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Status Report on the Effects of the 65 mph Speed Limit on Virgina's Rural Interstate Highway System

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Supplementary Notes

Abstract

In 1987, the Secretary of Transportation and Public Safety created a task force to study the potential effects of raising the speed limit on rural interstate highways in Virginia. In its 1988 session, the Virginia General Assembly passed legislation to increase the speed limit on rural interstate highways to 65 mph for passenger vehicles, but the 55 mph limit was retained for buses and large trucks. After implementation of the higher speed limit on July 1, 1988, the Secretary reconvened the task force to design a study to determine the effects of the changed speed limit. The Virginia Transportation Research Council was again asked to serve a the staff for the task force.

The preliminary data provided in this report represent only 5 months of experience with the 65 mph speed limit and are presented for information only. Any conclusions drawn from these data would be inappropriate and perhaps incorrect.

After the speed limit for cars was increased by 10 mph, the average and 85th percentile speeds traveled by all vehicles on the rural interstate system increased by 3 mph, to 63 mph and 68 mph, respectively. The average and 85th percentile speeds traveled by trucks and buses, for which the speed limit remained at 55 mph, decreased slightly.

Between July 1 and November 30, 1988, there were 44 fatalities in 35 fatal crashes on rural interstate highways in Virginia. This was a 76 percent increase over the 25 fatalities and a 52 percent increase over the 23 fatal crashes for the same tim period in 1987. In the states that increased the speed limit, there was a 41 percent increase overall in the number of fatalities, but in states that did not increase the speed limit, there was a 54 percent increase in fatalities--higher than that noted for states that increased the speed limit.

Many of the crashes that accounted for the increase in the number of fatal crashes on rural interstate highways occurred on I-81, and all of the multiple-fatalit crashes occurred on either I-81 or I-95. In comparison with 1987, the number of fatal crashes in 1988 included 5 more involving vehicles that ran off the road, 4 more involving tractor trailers, and 3 more involving pedestrians. In October 1988, there was an abnormally high number of fatal crashes and fatalities on Virginia's rural interstate highways, but no patterns were found to explain this 1-month abnormality.

Because there are not sufficient data to determine the reasons for the increases in fatal crashes and fatalities, data will be gathered over a 5- year period to determine the effect of the changed speed limit on Virginia's rural interstate highways.

STATUS REPORT

ON

THE EFFECTS OF THE 65 MPH SPEED LIMIT ON VIRGINIA'S RURAL INTERSTATE HIGHWAY SYSTEM

Submitted to the Secretary of Transportation and Public Safety

from

The Secretarial Task Force on Interstate Highway Speed Limits

by

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(The opinions, findings, and conclusions expressed in this report are those of the authors and not necessarily those of the sponsoring agencies.)

Virginia Transportation Research Council
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SUMMARY

- The preliminary data represent only 5 months of experience with the 65 mph speed limit and are presented for information only. Any conclusions drawn from these data would be inappropriate and perhaps incorrect.

- After the speed limit was raised, the average speed traveled by all vehicles on the rural interstate highways in Virginia was 63 mph, and the 85th percentile speed was 68 mph, each up 3 mph.

- Compared to 1987, average and 85th percentile speeds in 1988 were down on the rural interstate highways approximately 0.5 mph in states that retained the 55 mph speed limit but up approximately 2 mph in states that increased the speed limit.

- In Virginia, after the rural interstate speed limit was increased for cars but remained 55 mph for trucks and buses, the average speed traveled by trucks decreased from 58.8 mph to 57.5 mph. That for buses decreased from 61.9 mph to 59.6 mph.

- Rural interstate fatal crashes in Virginia increased from 23 between July and November 1987 to 35 in 1988. Fatalities rose from 25 to 44.

- Rural interstate fatalities were up 54 percent in states that did not increase the rural interstate speed limit and 41 percent in states that did increase the speed limit. In the 5 months immediately following the change in the speed limit, fatalities were up 76 percent in Virginia.

- There was a 7 percent increase in traffic on the rural interstate highways in Virginia in 1988.

- Increases in fatal crashes on the rural interstate highways in Virginia during the first 5 months after the speed limit change compared to those months in 1987 included 5 more crashes involving vehicles that ran off the road, 4 more involving tractor trailers, and 3 more involving pedestrians.

- Much of the increase in rural interstate fatal crashes occurred on Interstate 81. Interstate 81 and Interstate 95 had all of the multiple-fatality crashes.

- In October 1988, there was an abnormally high number of fatal crashes and fatalities on Virginia's rural interstate highways, but no patterns were found to explain this one-month abnormality.

- Nationally, urban interstate average and 85th percentile speeds were up slightly both in states that retained the 55 mph speed limit and in those that raised it.

- In Virginia, urban interstate fatal crashes were up by 5 between July and November 1988, but there was only 1 additional fatality compared to 1987.

- Data will be gathered over a 5 year period to determine the impact of both the 65 mph speed limit and the differential between cars and trucks and buses and to determine whether action is warranted at any time by the Commissioner of the Department of Transportation to lower the speed limit on specific stretches of the rural interstate highway system.

STATUS REPORT

ON

THE EFFECTS OF THE 65 MPH SPEED LIMIT ON VIRGINIA'S RURAL INTERSTATE HIGHWAY SYSTEM

Submitted to the Secretary of Transportation and Public Safety

INTRODUCTION

In April of 1987, after the Virginia General Assembly had adjourned, Congress passed the Surface Transportation and Uniform Relocation Assistance Act of 1987, which included a provision to grant the states the authority to raise the speed limit to 65 mph, without penalty, on interstate highways outside of urbanized areas with a population of 50,000 or more. In an effort to provide the administration and members of the General Assembly with the data necessary to make an informed decision on this matter, the Secretary of Transportation and Public Safety, Vivian E. Watts, created a task force to study the issue. Although the task force made no recommendations, it produced a report that included estimates of both the positive and negative effects that raising the speed limit would have on the Commonwealth. The issue received considerable attention during the 1988 Session of the General Assembly. Toward the end of the Session, legislation to increase the speed limit was passed, and on July 1, 1988, the speed limit on most of Virginia's rural interstate highway system was raised from 55 mph to 65 mph for passenger vehicles, but remained at 55 mph for buses and large trucks.

The task force was recovened to develop a study to determine the impact of the changed speed limit. Because of the short time since the implementation of the higher speed limit there are not sufficient data to link any changes, or lack thereof, to the change in the speed limit alone. In order to evaluate the impact of the higher speed limit, sufficient time must have passed and adequate data must have been collected in order to rule out the possibility that changes on the rural interstate highways are the result of other factors (e.g., changes in alcohol-related crashes, pedestrian crashes, or traffic volume) or more than a result of normal fluctuations. Thus, the task force cautions that the preliminary data provided are for information only, and any conclusions based on these data would be inappropriate, premature, and, perhaps, incorrect.

SPEEDS AND CRASHES ON THE INTERSTATE HIGHWAY SYSTEM

Speeds

Average and 85th Percentile Speeds

As predicted by the task force, speeds on the rural interstate highway system increased in Virginia subsequent to the implementation of the 65 mph speed limit, and the amount of the increase was substantially less than the 10 mph increase in the legal limit (see Figure 1). Data collected by the VDOT in August 1988 indicate that the average speed traveled on the rural interstate highway system in Virginia was approximately 63 mph, up 3 mph from the average speed traveled during the period from April to June of 1987, which was used as the baseline in the 1987 report of the task force. The 85th percentile speed (the speed at or below which 85 percent of the vehicles travel) on the rural interstate highway system in August of 1988 was 68 mph; 3 mph higher than it was during the 1987 baseline time period.*

The 1987 report of the task force noted that in most of the states that had speed data available, the average and 85th percentile speeds traveled, in general, were up between 1 mph and 5 mph within the first three months of the higher speed limit's implementation. Thus, the short-term increases in average and 85th percentile speeds experienced in Virginia are not unlike increases experienced elsewhere.

In order to learn what has happened over a longer period of time, other states were again surveyed. Only 10 states do not currently have a 65 mph speed limit posted on at least part of the rural interstate highway system (see Figure 2). Of these, Alaska and Delaware have no miles of rural interstate highway, and Hawaii has only five miles. Thus, the seven states that realistically could raise the rural interstate speed limit to 65 mph, but have chosen not to are: Connecticut, Maryland, Massachusetts, New Jersey, New York, Pennsylvania, and Rhode Island. All seven of these states were surveyed and had available speed data for the rural interstate highway system, but only four had data available for the urban interstate highways. Of the 40 states that raised the rural interstate speed limit to 65 mph, rural interstate speed data were available only for Virginia and 14 other states, but 16 other states had urban interstate data available. Every attempt was made to compare the period from January to March of 1987 to those months in 1988 since these months represent periods before and after the change to the higher speed limit in all cases but Virginia. However, because of the limited availability of data, a few states were compared across other periods before and after the speed limit change. Table 1 provides an average of the rural interstate speed data collected from the various states. The actual data are listed in detail in Appendix A.

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*A subsequent speed survey in October 1988 showed that the average speed was 60 mph and the 85th percentile 70 mph. The August data, which indicate the higher average speed, will be used in this report; however, the October data indicate that approximately 15 percent of the traffic in the 24 hour survey periods exceeded 70 mph on the rural interstate highways in Virginia.

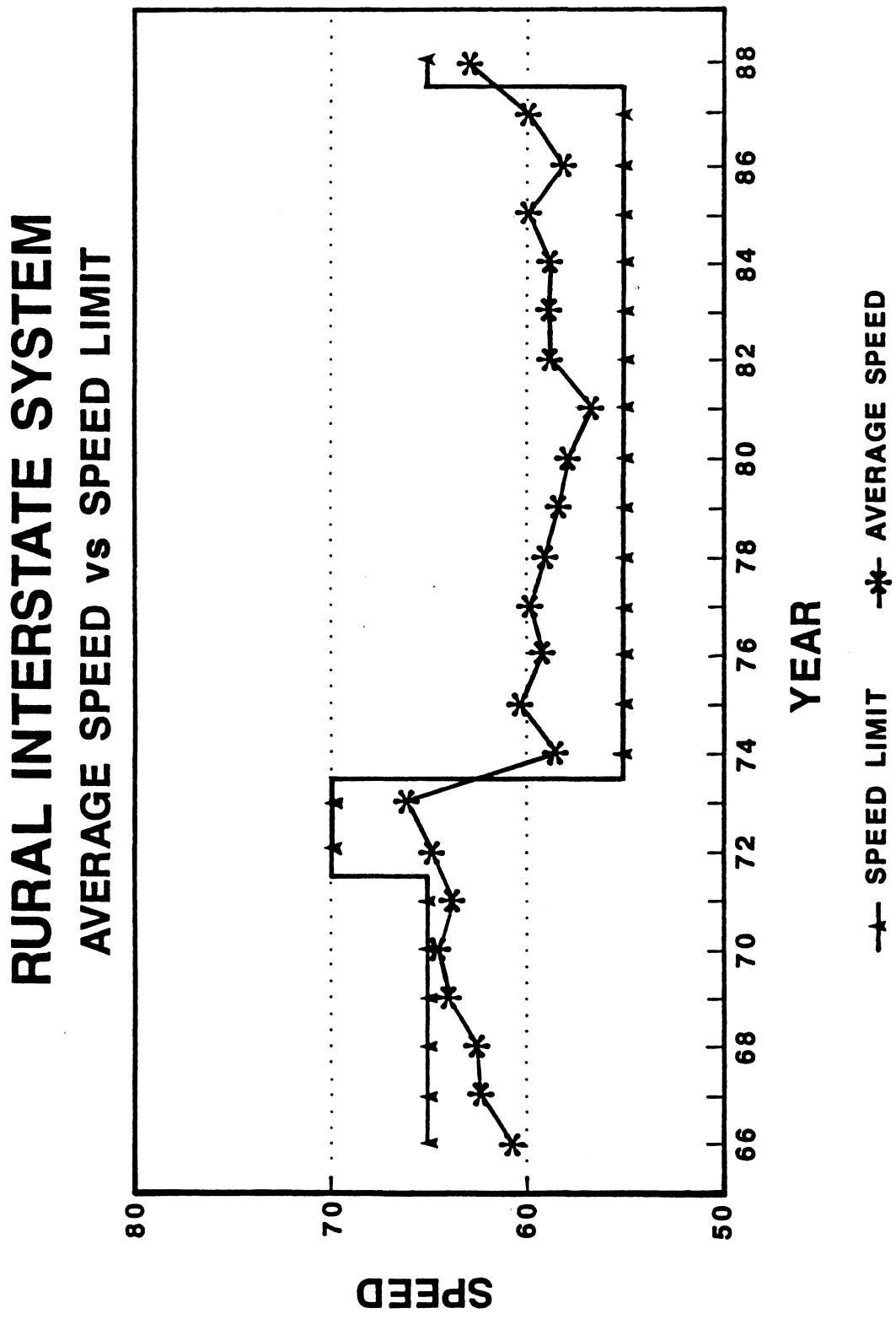

Figure 1. Rural Interstate Average Speed vs. Speed Limit in Virginia, 1966 - 1988.

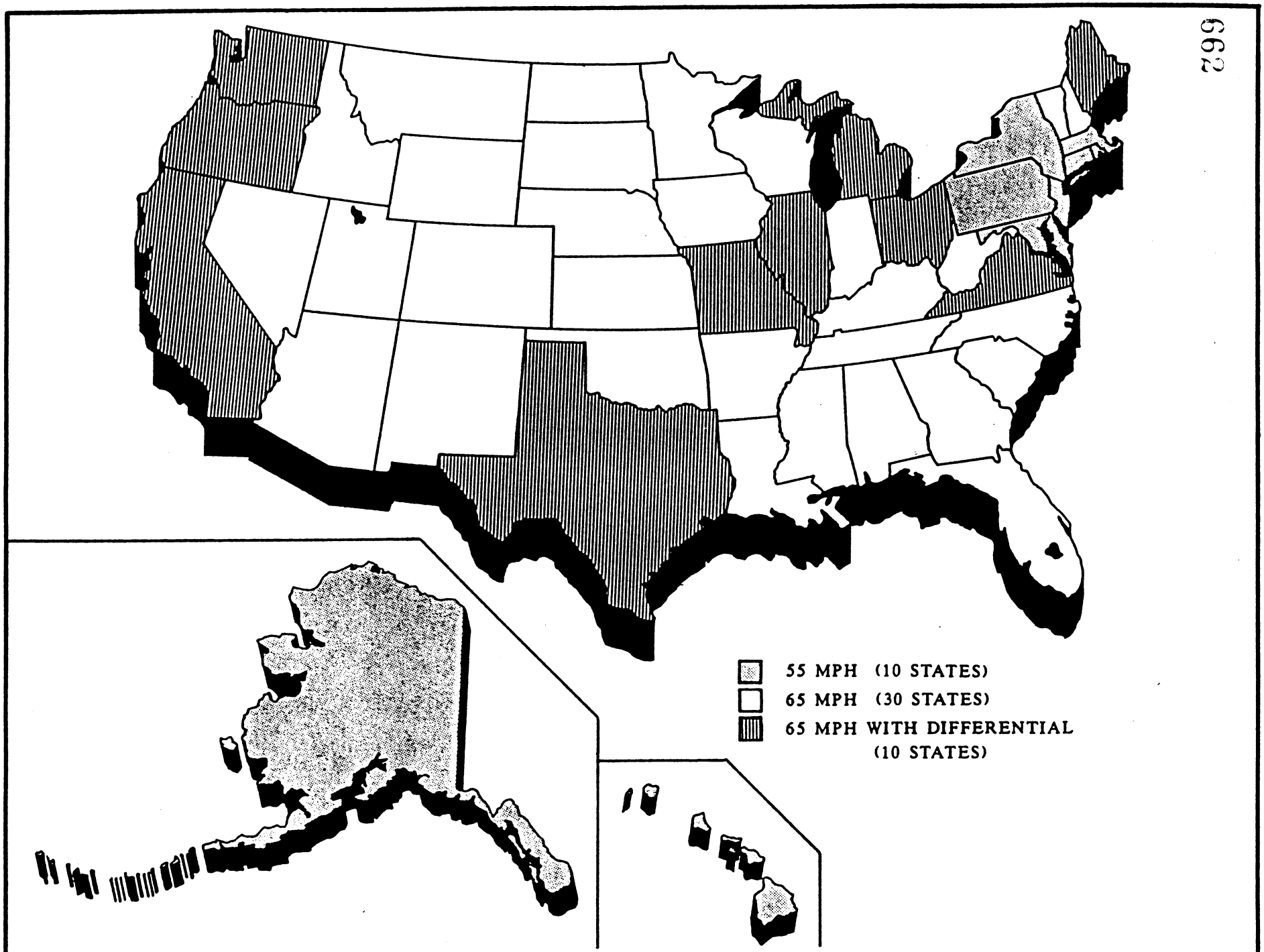

Figure 2. Rural Interstate Speed Limits in the United States.

TABLE 1
Selected States' Average and 85th Percentile
Rural Interstate Speeds

States with a 55 mph Rural Interstate Speed Limit
(n=7)

Speeds (mph)	1987	1988	Change
Average Speed	59.0	58.4	-0.6
85th Percentile	65.8	65.3	-0.5

States with a 65 mph Rural Interstate Speed Limit
(n=15)

Speeds (mph)	1987	1988	Change
Average Speed	60.5	62.6	+2.1*
85th Percentile	67.0	68.9	+1.9*

Virginia

Speeds (mph)	1987	1988	Change
Average Speed	59.9	62.9	+3.0
85th Percentile	65.0	68.0	+3.0

* Statistically significant at $p < 0.05$.

In the states where the 55 mph rural interstate speed limit was retained, the average speed traveled in 1988 on the rural interstate highways was 58.4 mph, down 0.6 mph overall, and the 85th percentile speed was 65.3 mph, down 0.5 mph; however, a t-test indicates that these differences are not statistically significant. Further, a close examination of the data indicates that one state, Connecticut, had a substantial reduction in speeds in 1988. If the Connecticut data are excluded, the other 6 states show a slight increase in speeds. Thus, the overall decrease in speeds should be interpreted cautiously.

In the states where the speed limit was increased to 65 mph on the rural interstate highways, the average speed traveled on the rural interstate highway system in 1988 was 62.6 mph, up 2.1 mph over that traveled in 1987, and the 85th percentile speed was 68.9 mph, up 1.9 mph. The increase in speeds on the rural interstate highways in states that increased the speed limit to 65 mph is statistically significant.

Because there is some concern that the higher speeds traveled on the rural interstate highways may spill over onto the urban interstate system,

other states were surveyed concerning the average and 85th percentile speeds on the urban interstate system. Table 2 lists an average of the urban interstate speed data collected by the survey, and a more detailed account of urban interstate speeds is listed by state in Appendix B.

TABLE 2
Selected States' Average and 85th Percentile
Urban Interstate Speeds

States with a 55 mph Rural Interstate Speed Limit
(n=4)

Speeds (mph)	1987	1988	Change
Average Speed	59.2	59.9	+0.7
85th Percentile	66.6	67.3	+0.7

States with a 65 mph Rural Interstate Speed Limit
(n=17)

Speeds (mph)	1987	1988	Change
Average Speed	57.2	58.1	+0.9*
85th Percentile	63.8	64.5	+0.7*

Virginia

Speeds (mph)	1987	1988	Change
Average Speed	53.7	58.9	+5.1
85th Percentile	63.0	64.0	+1.0

* Statistically significant at $p < 0.05$.

In August of 1988, after the rural interstate speed limit had been increased in the Commonwealth, the average speed traveled on the urban interstate highway system in Virginia was 58.9 mph, up 5.1 mph compared with the 53.7 mph average speed traveled in the baseline period from April to June 1987. The 85th percentile speed traveled on Virginia's urban interstate highway system was 64.0 mph, up 1 mph from the 63.0 mph baseline. In the states where the rural interstate speed limit remained 55 mph, the urban interstate average speed was 59.9 mph in 1988, up 0.7 mph from the 1987 average. The urban interstate 85th percentile speed was 67.3 mph in 1988, also up 0.7 mph compared with 1987. Neither of these increases are statistically significant. In the states where the rural interstate speed

limit was increased, the average speed on the urban interstate highways in 1988 was 58.1 mph, up 0.9 mph over the 1987 average. The 85th percentile speed on the urban interstate system was up to 64.5 mph, an increase of 0.7 mph over the 63.8 mph figure for 1987. Even though these increases are modest, they are statistically significant.

Other Speed Characteristics

Although Virginia's speed law was changed to allow a higher speed limit for passenger vehicles, the speed limit for buses and large trucks was not increased. Many of those who supported the speed limit differential believed that the inherent mass of trucks and buses made them potentially dangerous enough to warrant restricting their speeds to 55 mph. There was also some concern that the "differential" would result in a broad distribution of speeds on the rural interstate highways (i.e., increased speed variance), which previous research found associated with an increase in the number of crashes. However, because of the relatively high percentage of passenger cars normally found in the traffic stream of most interstate highways, any computation of the speed variance in the traffic stream will mainly reflect the variability of speeds of the passenger cars. The effect of a differential speed limit between cars and trucks therefore may not be indicated by the overall speed variance in the traffic stream. For example, if the variance of speeds within each class of vehicles were to reduce substantially, it would be possible for overall speed variance to decrease even if the difference in speeds traveled between the classes were to increase. Thus, it is important not only to examine changes in speed variance, average speed, and 85th percentile speed, but also to examine these speed characteristics for trucks and cars separately.

The results of several speed surveys of Virginia's rural interstate highways were provided by the VDOT and are listed in Table 3 and Table 4. Although these data are preliminary, they provide an interesting contrast. One set of data was collected by using radar units to check the speeds of vehicles. The data collectors manually recorded the speeds of cars, trucks, and buses. The disadvantage of the use of radar is that the use of radar detectors (although illegal in Virginia) allows drivers who detect the radar signal to slow down, which may function to slow at least part of the traffic. The other data were collected through the use of automated equipment attached to permanent electronic loops buried in the pavement. These loops do not emit a signal that may lead to a reduction in the speed of some of the traffic, but they only allow separation of speeds of small and large vehicles.

Table 3 shows the results of speed surveys conducted by radar at 10 different sites on Virginia's rural interstate highways. These data indicate that in March of 1988, before the change in the speed limit, trucks had a lower average speed than cars. After the change in the rural interstate speed limit for cars, car speeds increased slightly, and truck and bus speeds decreased slightly. The resulting difference between truck and car average speeds was 6.9 mph in August of 1988. Likewise, bus speeds,

which were similar to those of cars before the speed limit change, decreased after the implementation of the higher limit for cars, and the difference between car and bus speeds was 4.8 mph.

TABLE 3

Radar Speed Survey of Cars, Trucks, and Buses
on Virginia's Rural Interstate System

Cars

Speeds (mph)	Before	After	Change
Average Speed	61.9	64.4	+2.5
85th Percentile	66.0	69.0	+3.0

Trucks

Speeds (mph)	Before	After	Change
Average Speed	58.8	57.5	-1.3
85th Percentile	63.0	62.0	-1.0

Buses

Speeds (mph)	Before	After	Change
Average Speed	61.9	59.6	-2.3
85th Percentile	69.0	65.0	-4.0

The only other state with a differential for which there were data available was Illinois. Like Virginia, Illinois experienced a growth in the difference between car and truck speeds during the first few months after the implementation of a 65 mph speed limit for passenger vehicles on the rural interstate highway system. When the speed limit for cars and trucks was a uniform 55 mph, cars and trucks traveled at approximately the same speeds. With the higher speed limit, the 85th percentile speed traveled by passenger cars increased by approximately 1 mph, to an average speed of 68 mph, but the 85th percentile speed traveled by trucks, for which the 55 mph speed limit was maintained, decreased by about 2 mph, to approximately 64 mph.

Table 4 shows that the data collected in Virginia by radar indicate that overall speed variance on the rural interstate system increased after the implementation of the 65 mph speed limit for cars. However, the other data, which were collected through the use of automated equipment, indicate that although there was a slight increase in the difference in average travel speeds between large and small vehicles in the before and after periods, overall speed variance was down slightly in Virginia. Thus, the two surveys provide conflicting information and therefore do not clearly indicate whether the speed limit increase and the differential have had an effect on speed variance on Virginia's rural interstate highways. However, the data from both surveys clearly indicate that after the implementation of the 65 mph speed limit with a differential, a substantial gap developed between the speeds of small and large vehicles.

TABLE 4
Speed Variance on the Rural Interstate Highway System in Virginia

Radar Survey

	Before			After		
	Average Speed (mph)	Speed Variance	Overall Variance	Average Speed (mph)	Speed Variance	Overall Variance
Cars	61.9	19.4		64.4	24.0	
Trucks	58.8	15.2	20.2	57.5	24.0	32.5
Buses	61.9	22.1		59.6	23.0	

Automated Survey

	Before			After		
	Average Speed (mph)	Speed Variance	Overall Variance	Average Speed (mph)	Speed Variance	Overall Variance
Site 1						
Large	61.5	36.0		62.0	23.0	
			38.4			28.1
Small	62.6	38.4		65.4	25.0	
Site 2						
Large	65.6	25.0		63.6	25.0	
			28.1			26.0
Small	66.5	29.2		66.4	22.1	

Crashes

Fatal Crashes and Fatalities

Fatal crashes and fatalities have increased on the rural interstate highway system in Virginia since the implementation of the higher speed limit (see Figure 3). The 1987 report of the task force predicted that increasing the rural interstate speed limit to 65 mph would result in between 6 and 18 additional fatalities on the rural interstate highway system annually. However, between July 1 and November 30, 1988, there were 44 fatalities in 35 fatal crashes on the rural interstate highway system in Virginia. This compares with 25 fatalities in 23 fatal crashes during the same months in 1987. These numbers represent an increase in multiple-fatality crashes, an increase of 19 fatalities, and an increase of 12 fatal crashes.*

Most states compile crash data for an entire calendar year before analyzing or organizing the data by road classification. Hence, few states other than Virginia have released crash data for 1988. Most of the data that were found compared the first several months' experience with the higher limit in 1987 with comparable months in 1986. Although the months for which the data were collected vary from state to state, the data used for each state compare the same time periods in the years immediately before and after the speed limit change.

In Virginia, fatalities were up 76 percent on the rural interstate highways in the after period when compared with the same months during the previous year. In the states where the 55 mph speed limit was retained, rural interstate fatalities were up approximately 54 percent. In the states that increased the speed limit on the rural interstate highway system, rural interstate fatalities were up approximately 41 percent. Thus, since Congress passed the enabling legislation in 1987, rural interstate fatalities have generally increased both in states that enacted a higher rural interstate speed limit and in states that retained the 55 mph speed limit, but the states that retained the 55 mph speed limit had a slightly higher percentage increase.

Crash Characteristics

Questions that normally arise in a discussion of an increase or a decrease in fatalities and fatal crashes concern the characteristics of the crashes. Table 5 shows a number of characteristics that were present in the fatal crashes that occurred on the rural interstate highway system in Virginia. These characteristics were not necessarily the cause of the crash nor did they necessarily contribute to the severity of the crash, rather they were present in the crash. Further, because these are preliminary data, caution should be used to avoid making premature conclusions.

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*There were 344 rural interstate injury crashes between July and September 1988, up from 331 in 1987. Injuries increased from 543 to 590.

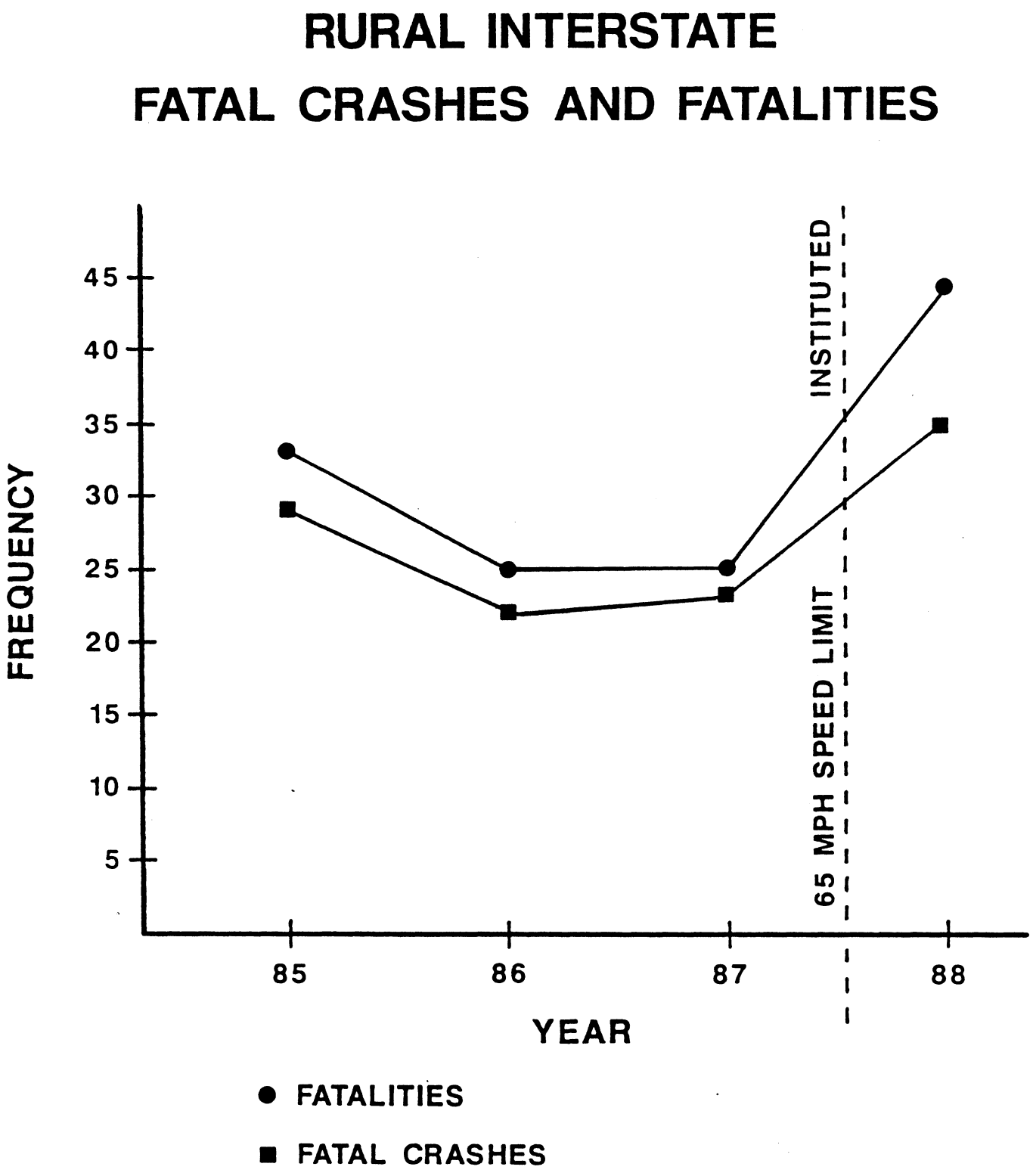

Figure 3. Rural Interstate Fatal Crashes and Fatalities in Virginia, 1985 - 1988.

TABLE 5
Characteristics Involved in Fatal Crashes
on Virginia's Rural Interstate Highways

Characteristics	Before (n=23)	After (n=35)	Change
Ran Off Road	10	15	+5
Tractor Trailer	8	12	+4
Pedestrian	3	6	+3
Rear End	2	4	+2
Wrong Way	0	2	+2
Speeding	9	9	0
Alcohol	7	5	-2

Between July and November of 1988, 15 of the 35 fatal crashes on Virginia's rural interstate highways involved a vehicle that ran off the road. This figure represents an increase of 5 over the number recorded during the same period in 1987. Fatal crashes involving tractor trailers each increased by 4, and fatal crashes involving pedestrians were up by 3, after the implementation of the higher rural interstate speed limit when compared with the same period in the previous year. Fatal crashes that involved one vehicle striking the rear of another were up by 2 in the later time period, as were wrong-way crashes. There was no increase in fatal crashes involving speeding (i.e., vehicles that were exceeding the posted speed limit), and alcohol was reported as a factor in 5 of the fatal crashes in the later period, 2 fewer than were reported in the before period.

Another factor that is often considered when there is an increase or decrease in fatalities or fatal crashes is traffic volume. Data collected from the permanent traffic count stations maintained by the VDOT indicate that traffic increased on the rural interstate highways in Virginia between 1987 and 1988. During July and August of 1988, the only months in the period after the speed limit increase for which there were data available, there was slightly more than a 7 percent increase in average daily traffic when compared with the same months in 1987.

The interstate routes on which the fatal crashes occurred should also be considered in evaluating the changes in rural interstate fatalities and fatal crashes. Because the numbers of rural interstate miles differ among the various interstate routes, and because an increase in the number of crashes on a particular route does not indicate a hazardous or high accident location, great caution should be taken not to misjudge the significance of changes that occur.

Table 6 shows that the number of fatal crashes on the rural portions of Interstate 64 decreased by 1 between July and November 1988 compared with 1987. Interstate 66, which had 1 fatal crash on its rural sections in 1987, had 4 fatal crashes between July and November 1988. Interstate 77 had 2 fatal crashes on its rural miles in 1987, but none in 1988. The number of fatal crashes on the rural sections of Interstate 81 increased from 9 during the months of July to November 1987 to 17 during the same months in 1988 (an increase of 8). Interstate 85 recorded 1 fatal crash in 1988, but had none on its rural miles in 1987. Interstate 95, on which there were 7 fatal crashes between July and November 1987, had 3 additional fatal crashes during the same months in 1988. Thus, a substantial portion of the increase in fatal crashes occurred on Interstate 81, which has one of the highest percentages of truck traffic in the Commonwealth.

TABLE 6
Fatal Crashes on Rural Interstate Highways
in Virginia by Route

Route	Before (n=23)	After (n=35)	Change
64	4	3	-1
66	1	4	+3
77	2	0	-2
81	9	17	+8
85	0	1	+1
95	7	10	+3

All of the rural interstate multiple-fatality crashes for July through November during both 1987 and 1988 occurred on two interstate routes. In 1987, there was only one rural interstate fatal crash that resulted in more than one fatality, and it occurred on Interstate 95. During 1988, there were 7 multiple-fatality crashes on the rural interstate system, and those resulted in 16 of the 44 fatalities. There were 2 multiple-fatality crashes on the rural sections of Interstate 95, which accounted for 4 fatalities, and 5 multiple-fatality crashes on the rural segments of Interstate 81, which accounted for 12 fatalities. These data do not mean that these routes are hazardous, however, because each route carries a large volume of traffic and has a significant portion of the Commonwealth's rural interstate miles.

Another factor to consider when evaluating changes in fatal crashes is what could be considered normal fluctuations in the numbers. Table 7 shows the monthly breakdown of fatal crashes on Virginia's rural interstate highways from 1985 through 1988. The table also provides a comparison of the 1988 totals with the 1985-1987 average. In the months other than October,

the number of fatal crashes in 1988 was approximately 1 higher per month than the three-year average. In October 1988, there were 7 more fatal crashes than the three-year average. Thus, October had an abnormally high number of fatal crashes. A review of the circumstances surrounding the October crashes reveals no patterns that might explain this abnormality.

TABLE 7
Rural Interstate Fatal Crashes in Virginia by Month, 1985-1988

Month	1985	1986	1987	1988	85-87 Avg.	1988 Diff.
July	6	2	4	5	4.0	+1.0
Aug.	7	6	5	7	6.0	+1.0
Sept.	5	6	5	5	5.3	-0.3
Oct.	6	7	2	12	5.0	+7.0
Nov.	5	1	7	6	4.3	+1.7
Total	29	22	23	35	24.7	+10.3

Table 8 shows the rural interstate fatalities by month. Much of the increase in the number of rural interstate fatalities occurred during the month of October. However, the influence of multiple-fatality crashes, along with the increase in fatal crashes in general in 1988, functioned to produce approximately 2 more fatalities in each month other than October.

Because much of the increase in fatalities and fatal crashes during the later period occurred during one month and because a substantial part of the increase occurred on Interstate 81, there are not sufficient data to show that the increase in the speed limit, which was in effect during all months and on all routes in the later period, was the cause of the increase. Hence, these data indicate that to calculate the effects of the 65 mph speed limit on rural interstate fatalities and fatal crashes, a longer study will be needed.

TABLE 8
Rural Interstate Fatalities in Virginia by Month, 1985-1988

Month	1985	1986	1987	1988	85-87 Avg.	1988 Diff.
July	6	3	6	7	5.0	+2.0
Aug.	8	7	5	9	6.7	+2.3
Sept.	5	7	5	7	5.7	+1.3
Oct.	8	7	2	13	5.7	+7.3
Nov.	6	1	7	8	4.7	+3.3
Total	33	25	25	44	27.7	+16.3

On the urban interstate system in Virginia, there were 26 fatal crashes from July through November 1988, up 5 from the total of 21 during the same period in 1987. However, in 1988, 27 people were killed in crashes on Virginia's urban interstate system, 1 more than the 26 fatalities in 1987. The only other state that had crash data available for the urban interstate highway system was Kansas. Fatal crashes were down from 7 during the first 6 months of 1987 to 5 in 1988. Fatalities, on the other hand, were up from 7 in 1987 to 9 in 1988. Obviously, there are not sufficient data to draw any conclusions concerning changes in fatalities on the urban interstate highways.

FUTURE EVALUATION EFFORTS

Between now and June 30, 1993, the date when the higher speed limit is scheduled to expire, the VDOT will continue to monitor speeds and crashes on the rural interstate system, and the Commissioner will lower the posted speed limit on any section of the system where such action is deemed appropriate. Members of the task force and their agencies will also closely watch changes in the speeds traveled and the crashes occurring on the interstate system.

In the upcoming four years, the Virginia Transportation Research Council, which has served as the staff for the task force, will conduct an impact evaluation of the 65 mph speed limit on the rural interstate highway system in Virginia (a copy of the working plan is shown in Appendix D). This study will investigate how Virginia's experience with the higher limit compares with that of other states. Further, Virginia's experience will also be compared with those states that did not raise the speed limit.

The long-term impact of the 65 mph speed limit on average and 85th percentile speeds will be investigated. The study will attempt to determine whether the differential in the speed limits of cars and buses and trucks has contributed to greater speed variance on the rural interstate highway system. The study will also determine whether the increase in the speed limit on the rural interstate highways precipitated an increase in speeds on the urban interstate highways or on the primary or secondary systems.

The study will concentrate on evaluating the impact of the higher speed limit on crashes, injuries, and fatalities on the rural interstate highways, as well as on the other systems. The investigators will determine any changes in traffic volume and will calculate crash, injury, and fatality rates based on the changes in traffic volume. The investigators will also attempt to determine whether the increase in the rural interstate speed limit caused a shift in travel from the primary and secondary systems to the interstate system.

APPENDIX A

Rural Interstate Speed Data for Selected States

APPENDIX A
Rural Interstate Speed Data for Selected States

States with a 55 mph Rural Interstate Speed Limit
(mph)

State	1987	1988	Change
Connecticut			
Average Speed	60.1	53.8	-6.3
85th Percentile	66.7	60.7	-6.0
Maryland			
Average Speed	57.3	59.7	+2.4
85th Percentile	64.7	68.0	+3.3
Massachusetts			
Average Speed	62.0	62.4	+0.4
85th Percentile	68.2	69.6	+1.4
New Jersey			
Average Speed	54.8	52.5	-2.3
85th Percentile	60.3	58.2	-2.1
New York			
Average Speed	64.1	63.4	-0.7
85th Percentile	69.7	69.1	-0.6
Pennsylvania			
Average Speed	57.6	60.2	+2.6
85th Percentile	65.9	67.4	+1.5
Rhode Island			
Average Speed	57.1	56.7	-0.4
85th Percentile	64.8	64.1	-0.7

States with a 65 mph Rural Interstate Speed Limit
(mph)

State	1987	1988	Change
Alabama			
Average Speed	63.0	66.7	+3.7
85th Percentile	69.5	72.6	+3.1
Arizona			
Average Speed	60.2	62.9	+2.7
85th Percentile	66.4	69.0	+2.6
Colorado			
Average Speed	54.3	62.0	+7.7
85th Percentile	63.1	67.9	+4.8

States with a 65 mph Rural Interstate Speed Limit
(mph)

State	1987	1988	Change
Florida			
Average Speed	61.1	65.1	+4.0
85th Percentile	67.2	70.4	+3.2
Kansas			
Average Speed	57.5	59.4	+1.9
85th Percentile	64.4	66.5	+2.1
Kentucky			
Average Speed	58.0	59.3	+1.3
85th Percentile	67.1	67.3	+0.2
Michigan			
Average Speed	61.7	64.1	+2.4
85th Percentile	68.4	70.9	+2.5
Mississippi			
Average Speed	62.8	60.4	-2.4
85th Percentile	68.4	68.0	-0.4
North Carolina			
Average Speed	60.6	61.3	+0.7
85th Percentile	66.9	67.2	+0.3
South Carolina			
Average Speed	65.2	65.9	+0.7
85th Percentile	72.5	72.3	-0.2
South Dakota			
Average Speed	62.0	63.1	+1.1
85th Percentile	65.6	67.2	+1.6
Tennessee			
Average Speed	62.5	62.3	-0.2
85th Percentile	68.9	68.3	-0.6
Vermont			
Average Speed	59.1	61.8	+2.7
85th Percentile	66.3	69.4	+3.1
Virginia			
Average Speed	59.9	62.9	+3.0
85th Percentile	65.0	68.0	+3.0
Washington			
Average Speed	59.6	62.2	+2.6
85th Percentile	65.4	68.8	+3.4

APPENDIX B

Urban Interstate Speed Data for Selected States

APPENDIX B
Urban Interstate Speed Data for Selected States

States with a 55 mph Rural Interstate Speed Limit
(mph)

State	1987	1988	Change
Delaware			
Average Speed	58.9	59.0	+0.1
85th Percentile	65.8	67.5	+1.7
Maryland			
Average Speed	56.7	58.1	+1.4
85th Percentile	65.7	65.7	0
New York			
Average Speed	61.8	62.0	+0.2
85th Percentile	68.0	68.6	+0.6
Pennsylvania			
Average Speed	59.6	60.5	+0.9
85th Percentile	66.8	67.3	+0.5

States with a 65 mph Rural Interstate Speed Limit
(mph)

State	1987	1988	Change
Alabama			
Average Speed	59.2	60.1	+0.9
85th Percentile	66.6	67.4	+0.8
Arizona			
Average Speed	54.9	56.8	+1.9
85th Percentile	61.9	63.1	+1.2
Arkansas			
Average Speed	56.1	58.5	+2.4
85th Percentile	62.9	65.0	+2.1
Colorado			
Average Speed	54.2	54.7	+0.5
85th Percentile	62.0	62.6	+0.6
Florida			
Average Speed	59.0	58.0	-1.0
85th Percentile	65.5	64.5	-1.0

States with a 65 mph Rural Interstate Speed Limit
(mph)

State	1987	1988	Change
Kentucky			
Average Speed	54.3	57.8	+3.5
85th Percentile	62.8	65.5	+2.7
Minnesota			
Average Speed	58.0	58.3	+0.3
85th Percentile	62.4	64.5	+2.1
Mississippi			
Average Speed	62.0	59.4	-2.6
85th Percentile	68.0	66.6	-1.4
Montana			
Average Speed	57.5	57.7	+0.2
85th Percentile	64.1	64.4	+0.3
Oregon			
Average Speed	58.7	58.1	-0.6
85th Percentile	64.4	64.2	-0.2
North Carolina			
Average Speed	56.0	57.1	+1.1
85th Percentile	63.3	63.6	+0.3
South Carolina			
Average Speed	59.3	62.4	+3.1
85th Percentile	65.5	68.0	+2.5
South Dakota			
Average Speed	56.7	56.9	+0.2
85th Percentile	60.4	60.8	+0.4
Vermont			
Average Speed	57.2	57.2	0
85th Percentile	64.0	64.0	0
Virginia			
Average Speed	53.7	58.9	+5.1
85th Percentile	63.0	64.0	+1.0
Washington			
Average Speed	57.7	57.8	+0.1
85th Percentile	63.9	64.2	+0.3
Wyoming			
Average Speed	57.1	58.5	+1.4
85th Percentile	--	--	--

APPENDIX C

Fatal Crashes and Fatalities on Rural Interstate Highways in Selected States

APPENDIX C
Fatal Crashes and Fatalities on Rural Interstate Highways
in Selected States

States with a 55 mph Rural Interstate Speed Limit
(mph)

State	Before	After	Change
	4/86-7/86	4/87-7/87	
Massachusetts			
Fatal Crashes	--	--	--
Fatalities	2	4	+100%
	4/86-7/86	4/87-7/87	
New Jersey			
Fatal Crashes	--	--	--
Fatalities	4	5	+25%
	4/86-7/86	4/87-7/87	
New York			
Fatal Crashes	--	--	--
Fatalities	15	21	+40%
	4/86-7/86	4/87-7/87	
Pennsylvania			
Fatal Crashes	--	--	--
Fatalities	25	40	+60%
	4/86-7/86	4/87-7/87	
Rhode Island			
Fatal Crashes	--	--	--
Fatalities	0	1	--

States with a 65 mph Rural Interstate Speed Limit
(mph)

State	Before	After	Change
	4/86-7/86	4/87-7/87	
Arizona			
Fatal Crashes	--	--	--
Fatalities	26	67	+158%
	4/86-7/86	4/87-7/87	
Arkansas			
Fatal Crashes	--	--	--
Fatalities	6	17	+183%
	5/86-7/86	5/87-7/87	
California			
Fatal Crashes	--	--	--
Fatalities	64	94	+47%

States with a 65 mph Rural Interstate Speed Limit
(mph)

State	Before	After	Change
	4/86-7/86	4/87-7/87	
Colorado			
Fatal Crashes	--	--	--
Fatalities	19	18	-5%
	5/86-7/86	5/87-7/87	
Idaho			
Fatal Crashes	--	--	--
Fatalities	5	11	+120%
	5/86-7/86	5/87-7/87	
Iowa			
Fatal Crashes	--	--	--
Fatalities	3	9	+200%
	1/87-6/87	1/88-6/88	
Kansas			
Fatal Crashes	12	9	-25%
Fatalities	19	12	-37%
	4/86-7/86	4/87-7/87	
Louisiana			
Fatal Crashes	--	--	--
Fatalities	10	34	+240%
	4/86-7/86	4/87-7/87	
Mississippi			
Fatal Crashes	--	--	--
Fatalities	14	18	+29%
	5/86-7/86	5/87-7/87	
Missouri			
Fatal Crashes	--	--	--
Fatalities	14	24	+71%
	4/86-7/86	4/87-7/87	
Montana			
Fatal Crashes	--	--	--
Fatalities	16	12	-25%
	5/86-7/86	5/87-7/87	
Nebraska			
Fatal Crashes	--	--	--
Fatalities	1	3	+200%
	4/86-3/87	4/87-3/88	
Nevada			
Fatal Crashes	29	33	+14%
Fatalities	33	37	+12%

States with a 65 mph Rural Interstate Speed Limit
(mph)

State	Before	After	Change
	4/86-7/86	4/87-7/87	
New Mexico			
Fatal Crashes	--	--	--
Fatalities	27	47	+74%
	4/86-7/86	4/87-7/87	
North Dakota			
Fatal Crashes	--	--	--
Fatalities	1	3	+200%
	4/86-7/86	4/87-7/87	
Oklahoma			
Fatal Crashes	--	--	--
Fatalities	31	14	-55%
	7/86-7/87	7/87-7/88	
South Carolina			
Fatal Crashes	50	42	-16%
Fatalities	--	--	--
	7/86-6/87	7/87-6/88	
South Dakota			
Fatal Crashes	12	19	+58%
Fatalities	19	23	+21%
	5/86-7/86	5/87-7/87	
Texas			
Fatal Crashes	--	--	--
Fatalities	58	63	+9%
	5/86-7/86	5/87-7/87	
Utah			
Fatal Crashes	--	--	--
Fatalities	17	18	+6%
	4/86-7/86	4/87-7/87	
Vermont			
Fatal Crashes	--	--	--
Fatalities	0	0	0%
	7/87-11/87	7/88-11/88	
Virginia			
Fatal Crashes	23	35	+52%
Fatalities	25	44	+76%
	1/87-7/87	1/88-7/88	
Washington			
Fatal Crashes	19	24	+26%
Fatalities	21	30	+43%

States with a 65 mph Rural Interstate Speed Limit
(mph)

State	Before	After	Change
	5/86-7/86	5/87-7/87	
West Virginia			
Fatal Crashes	--	--	--
Fatalities	5	3	-40%
	5/86-7/86	5/87-7/87	
Wyoming			
Fatal Crashes	--	--	--
Fatalities	5	15	+200%

APPENDIX D

Working Plan

Evaluation of the 65 mph Speed Limit on Virginia's Rural Interstate Highway System

WORKING PLAN

Evaluation of the 65 mph Speed Limit on Virginia's Rural Interstate Highway System

by

Jack D. Jernigan
Research Scientist

(The opinions, findings, and conclusions expressed in this report are those of the author and not necessarily those of the sponsoring agencies.)

Virginia Transportation Research Council
(A Cooperative Organization Sponsored Jointly by the Virginia Department of Transportation and the University of Virginia)

Charlottesville, Virginia

December 1988
VTRC 89-WP11

WORKING PLAN

Evaluation of the 65 mph Speed Limit on Virginia's Rural Interstate Highway System

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Jack D. Jernigan
Research Scientist

PROBLEM STATEMENT

On July 1, 1988, the speed limit on most of Virginia's rural interstate highway system was raised from 55 mph to 65 mph for passenger vehicles but remained at 55 mph for large trucks and buses. The legislation enabling the change was passed late in the 1988 Session of the General Assembly, and this issue was one of the most controversial of the Session. Much debate focused on whether a 65 mph speed limit would bring about an increase in injuries and fatalities. Debate also focused on the question of whether lawmakers should set policy based on the related facts that approximately 85 percent of drivers on Virginia's rural interstate system were violating the 55 mph speed limit and that public opinion supported a speed limit increase.

The seeds for the debate were planted more than a year prior to the 1988 Session of the General Assembly, when it became apparent that there was a good chance that the U.S. Congress would pass legislation enabling the states to raise, without penalty, the maximum speed limit on some highways. In April of 1987, after the Virginia General Assembly had adjourned for the year, the Surface Transportation and Uniform Relocation Assistance Act of 1987 became law, thus allowing the states to raise the speed limit to 65 mph without penalty on the interstate highways outside urbanized areas with a population of 50,000 or more.

In anticipation of this federal action, many states had already passed legislation that made increasing the speed limit an administrative process that required no additional response by state lawmakers. Virginia was not one of these states. The Governor of Virginia, Gerald L. Baliles, decided that there was no need to pass emergency legislation and that Virginia lawmakers should consider the issue carefully and wait until the 1988 Session of the General Assembly to vote on the issue.

In the interim, the Secretary of Transportation and Public Safety, Vivian E. Watts, reacted to the Governor's caution by creating a Task Force to consider the issues related to the decision of whether to change the rural interstate speed limit. The Task Force was chaired by Deputy Secretary of Transportation and Public Safety, Donald C. J. Gehring, and

included David R. Gehr, Director of Operations of the Virginia Department of Transportation; John T. Hanna, Deputy Commissioner for Transportation Safety of the Virginia Department of Motor Vehicles; and Lt. Col. C. M. Robinson, Director of the Bureau of Field Operations of the Virginia State Police. Several members of the Virginia Transportation Research Council served as the staff of the Task Force.

Although the Task Force made no legislative recommendations, it produced a report that included estimates of the impact that raising the speed limit would have on traffic safety, estimates of the costs and benefits of raising the speed limit, and the results of public opinion surveys of individuals and of organizations that may have had an interest in the issue. The report concluded that the passage of the federal enabling legislation had already resulted in an approximate 3 mph increase in the average and 85th percentile speeds traveled on Virginia's rural interstate system prior to any legislative action by the Commonwealth. The report estimated that if Virginia were to increase the speed limit to 65 mph, then another 3 mph increase would result. It was also determined that raising the speed limit to 65 mph on most of the rural interstate highway system would not violate generally accepted tenets of traffic engineering. On the other hand, based on the relationship between average speed and the number of fatalities and injuries on Virginia's rural interstates between 1966 and 1986, the additional 3 mph increase in the average speed traveled would result in between 6 and 18 additional fatalities per year and between 171 and 405 additional injuries per year. Thus, it was concluded that raising the speed limit would have a negative impact on traffic safety.

A survey of the general public found that approximately 60 percent of those questioned wanted the General Assembly to increase the rural interstate speed limit to 65 mph. Similar results were found by separate surveys conducted by a state delegate, George F. Allen, Jr., and the Tidewater Automobile Association. These results, combined with the fact that few of those traveling on Virginia's rural interstate highway system were obeying the 55 mph speed limit, led to a concern that an ignored law could lead to a general disrespect for other traffic laws.

Another significant finding of the report involved the question of whether it would be wise to set a slower speed limit for trucks than cars. Those who wanted a lower speed limit for trucks believed that the braking characteristics of large trucks made it wise to slow these vehicles to enable their drivers to avoid a crash more easily. Opponents of a speed limit differential pointed out that the height of trucks gave their drivers more sight-distance than the drivers of cars, therefore offsetting some of the problems caused by a longer braking distance. Most agreed that the faster a truck, or any vehicle, was traveling at the point of impact, the greater the force and the severity of the impact. However, there was disagreement on the estimates of the probability of a large truck being involved in a crash. Many believed that uniform speeds and speed limits

reduced the chance of vehicles becoming involved in a crash by reducing the speed variance, thereby reducing the number of overtaking and passing maneuvers. Among those for the speed limit differential, there were some who felt that trucks were already traveling faster than cars and, therefore, that the differential would result in a more uniform speed overall. Other supporters of the differential truly wanted trucks to travel slower than cars. Some of those supporting a uniform speed limit did so out of a belief in fairness--that if cars were allowed to travel faster, then large trucks should be as well.

Each side on this issue made a good case that there were potential advantages and disadvantages to having the speed limit differential or not. After carefully examining the data and considering both sides of the issue, the Task Force reached a conclusion. Data collected on Virginia's rural interstates when the speed limit for both cars and trucks was 55 mph indicated that trucks were not traveling faster than cars on average. In fact, the data showed that for average speeds traveled, trucks were traveling slightly slower than cars. Further, data from Illinois, which had recently instituted a speed limit differential, indicated that the average speed traveled for trucks was down after the implementation of a 65 mph/55 mph speed limit and that the average speed for cars was up. Because cars and trucks were traveling at approximately the same average speed before the new law was instituted, this meant that the speed variance increased. The literature on speed variance indicated that although a vehicle's absolute speed was related to the severity of a crash, speed variance was related to the probability of being involved in crash. Thus, the literature supported the hypothesis that the greater the speed variance, the greater the probability of a crash. Because speeds were less uniform in Illinois after the implementation of the higher speed limit with a truck differential, the Task Force concluded that the speed limit differential in Illinois was contributing to a traffic safety environment that was less safe than would have been the case had a uniform speed limit been established.

After much debate, and several apparent defeats and subsequent resurrections in the Virginia General Assembly, a bill was passed that raised the rural interstate speed limit to 65 mph for passenger vehicles but retained the 55 mph speed limit for large trucks and buses. A provision of the bill was that the Department of State Police must collect crash data and the Department of Transportation monitor the data for a five-year period.

PURPOSE AND SCOPE

The purpose of this study is to evaluate the impact of raising the speed limit on the rural interstate highway system. To do this, the study will address the issues that were addressed by the Task Force; but instead

of predicting what may happen, the study will look retrospectively to determine what resulted from the law's implementation.

In general, this study will address the question: What were the economic and safety outcomes of implementing a 65 mph speed limit with a large truck and bus differential on most of the rural interstate highway system in Virginia? To answer this question, this study will gather data over a five-year period in an attempt to understand fully the long-term impact of the 65 mph speed limit. Items to be addressed include

- What impact did raising the speed limit have on average and 85th percentile speeds on the rural interstates, the urban interstates, other divided highways, and rural connector roads?
- What have been the economic costs and benefits of raising the rural interstate speed limit?
- Did the speed limit differential affect traffic safety for the better or worse, or did it have no impact on traffic safety?
- Has public opinion changed since the implementation of the 65 mph speed limit?
- Should the increased speed limit be retained, modified, or replaced?

METHODOLOGY

In evaluating the impact that the speed limit increase may have had on average and 85th percentile speeds, data collected from the compliance monitoring stations will be used. Because these stations have been used for several years to fulfill the federal requirement that the states monitor speeds on roads with a 55 mph speed limit, these data will provide both an adequate and reliable baseline. Virginia and many other states plan to continue monitoring the standard stations that are located on roadways where the speed limit is set at 65 mph, even though rural interstates with the 65 mph speed limit are exempt from the federal compliance monitoring program. These data will provide a good picture of what happened before and after the implementation of the higher speed limit. Compliance monitoring data can also be used to determine whether speeds have changed on roads other than the rural interstates.

The impact that the increased speed limit may have had on the traffic safety environment will be determined through comparing the number of fatalities and injuries in the before and after periods. Not only will the

impact on the rural interstates be considered, but also the spillover effect on the urban interstate system, the divided highways, and the rural connector roads. Virginia's data will be compared with those of other states that increased the speed limit as well as with states that did not.

Using much the same strategy as that used by the Task Force, this study will estimate the economic costs and benefits of the increased speed limit. This study will take into account additional fatalities or injuries, additional fuel consumption, and the time-savings benefit that may have occurred as a result of the higher speed limit.

To determine the impact of the speed limit differential, the study will compare the average and 85th percentile speeds of cars and trucks in the before and after periods. The percentage of crashes that were truck crashes will also be compared in the before and after periods. Finally, these data will be compared with those of the states that did not choose to set a speed limit differential.

A survey of Virginians will be conducted to determine the public's attitudes toward the 65 mph speed limit and the speed limit differential. A survey of truck drivers and trucking companies will collect their opinions on how the speed limit differential has affected their businesses and the trucking industry in Virginia.

Based on the data and on careful consideration of the issues, the study will develop a set of recommendations for any changes in the speed limit deemed warranted.

WORK SCHEDULE
STATE FISCAL YEARS 1989-1993, BY QUARTERS

TASKS	FY 89				FY 90				FY 91				FY 92				FY 93			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Prepare working plan	X	X																		
2. Identify data needs	X	X																		
3. Identify data sources	X	X	X	X																
4. Contact data sources	X	X	X	X																
5. Refine methodology and data for cost/ benefit and other analyses		X	X	X	X							X	X			X	X			
6. Collect baseline data			X	X	X	X														
7. Update data			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
8. Analyze data		X	X	X	X		X	X	X			X	X	X			X	X	X	
9. Prepare first Interim Report								X	X	X										
10. Prepare second Interim Report													X	X	X					
11. Conduct public opinion surveys																X	X	X		
12. Prepare final report																		X	X	X

BUDGET

COSTS	FY 89	FY 90	FY 91	FY 92	FY 93
Personnel					
Research Scientists	$11,500	$ 8,000	$ 9,000	$10,000	$15,500
Additive rate 54.2%	6,230	4,330	4,850	5,420	8,400
Research Scientist Assts.	2,000	1,400	1,600	1,800	3,000
Additive rate 7.51%	150	105	120	135	225
Commodities					
Computer time	1,000	700	900	1,100	1,500
Supplies	140	85	80	115	165
Travel	1,000	800	1,000	1,100	2,000
Direct Costs					
Rent	1,000	700	900	1,100	1,500
Indirect Costs					
10% of salaries	1,980	1,380	1,550	1,730	2,710
TOTAL	$25,000	$17,500	$20,000	$22,500	$35,000