

SUMMARY OF NATIONAL AND REGIONAL TRAVEL TRENDS:
1970-1995

MAY 1996

By

Scott M. Festin
Office of Highway Information Management

UNITED STATES DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

WASHINGTON, D.C.

Abstract

Summary of National and Regional Travel Trends: 1970-1995

Scott M. Festin

This paper summarizes travel trends in the United States and five regional areas for the period 1970-1995. Travel is summarized at the annual, monthly, weekly, and daily time scales. Data sources for this study included the annual automobile travel estimates included in the Table VM-2 from Highway Statistics and traffic count data from approximately 5,000 Automatic Traffic Recorder (ATR) sites nationwide. The nation was split into 5 regions, corresponding to the regional breakdown in Traffic Volume Trends. It was found that travel has grown at approximately 3 percent per year over the past 25 years. For recent years urban travel makes up more than 60 percent of the total travel in the United States. The urban travel growth rate is slowing while rural growth rate is increasing. This shift in growth rates is also occurring at the regional level. The daily distribution of travel shows that, since 1978, traffic distribution during the day has undergone significant changes. The early morning hours (12 midnight to 4:00 a.m.) have declined as a percentage of the total ADT. The peaks in the morning and in the afternoon are increasing as a percentage of the total and the shoulders are growing into the middle of the day. The share of travel occurring during daylight hours (between 5:00 a.m. and 6:00 p.m.) has been increasing since 1978, and accounts for over 80 percent of the travel during the day.

1: Introduction and Issues

The monitoring of traffic and travel volumes has been an important aspect of transportation planning for as long as there has been demand for roads. The results of this monitoring are used for a wide variety of purposes by transportation planners and managers at all levels of government and private industry. Accurate monitoring of the traffic on the nation's highways is essential, since public money for transportation investment is becoming more and more scarce. Along with other data, traffic volume measurements are used to estimate congestion, potential air pollution production, and expectations of gas tax revenues, and they provide a general indication of the economic health of a region, and the nation as a whole.

While many analyses focus on the annual aspect of travel, there is a need for finer analysis of travel with respect to time. Travel patterns may appear similar, but, over time, the patterns will shift. With the amount of vehicle travel that takes place in the United States, even a small percentage change in travel translates to a large change in overall travel and congestion. These changes do not occur at the annual time scale, rather at the smaller time scales. This report is intended to provide that analysis. It will examine travel patterns with respect to not only yearly, but monthly, weekly, and daily, both weekday and weekend, time periods. Another important aspect of traffic monitoring that needs to be addressed is that of special travel around major holidays. This report will focus attention on highway travel around two holiday seasons, Memorial Day and Thanksgiving Day. To examine the travel trends for these holidays, the travel for the holiday week will be examined. These travel patterns will be compared to average, non-holiday travel patterns and any differences will be examined.

This report seeks to expand upon and update the Federal Highway Administration (FHWA)

publication titled Analysis of National and Regional Travel Trends (Lau, 1986). Utilizing the newest computer tools and techniques, this report will provide the users of such information an accurate estimate of the state of travel in the United States and the trends that travel has followed since 1970.

There have been some major events that, in one form or another, have shaped recent national travel demand. In the time period covered in this analysis, there have been events such as the 1974 and 1979 energy crises, the 1987 Wall Street collapse, and the 1990-91 Persian Gulf War. All of these events had impacts on travel in this country. These events will not be discussed directly; however, their effects will be noted where necessary.

Users of these traffic volume data should understand that the figures presented here represent an estimate from a sample of approximately 5,000 continuous traffic counters distributed throughout the states.

2: National Results

1: Annual Travel

There is no doubt that highway travel is increasing each year, except when economic conditions have curtailed growth. This is evident from previous research and from the perception of the American public. This section analyzes the trends that can be seen in nationwide travel from year to year.

The unit of measurement for travel, traditionally, has been the Vehicle Mile of Travel (VMT). With Federal regulations now requiring conversion to metric, this is being replaced by the Vehicle Kilometer of Travel (VKT). Both units will be used in the tables and figures in this report. One VMT (or VKT) is defined as 1 vehicle traveling 1 mile (or kilometer). Travel figures reported through the Highway Performance Monitoring System (HPMS) are calculated from traffic volumes, expanded to estimates of Annual Average Daily Traffic (AADT) from each sample section. The AADT estimates are then multiplied by 365 and by the segment length to yield an annual VMT (or VKT) estimate for the segment. Since the HPMS segments account for a known percentage of the State's total, the sample estimates are then expanded to estimate total statewide VMT (or VKT).

Table 2.1.1 contains the data analyzed for this section, both in miles and kilometers. All of these data were extracted from the revised VM-2 tables from Highway Statistics. Some clear trends can be seen in these tables. Urban travel growth is still out pacing rural travel growth. Total travel in the U.S. between 1970 and 1995 grew at an annual rate of 3.16 percent per year. Urban travel increased by 3.90 percent while rural travel increased by 2.23 percent. Comparing

Table 2.1.1: Nationwide Travel, 1970-1995 (Billions)

Year	Rural				Urban				Total			
	VMT	VKT	% Total	% Change	VMT	VKT	% Total	% Change	VMT	VKT	% Change	
1970	539.47	868.55	48.61%	--	570.25	918.10	51.39%	--	1,109.72	1,786.65	--	
1971	572.77	922.16	48.59%	6.17%	606.05	975.74	51.41%	6.28%	1,178.82	1,897.90	6.23%	
1972	589.78	949.55	46.82%	2.97%	670.00	1,078.70	53.18%	10.55%	1,259.78	2,028.25	6.87%	
1973	605.80	975.34	46.13%	2.72%	707.31	1,138.77	53.87%	5.57%	1,313.11	2,114.11	4.23%	
1974	585.35	942.41	45.71%	-3.38%	695.19	1,119.26	54.29%	-1.71%	1,280.54	2,061.67	-2.48%	
1975	601.66	968.67	45.32%	2.79%	726.01	1,168.88	54.68%	4.43%	1,327.67	2,137.55	3.68%	
1976	627.10	1,009.63	44.72%	4.23%	775.29	1,248.22	55.28%	6.79%	1,402.39	2,257.85	5.63%	
1977	654.09	1,053.08	44.59%	4.30%	812.93	1,308.82	55.41%	4.85%	1,467.02	2,361.90	4.61%	
1978	686.26	1,104.88	44.43%	4.92%	858.45	1,382.10	55.57%	5.60%	1,544.71	2,486.98	5.30%	
1979	670.08	1,078.83	43.82%	-2.36%	859.05	1,383.07	56.18%	0.07%	1,529.13	2,461.90	-1.01%	
1980	672.03	1,081.97	44.00%	0.29%	855.27	1,376.98	56.00%	-0.44%	1,527.30	2,458.95	-0.12%	
1981	685.93	1,104.35	43.61%	2.07%	886.87	1,427.86	56.39%	3.69%	1,572.80	2,532.21	2.98%	
1982	689.23	1,109.66	43.21%	0.48%	905.78	1,458.31	56.79%	2.13%	1,595.01	2,567.97	1.41%	
1983	700.52	1,127.84	42.38%	1.64%	952.27	1,533.15	57.62%	5.13%	1,652.79	2,660.99	3.62%	
1984	718.13	1,156.19	41.75%	2.51%	1,002.14	1,613.45	58.25%	5.24%	1,720.27	2,769.63	4.08%	
1985	730.20	1,175.62	41.16%	1.68%	1,043.98	1,680.81	58.84%	4.18%	1,774.18	2,856.43	3.13%	
1986	747.78	1,203.93	40.75%	2.41%	1,087.09	1,750.21	59.25%	4.13%	1,834.87	2,954.14	3.42%	
1987	780.45	1,256.52	40.62%	4.37%	1,140.75	1,836.61	59.38%	4.94%	1,921.20	3,093.13	4.70%	
1988	817.53	1,316.22	40.35%	4.75%	1,208.43	1,945.57	59.65%	5.93%	2,025.96	3,261.80	5.45%	
1989	847.23	1,364.04	40.41%	3.63%	1,249.23	2,011.26	59.59%	3.38%	2,096.46	3,375.30	3.48%	
1990	868.88	1,398.90	40.52%	2.56%	1,275.48	2,053.52	59.48%	2.10%	2,144.36	3,452.42	2.28%	
1991	883.55	1,422.52	40.68%	1.69%	1,288.50	2,074.49	59.32%	1.02%	2,172.05	3,497.00	1.29%	
1992	884.10	1,423.40	39.34%	0.06%	1,363.05	2,194.51	60.66%	5.79%	2,247.15	3,617.91	3.46%	
1993	886.83	1,427.80	38.61%	0.31%	1,409.87	2,269.89	61.39%	3.43%	2,296.70	3,697.69	2.21%	
1994	909.42	1,464.17	38.53%	2.55%	1,450.57	2,335.42	61.47%	2.89%	2,359.99	3,799.58	2.76%	
1995	930.80	1,498.59	38.73%	2.35%	1,472.30	2,370.40	61.27%	1.50%	2,403.10	3,868.99	1.83%	
			MEAN 70-95	2.23%			MEAN 70-95	3.90%			MEAN 70-95	3.16%
			MEAN 70-84	2.10%			MEAN 70-84	4.16%			MEAN 70-84	3.22%
			MEAN 85-95	2.40%			MEAN 85-95	3.57%			MEAN 85-95	3.09%

the periods 1970-1984 and 1985-1995, the average rural growth rate increased from 2.10 percent to 2.40 percent while the urban growth rate declined from 3.90 percent to 3.57 percent. This may be an indication that the growth in urban travel is beginning to slow, while growth in rural travel is on the increase, but the figures are influenced by changes in urban boundaries after each census.

Figure 2.1.1 is a representation of the rural, urban, and total travel for the nation for the period 1970-1995. The dominance of the urban travel clearly can be seen, as it now accounts for more than 61 percent of the total travel in the country. The previously mentioned change in urban and rural growth rates can begin to be seen in the latter years (1992-1995), as the urban line begins to flatten while the rural line begins to climb.

Figure 2.1.2 shows graphically the average annual travel change for the years 1970-71 to 1994-95. In this figure, some of the major events in the last 25 years can be seen. The two energy crises of 1974 and 1979 correspond with the major valleys. Another significant feature of this figure is the impact of census definitions between 1980 and 1990. The redefinition of urbanized areas is especially evident between 1991 and 1992, and, to a lesser degree, between 1980 and 1981.

Figure 2.1.3 shows a comparison of travel to per capita Gross Domestic Product (GDP). The relationship between travel and the GDP is very close, and it would appear that economic indicators could yield a close estimate of travel in the United States, and vice versa.

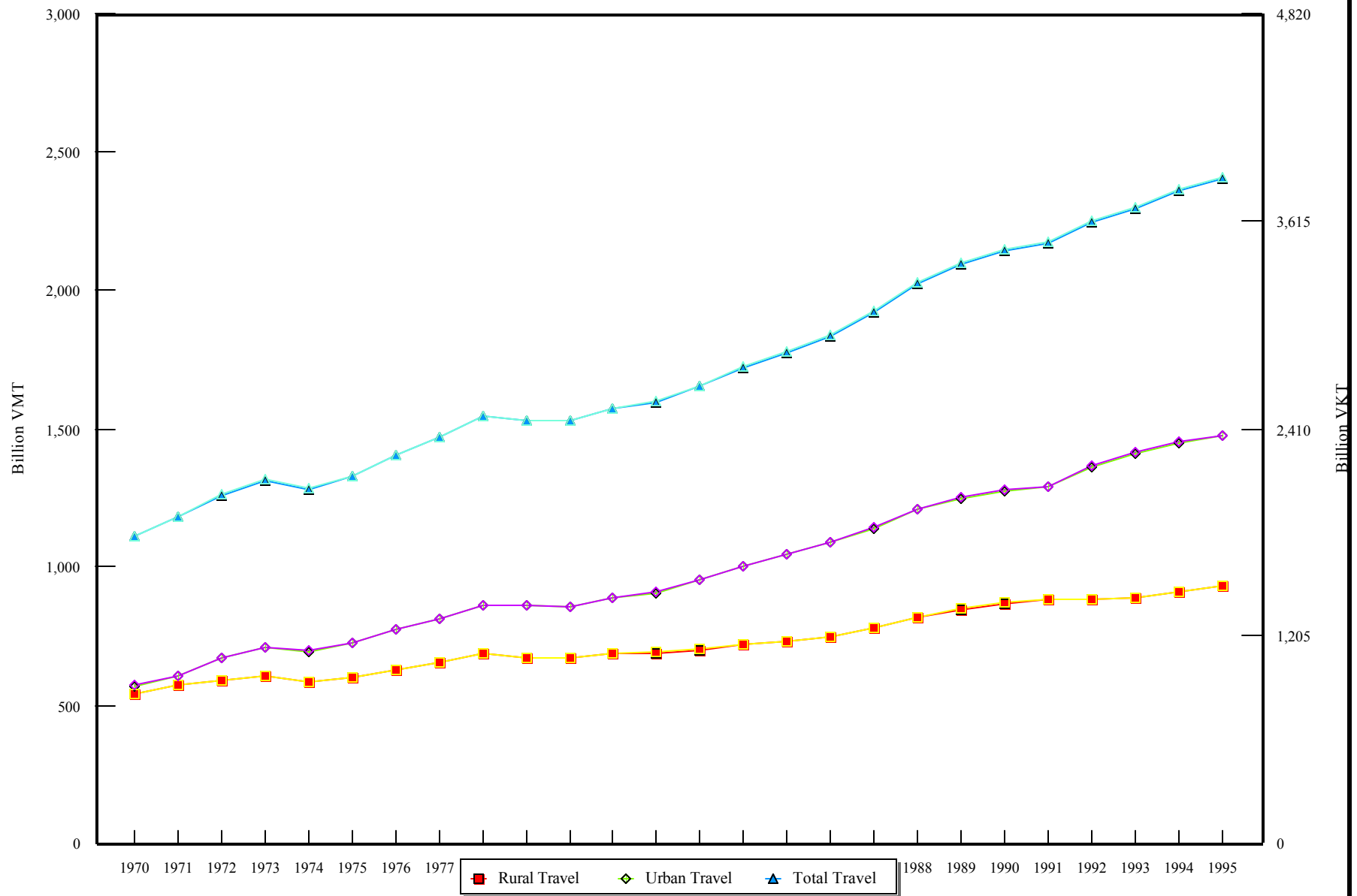


Figure 2.1.1: Annual Travel, 1970-1995

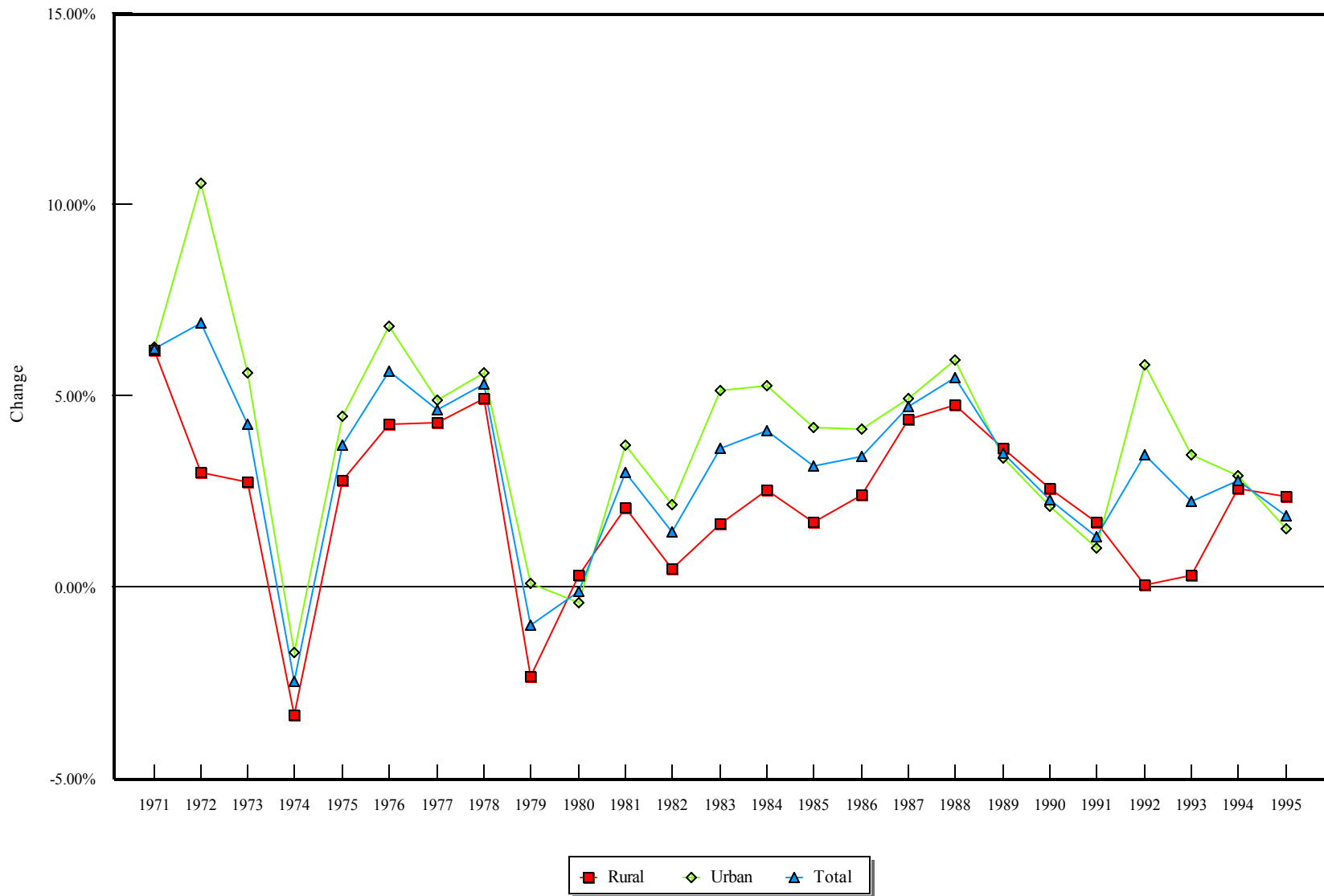


Figure 2.1.2: Percent Change in Travel, 1970-1995

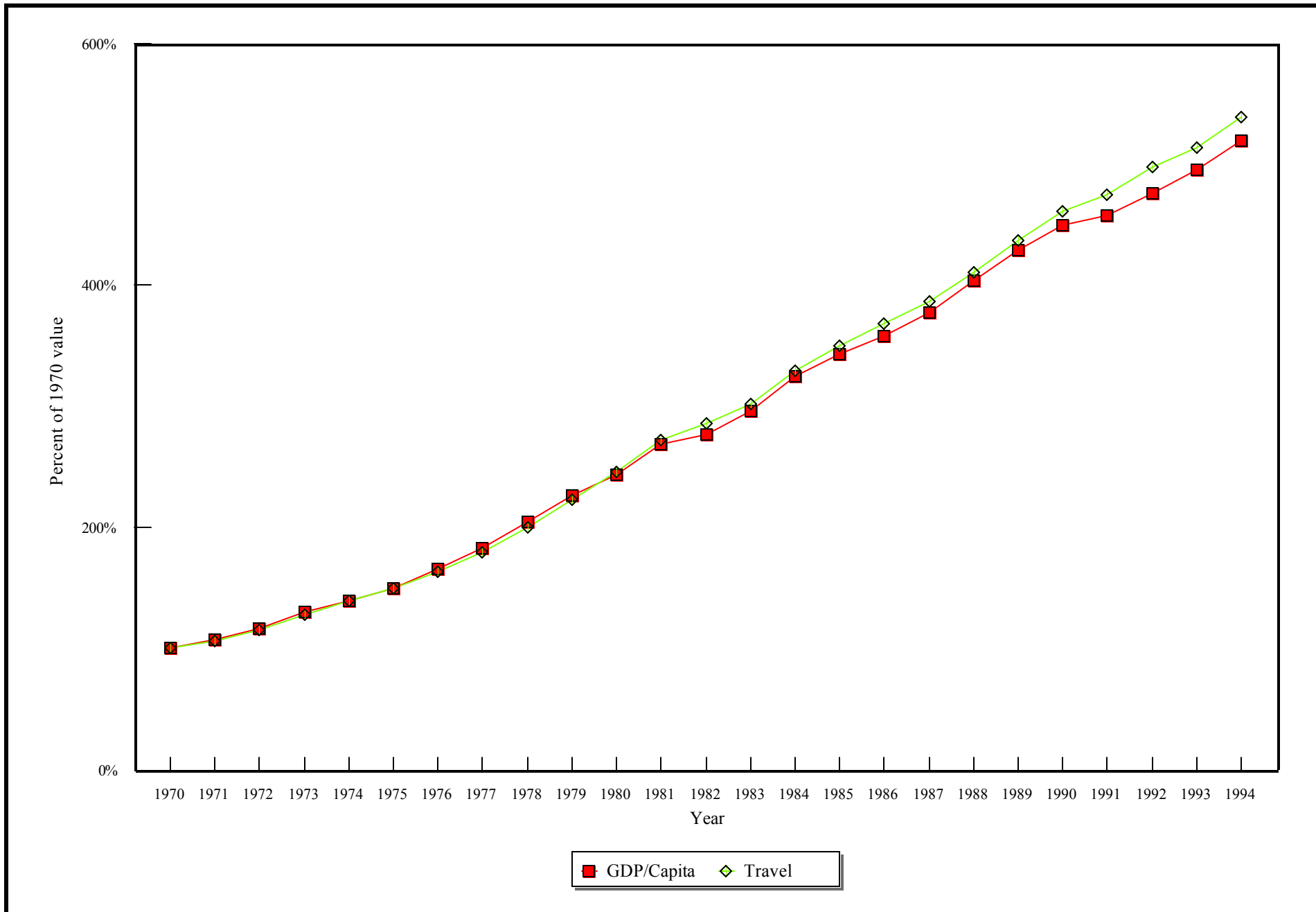


Figure 2.1.3: Travel vs. GDP per Capita, 1970-1994

2: Monthly Travel

The annual aspect of travel has been well documented; travel continues to increase over time. However, monthly fluctuations during the year need to be examined. This section will address the month-to-month variation that exists in the travel patterns in the United States.

Figure 2.2.1 shows the monthly fluctuation of travel. This chart represents the average daily travel for each month. This is calculated by dividing the total amount of travel for each month by the number of days in each month. This yields a normalized figure of travel per day for each month. The graph represents the average for the entire 25 year study period, from 1970 through 1995. As can be seen from the graph, the peak month for travel in the United States is August. The low point of travel in the United States comes in the winter, during January.

Figure 2.2.2 shows the comparison of urban travel to rural travel throughout the year. As can be seen, urban travel and rural travel follow different patterns throughout the year. There is less seasonal variation in the urban element of travel than in the rural. The urban travel remains relatively consistent from month to month while the rural element of travel has wide seasonal variations from summer to winter.

Figure 2.2.3 shows the comparison of the annual travel pattern by the two time periods examined in this report. The patterns appear to be similar for the two time periods. January represents the lowest period of travel, while the peak is in August. The decline from August to September appears to be slowing. Overall, though, the pattern appears to remain constant.

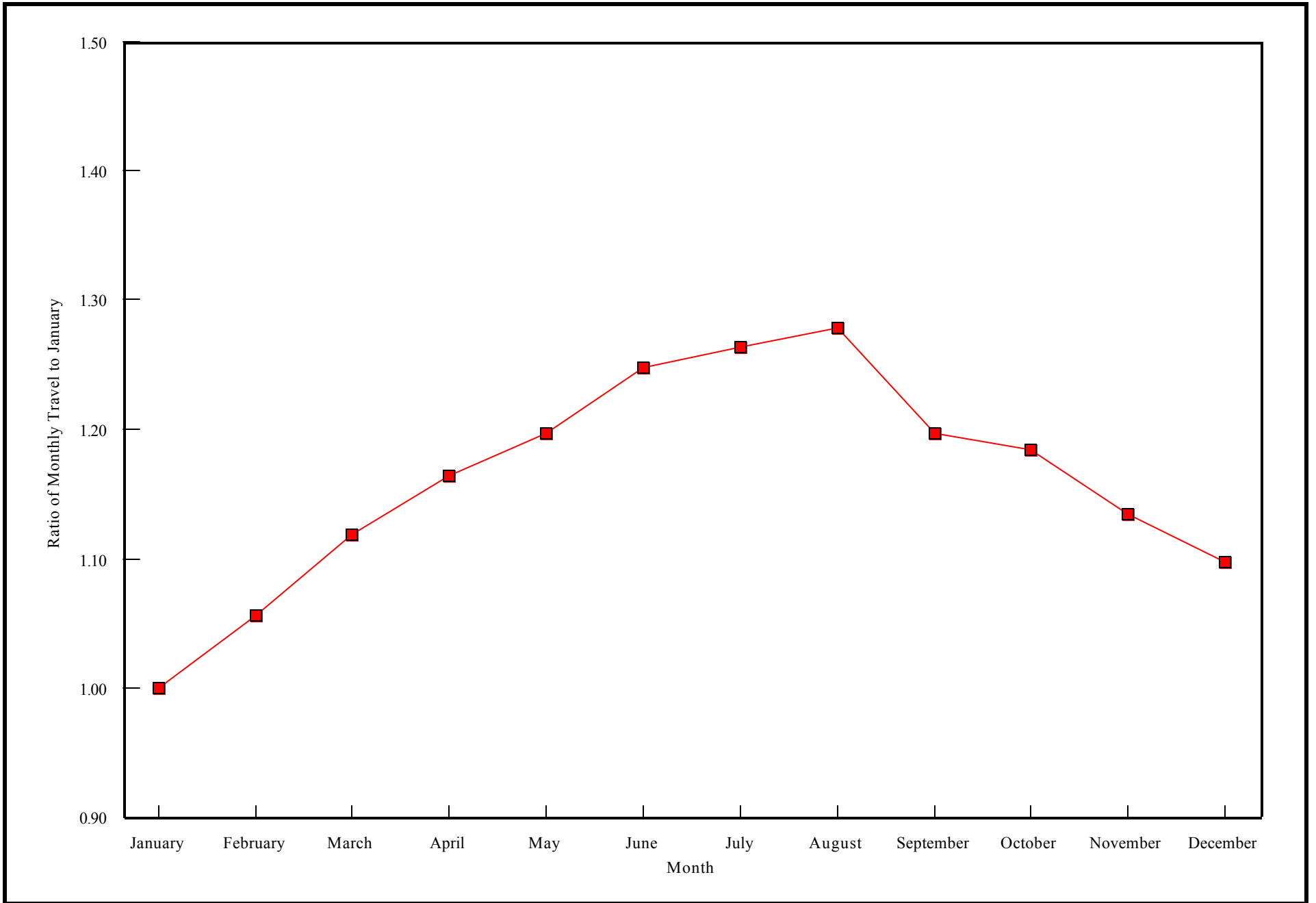


Figure 2.2.1: Travel by Month, 1970-1995 (January = 1.0)

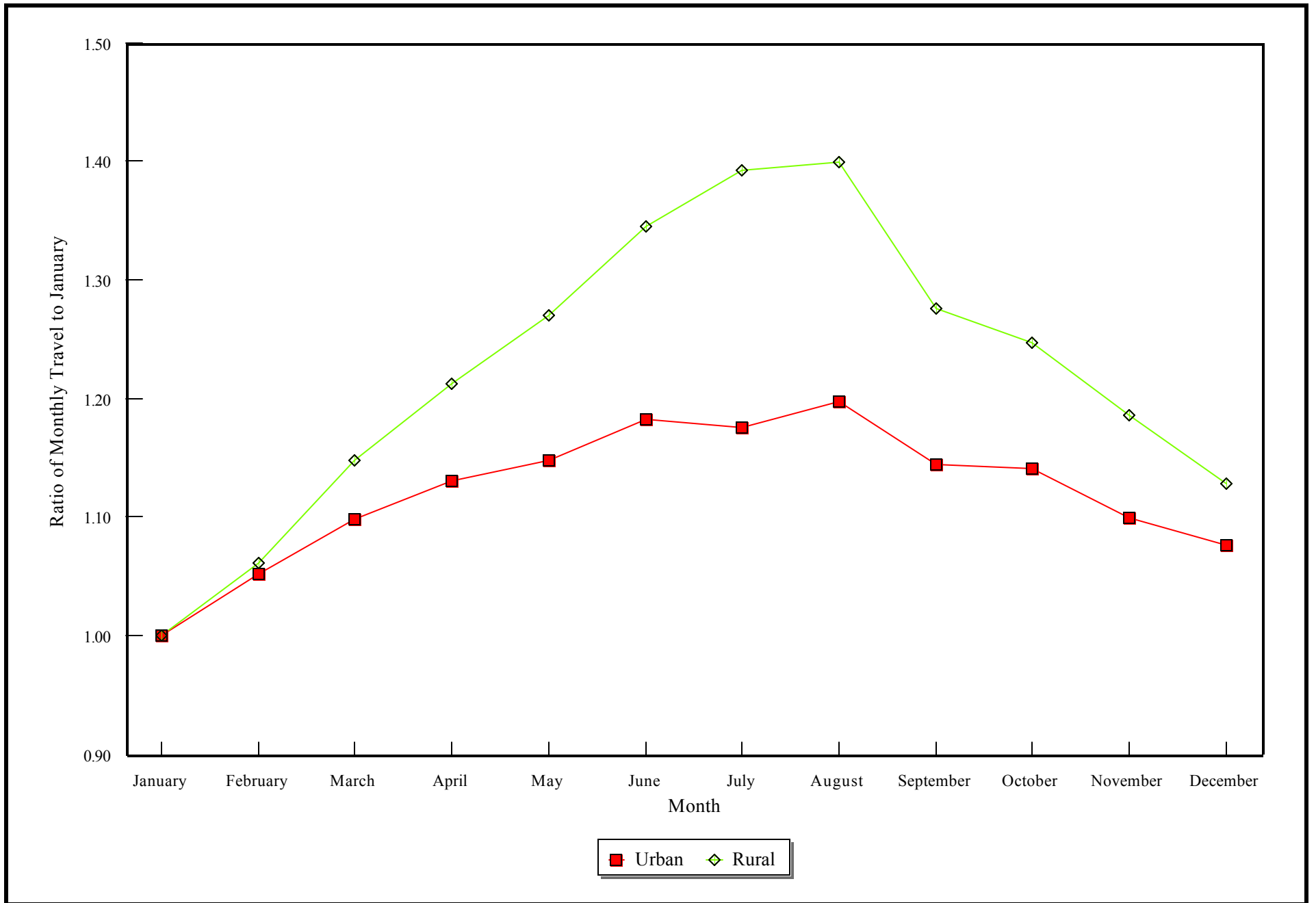


Figure 2.2.2: Urban and Rural Travel by Month, 1970-1995 (January = 1.0)

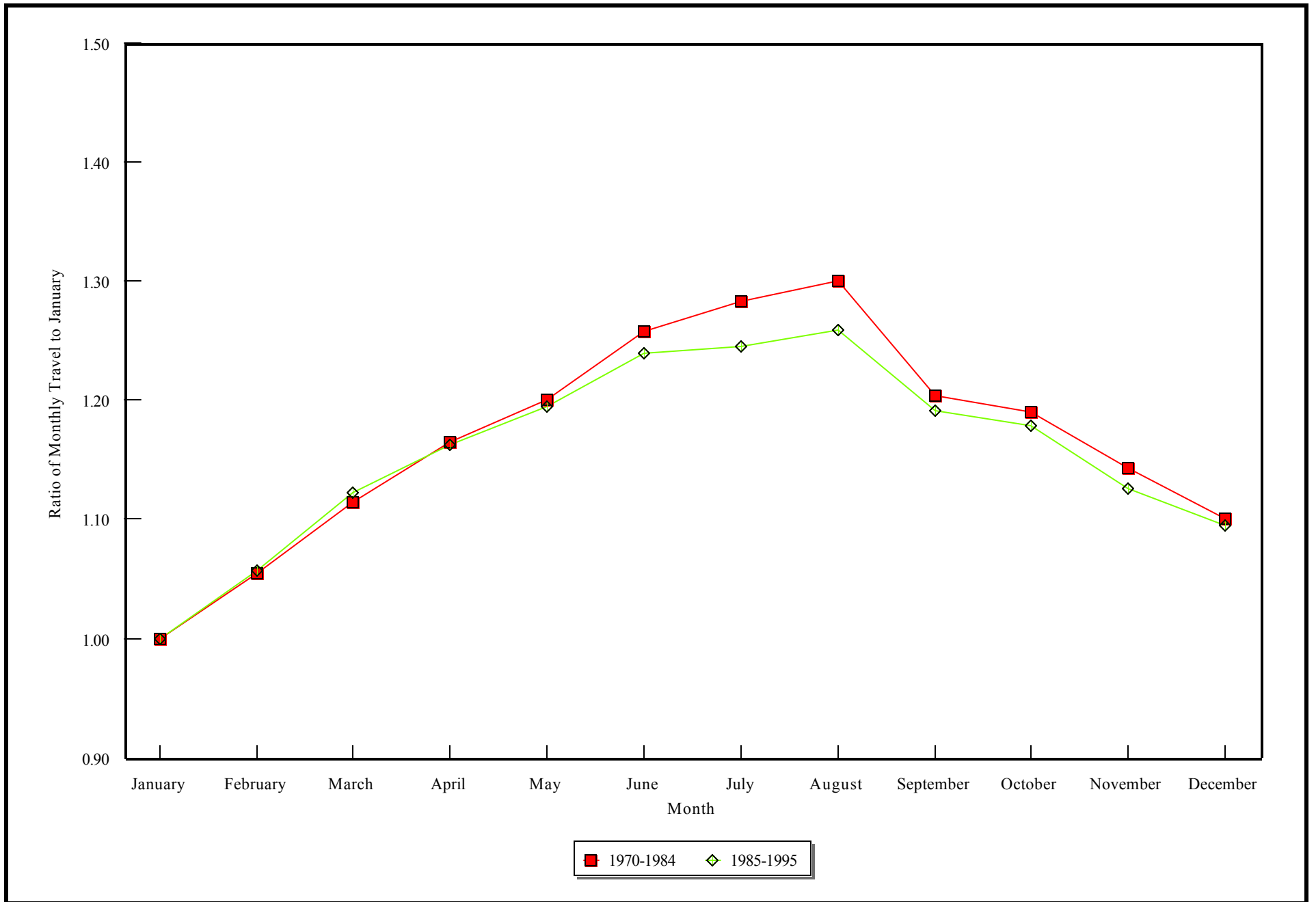


Figure 2.2.3: Daily Travel by Month, 1970-1984 vs 1985-1995 (January = 1.0)

3: Weekly Travel

In this section, the unit of analysis will shift from VMT to traffic volumes taken from permanent counters. The data source for this section are the hourly ATR files for 1992 and 1995, submitted to the FHWA by the states in support of Traffic Volume Trends.

The weekly pattern for the nationwide analysis remains constant over the two study years. All of the charts in this section show the traffic pattern, measured as a percent of the average weekly traffic that occurs during any given hour. The graphs all run from Sunday to Saturday and measure each hour as a percent of the weekly total. In this way, all of the graphs are normalized.

Figures 2.3.1 and 2.3.2 show the nationwide, weekly traffic patterns, urban and rural, in the two study years. From these figures, it can be seen that days of the week follow distinct patterns. The weekday pattern is characterized by two peaks, one in the morning and a higher one in the afternoon. These peaks will be discussed in more detail in the daily travel section. Saturday and Sunday have distinct patterns as well. Saturday has a peak in the morning, while Sunday has a peak in the afternoon. The highest peak of travel during the week occurs on Friday afternoon. The analysis of Friday traffic can present a dilemma because Friday travel has characteristics of weekend and weekday travel. Some States classify Friday as a weekend, some classify only the afternoon as part of the weekend, while most still consider it part of the weekday traffic. For this study, Friday was considered as part of the work week, not the weekend.

Figures 2.3.3 and 2.3.4 show the rural and urban weekly patterns for the two study years. There is little change from 1992 to 1995 except in the rural Sunday travel. From 1992 to 1995,

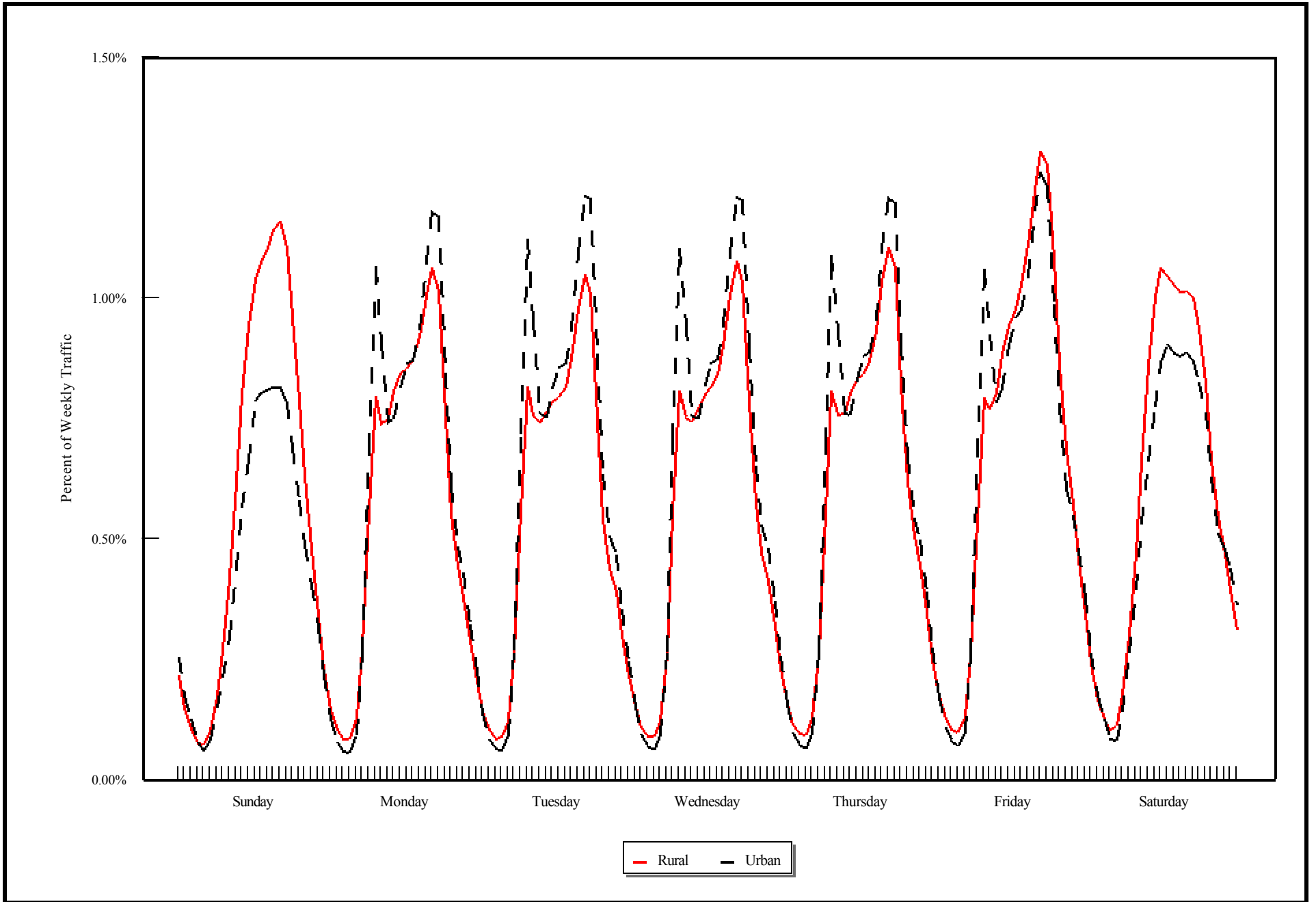


Figure 2.3.1: 1992 Weekly Traffic Pattern

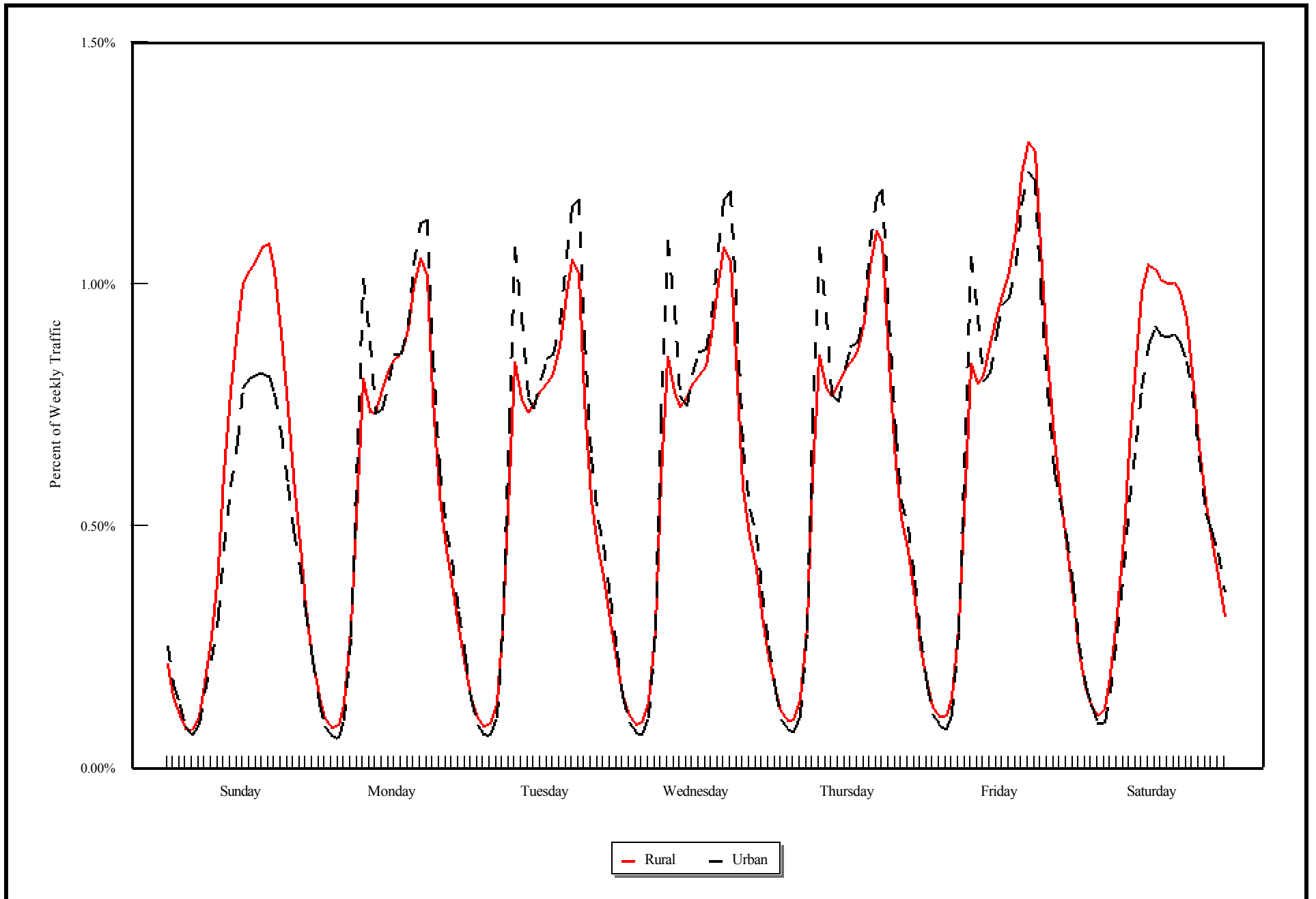


Figure 2.3.2: 1995 Weekly Traffic Pattern

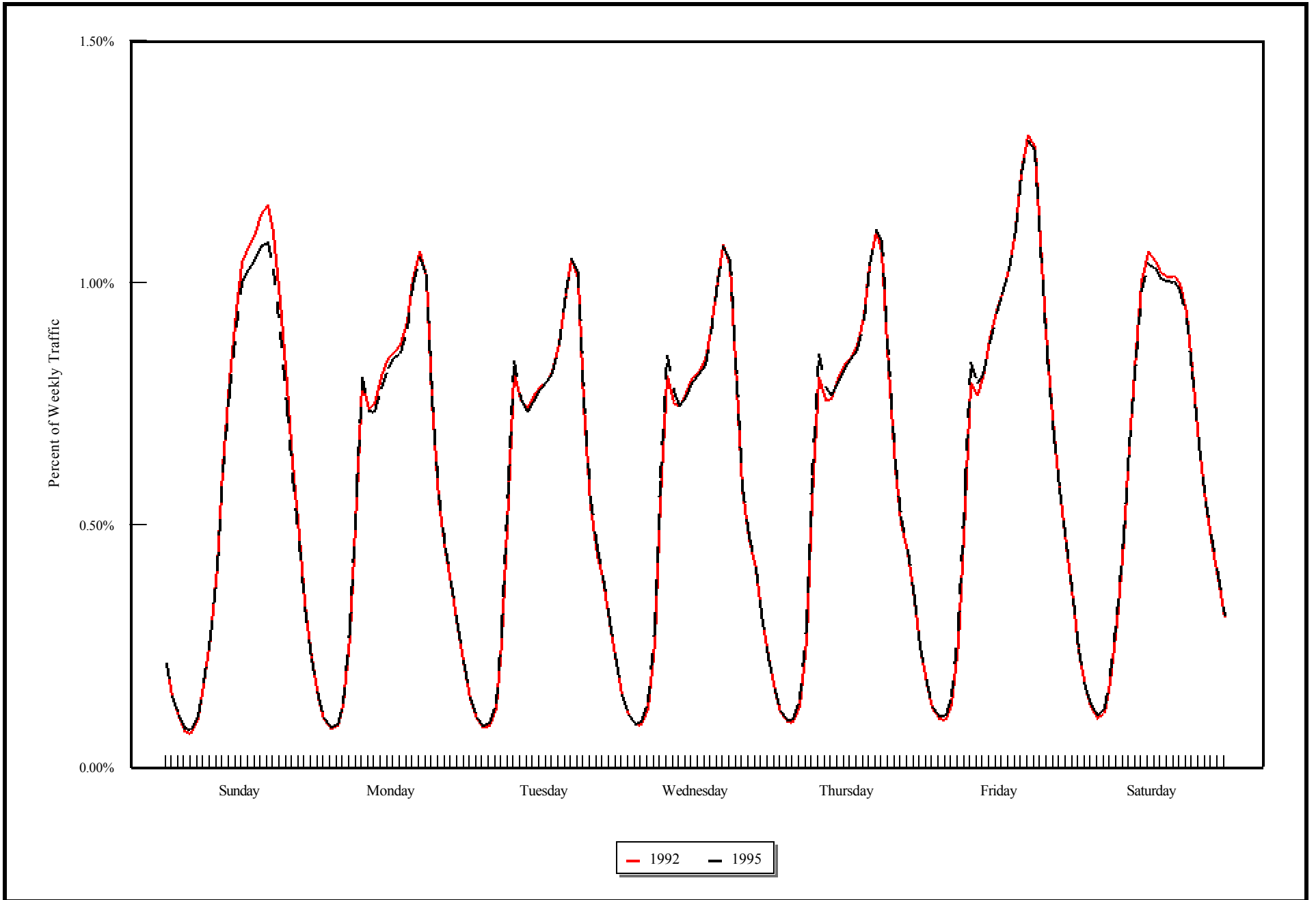


Figure 2.3.3: Rural Weekly Pattern, 1992 vs. 1995

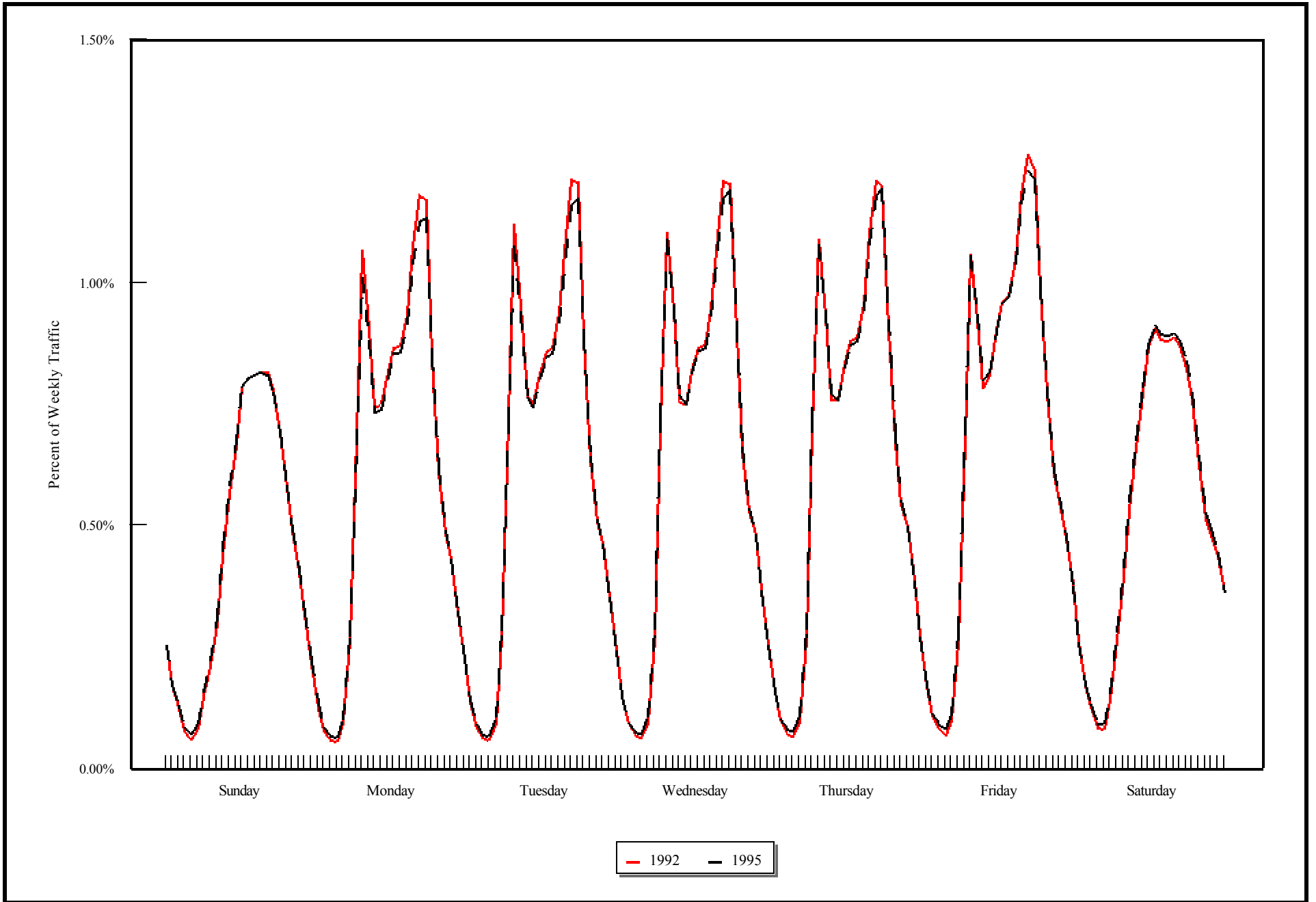


Figure 2.3.4: Urban Weekly Pattern, 1992 vs. 1995

the percent pattern decreases during the middle of the day. The rural pattern also shows higher peaks in the weekday mornings. Overall, however, it appears that the weekly patterns are remaining stable, with no large changes.

4: Daily Travel

This section will focus on the daily distribution of traffic. The data for this section also come from the State ATR records. The unit of measurement for this section will be AADT. The data have all been normalized to percentage of AADT for each category. As congestion mitigation and air quality issues become major factors for local metropolitan planning organizations (MPOs) and other planning organizations, possession of accurate and up-to-date hourly distributions of traffic will become an increasingly important aspect of local and regional planning. The traffic data presented here represent national averages and are not location specific. They were obtained by averaging hourly counts from approximately 5,000 ATR stations across the country.

Figure 2.4.1 shows the pattern for weekday and weekend travel in 1992. Notice the distinct pattern that marks the weekdays. The low point of the day is at 3:00 a.m., with less than 1 percent of the AADT measured between 3:00 and 4:00 a.m. By 5:00 a.m., the morning rush is beginning. Between 5:00 and 7:00 a.m., the amount of traffic more than triples, from less than 2 percent to more than 6 percent. Between 7:00 and 9:00 a.m. traffic drops off to about 5 percent. Traffic then begins building again and continues throughout the rest of the morning and into the afternoon. Traffic increases steadily from 9:00 a.m. to 4:00 p.m. Traffic peaks during the 4:00 p.m. hour with approximately 8 percent of the AADT. Traffic then drops sharply until 7:00 p.m. when it diminishes more slowly.

Weekends also have a distinct pattern. The weekend traffic distribution is similar to a bell curve. The weekend low point is at 4:00 a.m., with less than 1 percent of the AADT. Traffic builds steadily throughout the day to peak at 3:00 p.m. Traffic then diminishes at

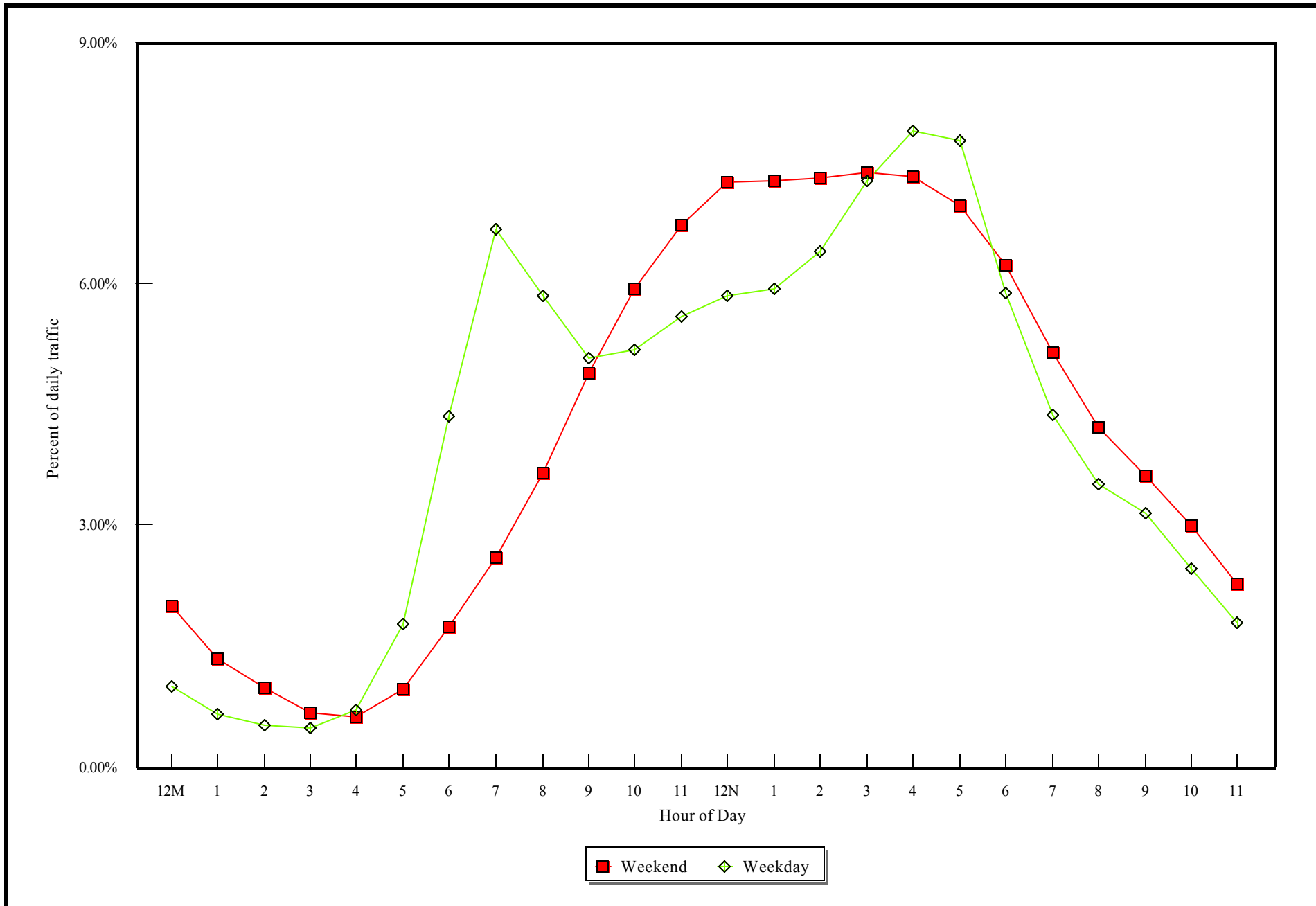


Figure 2.4.1: Weekday vs Weekday Traffic Patterns

approximately the same rate that it increased.

Figure 2.4.2 shows the 1995 daily traffic patterns. The patterns remain similar to those of 1992.

Figure 2.4.3 shows a comparison of the weekday patterns for four calendar years: 1978, 1983, 1992, and 1995. At first glance, these patterns appear to be similar. Closer inspection, however, shows some major changes occurring in the daily distribution of traffic. There are two main points that need elaboration. First, and probably most obvious, is the rising afternoon peak. The peak hour of traffic is still between 4:00 and 5:00 p.m., but the peak is getting higher. In 1978, the afternoon peak accounted for approximately 7.1 percent of the AADT. That increased to 7.5 percent in 1983, 7.9 percent in 1992, but dropped to 7.7 percent in 1995. That represents an 11 percent increase in the afternoon peak hour between 1978 and 1992.

The second point is the amount of traffic in the early morning, between midnight and 4:00 a.m. The percentage of daily traffic that takes place at this time of day has been steadily decreasing. This has the effect of shifting a larger portion of traffic to the middle part of the day. Indeed, the percentage of travel occurring between the hours of 5:00 a.m. and 6:00 p.m. has increased from 74.1 percent in 1978 to 80.4 percent in 1995. The effect of these two trends is that travel during the middle of the day is becoming more difficult, due to increased congestion. Traffic begins to increase at 10:00 a.m., and builds steadily until 4:00 p.m. The weekday morning rush hour starts at the same time but lasts later into the day.

Figure 2.4.4 shows the weekend travel patterns for the same 4 years. The same basic trend examined above is present in the weekend travel as well. The percentage of travel in the early morning hours shows a significant decline while the percent of travel during the middle of

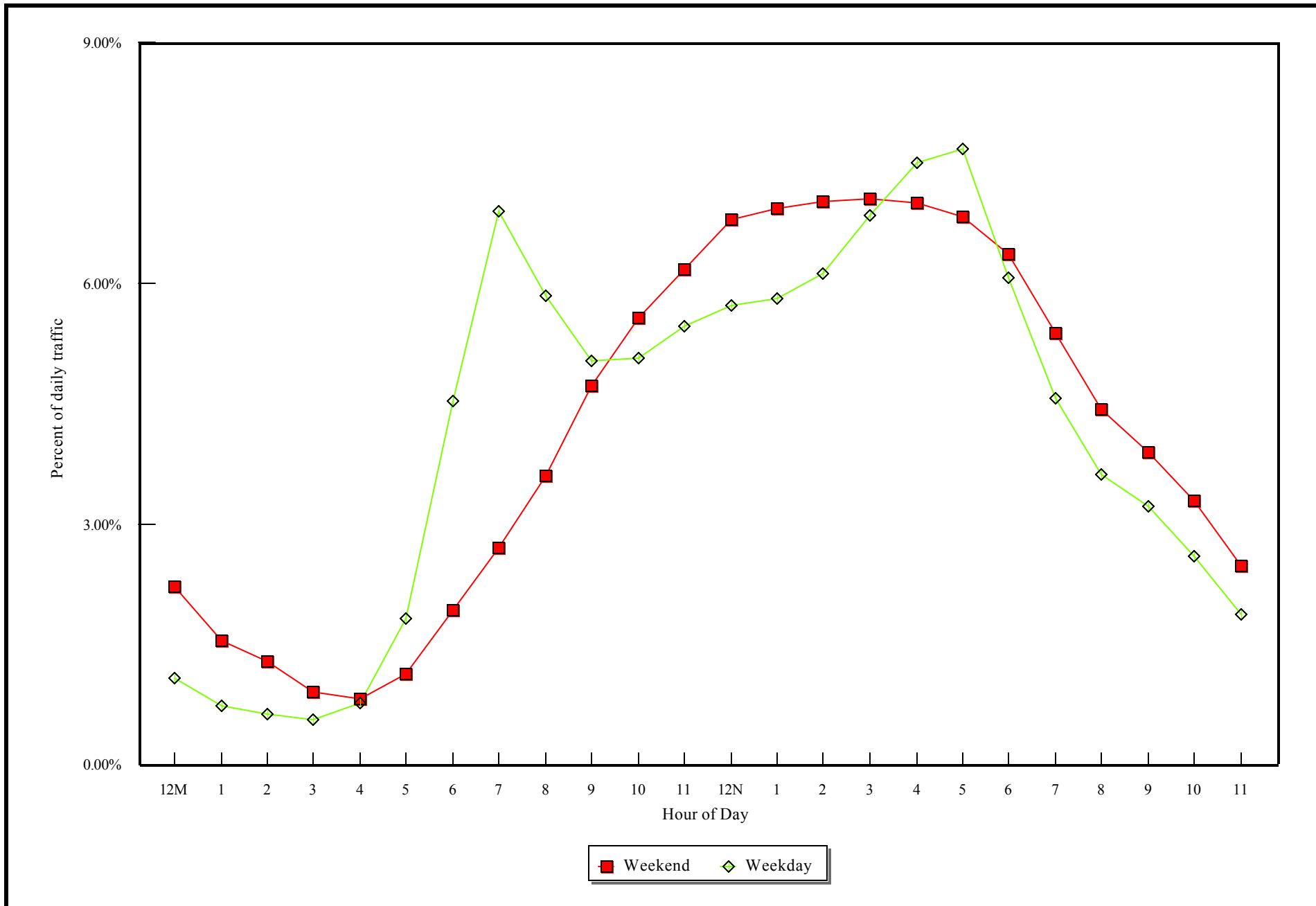


Figure 2.4.2: 1995 Weekend vs Weekday Traffic Patterns

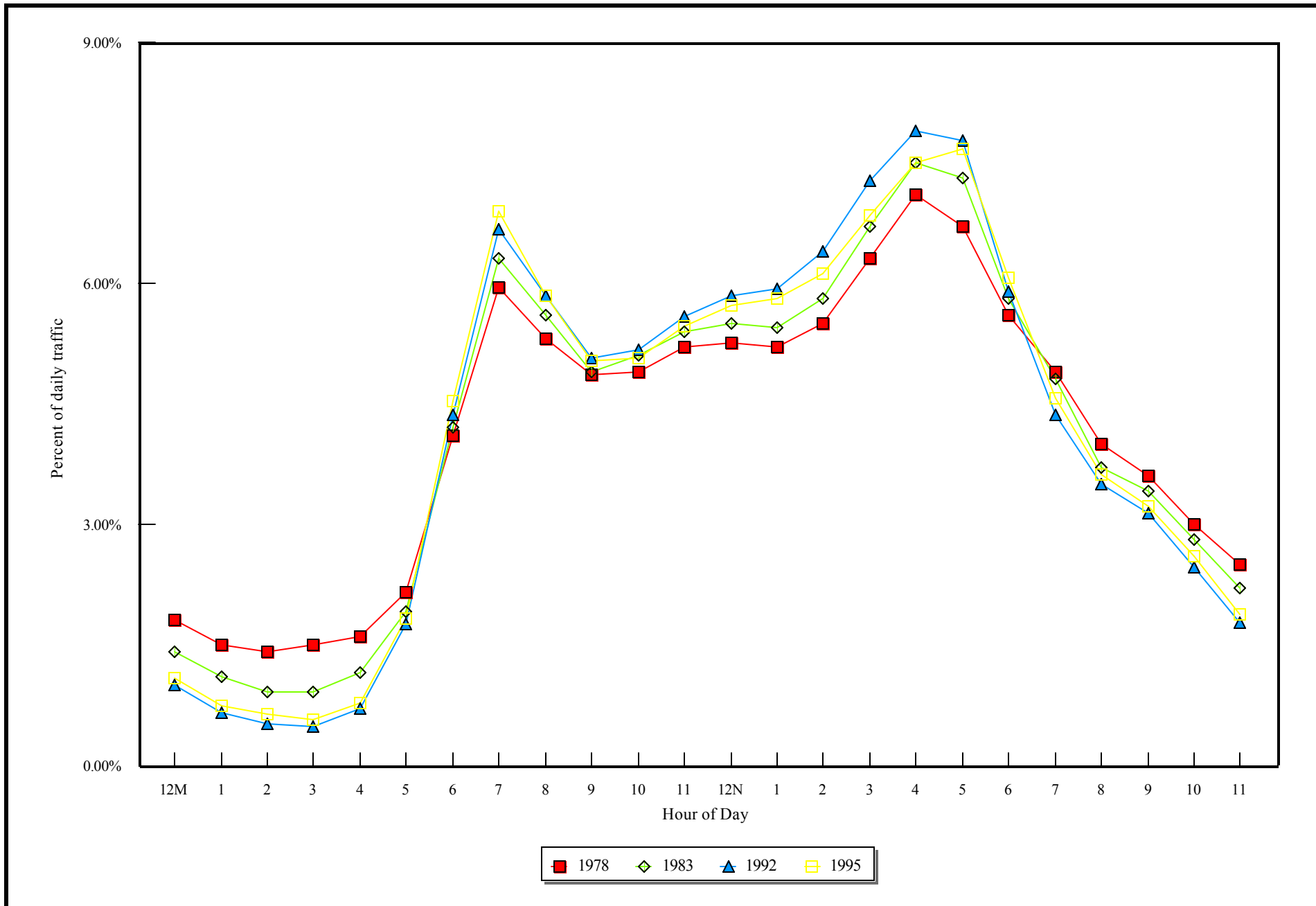


Figure 2.4.3: Weekday Traffic, 1978-1995

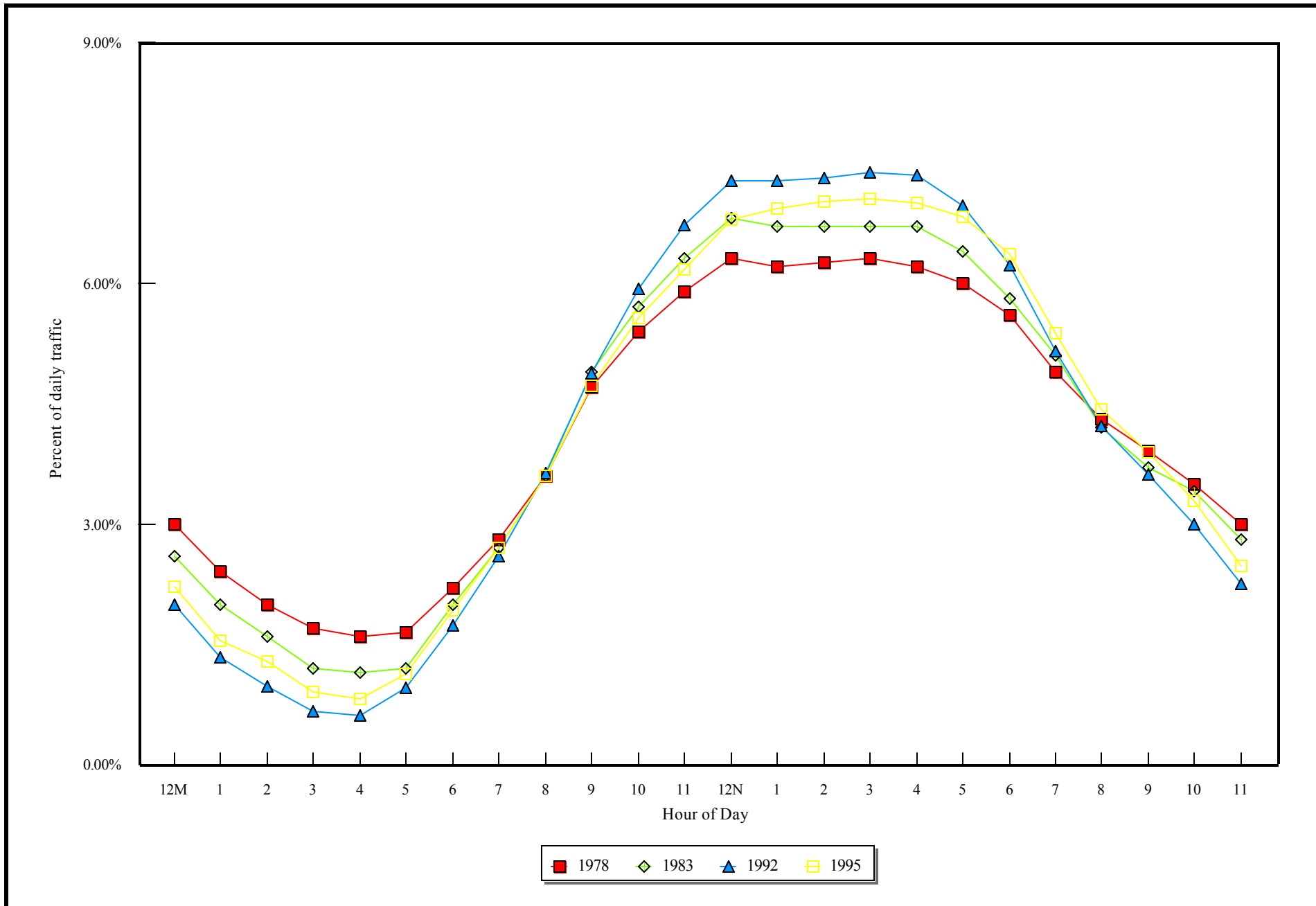


Figure 2.4.4: Weekend Traffic 1978-1995

the day is expanding rapidly. This pattern shows the same effect as the weekday pattern, travel is becoming increasingly concentrated in the middle of the day.

Figure 2.4.5 shows the rural weekday pattern. It shows the same basic pattern as the total weekday pattern for all systems (Figure 2.4.3). The morning peak is higher and lasts longer into the day. The afternoon peak is higher and travel begins to increase earlier in the day. The afternoon peak hour has shifted from 4:00 to 5:00 p.m. The percentage of traffic drops off steadily after 5:00 p.m. Early morning traffic percentage is dropping off as well.

Figure 2.4.6 shows rural weekend traffic. The bell curve shape is typical of the average weekend traffic pattern. The early morning share is steadily decreasing while the afternoon peak is showing marked increases. The peak hour is at 3:00 p.m., with 7.6 percent of the AADT. The low point of the rural weekend day is at 4:00 a.m., with only 0.66 percent of the AADT occurring in that hour.

Figure 2.4.7 is one of the most important figures in this report. It shows the typical urban weekday traffic pattern. Urban travel comprises the majority of travel in this country. If urban travel continues to increase in the daylight hours, the frequency and severity of congestion will also increase.

Figure 2.4.8 shows the urban weekend traffic pattern. In this figure, a true shift can be seen. The afternoon peak has increased and has moved from 12:00 noon in 1978 to 4:00 p.m. in 1995. The early morning has decreased since 1978 as well.

The overall trend can be summarized as follows: weekday travel is becoming increasingly concentrated between the hours of 5:00 a.m. and 6:00 p.m. The afternoon peak is spreading, but it is spreading faster into the middle of the day than into the evening hours. The difference is

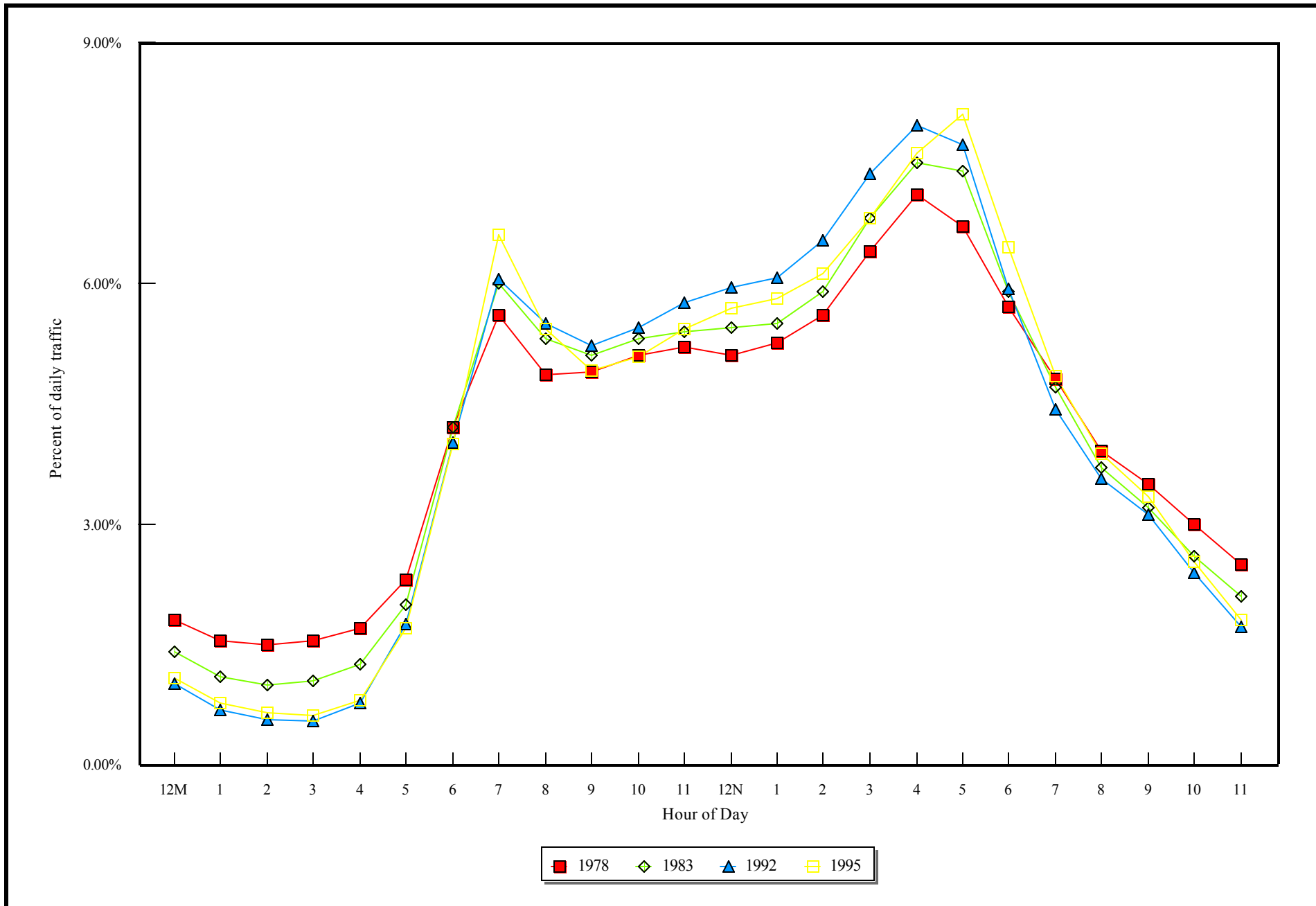


Figure 2.4.5: Weekday Rural Traffic, 1978-1995

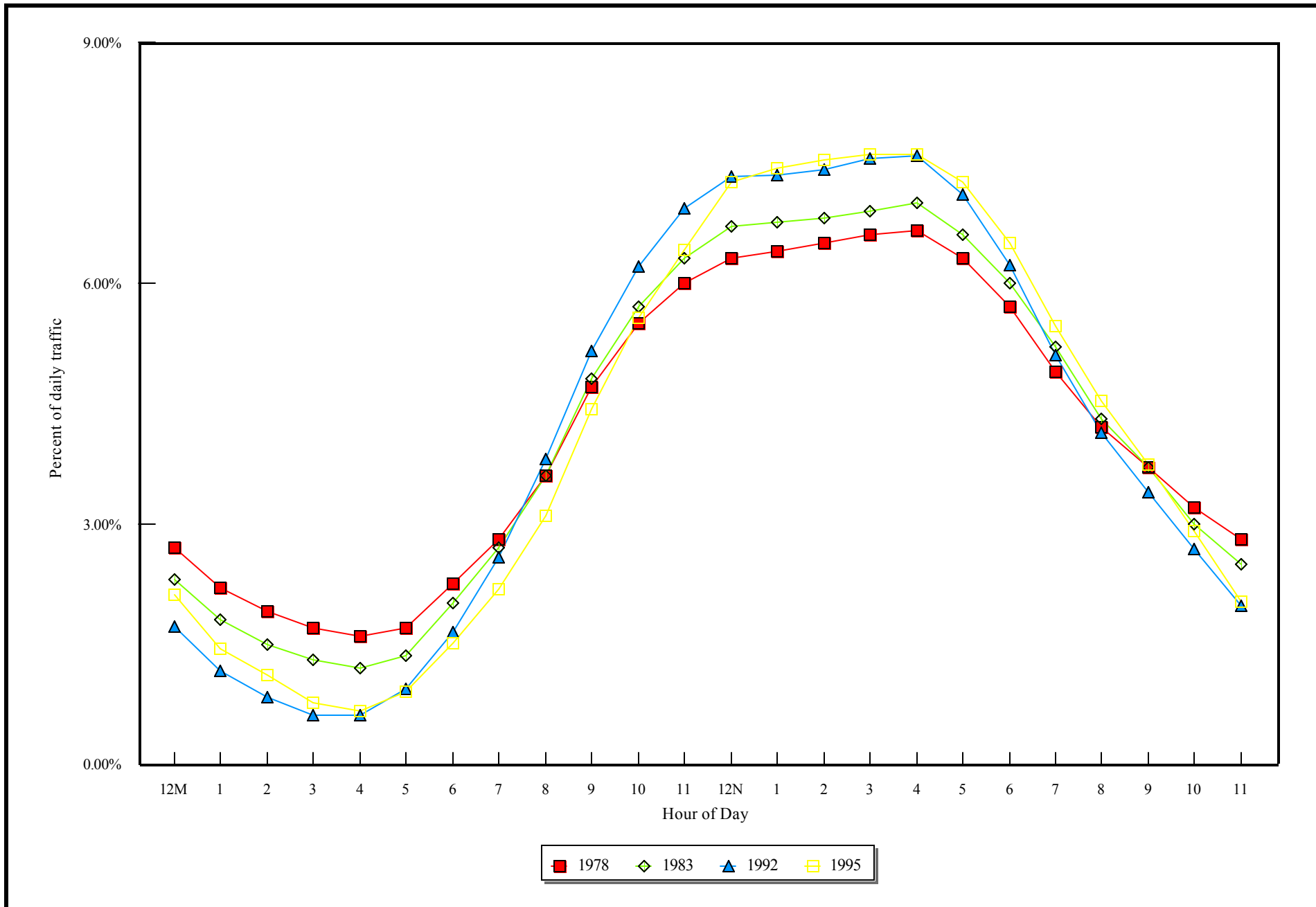


Figure 2.4.6: Weekend Rural Traffic, 1978-1995

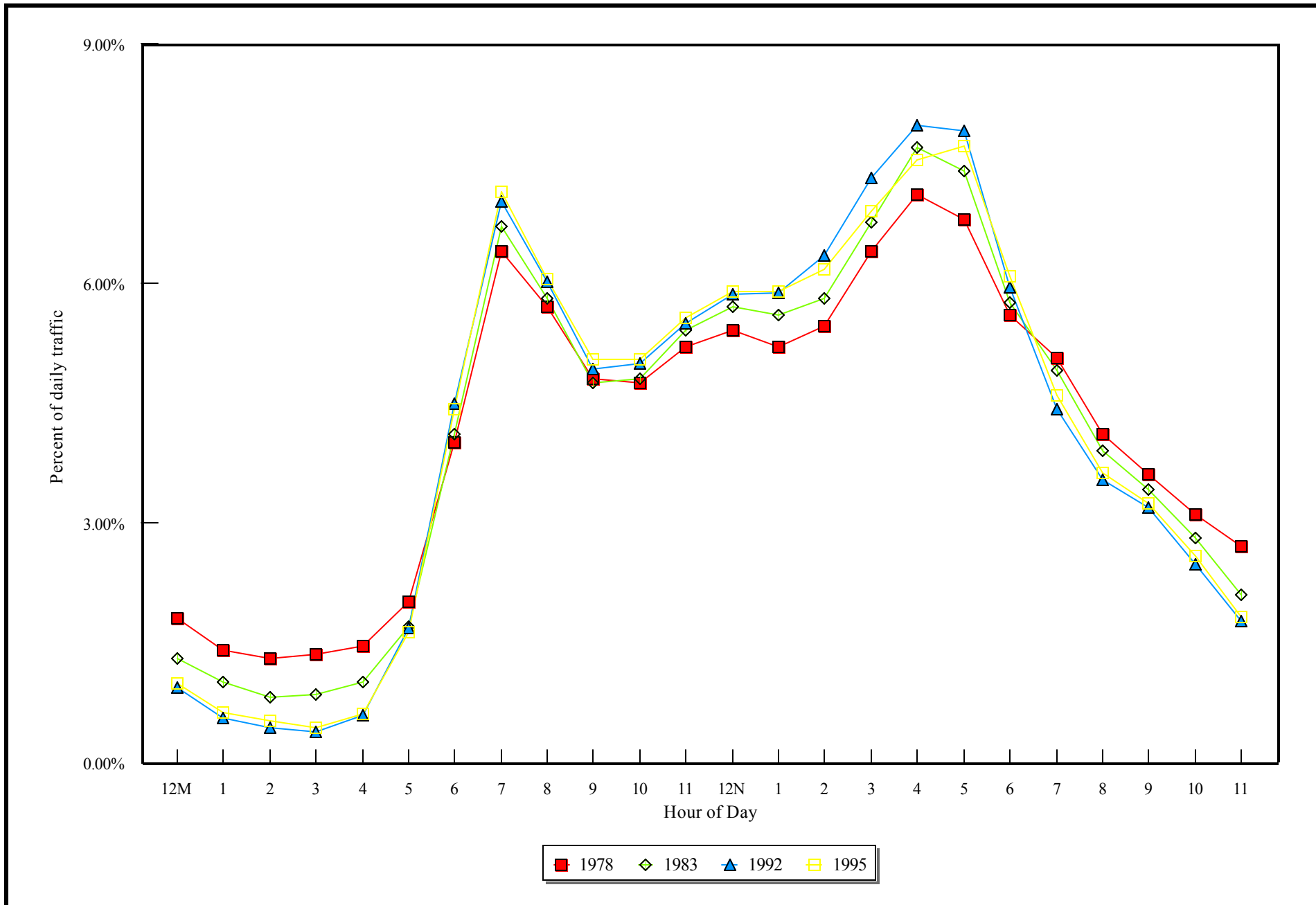


Figure 2.4.7: Weekday Urban Traffic, 1978-1995

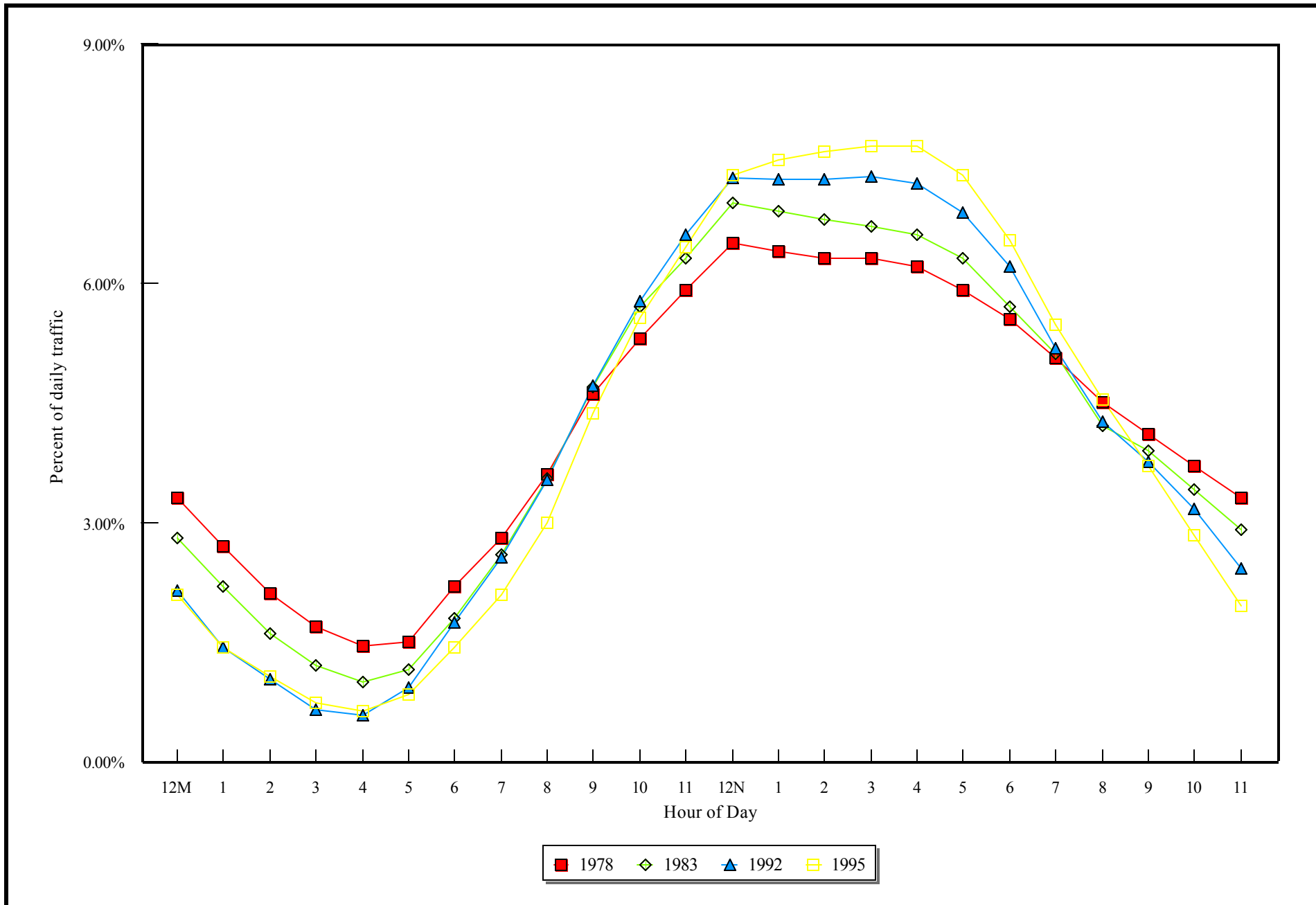


Figure 2.4.8: Weekend Urban Traffic, 1978-1995

made up in the early morning, where the percentage of traffic has declined significantly. Weekend travel is showing the same pattern of change.

3: Regional Results

The same trends that were discussed above were also examined at the regional level. For the regional definitions, see Table A.2 (p.71). The results are presented below. Values presented may not add to the total due to rounding and estimation.

1: Annual Travel

Tables 3.1.1 through 3.1.5 are the travel figures for the five regional subdivisions defined in section three. Figures 3.1.1 through 3.1.5 are the graphs which represent these tables.

Table 3.1.1 and Figure 3.1.1 are for the Western region. It can be seen that the same basic pattern from the national graph exists in the Western region. The urban travel is outpacing the rural and presently represents almost 69 percent of all travel in this region. Rural travel has maintained a steady growth rate of 2.28 percent annually, compared to 4.60 percent for all travel. The trend, seen at the national level, of rural travel growth rates outpacing urban growth rates in the past 10 years is not present here.

The North Central region is examined in Table 3.1.2 and Figure 3.1.2. The North Central region has the most travel of any region, accounting for 24 percent of the national travel in 1995. Travel in the North Central region seems to be more homogeneous than in the West. Urban travel only accounts for 55.6 percent of the total travel. The growth rate for urban and rural travel has increased over the last 10 years. Urban travel growth has increased from 2.59 percent between 1970 and 1984 to 3.36 percent between 1985-1995 while rural has increased from 1.27 percent to 2.55 percent over the same time periods. For the same time periods, total travel has increased from 1.98 percent to 2.98 percent.

Table 3.1.1: West Regional Travel 1970-1995 (Millions)

Year	Rural				Urban				Total		
	VMT	VKT	% Total	% Change	VMT	VKT	% Total	% Change	VMT	VKT	% Change
1970	93.09	149.87	44.17%	--	117.68	189.46	55.83%	--	210.77	339.34	--
1971	97.88	157.59	45.03%	5.15%	119.50	192.40	54.97%	1.55%	217.38	349.98	3.14%
1972	101.19	162.92	43.29%	3.38%	132.57	213.44	56.71%	10.94%	233.76	376.35	7.54%
1973	104.44	168.15	42.98%	3.21%	138.57	223.10	57.02%	4.53%	243.01	391.25	3.96%
1974	99.80	160.68	41.70%	-4.44%	139.50	224.60	58.30%	0.67%	239.30	385.27	-1.53%
1975	100.94	162.51	40.47%	1.14%	148.48	239.05	59.53%	6.44%	249.42	401.57	4.23%
1976	109.30	175.97	41.26%	8.28%	155.62	250.55	58.74%	4.81%	264.92	426.52	6.21%
1977	114.77	184.78	40.46%	5.00%	168.87	271.88	59.54%	8.51%	283.64	456.66	7.07%
1978	120.66	194.26	39.59%	5.13%	184.11	296.42	60.41%	9.02%	304.77	490.68	7.45%
1979	118.55	190.87	39.37%	-1.75%	182.58	293.95	60.63%	-0.83%	301.13	484.82	-1.19%
1980	118.56	190.88	39.49%	0.01%	181.65	292.46	60.51%	-0.51%	300.21	483.34	-0.31%
1981	122.73	197.60	39.94%	3.52%	184.54	297.11	60.06%	1.59%	307.27	494.70	2.35%
1982	118.96	191.53	36.84%	-3.07%	203.94	328.34	63.16%	10.51%	322.90	519.87	5.09%
1983	123.48	198.80	36.04%	3.80%	219.12	352.78	63.96%	7.44%	342.60	551.59	6.10%
1984	126.80	204.15	35.35%	2.69%	231.93	373.41	64.65%	5.85%	358.73	577.56	4.71%
1985	127.75	205.68	34.04%	0.75%	247.57	398.59	65.96%	6.74%	375.32	604.27	4.62%
1986	131.85	212.28	34.00%	3.21%	255.97	412.11	66.00%	3.39%	387.82	624.39	3.33%
1987	137.01	220.59	32.96%	3.92%	278.70	448.71	67.04%	8.88%	415.71	669.30	7.19%
1988	143.53	231.08	32.53%	4.76%	297.69	479.28	67.47%	6.81%	441.22	710.36	6.14%
1989	148.73	239.46	32.61%	3.62%	307.42	494.95	67.39%	3.27%	456.15	734.40	3.38%
1990	155.35	250.11	33.05%	4.45%	314.71	506.68	66.95%	2.37%	470.06	756.80	3.05%
1991	155.16	249.81	32.85%	-0.12%	317.17	510.64	67.15%	0.78%	472.33	760.45	0.48%
1992	153.57	247.25	31.54%	-1.02%	333.34	536.68	68.46%	5.10%	486.91	783.93	3.09%
1993	157.18	253.06	31.81%	2.35%	336.93	542.46	68.19%	1.08%	494.11	795.52	1.48%
1994	159.66	257.05	31.16%	1.58%	352.76	567.94	68.84%	4.70%	512.42	825.00	3.71%
1995 (est.)	161.80	260.50	31.15%	1.34%	357.61	575.75	68.85%	1.37%	519.41	836.25	1.36%
			MEAN 70-95	2.28%			MEAN 70-95	4.60%		MEAN 70-95	3.71%
			MEAN 70-84	2.29%			MEAN 70-84	5.04%		MEAN 70-84	3.91%
			MEAN 85-95	2.26%			MEAN 85-95	4.05%		MEAN 85-95	3.44%

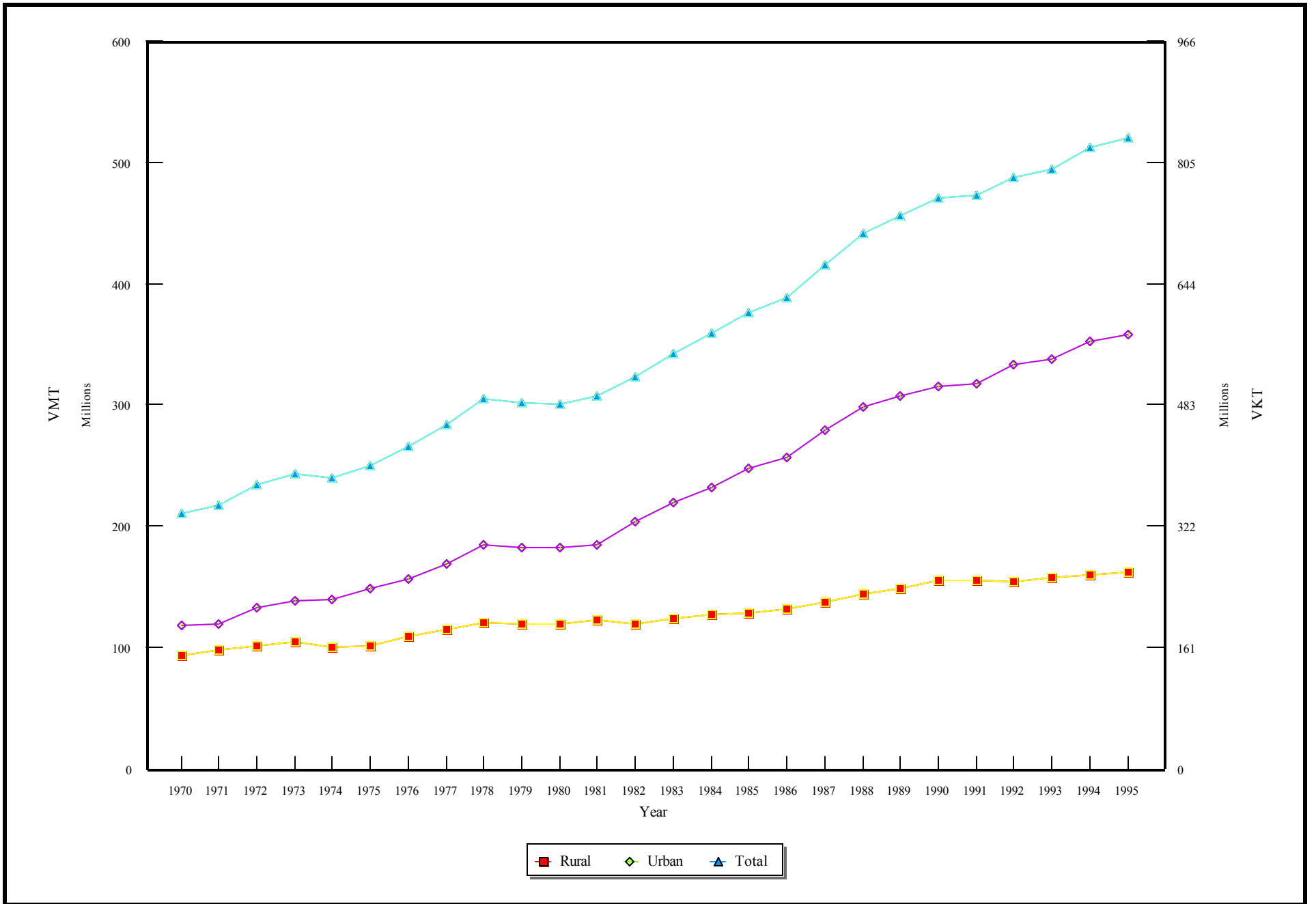


Figure 3.1.1 Annual Travel, 1970-1995, West Region

Table 3.1.2: North Central Regional Travel 1970-1995 (Millions)

Year	Rural				Urban				Total		
	VMT	VKT	% Total	% Change	VMT	VKT	% Total	% Change	VMT	VKT	% Change
1970	161.62	260.21	50.61%	--	157.74	253.96	49.39%	--	319.36	514.17	--
1971	169.52	272.93	50.47%	4.89%	166.36	267.84	49.53%	5.46%	335.88	540.77	5.17%
1972	170.53	274.55	48.33%	0.60%	182.31	293.52	51.67%	9.59%	352.84	568.07	5.05%
1973	171.41	275.97	47.18%	0.52%	191.91	308.98	52.82%	5.27%	363.32	584.95	2.97%
1974	164.43	264.73	46.72%	-4.07%	187.54	301.94	53.28%	-2.28%	351.97	566.67	-3.12%
1975	167.17	269.14	46.26%	1.67%	194.21	312.68	53.74%	3.56%	361.38	581.82	2.67%
1976	176.66	284.42	46.24%	5.68%	205.42	330.73	53.76%	5.77%	382.08	615.15	5.73%
1977	181.75	292.62	46.58%	2.88%	208.48	335.65	53.42%	1.49%	390.23	628.27	2.13%
1978	186.45	300.18	46.02%	2.59%	218.73	352.16	53.98%	4.92%	405.18	652.34	3.83%
1979	181.64	292.44	45.69%	-2.58%	215.88	347.57	54.31%	-1.30%	397.52	640.01	-1.89%
1980	184.08	296.37	47.31%	1.34%	204.98	330.02	52.69%	-5.05%	389.06	626.39	-2.13%
1981	186.47	300.22	47.15%	1.30%	209.00	336.49	52.85%	1.96%	395.47	636.71	1.65%
1982	185.42	298.53	46.94%	-0.56%	209.59	337.44	53.06%	0.28%	395.01	635.97	-0.12%
1983	188.92	304.16	46.76%	1.89%	215.10	346.31	53.24%	2.63%	404.02	650.47	2.28%
1984	194.55	313.23	46.54%	2.98%	223.49	359.82	53.46%	3.90%	418.04	673.04	3.47%
1985	197.28	317.62	46.27%	1.40%	229.13	368.90	53.73%	2.52%	426.41	686.52	2.00%
1986	204.73	329.62	45.82%	3.78%	242.06	389.72	54.18%	5.64%	446.79	719.33	4.78%
1987	211.47	340.47	45.99%	3.29%	248.37	399.88	54.01%	2.61%	459.84	740.34	2.92%
1988	224.17	360.91	46.43%	6.01%	258.68	416.47	53.57%	4.15%	482.85	777.39	5.00%
1989	232.54	374.39	46.40%	3.73%	268.64	432.51	53.60%	3.85%	501.18	806.90	3.80%
1990	236.98	381.54	46.29%	1.91%	274.92	442.62	53.71%	2.34%	511.90	824.16	2.14%
1991	239.97	386.35	45.86%	1.26%	283.31	456.13	54.14%	3.05%	523.28	842.48	2.22%
1992	243.51	392.05	44.91%	1.48%	298.68	480.87	55.09%	5.43%	542.19	872.93	3.61%
1993	251.14	404.34	44.99%	3.13%	307.09	494.41	55.01%	2.82%	558.23	898.75	2.96%
1994	250.28	402.95	44.02%	-0.34%	318.25	512.38	55.98%	3.63%	568.53	915.33	1.85%
1995 (est.)	256.29	412.63	44.39%	2.40%	321.06	516.91	55.61%	0.88%	577.35	929.53	1.55%
			MEAN 70-95	1.89%			MEAN 70-95	2.92%		MEAN 70-95	2.42%
			MEAN 70-84	1.36%			MEAN 70-84	2.59%		MEAN 70-84	1.98%
			MEAN 85-95	2.55%			MEAN 85-95	3.36%		MEAN 85-95	2.98%

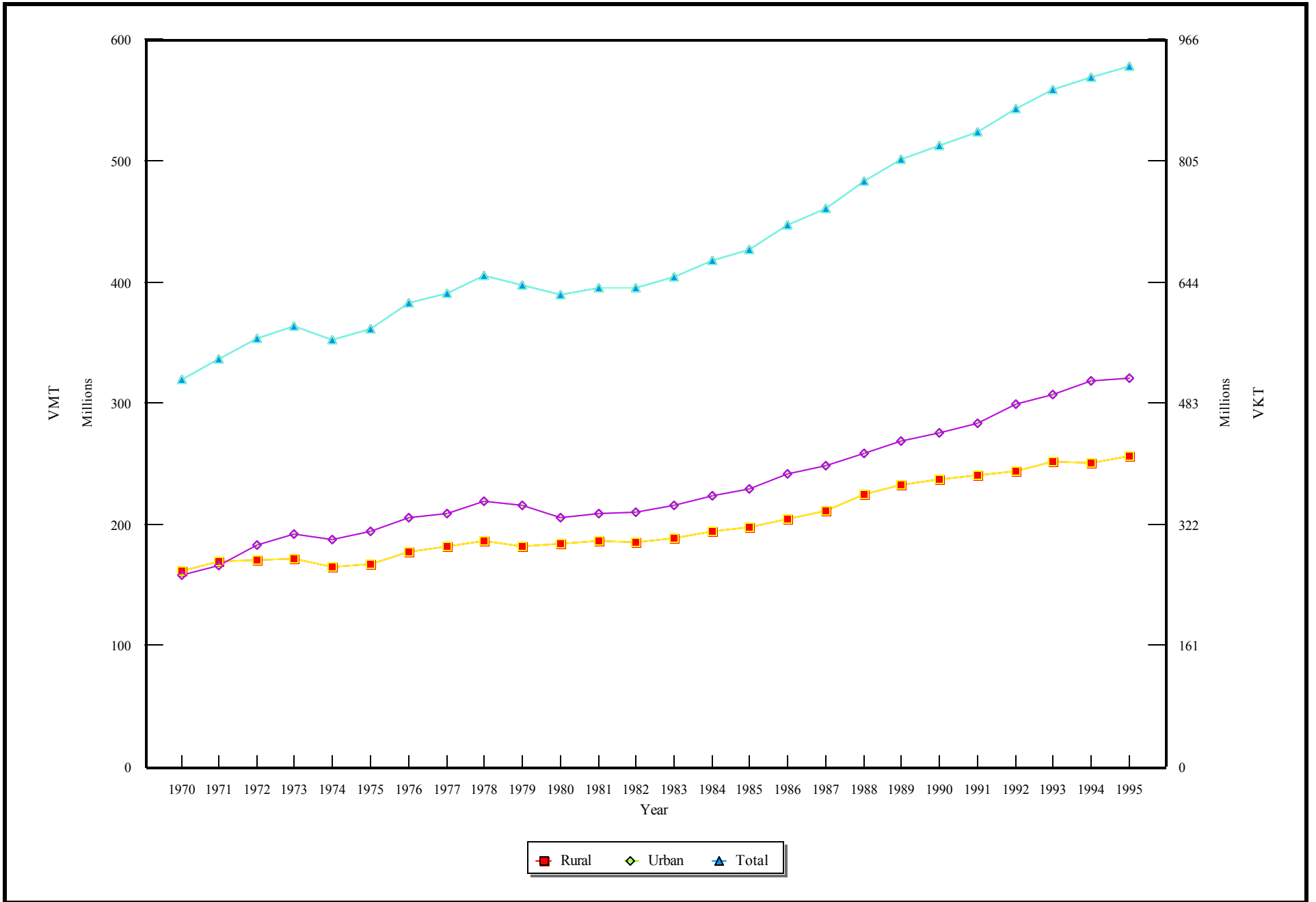


Figure 3.1.2: Annual Travel, 1970-1995, North Carolina Region

Table 3.1.3 and Figure 3.1.3 are for the Southern Gulf region. This region resembles the nation in its trends although urban travel has only relatively recently come to account for the majority of travel in the Southern Gulf region, occurring in 1981. Even in 1995, urban travel accounted for only 54.7 percent of total travel. Growth rates for urban and rural travel have both declined in the last ten years. Urban growth has declined from 5.58 percent per year between 1970 and 1984 to 3.53 percent between 1985 and 1995, while rural has declined from 3.25 percent to 2.47 percent during the same time periods. The overall growth rate for the South Gulf region for the whole study period is 3.77 percent.

The South Atlantic region is shown in Table 3.1.4 and Figure 3.1.4. The South Atlantic region resembles the South Gulf region in its recent move to urbanization. Urban travel overtook rural travel in 1979. In 1995, urban travel represented 59.75 percent of the total regional travel. The growth rate trends for urban and rural travel mirrors the national trends. The rural growth rate has increased from 2.50 percent to 2.62 percent between 1970 and 1984, while the urban rate has fallen from 5.48 percent to 4.79 percent for the same time periods. These changes are not significant at the regional level, but they are there nonetheless.

Table 3.1.5 and Figure 3.1.5 show the Northeastern region. This region accounts for the smallest portion of travel in the country, accounting for only 16 percent of the national travel in 1995. The region has always been dominated by urban travel, as this is the most urbanized area in the country. In 1995, urban travel accounted for 69.27 percent of the total regional travel. This region also has the slowest growth rate in the country, just 2.16 percent. Rural travel is hardly growing at all, with a mere 1.38 percent annual growth rate.

Table 3.1.3: South Gulf Regional Travel 1970-1995 (Millions)

Year	Rural				Urban				Total		
	VMT	VKT	% Total	% Change	VMT	VKT	% Total	% Change	VMT	VKT	% Change
1970	102.88	165.64	55.88%	--	81.22	130.76	44.12%	--	184.10	296.40	--
1971	107.42	172.95	54.81%	4.41%	88.55	142.57	45.19%	9.02%	195.97	315.51	6.45%
1972	113.15	182.17	53.66%	5.33%	97.73	157.35	46.34%	10.37%	210.88	339.52	7.61%
1973	118.79	191.25	53.32%	4.98%	104.00	167.44	46.68%	6.42%	222.79	358.69	5.65%
1974	117.82	189.69	52.26%	-0.82%	107.65	173.32	47.74%	3.51%	225.47	363.01	1.20%
1975	123.93	199.53	51.99%	5.19%	114.45	184.26	48.01%	6.32%	238.38	383.79	5.73%
1976	130.37	209.90	51.70%	5.20%	121.79	196.08	48.30%	6.41%	252.16	405.98	5.78%
1977	138.90	223.63	51.94%	6.54%	128.52	206.92	48.06%	5.53%	267.42	430.55	6.05%
1978	149.66	240.95	51.91%	7.75%	138.62	223.18	48.09%	7.86%	288.28	464.13	7.80%
1979	145.82	234.77	51.25%	-2.57%	138.69	223.29	48.75%	0.05%	284.51	458.06	-1.31%
1980	143.69	231.34	50.83%	-1.46%	139.02	223.82	49.17%	0.24%	282.71	455.16	-0.63%
1981	147.91	238.14	50.08%	2.94%	147.41	237.33	49.92%	6.04%	295.32	475.47	4.46%
1982	152.00	244.72	49.86%	2.77%	152.84	246.07	50.14%	3.68%	304.84	490.79	3.22%
1983	155.49	250.34	48.97%	2.30%	162.02	260.85	51.03%	6.01%	317.51	511.19	4.16%
1984	159.99	257.58	48.07%	2.89%	172.81	278.22	51.93%	6.66%	332.80	535.81	4.82%
1985	162.38	261.43	47.21%	1.49%	181.54	292.28	52.79%	5.05%	343.92	553.71	3.34%
1986	163.01	262.45	46.76%	0.39%	185.59	298.80	53.24%	2.23%	348.60	561.25	1.36%
1987	169.13	272.30	46.75%	3.75%	192.61	310.10	53.25%	3.78%	361.74	582.40	3.77%
1988	175.13	281.96	46.05%	3.55%	205.15	330.29	53.95%	6.51%	380.28	612.25	5.13%
1989	179.31	288.69	45.73%	2.39%	212.83	342.66	54.27%	3.74%	392.14	631.35	3.12%
1990	184.66	297.30	46.04%	2.98%	216.42	348.44	53.96%	1.69%	401.08	645.74	2.28%
1991	188.72	303.84	47.19%	2.20%	211.22	340.06	52.81%	-2.40%	399.94	643.90	-0.28%
1992	191.75	308.72	46.16%	1.61%	223.69	360.14	53.84%	5.90%	415.44	668.86	3.88%
1993	200.06	322.10	46.37%	4.33%	231.42	372.59	53.63%	3.46%	431.48	694.68	3.86%
1994	201.88	325.03	44.91%	0.91%	247.68	398.76	55.09%	7.03%	449.56	723.79	4.19%
1995 (est.)	209.06	336.59	45.33%	3.56%	252.13	405.93	54.67%	1.80%	461.19	742.52	2.59%
			MEAN 70-95	2.90%			MEAN 70-95	4.68%		MEAN 70-95	3.77%
			MEAN 70-84	3.25%			MEAN 70-84	5.58%		MEAN 70-84	4.36%
			MEAN 85-95	2.47%			MEAN 85-95	3.53%		MEAN 85-95	3.02%

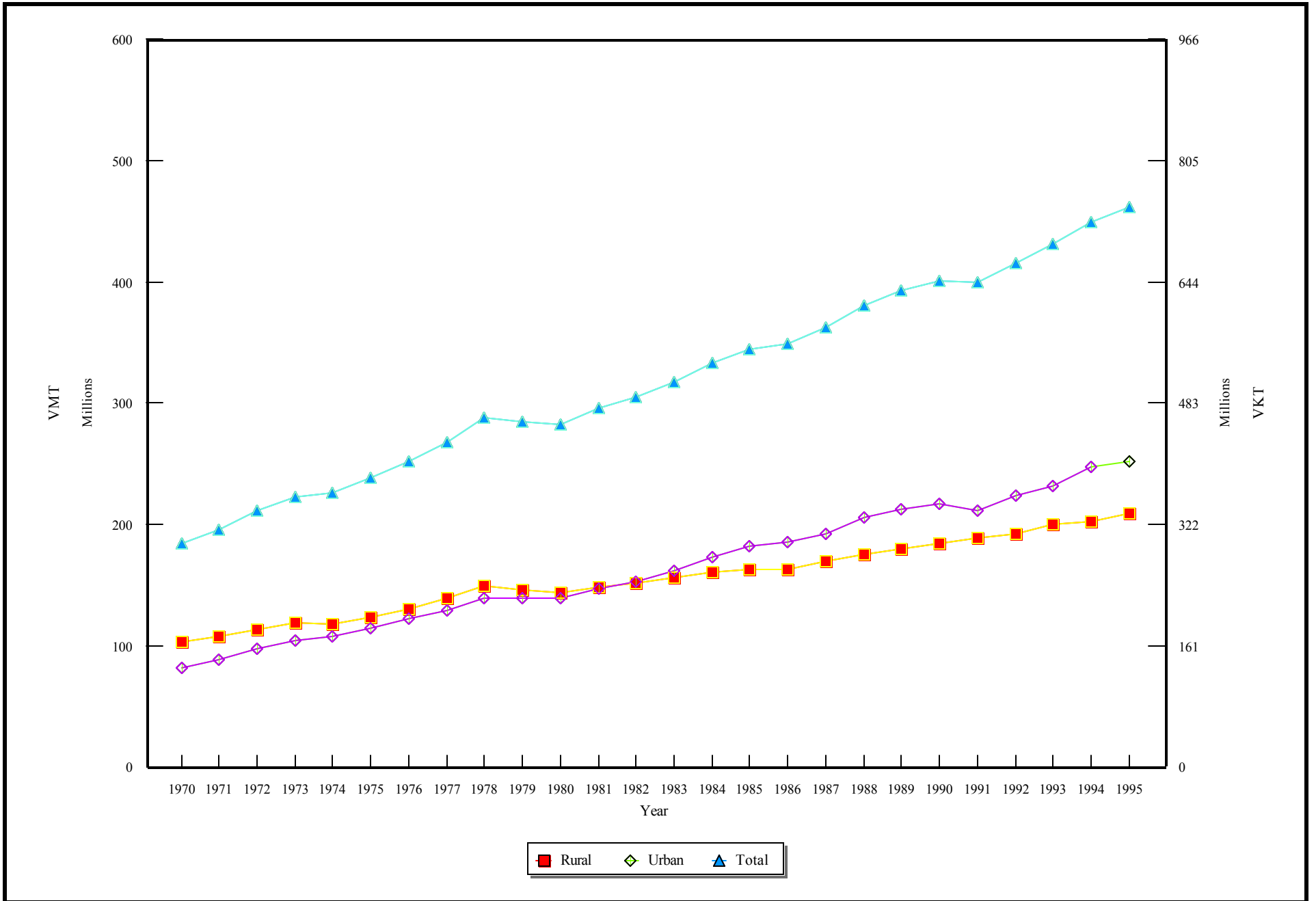


Figure 3.1.3: Annual Travel, 1970-1995, South Gulf Region

Table 3.1.4: South Atlantic Regional Travel 1970-1995 (Millions)

Year	Rural				Urban				Total		
	VMT	VKT	% Total	% Change	VMT	VKT	% Total	% Change	VMT	VKT	% Change
1970	100.67	162.08	55.75%	--	79.91	128.66	44.25%	--	180.58	290.73	--
1971	106.24	171.05	54.33%	5.53%	89.31	143.79	45.67%	11.76%	195.55	314.84	8.29%
1972	114.38	184.15	53.33%	7.66%	100.11	161.18	46.67%	12.09%	214.49	345.33	9.69%
1973	119.76	192.81	52.47%	4.70%	108.50	174.69	47.53%	8.38%	228.26	367.50	6.42%
1974	117.71	189.51	52.04%	-1.71%	108.48	174.65	47.96%	-0.02%	226.19	364.17	-0.91%
1975	124.23	200.01	52.84%	5.54%	110.87	178.50	47.16%	2.20%	235.10	378.51	3.94%
1976	133.42	214.81	53.97%	7.40%	113.79	183.20	46.03%	2.63%	247.21	398.01	5.15%
1977	140.04	225.46	54.65%	4.96%	116.19	187.07	45.35%	2.11%	256.23	412.53	3.65%
1978	135.70	218.48	50.32%	-3.10%	133.97	215.69	49.68%	15.30%	269.67	434.17	5.25%
1979	133.09	214.27	49.33%	-1.92%	136.71	220.10	50.67%	2.05%	269.80	434.38	0.05%
1980	132.46	213.26	48.76%	-0.47%	139.18	224.08	51.24%	1.81%	271.64	437.34	0.68%
1981	133.16	214.39	49.07%	0.53%	138.19	222.49	50.93%	-0.71%	271.35	436.87	-0.11%
1982	138.55	223.07	48.65%	4.05%	146.26	235.48	51.35%	5.84%	284.81	458.54	4.96%
1983	137.57	221.49	46.92%	-0.71%	155.66	250.61	53.08%	6.43%	293.23	472.10	2.96%
1984	141.03	227.06	45.88%	2.52%	166.34	267.81	54.12%	6.86%	307.37	494.87	4.82%
1985	144.01	231.86	44.88%	2.11%	176.88	284.78	55.12%	6.34%	320.89	516.63	4.40%
1986	147.06	236.77	43.98%	2.12%	187.33	301.60	56.02%	5.91%	334.39	538.37	4.21%
1987	156.69	252.27	44.35%	6.55%	196.59	316.51	55.65%	4.94%	353.28	568.78	5.65%
1988	163.24	262.82	43.42%	4.18%	212.68	342.41	56.58%	8.18%	375.92	605.23	6.41%
1989	173.47	279.29	43.23%	6.27%	227.83	366.81	56.77%	7.12%	401.30	646.09	6.75%
1990	177.40	285.61	43.70%	2.27%	228.51	367.90	56.30%	0.30%	405.91	653.52	1.15%
1991	181.44	292.12	43.78%	2.28%	233.02	375.16	56.22%	1.97%	414.46	667.28	2.11%
1992	177.09	285.11	41.47%	-2.40%	249.99	402.48	58.53%	7.28%	427.08	687.60	3.04%
1993	180.55	290.69	41.43%	1.95%	255.25	410.95	58.57%	2.10%	435.80	701.64	2.04%
1994	181.63	292.42	40.06%	0.60%	271.72	437.47	59.94%	6.45%	453.35	729.89	4.03%
1995 (est.)	186.82	300.78	40.26%	2.86%	277.27	446.40	59.74%	2.04%	464.09	747.18	2.37%
			MEAN 70-95	2.55%			MEAN 70-95	5.18%		MEAN 70-95	3.88%
			MEAN 70-84	2.50%			MEAN 70-84	5.48%		MEAN 70-84	3.92%
			MEAN 85-95	2.62%			MEAN 85-95	4.79%		MEAN 85-95	3.83%

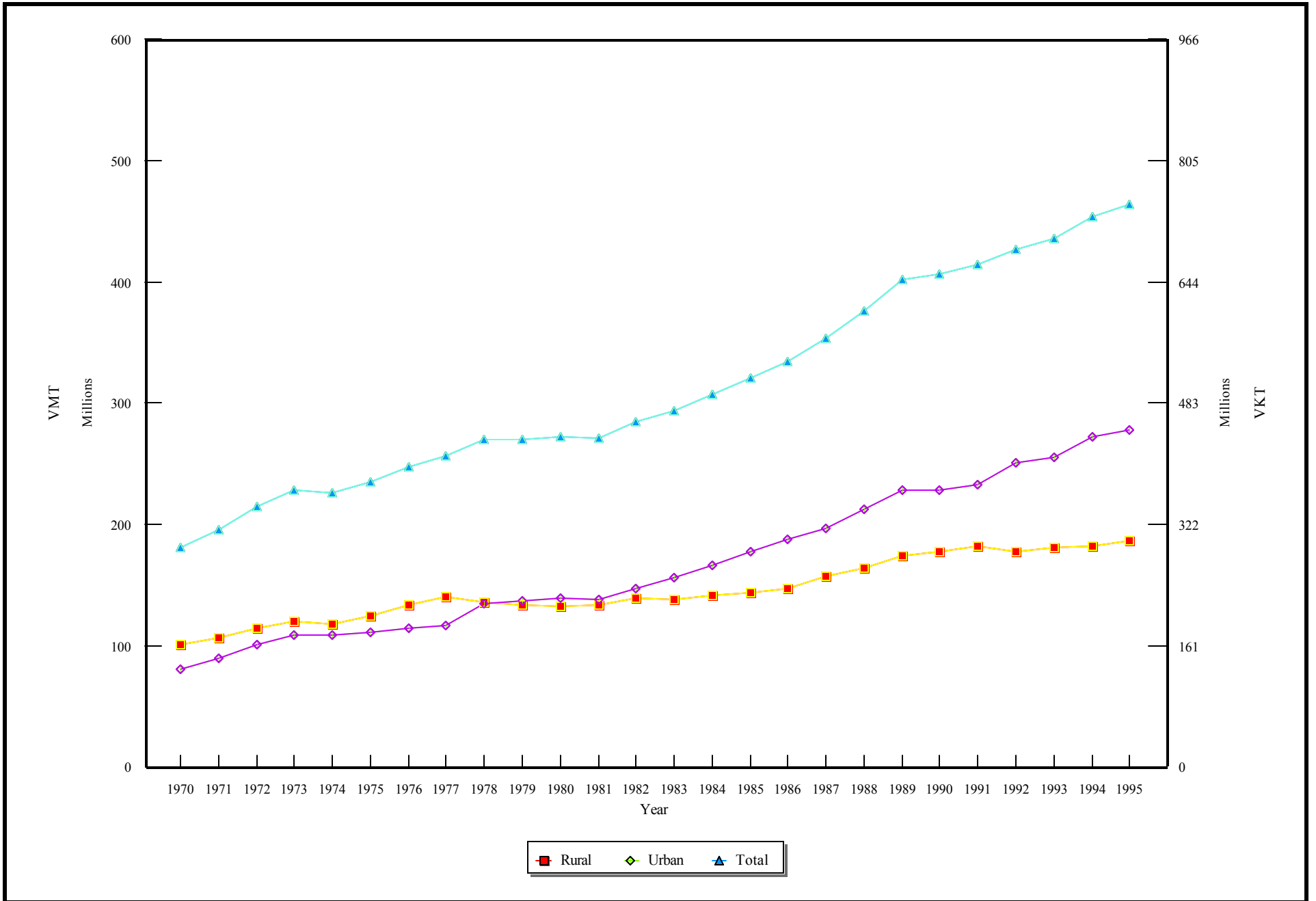


Figure 3.1.4: Annual Travel, 1970-1995, South Atlantic Region

Table 3.1.5: Northeast Regional Travel 1970-1995 (Millions)

Year	Rural				Urban				Total			
	VMT	VKT	% Total	% Change	VMT	VKT	% Total	% Change	VMT	VKT	% Change	
1970	84.82	136.56	37.61%	--	140.69	226.51	62.39%	--	225.51	363.07	--	
1971	92.09	148.26	38.24%	8.57%	148.73	239.46	61.76%	5.71%	240.82	387.72	6.79%	
1972	91.06	146.61	35.68%	-1.12%	164.16	264.30	64.32%	10.37%	255.22	410.90	5.98%	
1973	86.77	139.70	34.58%	-4.71%	164.13	264.25	65.42%	-0.02%	250.90	403.95	-1.69%	
1974	83.72	134.79	33.93%	-3.52%	162.99	262.41	66.07%	-0.69%	246.71	397.20	-1.67%	
1975	84.36	135.82	34.32%	0.76%	161.43	259.90	65.68%	-0.96%	245.79	395.72	-0.37%	
1976	89.64	144.32	34.61%	6.26%	169.37	272.69	65.39%	4.92%	259.01	417.01	5.38%	
1977	92.62	149.12	34.83%	3.32%	173.27	278.96	65.17%	2.30%	265.89	428.08	2.66%	
1978	97.48	156.94	34.78%	5.25%	182.83	294.36	65.22%	5.52%	280.31	451.30	5.42%	
1979	90.97	146.46	32.94%	-6.68%	185.20	298.17	67.06%	1.30%	276.17	444.63	-1.48%	
1980	94.93	152.84	34.24%	4.35%	182.29	293.49	65.76%	-1.57%	277.22	446.32	0.38%	
1981	96.62	155.56	34.40%	1.78%	184.22	296.59	65.60%	1.06%	280.84	452.15	1.31%	
1982	95.75	154.16	33.61%	-0.90%	189.17	304.56	66.39%	2.69%	284.92	458.72	1.45%	
1983	95.07	153.06	32.59%	-0.71%	196.67	316.64	67.41%	3.96%	291.74	469.70	2.39%	
1984	96.49	155.35	32.18%	1.49%	203.35	327.39	67.82%	3.40%	299.84	482.74	2.78%	
1985	98.90	159.23	32.09%	2.50%	209.33	337.02	67.91%	2.94%	308.23	496.25	2.80%	
1986	103.42	166.51	32.25%	4.57%	217.22	349.72	67.75%	3.77%	320.64	516.23	4.03%	
1987	107.44	172.98	32.19%	3.89%	226.31	364.36	67.81%	4.18%	333.75	537.34	4.09%	
1988	111.48	179.48	32.28%	3.76%	233.83	376.47	67.72%	3.32%	345.31	555.95	3.46%	
1989	114.83	184.88	32.23%	3.01%	241.44	388.72	67.77%	3.25%	356.27	573.59	3.17%	
1990	116.02	186.79	32.36%	1.04%	242.52	390.46	67.64%	0.45%	358.54	577.25	0.64%	
1991	118.33	190.51	32.67%	1.99%	243.87	392.63	67.33%	0.56%	362.20	583.14	1.02%	
1992	115.18	185.44	31.28%	-2.66%	253.03	407.38	68.72%	3.76%	368.21	592.82	1.66%	
1993	116.94	188.27	31.32%	1.53%	256.49	412.95	68.68%	1.37%	373.43	601.22	1.42%	
1994	115.97	186.71	30.83%	-0.83%	260.16	418.86	69.17%	1.43%	376.13	605.57	0.72%	
1995 (est.)	117.65	189.42	30.73%	1.45%	265.16	426.91	69.27%	1.92%	382.81	616.32	1.78%	
			MEAN 70-95	1.38%			MEAN 70-95	2.60%			MEAN 70-95	2.16%
			MEAN 70-84	1.01%			MEAN 70-84	2.71%			MEAN 70-84	2.09%
			MEAN 85-95	1.84%			MEAN 85-95	2.45%			MEAN 85-95	2.25%

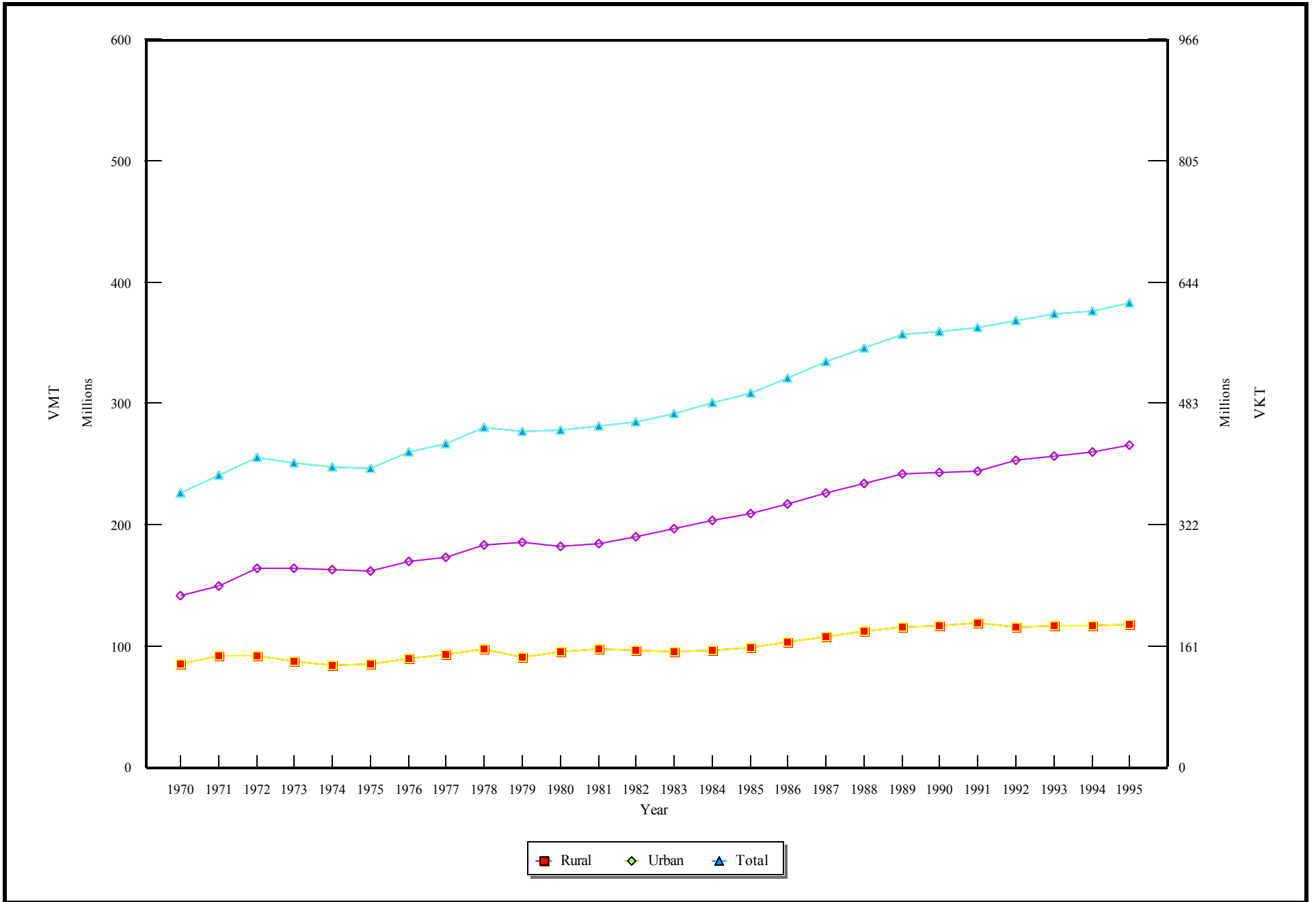


Figure 3.1.5: Annual travel, 1970-1995, Northeast Region

2: Monthly Travel

Figure 3.2.1 shows the monthly traffic fluctuations for each of the regions. This section uses data from all 25 years in the study period. The pattern follows the basic nationwide pattern, with some regional fluctuations. The southern regions (South Gulf and South Atlantic) show less variation from winter to summer than do the other regions. These two regions have the highest winter travel percentages and the lowest summer percentages. This is probably due to the milder climate in the south, leading to retirement communities and winter vacationers. The same pattern of a low point in January and August peak still holds for all regions; however, it is most pronounced in the West, North Central, and Northeast regions.

Figure 3.2.2 is the rural segment of travel. This also follows the regional variations that were pointed out above. It also follows the rural pattern from Section 2.2. There is more variation from season to season in the rural segment than in the urban. Again, the southern regions show less variation from summer to winter than do the other regions. The northern regions show the most variation, while the west is in the middle. This may be due to the fact that the West region is the only region that runs from Canada to Mexico and encompasses several climates. The West region is more in line with the national trends than any of the other regions.

Figure 3.2.3 shows the urban travel for the regions. The same pattern is evident here. The regions also all follow the national trend in that there is less seasonal variation in the urban travel element. The southern regions, again, show less variation than the northern regions. The west is still the average, and closely mirrors the national average.

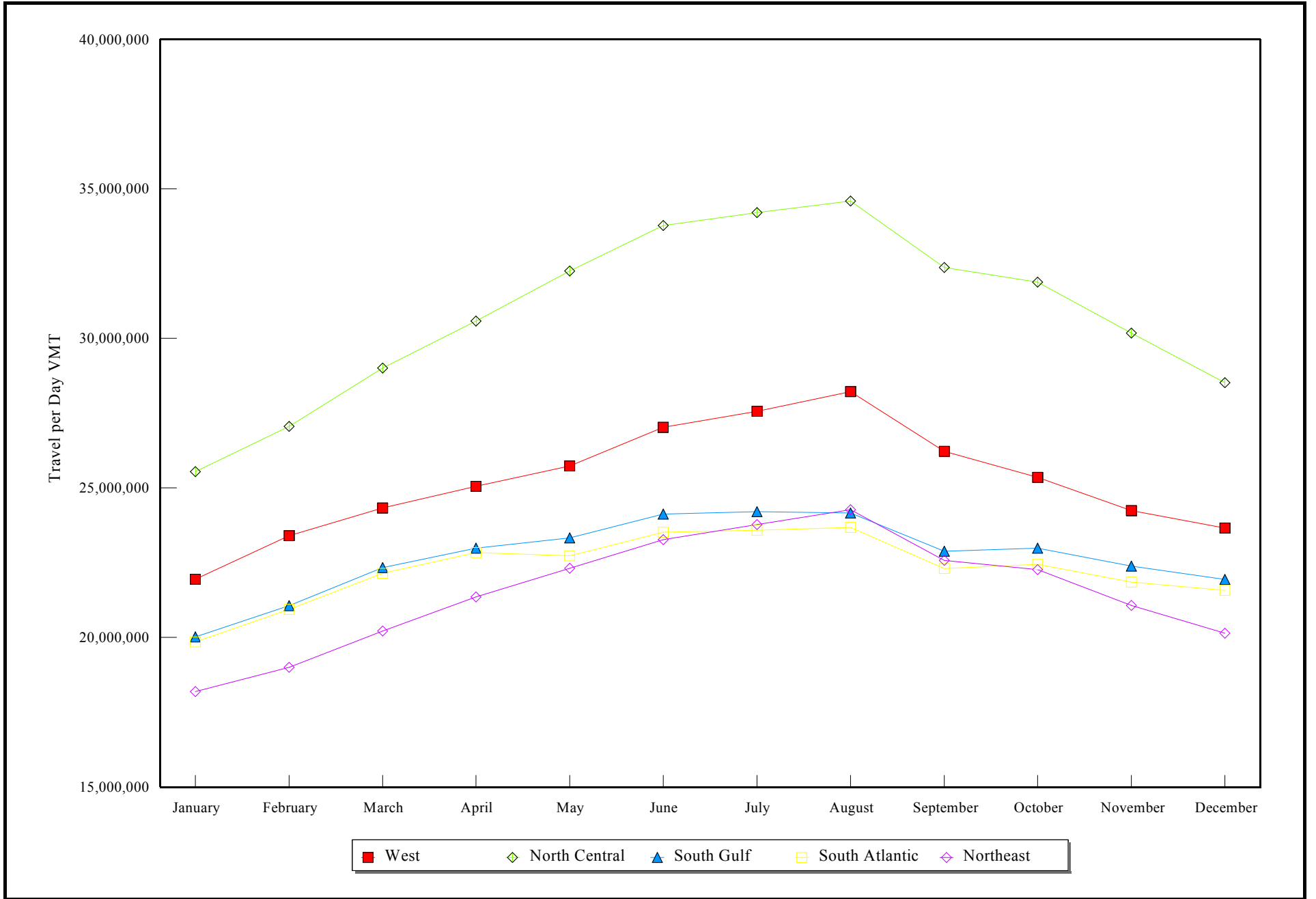


Figure 3.2.1: Regional Average VMT per Day, 1970-1995

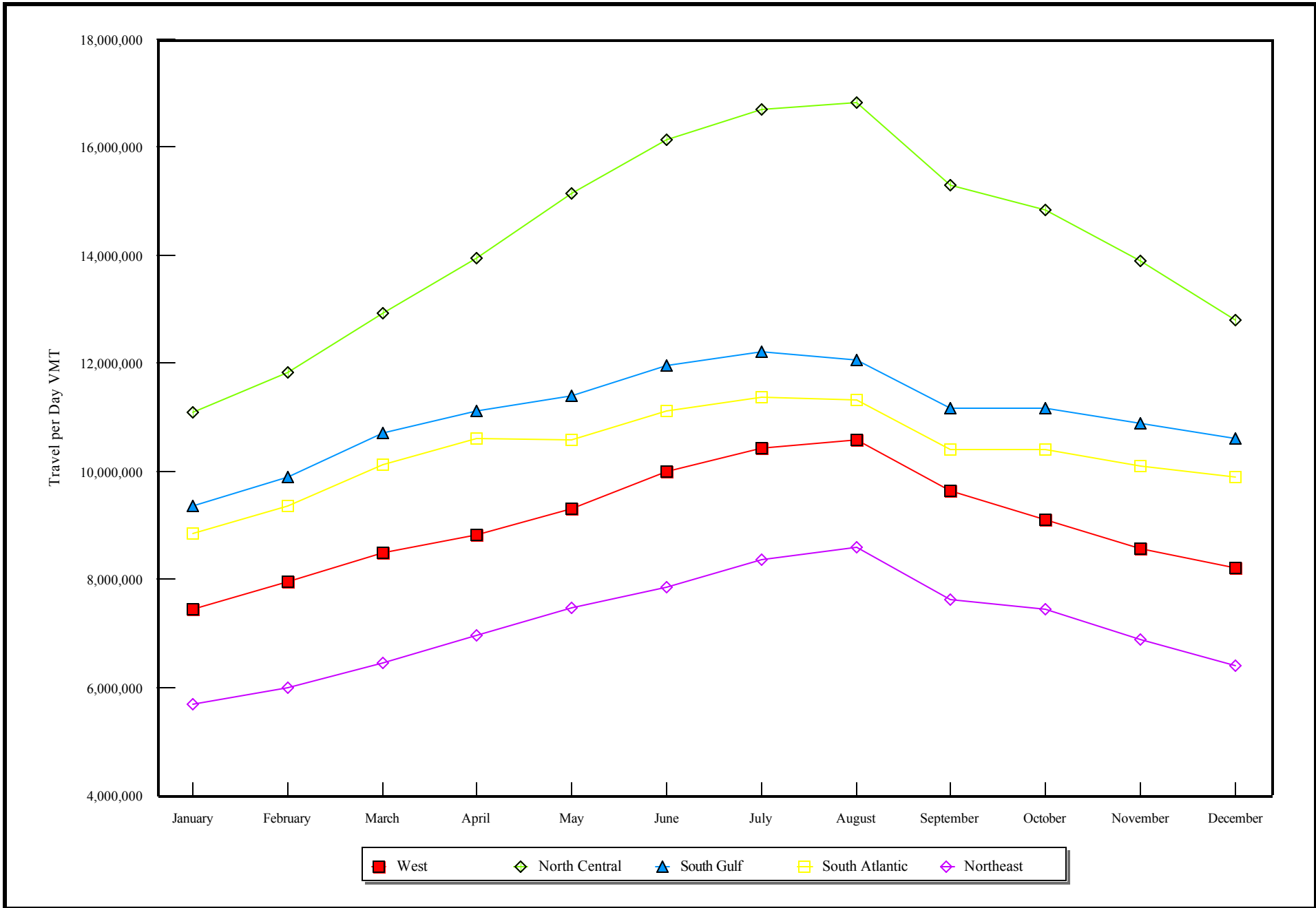


Figure 3.2.2: Regional Average Rural VMT per Day, 1970-1995

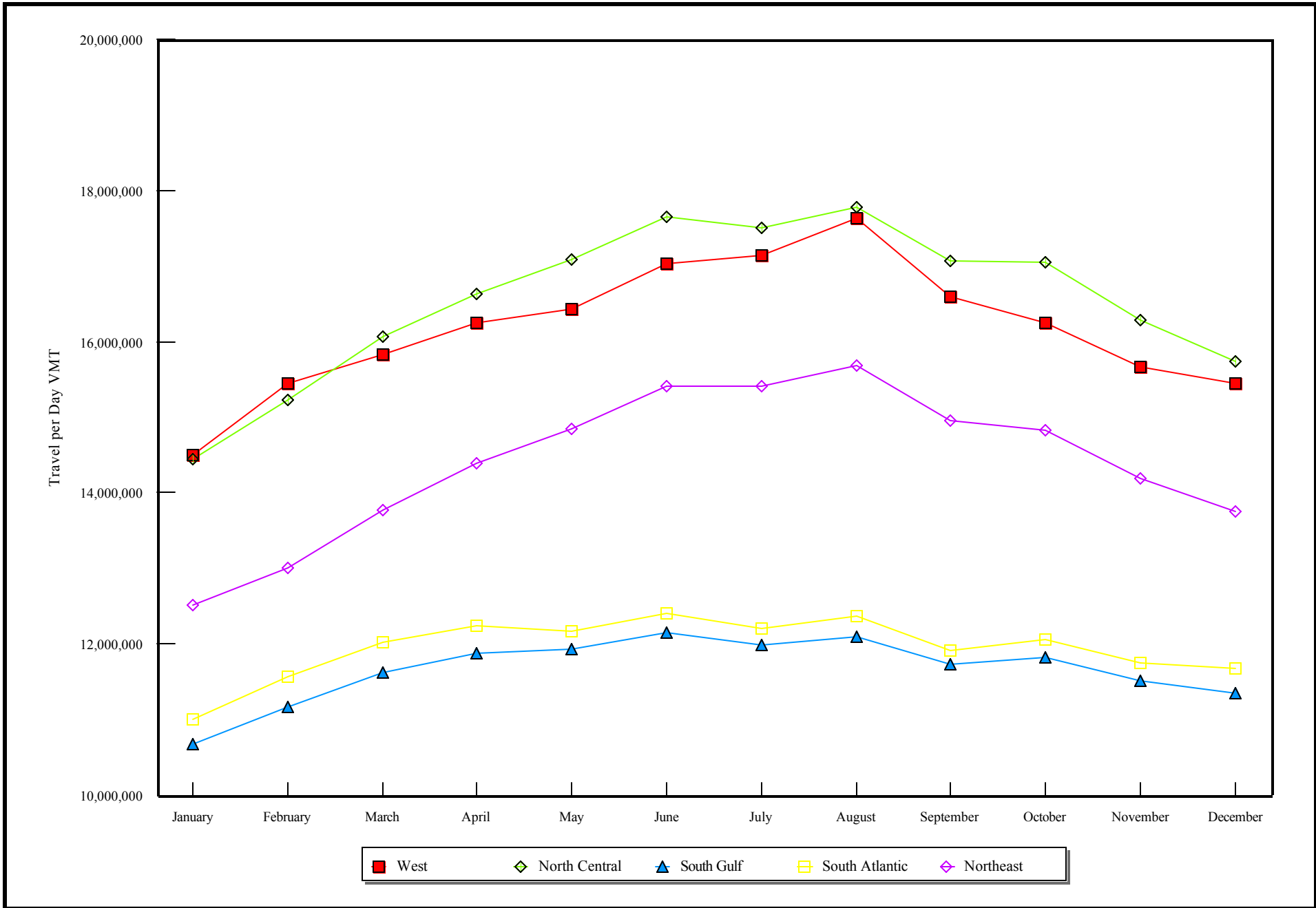


Figure 3.2.3: Regional Average Urban VMT per Day, 1970-1995

3: Weekly Travel

The weekly patterns for each of the regions are discussed in this section. These figures were extracted from the same data set as the national comparisons. The urban and rural designations were made by averaging ATR counts for all functional classifications. The graphs all start with Sunday and run to Saturday. Figures 3.3.1 through 3.3.5 show the 1995 weekly traffic pattern for all five regions. They are very similar to the national pattern. The same distinct weekday and weekend patterns are present, as is the difference between Saturday and Sunday. The peaks in the rural traffic pattern are consistently at or above 1.0 percent of the weekly traffic. The urban traffic pattern exhibits more variability throughout the week. Urban traffic is at its highest during the week, specifically at Friday afternoon. The lowest peak on the urban system is on Sunday.

The rural traffic pattern exhibits many of the same characteristics as the urban pattern. The weekday morning peak is less pronounced, and the afternoon peak is not as high as that of the urban, except on Friday when it is higher, as a percent of the weekly traffic on the specific system. Urban traffic at the regional level shows lower dips in the early morning hours than does rural.

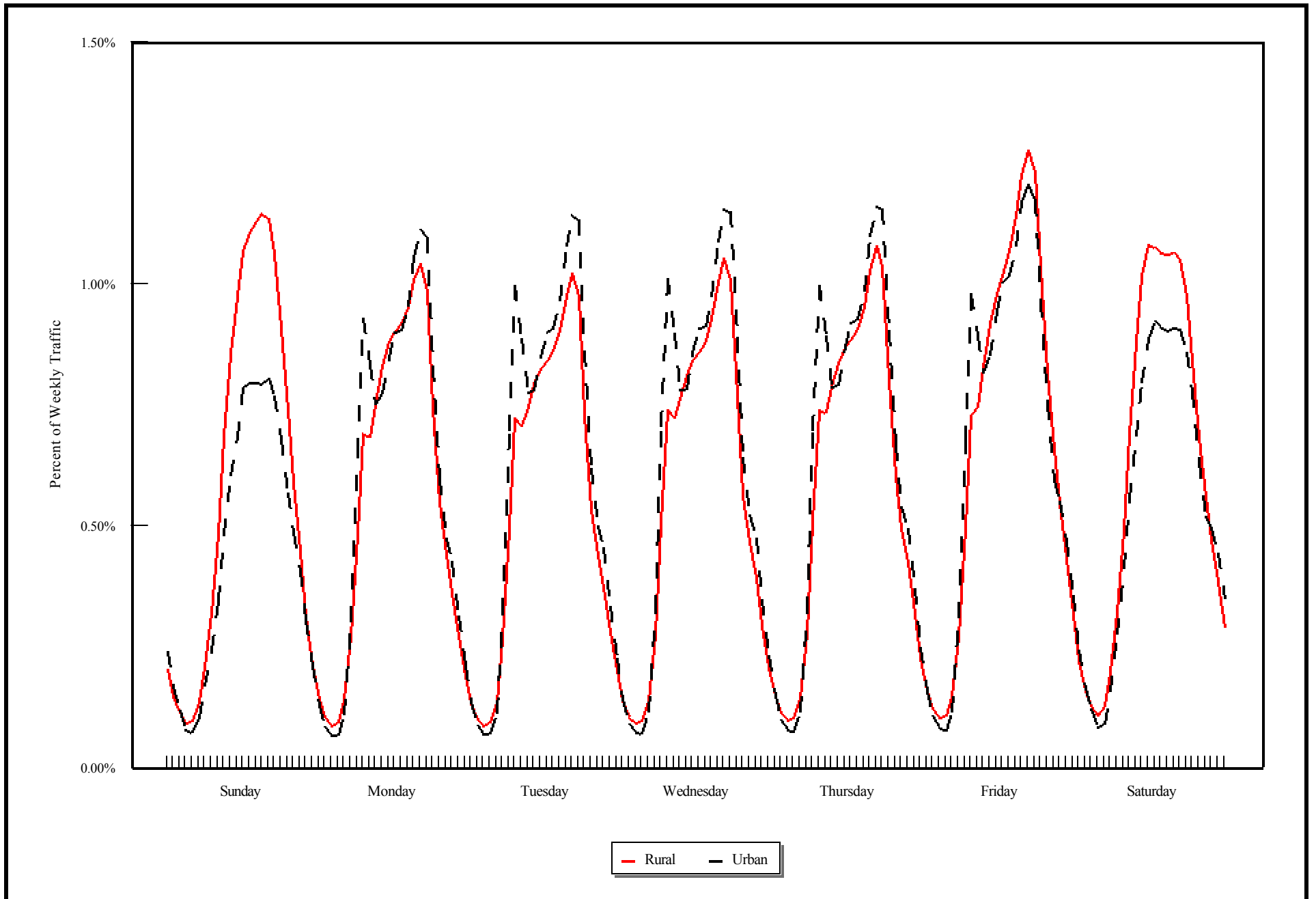


Figure 3.3.1: West Region, 1995 Weekly Pattern

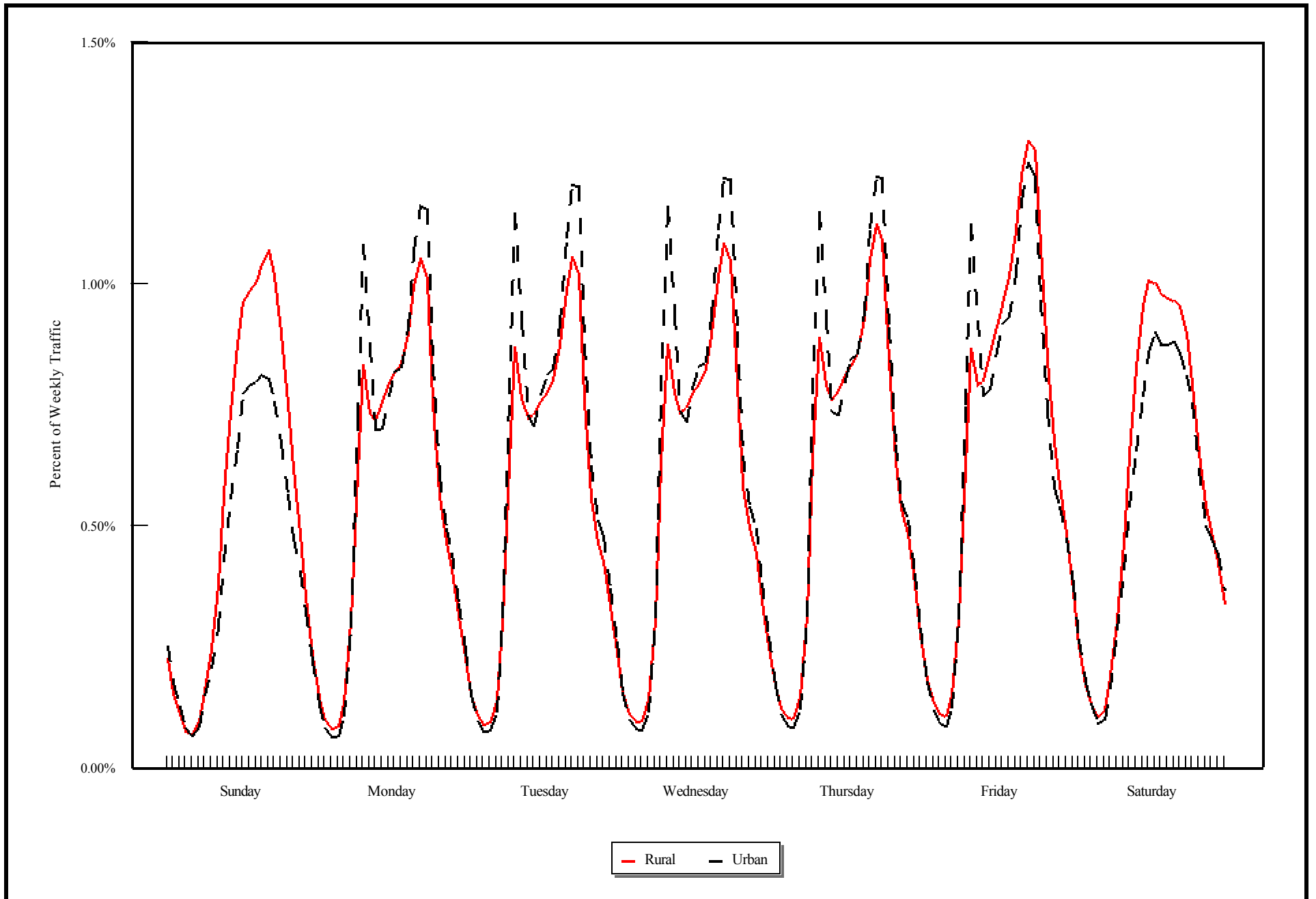


Figure 3.3.2: North Central Region, 1995 Weekly Pattern

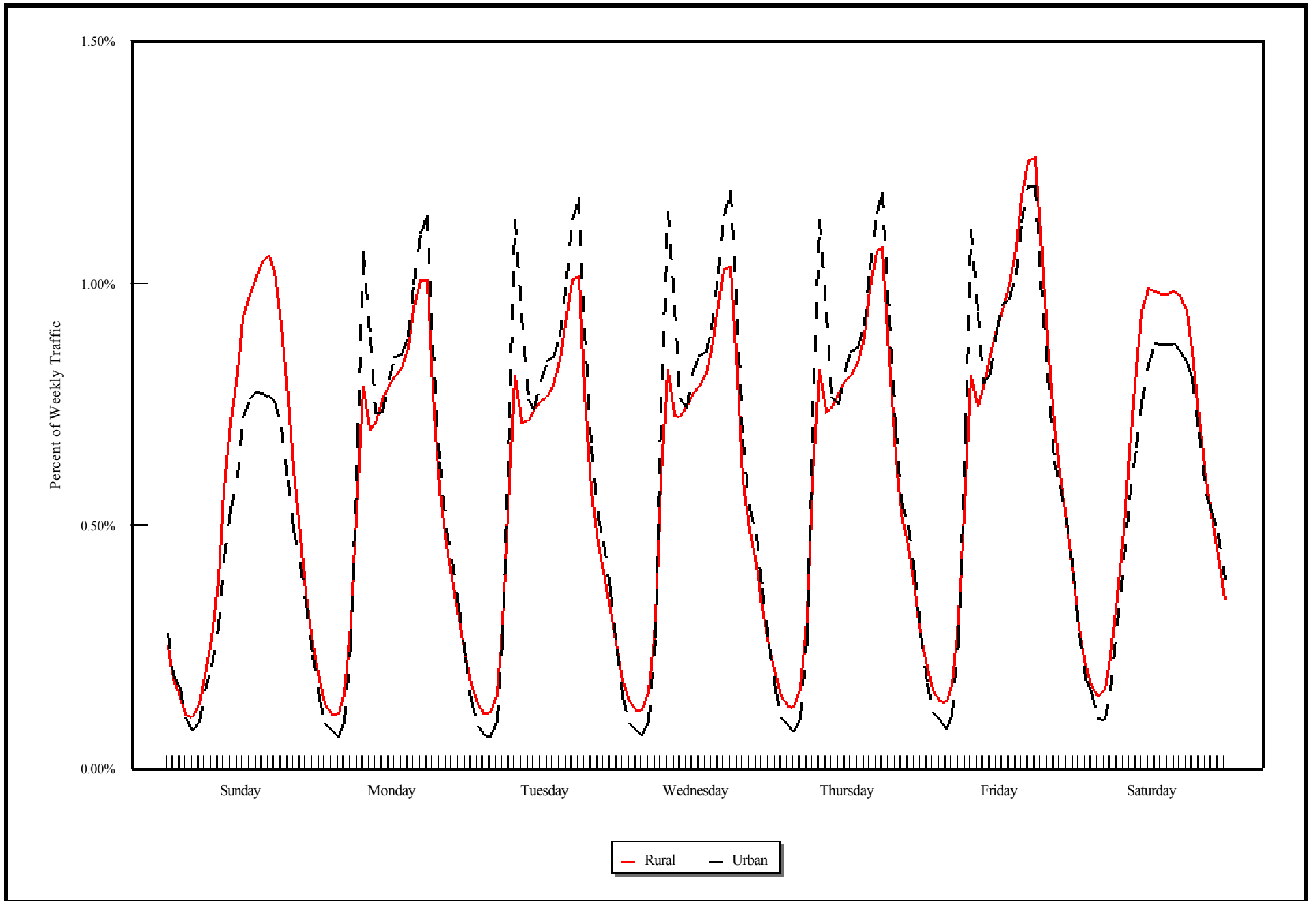


Figure 3.3.3: South Gulf Region, 1995 Weekly Pattern

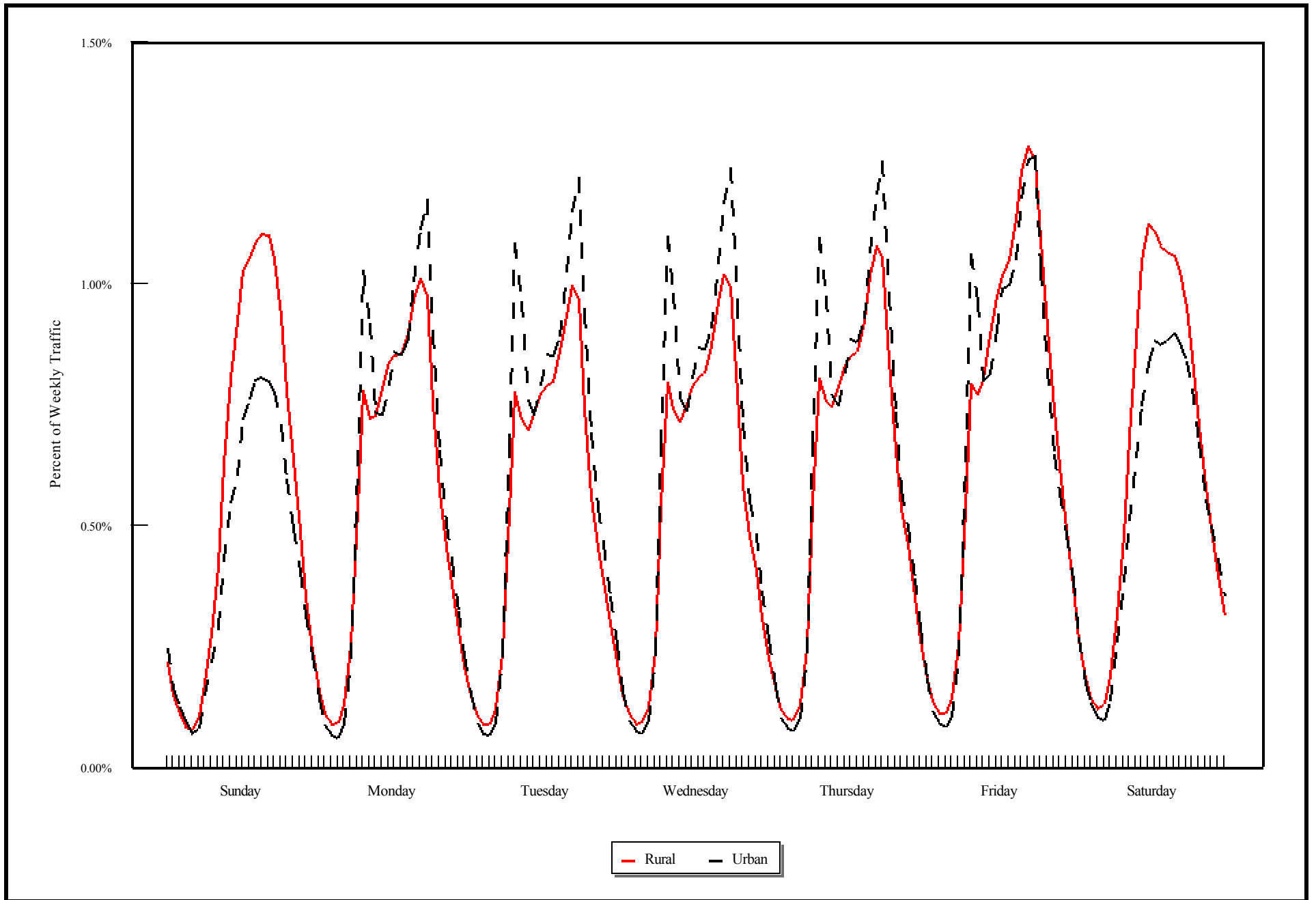


Figure 3.3.4: South Atlantic Region, 1995 Weekly Pattern

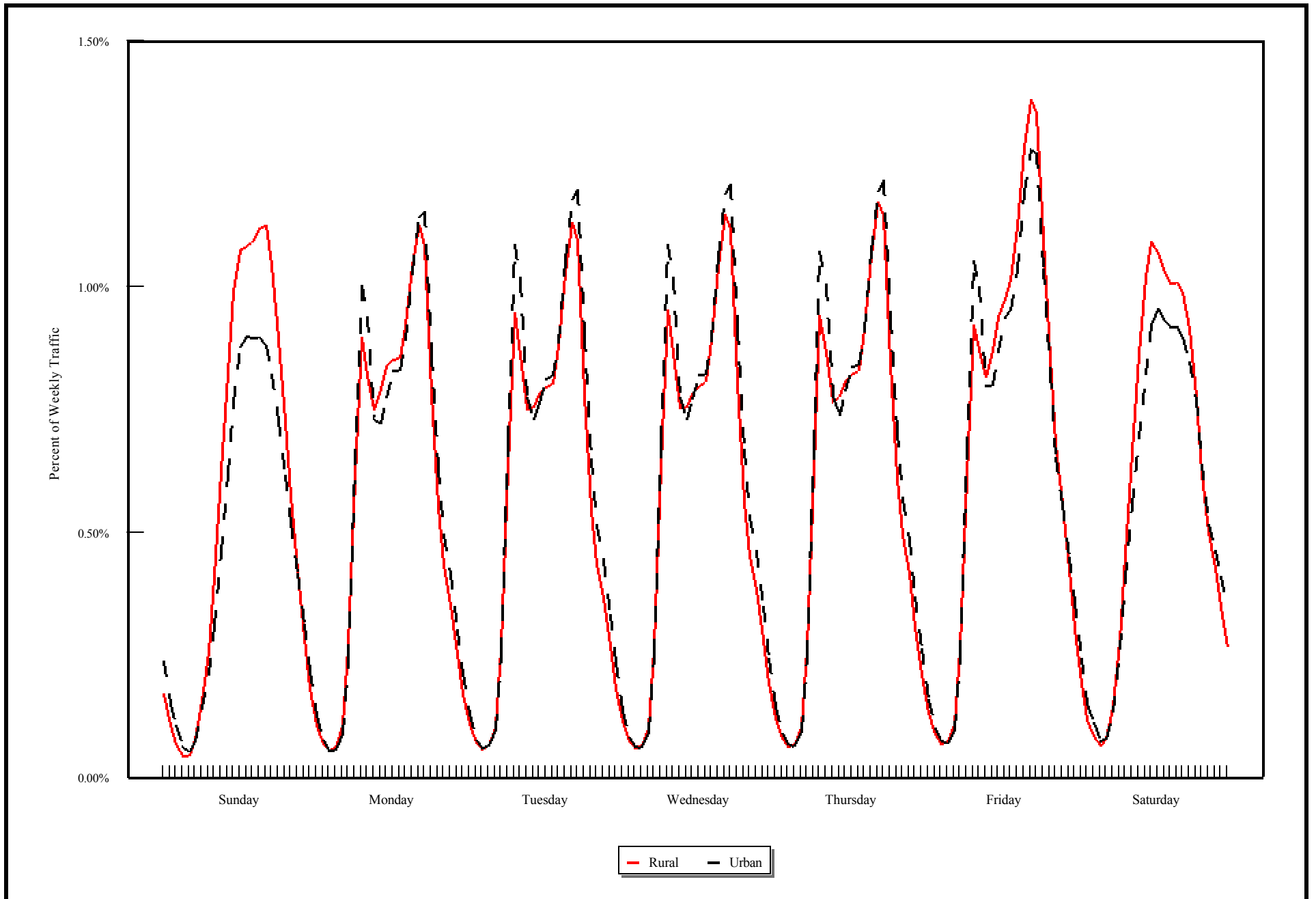


Figure 3.3.5: Northeast Region, 1995 Weekly Pattern

4: Daily Travel

Figures 3.4.1 through 3.4.4 show the daily traffic distributions by region for 1992 and 1995. Comparable data for 1978 and 1983 were unavailable; therefore, this section will focus only on the 1992 and 1995 data.

Figure 3.4.1 shows the 1992 weekday distribution. There are morning and evening peaks, but there are some regional variations. The Northeast region shows a different pattern during the morning peak. It does not decline as fast as the other regions. The West region has the lowest morning peak, but has a high percentage of traffic in the afternoon. At the other times during the day, the regions appear similar. All five regions have the largest volume of traffic from 12 noon to 4:00 p.m.

Figure 3.4.2 is the regional traffic pattern for weekends in 1992. The Northeast region shows a slightly different pattern from the other regions, as the peak comes at 12 noon, rather than at 4:00 p.m., as in the other regions.

Figures 3.4.3 and 3.4.4 show the same patterns for 1995 that Figures 3.4.1 and 3.4.2 showed for 1992. Figure 3.4.3 shows the weekday pattern. There is less variation in this figure than in Figure 3.4.1. The Northeast has resumed a pattern that is consistent with the rest of the country. The South Atlantic region shows increased traffic during the middle of the day, while the other regions remain fairly consistent.

Figure 3.4.4 shows the 1995 weekend pattern. All of the regions are remarkably similar, with only the South Gulf region showing much variation from the pattern. The South Gulf shows a higher portion of traffic in the morning and a lower peak than the other regions.

All in all, the regions show a remarkable level of consistency. There is very little

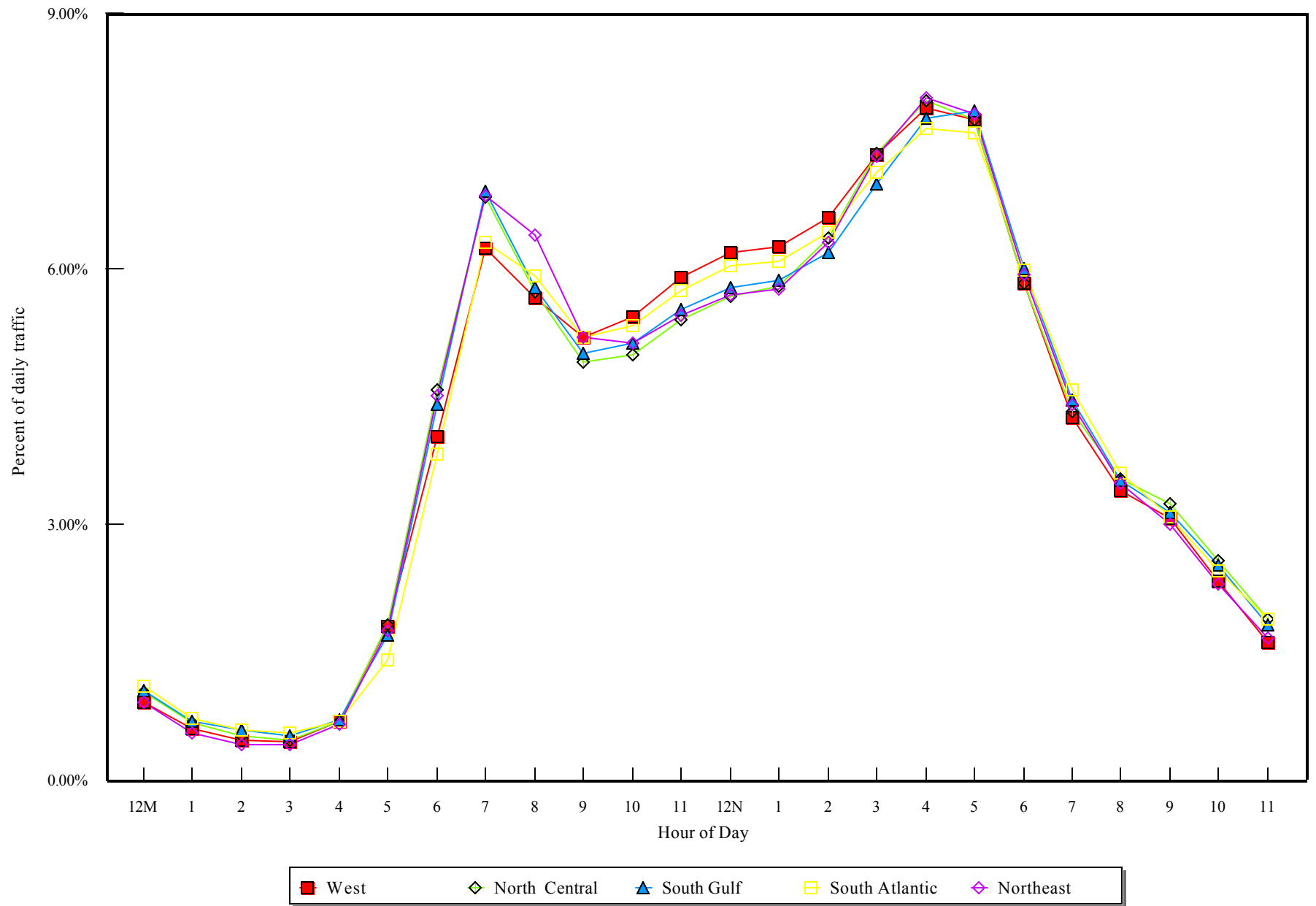


Figure 3.4.1: 1992 Weekday Traffic Pattern by Region

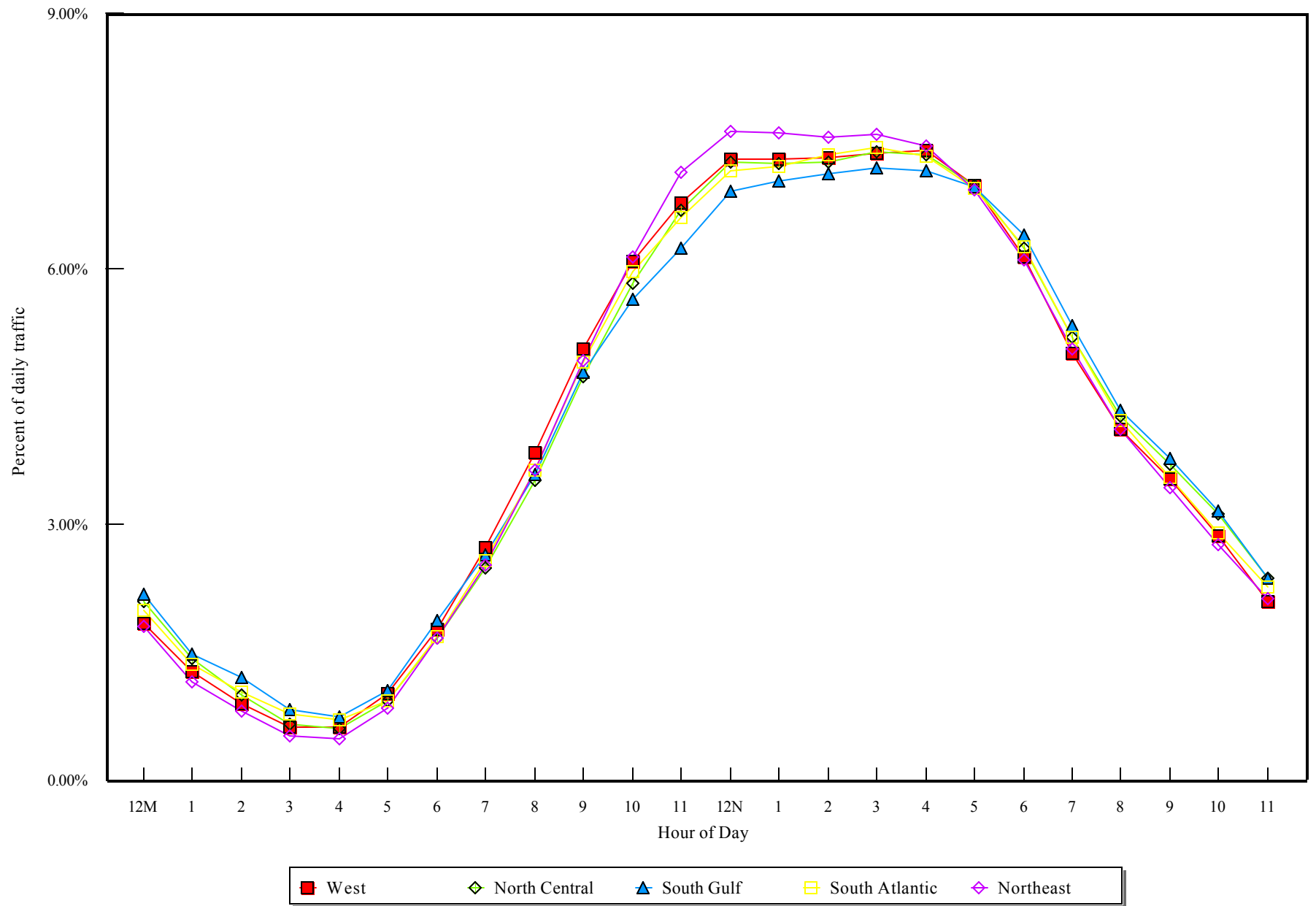


Figure 3.4.2: 1992 Weekend Traffic Pattern by Region

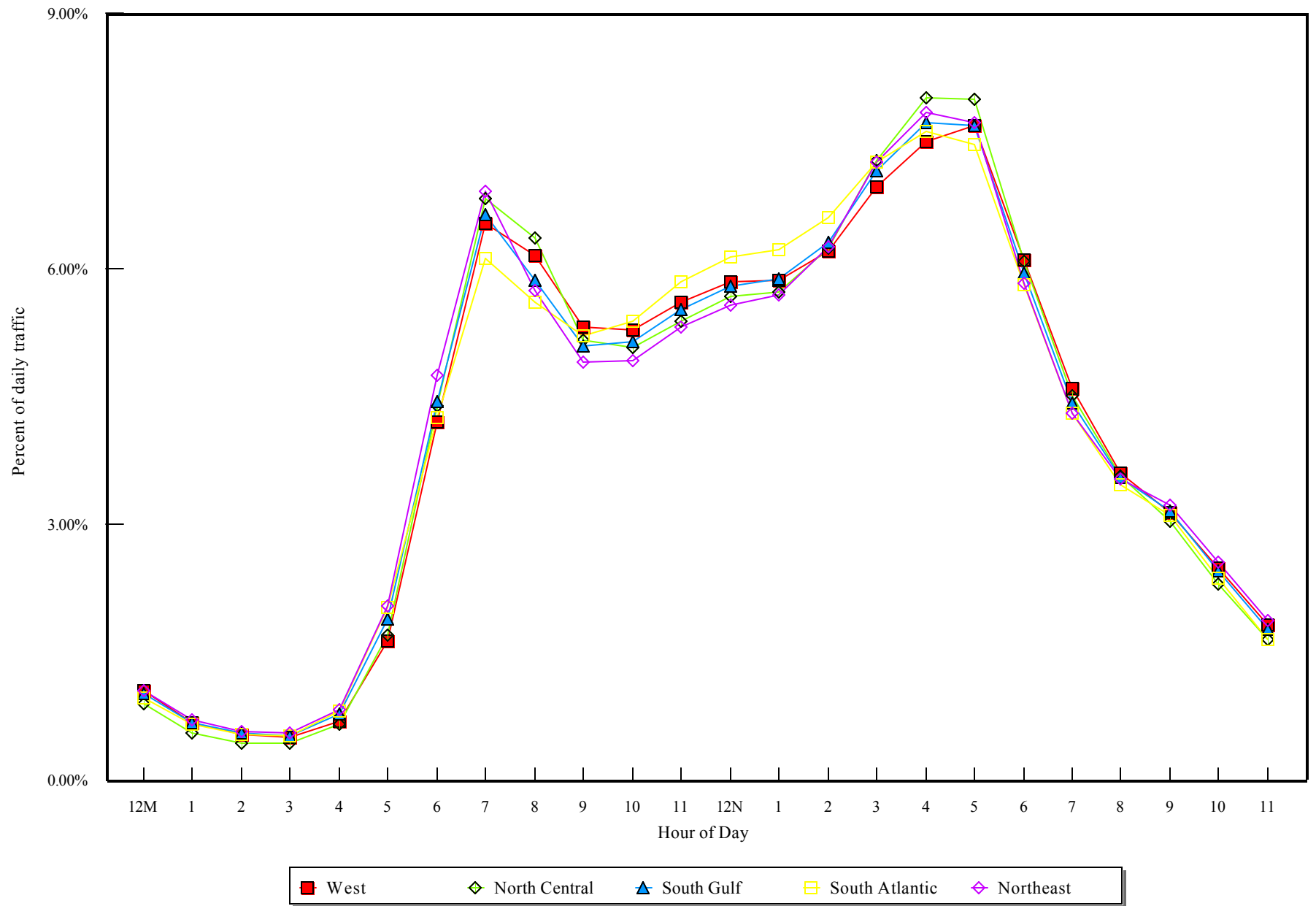


Figure 3.4.3: 1995 Weekday Traffic Pattern by Region

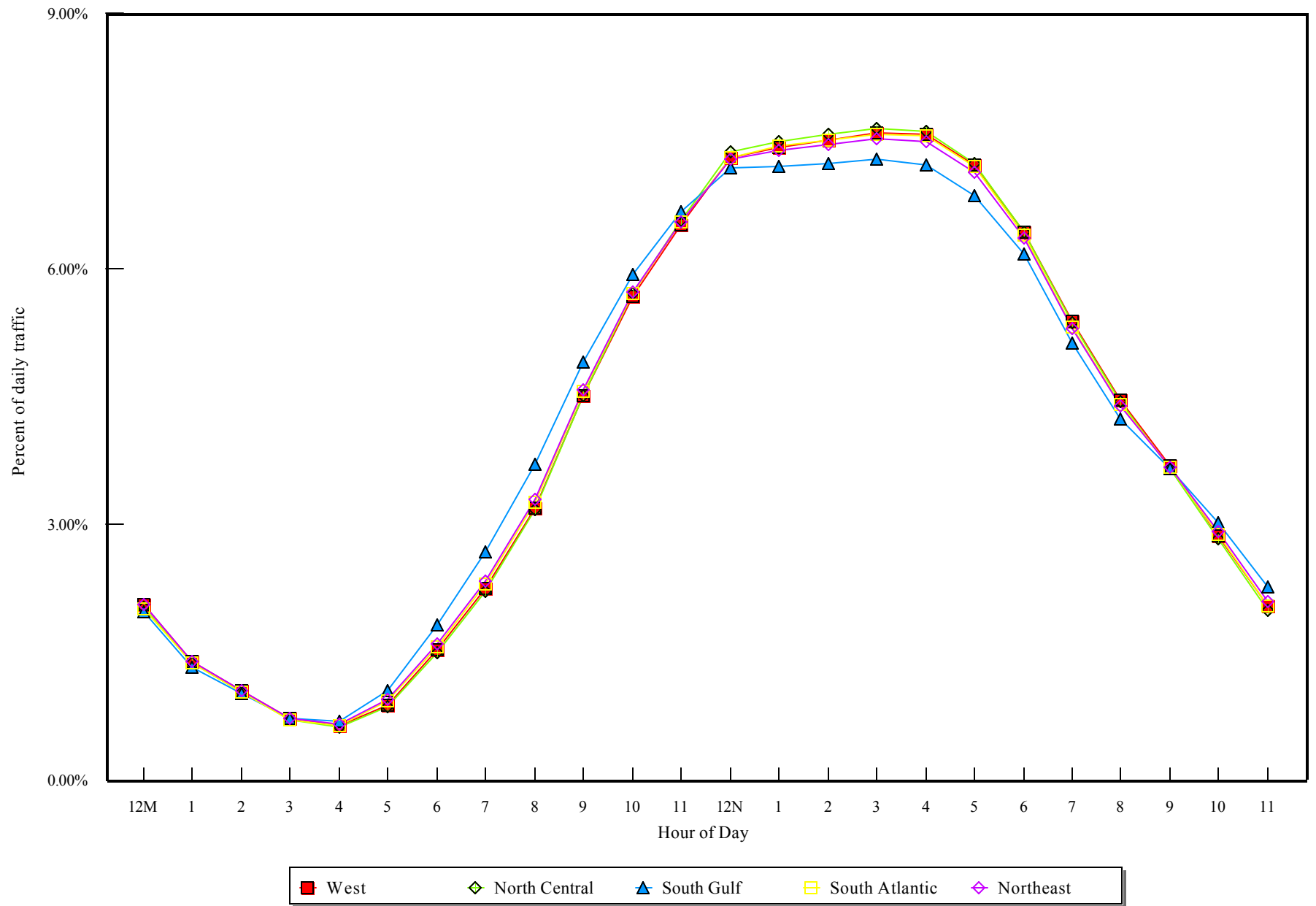


Figure 3.4.4: 1995 Weekend Traffic Pattern by Region

variation from region to region in terms of the percentage of travel during the day. There is however, a large disparity when the actual amount of travel is examined, as in section 3.1. There are large differences among the regions. Even with these differences, patterns remain largely the same.

4: Holiday Traffic

In this section, holiday traffic is examined. ATR records were averaged for 1992 and for 1995 for two holiday periods, Memorial Day and Thanksgiving Day. The weeks when these holidays occur were extracted from the ATR data to yield a pattern for the holiday week.

Figures 4.1 and 4.2 show the rural and urban weekly patterns for Memorial Day week for 1992 and 1995, respectively. These figures start with the Friday before Memorial Day and run through the Friday after Memorial Day. The scale is in percent of traffic occurring during those 8 days. Figure 4.1 shows the Memorial Day week for 1992. From this figure, it can be seen that a holiday affects traffic for time periods other than the holiday itself. Notice the large peak in the afternoon of Friday, May 22. The urban and rural patterns almost match on Friday afternoon. Saturday also has a distinct pattern, with a large peak in the morning. This occurs on both the urban and rural systems. Sunday resembles a typical pattern, but Monday, the holiday, exhibits a weekend type pattern. There are no significant peaks on Monday, but it is almost a perfect bell curve. By Tuesday, the traffic has resumed a normal pattern, and by Wednesday, there is no variation from a normal pattern at all. Figure 4.2 shows an identical pattern for 1995. This may indicate a repeating pattern around the Memorial Day holiday, or all Monday holidays in general.

Figures 4.3 and 4.4 show the pattern for Thanksgiving week for 1992 and 1995. The scale is the same as for Memorial Day, but the graph runs from Monday to Monday. Figure 4.3 is the pattern for 1992. Monday and Tuesday show the normal pattern for weekdays. Wednesday, however, shows a Friday pattern, showing a large afternoon peak on both urban and rural

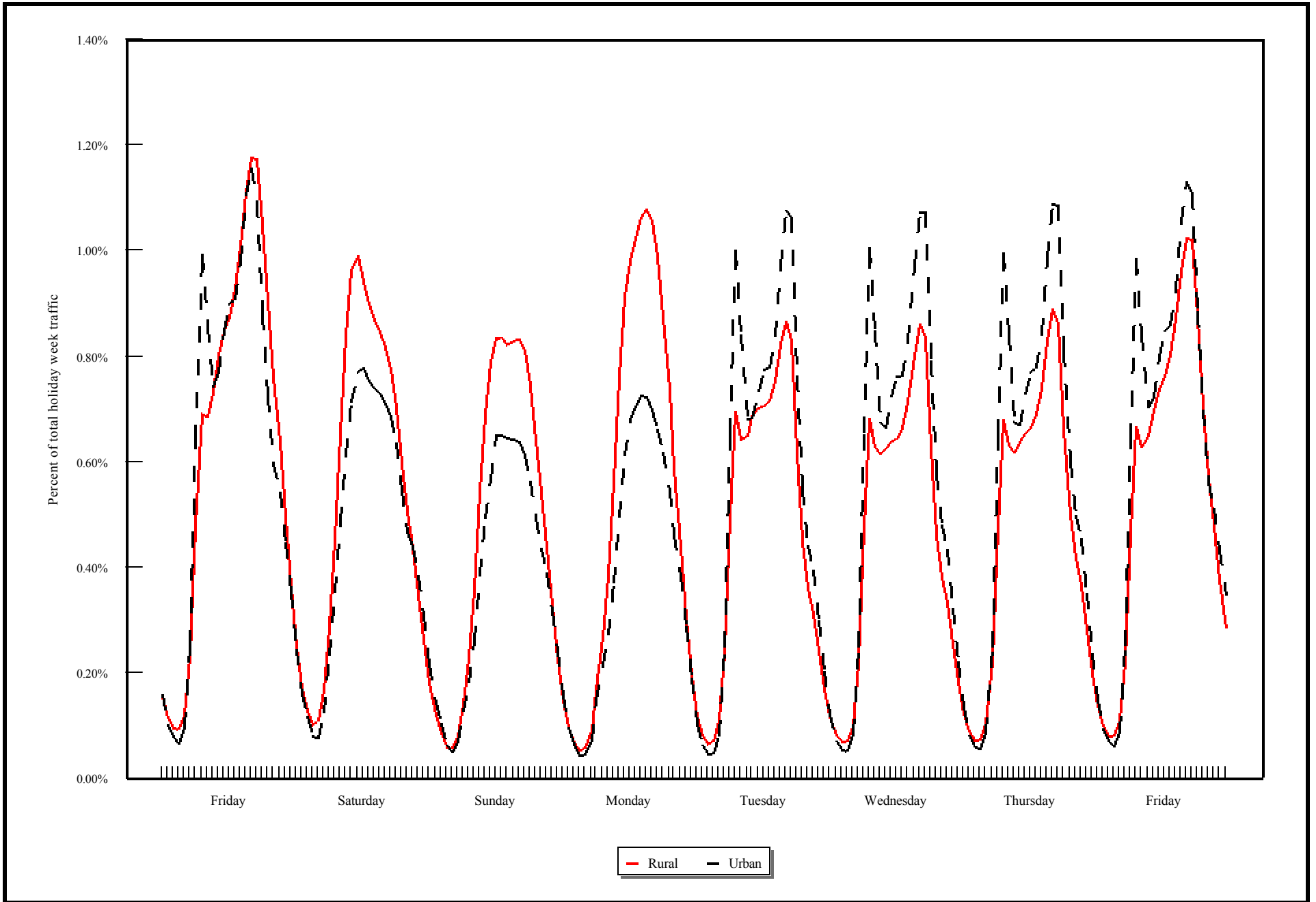


Figure 4.1: 1992 Memorial Day Week, Friday, May 22-Friday, May 29

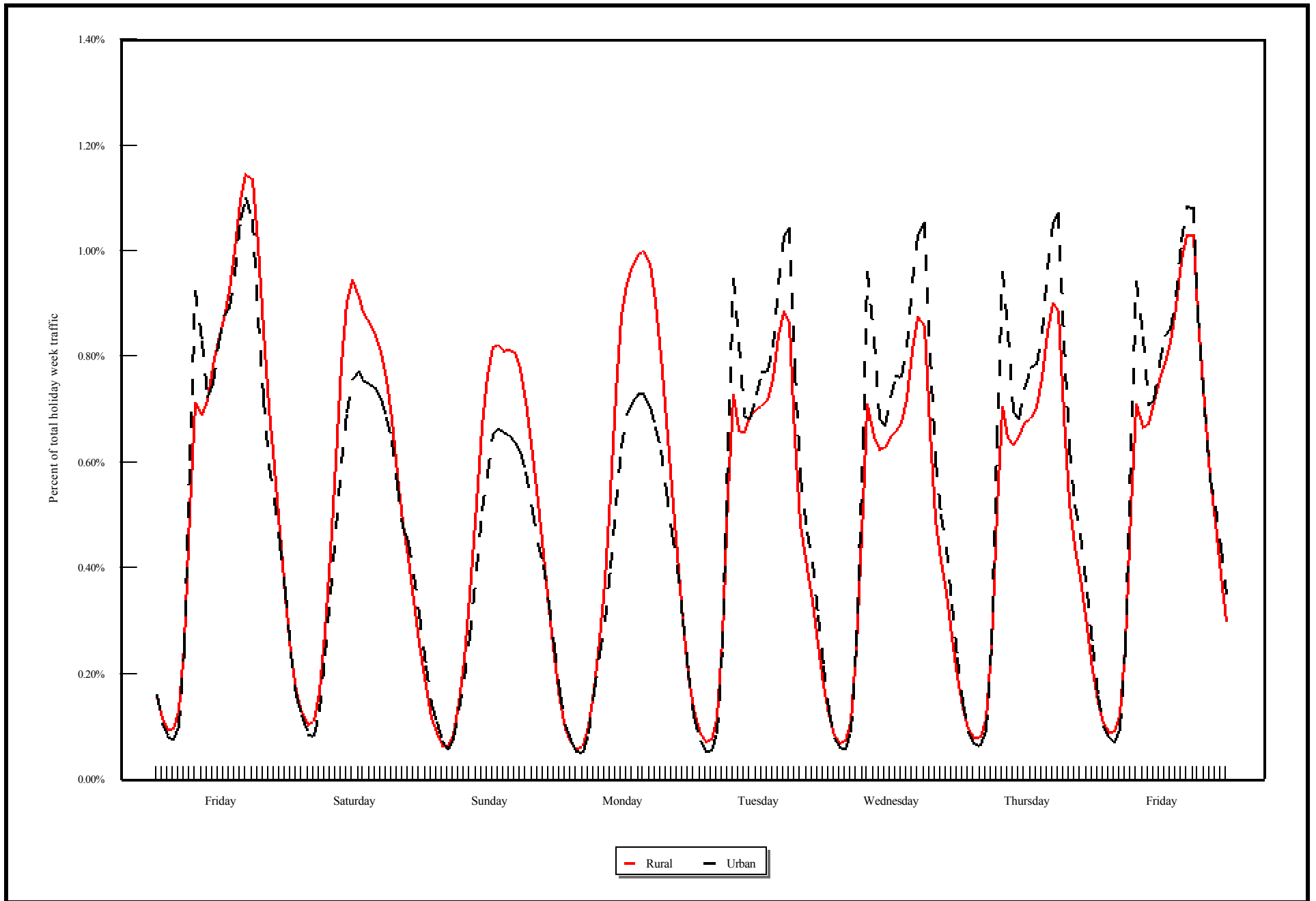


Figure 4.2: 1995 Memorial Day Week, Friday, May 26-Friday, June 2

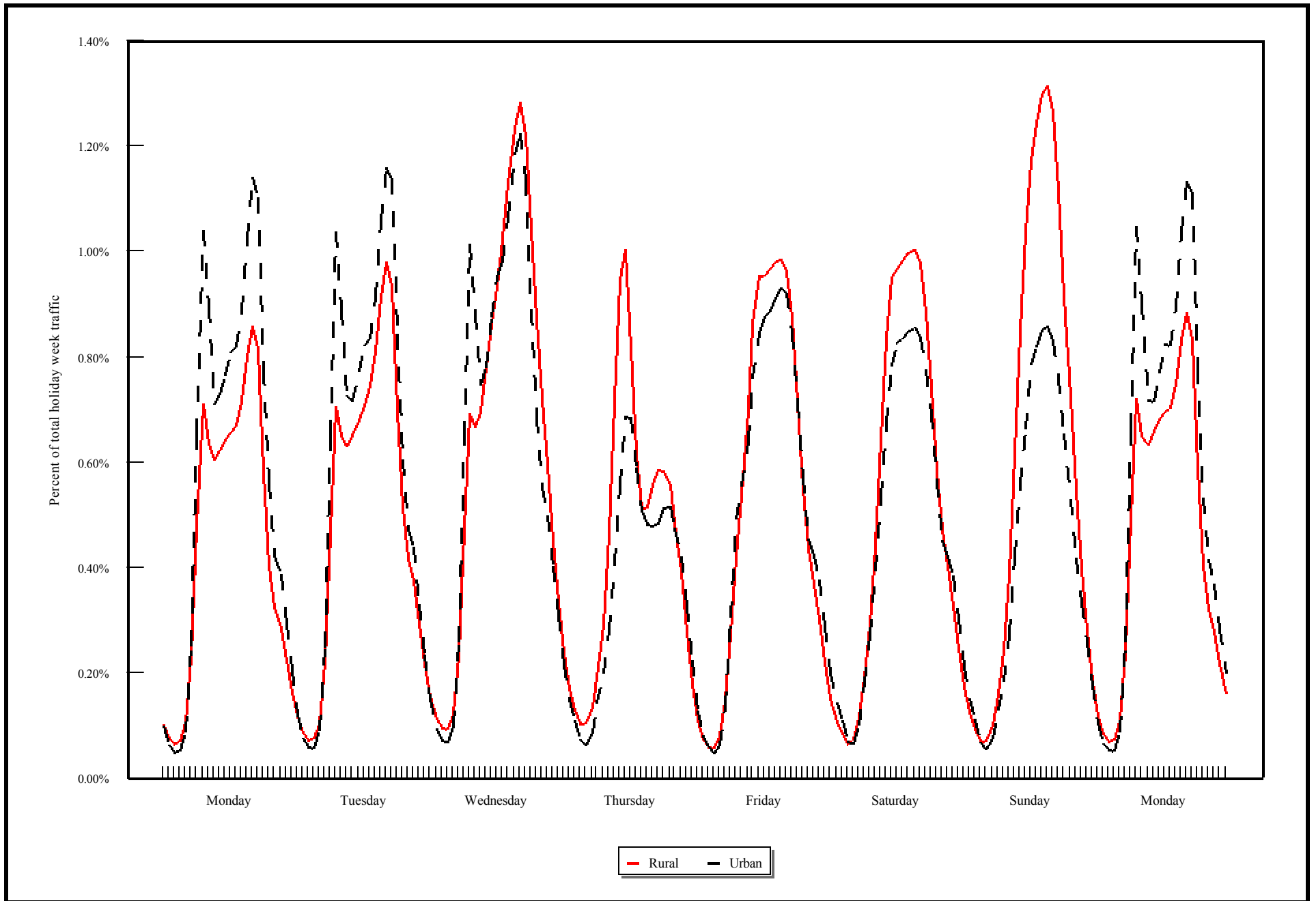


Figure 4.3: 1992 Thanksgiving Week, Monday, November 23-Monday, November 30

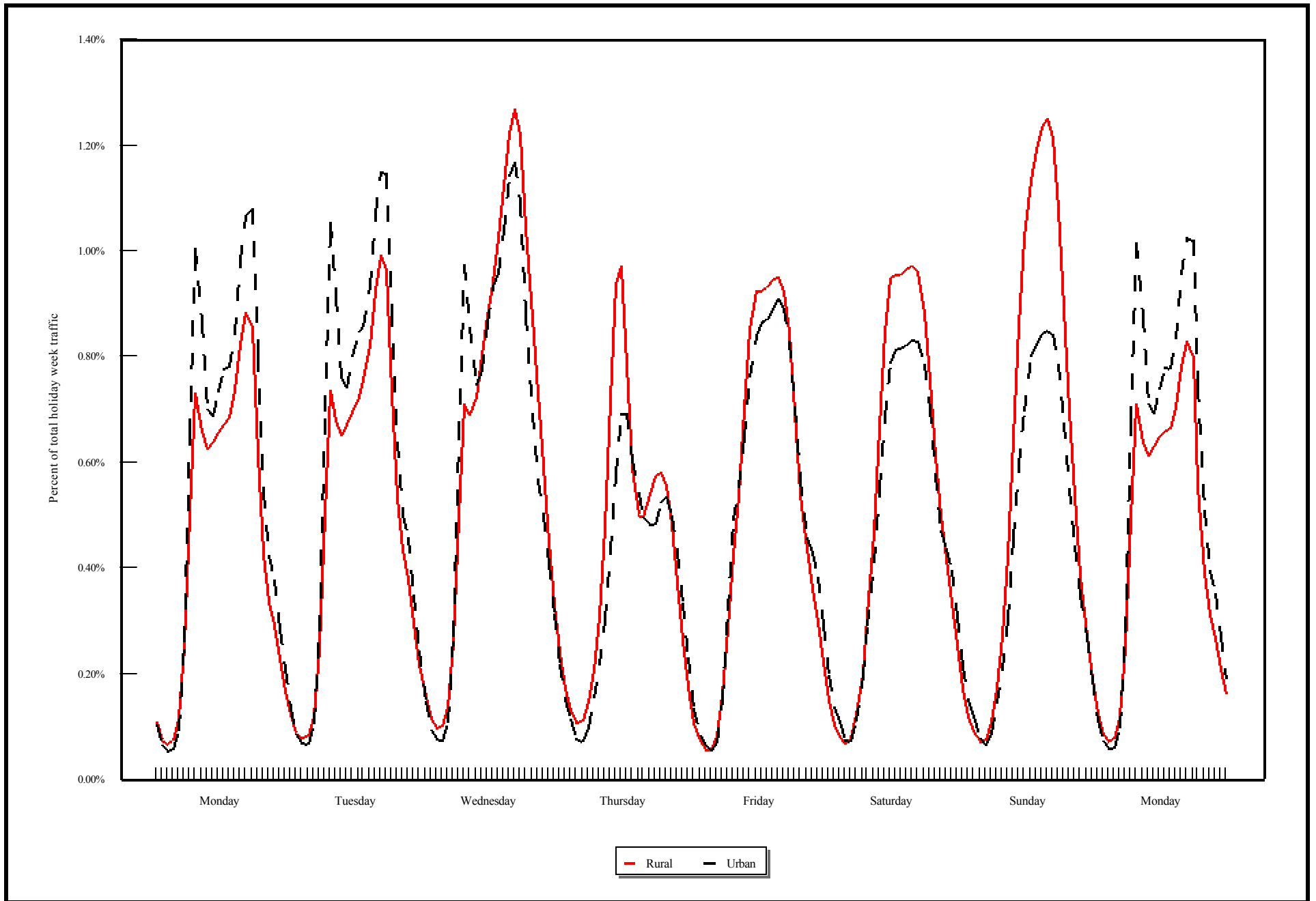


Figure 4.4: 1995 Thanksgiving Week, Monday, November 20-Monday, November 27

systems. Thursday, Thanksgiving Day, shows a very unique pattern. The morning peak is almost twice that of the afternoon and it drops very fast after the peak. These last minute travelers then return at the peak of Sunday travel. Friday and Saturday are identical, with the urban traffic on Friday being slightly higher. Sunday shows a large peak, indicating a large volume of traffic. Figure 4.4 shows this same pattern. By Monday, traffic has resumed its normal pattern.

These patterns seem to indicate that where a holiday falls in the week determines how traffic will be affected. Memorial Day always falls on a Monday, and the traffic is affected before the holiday, mainly from Friday to Monday night. By Tuesday morning, traffic has resumed its normal patterns. Thanksgiving Day, on the other hand, is always on a Thursday. Traffic seems to be affected more after the holiday than before. The Wednesday before shows a Friday pattern, while Friday and Saturday show identical patterns. Sunday seems to be the big travel day as everyone returns home. By Monday the traffic has resumed its normal pattern. The traffic pattern for the holiday itself is rather odd as well. With a large morning peak and lower afternoon peak, Thanksgiving Day has a unique traffic pattern.

5: Conclusions

The importance of mobility to Americans has never been higher than it is today. As traffic and travel increase, it becomes increasingly more important to have accurate estimates and historic data on which to base forecasts of the amount and temporal distribution of that travel. The main data collection agencies charged with this task are at the State and local level.

The data provided by the States are used by the Federal government in the national and regional analyses of travel. This report has looked at these estimates and has extracted some important trends in the travel in this country. Overall, it appears that travel is growing at approximately 3 percent per year. Urban travel is growing faster than rural, but the urban growth rate appears to be slowing. Since a similar report was first published in 1986, the urban growth rate has dropped from 3.88 percent to 3.57 percent while rural travel has increased from 1.96 percent to 2.40 percent.

Travel takes place in cycles, whether it is monthly, weekly, or daily. The knowledge that these cycles are relatively steady is important to planners and policy makers. Travel is lowest in the winter and highest in the summer. This holds for all regions. Weekend and weekdays have distinct patterns, and Saturday and Sunday have patterns which are distinct from one another, as well. These hourly fluctuations are beginning to change. More travel is taking place in the middle of the day. Presently, more than 80 percent of the daily travel takes place between the hours of 5:00 a.m. and 6:00 p.m. The middle part of the day is where the growth is occurring. The early morning hours are losing their share of the daily travel.

There is some regional variation in travel patterns, but not as much as was expected. The largest differences appear between the northern, more urbanized regions, which are subject to severe

winter weather, and the southern, more rural, regions, which are not prone to severe winter weather.

The western region has the characteristics of the national pattern.

Holiday travel is an area which yielded some very interesting results. The most striking result is how quickly traffic returns to its normal pattern after a holiday. Where a holiday falls in the week will determine when traffic will be affected. Memorial Day, which is always on Monday, affects travel the weekend before, while Thanksgiving, always on Thursday, affects travel more after the holiday than before.

Bibliography

Highway Statistics. Various Years. Washington D.C. Federal Highway Administration, U.S. Department of Transportation.

Lau, L. 1986. Analysis of National and Regional Travel Trends. Washington D.C. Federal Highway Administration, U.S. Department of Transportation.

The Highway Performance Monitoring System. 1994. Washington D.C. Federal Highway Administration, U.S. Department of Transportation.

Traffic Monitoring Guide. 1992. Washington D.C. Federal Highway Administration, U.S. Department of Transportation.

Traffic Volume Trends. Various Months. Washington D.C. Federal Highway Administration, U.S. Department of Transportation.

Appendix A: Methodology

The methodology used for this project is very straightforward. For the annual and monthly analysis, travel data from Table VM-2 in the annual Highway Statistics publication were used. For the weekly, daily, and special travel sections, data collected by States in support of Traffic Volume Trends were used. These data were taken from the individual Automatic Traffic Recorder (ATR) sites in the individual States. Most of the States provide data in support of this monthly publication. The size of these data sets is immense. The 1992 data set alone contains 1.8 million data records, covering the hourly counts of ATR sites in 42 states for the calendar year of 1992. The file size of this database file is in excess of 256 megabytes.

The data for the annual and monthly sections were extracted from their original format into spreadsheets used for creating the final tables. These data are the most up-to-date figures available, and therefore, may not agree with previously published totals due to revision and/or rounding. The extraction process for the ATR data was more complex. When the files are submitted by the States, they are in ASCII format. A series of database programs were written to calculate the average hourly count for different combinations of variables, whether region, functional class, or day of the week. The distribution of records by functional class is shown in Figure A.1. This process put the data into a form where they could be easily analyzed and manipulated. The data were examined at the national and regional level for both urban and rural classes and by weekend and weekday time periods. The urban/rural designation was made using the FHWA classification system (See Table A.1 below) set forth in the Highway Performance

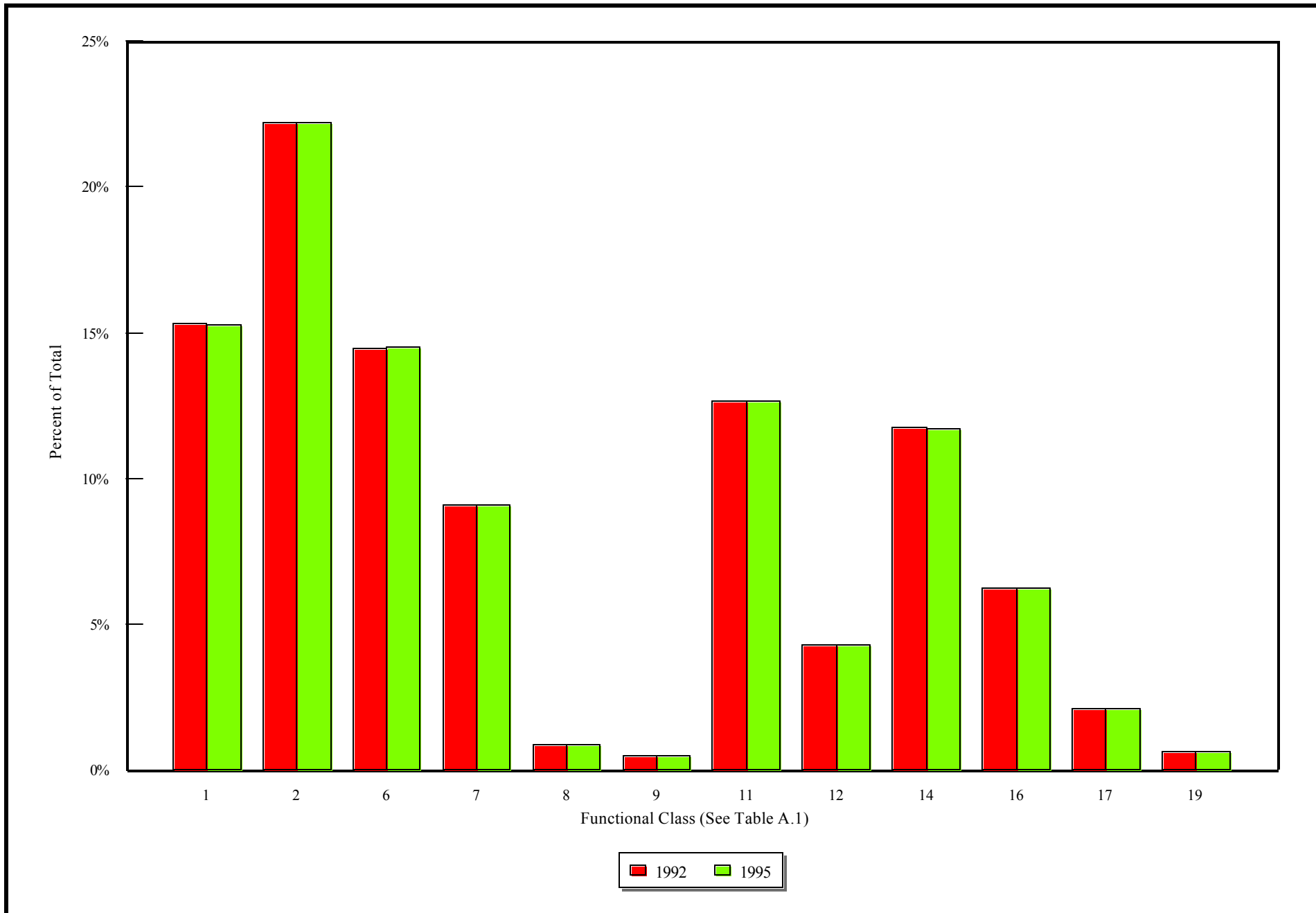


Figure A.1: Distribution of ATR observations by Functional Class

Monitoring System (HPMS) and taken from the Traffic Monitoring Guide (1992).

Table A.1 Functional Classification of Road Segments

Rural	Functional Class
Principal Arterial-Interstate	01
Other Principal Arterial	02
Minor Arterial	06
Major Collector	07
Minor Collector	08
Local System	09
<hr/>	
Urban	
Principal Arterial-Interstate	11
Principal Arterial-Other Freeway and Expressway	12
Other Principal Arterial	14
Minor Arterial	16
Collector	17
Local System	19

Source: Traffic Monitoring Guide p. 5-4-2

The grouping of States into regions was done to conform to the Traffic Volume Trends regions. There are five regions: West, North Central, South Gulf, South Atlantic, and Northeast. These regions, and the States contained within them, are defined in Table A.2. Also noted are the States which did not submit ATR data for the study years.

The analysis of all these data began with charting the results. It is often easier to identify changes and problems in the data when they are displayed in graphical format. The graphs and charts that are contained in this document represent the data sets. Basic statistical calculations were also used in the analysis of the annual trends.

Table A.2 Regional Designation of States

West	North Central	South Gulf	South Atlantic	Northeast
Alaska	Illinois	Alabama	Delaware	Connecticut
Arizona	Indiana	Arkansas	D.C.*	Maine
California	Iowa	Kentucky	Florida*	Massachusetts
Colorado*+	Kansas*+	Louisiana*+	Georgia	New Hampshire
Hawaii*+	Michigan	Mississippi	Maryland*	New Jersey
Idaho	Minnesota	Oklahoma	North Carolina	New York
Montana	Missouri	Tennessee*	South Carolina	Pennsylvania
Nevada	Nebraska	Texas	Virginia*	Rhode Island
New Mexico	North Dakota		West Virginia*+	Vermont
Oregon	Ohio			
Utah	South Dakota			
Washington	Wisconsin			
Wyoming			* State did not report in 1992	+ State did not report in 1995