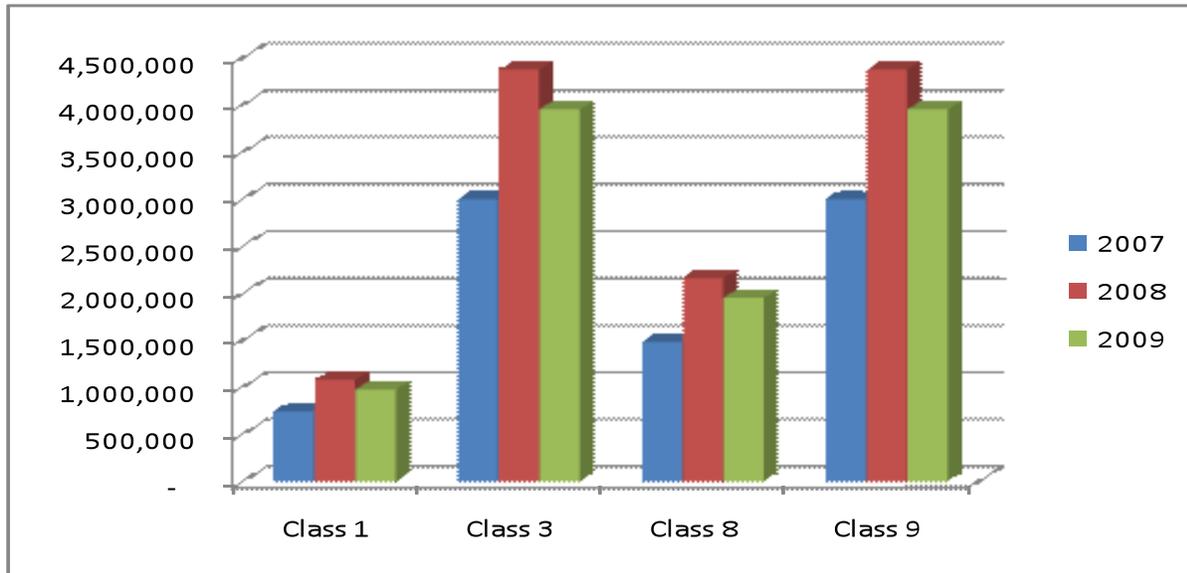


Table 3-1 lists the top five (5) air corridors according to the data received and evaluated.<sup>27</sup> Air routes from Anchorage to Bethel, Kotzebue, Nome, Emmonak, and Dillingham consistently experienced the highest number of hazardous materials shipments from 2007 to 2009. Figure 3-2 depicts weighted airline routes based on the number of hazardous materials shipments to a particular location.

Bethel and Kotzebue consistently experienced the highest number of hazardous materials shipments from 2007 to 2009, based on the one air carrier that provided data. It is likely there were additional hazardous material shipments throughout the State via air carriers not captured in this dataset, including specifically routes to Prince William Sound, and Southeast Alaska Subareas.

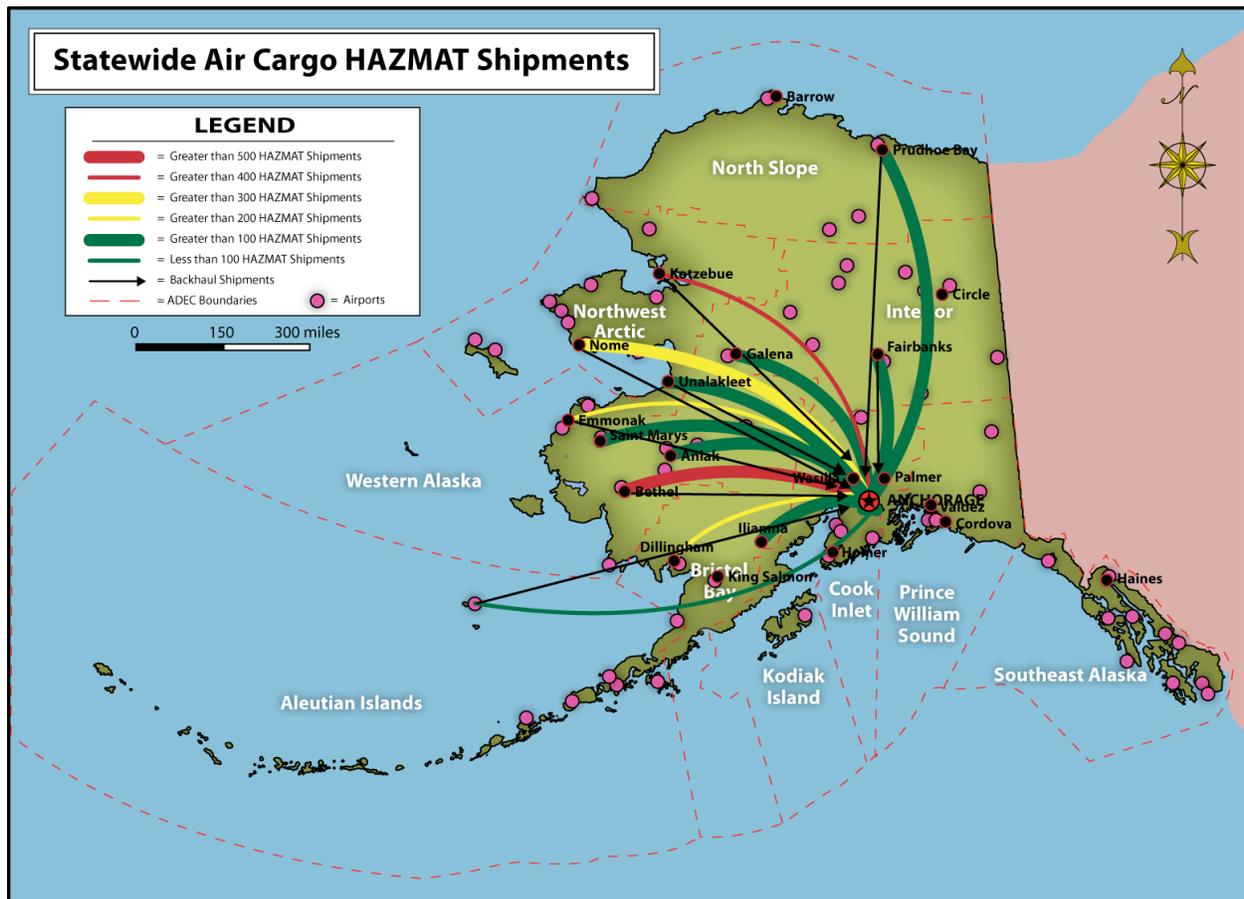
Based on the data received and evaluated, the primary EHS commodity transported via air was sulfuric acid that was carried in batteries.

<sup>27</sup> Note that no data was received regarding air shipments to or from Juneau or within the Southeast Alaska Subarea. The lack of data should not necessarily be interpreted as a lack of activity.

Table 3-1. Top 5 Air Corridors by Hazardous Material Classification

Top 5 Air Corridors (Based on a 3 year average)					
Hazard Class	1	2	3	4	5
1	Anchorage-Bethel	Backhaul Anchorage	Anchorage-Kotzebue	Anchorage-Nome	Anchorage-Emmonak
2	N/A	N/A	N/A	N/A	N/A
3	Anchorage-Bethel	Anchorage-Kotzebue	Anchorage-Nome	Anchorage-Emmonak	Anchorage-Dillingham
4	N/A	N/A	N/A	N/A	N/A
5	N/A	N/A	N/A	N/A	N/A
6	N/A	N/A	N/A	N/A	N/A
7	N/A	N/A <td N/A	N/A	N/A	
8	Anchorage-Bethel	Backhaul Anchorage	Anchorage-Kotzebue	Anchorage-Nome	Anchorage-Emmonak
9	Anchorage-Bethel	Backhaul Anchorage	Anchorage-Kotzebue	Anchorage-Nome	Anchorage-Emmonak
ORM-D	N/A	N/A	N/A	N/A	N/A

Figure 3-2. Statewide Air Cargo Hazardous Materials Shipments by Total Shipments



### 3.2 Highway

The transportation of hazardous materials via the highway represents 55% of the total number of shipments in the timeframe evaluated but only 0.0016% of the total volume statewide. The highway shipments reviewed cover the complete spectrum of hazard classes. Table 3-2 lists the volumes of hazardous material commodities shipped in total from 2007 to 2009. Hazard Class 3 (Flammable Liquid Materials) commodities represent the highest volume commodity shipped via the highway.

**Table 3-2. Total Volumes of Hazardous Materials Shipped via Highway**

Statewide Summary of Volumes (lbs) Transported via Highway		
Rank	Commodity	Total Volume (lbs)
1	HC 3 - Flammable Liquid Materials	342,943,656
2	HC 1 - Explosive Materials	263,426,333
3	HC 4 - Flammable Solid Materials	259,407,387
4	HC 2 - Gas Materials	104,748,177
5	HC 9 - Miscellaneous Materials	93,534,346
6	HC 8 - Corrosive Materials	83,419,216
7	HC 5 - Oxidizer & Organic Peroxide Materials	71,145,588
8	HC 7 - Radioactive Materials	4,851,008
9	HC 6 - Poison Materials	2,119,354

Twenty-one primary highways/roadways were found to be associated with the transportation of hazardous materials within the State of Alaska.<sup>28</sup> Table 3-3 lists the top five (5) highway corridors identified for movement of hazardous materials by the specific Hazard Class division, and Figure 3-3 depicts the weighted highway routes based on the volume of hazardous materials shipments to a particular location.

Table 3-4 lists the total three-year volume of hazardous materials shipped along seven (7) primary highways that are included in Table 3-3. The top five highway corridors by volume of hazardous materials shipped are: (1) Alaska Highway, (2) North Slope Haul Road, (3) Glenn Highway, (4) Richardson Highway, and (5) Sterling Highway. The EHS commodities transported via the highway are listed in Table 3-5 by volume. The major EHS commodity transported via highway is sulfuric acid.

The top highway corridors used to transport the EHS noted above are listed in Table 3-6. The primary routes include shipment from Anchorage north through Fairbanks en-route to the North Slope, and shipment from Anchorage south to Kenai, Homer, Seward and Nikiski.

<sup>28</sup> It is likely that hazardous materials are shipped over other secondary roads, but these were not identified because of the limitation in scope to eight layers (e.g. 8 changes in roadways/highways).

Figure 3-3. Statewide Highway Corridors by hazardous materials Volume

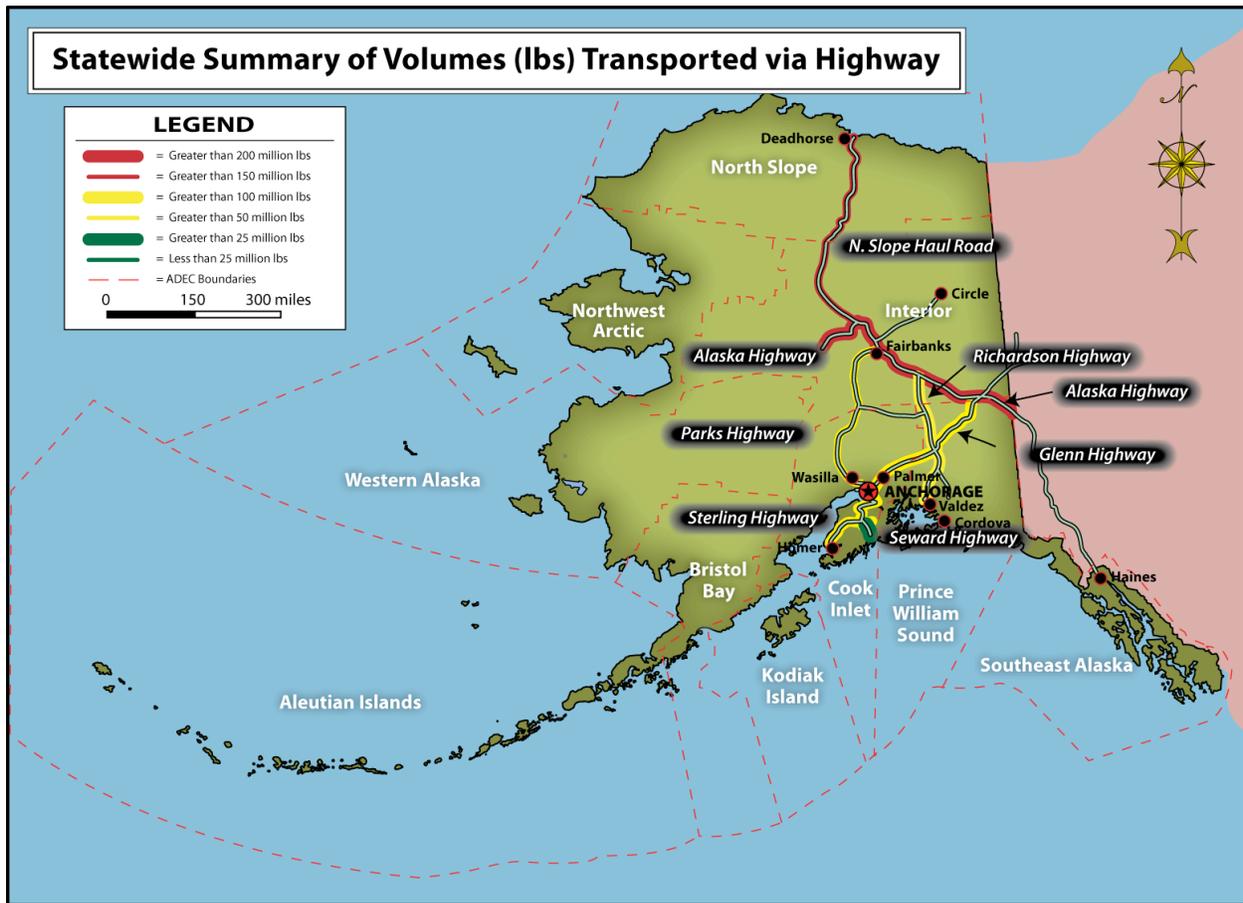


Table 3-3. Top 5 Highway Corridors by Specific Hazardous Material Classification

Top 5 Highway Corridors (Based on a 3 year average) by Hazard Class Division					
Divisions	1	2	3	4	5
1.1	Richardson Hwy	Glenn Hwy	Alaska Hwy	Parks Hwy	Klondike Hwy
1.2	Richardson Hwy	Glenn Hwy	Alaska Hwy	Parks Hwy	N/A
1.3	Richardson Hwy	Glenn Hwy	Parks Hwy	Alaska Hwy	N/A
1.4	Richardson Hwy	Glenn Hwy	Alaska Hwy	Parks Hwy	N. Slope Haul Rd
1.5	Alaska Hwy	Klondike Hwy	Klondike Hwy	Glenn Hwy	Parks Hwy
2	Seward Hwy	North Slope Lcl	Glenn Hwy	Sterling Hwy	Parks Hwy
2.1	Parks Hwy	Knik-Goose Bay	Port Access Rd	Alaska Hwy	Glenn Hwy
2.2	Glenn Hwy	Alaska Hwy	N. Slope Haul Rd	Parks Hwy	Seward Hwy
2.3	Alaska Hwy	Glenn Hwy	Richardson Hwy	Sterling Hwy	Parks Hwy
3	Alaska Hwy	N. Slope Haul Rd	Glenn Hwy	Parks Hwy	Richardson Hwy
4	Glenn Hwy	Parks Hwy	N/A	N/A	N/A
4.1	Sterling Hwy	Kalifornsky Bch	Bridge Access Rd	Greatland St	Seward Hwy
4.2	Sterling Hwy	Kalifornsky Bch	Bridge Access Rd	Seward Hwy	Greatland St
4.3	Sterling Hwy	Kalifornsky Bch	Greatland St	Bridge Access Rd	Glenn Hwy
5.1	Fairbanks Local	Alaska Hwy	Parks Hwy	Glenn Hwy	N. Slope Haul Rd
5.2	Alaska Hwy	Glenn Hwy	N. Slope Haul Rd	Parks Hwy	Seward Hwy
6.1	Glenn Hwy	Alaska Hwy	N. Slope Haul Rd	Parks Hwy	Seward Hwy
6.2	Glenn Hwy	Richardson Hwy	Parks Hwy	Alaska Hwy	N. Slope Haul Rd

Top 5 Highway Corridors (Based on a 3 year average) by Hazard Class Division					
Divisions	1	2	3	4	5
7	Glenn Hwy	Parks Hwy	N. Slope Haul Rd	Alaska Hwy	Seward Hwy
8	Glenn Hwy	Parks Hwy	Alaska Hwy	N. Slope Haul Rd	Seward Hwy
9	Seward Hwy	Sterling Hwy	Glenn Hwy	Parks Hwy	Alaska Hwy
ORM-D	N/A	N/A	N/A	• N/A	N/A

Table 3-4. 3-Year Volume of Hazardous Materials Shipped via the seven primary highway corridors

Statewide Summary of Volumes (lbs) Transported via Highway		
Rank	Highway Corridor	Total Volume (lbs)
1	Alaska Highway	251,248,348
2	North Slope Haul Road	163,573,116
3	Glenn Highway	142,438,260
4	Richardson Highway	129,011,155
5	Sterling Highway	113,019,744
6	Parks Highway	77,907,063
7	Seward Highway	49,305,224

Table 3-5. EHS Commodities Shipped via Highway 2007-2009

Hazard Class	EHS transported via Highway Corridor	Volume (lbs)
8	Sulfuric Acid	1,223,963
2.2	Ammonia, Anhydrous; or Anhydrous Ammonia	56,013
3	Formaldehyde Solution, Flammable	16,577
2.3	Nitric Oxide, Compressed	5,653
8	Nitric Acid	3,251
6.1	Arsenical Pesticides, Liquid, Toxic	2,560
2.3	Chlorine*	2,512
2.3	Sulfur Dioxide; or Sulphur Dioxide	1,600
2.3	Phosgene	457
6.1	Mercuric Chloride	3

*\*It is suspected that transport of Chlorine is one of the highest EHS commodities shipped via the highway but the dataset did not support this. There were large marine shipments coming into Anchorage, but there was no equivalent trucking information for Chlorine beyond Anchorage.*

Table 3-6. EHS Highway Corridors (Based on a 3 year average)

Top 5 EHS Highway Corridors (Based on a 3 year average) by Hazardous Material Description					
EHS	1	2	3	4	5
AA	Glenn Hwy	Parks Hwy	Alaska Hwy	N. Slope Haul Rd	Sterling Hwy
Bromine	N/A	N/A	N/A	N/A	N/A
Chlorine*	Seward Hwy	N/A	N/A	N/A	N/A
Chloroform	Glenn Hwy	Parks Hwy	N/A	N/A	N/A
Formaldehyde	Glenn Hwy	Alaska Hwy	Parks Hwy	N. Slope Haul Rd	Seward Hwy
Mercuric Chloride	Seward Hwy	Sterling Hwy	N/A	N/A	N/A
Nitric Acid	Sterling Hwy	Seward Hwy	Kalifornsky Bch	Bridge Access	Glenn Hwy
Nitric Oxide	Nikiski Local	Alaska Hwy	Glenn Hwy	Parks Hwy	N. Slope Haul Rd
Phosgene	Glenn Hwy	Seward Hwy	Sterling Hwy	Alaska Hwy	N/A
Sodium Cyanide	N/A	N/A	N/A	N/A	N/A
Sulfuric Acid	Glenn Hwy	Seward Hwy	Parks Hwy	Sterling Hwy	Alaska Hwy
Sulfur Dioxide	Nikiski Local	N/A	N/A	N/A	N/A

\*Chlorine data corridors are suspect based on lack of corresponding highway shipments as noted above.

### 3.3 Marine

For the data received, the transportation of hazardous materials via marine corridors represents 41% of the total number of shipments within the timeframe evaluated, but only 0.0006% of the total volume statewide. Marine shipments cover the entire hazard class spectrum. Table 3-7 lists the volumes of hazardous materials shipped in total over the three-year period evaluated in this study. Based on the data received and reviewed for this analysis, Hazard Class 1 commodities are the most prevalent commodity shipped. This is counter-intuitive and indicative of a gap in the dataset regarding marine shipment of Hazard Class 3 commodities, e.g. petroleum products shipped to/from Cook Inlet refineries, and from Valdez to various locations.

**Table 3-7. Total 3-Year Volumes of Hazardous Materials Shipped via Marine Corridors**

Statewide Summary of Volumes (lbs) Transported via Marine		
Rank	Commodity	Total Volume (lbs)
1	HC 1 - Explosive Materials	152,375,223
2	HC 2 - Gas Materials	37,824,316
3	HC 3 - Flammable Liquid Materials	22,509,122
4	HC 8 - Corrosive Materials	13,841,481
5	HC 9 - Miscellaneous Materials	5,071,176
6	HC 5 - Oxidizer & Organic Peroxide Materials	2,352,734
7	HC 4 - Flammable Solid Materials	1,223,684
8	HC 7 - Radioactive Materials	1,065,573
9	HC 6 - Poison Materials	105,061

The top five (5) marine transportation corridors by hazard class shipped are noted below in Table 3-8. The primary marine corridor involves transit through Cook Inlet to the various port locations within the Inlet.

**Table 3-8. Top 5 Marine Corridors by Specific Hazardous Material Classification**

Top 5 Marine Corridors (Based on a 3 year average)					
Hazard Class	1	2	3	4	5
1.1	Inside Passage	Homer-Kodiak	Cook Inlet	Haines-Juneau	Haines-Ketch
1.2	Cook Inlet	N/A	N/A	N/A	N/A
1.3	Cook Inlet	Cook Inlet-Kodiak	N/A	N/A	N/A
1.4	Cook Inlet	Homer-Kodiak	Inside Passage	Cook Inlet-Kodiak	Seward
1.5	Inside Passage	Cook Inlet	Haines-Juneau	Juneau-Ketch	Skagway-Haines
2	Cook Inlet	Kodiak	N/A	N/A	N/A
2.1	Cook Inlet	Seward	Cook Inlet-Kodiak	Kodiak	Homer-Kodiak
2.2	Cook Inlet	Homer-Kodiak	Cook Inlet-Kodiak	Kodiak	Aleutians
2.3	Cook Inlet	Homer-Kodiak	N/A	N/A	N/A
3	Cook Inlet	Inside Passage	Aleutian Islands	Northwest Arctic	Western AK

Top 5 Marine Corridors (Based on a 3 year average)					
Hazard Class	1	2	3	4	5
4	Cook Inlet	N/A	N/A	N/A	N/A
4.1	Cook Inlet	Seward	Homer-Kodiak	N/A	N/A
4.2	Cook Inlet	N/A	N/A	N/A	N/A
4.3	Cook Inlet	Whittier-Cordova	N/A	N/A	N/A
5.1	Cook Inlet	Inside Passage	Aleutians	Unimak Pass	North Slope
5.2	Cook Inlet	Inside Passage	Aleutians	Unimak Pass	North Slope
6.1	Cook Inlet	Homer-Kodiak	Seward	Aleutians	Unimak Pass
6.2	N/A	N/A	N/A	N/A	N/A
7	Aleutians	Inside Passage	North Slope	Unimak Pass	Cook Inlet
8	Cook Inlet	Homer-Kodiak	Seward	Inside Passage	Aleutians
9	Cook Inlet	Homer-Kodiak	Inside Passage	Kodiak	Kodiak-DH
ORM-D	N/A	N/A	N/A	N/A	N/A

Table 3-9 lists the total volume of hazardous materials exceeding one million pounds shipped via marine corridors from 2007 to 2009. By volume, Prince William Sound is the primary marine corridor. For this study, this result is primarily based on the size of military ammunition shipments that go through Valdez each year. The addition of tankship and barge shipments of petroleum products in/out of Prince William Sound and Cook Inlet would increase significantly the volumes moving through these subareas. The top five marine corridors by volume of hazardous materials shipped are: (1) Prince William Sound, (2) Cook Inlet, (3) Inside Passage, (4) Homer to Kodiak, and (5) Seward.

The EHS commodities transported via marine modes of transportation are listed in Table 3-10. Chlorine had the highest volume more than doubling the volume of Sulfuric Acid shipped. These shipments were shipped on the route from Tacoma, WA to Anchorage.

The primary marine transportation corridors for EHS are listed in Table 3-11. Again, Cook Inlet is the primary marine route that transports EHS commodities. Figure 3-5 depicts the weighted marine routes based on the volume of hazardous materials shipments to a particular location.

**Table 3-9. 3-Year Volumes of Hazardous Materials Shipped via Marine Corridors**

<b>Statewide Summary of Volumes (lbs) Transported via Marine</b>		
<b>Rank</b>	<b>Marine Corridor</b>	<b>Total Volume (lbs)</b>
1	Prince William Sound	144,220,300
2	Cook Inlet	49,289,686
3	Inside Passage / Southeast (Bellingham, Haine	3,803,035
4	Homer - Kodiak	3,319,711
5	Seward	1,956,017
6	Cook Inlet - Kodiak	1,513,025
7	Aleutian Islands & Alaska Peninsula (Akutan, C	1,414,655
8	Unimak Pass	1,411,428
9	Western Alaska	1,401,828
10	Northwest Arctic	1,401,732
11	North Slope	1,398,787

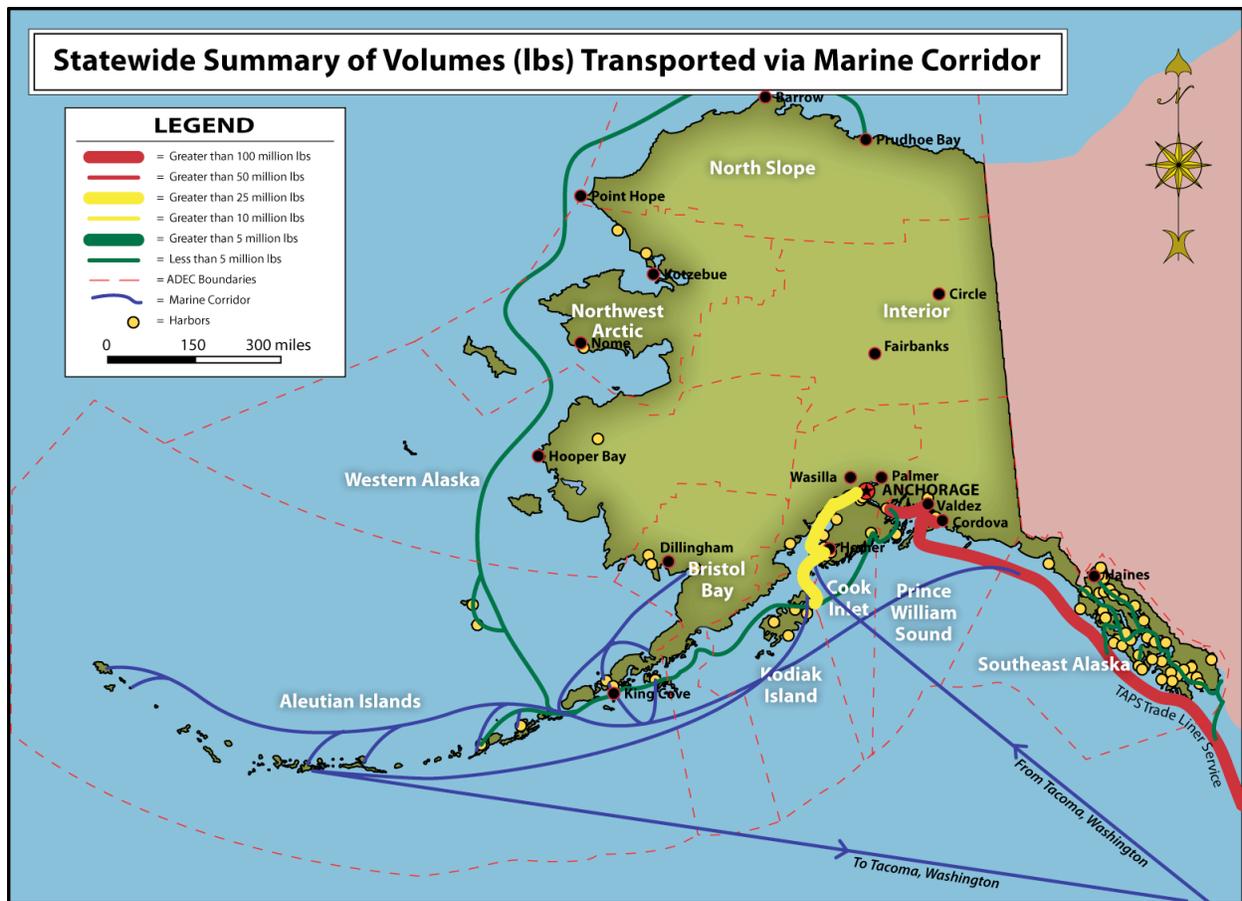
**Table 3-10. EHS Commodities Shipped via Marine 2007-2009**

<b>Hazard Class</b>	<b>EHS transported via Marine Corridor</b>	<b>Volume (lbs)</b>
2.3	Chlorine	3,651,900
8	Sulfuric Acid	1,493,703
3	Formaldehyde Solution, Flammable	23,520
2.3	Phosgene	17,700
8	Nitric Acid	869
8	Bromine or Bromine Solutions	277
2.2	Ammonia, Anhydrous; or Anhydrous Ammonia	204
2.3	Nitric Oxide, Compressed	165
6.1	Chloroform	55
6.1	Mercuric Chloride	9

Table 3-11. EHS Marine Corridors (Based on a 3 year average)

Top 5 EHS Marine Corridors (Based on a 3 year average)					
EHS	1	2	3	4	5
AA	Cook Inlet	N/A	N/A	N/A	N/A
Bromine	Cook Inlet	Inside Passage	Aleutians	Unimak Pass	North Slope
Chlorine	Cook Inlet	N/A	N/A	N/A	N/A
Chloroform	Cook Inlet	N/A	N/A	N/A	N/A
Formaldehyde	Cook Inlet	N/A	N/A	N/A	N/A
Mercuric Chloride	Aleutians	Unimak Pass	North Slope	Valdez-Whittier	Inside Passage
Nitric Acid	Cook Inlet	Inside Passage	Aleutians	Unimak Pass	North Slope
Nitric Oxide	Cook Inlet	N/A	N/A	N/A	N/A
Phosgene	Homer-Kodiak	N/A	N/A	N/A	N/A
Sodium Cyanide	N/A	N/A	N/A	N/A	N/A
Sulfuric Acid	Cook Inlet	Seward	Homer-Kodiak	Cook Inlet-Kodiak	Aleutians
Sulfur Dioxide	N/A	N/A	N/A	N/A	N/A

Figure 3-5. Volumes transported by Marine Corridor



### 3.4 Pipeline

The transportation of hazardous materials via pipeline represents 99% of the total volume of hazardous materials/petroleum shipments within the State. The dominance of the pipeline corridors is primarily due to the natural gas and petroleum commodities that are transported in the North Slope oil and gas pipelines, from the North Slope to Valdez via the Trans-Alaska Pipeline, and in the regional pipeline systems surrounding Cook Inlet, including the Anchorage Fueling and Service Company (AFSC). The scope of hazard classes transported via pipeline is limited to Hazard Class 3 and 2.1 commodities whereas the other transportation modes, particularly highway and marine cover the full spectrum of hazard classes. Table 3-12 lists the top five pipeline corridors by hazardous class shipped.

**Table 3-12. Top 5 Pipeline Corridors by Hazard Class Shipped**

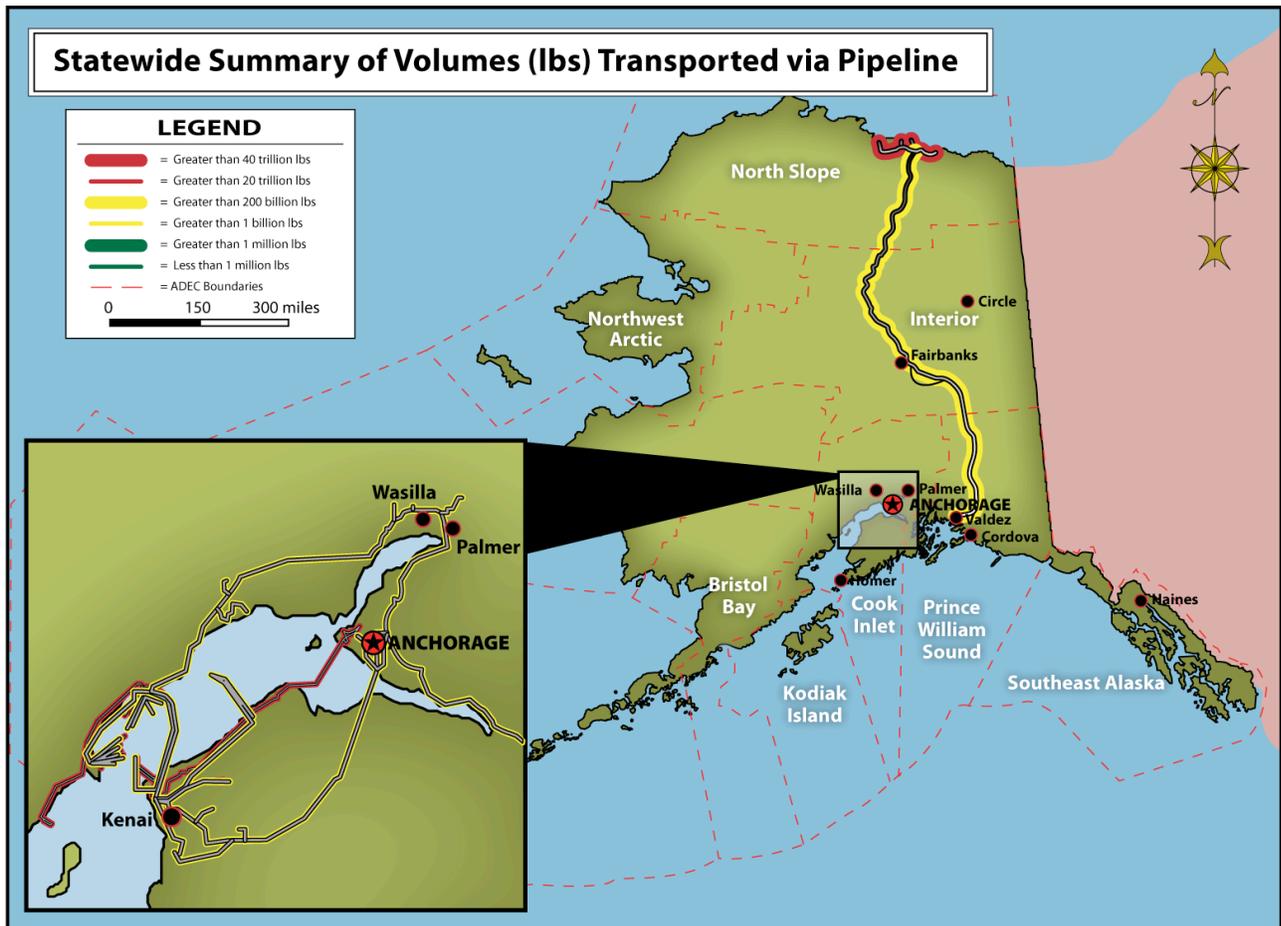
Top 5 Pipeline Corridors (Based on a 3 year average)				
Hazard Class	1	2	3	4
1	N/A	N/A	N/A	N/A
2.1	North Slope Process	Cook Inlet	N/A	N/A
3	North Slope-Valdez	Kenai-Anchorage	Cook Inlet	AFSC Crosstown
4	N/A	N/A	N/A	N/A
5	N/A	N/A	N/A	N/A
6	N/A	N/A	N/A	N/A
7	N/A	N/A	N/A	N/A
8	N/A	N/A	N/A	N/A
9	N/A	N/A	N/A	N/A
ORM-D	North Slope	N/A	N/A	N/A

There are no EHS commodities transported via pipelines within the State of Alaska. Table 3-13 lists the total three-year volumes of commodities shipped via pipeline. The top five by volume are: (1) North Slope Process Pipeline, (2) Cook Inlet Pipeline, (3) Trans-Alaska Pipeline (North Slope-Valdez), (4) Kenai-Anchorage Pipeline, and (5) AFSC Pipeline. Figure 3-6 depicts the weighted pipeline routes based on the 3-year volume of hazardous materials shipments to a particular location.

**Table 3-13. Statewide Summary of 3-Year Volumes of Hazardous Materials Shipped via Pipeline**

Statewide Summary of Volumes (lbs) Transported via Pipeline		
Rank	Pipeline	Total Volume (lbs)
1	North Slope Process Pipeline	49,941,394,050,000
2	Cook Inlet Pipeline	28,682,426,991,000
3	North Slope - Valdez Pipeline (TAPS)	270,827,508,620
4	Kenai - Anchorage Pipeline	13,337,100,000
5	AFSC Crosstown Pipeline	10,655,149,086

Figure 3-6. Pipeline Corridors



### 3.5 Railroad

The transportation of hazardous materials via railroad represents 0.0931% of the total volume of hazardous materials shipped from 2007 to 2009. Railroad shipments represent 97% of the total volume of shipments when pipeline volumes are excluded. While this mode represents the highest volume of commodities transported when compared to air, highway and marine modes, the commodities shipped are fairly limited across the spectrum of hazard classes when compared to those transported by highway and/or marine modes.

The top five (5) railroad corridors by Hazard Class shipped are listed in Table 3-14. The Whittier-Portage and Portage-Anchorage segments are primary routes for the majority of hazardous materials commodities shipped.

Table 3-15 lists the total three-year volumes of commodities shipped via railroad. The top five rail corridors are: (1) Anchorage – Fairbanks, (2) Fairbanks – Eielson AFB, (3) Portage – Anchorage, (4) Whittier –Portage, and (5) Seward – Portage. Figure 3-7 depicts the weighted railroad routes based on the 3-year volume of hazardous materials shipments to a particular location.

Sodium Cyanide is the only EHS commodity transported via the railroad as listed in Table 3-16, and is moved via the railroad segments listed in Table 3-17.

**Table 3-14. Top 5 Railroad Corridors by Hazard Class Shipped**

Top 5 Railroad Corridors (Based on a 3 year average)					
HC	1	2	3	4	5
1	Anchorage-Fairbanks	Portage-Anchorage	Whittier-Portage	N/A	N/A
2	Portage-Anchorage	Whittier-Portage	Anchorage-Fairbanks	Seward-Portage	N/A
3	Anchorage-Fairbanks	Fairbanks-Eielson	Portage-Anchorage	Whittier-Portage	Seward-Portage
4	Whittier-Portage	Portage-Anchorage	N/A	N/A	N/A
5.1	Whittier-Portage	Portage-Anchorage	Anchorage-Fairbanks	N/A	N/A
6.1	Whittier-Portage	Portage-Anchorage	Anchorage-Fairbanks	N/A	N/A
7	Whittier-Portage	Portage-Anchorage	N/A	N/A	N/A
8	Whittier-Portage	Portage-Anchorage	Anchorage-Fairbanks	N/A	N/A
9	Anchorage-Fairbanks	Whittier-Portage	Portage-Anchorage	Fairbanks-Eielson	Seward-Portage

Table 3-15. Statewide Summary of 3-Year Volumes of Hazardous Materials Shipped via Railroad

Statewide Summary of Volumes (lbs) Transported via Railroad		
Rank	Rail Segment	Total Volume (lbs)
1	Anchorage - Fairbanks	13,078,641,750
2	Fairbanks - Eielson, AFB	12,539,329,250
3	Portage - Anchorage	679,827,500
4	Whittier - Portage	602,236,750
5	Seward - Portage	76,750,250

Table 3-16. EHS Commodities Shipped via Rail 2007-2009

Hazard Class	EHS transported via Railroad Corridor	Volume (lbs)
6.1	Sodium Cyanide	29,136,000

Figure 3-7. Railroad Corridors

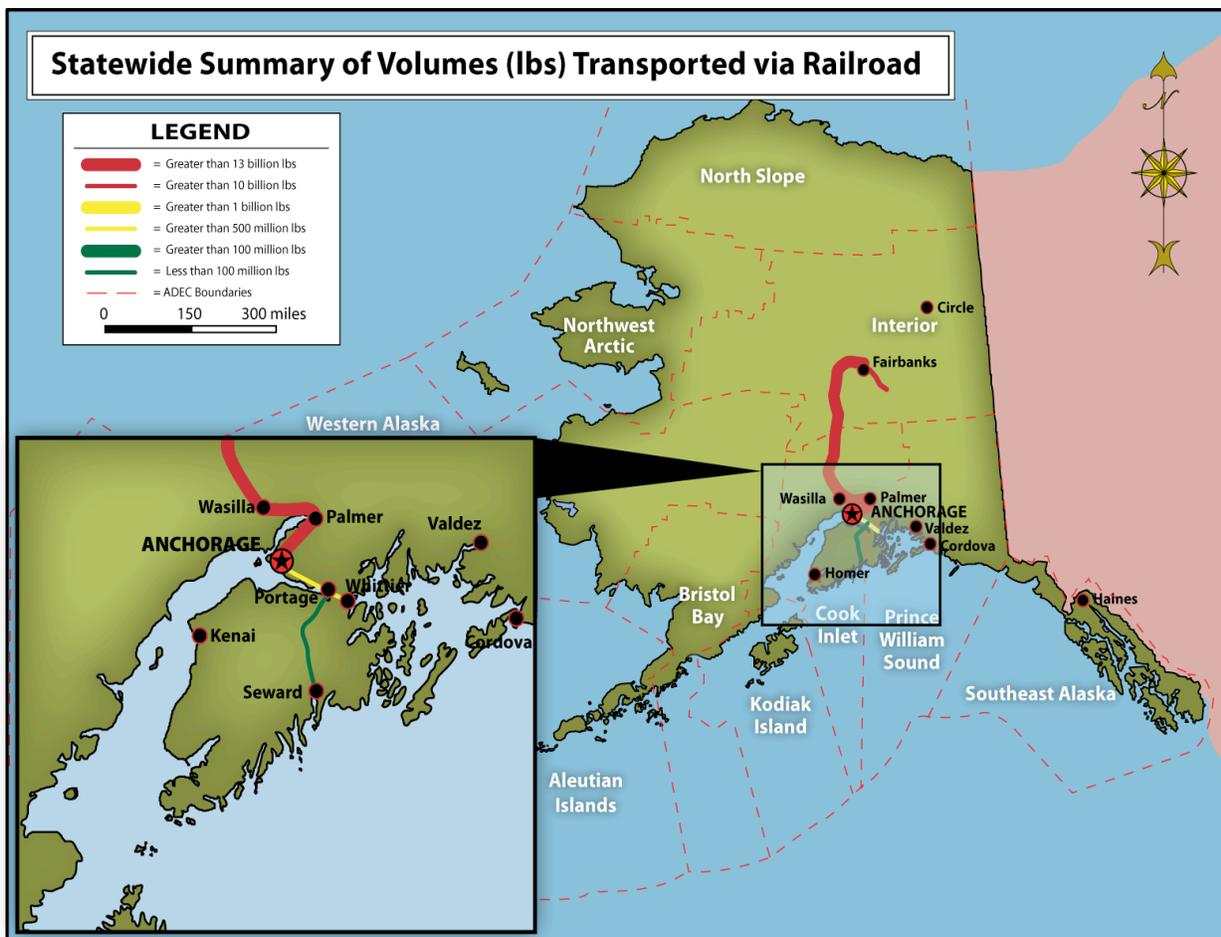


Table 3-17. EHS Rail Corridors (Based on a 3 year average)

Top 5 EHS Rail Corridors (Based on a 3 year average)					
EHS	1	2	3	4	5
Sodium Cyanide	Whittier-Portage	Portage-Anchorage	Anchorage-Fairbanks	N/A	N/A

### 3.6 Fixed Facilities

The State’s existing knowledge of and familiarity with the Tier Two Report content alleviated the need to provide a detailed evaluation of this data for this study. However, since the primary focus of the study is on Extremely Hazardous Substances (EHS) and given the need for increased awareness of the presence of these commodities within the State<sup>29</sup>, it was determined that this data should be summarized in this report. The total volumes of EHS stored at fixed facilities in the State are displayed in Table 3-18, and reveals that Anhydrous Ammonia, Sulfuric Acid, Urea, Sodium Cyanide, and Chlorine are the top 5 EHS commodities stored, by volume, within the State<sup>30</sup>.

**Table 3-18. Total Volumes of EHS Commodities Stored in Fixed Facilities in the State for 2008**

Hazard Class	EHS Facility	Volume (lbs)
2.2	Anhydrous Ammonia	17,058,534
8	Sulfuric Acid	1,998,043
3	Urea	414,000
6.1	Sodium Cyanide	276,002
2.3	Chlorine	179,550
3	Formaldehyde Solution, Flammable	41,936
8	Batteries, Wet, Filled with Acid	22,961
8	Nitric Acid	20,719
6.1	Arsenic Trioxide	9,367
8	Waste Oil w/Sulfuric Acid	6,740
8	Bromine	299
6.1	Chloroform	8
2.3	Nitric Oxide	5
6.1	Mercuric Chloride	5
6.1	Potassium Cyanide	2
4.1	Cobalt 57	1

Additionally, the locations of the fixed facilities within the State as reported/outlined in the 2008 Tier Two Report are shown below in Figure 3-8. While there are large concentrations of fixed facilities in the Western Alaska and Southeast Alaska Subareas, the majority of fixed facilities are located in/around Cook Inlet and along the corridor between Anchorage and Fairbanks.

The Tier Two reporting requirements apply to OSHA-regulated facilities. As such, mining facilities regulated under the Mining Safety and Health Administration (MSHA) are exempt from Tier Two reporting requirements.

<sup>29</sup> Extremely Hazardous Substances offer more of a public safety risk than general Hazardous Substances.

<sup>30</sup> This volume data was pulled directly from the 2008 Tier Two Report data.

Figure 3-8. Tier Two Fixed Facilities

