

# Log/Non-Log Movement in the Superior Region

## LSSA 3<sup>rd</sup> Stakeholder Meeting

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# Agenda

- I. Introduction of the Project
- II. Status of Data Collection
- III. Log Movement Analysis: 2<sup>nd</sup> iteration
- IV. Non-log Movement Analysis
- V. Conclusions to Date, Discussion and Next Steps



# I. Introduction of the project



# 1.1. Background

- Concern on the sustainability of the current transportation model for log movements (especially for pulp logs) in our region.
- Preserve the potential of using rail transportation as an alternative
  - Challenges: Rates, equipment age, availability, and service
- Limited tangible benefits from a decade of discussions
  - Most discussions based on anecdotal evidence, or “spot” analysis of specific lanes
- Could analytical approach with “region-wide” data provide better insight?



# 1.1. Objectives

- Develop spatial model for the modal splits of log movements by truck and by truck/rail for existing infrastructure (incorporating capacity and operational limitations).
  - Look into possibilities to increase the rail share and potential other benefits, if infrastructure /operations are modified.
- Identify “non-log” movements into/out of the region by forest products/other industries.
  - Mapping main lanes for outbound products (and other customers).... Not included in the spatial model

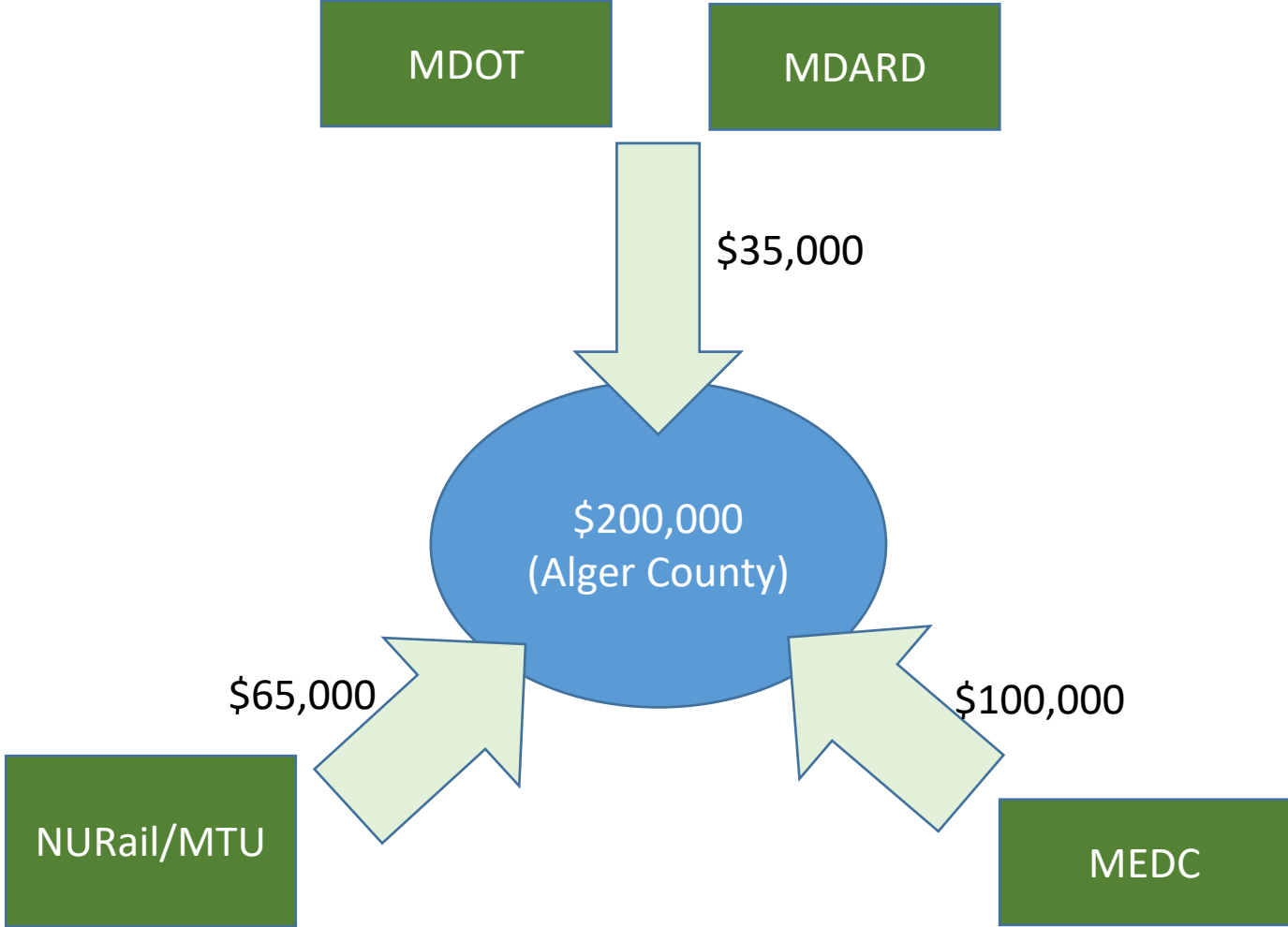


# 1.1. Analysis of Model Outputs

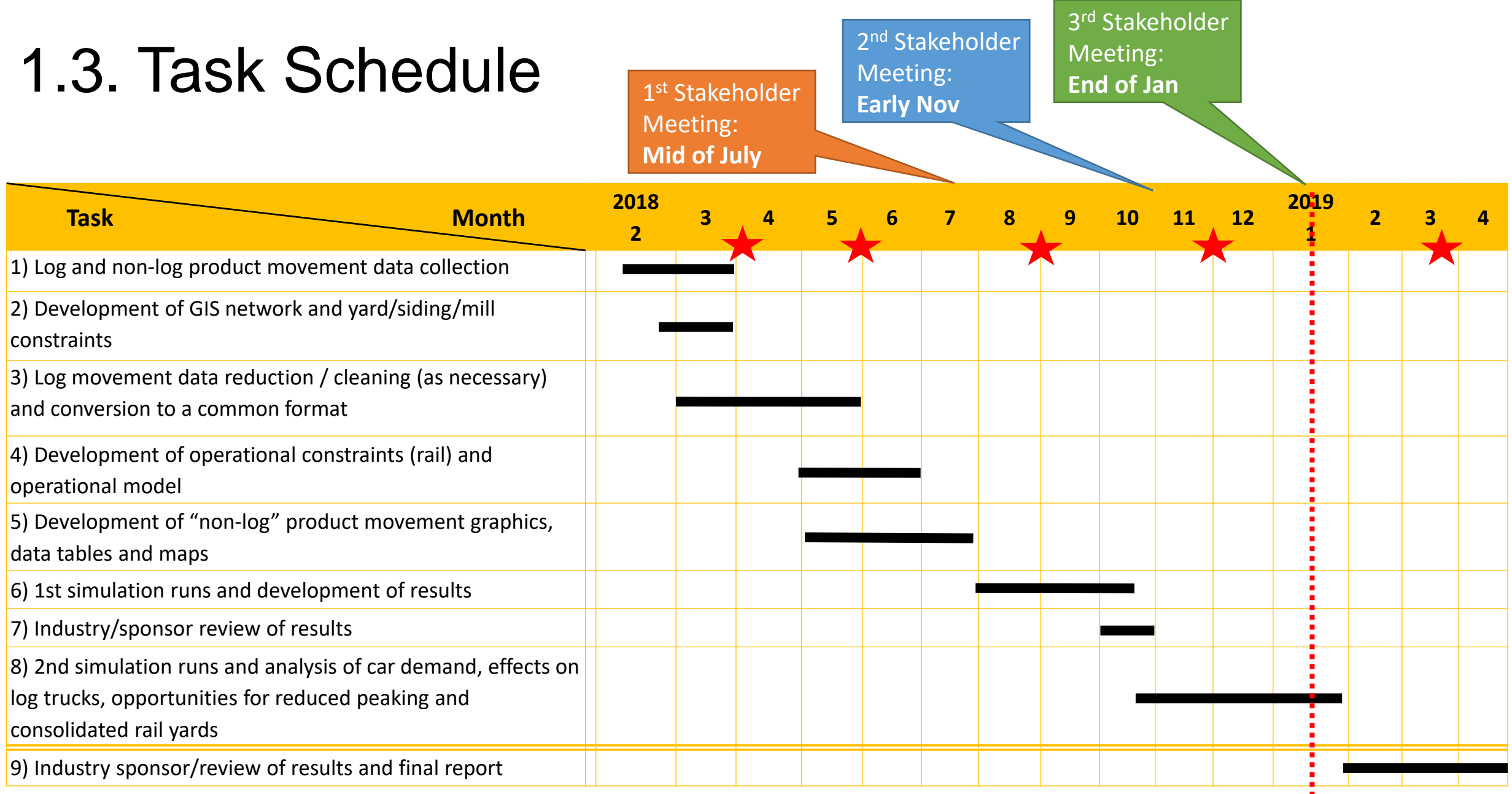
- Are there opportunities for creating economies of scale in rail, if log movements in the region are considered as a single pool (rate sensitivity)?
- What number of rail cars dedicated to the region would be needed to move the product?
- Are there opportunities to use consistent rail shipment to alleviate spring breakup limitations?
- Would increase in consolidated shipments by rail create productivity improvements for log truckers?
- Are there strategic locations for larger rail sidings that could accommodate larger blocks of cars, thus better supporting the current rail business model?



# 1.2. Project Funding



# 1.3. Task Schedule





# **II. Status of Data Collection – Log Movements**



# 2.1. Status of Log/Non-log Shipment Data Collection

- Status of Data Collection (as of Jan 16<sup>th</sup>, 2019)

- ✓ **7 Companies** – LPCorp, POTLATCH, VERSO, TPC, EXPERA, Neenah and Longyear
- ✓ **16 Mills** – Biron, Duluth, Escanaba, Deltic, Hayward, Newberry, Quinnesec, Sagola, Tomahawk, Two Harbors, Wisconsin Rapids, Munising (1), Munising (2), Kaukauna, Mosinee, Neenah

#	Company	Log Shipment Data		Non-Log Shipment Data	Mill Logistics Survey
		From consolidation site to mill	From logging site to mill		
1	VERSO	O	O	Δ (Outbound only)	O
2	POTLATCH	O	O	O	O
3	LP Corp	Δ (County base)	Δ (County base)	Δ (Outbound only, Rail only)	O
4	TPC	O	O	O	X
5	EXPERA	Δ (County or City base)	Δ (County or City base)	O	X
6	Neenah	n/a	n/a	O	O
7	Longyear	O	O	n/a	n/a

# III. Log Analysis

- Results of comparative analysis – 2<sup>nd</sup> iteration



# 3.1. Two iterations of log movement data

- Difference between **the 1<sup>st</sup>** and **the 2<sup>nd</sup>** iteration

		First-round of Log Data (as of July, 2018)	Second-round of Log Data (as of December, 2018)
1	<b>Data Size: Number of companies and mills participating</b>	4 companies and 12 mills (selected shipments) <b>*Total tons = 4,114,746</b> *Truck = 2,949,041; Rail = 1,165,705	5 companies and 14 mills (all shipments) <b>*Total tons = 9,282,305</b> *Truck = 7,936,027; Rail = 1,346,278
2	<b>Location of logging sites (1): New updates by company</b>	Limited detail of origins (county/siding)	Increased detail by VERSO and TPC “Dispersement” of county centroids
3	<b>Rail network</b>	Actual rail network that used by 4 companies and 12 mills	Actual rail network that used by 5 companies and 14 mills
4	<b>Estimation of rail rate</b>	“1 <sup>st</sup> iteration” equation of rail rate (by simple regression model based on tariff)	“2 <sup>nd</sup> iteration” equation of rail rate (by multi-regression model based on actual rail rate)


**Better Reflects actual operations**



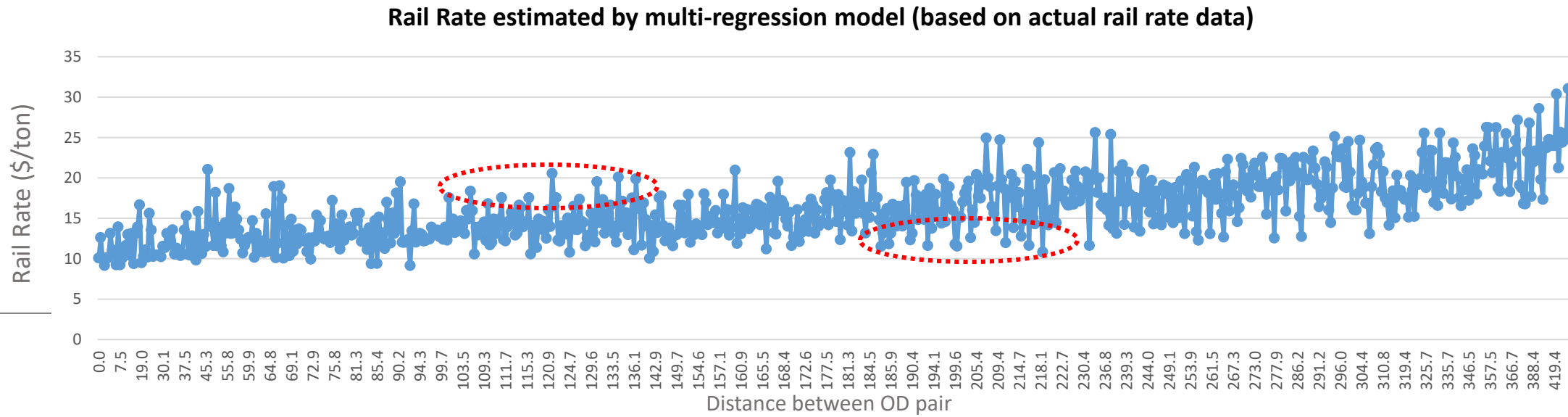
# 3.2. Two iterations of log movement data

- Function of **rail rate** based on **distance**

✓ Rail rate increase as OD distance increase.

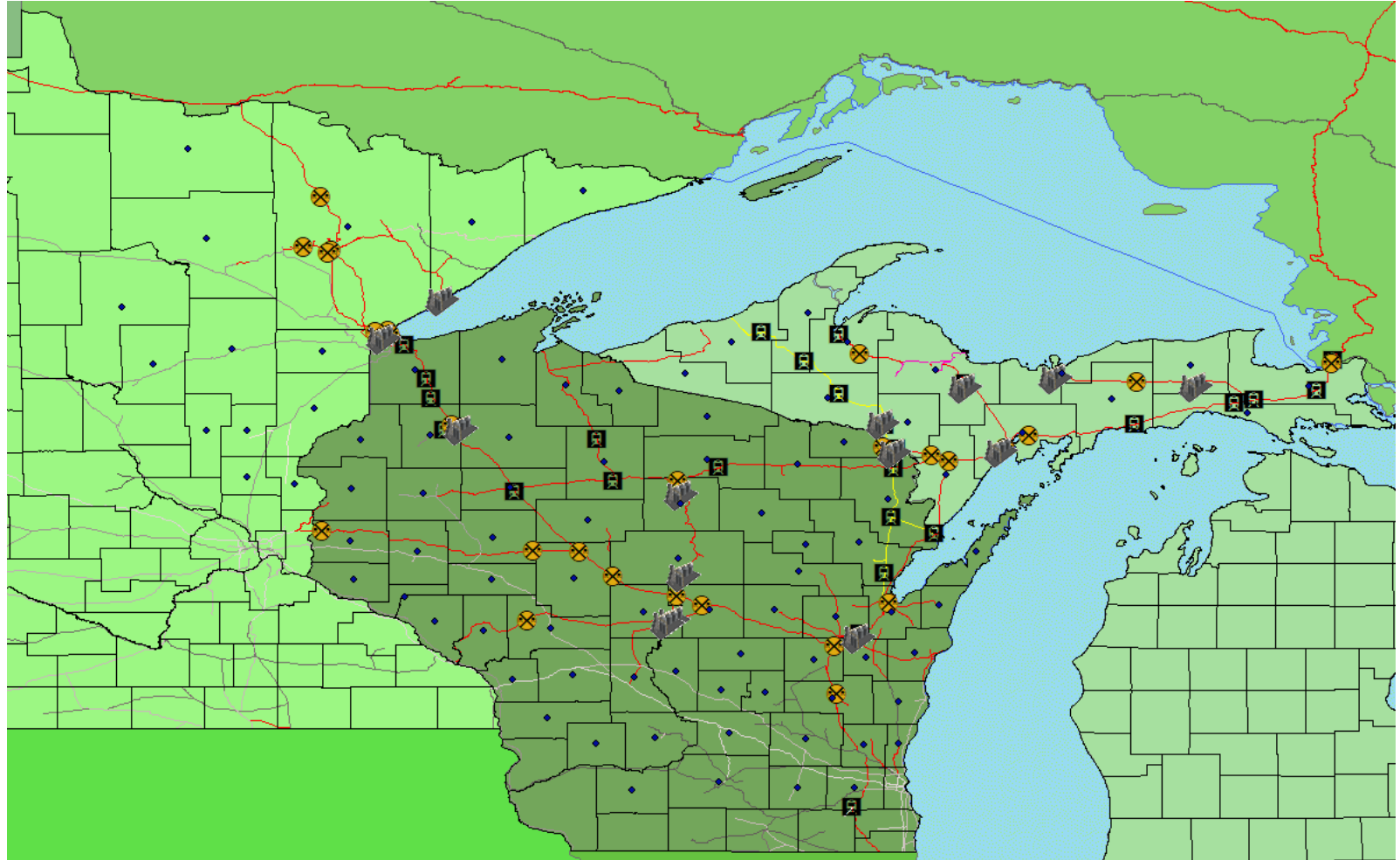


✓ Rail rate doesn't necessarily increase as OD distance increase.



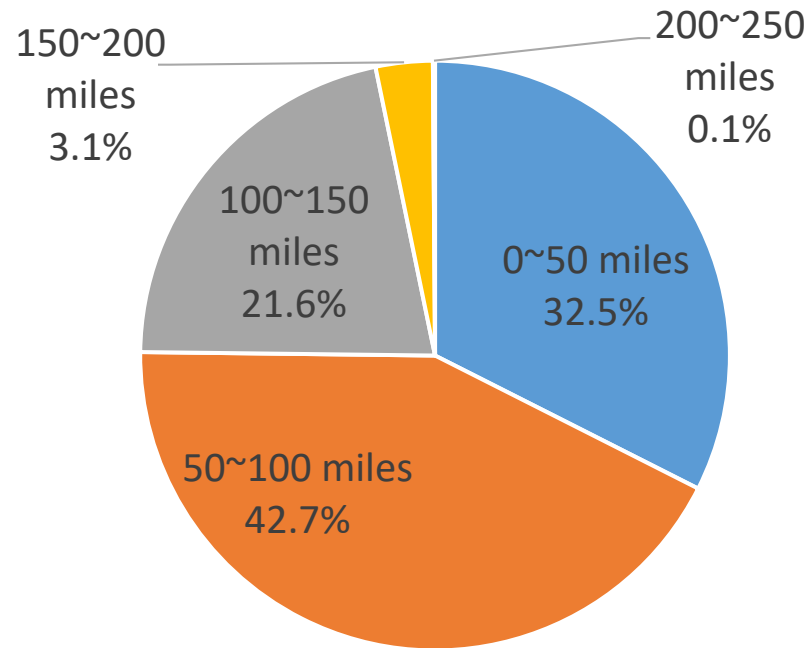
## 3.3. Improving the accuracy of “log origins”

- **Objective:** Using forest inventory to replace the county centroid as origin for all logs.
- **Data:** USDA FOREST BIOMASS INVENTORY DATA  
(<https://data.fs.usda.gov/geodata/astergateway/biomass/index.php>)
- **Number of Origins:**
  - **1** for <1,000 ton/ha
  - **3** for <10,000 ton/ha
  - **5** for <50,000 ton/ha
  - **10** for <100,000 ton/ha

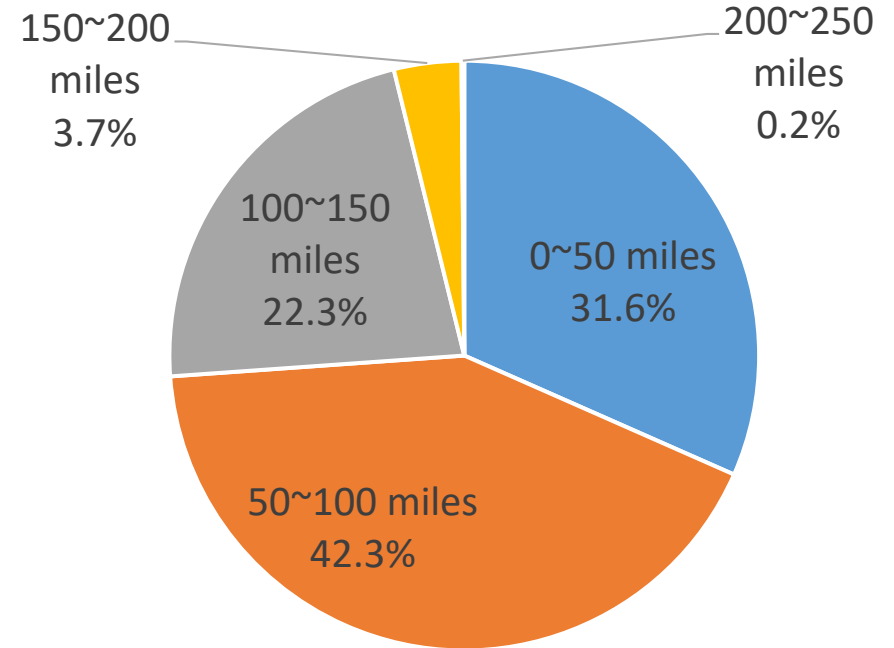


# 3.4. Comparison of origin dataset before/after modification

Tons per OD distance (including centroid)



Tons per OD distance (excluding centroid)



Total Truck Tons (Before) = 7,971,164

≠

Total Truck Tons (After) = 7,936,027

(due to the new data from TPC)



## 3.5. Scenarios for the Log Analysis

Comparison of  
Total  
Transportation  
Costs for All 3  
Scenarios:

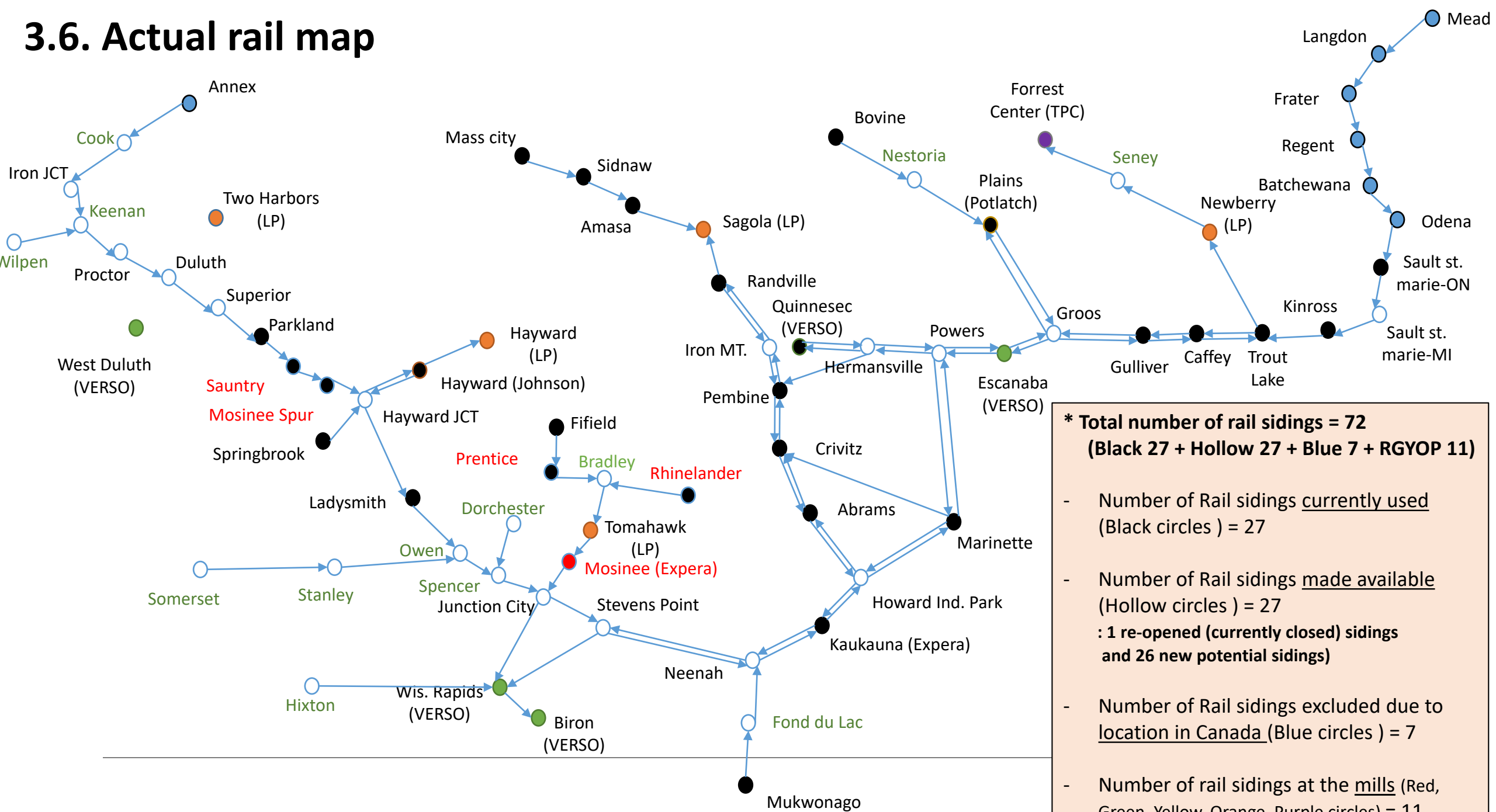
2<sup>nd</sup> iteration

- 1) **Scenario 1** (2017 shipment): **Partially shared rail consolidation**
- 2) **Scenario 2: Shared destination allowed by company**
- 2) **Scenario 3: All shared rail consolidation** (No dedicated site)
- 4) **Scenario 4: Re-opening sidings/ rail consolidation (share)**





# 3.6. Actual rail map



**\* Total number of rail sidings = 72**  
**(Black 27 + Hollow 27 + Blue 7 + RGYOP 11)**

- Number of Rail sidings currently used (Black circles) = 27
- Number of Rail sidings made available (Hollow circles) = 27  
 : 1 re-opened (currently closed) sidings and 26 new potential sidings)
- Number of Rail sidings excluded due to location in Canada (Blue circles) = 7
- Number of rail sidings at the mills (Red, Green, Yellow, Orange, Purple circles) = 11

### 3.7. Results – Rail Modal Shares

			Current mode share	
	Company	Mill	Rail % - 1 <sup>st</sup> iteration	Rail % - 2 <sup>nd</sup> iteration
1	Company 1	Mill 1	72.1%	38.3%
2	Company 2	Mill 2	0.0%	0.0%
3	Company 3	Mill 3	25.2%	1.5%
4	Company 4	Mill 4	71.7%	19.0%
5	Company 5	Mill 5	70.3%	31.4%
6	Company 6	Mill 6	3.3%	3.4%
7	Company 7	Mill 7	2.2%	2.2%
8	Company 8	Mill 8	31.6%	31.6%
9	Company 9	Mill 9	14.7%	14.7%
10	Company 10	Mill 10	0.0%	0.0%
11	Company 11	Mill 11	0.0%	0.0%
12	Company 12	Mill 12	1.1%	1.9%
13	Company 13	Mill 13		27.0%
14	Company 14	Mill 14		3.3%
Total Rail Ratio			<b>28.3%</b>	<b>14.50%</b>

Round 1 data

- Truck = 2,949,041;
- Rail = 1,165,705

**TOTAL = 4,114,746 Tons**

vs.

Round 2 data

- Truck = 7,936,027;
- Rail = 1,346,278

**TOTAL = 9,282,305 Tons**



### 3.7. Results – Rail Modal Shares from Simulation

- Are there opportunities for creating economies of scale in rail, if log movements in the region are considered as a single pool (rate sensitivity)?

			Current mode share	Scenario 1 No shared rail sidings	Scenario 2 Shared Rail sidings within company	Scenario 3 Shared rail sidings within study area
	Company	Mill	Rail % - Round 2	Rail % - Round 2	Rail % - Round 2	Rail % - Round 2
1	Company 1	Mill 1	38.3%	38.3%	38.3%	38.3%
2	Company 2	Mill 2	0.0%	0.0%	0.7%	0.8%
3	Company 3	Mill 3	1.5%	1.5%	1.5%	1.6%
4	Company 4	Mill 4	19.0%	18.9%	18.9%	18.9%
5	Company 5	Mill 5	31.4%	31.4%	31.4%	31.4%
6	Company 6	Mill 6	3.4%	3.9%	3.9%	4.5%
7	Company 7	Mill 7	2.2%	2.2%	2.2%	2.2%
8	Company 8	Mill 8	31.6%	31.5%	31.5%	31.5%
9	Company 9	Mill 9	14.7%	14.6%	14.6%	14.6%
10	Company 10	Mill 10	0.0%	0.0%	0.0%	0.0%
11	Company 11	Mill 11	0.0%	0.0%	0.0%	0.0%
12	Company 12	Mill 12	1.9%	1.9%	1.9%	1.9%
13	Company 13	Mill 13	27.0%	27.0%	27.0%	27.0%
14	Company 14	Mill 14	3.3%	3.3%	3.3%	3.3%
Ratio of rail tons changed over current rail tons				(0.06%↑)	(0.20%↑)	(0.47%↑)
Total Rail Ratio			14.50%	14.51%	14.53%	14.57%



## 3.8. How many rail cars do we need (1<sup>st</sup> iteration)

- What number of rail cars dedicated to the region would be needed to move the product?

### < What we know? >

- Rail Origins & Rail Destinations
- Hauling days between OD pair (Estimation)
- Arrival dates of rail freights at the mill

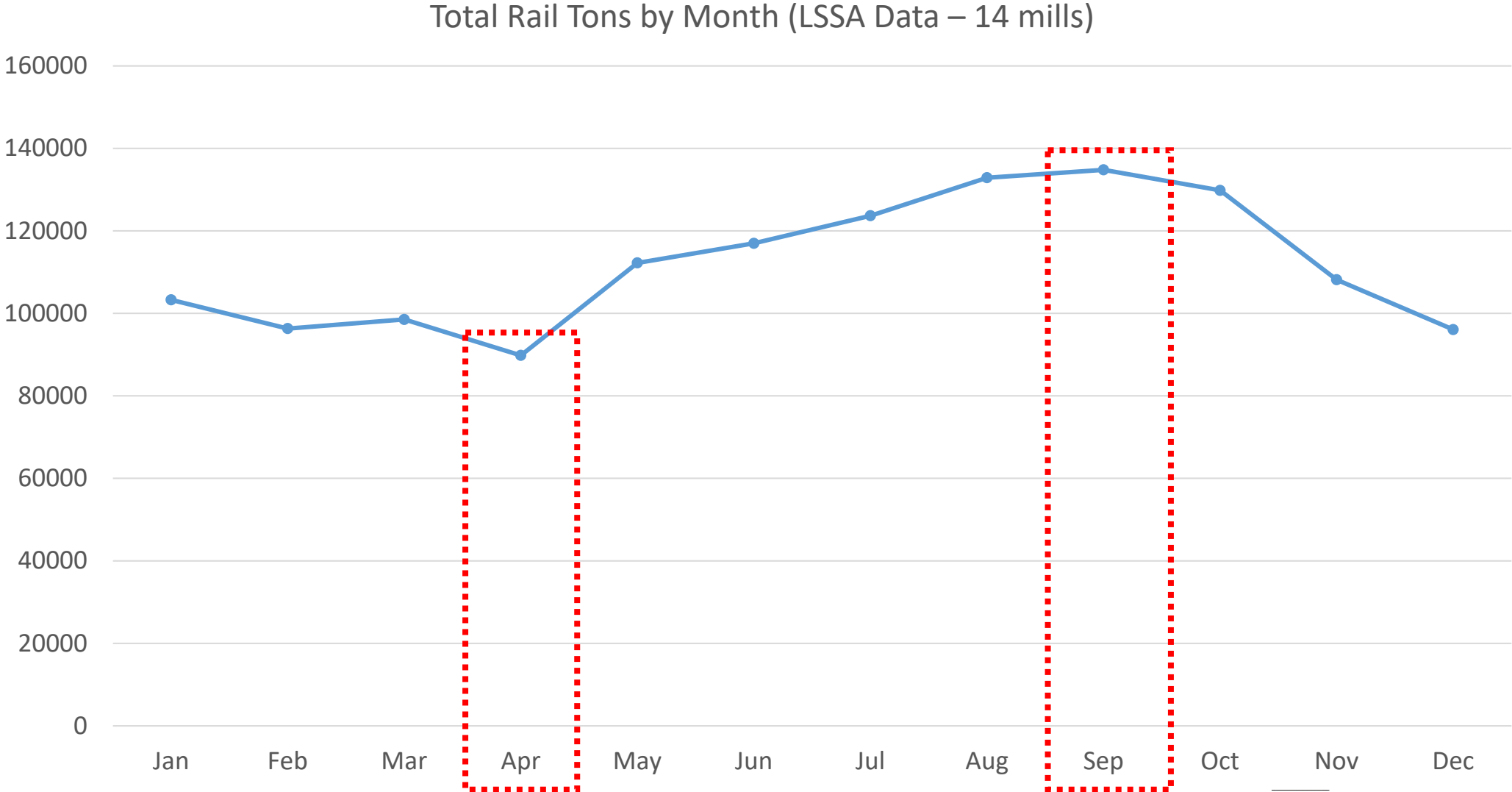
### < What we don't know? >

- Rail car assignment cost (administration and management cost)
- Rail car maintenance cost (including depreciation cost)
- Rail hauling cost (only rate)
- A “penalty cost” of unsatisfied demand



# 3.8.1. Seasonal Fluctuation

- Minimum (Apr) Vs. Maximum (Sep) Tonnage



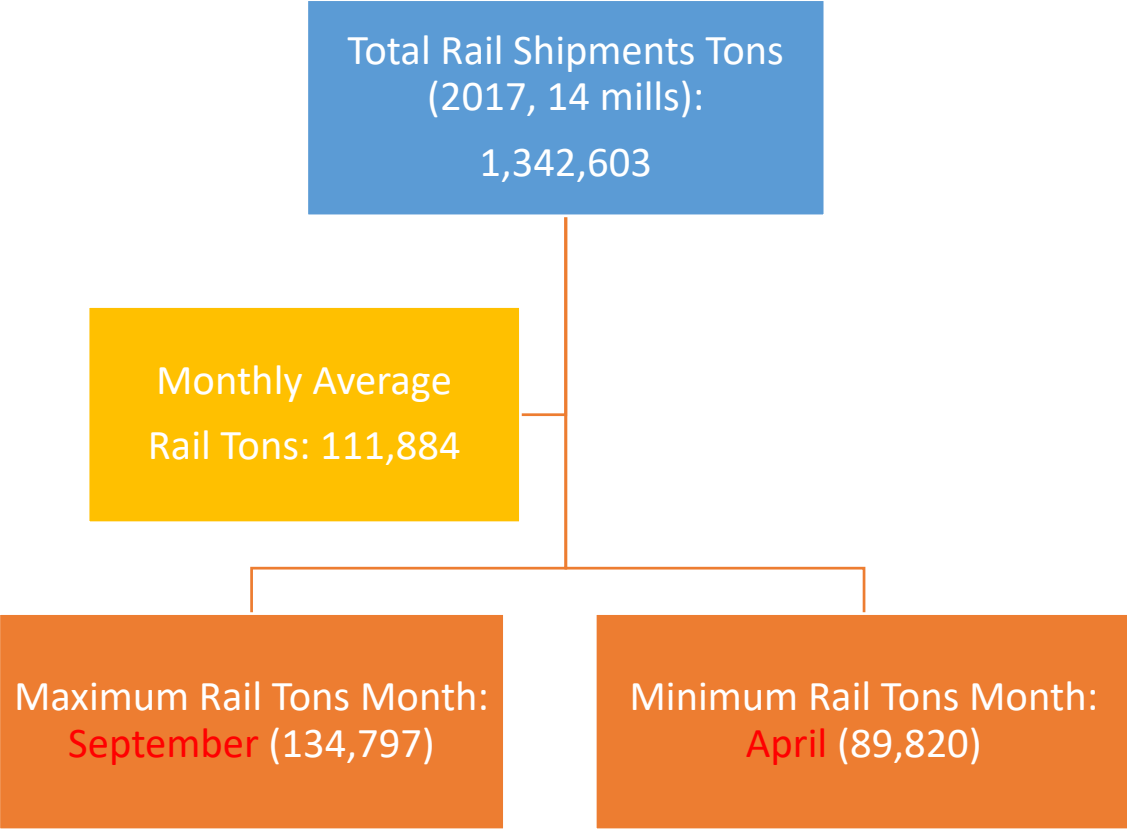
## 3.8.4. Data Analysis

- Hauling days of existing OD pairs based on actual time table
- **2 days** of loading/unloading assumed

	Destinations	1	2	3	4	5	6	7	8	9	10	11
Origins		Biron	Escanaba	Deltic	HAYWARD	Kaukauna	MOSINEE	Munising	NEWBERRY	Quinnesec	SAGOLA	WisconsinRapids
1	A										1	
2	B										2	
3	C	8			9							
4	D	7								4		
5	E		3							3		
6	F	5										5
7	G	5	8									4
8	H		7							6		
9	I	6								3		5
10	J			9						8		5
11	K			5								
12	L		3	4						3		
13	M	4										3
14	N	9		7				5	4			
15	O										3	
16	P								3		3	
17	Q	8										
18	R						4					
19	S	7				5						6
20	T		6							4		
21	U	4										3
22	V											5
23	W					5						
24	X					5						
25	Y	6	3									
26	Z	6										
27	AA		8							6		
28	BB					5						
29	CC		4	4						3	5	
30	DD					5	4					
31	EE					4					3	
32	FF	6				7						5
33	GG		3							3		



# 3.8.6. Result



✓ Minimum # of rail cars required: **511 railcars**      **393 railcars**



## 3.9. Scenario 4 for the Log Analysis

- 1) **Scenario 1** (2017 shipment): **Partially shared rail consolidation**
- 2) **Scenario 2: Shared destination allowed by company**
- 2) **Scenario 3: All shared rail consolidation** (No dedicated site)
- 4) **Scenario 4: Re-opening sidings/ rail consolidation (share)**



### 3.9.1. Results - Rail Modal Share w/ Rate Discounts (no volume limit)

- Mode share based on the different rail rate (10~30% discounted rail rate)

\* Rail tonnage changed over current rail tons of 2017.

			Percentage of rail shipments over truck shipments							
			Scenario 4 + No rail discount		Scenario 4 + 10% Rail rate discount		Scenario 4 + 20% Rail rate discount		Scenario 4 + 30% Rail rate discount	
			Centroid	No Centroid	Centroid	No Centroid	Centroid	No Centroid	Centroid	No Centroid
1	Company 1	Mill 1	38.4%	38.8%	38.4%	38.9%	39.0%	39.9%	40.2%	41.7%
2	Company 2	Mill 2	0.8%	0.8%	1.3%	1.3%	2.4%	2.5%	4.4%	5.2%
3	Company 3	Mill 3	1.6%	1.6%	1.8%	1.8%	1.9%	1.9%	2.0%	2.0%
4	Company 4	Mill 4	18.9%	18.9%	19.0%	19.0%	19.3%	19.5%	20.0%	20.2%
5	Company 5	Mill 5	32.2%	32.3%	33.1%	33.4%	34.2%	34.6%	37.9%	38.5%
6	Company 6	Mill 6	4.5%	4.5%	5.4%	5.4%	10.0%	10.0%	13.1%	13.1%
7	Company 7	Mill 7	2.2%	2.2%	2.2%	2.2%	2.2%	2.4%	2.2%	2.6%
8	Company 8	Mill 8	31.5%	31.5%	31.5%	31.5%	31.6%	31.5%	31.6%	31.6%
9	Company 9	Mill 9	14.7%	14.7%	14.8%	14.7%	14.9%	14.9%	15.0%	14.9%
10	Company 10	Mill 10	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%
11	Company 11	Mill 11	0.0%	0.0%	0.0%	1.7%	0.0%	1.7%	0.0%	1.8%
12	Company 12	Mill 12	1.5%	1.9%	1.6%	1.9%	1.7%	1.9%	4.3%	1.9%
13	Company 13	Mill 13	36.6%	27.9%	36.6%	32.4%	36.9%	39.2%	39.2%	39.4%
14	Company 14	Mill 14	3.5%	4.1%	3.5%	5.0%	4.0%	5.6%	4.5%	7.1%
<b>Total Rail Ratio (rail tons change*)</b>			15.3%	<b>14.8%</b>	15.6%	<b>15.5%</b>	16.2%	<b>16.7%</b>	17.5%	<b>17.9%</b>
			(6.0% ↑)	<b>(2.3% ↑)</b>	(7.9% ↑)	<b>(6.7% ↑)</b>	(12.2% ↑)	<b>(13.1% ↑)</b>	(20.9% ↑)	<b>(19.1% ↑)</b>

## 3.9.2. Results - Rail Modal Share w/ Rate Discounts by Aggregation – Total costs

\* Scenario 4 + no discounts (base case – **No centroid of county**): \$ 106,667,639 / 14.8% (2.3% ↑)

		Total log shipment costs and the percentage of rail shipments over truck shipments					
Minimum Aggregation Tons		Scenario 4 + 10% Rail rate discount per		Scenario 4 + 20% Rail rate discount per		Scenario 4 + 30% Rail rate discount per	
		Total Cost (Cost change %)	Rail Share (Rail ton change %)	Total Cost (Cost change %)	Rail Share (Rail ton change %)	Total Cost (Cost change %)	Rail Share (Rail ton change %)
1	50,000	\$105,368,334 (1.2% ↓)	14.9% (2.7% ↑)	\$103,990,239 (2.5% ↓)	16.3% (11.2% ↑)	\$102,349,034 (4.0% ↓)	18.7% (22.5% ↑)
2	100,000	\$105,679,365 (0.9% ↓)	15.4% (6.0% ↑)	\$104,406,878 (2.1% ↓)	16.9% (14.3% ↑)	\$102,934,746 (3.5% ↓)	17.5% (17.0% ↑)
3	200,000	\$106,220,340 (0.4% ↓)	15.5% (6.7% ↑)	\$ 105,582,520 (1.0% ↓)	15.5% (6.7% ↑)	\$104,399,448 (2.1% ↓)	18.5% (21.7% ↑)
4	300,000	\$106,667,639 (0.0%)	14.8% (2.3% ↑)	\$106,328,354 (0.3% ↓)	17.5% (17.2% ↑)	\$105,478,076 (1.1% ↓)	17.5% (17.2% ↑)



### 3.9.3. Results – Main Rail sidings in terms of tonnage

Rank		Current 2017 (Bench marking)			Scenario 4 + No rail discount			Scenario 4 + 30% Rail discount by 50,000 aggregation			Scenario 4 + 30% Rail discount by 200,000 aggregation		
<b>TOP 3 Existing Rail sidings (Tons)</b>	<b>1</b>	Gulliver	MI	214,581	Gulliver	MI	214,657	Gulliver	MI	214,784	Gulliver	MI	217,784
	<b>2</b>	Plains	MI	131,015	Plains	MI	135,335	Plains	MI	164,765	Plains	MI	200,000
	<b>3</b>	Caffey	MI	116,522	Caffey	MI	116,596	Caffey	MI	116,522	Caffey	MI	200,000
<b>TOP 3 New Rail sidings (Tons)</b>	<b>1</b>	-			Stevens Point	WI	6,114	Stevens Point	WI	69,153	Stevens Point	WI	6,114
	<b>2</b>	-			Bradley	WI	5,083	Dorchester	WI	50,000	Bradley	WI	5,138
	<b>3</b>	-			Spencer	WI	4,167	Spencer	WI	50,000	Spencer	WI	4,167



# **IV. Non-log Movement Analysis in the Superior Region**



# 4.1. Status of Non-log Shipment Data Collection

- Status of non-log data collection for LSSA project (as of Jan 16<sup>th</sup>, 2019)
  - ✓ **6 Companies** – LPCorp, POTLATCH, TPC, VERSO, EXPERA, and NEENAH
  - ✓ **Over 20 Locations** – Deltic, Hayward, Newberry, Sagola, Tomahawk, Two Harbors, Munising, Kaukauna, Mosinee, Rhinelander, De Pere, Beaver Dam, Appleton, Marathon, Greenville, Neenah, Menasha etc.

O: Received; X: Not Received

#	Company	Non-Log Shipment Data			
		Inbound		Outbound	
		Truck	Rail	Truck	Rail
1	VERSO	X	X	O	O
2	POTLATCH	X	X	O	O
3	LP Corp	X	X	X	O
4	TPC	O	X	O	O
5	EXPERA	O	X	O	O
6	NEENAH	O	O	O	O



# 4.2. Non-log Shipment Analysis

- Status of non-log data collection for LSSA project (as of Jan 16<sup>th</sup>, 2019)
  - **REGIONAL Flows** (Within the Lake Superior States: MI, MN, WI)
  - **Non-Regional Flows (Inbound)** from States excluding MI, MN, WI)
  - **Non-Regional Flows (Outbound)** to States excluding MI, MN, WI)

	Regional	Non-Reg (Inbound)	Non-Reg (Outbound)	Total
Truck	1,160,707	83,392	1,344,439	2,588,538
Rail	407,368		1,103,845	
Total	1,568,076		2,448,283	
Rail %	26%		45%	



# 4.2. Non-log Shipment Analysis

- **Comparison: LSSA non-log data and other data sources (as of Jan 16<sup>th</sup>, 2019)**

- **LSSA Non-log data**

	Regional	Inbound	Outbound	Total
Truck	1,160,707	83,392	1,344,439	2,588,538
Rail	407,368		1,103,845	
<b>Total</b>	<b>1,568,076</b>		<b>2,448,283</b>	
Rail %	26%		45%	

- **TRANSEARCH (2015) Non-log data**

	Regional	Inbound	Outbound	Total
Truck	5,400,471	1,890,686	1,845,007	9,136,164
Rail	5,489,890	985,200	2,260,649	8,735,739
<b>Total</b>	<b>10,890,361</b>	<b>2,875,886</b>	<b>4,105,656</b>	<b>17,871,903</b>
Rail %	50%	34%	55%	49%

- **NRTC Survey (2018) Non-log data**

	Regional	Inbound	Outbound	Total
Truck	1,401,747	n/a	n/a	1,401,747
Rail	202,348	n/a	n/a	202,348
<b>Total</b>	<b>1,604,095</b>	<b>n/a</b>	<b>n/a</b>	<b>1,604,095</b>
Rail %	13%	n/a	n/a	13%





# 4.3. Results: Regional – all inbound/outbound within region

- Main locations for regional non-log flows per data source

	Truck												Rail											
	Top 5 Origins						Top 5 Destination						Top 5 Origins						Top 5 Destination					
Data	LSSA		TRAN SEARCH		NRTC		LSSA		TRAN SEARCH		NRTC		LSSA		TRAN SEARCH		NRTC		LSSA		TRAN SEARCH		NRTC	
Tons	1,160,707		5,400,471		1,401,747		1,160,707		5,400,471		1,401,747		407,368		5,489,890		202,348		407,368		5,489,890		202,348	
<b>1</b>	Marquette, MI	20%	Marquette, MI	27%	Iron, MI	33%	Delta, MI	12%	Dickinson, MI	12%	Iron, MI	32%	Dickinson, MI	55%	Marquette, MI	74%	Lincoln, WI	66%	Portage, WI	24%	Delta, MI	81%	Marathon, WI	15%
<b>2</b>	Wood, WI	11%	Chippewa, MI	9%	Marathon, WI	19%	Marathon, WI	10%	Marquette, MI	11%	Marathon, WI	10%	Delta, MI	23%	Delta, MI	13%	Marathon, WI	17%	Brown, WI	11%	Marquette, MI	8%	Milwaukee, WI	11%
<b>3</b>	Marathon, WI	11%	Delta, MI	7%	Brown, WI	8%	Outagamie, WI	9%	Marathon, WI	10%	Langlade, WI	7%	Brown, WI	7%	St. Louis, MN	7%	Barron, WI	13%	Waukesha, WI	8%	Brown, WI	3%	Barron, WI	6%
<b>4</b>	Oneida, WI	10%	Schoolcraft, MI	7%	Lincoln, WI	7%	Lincoln, WI	7%	Delta, MI	10%	Wood, WI	4%	Wood, WI	5%	Dickinson, MI	4%	Brown, WI	3%	Anoka, MN	5%	Dickinson, MI	2%	Wood, WI	5%
<b>5</b>	Dickinson, MI	10%	Baraga, MI	6%	Eau Claire, WI	7%	Brown, WI	6%	Chippewa, MI	7%	Lincoln, WI	4%	Midland, MI	3%	Outagamie, WI	1%	Waupaca, WI	0%	Carlton, MN	4%	Marathon, WI	2%	Lincoln, WI	5%



## 4.2.2. UP Freight by County - Neighboring States vs. Rest of Country

UP County	Inbound				Outbound			
	Truck		Rail		Truck		Rail	
	MI, WI, MN	Beyond MI, WI, MN	MI, WI, MN	Beyond MI, WI, MN	MI, WI, MN	Beyond MI, WI, MN	MI, WI, MN	Beyond MI, WI, MN
Alger	195,083	109,342	6,440	29,960	62,556	304,141		6,760
Baraga	82,556	15,920		18,840	319,374	116,274		
Chippewa	371,033	191,370		36,280	490,631	307,386		
Delta	518,914	231,339	4,443,954	447,760	366,544	264,951	714,896	274,120
Dickinson	671,063	319,190	93,280	208,800	152,892	196,472	201,360	251,640
Gogebic	90,996	12,864			76,520	38,343		
Houghton	206,057	55,519			84,204	43,472		7,880
Iron	76,171	12,891			44,320	51,012		
Keweenaw	2,533	1,562			48,653	785		
Luce	30,358	9,451			11,746	13,858		
Mackinac	51,443	11,832	1,200	7,600	87,839	42,391		33,920
Marquette	574,515	747,477	425,536	172,480	1,451,730	201,985	4,045,404	1,624,889
Menominee	233,545	144,583		63,480	274,799	223,374	23,320	81,040
Ontonagon	13,437	11,508			8,347	2,791		
Schoolcraft	50,390	15,839			359,826	57,212	26,600	
<b>Total tons</b>	<b>3,168,094</b> <b>(63%)</b>	<b>1,890,686</b> <b>(37%)</b>	<b>4,970,410</b> <b>(83%)</b>	<b>985,200</b> <b>(17%)</b>	<b>3,839,980</b> <b>(67%)</b>	<b>1,864,448</b> <b>(33%)</b>	<b>5,011,580</b> <b>(69%)</b>	<b>2,280,249</b> <b>(31%)</b>



## 4.2.2. Summary of UP non-log freight by county (regional)

COUNTY	RAIL			TRUCK			Grand Total	Rail Rank	Truck Rank	Total Rank
	Inbound	Outbound	TOTAL	Inbound	Outbound	TOTAL				
Alger	36,400	6,760	43,160	195,083	62,556	666,540	709,700	5	6	6
Baraga	18,840	-	18,840	82,556	319,374	514,000	532,840	9	7	7
Chippewa	36,280	-	36,280	371,033	490,631	969,316	1,005,596	7	4	5
<b>Delta</b>	<b>4,867,874</b>	<b>965,176</b>	<b>5,833,050</b>	<b>518,914</b>	<b>366,544</b>	<b>1,286,015</b>	<b>7,119,065</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>Dickinson</b>	<b>302,080</b>	<b>453,000</b>	<b>755,080</b>	<b>671,063</b>	<b>152,892</b>	<b>1,267,259</b>	<b>2,022,339</b>	<b>3</b>	<b>3</b>	<b>3</b>
Gogebic	-	-	0	90,996	76,520	208,839	208,839	11	10	10
Houghton	-	7,880	7,880	206,057	84,204	357,440	365,320	10	9	9
Iron	-	-	0	76,171	44,320	182,011	182,011	11	12	12
Keweenaw	-	-	0	2,533	48,653	51,293	51,293	11	14	14
Luce	8,800	33,920	42,720	30,358	11,746	64,182	106,902	6	13	13
Mackinac	-	-	0	51,443	87,839	188,962	188,962	11	11	11
<b>Marquette</b>	<b>598,016</b>	<b>5,670,293</b>	<b>6,268,309</b>	<b>574,515</b>	<b>1,451,730</b>	<b>2,498,905</b>	<b>8,767,214</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>Menominee</b>	<b>63,480</b>	<b>104,360</b>	<b>167,840</b>	<b>233,545</b>	<b>274,799</b>	<b>853,618</b>	<b>1,021,458</b>	<b>4</b>	<b>5</b>	<b>4</b>
Ontonagon	-	-	0	13,437	8,347	36,013	36,013	11	15	15
Schoolcraft	-	26,600	26,600	50,390	359,826	483,217	509,817	8	8	8
<b>TOTAL</b>	<b>5,931,770</b>	<b>7,267,989</b>	<b>13,199,759</b>	<b>3,168,094</b>	<b>3,839,980</b>	<b>7,008,074</b>	<b>22,827,369</b>			



## 4.2.2. Summary of UP non-log freights by county (Non-Regional)

COUNTY	RAIL			TRUCK			Grand Total	Rail Rank	Truck Rank	Total Rank
	Inbound	Outbound	TOTAL	Inbound	Outbound	TOTAL				
Alger	29,960	6,760	36,720	109,342	304,141	413,483	450,203	6	5	6
Baraga	18840	0	18,840	15,920	116,274	132,194	151,034	7	7	7
Chippewa	36280	0	36,280	191,370	307,386	498,756	535,036	5	3	4
<b>Delta</b>	<b>447,760</b>	<b>274,120</b>	<b>721,880</b>	<b>231,339</b>	<b>264,951</b>	<b>496,290</b>	<b>1,218,170</b>	<b>1</b>	<b>4</b>	<b>2</b>
<b>Dickinson</b>	<b>208,800</b>	<b>251,640</b>	<b>460,440</b>	<b>319,190</b>	<b>196,472</b>	<b>515,662</b>	<b>976,102</b>	<b>2</b>	<b>2</b>	<b>3</b>
Gogebic	0	0	0	12,864	38,343	51,207	51,207	9	12	12
Houghton	0	7,880	7,880	55,519	43,472	98,991	106,871	9	8	8
Iron	0	0	0	12,891	51,012	63,903	63,903	9	10	11
Keweenaw	0	0	0	1,562	785	2,347	2,347	9	15	15
Luce	0	0	0	9,451	13,858	23,309	23,309	9	13	13
Mackinac	7,600	33,920	41,520	11,832	42,391	54,223	95,743	8	11	9
<b>Marquette</b>	<b>172,480</b>	<b>1,624,889</b>	<b>1,797,369</b>	<b>747,477</b>	<b>201,985</b>	<b>949,462</b>	<b>2,746,831</b>	<b>3</b>	<b>1</b>	<b>1</b>
<b>Menominee</b>	<b>63,480</b>	<b>81,040</b>	<b>144,520</b>	<b>144,583</b>	<b>223,374</b>	<b>367,957</b>	<b>512,477</b>	<b>4</b>	<b>6</b>	<b>5</b>
Ontonagon	0	0	0	11,508	2,791	14,299	14,299	9	14	14
Schoolcraft	0	0	0	15,839	57,212	73,051	73,051	9	9	10
<b>TOTAL</b>	<b>985,200</b>	<b>2,280,249</b>	<b>3,265,449</b>	<b>1,890,687</b>	<b>1,864,447</b>	<b>3,755,134</b>	<b>7,020,583</b>			

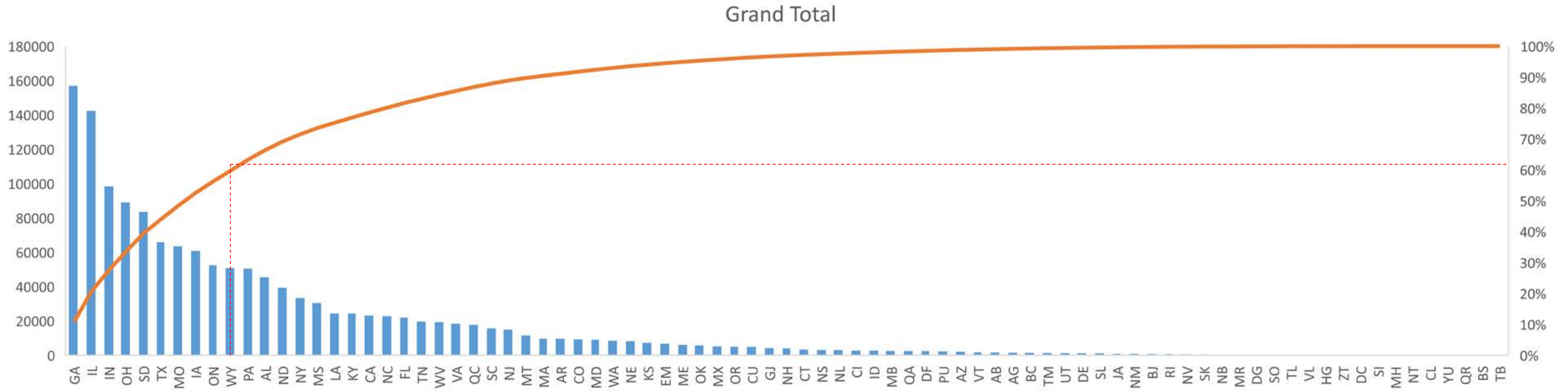


## 4.2.3. Summary of UP non-log freights by county

- 4 top counties account for:
  - Over 6,000,000 (61% of total truck tons) of UP non-log freight
  - Over 2,300,000 truck tons beyond neighboring states
  - 83% of grand totals (rail + truck) tons of UP non-log freights
  - 80% of LSSA truck movements

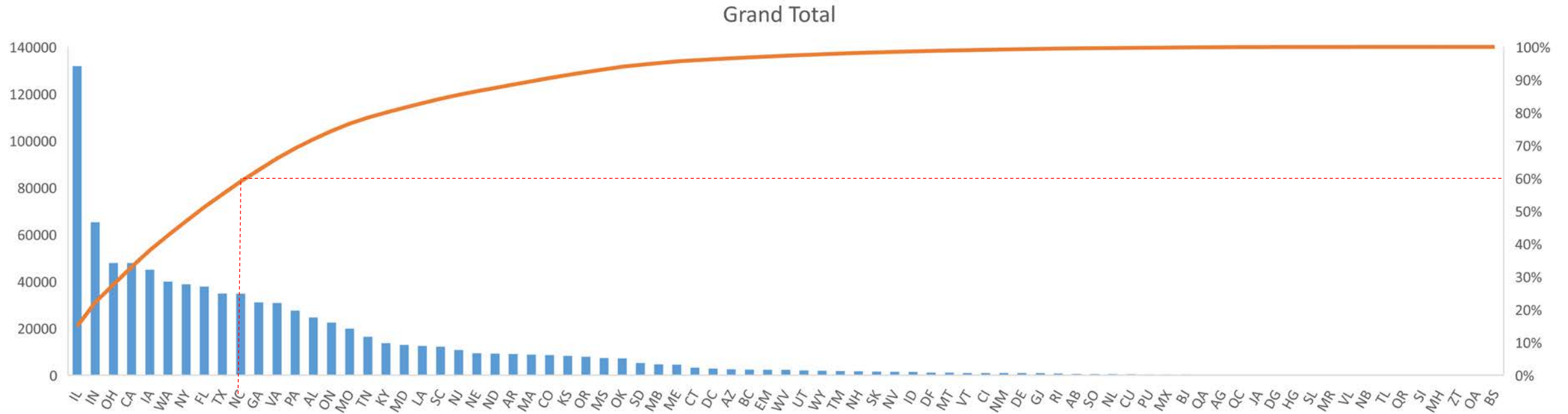


## 4.2.4. Origin of non-regional **inbound** non-log truck for 4 top UP counties



Rank	State	Delta Countyv. MI	Dickinson Countyv. MI	Marquette Countyv. MI	Menominee Countyv. MI	TOP 4 Total
1	GA	8,285	6,355	138,049	4,316	157,005
2	IL	21,620	27,730	63,982	29,036	142,368
3	IN	18,383	35,183	30,067	14,758	98,391
4	OH	17,354	33,002	33,197	5,459	89,012
5	SD	1,563	2,850	77,191	1,962	83,566
6	TX	14,002	26,481	13,383	11,948	65,814
7	MO	4,589	7,351	48,218	3,316	63,474
8	IA	10,954	13,783	23,937	12,136	60,810
9	ON	15,185	13,655	14,608	9,009	52,458
10	WY	2,960	1,705	42,420	3,722	50,807
<b>TOTAL</b>		114,895	168,096	485,052	95,661	863,705

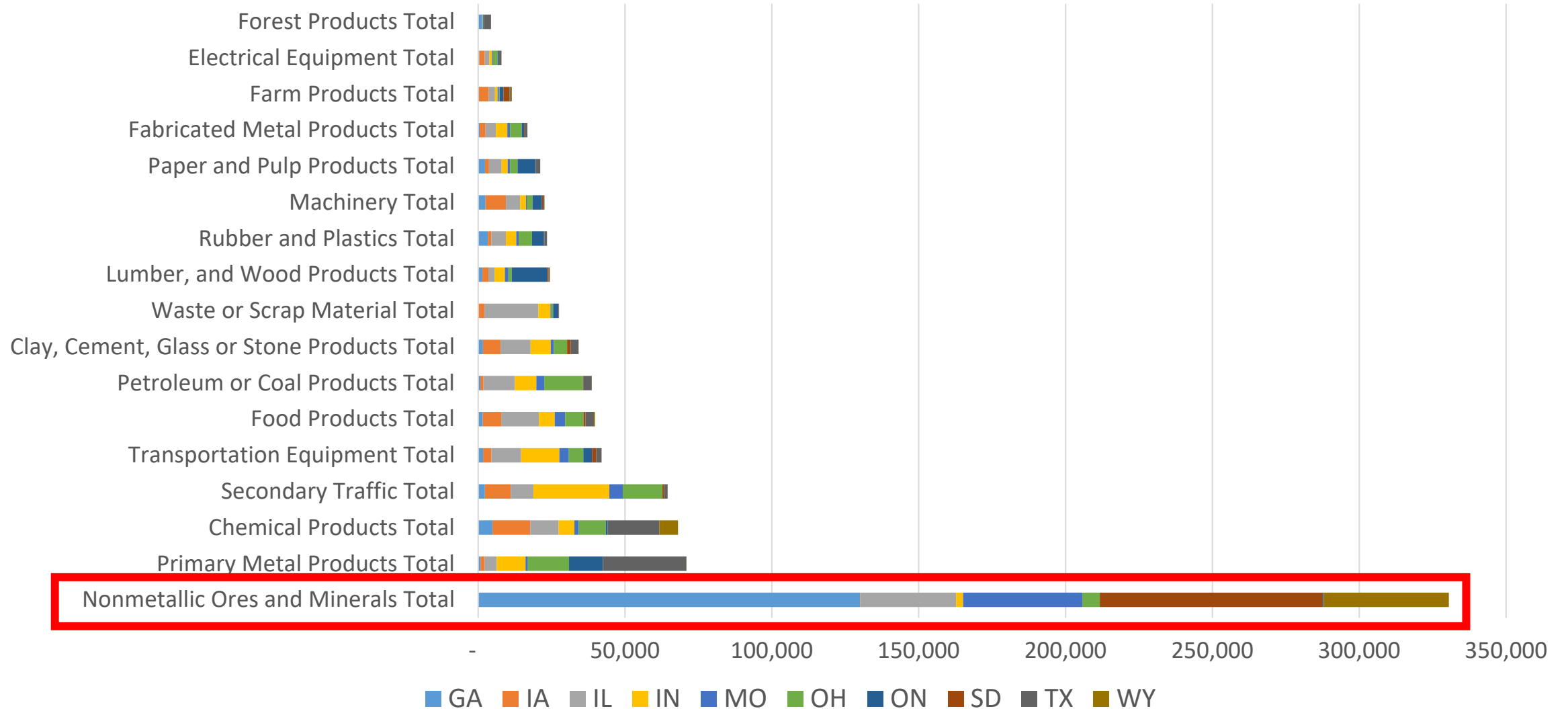
## 4.2.4. Destination of non-regional **outbound** non-log truck for 4 top UP counties



Rank	State	Delta Countyv. MI	Dickinson Countyv. MI	Marquette Countyv. MI	Menominee Countyv. MI	TOP 4 Total
1	IL	33,400	23,380	32,104	42,937	131,821
2	IN	13,724	18,957	19,998	12,545	65,223
3	OH	21,461	6,095	14,504	5,814	47,874
4	CA	10,401	10,549	19,007	7,889	47,846
5	IA	23,141	6,809	4,678	10,346	44,974
6	WA	8,195	10,597	774	20,375	39,941
7	NY	8,943	9,182	12,629	8,034	38,788
8	FL	6,540	9,295	16,609	5,372	37,817
9	TX	6,401	18,082	2,652	7,649	34,784
10	NC	6,944	2,688	7,890	17,236	34,759
<b>TOTAL</b>		139,148	115,636	130,846	138,197	523,827

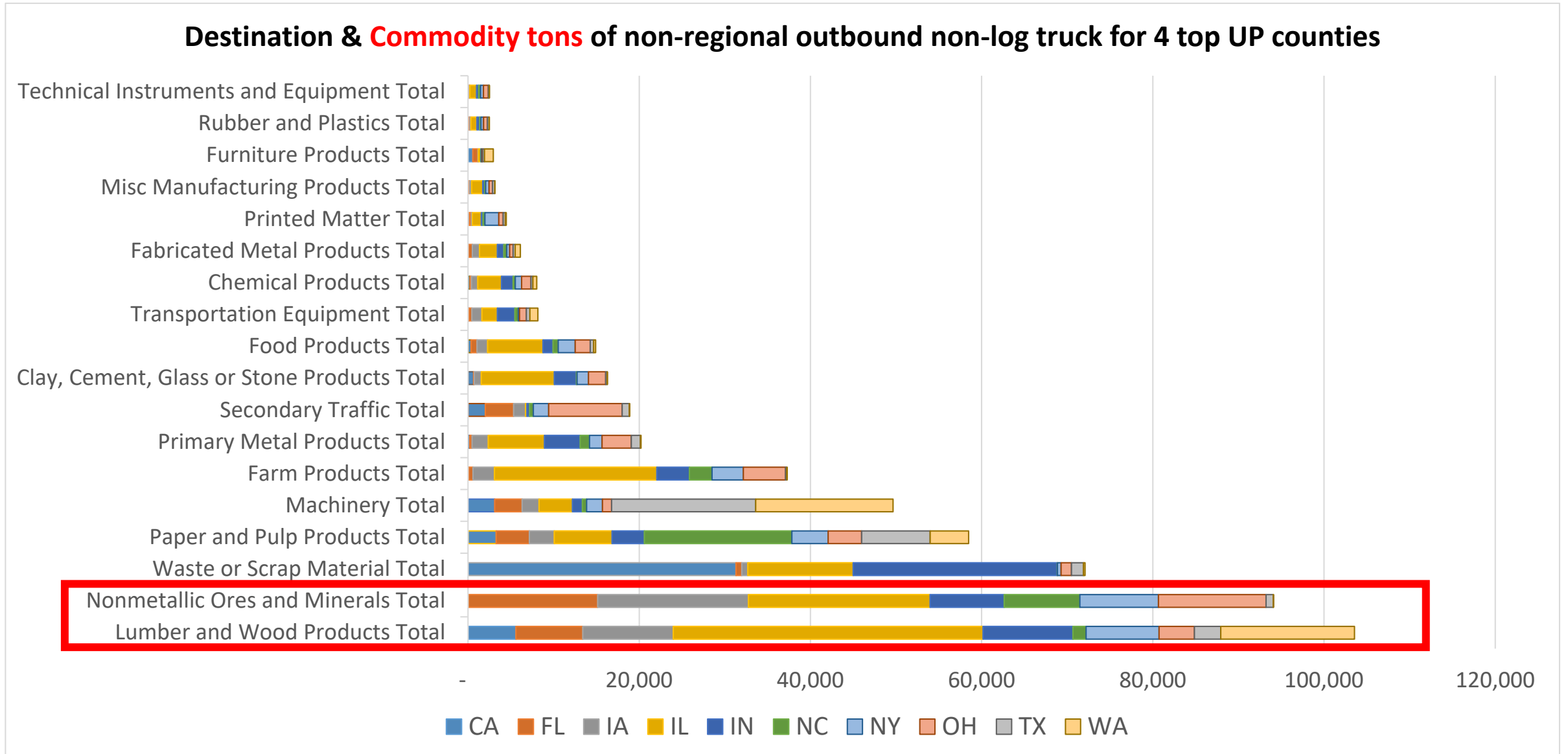
## 4.2.5. Origin of non-regional **inbound** non-log truck for 4 top UP counties

Origin & **Commodity tons** of non-regional inbound non-log truck for 4 top UP counties

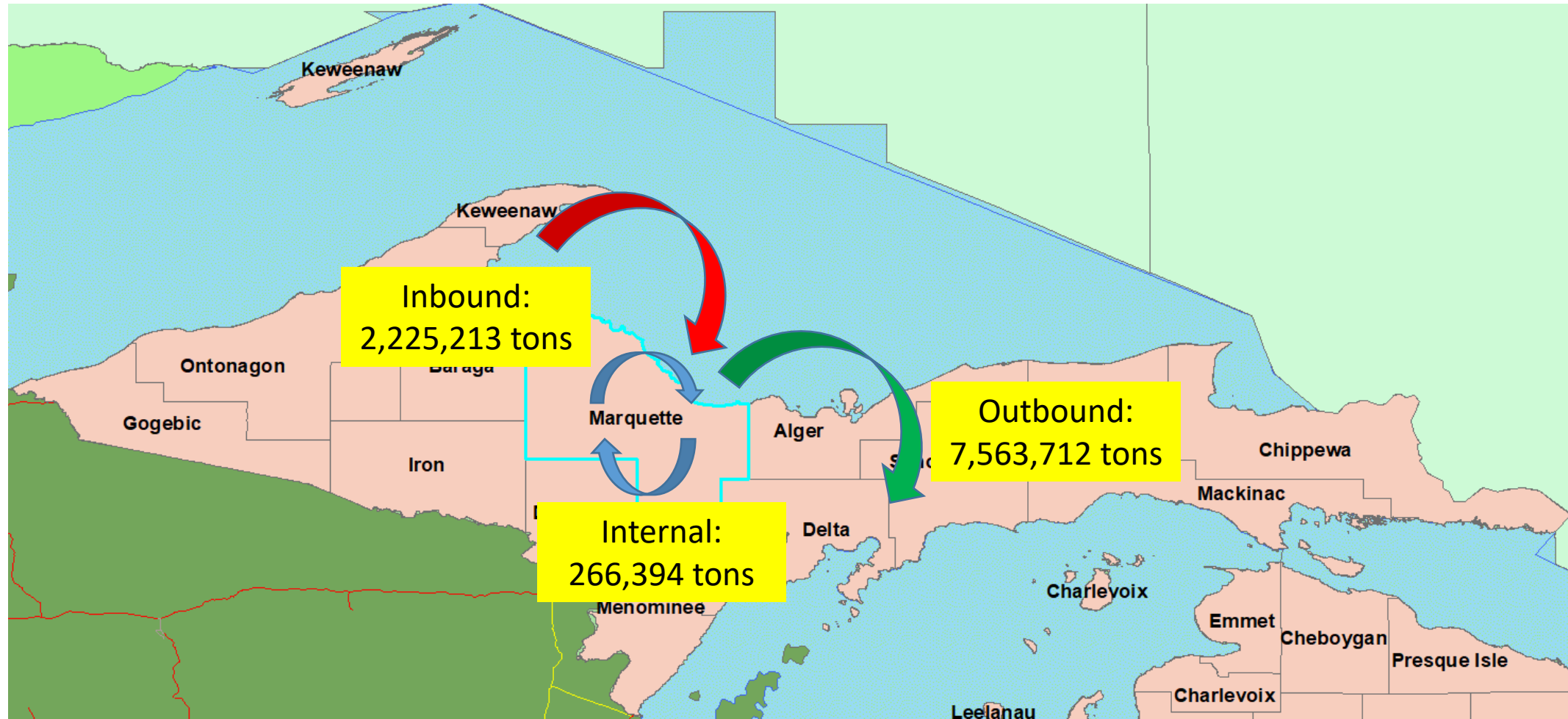




# 4.2.5. Destination of non-regional **outbound** non-log truck for 4 top UP counties

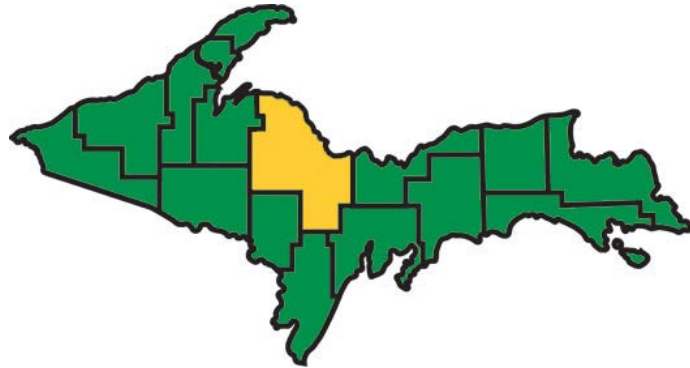


# Marquette County Freight Profile (Year 2015)



# 4.2.6. UP (MI) County Freight Profile Example (Marquette, 2015)

1/6



At a Glance	
67,535	Population
33,597	Total Labor Force
31,667	Employed
5.7%	Unemployment

Employers (# Employed)	
Major Employers that Export	
Cliffs Natural Resources	1,600
RTI Surgical Inc.	165
Argonics	85
Jilbert Dairy	60
Other Main Employers	
U.P. Health System – Marquette	2,619
Northern Michigan University	918
Peninsula Medical Center	625
Eagle Mine	435
Department of Corrections	388
Marquette Public Schools	382
Wal-Mart Stores, Inc.	380
Bell Hospital	370
American Eagle	253

Industries (# of Establishments)		
Retail trade	241	18%
Health care and social assistance	174	13%
Construction	174	13%
Other services, except public administration	172	13%
Professional and technical services	109	8.1%
Finance and insurance	85	6.3%
Administrative and waste services	70	5.2%
Real estate, rental, and leasing	53	4%
Wholesale trade	48	3.6%
Manufacturing	43	3.2%
Accommodations and food services	34	2.5%
Arts, entertainment, and recreation	32	2.4%
Transportation and warehousing	31	2.3%
Agriculture, forestry, fishing, and hunting	25	1.9%
Information	22	1.6%
Educational Services	11	0.8%
Mining, quarrying, oil, and gas extraction	7	0.6%
<b>TOTAL</b>	<b>1,332</b>	<b>99.5%</b>

\* Reference: <http://www.nmu.edu/ruralandlocal/county-data> – Other main employers with less than 253 employed are not shown. Industries with less than 0.5% of establishments are not shown (accounts for 9 missing (0.5%))



# Marquette County Freight Profile (Year 2015)

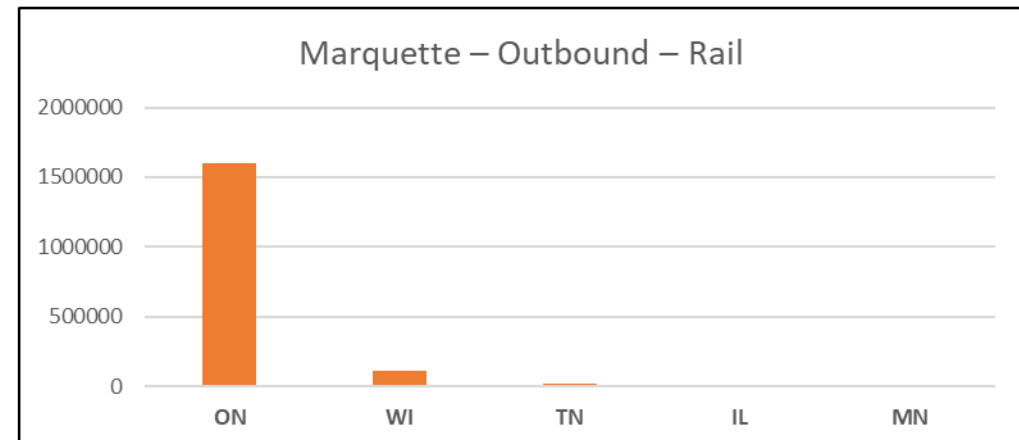
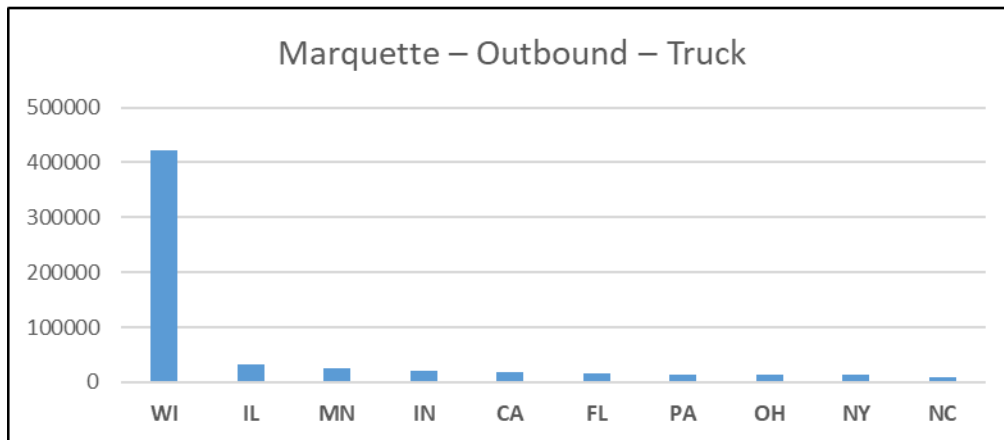
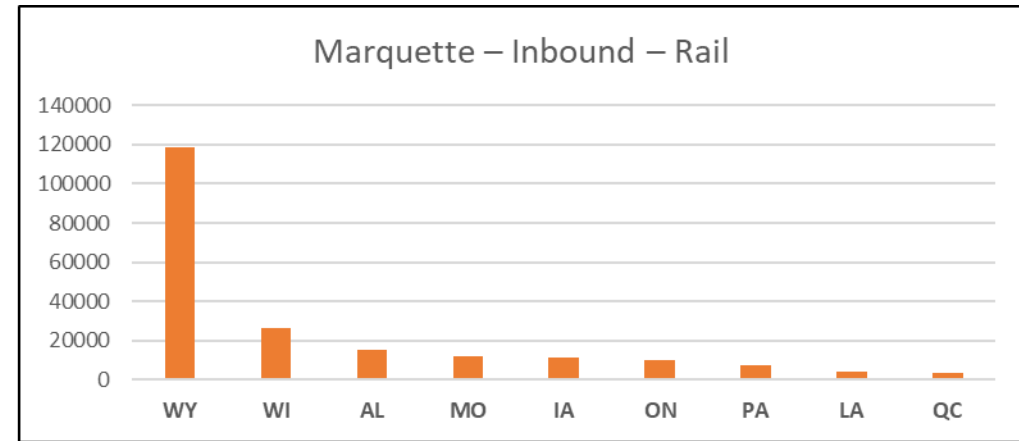
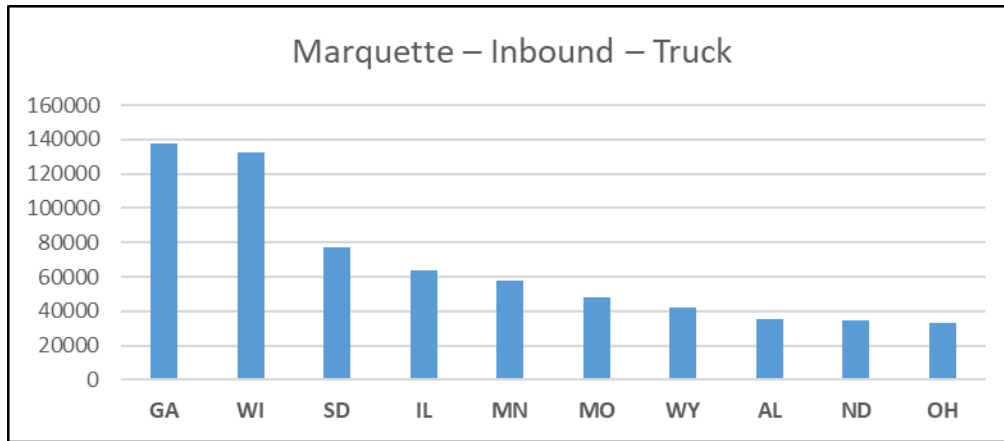
## Major Commodities Marquette County by Mode

Internal			Inbound			Outbound		
Truck		Rail	Truck		Rail	Truck		Rail
Nonmetallic Ores and Minerals	204,200	None	Nonmetallic Ores and Minerals	639,971	425,536	Metallic Ores		5,639,533
Logs, Lumber, and Wood Products	31,100		Logs, Lumber, and Wood Products	280,345	53,032	Nonmetallic Ores and Minerals	1,364,889	
Clay, Cement, Glass or Stone Products	23,643		Secondary Traffic	116,228		Logs, Lumber, and Wood Products	211,424	136,840
Food Products	2,911		Food Products	107,234	11,320	Waste or Scrap Material	85,766	
Waste or Scrap Material	2,303		Clay, Cement, Glass or Stone Products	88,597	118,800	Clay, Cement, Glass or Stone Products	39,557	
Technical Instruments and Equipment	431		Farm Products	49,973		Food Products	34,527	
Primary Metal Products	417		Chemical Products	47,218	42,360	Chemical Products	15,606	
Chemical Products	359		Machinery	44,492		Primary Metal Products	14,861	
Misc Manufacturing Products	331		Petroleum or Coal Products	44,033		Farm Products	7,892	
Secondary Traffic	241		Rubber and Plastics	40,534		Technical Instruments and Equipment	6,821	
Farm Products	177		Transportation Equipment	23,980		Misc Manufacturing Products	3,817	
Fabricated Metal Products	114		Primary Metal Products	19,390		Secondary Traffic	709	
Textile Mill Products	68		Waste or Scrap Material	17,541		Printed Matter	496	
Printed Matter	53		Paper and Pulp Products	9,127		Furniture Products	483	
Apparel or Finished Textiles	27		Printed Matter	8,098		Fabricated Metal Products	161	
Furniture Products	19		Coal	6,061		Textile Mill Products	157	
Shipping Containers	0		Fabricated Metal Products	5,854		Apparel or Finished Textiles	79	
			Metallic Ores	5,324		Machinery	50	
			Misc Manufacturing Products	4,313		Rubber and Plastics	29	
			Technical Instruments and Equipment	4,217		Electrical Equipment	15	
			Furniture Products	3,641		Shipping Containers	0	
			Electrical Equipment	2,429				
			Forest Products	1,865				
			Miscellaneous or Mixed Shipments	1,487				
			Apparel or Finished Textiles	937				
			Textile Mill Products	505				
			Tobacco Products	364				
			Leather Products	212				
			Fresh Fish	129				
			Ordnance	66				
			Shipping Containers	0				



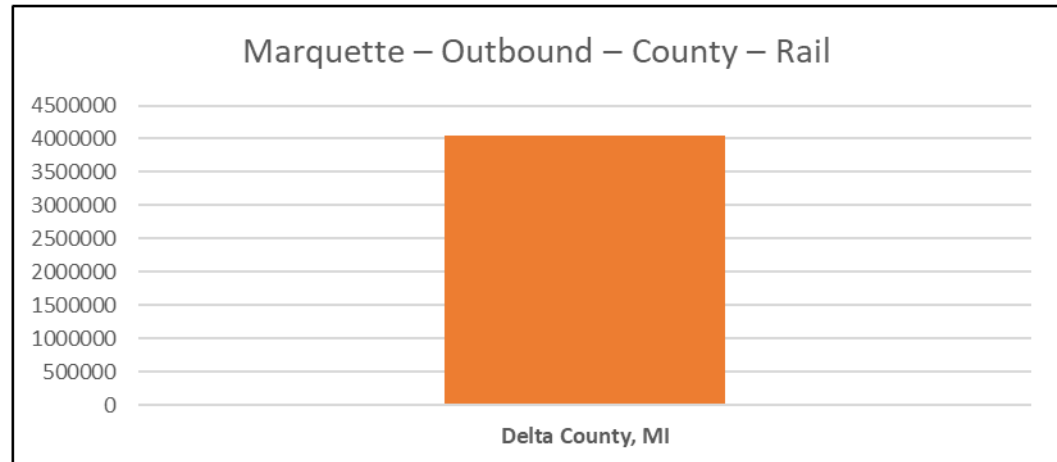
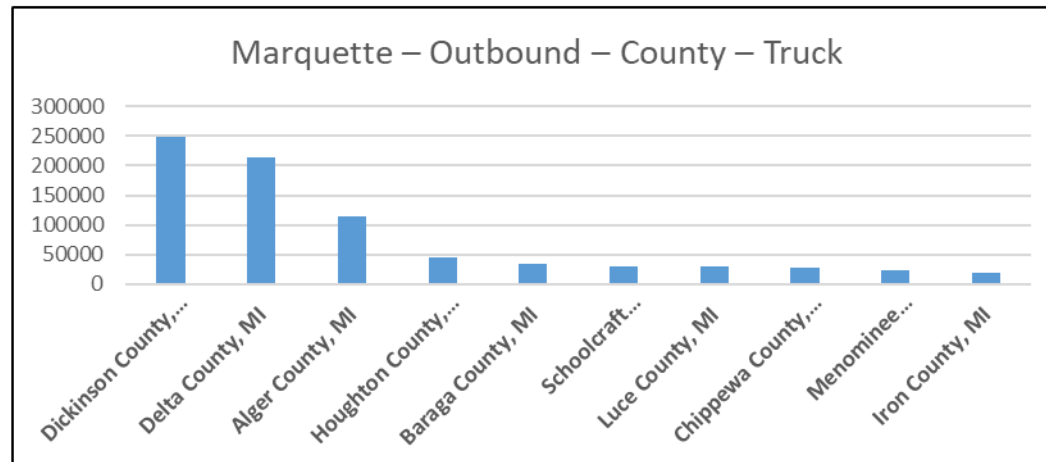
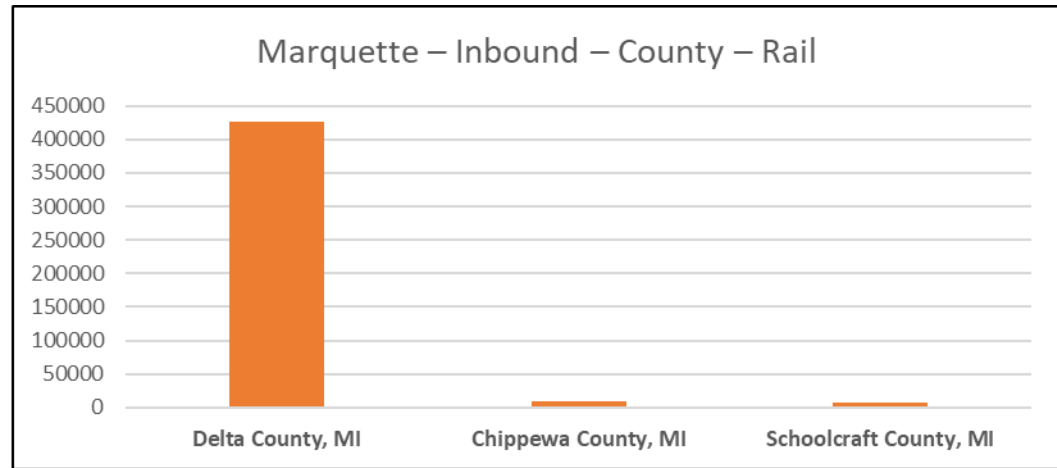
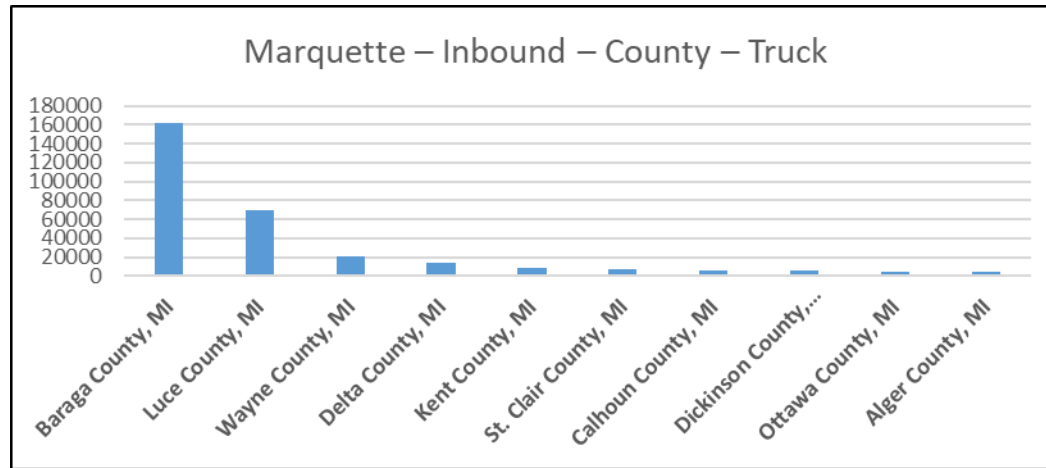
# Marquette County Freight Profile (Year 2015)

## Major Trading Partners by Mode – States/Provinces



# Marquette County Freight Profile (Year 2015)

## Major Trading Partners by Mode – Counties



# **V. Conclusions to Date, Discussion, and Next Steps**



# 5.1. Conclusions to Date & Next Steps - Logs

- ✓ Solid data for regionwide comprehensive database.....available for “other analysis”/proposals?
- ✓ 2<sup>nd</sup> iteration modeling results match “Base Scenario” well...validates our model
  - ✓ The impact of “improved origin accuracy” on results was limited
- ✓ Challenges for increasing rail share in log movements
  - ✓ Current modal choice fairly well optimized (“re-opening” rail sidings would only add 800+ total rail carloads (<10% increase))
  - ✓ Industry is efficient in minimizing transportation distance (almost 75% within 100 miles)
  - ✓ Shared sidings within/between companies have negligible impact on rail share
  - ✓ Adding loading sites could provide minor increase in rail share.....but where’s the carrot for railroads
  - ✓ Rate discounts (10-30%) would increase rail use 10-20%.....but where’s the carrot for railroads
  - ✓ Volume discounts from specific sidings could increase rail use 10-20%.....and there would be a carrot for railroads, but
    - ✓ Shipper savings would be minor.....1-4%.....would that be enough?
    - ✓ Unequal benefits between mills/companies (how to balance the benefits)





# 5.1. Conclusions to Date & Next Steps – Non-Logs

- ✓ Incomplete data between different sources, but Transearch not a bad place to start
- ✓ 2/3 of freight within neighboring states. Not not ideal for rail movements, but...
  - ✓ Four main counties (Delta, Marquette, Dickinson, Menonimee) have majority of traffic within 70 mile radius
- ✓ Over 2,000,000 tons of truck traffic beyond neighboring states....how much is enough for transload/container terminal??



# 5.1. Next Steps

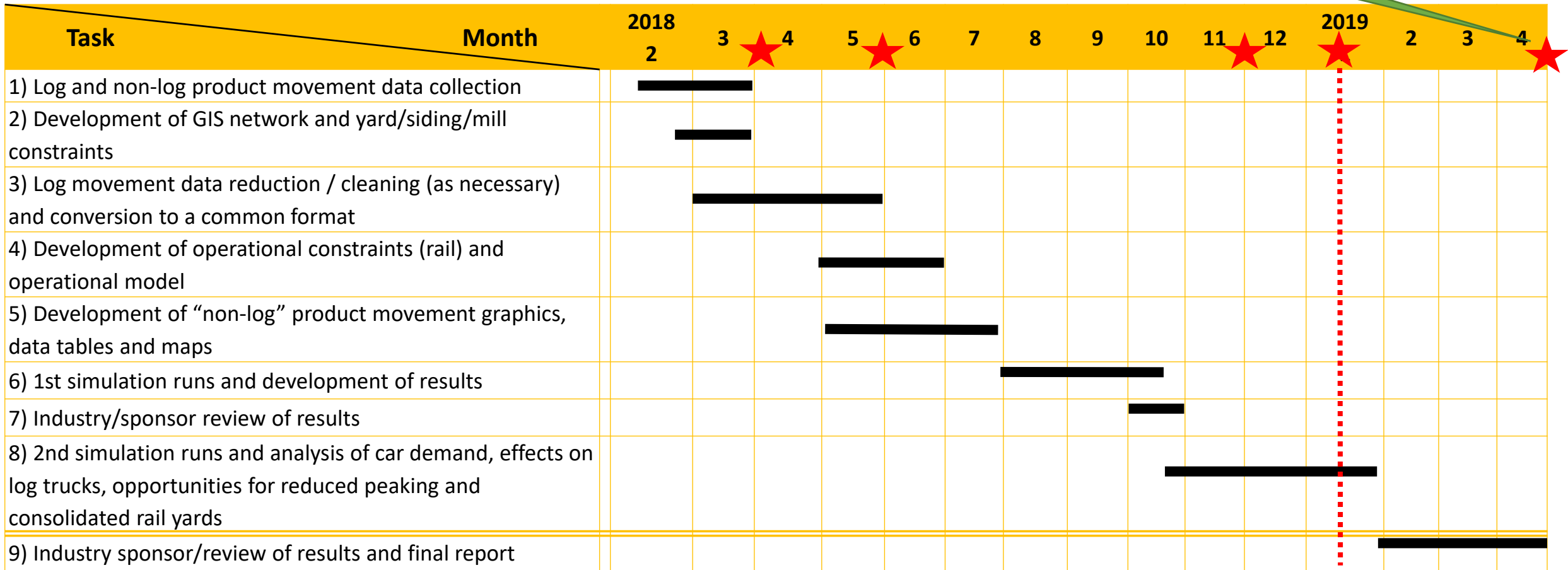
- ✓ Next steps - Logs
  - ✓ Incorporate more companies (if data arrives) and E&LS
  - ✓ Re-evaluate rail car needs for various scenarios
  - ✓ Investigate “reduced peaking” opportunities through rail & individual lane cases
  - ✓ Investigate possibility to incorporate backhaul opportunities to model
  - ✓ Estimate cost to include 2015-2016 data
- ✓ Next steps – Non-Logs
  - ✓ Incorporate more companies (if data arrives)
  - ✓ “Fine-tune” evaluations (remove certain commodities)
  - ✓ Compare/contrast LSSA data to Transearch in top counties
  - ✓ Look into incorporation of Wisconsin data (NRTC)



# 5.3. Next Project Steps

Final Meeting?

Progress Web-Conference



**Extend project until June 30, 2019**



# Q & A

Thank you!

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**Michigan Tech**