

Minnesota Safety Rest Area Programs

Market Research Nighttime Truck Parking Length of Stay Study

I-94 East Bound - Fergus Falls to St. Cloud August 1999



Minnesota Department of Transportation

Office of Technical Support

Site Development Unit

March 2000



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Prepared for:

**Minnesota Department of Transportation
Office of Technical Support
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Prepared by:



March 2000

TABLE OF CONTENTS

1.0	Executive Summary	1
2.0	Study Purpose	5
3.0	Methodology	5
4.0	Rest Area Usage	7
5.0	Oversized Vehicle Survey	13
	5.1 Breakdown of Observations	13
	5.2 Vehicle Arrival Times.....	13
	5.3 Lot Capacity.....	18
	5.4 Vehicle Dwell Times	18
6.0	Conclusion	25

APPENDIX

Appendix A	Hourly Traffic Counts on I-94 Eastbound and at the Rest Area Entrance Ramps
Appendix B	Dwell Times Broken Out by Arrival Times

LIST OF FIGURES

2-1	Survey Site Locations	6
5-1	Percent of Vehicles Arriving by time of Arrival.....	17
5-2	Oversized Vehicle Occupancy for each Rest Area by Hours of Survey	20
5-3	Breakdown of Fully Observed Vehicle Dwell Times for each Rest Area	24
5-4	Breakdown of Partially Observed Vehicle Dwell Times for each Rest Area	24

LIST OF TABLES

4-1	24 Hour Count of Vehicles on I-94 Eastbound.....	8
4-2	11 PM to 7 AM Count of Vehicles on I-94 Eastbound	9
4-3	24 Hour Count of Vehicles Entering Rest Areas	10
4-4	11 PM to 7 AM Count of Vehicles Entering Rest Areas.....	11
4-5	Percentage of Vehicles on Eastbound I-94 Entering Each Rest Area	12
5-1	Count of Oversized Vehicles Surveyed by Rest Area, and Day of Week	14

5-2	Breakdown of Fully Observed Oversized Vehicles by Rest Area, Day of the Week, and Hour of Arrival.....	15
5-3	Breakdown of Partially Observed Oversized Vehicles by Rest Area, Day of the Week, and Hour of Arrival	16
5-4	Oversized Vehicles Parking Lot Occupancy by Day of the Week, and Time of Day, for Each Rest Area	19
5-5	Parking Lot Dwell Times for Fully Observed Vehicles by Day of the Week for Each Rest Area	21
5-6	Parking Lot Dwell Times for Partially Observed Vehicles by Day of the Week for Each Rest Area	22

1.0 EXECUTIVE SUMMARY

The purpose of this survey is to determine the length of time and how oversized vehicle operators utilize the rest areas along I-94 in outstate¹ Minnesota during nighttime hours. "Oversized Vehicle" indicates any vehicle larger than a standard size car or pick-up truck (defined as vehicles falling into FHWA Classes 7 through 12). To assess oversized vehicle usage, three rest areas along I-94 were surveyed. The three rest areas are the Iverson Lake Rest Area, Lake Lakota Rest Area, and the Big Spunk Lake Rest Area. All three rest areas are located between Fergus Falls and Saint Cloud. They are sequentially spaced in approximately 50-mile increments and all three serve eastbound I-94 traffic heading in the direction of the Twin Cities Metropolitan Area.

METHODOLOGY

The survey began Monday, August 16th at 11:00 PM and ended Saturday, August 21st at 7:00 AM. Survey hours were from 11:00 PM and 7:00 AM. Between these hours, surveyors classified (using the FHWA Vehicle Classification Scheme) each oversized vehicle entering the rest areas. The time each oversized vehicle entered and exited the rest area was recorded. Oversized vehicles, which were on-site prior to 11:00 PM and/or after 7:00 AM, were noted as such.

Tube counters² were placed on both lanes of eastbound I-94 to the west of each rest area entrance and on each rest area entrance ramp. These devices are used to gather specific data sets on the traveling public. The data collected for our survey are: type of vehicle, time, date, and rate of speed. The tube counters were used to collect hourly traffic count totals broken out by vehicle type. The counters were set to collect data continuously from 11:00 PM Monday, August 16th to 7:00 AM Saturday, August 21st.

Below is a summary of all the data collected:

- Total number of vehicles (passenger and oversized) on eastbound I-94 immediately before each rest area surveyed.
- Total number of vehicles (passenger and oversized) entering each rest area surveyed.
- Arrival times of oversized vehicles entering each rest area between 11:00 PM and 7:00 AM
- Dwell time³ of oversized vehicles using each rest area between 11:00 PM and 7:00 AM

The actions of oversized vehicles that were in each lot prior to 11:00 PM and after 7:00 PM were also recorded during the survey period.

¹ "Outstate" indicates outside of the 5-county metropolitan area.

² A tube counter is an impact recording device that makes a data record of traffic at a particular point along the path of the road.

³ "Dwell time" indicates length of stay.

Based on the data collected, the following was determined:

- Percent of vehicles (passenger and oversized) on I-94 eastbound entering each rest area during the day and during the survey hours
- Breakdown of oversized vehicles by arrival time at each rest area
- Percent Occupancy of oversized vehicle lot at each rest area
- Breakdown of oversized vehicles by dwell time at each rest area

REST AREA USAGE

Between 5,800 to 13,000 vehicles per day use eastbound I-94 between Fergus Falls and St. Cloud. Complete traffic count data reveals that the daily percentage of oversized vehicles is 16% to 31% of the total vehicles. During the nighttime survey period 10% of the daily passenger vehicles and 19% of the daily oversized vehicles were counted. A larger percentage of oversized vehicles, 24% to 49%, use I-94 during the nighttime survey period.

Data collected at the rest area entrance ramps reveals that, over a 24-hour period, about 30% of the vehicles entering the rest areas are oversized vehicles. This number jumps to about 40% between 11:00 PM and 7:00 AM.

Using the traffic counts taken on I-94 and the rest area entrances, it was determined that around 6% of the passenger vehicles and 14% of the oversized vehicles on eastbound I-94 enter one of the three rest areas over a 24-hour period.

OVERSIZED VEHICLE SURVEY

Breakdown of Observations

A total of 681 oversized vehicles were surveyed at all three rest areas from Monday through Friday. These vehicles were split into two different groups.

- The first group consists of oversized vehicles that were fully observed by the surveyors. These are vehicles that entered the rest area at or after 11:00 PM and exited at or before 7:00 AM. This portion of the data is referred to as the “fully observed” group.
- The second group consists of oversized vehicles that were partially observed by surveyors. These vehicles were either at the rest area before the survey start time of 11:00 PM or were still present at the survey end time of 7:00 AM. This portion of the data is referred to as the “partially observed” group. Because the entry and/or exit times of these vehicles did not occur during the hours surveyed, exact dwell times can not be calculated. Instead, the dwell times of these vehicles observed between 11:00 PM and 7:00 AM were documented.

Generally, 60% of the vehicles were fully observed and 40% were partially observed. Breaking out the observations by rest area, it was shown that 41% of all the vehicles were observed at Lake Lakota, 35% at Big Spunk Lake, and 24% at Iverson Lake. Looking at the observations by day of the week, over 70% of the observations were made by Wednesday, indicating a drop-off in usage on Thursday and Friday.

Vehicle Arrival Times

For the week as a whole, over 50% of the fully observed oversized vehicles arrived between the hours of 11:00 PM and 2:00 AM. In comparison, 50% of the partially observed vehicles arrive before the survey start time of 11:00 PM. From 11:00 PM on, the arrival patterns for both groups are similar.

Lot Capacity

The number of oversized parking stalls for each rest area is as follows:

- Iverson Lake Rest Area: 11
- Lake Lakota Rest Area: 19
- Big Spunk Lake Rest Area: 16

The oversized parking lot occupancy was assessed at each rest area by tallying the number of oversized vehicles present in each rest area on the hour and half-hour during the survey period. The rest areas were at or over capacity for 45% of the time periods examined. The lots were at times 50% over their capacity. According to surveyor observation, oversized vehicle operators would often park their vehicles in areas not designated as a parking stall, because no stalls were available. Vehicles were parked along the rest area entry and exit ramps and at the edge of the lot.

The busiest day of the week for the rest areas tended to occur during the middle of the week on a Tuesday or Wednesday. The least busy day was Friday. On Fridays the lots were still close to capacity. Overall, the time period where the highest occupancy occurred was between 1:30 AM and 5:00 AM.

Vehicle Dwell Times

Dwell times of the vehicles were broken into eight categories ranging from less than 4 minutes to greater than 5 hours. For both full and partial observation groups, dwell times were shown to be consistent across days of the week and rest areas.

Between observation groups, dwell times were quite different.

Fully observed vehicles

- +50% stay at the rest areas 15 minutes or less
- 18% stayed in the rest areas less than 4 minutes on average
- around 18% stayed between 4 and 8 minutes
- around 18% stayed between 8 and 15 minutes

Partially observed vehicles

- Approximately 50% stayed at the rest areas more than 5 hours.
- No more than 5% stayed at any one of the rest areas less than 4 minutes.
- only 21% stayed at the rest areas less than 1 hour for the three rest areas as a whole,.

The dwell time patterns can be explained when lot capacity is taken into consideration. Approximately half of the partially observed vehicles were present before 11:00 PM each day. Based on surveyor observation, these vehicles were the ones that were parked in designated parking stalls. The assumption can be made that many of these vehicles were parked for the remainder of the night while their operators rested. Almost 60% of the oversized vehicles arriving in the rest areas before 11:00 PM stayed there for 5 hours or more.

The fully observed vehicles were those that showed up after 11:00 PM. Based on surveyor observation, the operators of these vehicles would often pull into the rest area and drive slowly through the lot looking for a parking space. If a space was not available, they would either illegally park their vehicle for a brief stay of a few minutes or exit the rest area immediately. Almost 20% of the fully observed vehicles stayed at the rest areas less than 4 minutes. Another 17% stayed only between 4 and 8 minutes. It can be assumed from the data and observation that the reason a significant percentage of the fully observed vehicles stayed in the rest area for only a few minutes is because their operators were unable to find a place to park.

CONCLUSION

Based on the survey and accompanying data collection of the Iverson Lake, Lake Lakota, and Big Spunk Lake Rest areas, the following conclusions can be made:

- About 6% of the passenger vehicles and 14% of the oversized vehicles on eastbound I-94 utilize the rest areas.
- 20% of all the oversized vehicles surveyed arrived before 11:00 PM.
- 20% of all the oversized vehicles surveyed departed after 7:00 AM.
- Over the entire week for all the rest areas, the oversized lots were at or over capacity for 45% of the survey time periods examined between 11:00 PM and 7:00 AM.
- None of the rest areas were at capacity at 11:00 PM.
- Almost 60% of the oversized vehicles arriving before 11:00 PM stayed there for 5 hours or more.
- Of the oversized vehicles arriving between 11:00 PM and 7:00 AM, almost 20% stayed in the rest areas less than 4 minutes. Over 1 in 3 oversized vehicles arriving between these times stayed 8 minutes or less.

The above conclusions indicate that oversized vehicles arriving at the rest areas right before 11:00 PM were able to find parking spaces. Once parked, these vehicles often stayed for most of the night. Oversized vehicles that arrived later in the evening when the lots were often fully occupied, stayed a much shorter length of time overall. Based on surveyor observation, these vehicles would often pass through the rest areas apparently looking for a parking space. When no spaces were available, these vehicles tended to exit the rest area without stopping or with only a momentary stop.

2.0 STUDY PURPOSE

The purpose of this survey is to determine length of time and how oversized vehicles operators utilize the rest areas along I-94 in outstate Minnesota during nighttime hours. For this survey, oversized vehicles are generally defined as those vehicles falling into Federal Highway Administration (FHWA) Classes 7 through 12 with the most frequently observed class being Class 9, 5-Axle Semi. A small number of vehicles not in Classes 7 through 12 did park in the oversized vehicle lots and were included in the survey. To assess oversized vehicle usage, three rest areas along I-94 were surveyed. The three rest areas are the Iverson Lake Rest Area, Lake Lakota Rest Area, and the Big Spunk Lake Rest Area. They are identified on **Figure 2-1**. All three rest areas are located between Fergus Falls and Saint Cloud. They are sequentially spaced in approximately 50-mile increments and all three serve eastbound I-94 traffic heading in the direction of the Twin Cities Metropolitan Area.

3.0 METHODOLOGY

Each rest area was surveyed between 11:00 PM and 7:00 AM from 11:00 PM Monday, August 16th to 7:00 AM Saturday, August 21st. The survey occurred from 11:00 PM to 7:00 AM every night between Monday night and Saturday morning. Between these hours, surveyors located at the three rest areas classified each oversized vehicle using the Federal Highway Administration (FHWA) Vehicle Classification Scheme. The time at which each oversized vehicle entered and exited the rest area was also noted. Oversized vehicles, which were on-site prior to 11:00 PM and/or after 7:00 AM, were noted as arriving before 11:00 PM and/or departing after 7:00 AM, respectively.

To the west of each rest area entrance, tube counters were placed on both lanes of eastbound I-94. Tube counters were also placed on each rest area entrance ramp. They were located on the entrance ramps so that both passenger and oversized vehicles could be identified. The tube counters were used to collect hourly traffic count totals broken out by vehicle type. The counters were set to run continuously from 11:00 PM Monday, August 16th to 7:00 AM Saturday, August 21st.

Below is a summary of all the data collected:

- Total number of vehicles (passenger and oversized) on eastbound I-94 immediately preceding each rest area surveyed.
- Total number of vehicles (passenger and oversized) entering each rest area surveyed.
- Arrival times of oversized vehicles entering each rest area between 11:00 PM and 7:00 AM
- Dwell times of oversized vehicles using each rest area between 11:00 PM and 7:00 AM

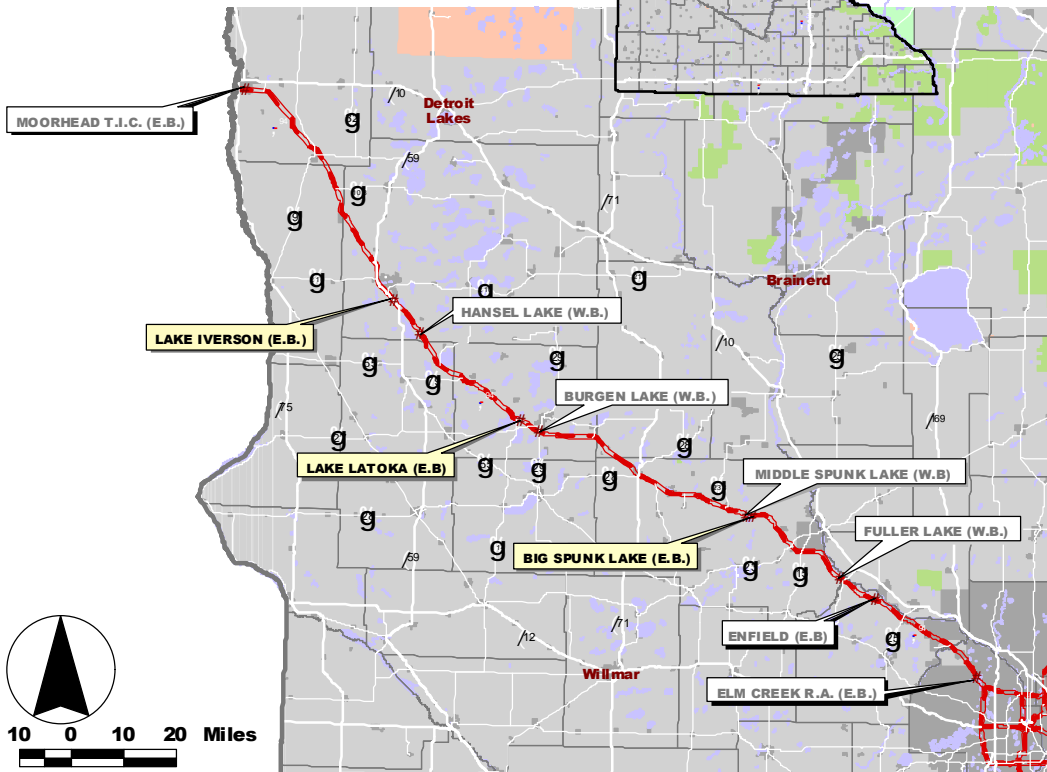
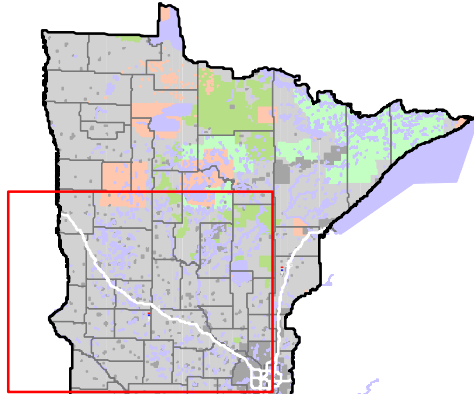
The movements of oversized vehicles that were in each lot prior to 11:00 PM and after 7:00 PM were also recorded during the survey period.

I-94 OVERSIZED VEHICLE REST AREA USAGE SURVEY

SURVEY SITE LOCATIONS

EASTBOUND INTERSTATE 94 REST AREA SPACING (Moorehead to Elm Creek)	
Moorehead to Lake Iverson*	58 miles
Lake Iverson* to Lake Latoka*	39 miles
Lake Latoka* to Big Spunk Lake*	53 miles
Big Spunk Lake* to Enfield	35 miles
Enfield to Elm Creek	28 miles

* Data collected from these Rest Areas analyzed in Mn/DOT report entitled:
Market Research
Nighttime Truck Parking
Length of Stay Study



Based on the data collected, the following was determined:

- Percent of vehicles (passenger and oversized) on I-94 eastbound entering each rest area during the day and during the survey hours
- Breakdown of oversized vehicles by arrival time at each rest area
- Percent Occupancy of oversized vehicle lot at each rest area
- Breakdown of oversized vehicles by dwell time at each rest area

These results are presented in the following paragraphs.

4.0 REST AREA USAGE

Table 4-1 displays the number of passenger and oversized (FHWA Classes 7-12) vehicles on eastbound I-94 west of each rest area entrance ramp during each day surveyed. The table shows that the number of vehicles traveling on I-94 eastbound in the vicinity of the three rest areas ranges from 5,800 to 13,300 vehicles per day. An examination of the days with complete traffic count data reveals that the percent of oversized vehicles on I-94 eastbound ranges from 16% to 31%. **Table 4-2** displays the number of passenger and oversized vehicles on eastbound I-94 west of each rest area entrance ramp for each day during the survey period of 11:00 PM to 7:00 AM. The table shows that, during these hours, the percent of oversized vehicles on I-94 eastbound ranges from 24% to 49%. Comparing **Table 4-1** to **Table 4-2**, it can be seen that approximately 10% of the daily passenger vehicles and 19% of the daily oversized vehicles are on I-94 eastbound during the survey period of 11:00 PM to 7:00 AM. An hourly breakdown of the traffic counts shown in **Tables 4-1** and **4-2** can be found in Appendix A.

Tables 4-3 and **4-4** display the number of passenger and oversized vehicles entering the rest areas during the entire day and survey period, respectively. **Table 4-3** shows that over an entire weekday, about 30% of the vehicles entering the rest areas are oversized vehicles. **Table 4-4** shows that between 11:00 PM and 7:00 AM, about 40% of the vehicles entering the rest areas are oversized vehicles.

Table 4-5 shows the percentage of vehicles on eastbound I-94 entering each rest area. The table shows that around 6% of the passenger vehicles on eastbound I-94 enter one of the three rest areas over a 24-hour period. It also shows that, for oversized vehicles, the percentage is approximately 14%.

**TABLE 4-1
24 HOUR COUNT OF VEHICLES ON I-94 EASTBOUND**

WEST OF IVERSON LAKE REST AREA ENTRANCE RAMP				
	Passenger Vehicles	Oversized Vehicles	Total Vehicles	% of Oversized Vehicles
Monday	N/A	N/A	N/A	N/A
Tuesday	3,986	1,773	5,759	31%
Wednesday	5,171	1,590	6,761	24%
Thursday	5,777 ¹	1,234 ¹	7,011 ¹	18%
Friday	N/A	N/A	N/A	N/A
WEST OF LAKE LAKOTA REST AREA ENTRANCE RAMP				
	Passenger Vehicles	Oversized Vehicles	Total Vehicles	% of Oversized Vehicles
Monday	N/A	N/A	N/A	N/A
Tuesday	N/A	N/A	N/A	N/A
Wednesday	5,096	1,485	6,581	23%
Thursday	5,690 ²	1,328 ²	7,018 ²	19%
Friday	7,290 ³	1,073 ³	8,363 ³	13%
WEST OF BIG SPUNK LAKE REST AREA ENTRANCE RAMP				
	Passenger Vehicles	Oversized Vehicles	Total Vehicles	% of Oversized Vehicles
Monday	N/A	N/A	N/A	N/A
Tuesday	N/A	N/A	N/A	N/A
Wednesday	9,711	1,817	11,528	16%
Thursday	10,801	2,505	13,306	19%
Friday	10,985 ¹	1,343 ¹	12,328 ¹	11%
TOTAL OF ALL THREE LOCATIONS				
	Passenger Vehicles	Oversized Vehicles	Total Vehicles	% of Oversized Vehicles
Monday	N/A	N/A	N/A	N/A
Tuesday	N/A	N/A	N/A	N/A
Wednesday	19,978	4,892	24,870	20%
Thursday	N/A	N/A	N/A	N/A
Friday	N/A	N/A	N/A	N/A

¹ Data missing from 9:00 PM to 12:00 AM

² Data missing from 10:00 PM to 12:00 AM

³ Data missing from 11:00 PM to 12:00 AM

NOTE: Count data collected from 11:00 PM 8/16/99 to 7:00 AM 8/21/99.

10/17/00

Source: BRW, Inc.

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TABLE 4-2

11 PM to 7 AM COUNT OF VEHICLES ON I-94 EASTBOUND

WEST OF IVERSON LAKE REST AREA ENTRANCE RAMP				
	Passenger Vehicles	Oversized Vehicles	Total Vehicles	% of Oversized Vehicles
Monday	330	320	650	49%
Tuesday	390	311	701	44%
Wednesday	484	296	780	38%
Thursday	N/A	N/A	N/A	N/A
Friday	395 ¹	120 ¹	515 ¹	23%
WEST OF LAKE LAKOTA REST AREA ENTRANCE RAMP				
	Passenger Vehicles	Oversized Vehicles	Total Vehicles	% of Oversized Vehicles
Monday	N/A	N/A	N/A	N/A
Tuesday	508	300	808	37%
Wednesday	451	311	762	41%
Thursday	433	293	726	40%
Friday	394 ¹	210 ¹	604 ¹	35%
WEST OF BIG SPUNK LAKE REST AREA ENTRANCE RAMP				
	Passenger Vehicles	Oversized Vehicles	Total Vehicles	% of Oversized Vehicles
Monday	N/A	N/A	N/A	N/A
Tuesday	N/A	N/A	N/A	N/A
Wednesday	1,122	444	1,566	28%
Thursday	1,041	325	1,366	24%
Friday	617 ¹	143 ¹	760 ¹	19%
TOTAL OF ALL THREE LOCATIONS				
	Passenger Vehicles	Oversized Vehicles	Total Vehicles	% of Oversized Vehicles
Monday	N/A	N/A	N/A	N/A
Tuesday	N/A	N/A	N/A	N/A
Wednesday	2,057	932	2,989	31%
Thursday	N/A	N/A	N/A	N/A
Friday	1,406 ¹	473 ¹	1,879 ¹	25%

¹ Data missing from 11:00 PM to 12:00 AM

NOTE: Count data collected from 11:00 PM 8/16/99 to 7:00 AM 8/21/99.

10/17/00

Source: BRW, Inc.

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**TABLE 4-3
24 HOUR COUNT OF VEHICLES ENTERING REST AREAS**

IVERSON LAKE REST AREA ENTRANCE RAMP				
	Passenger Vehicles	Oversized Vehicles	Total Vehicles	% of Oversized Vehicles
Monday	N/A	N/A	N/A	N/A
Tuesday	314	138	452	31%
Wednesday	317	171	488	35%
Thursday	390	167	557	30%
Friday	462	127	589	22%
LAKE LAKOTA REST AREA ENTRANCE RAMP				
	Passenger Vehicles	Oversized Vehicles	Total Vehicles	% of Oversized Vehicles
Monday	N/A	N/A	N/A	N/A
Tuesday	413	208	621	33%
Wednesday	432	244	676	36%
Thursday	448	225	673	33%
Friday	652	154	806	19%
BIG SPUNK LAKE REST AREA ENTRANCE RAMP				
	Passenger Vehicles	Oversized Vehicles	Total Vehicles	% of Oversized Vehicles
Monday	N/A	N/A	N/A	N/A
Tuesday	475	202	677	30%
Wednesday	423	257	680	38%
Thursday	436	139	575	24%
Friday	722	147	869	17%
TOTAL OF ALL THREE LOCATIONS				
	Passenger Vehicles	Oversized Vehicles	Total Vehicles	% of Oversized Vehicles
Monday	N/A	N/A	N/A	N/A
Tuesday	1,202	548	1,750	31%
Wednesday	1,172	672	1,844	36%
Thursday	1,274	531	1,805	29%
Friday	1,836	428	2,264	19%

NOTE: Count data collected from 11:00 PM 8/16/99 to 7:00 AM 8/21/99.

10/17/00

Source: BRW, Inc.

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TABLE 4-4

11 PM to 7 AM COUNT OF VEHICLES ENTERING REST AREAS

IVERSON LAKE REST AREA ENTRANCE RAMP				
	Passenger Vehicles	Oversized Vehicles	Total Vehicles	% of Oversized Vehicles
Monday	52	29	81	36%
Tuesday	55	36	91	40%
Wednesday	43	36	79	46%
Thursday	53	20	73	27%
Friday	50	18	68	26%
LAKE LAKOTA REST AREA ENTRANCE RAMP				
	Passenger Vehicles	Oversized Vehicles	Total Vehicles	% of Oversized Vehicles
Monday	57	52	109	48%
Tuesday	60	49	109	45%
Wednesday	55	52	107	49%
Thursday	61	51	112	46%
Friday	92	23	115	20%
BIG SPUNK LAKE REST AREA ENTRANCE RAMP				
	Passenger Vehicles	Oversized Vehicles	Total Vehicles	% of Oversized Vehicles
Monday	71	46	117	39%
Tuesday	65	40	105	38%
Wednesday	35	58	93	62%
Thursday	71	32	103	31%
Friday	114	32	146	22%
TOTAL OF ALL THREE LOCATIONS				
	Passenger Vehicles	Oversized Vehicles	Total Vehicles	% of Oversized Vehicles
Monday	180	127	307	41%
Tuesday	180	125	305	41%
Wednesday	133	146	279	52%
Thursday	185	103	288	36%
Friday	256	73	329	22%

NOTE: Count data collected from 11:00 PM 8/16/99 to 7:00 AM 8/21/99.

10/17/00

Source: BRW, Inc.

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**TABLE 4-5
PERCENTAGE OF VEHICLES ON EASTBOUND I-94 ENTERING EACH REST AREA**

IVERSON LAKE REST AREA				
	Day	% of Passenger Vehicles	% of Oversized Vehicles	% of Total Vehicles
24 Hour	Wednesday	6.1%	10.8%	7.2%
	Thursday	6.8%	13.5%	7.9%
11 PM to 7 AM	Monday	15.8%	9.1%	12.5%
	Wednesday	8.9%	12.2%	10.1%
LAKE LAKOTA REST AREA				
	Day	% of Passenger Vehicles	% of Oversized Vehicles	% of Total Vehicles
24 Hour	Wednesday	8.5%	16.4%	10.3%
11 PM to 7 AM	Tuesday	11.8%	16.3%	13.5%
	Wednesday	12.2%	16.7%	14.0%
BIG SPUNK LAKE REST AREA				
	Day	% of Passenger Vehicles	% of Oversized Vehicles	% of Total Vehicles
24 Hour	Wednesday	4.4%	14.1%	5.9%
	Thursday	4.0%	5.5%	4.3%
11 PM to 7 AM	Wednesday	3.1%	13.1%	5.9%
	Thursday	6.8%	9.8%	7.5%
TOTAL OF ALL THREE LOCATIONS				
	Day	% of Passenger Vehicles	% of Oversized Vehicles	% of Total Vehicles
24 Hour	Wednesday	5.9%	13.7%	7.4%
11 PM to 7 AM	Wednesday	6.5%	15.7%	9.3%

NOTE: Percentages were calculated only for the days that had complete count information.

10/17/00

Source: BRW, Inc.

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5.0 OVERSIZED VEHICLE SURVEY

5.1 Breakdown of Observations

A total of 681 oversized vehicles were surveyed at all three rest areas from Monday through Friday. These vehicles were split into two different groups. The first group consists of oversized vehicles that were fully observed by the surveyors. These are vehicles that entered the rest area at or after 11:00 PM and exited at or before 7:00 AM. This portion of the data will be referred to as the “fully observed” group. The second group consists of oversized vehicles that were partially observed by surveyors. These vehicles were either at the rest area before the survey start time of 11:00 PM or were still present at the survey end time of 7:00 AM. This portion of the data will be referred to as the “partially observed” group. Because the entry and/or exit times of these vehicles did not occur during the hours surveyed, exact dwell times can not be calculated. Instead, the dwell times of these vehicles observed between 11:00 PM and 7:00 AM were documented.

Table 5-1 displays the number of oversized vehicles observed broken out by rest area and day of the week. The table also breaks down the observations into those that were fully observed and partially observed. Generally, 60% of the vehicles were fully observed and 40% were partially observed. Breaking out the observations by rest area, the table shows that 41% of the vehicles were observed at Lake Lakota, 35% at Big Spunk Lake, and 24% at Iverson Lake. Looking at the observations by day of the week, over 70% of the observations were made by Wednesday, indicating a drop-off in usage on Thursday and Friday.

5.2 Vehicle Arrival Times

The arrival times of the observed vehicles are summarized in **Tables 5-2** and **5-3**. **Table 5-2** breaks down the fully observed vehicles for each day of the week by the hour of their arrival. For the week as a whole, over 50% of the fully observed oversized vehicles arrived between the hours of 11:00 PM and 2:00 AM. **Table 5-3** presents the same information as **Table 5-2** but for the partially observed vehicles. In order to be a partially observed vehicle, the vehicle must arrive before 11:00 PM or depart after 7:00 AM. Therefore, it makes sense that 50% of the partially observed vehicles arrive before the survey start time of 11:00 PM. **Figure 5-1** compares the percent arrival by time of day of the fully and partially observed vehicles against one another. The graph shows that, from 11:00 PM on, the arrival patterns for both groups are similar.

**TABLE 5-1
COUNT OF OVERSIZED VEHICLES SURVEYED BY REST AREA AND DAY OF THE WEEK**

DAY SURVEYED	OBSERVATION TYPE	REST AREA			GRAND TOTAL	% OF GRAND TOTAL
		Iverson Lake	Lake Lakota	Big Spunk Lake		
Monday	Fully Observed	26	40	45	111	16%
	Partially Observed*	11	25	19	55	8%
	Total	37	65	64	166	24%
Tuesday	Fully Observed	23	37	33	93	14%
	Partially Observed*	20	23	17	60	9%
	Total	43	60	50	153	22%
Wednesday	Fully Observed	24	42	26	92	14%
	Partially Observed*	18	30	26	74	11%
	Total	42	72	52	166	24%
Thursday	Fully Observed	11	34	25	70	10%
	Partially Observed*	15	17	11	43	6%
	Total	26	51	36	113	17%
Friday	Fully Observed	11	15	17	43	6%
	Partially Observed*	7	15	18	40	6%
	Total	18	30	35	83	12%
FULLY OBSERVED TOTAL		95	168	146	409	60%
PARTIALLY OBSERVED TOTAL		71	110	91	272	40%
GRAND TOTAL		166	278	237	681	100%
% OF GRAND TOTAL		24%	41%	35%	100%	

* Partially observed vehicles are vehicles that entered the rest area before the survey start time of 11:00 PM and/or exited the rest area after the survey end time of 7:00 AM.

NOTE: Survey data collected from 8/16/99 to 8/20/99 between 11:00 PM and 7:00 AM.

Source: BRW, Inc.

10/17/00

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**TABLE 5-2
BREAKDOWN OF FULLY OBSERVED OVERSIZED VEHICLES BY REST AREA, DAY OF THE WEEK, AND HOUR OF ARRIVAL**

DAY STARTED	TIME OF ARRIVAL	REST AREA			TOTALS	% OF DAILY TOTAL
		Iverson Lake	Lake Lakota	Big Spunk Lake		
Monday	11 PM - 12 AM	11	9	5	25	23%
	12 AM - 1 AM	4	10	5	19	17%
	1 AM - 2 AM	5	4	13	22	20%
	2 AM - 3 AM	2	8	3	13	12%
	3 AM - 4 AM	0	3	5	8	7%
	4 AM - 5 AM	1	4	5	10	9%
	5 AM - 6 AM	2	0	5	7	6%
	6 AM - 7 AM	1	2	4	7	6%
Monday Total		26	40	45	111	100%
Tuesday	11 PM - 12 AM	4	2	6	12	13%
	12 AM - 1 AM	4	11	8	23	25%
	1 AM - 2 AM	2	4	4	10	11%
	2 AM - 3 AM	2	7	1	10	11%
	3 AM - 4 AM	1	4	6	11	12%
	4 AM - 5 AM	3	4	4	11	12%
	5 AM - 6 AM	1	2	4	7	8%
	6 AM - 7 AM	6	3	0	9	10%
Tuesday Total		23	37	33	93	100%
Wednesday	11 PM - 12 AM	5	7	5	17	18%
	12 AM - 1 AM	4	19	4	27	29%
	1 AM - 2 AM	3	2	1	6	7%
	2 AM - 3 AM	2	2	4	8	9%
	3 AM - 4 AM	3	2	2	7	8%
	4 AM - 5 AM	0	5	4	9	10%
	5 AM - 6 AM	5	4	1	10	11%
	6 AM - 7 AM	2	1	5	8	9%
Wednesday Total		24	42	26	92	100%
Thursday	11 PM - 12 AM	1	10	10	21	30%
	12 AM - 1 AM	1	6	3	10	14%
	1 AM - 2 AM	2	3	1	6	9%
	2 AM - 3 AM	1	4	4	9	13%
	3 AM - 4 AM	1	3	4	8	11%
	4 AM - 5 AM	2	3	0	5	7%
	5 AM - 6 AM	1	4	2	7	10%
	6 AM - 7 AM	2	1	1	4	6%
Thursday Total		11	34	25	70	100%
Friday	11 PM - 12 AM	3	2	6	11	26%
	12 AM - 1 AM	2	3	3	8	19%
	1 AM - 2 AM	0	2	1	3	7%
	2 AM - 3 AM	3	5	2	10	23%
	3 AM - 4 AM	0	1	2	3	7%
	4 AM - 5 AM	1	1	0	2	5%
	5 AM - 6 AM	2	1	3	6	14%
	6 AM - 7 AM	0	0	0	0	0%
Friday Total		11	15	17	43	100%
Entire Week	11 PM - 12 AM	24	30	32	86	21%
	12 AM - 1 AM	15	49	23	87	21%
	1 AM - 2 AM	12	15	20	47	11%
	2 AM - 3 AM	10	26	14	50	12%
	3 AM - 4 AM	5	13	19	37	9%
	4 AM - 5 AM	7	17	13	37	9%
	5 AM - 6 AM	11	11	15	37	9%
	6 AM - 7 AM	11	7	10	28	7%
Grand Total		95	168	146	409	100%

NOTE: Survey data collected from 8/16/99 to 8/20/99 between 11:00 PM and 7:00 AM.

Source: BRW, Inc.

10/17/00

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TABLE 5-3

BREAKDOWN OF PARTIALLY OBSERVED OVERSIZED VEHICLES BY REST AREA, DAY OF THE WEEK, AND HOU

DAY STARTED	TIME OF ARRIVAL	REST AREA			TOTALS	% OF DAILY TOTAL
		Iverson Lake	Lake Lakota	Big Spunk Lake		
Monday	Before Survey*	9	11	11	31	56%
	11 PM - 12 AM	1	4		5	9%
	12 AM - 1 AM		3		3	5%
	1 AM - 2 AM		1	4	5	9%
	2 AM - 3 AM		3		3	5%
	3 AM - 4 AM			2	2	4%
	4 AM - 5 AM		2		2	4%
	5 AM - 6 AM			1	1	2%
6 AM - 7 AM	1	1	1	3	5%	
Monday Total		11	25	19	55	100%
Tuesday	Before Survey*	8	10	9	27	45%
	11 PM - 12 AM	1	2	2	5	8%
	12 AM - 1 AM	1	2	1	4	7%
	1 AM - 2 AM	3	1		4	7%
	2 AM - 3 AM	2	2		4	7%
	3 AM - 4 AM	2			2	3%
	4 AM - 5 AM	1	1	1	3	5%
	5 AM - 6 AM	1	1	2	4	7%
6 AM - 7 AM	1	4	2	7	12%	
Tuesday Total		20	23	17	60	100%
Wednesday	Before Survey*	7	16	12	35	47%
	11 PM - 12 AM	1	2	6	9	12%
	12 AM - 1 AM	1	7	1	9	12%
	1 AM - 2 AM	1	1	1	3	4%
	2 AM - 3 AM	3			3	4%
	3 AM - 4 AM	1	1	2	4	5%
	4 AM - 5 AM	1		1	2	3%
	5 AM - 6 AM	1	1	1	3	4%
6 AM - 7 AM	2	2	2	6	8%	
Wednesday Total		18	30	26	74	100%
Thursday	Before Survey*	7	4	8	19	44%
	11 PM - 12 AM		1		1	2%
	12 AM - 1 AM	2	1	1	4	9%
	1 AM - 2 AM		1		1	2%
	2 AM - 3 AM	1	1		2	5%
	3 AM - 4 AM	2	3		5	12%
	4 AM - 5 AM	2	1		3	7%
	5 AM - 6 AM	1	2		3	7%
6 AM - 7 AM		3	2	5	12%	
Thursday Total		15	17	11	43	100%
Friday	Before Survey*	2	10	12	24	60%
	11 PM - 12 AM				0	0%
	12 AM - 1 AM	1		2	3	8%
	1 AM - 2 AM		2	1	3	8%
	2 AM - 3 AM	3		1	4	10%
	3 AM - 4 AM		1		1	3%
	4 AM - 5 AM		1		1	3%
	5 AM - 6 AM		1	2	3	8%
6 AM - 7 AM	1			1	3%	
Friday Total		7	15	18	40	100%
Entire Week	Before Survey*	33	51	52	136	50%
	11 PM - 12 AM	3	9	8	20	7%
	12 AM - 1 AM	5	13	5	23	8%
	1 AM - 2 AM	4	6	6	16	6%
	2 AM - 3 AM	9	6	1	16	6%
	3 AM - 4 AM	5	5	4	14	5%
	4 AM - 5 AM	4	5	2	11	4%
	5 AM - 6 AM	3	5	6	14	5%
6 AM - 7 AM	5	10	7	22	8%	
Grand Total		71	110	91	272	100%

* Oversized vehicles that were already at the rest area when the survey began.

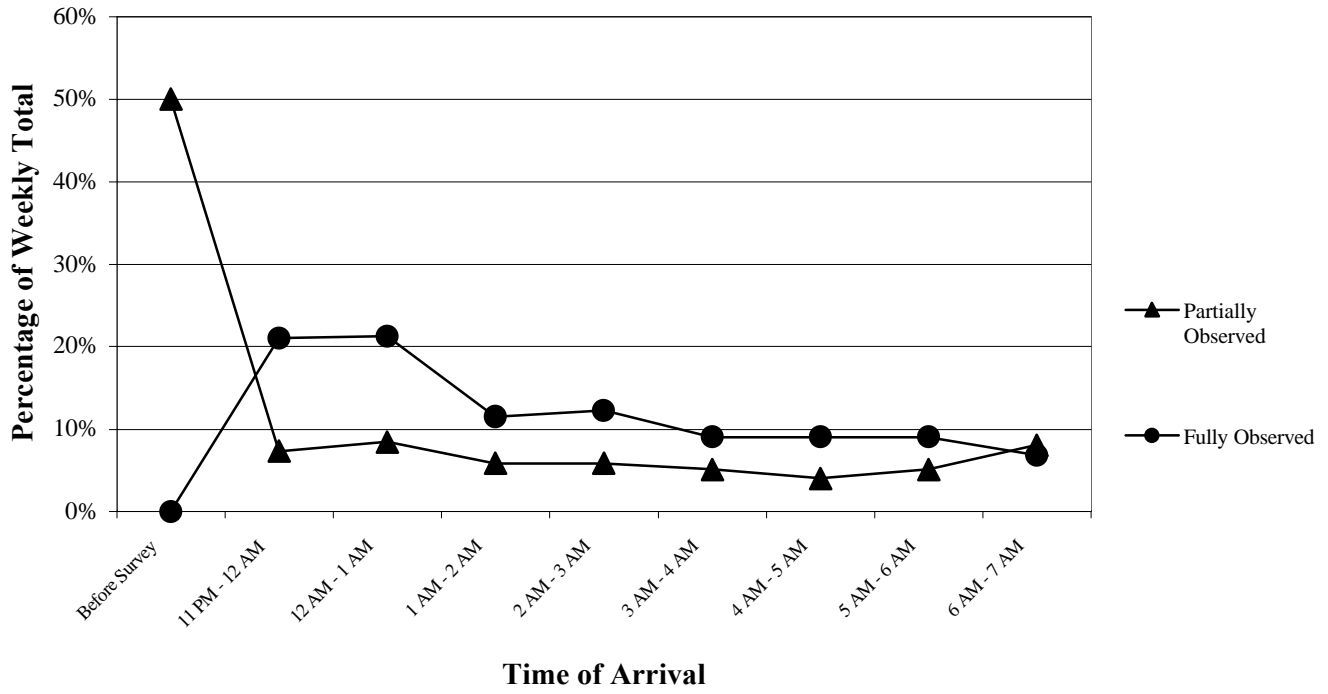
NOTE: Survey data collected from 8/16/99 to 8/20/99 between 11:00 PM and 7:00 AM.

Source: BRW, Inc.

10/17/00

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**FIGURE 5-1
PERCENT OF VEHICLES ARRIVING BY TIME OF ARRIVAL**



5.3 Lot Capacity

The number of oversized parking stalls for each rest area is as follows:

- Iverson Lake Rest Area: 11
- Lake Lakota Rest Area: 19
- Big Spunk Lake Rest Area: 16

The oversized parking lot occupancy was assessed for each rest area by tallying the number of oversized vehicles present in each rest area on the hour and half-hour during the survey period. **Table 5-4** displays the number of oversized vehicles present in each rest area at those times for each day of the week. The 5-day average for the week is also included. Times where the parking lot was at or over capacity are shaded. The table shows that each rest area was over capacity several times during the night almost every day of the week. For all of the rest areas during the entire week, the rest areas were at or over capacity for 45% of the time periods examined. In fact, the lots were over at times 50% over their capacity. According to surveyor observation, oversized vehicle operators would often park their vehicles in areas not designated as a parking stall. Instead, they would park along the rest area entry and exit ramps and at the edge of the lot. This explains how the lots were so far over capacity.

Figure 5-2 consists of charts depicting the occupancy of each rest area's oversized lot during the night. Each chart illustrates the night that was over capacity the greatest number of times along with the night that was over capacity the least number of times. The five-day average occupancy was also given. As shown on the figure, the busiest day of the week for the rest areas tended to occur during the middle of the week on a Tuesday or Wednesday. The least busy day was always Friday. However, the charts show that even on Friday, each lot was often close to capacity. Overall, the moments of the night that had the highest occupancy occurred between 1:30 AM and 5:00 AM.

5.4 Vehicle Dwell Times

As stated previously, the dwell times of the oversized vehicles were broken out into two groups: partially observed and fully observed. **Tables 5-5** and **5-6** display the dwell times for each rest area and day of the week for the fully observed and partially observed vehicles, respectively. A more detailed breakdown of the dwell times of the fully and partially observed vehicles broken out by arrival time is located in Appendix B. For **Tables 5-5** and **5-6**, dwell times of the vehicles were broken into eight categories ranging from less than 4 minutes to greater than 5 hours. The tables show a fairly consistent dwell time pattern within each observation group across the days of the week and across the rest areas.

TABLE 5-4

OVERSIZED VEHICLE PARKING LOT OCCUPANCY BY DAY OF THE WEEK AND TIME OF DAY FOR EACH REST AREA

IVERSON LAKE REST AREA - TOTAL NUMBER OF OVERSIZED PARKING STALLS: 11															
	11:00 PM	11:30 PM	12:00 AM	12:30 AM	1:00 AM	1:30 AM	2:00 AM	2:30 AM	3:00 AM	3:30 AM	4:00 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM
Monday	8	13	14	13	15	16	15	15	13	13	11	9	9	10	4
Tuesday	8	7	9	9	8	10	11	13	14	14	16	17	18	15	16
Wednesday	7	6	6	7	7	9	10	11	13	14	11	10	9	12	11
Thursday	7	8	6	7	9	10	9	10	10	12	11	10	11	12	11
Friday	2	3	5	4	4	4	4	6	7	7	7	7	7	7	8
5-Day Average	7	8	8	8	9	10	10	11	12	12	12	11	11	12	10

LAKE LAKOTA REST AREA - TOTAL NUMBER OF OVERSIZED PARKING STALLS: 19															
	11:00 PM	11:30 PM	12:00 AM	12:30 AM	1:00 AM	1:30 AM	2:00 AM	2:30 AM	3:00 AM	3:30 AM	4:00 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM
Monday	13	11	18	21	23	25	26	29	27	26	24	27	28	28	24
Tuesday	10	11	11	17	21	21	22	24	25	25	22	20	19	16	14
Wednesday	15	16	21	28	31	32	33	32	33	33	33	33	32	33	30
Thursday	5	10	10	12	11	13	13	14	17	19	19	20	21	22	20
Friday	10	9	9	9	9	12	12	12	14	15	16	17	14	13	13
5-Day Average	11	12	14	18	19	21	22	23	24	24	23	24	23	23	21

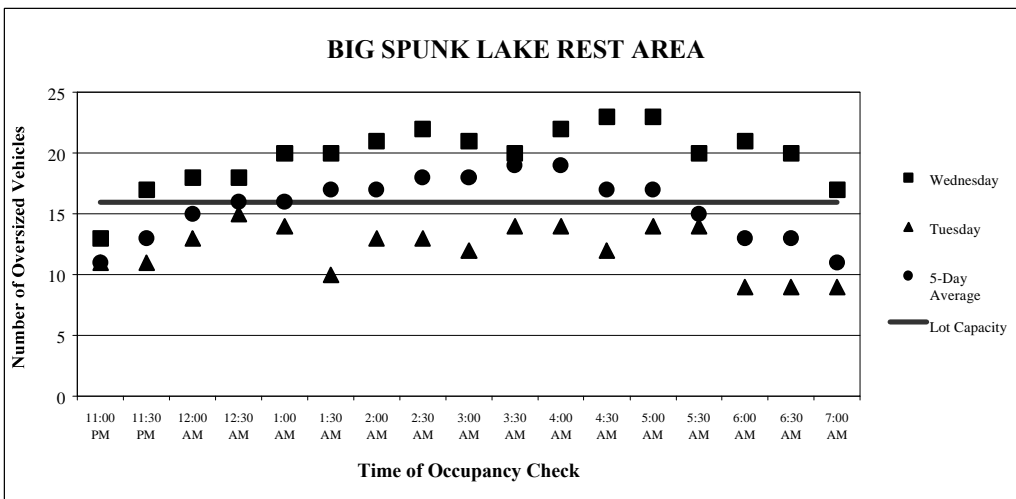
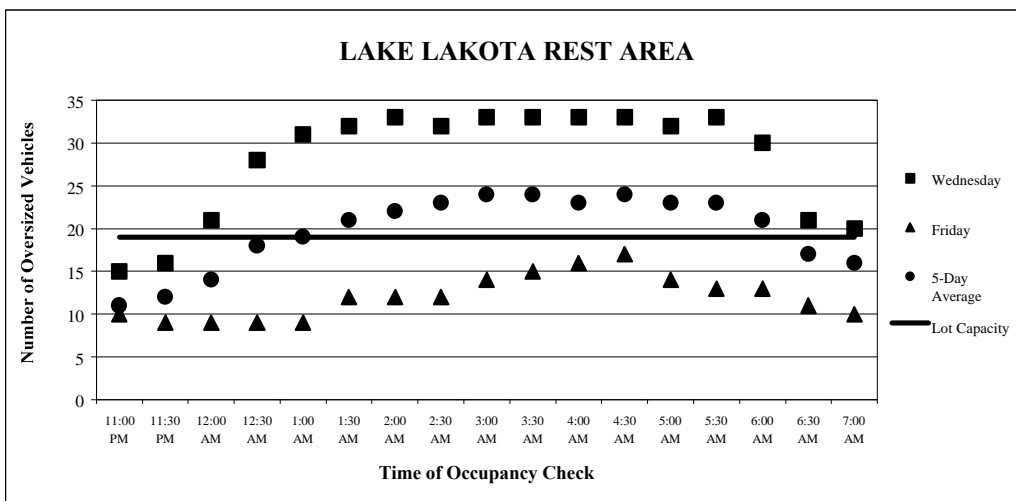
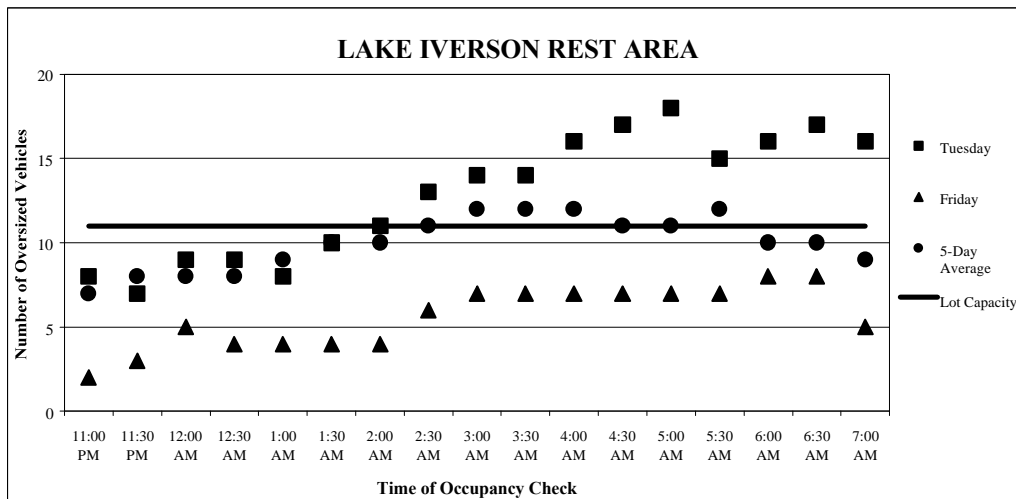
BIG SPUNK LAKE REST AREA - TOTAL NUMBER OF OVERSIZED PARKING STALLS: 16															
	11:00 PM	11:30 PM	12:00 AM	12:30 AM	1:00 AM	1:30 AM	2:00 AM	2:30 AM	3:00 AM	3:30 AM	4:00 AM	4:30 AM	5:00 AM	5:30 AM	6:00 AM
Monday	11	10	13	13	16	21	22	20	22	26	24	21	19	16	15
Tuesday	11	11	13	15	14	10	13	13	12	14	14	12	14	14	9
Wednesday	13	17	18	18	20	20	21	22	21	20	22	23	23	20	21
Thursday	8	12	13	14	13	14	12	14	16	17	16	13	12	10	7
Friday	12	15	14	16	16	17	17	17	16	16	16	13	13	14	13
5-Day Average	11	13	15	16	16	17	17	18	18	19	19	17	17	15	13

- At Capacity
- Over Capacity by 1 to 7 Stalls
- Over Capacity by 8 + Stalls

Source: BRW, Inc.

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FIGURE 5-2
OVERSIZED VEHICLE OCCUPANCY FOR EACH REST AREA BY HOURS OF SURVEY



Source: BRW, Inc

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**TABLE 5-5
PARKING LOT DWELL TIMES FOR FULLY OBSERVED VEHICLES BY DAY OF THE WEEK FOR EACH REST AREA**

IVERSON LAKE REST AREA									
		LESS THAN 4 MIN	4 MIN to 8 MIN	> 8 MIN to 15 MIN	> 15 MIN to 30 MIN	> 30 MIN to 1 HOUR	> 1 HOUR to 3 HOURS	> 3 HOURS to 5 HOURS	> 5 HOURS
Monday	Number of Vehicles	7	3	1	6	0	1	6	2
	% of Total	27%	12%	4%	23%	0%	4%	23%	8%
Tuesday	Number of Vehicles	8	6	4	2	1	0	2	0
	% of Total	35%	26%	17%	9%	4%	0%	9%	0%
Wednesday	Number of Vehicles	4	4	6	4	1	3	2	0
	% of Total	17%	17%	25%	17%	4%	13%	8%	0%
Thursday	Number of Vehicles	2	3	1	1	1	2	1	0
	% of Total	18%	27%	9%	9%	9%	18%	9%	0%
Friday	Number of Vehicles	3	0	3	1	1	2	0	1
	% of Total	27%	0%	27%	9%	9%	18%	0%	9%
5-Day Average	Number of Vehicles	5	4	3	3	1	2	3	1
	% of Total	26%	21%	16%	16%	5%	11%	16%	5%
LAKE LAKOTA REST AREA									
		LESS THAN 4 MIN	4 MIN to 8 MIN	> 8 MIN to 15 MIN	> 15 MIN to 30 MIN	> 30 MIN to 1 HOUR	> 1 HOUR to 3 HOURS	> 3 HOURS to 5 HOURS	> 5 HOURS
Monday	Number of Vehicles	4	4	10	4	4	5	5	4
	% of Total	10%	10%	25%	10%	10%	13%	13%	10%
Tuesday	Number of Vehicles	2	6	4	8	5	4	6	2
	% of Total	5%	16%	11%	22%	14%	11%	16%	5%
Wednesday	Number of Vehicles	4	9	11	2	3	3	1	9
	% of Total	10%	21%	26%	5%	7%	7%	2%	21%
Thursday	Number of Vehicles	5	5	6	2	3	4	4	5
	% of Total	15%	15%	18%	6%	9%	12%	12%	15%
Friday	Number of Vehicles	1	5	2	1	0	4	1	1
	% of Total	7%	33%	13%	7%	0%	27%	7%	7%
5-Day Average	Number of Vehicles	4	6	7	4	3	4	4	5
	% of Total	12%	18%	21%	12%	9%	12%	12%	15%
BIG SPUNK LAKE REST AREA									
		LESS THAN 4 MIN	4 MIN to 8 MIN	> 8 MIN to 15 MIN	> 15 MIN to 30 MIN	> 30 MIN to 1 HOUR	> 1 HOUR to 3 HOURS	> 3 HOURS to 5 HOURS	> 5 HOURS
Monday	Number of Vehicles	12	7	9	2	5	3	5	2
	% of Total	27%	16%	20%	4%	11%	7%	11%	4%
Tuesday	Number of Vehicles	8	7	5	1	5	3	1	3
	% of Total	24%	21%	15%	3%	15%	9%	3%	9%
Wednesday	Number of Vehicles	5	5	3	2	0	6	1	4
	% of Total	19%	19%	12%	8%	0%	23%	4%	15%
Thursday	Number of Vehicles	4	3	1	3	2	5	2	5
	% of Total	16%	12%	4%	12%	8%	20%	8%	20%
Friday	Number of Vehicles	4	2	1	1	3	4	0	2
	% of Total	24%	12%	6%	6%	18%	24%	0%	12%
5-Day Average	Number of Vehicles	7	5	4	2	3	5	2	4
	% of Total	23%	17%	13%	7%	10%	17%	7%	13%
SUM OF ALL THREE REST AREAS									
		LESS THAN 4 MIN	4 MIN to 8 MIN	> 8 MIN to 15 MIN	> 15 MIN to 30 MIN	> 30 MIN to 1 HOUR	> 1 HOUR to 3 HOURS	> 3 HOURS to 5 HOURS	> 5 HOURS
Monday	Number of Vehicles	23	14	20	12	9	9	16	8
	% of Total	21%	13%	18%	11%	8%	8%	14%	7%
Tuesday	Number of Vehicles	18	19	13	11	11	7	9	5
	% of Total	19%	20%	14%	12%	12%	8%	10%	5%
Wednesday	Number of Vehicles	13	18	20	8	4	12	4	13
	% of Total	14%	20%	22%	9%	4%	13%	4%	14%
Thursday	Number of Vehicles	11	11	8	6	6	11	7	10
	% of Total	16%	16%	11%	9%	9%	16%	10%	14%
Friday	Number of Vehicles	8	7	6	3	4	10	1	4
	% of Total	19%	16%	14%	7%	9%	23%	2%	9%
5-Day Average	Number of Vehicles	15	14	14	8	7	10	8	8
	% of Total	18%	17%	17%	10%	9%	12%	10%	10%

Source: BRW, Inc.

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**TABLE 5-6
PARKING LOT DWELL TIMES FOR PARTIALLY OBSERVED VEHICLES BY DAY OF THE WEEK FOR EACH REST AREA**

		IVERSON LAKE REST AREA							
		LESS THAN 4 MIN	4 MIN to 8 MIN	> 8 MIN to 15 MIN	> 15 MIN to 30 MIN	> 30 MIN to 1 HOUR	> 1 HOUR to 3 HOURS	> 3 HOURS to 5 HOURS	> 5 HOURS
Monday	Number of Vehicles	0	1	0	1	1	1	2	5
	% of Total	0%	9%	0%	9%	9%	9%	18%	45%
Tuesday	Number of Vehicles	1	2	0	0	0	3	4	10
	% of Total	5%	10%	0%	0%	0%	15%	20%	50%
Wednesday	Number of Vehicles	0	2	0	1	1	3	6	5
	% of Total	0%	11%	0%	6%	6%	17%	33%	28%
Thursday	Number of Vehicles	0	0	0	0	1	4	3	7
	% of Total	0%	0%	0%	0%	7%	27%	20%	47%
Friday	Number of Vehicles	0	0	0	1	0	0	3	3
	% of Total	0%	0%	0%	14%	0%	0%	43%	43%
5-Day Average	Number of Vehicles	1	1	0	1	1	3	4	6
	% of Total	7%	7%	0%	7%	7%	20%	27%	40%

		LAKE LAKOTA REST AREA							
		LESS THAN 4 MIN	4 MIN to 8 MIN	> 8 MIN to 15 MIN	> 15 MIN to 30 MIN	> 30 MIN to 1 HOUR	> 1 HOUR to 3 HOURS	> 3 HOURS to 5 HOURS	> 5 HOURS
Monday	Number of Vehicles	0	0	2	2	0	2	5	14
	% of Total	0%	0%	8%	8%	0%	8%	20%	56%
Tuesday	Number of Vehicles	0	1	2	1	1	3	5	10
	% of Total	0%	4%	9%	4%	4%	13%	22%	43%
Wednesday	Number of Vehicles	0	1	1	1	1	3	2	21
	% of Total	0%	3%	3%	3%	3%	10%	7%	70%
Thursday	Number of Vehicles	0	2	1	0	1	3	5	5
	% of Total	0%	12%	6%	0%	6%	18%	29%	29%
Friday	Number of Vehicles	0	0	0	1	0	3	1	10
	% of Total	0%	0%	0%	7%	0%	20%	7%	67%
5-Day Average	Number of Vehicles	0	1	2	1	1	3	4	12
	% of Total	0%	5%	9%	5%	5%	14%	18%	55%

		BIG SPUNK LAKE REST AREA							
		LESS THAN 4 MIN	4 MIN to 8 MIN	> 8 MIN to 15 MIN	> 15 MIN to 30 MIN	> 30 MIN to 1 HOUR	> 1 HOUR to 3 HOURS	> 3 HOURS to 5 HOURS	> 5 HOURS
Monday	Number of Vehicles	0	0	0	1	1	1	4	12
	% of Total	0%	0%	0%	5%	5%	5%	21%	63%
Tuesday	Number of Vehicles	0	2	0	0	1	7	0	7
	% of Total	0%	12%	0%	0%	6%	41%	0%	41%
Wednesday	Number of Vehicles	1	1	0	1	2	3	4	14
	% of Total	4%	4%	0%	4%	8%	12%	15%	54%
Thursday	Number of Vehicles	1	0	0	1	0	3	0	6
	% of Total	9%	0%	0%	9%	0%	27%	0%	55%
Friday	Number of Vehicles	0	0	0	0	1	3	4	10
	% of Total	0%	0%	0%	0%	6%	17%	22%	56%
5-Day Average	Number of Vehicles	1	1	0	1	1	4	3	10
	% of Total	5%	5%	0%	5%	5%	21%	16%	53%

		SUM OF ALL THREE REST AREAS							
		LESS THAN 4 MIN	4 MIN to 8 MIN	> 8 MIN to 15 MIN	> 15 MIN to 30 MIN	> 30 MIN to 1 HOUR	> 1 HOUR to 3 HOURS	> 3 HOURS to 5 HOURS	> 5 HOURS
Monday	Number of Vehicles	0	1	2	4	2	4	11	31
	% of Total	0%	2%	4%	7%	4%	7%	20%	56%
Tuesday	Number of Vehicles	1	5	2	1	2	13	9	27
	% of Total	2%	8%	3%	2%	3%	22%	15%	45%
Wednesday	Number of Vehicles	1	4	1	3	4	9	12	40
	% of Total	1%	5%	1%	4%	5%	12%	16%	54%
Thursday	Number of Vehicles	1	2	1	1	2	10	8	18
	% of Total	2%	5%	2%	2%	5%	23%	19%	42%
Friday	Number of Vehicles	0	0	0	2	1	6	8	23
	% of Total	0%	0%	0%	5%	3%	15%	20%	58%
5-Day Average	Number of Vehicles	1	3	2	3	3	9	10	28
	% of Total	2%	5%	4%	5%	5%	16%	18%	51%

Source: BRW, Inc.

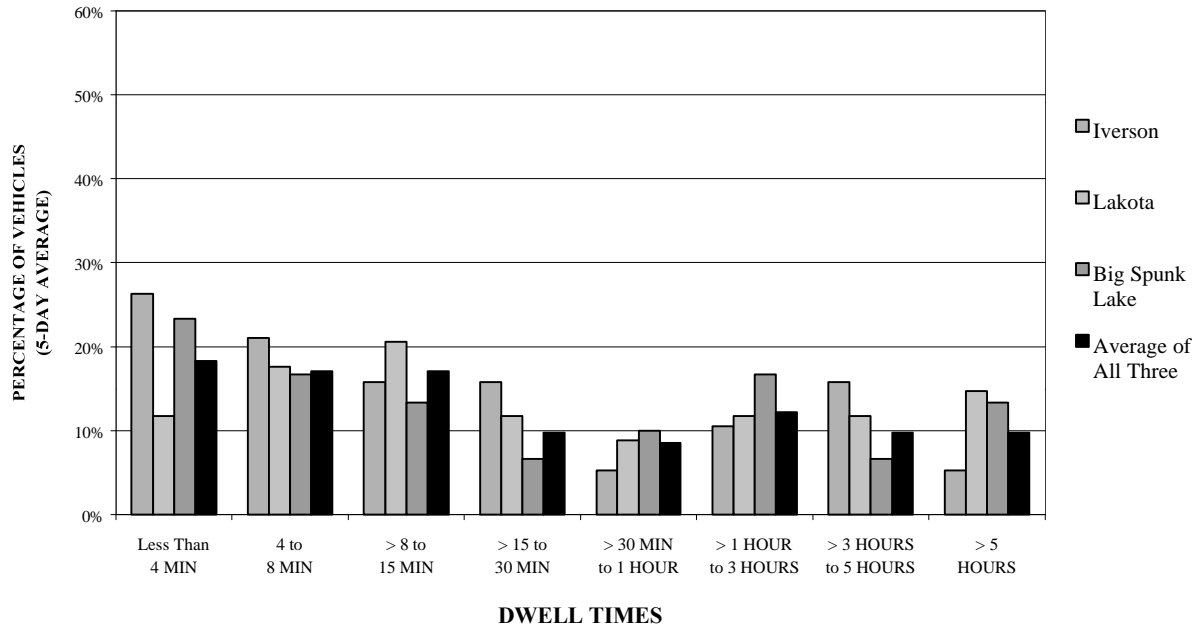
I:\SiteDevelopment\MN\prj\overnighttruck\

Figures 5-3 and 5-4 illustrate the patterns for the fully observed and partially observed groups, respectively. Both figures show the 5-day average for each individual rest area and all three combined. **Figure 5-3** shows that over 50% of the fully observed vehicles stay at the rest areas 15 minutes or less. The percentage of vehicles staying in the rest areas less than 4 minutes is 18%, on average. The percentages of vehicles staying between 4 and 8 minutes and between 8 and 15 minutes are also around 18%, on average. The partially observed vehicle data shown in **Figure 5-4** has a very different pattern than the fully observed data. **Figure 5-4** shows that approximately 50% of the partially observed vehicles stayed at the rest areas more than 5 hours. No more than 5% of partially observed vehicles stayed at any one of the rest areas less than 4 minutes. In fact, for the three rest areas as a whole, only 21% of these vehicles stayed at the rest areas less than 1 hour, on average.

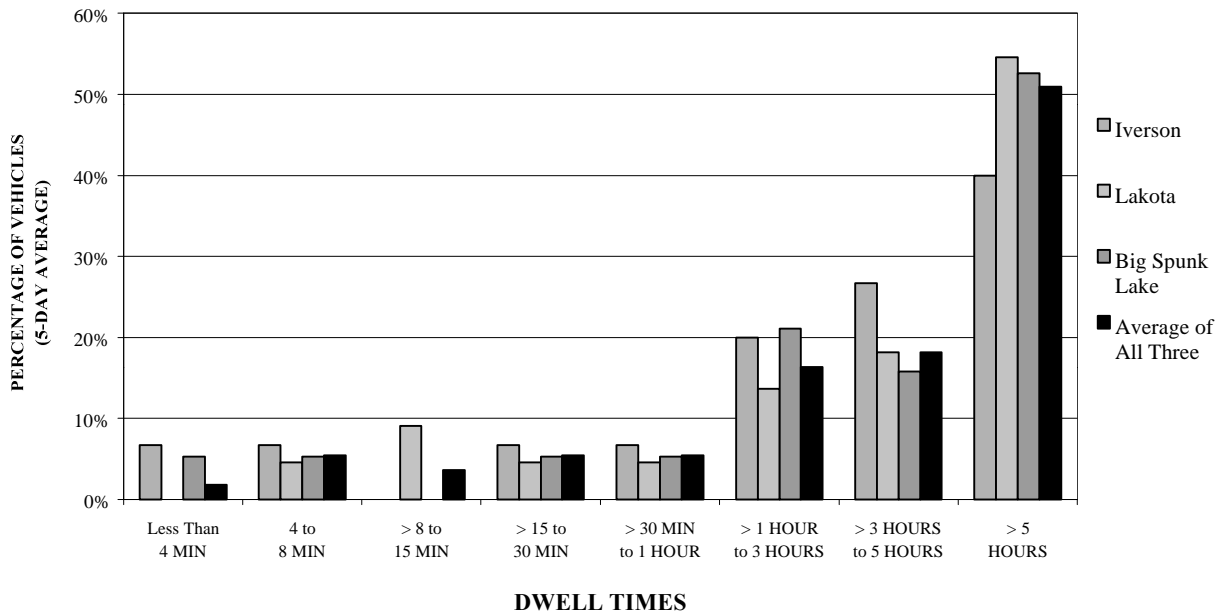
The dwell time patterns described in the preceding paragraph can be explained if lot capacity is also considered. Approximately half of the partially observed vehicles were present before 11:00 PM each day. Based on surveyor observation, these vehicles tended to be the ones that were parked in designated parking stalls. It can be inferred that many of these vehicles were parked for the remainder of the night while their operators rested. In fact, almost 60% of the oversized vehicles arriving in the rest areas before 11:00 PM stayed there for 5 hours or more.

The fully observed vehicles were those that showed up after 11:00 PM. Based on surveyor observation, the operators of these vehicles would often pull into the rest area, drive slowly through the lot looking for a parking space. If no space was available, they would either illegally park their vehicle for a brief stay of a few minutes or exit the rest area immediately. Almost 20% of the fully observed vehicles stayed at the rest areas less than 4 minutes. Another 17% stayed only between 4 and 8 minutes. Therefore, it may be inferred from the data and observation that the reason a significant percentage of the fully observed vehicles stayed in the rest area for only a few minutes is because their operators were unable to find a place to park.

**FIGURE 5-3
BREAKDOWN OF FULLY OBSERVED VEHICLE DWELL TIMES FOR EACH REST AREA**



**FIGURE 5-4
BREAKDOWN OF PARTIALLY OBSERVED VEHICLE DWELL TIMES FOR EACH REST AREA**



6.0 CONCLUSION

Based on the survey and accompanying data collection of the Iverson Lake, Lake Lakota, and Big Spunk Lake Rest areas, the following conclusions can be made:

- About 6% of the passenger vehicles and 14% of the oversized vehicles on eastbound I-94 utilize the rest areas.
- 20% of all the oversized vehicles surveyed arrived before 11:00 PM.
- 20% of all the oversized vehicles surveyed departed after 7:00 AM.
- Over the entire week for all the rest areas, the oversized lots were at or over capacity for 45% of the survey time periods examined between 11:00 PM and 7:00 AM.
- None of the rest areas were at capacity at 11:00 PM.
- Almost 60% of the oversized vehicles arriving before 11:00 PM stayed there for 5 hours or more.
- Of the oversized vehicles arriving between 11:00 PM and 7:00 AM, almost 20% stayed in the rest areas less than 4 minutes. Over 1 in 3 oversized vehicles arriving between these times stayed 8 minutes or less.

The above conclusions indicate that oversized vehicles arriving at the rest areas right before 11:00 PM tended to be able to find parking spaces. Once parked, these vehicles often stayed for most of the night. Oversized vehicles that arrived later in the evening when the lots were often fully occupied, stayed a much shorter length of time overall. Based on surveyor observation, these vehicles would often pass through the rest areas apparently looking for a parking space. When no spaces were available, these vehicles tended to exit the rest area without stopping or with only a momentary stop.