UPDATE REPORT

ON

SPEED LIMITS IN IOWA

PREPARED
By

TASK FORCE ON SPEED LIMITS

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EXECUTIVE SUMMARY

The National Highway System Designation Act of 1995 repealed the National Maximum Speed Limit (NMSL) and returned authority to set speed limits to the states. In the interest of providing information to legislative decision-makers, the Iowa Safety Management System Coordinating Committee formed a Speed Limit Task Force. The Speed Limit Task Force has issued reports on the subject of speed limits in January of 1996, 1997, and 1998.

Iowa Code section 321.285 was amended in 1996 to authorize the Department of Transportation (DOT) to increase speed limits to 65 mph on certain divided multi-lane highways.

The DOT undertook an engineering review of highways eligible for increased speed limits under the new law. A total of 355 miles of rural, four-lane divided freeways and expressways[1] were included in the review. After it was completed, the speed limits were increased to 65 mph on a total of 248 miles.

This Report is a compilation of data gathered in Iowa and other states regarding the effects of changing speed limits on travel speeds, crashes, injuries, and fatalities.

Key Findings on Speeds on Iowa's Rural Expressways and Freeways

- The 85th percentile operating speeds increased an average of 7.1 mph—from 61.6 to 68.7 mph—since the new speed limits went into effect in 1996. The 85th percentile speed is the speed at, or below which 85 percent of vehicles travel, and which 15 percent of vehicles exceed.
- On sections of rural four-lane highway where speed limits were increased from 55 mph to 65 mph, the difference between the 85th and 15th percentile speeds initially increased from 7.9 to 9.3 mph and has since remained at 9.0 mph. Also, the percent of vehicles travelling in the 10 mph pace speed initially declined from 80.7 percent to

[1] "Freeways" are divided, multiple-lane highways with full access control (no intersections). "Expressways" are like Freeways, but include at-grade intersections.

74.1 percent, but has gradually increased to 75.2 percent. In theory, a larger variance in speeds between vehicles on the roadway may be detrimental to safety.

- The percent in violation of the posted speed limit decreased from 71 percent to 31 percent immediately following the 1996 change in the speed limit from 55 to 65 mph. However, in 1998—two years after the speed limit change—the percent in violation has increased to 41 percent.

Key Findings on Crashes on Iowa's Rural Expressways and Freeways

- Preliminary data for fatal crashes during 1998 became available just before this report was finalized. The sections of 65-mph expressway continue to show a high frequency of fatal crashes. The preliminary totals for 1998 include 9 fatal crashes involving 12 fatalities. This experience closely matches the totals for 1997 which were 10 fatal crashes involving 11 fatalities.
- Crash and injury rates on Iowa expressways before and after the speed limit increase from 55 to 65 mph were compared. The data showed increases of approximately 36 percent for "Fatal Plus Injury Crash" rate, 32 percent for total crash rate, 36 percent for "Fatal Plus Major Injury" rate, and 48 percent for "Other" injury rates when compared with the "Before" time period.
- Fatal crash rates, fatality rates, and crash rates on 65 mph fully access controlled, non-Interstate freeways were approximately 40 to 50 percent higher than the rates on the Interstate System.
- While an increase in fatalities, injuries, and total crashes following the speed limit change has been documented, it is important to collect additional data (three years total) to verify a statistically reliable trend.
- The number of Iowa State Patrol speeding citations issued has not experienced any significant increases or decreases from 1993 to 1998.

Key Findings from Surrounding States

- In Nebraska and South Dakota, where rural Interstate speed limits were increased to 75 mph, 1996-1998 average rural Interstate fatalities were up 61 percent in Nebraska and 27 percent in South Dakota compared with the 1993-1995 average rural Interstate fatalities (the last 3 years before limits were increased).

- Missouri has reported annual Interstate fatal crashes 34.4 percent and 49.6 percent higher than the annual average prior to the speed limit increase. Missouri averaged 125 fatal crashes per year on their Interstate for the three years preceding the speed limit change. Following the speed limit increase in 1996, the number of fatal crashes increased to 168 and 187, in 1996 and 1997 respectively.
- By contrast, Iowa's average annual fatalities on rural Interstates increased by 48 percent (from 21 to 31) following the increase in speed limits from 55 mph to 65 mph but have remained stable at approximately 31 since 1988.
- Because of the increase in travel, Iowa's rural Interstate fatality rate and fatal crash rate have declined modestly since 1988. However, the rural Interstate rates have not decreased as much as the rates on the rural Primary System. This can be seen in Tables A-1 and A-2 in the Appendix.
- A comparison was also made of total traffic fatalities through the first eight months of 1998 and compared with the first eight months of 1995. The states that did not raise speed limits above 65 mph each had decreases of 8.3 to 19.9 percent in fatalities when comparing January-August 1998 with the same period in 1995. Of the states that raised their speed limit above 65 mph, all but Minnesota[2] experienced increases in their traffic fatalities ranging from 10.0 to 14.5 percent. See Table ES-1 below and Table A-3 in the Appendix.

Table ES-1 Change in January Through August Total Traffic Fatalities from 1995 to 1998

States That **Did Not** Change Speed Limits Above 65 mph		States That **Did** Change Speed Limits Above 65 mph	
Iowa	- 19.9%	Kansas	+ 11.9%
Illinois	- 8.3%	Minnesota[2]	+ 4.3%
Wisconsin	- 19.6%	Missouri	+ 12.0%
		Nebraska	+ 14.5%
		South Dakota	+ 10.0%

[2] Minnesota changed their Interstate speed limit to 70 mph in mid-summer 1997.

- Rural Interstate traffic injuries have increased in all states, however Table ES-2 shows that the increase is greater in those states which have raised rural Interstate speed limits.

Table ES-2 Rural Interstate Traffic Injuries in surrounding states

State	Limit Change?	1993	1994	1995	'93-'95 Ave.	1996	1997	'96-'97 Ave.	Percent Change in Averages
SD	Yes- 75 mph	569	463	513	**515**	742	764	**753**	**+46.2%**
NE	Yes-75 mph	797	868	886	**850**	1000	998	**999**	**+17.5%**
IA	No	1272	1119	1185	**1192**	1339	1421	**1380**	**+15.3%**
MN	Yes-70 mph	862	908	807	**929** [3]	1139	1155	**1155** [3]	**+24.3%**

[3] Minnesota changed their Interstate speed limit to 70 mph in mid-summer 1997, therefore 1993-1996 injuries were compared to 1997.

INTRODUCTION

The National Highway Designation Act of 1995 repealed the National Maximum Speed Limit (NMSL) and returned authority to set speed limits to the states. To provide information to legislative decision-makers, the Iowa Safety Management System Coordinating Committee (SMSCC) formed a Speed Limit Task Force in late 1995. This Task Force developed information reports on the subject of speed limits in January of 1996, 1997 and 1998. Copies of these reports are available by contacting the Iowa Department of Transportation Engineering Division in Ames.

As in past years, the SMSCC reconvened the Speed Limit Task Force to develop an update on what has happened with speed limits, operating speeds and crash statistics in the past 12 months. This report is a compilation of the findings of the Task Force. It contains information on speed limit changes, operating speeds, fatalities, injuries, speeding citations, car and truck fuel efficiency relative to speed, and a discussion of items relevant to speed limit changes. As was the case for past reports, this report contains information and facts and does not contain recommendations.

SPEED LIMIT CHANGES IN IOWA

Iowa Code section 321.285 was amended in 1996 to authorize the Department of Transportation (DOT) to increase speed limits up to 65 mph on certain divided multi-lane highways.

Table 1 is a tabulation of the 27 sections of rural freeways and expressways[4] in Iowa eligible for the increased speed limit. The list includes a few sections where construction was completed after the new speed limit law was enacted. The table shows a total of 355 miles eligible for the increased speed limit.

Engineering studies were made on each section. These studies included a review of design characteristics, a check on the crash history, and a field review. In 1996, the speed limit was raised to 65 mph on 17 sections totaling 204 miles. In 1997, the speed limit was raised on 2 more sections encompassing 28 miles. Action in 1998 increased the speed limit on two new sections for approximately 16 miles. This brings the total mileage increased to date to 248. Table 1 also includes several sections where speed limits were left at 55 mph. The reasons for not increasing some speed limits were unfavorable physical characteristics, adverse crash history, or a length considered to be too short. For some short, isolated sections, it was decided to wait until the section was extended before considering an increase in the speed limit to 65 mph.

[4] "Freeways" are divided, multiple-lane highways with full access control (no intersections). "Expressways" are like Freeways, but include at-grade intersections.

Table 1 Iowa Expressways and Freeways Eligible for 65 mph Speed Limit

Route	Location	Eligible Length (miles)	Changed Length (miles)	Date Changed	Comments
US 20	Iowa 38 to Dubuque	32.3	28.3	7/2/96	
US 20	Grundy Co. Line to US 218/ I-380	11.4	10.5	5/28/96	
US 20	US 169 to West Jct IA 17	14.5	13.0	5/6/96	
US 20	I-29 to End Divided Section (W. of Moville)	20.5	14.9	7/8/96	55 @ Lawton & Moville East
US 30	Ogden to Nevada	35.4	26.2	7/8/96	55 @ Boone & School Speed Zone @ United
US 30	Nevada to Colo	6.0	6.0	12/11/98	Reconstructed 2-lane to 4-lane
US 30	Iowa 201 to US 151	20.5	17.9	7/2/96	
US 30	US 61 to Clinton	17.2	9.5	7/2/96	
US 30	Marshalltown Bypass	7.8	7.1	12/16/96	New Construction
US 218	IA 22 to N. of IA 92	12.1	10.5	7/3/96	
US 218	N. of IA 92 to Co. Rd. G62	9.9	9.9	7/3/96	
US 71	Spencer to Milford	8.6	7.7	7/3/96	
US 75	Sioux City to LeMars	19.5	--	--	Defer - SB Lanes Resurfacing, unfavorable cross-sections
US 69/65	Des Moines to Indianola	10.9	7.8	9/4/96	
IA 141	I-35/80 to Granger	8.3	5.9	12/11/96	
IA 141	West of Granger to East of Perry	13.5	13.5	11/20/97	Reconstructed 2-lane to 4-lane
US 151	IA 13 to E. of Springville	10.1	6.7	8/30/96	
IA 13	US 151 to Central City	11.8	10.3	8/30/96	
US 63	Waterloo to Iowa 3	12.6	8.5	10/14/96	
US 218	Cedar Falls to Waverly	12.8	--	--	Under study - studying County road intersections
US 34	I-29 to US 275	8.3	6.3	7/2/96	
US 61	Ft. Madison to Burlington	15.0	15.0	8/4/97	
US 61	North of DeWitt to Maquoketa	14.0	12.6	11/1/96	Reconstructed 2-lane to 4-lane
IA 163	Pleasant Hill to Prairie City	8.6	--	--	Defer until more 4-lane is done
IA 163	Pella Bypass	5.6	--	--	Defer until more 4-lane is done
IA 92	Knoxville Bypass	5.9	--	--	No - too short
US 34	Ottumwa to Agency	2.3	--	--	No - too short
	Total Length	**355**	**248**		

OPERATING SPEEDS IN IOWA

85th Percentile Speeds

One statistic commonly used to study travel speeds is the 85th percentile speed. It is the speed at or below which 85 percent of the free flow traffic travels. This is considered to be a reasonable and safe speed. Fifteen percent travel above the 85th percentile and may be travelling too fast for conditions. Other statistics used in this section are the 50th percentile speed and the 15th percentile speed. The 50th percentile is also the median speed. It is the speed at which one-half of the traffic is traveling above and one-half is traveling below. It is a good measure of the central tendency of the speed distribution. The 15th percentile speed is the speed at or below which 15 percent of the free flowing traffic is traveling.

Speed data were collected before and after speed limits were changed on the 248 miles of freeway and expressway previously described. A summary of this data can be seen in Table 2. The average 85th percentile speed before the increase was 61.6 mph. The 85th percentile speed in 1996, after the 65 mph speed limit had been in effect for one to six months, was 67.6 mph. Although the speed limit was increased 10 mph, the 85th percentile operating speed increased 6.0 mph. In 1997, after the 65 mph speed limit had been in effect for 12 to 18 months, the average 85th percentile speed was 68.2 mph, which is 0.6 mph higher than the previous year. In 1998, the 85th percentile speed is another 0.5 mph higher at 68.7 mph. The 85th percentile speed is now 7.1 mph higher than it was before the speed limit changes.

Speed Variance

Speed variance is the difference in travel speeds between vehicles on the road. Under ideal conditions, all vehicles would be traveling at the same speed. In other words, there would be no variation in speeds and therefore, speed related crashes would be minimized. Theoretically, there would be no rear end collisions and there would be no need for lane changing and passing. Motorists tend to travel at different speeds so there

Table 2 Percentile Speeds on 65 mph Iowa Freeways and Expressways

		85th Percentile Speed				50th Percentile Speed				15th Percentile Speed			
Route	Location	1996 Before Changes	1996 After Changes	1997	1998	1996 Before Changes	1996 After Changes	1997	1998	1996 Before Changes	1996 After Changes	1997	1998
US 20	Iowa 38 to Dubuque	62	69	70	70	58	65	67	66	53	59	62	62
US 20	Grundy Co. Line to US 218/I-380	64	69	69	70	59	64	64	66	56	59	58	59
US 20	US 169 to West Jct IA 17	64	68	69	70	60	65	65	66	56	59	61	61
US 20	I-29 to End Divided Section (W. of Moville)	61	66	67	69	58	62	63	65	53	57	58	60
US 30	Ogden to Nevada	60	68	67	69	57	64	63	64	54	58	56	59
US 30	Iowa 201 to US 151	61	67	70	68	57	64	65	65	54	60	60	59
US 30	US 61 to Clinton	61	70	70	68	57	65	66	64	53	60	61	60
US 218	IA 22 to N. of IA 92	63	69	68	70	58	65	64	66	55	61	60	62
US 71	Spencer to Milford	61	66	67	67	57	64	63	64	54	58	58	60
US 69/65	Des Moines to Indianola	60	68	67	69	57	63	64	64	54	58	59	60
IA 141	I-35/80 to Granger	62	67	68	69	58	62	63	64	53	57	59	60
US 151	IA 13 to E. of Springville	62	68	68	69	57	63	63	64	52	57	58	59
IA 13	US 151 to Central City	60	67	68	68	56	62	63	64	53	56	57	59
US 63	Waterloo to Iowa 3	60	65	67	68	56	62	63	64	53	57	57	58
US 34	I-29 to US 275	62	N/A	68	66	57	N/A	63	61	53	N/A	58	58
US 61	Ft. Madison to Burlington	62	N/A	67	68	57	N/A	63	64	53	N/A	58	58
US 30	Marshalltown Bypass	N/A	N/A	69	69	N/A	N/A	65	65	N/A	N/A	61	61
US 61	North of DeWitt to Maquoketa	N/A	N/A	69	69	N/A	N/A	65	65	N/A	N/A	60	60
	Average (mph)	**61.6**	**67.6**	**68.2**	**68.7**	**57.4**	**63.6**	**64.0**	**64.5**	**53.7**	**58.3**	**58.9**	**59.7**

will be variations. Good speed limit strategy attempts to keep variations in speed to a minimum.

Percentile Distribution

One way to examine travel speed variance is by looking at the distribution of speeds. Table 2 shows the 85th, 50th, and 15th percentile travel speeds for the 65 mph Iowa freeway and expressway segments both before and after the speed limits were increased. The greater the difference between the 15th and 85th percentile speeds, the more variation there is in the speeds being driven. This difference was 7.9 mph before the speed limit increase and 9.3 mph for both 1996 and 1997. In 1998 this difference decreased to 9.0 mph. Figure 1 graphically shows the changes in percentile speeds. It appears that the increase in variation for 1996 and 1997 is the result of the slower vehicles not increasing their speed as much as the faster vehicles. In 1998 it appears that the slower drivers have increased their speed more than the faster drivers. Comparing the "Before Changes" data and the "1998" data, the 85th percentile and 50th percentile speeds each increased 7.1 mph, while the 15th percentile increased by 6.0 mph. The variance in the upper half of the speed distribution remained the same at 4.2 mph before and after the speed limit changes. The variance in the lower half of the speeds increased from 3.7 mph before the changes to 4.8 mph after the changes. While the variance in speeds has increased since the speed limits were changed, there is less variance in 1998 then there was in 1997.

The percentile speeds also show that more drivers are complying with the 65 mph speed limits. Before the increase, the 85th percentile speed was 6.6 mph over the posted 55 mph speed limit. In 1996, after the 65 mph speed limit had been in effect for one to six months, the 85th percentile speed was 2.6 mph over the posted speed limit. In 1997, the average 85th percentile speed was 3.2 mph above the new posted speed limit. And in 1998 the 85th percentile speed was 3.7 mph above the speed limit. This indicates that motorists on the divided multi-lane highways complied more closely to the 65 mph speed limit than they did to the 55 mph speed limit. However, the percent of motorists

violating the 65 mph speed limit on Iowa freeways and expressways has increased from 31.2 percent right after the change to 41.4 percent in 1998.

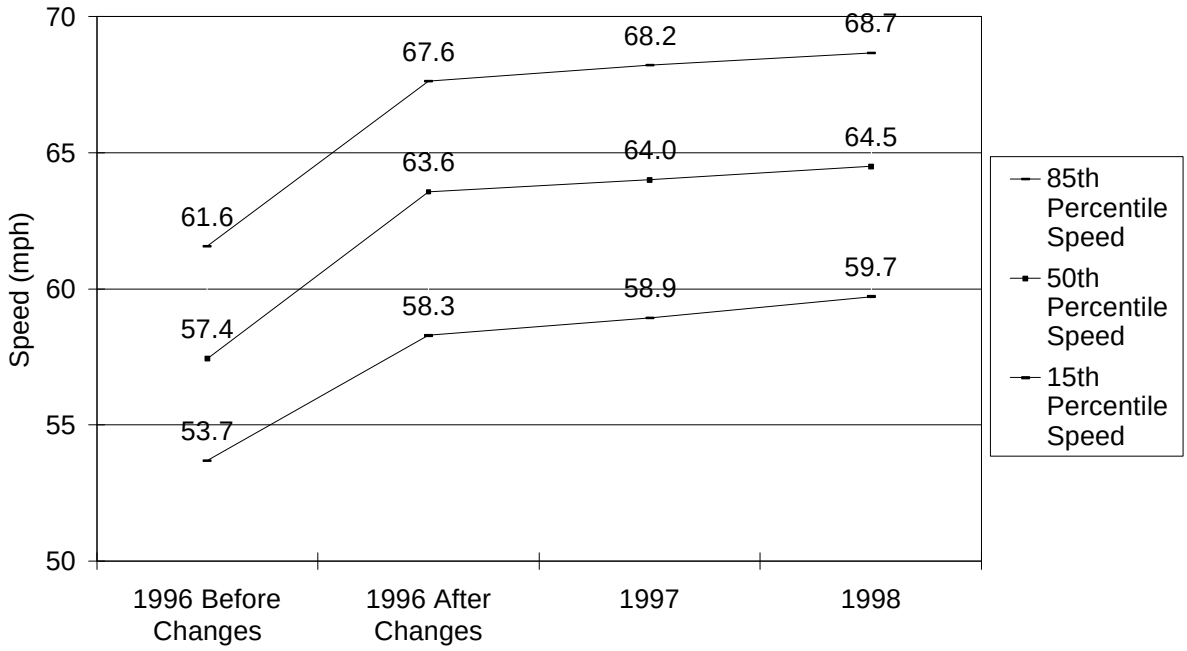

Figure 1 Changes in Speed Variance on Iowa Freeways and Expressways (85th percentile to 15th percentile)

Pace Speeds

Another way to judge travel speed variance is by looking at the pace speed. The pace speed is the 10 mph speed range that contains the highest number of observations. The higher the percentage in the pace speed, the less variation there is in travel speeds.

Table 3 lists the pace speeds for the Iowa freeways and expressways which had their speed limits increased to 65 mph and shows the percent of observations (vehicles) that were in the 10 mph pace. Higher percentages within the pace speeds indicate less speed variance. The averages from Table 3 are also shown graphically in Figure 2.

Table 3 shows that the 10 mph pace speed increased 6 mph in 1996, after the speed limit was increased to 65 mph. The 6 mph change was less than the 10 mph increase in the speed limit. In 1997, the average pace went up 0.5 mph and in 1998 it went up another 0.6 mph.

Table 3 Pace Speeds on 65 mph Iowa Freeways and Expressways

		10 mph Pace Speed (mph)				% in 10 mph Pace Speed			
Route	Location	1996 Before Changes	1996 After Changes	1997	1998	1996 Before Changes	1996 After Changes	1997	1998
US 20	Iowa 38 to Dubuque	54-63	61-70	62-71	62-71	76.4	68.8	76.4	77.5
US 20	Grundy Co. Line to US 218/I-380	55-64	60-69	60-69	61-70	80.5	74.3	68.1	70.1
US 20	US 169 to West Jct IA 17	55-64	59-68	61-70	61-70	77.0	78.4	80.6	76.8
US 20	I-29 to End Divided (W. of Moville)	53-62	58-67	59-68	60-69	79.5	74.5	74.2	80.5
US 30	Ogden to Nevada	52-61	60-69	59-68	61-70	87.8	71.5	71.5	74.3
US 30	Iowa 201 to US 151	53-62	59-68	60-69	60-69	82.4	81.7	70.1	73.9
US 30	US 61 to Clinton	53-62	62-71	61-70	59-68	81.0	71.5	75.7	79.8
US 218	IA 22 to End Divided (N. of IA 92)	54-63	61-70	61-70	62-71	76.2	78.1	77.9	78.5
US 71	Spencer to Milford	52-61	58-67	59-68	60-69	86.9	80.2	77.7	80.4
US 69/65	Des Moines to Indianola	52-61	58-67	59-68	60-69	86.8	72.2	78.2	74.7
IA 141	I-35/80 to Granger	53-62	59-68	59-68	61-70	79.6	68.8	73.9	73.8
US 151	IA 13 to E. of Springville	53-62	58-67	58-67	61-70	72.2	67.4	70.8	73.4
IA 13	US 151 to Central City	52-61	58-67	59-68	59-68	84.4	67.7	68.7	72.7
US 63	Waterloo to Iowa 3	53-62	57-66	59-68	60-69	85.4	82.9	73.2	72.1
US 34	I-29 to US 275	53-62	N/A	58-67	56-65	74.8	N/A	70.9	65.7
US 61	Ft. Madison to Burlington	N/A	N/A	59-68	60-69	N/A	N/A	76.0	76.6
US 30	Marshalltown Bypass	N/A	N/A	61-70	61-70	N/A	N/A	80.6	78.2
US 61	North of DeWitt to Maquoketa	N/A	N/A	59-68	61-70	N/A	N/A	77.2	74.2
	Average	**53-62**	**59-68**	**59-68**	**60-69**	**80.7**	**74.1**	**74.5**	**75.2**
	Low End	**53.1**	**59.1**	**59.6**	**60.2**				

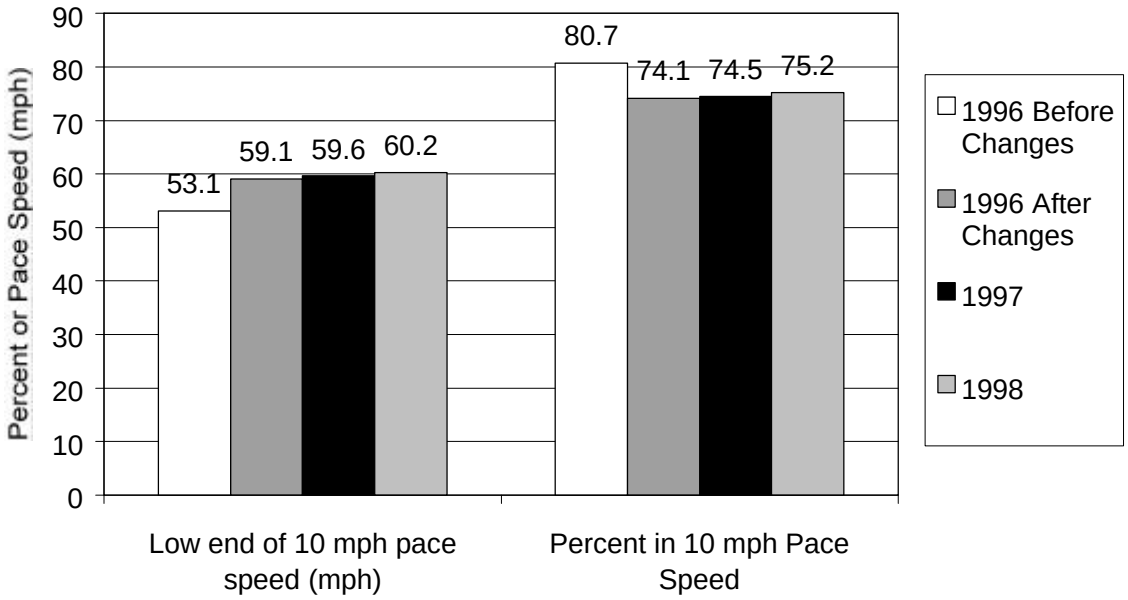

Figure 2 Changes in Pace Speeds on 65 mph Iowa Freeways and Expressways

Table 3 shows that before the speed limit was increased, 80.7 percent of drivers were in the 10 mph pace. After the increase to 65 mph in 1996, this figure dropped to 74.1 percent. This indicates a slightly wider dispersion in speeds which, in theory, is detrimental to safety. In 1997, the percent in the 10 mph pace went up 0.4 percent to 74.5 percent and in 1998 by 0.7 percent to 75.2 percent, which indicates a slight improvement, or reduction in speed variance.

Speed Compliance

Table 4 and Figure 3 show the percentage of motorists exceeding the posted speed limit. Before the speed limit was increased, an average of 71.0 percent of motorists exceeded the posted 55 mph speed limit. After the freeway and expressway speed limits were raised to 65 mph, the percent in violation dropped significantly to 31.2 percent. In other words, almost 70 percent of motorists were in compliance following the change. In 1997 and 1998 the percent in violation increased to 35.2 percent and 41.4 percent, respectively. Although the percent of vehicles exceeding 70 mph in Table 4 and Figure 4 continued to increase in 1998, no vehicles exceeding 75 mph were observed in the 1998 sample.

Table 4 Percent Exceeding High Speeds on 65 mph Iowa Freeways and Expressways

		Percent in Violation				Percent Exceeding 70 mph				Percent Exceeding 75 mph			
Route	Location	1996 Before Changes	1996 After Changes	1997	1998	1996 Before Changes	1996 After Changes	1997	1998	1996 Before Changes	1996 After Changes	1997	1998
US 20	Iowa 38 to Dubuque	70.8	41.9	58.6	59.4	0	8	15	13	0	1	2	0
US 20	Grundy Co. Line to US 218/I-380	86.6	36.3	38.7	52.3	1	7	7	9	0	0	1	0
US 20	US 169 to West Jct IA 17	86.4	42.9	46.0	51.7	0	3	6	12	0	0	0	0
US 20	I-29 to End Divided Section (W. of Moville)	70.5	21.6	25.8	45.1	0	3	4	5	0	1	0	0
US 30	Ogden to Nevada	71.6	34.4	26.4	40.1	0	2	3	7	0	0	0	0
US 30	Iowa 201 to US 151	67.8	27.7	45.5	41.1	0	2	12	8	0	0	1	0
US 30	US 61 to Clinton	69.8	47.0	52.2	35.7	0	14	12	4	0	1	1	0
US 218	IA 22 to End Divided Section (N. of IA 92)	78.0	39.8	34.7	54.0	1	7	3	14	1	0	0	0
US 71	Spencer to Milford	70.8	25.6	28.2	33.5	0	0	1	3	0	0	0	0
US 69/65	Des Moines to Indianola	72.6	31.5	32.4	38.2	0	4	4	6	0	1	1	0
IA 141	I-35/80 to Granger	71.4	25.2	26.3	38.7	1	5	5	7	0	1	1	0
US 151	IA 13 to E. of Springville	61.9	28.1	28.1	39.3	1	5	6	7	0	1	1	0
IA 13	US 151 to Central City	60.4	23.0	28.5	34.7	0	2	5	6	0	0	0	0
US 63	Waterloo to Iowa 3	60.9	11.8	26.1	35.0	1	1	3	5	0	0	0	0
US 34	I-29 to US 275	66.0	N/A	26.3	19.3	1	N/A	4	3	0	N/A	0	0
US 61	Ft. Madison to Burlington	N/A	N/A	26.7	34.2	1	N/A	2	3	0	N/A	0	0
US 30	Marshalltown Bypass	N/A	N/A	47.0	44.6	N/A	N/A	7	9	N/A	N/A	0	0
US 61	North of DeWitt to Maquoketa	N/A	N/A	36.8	47.5	N/A	N/A	10	10	N/A	N/A	1	0
	Average	**71.0**	**31.2**	**35.2**	**41.4**	**0.4**	**4.5**	**6.1**	**7.3**	**0.1**	**0.4**	**0.5**	**0.0**

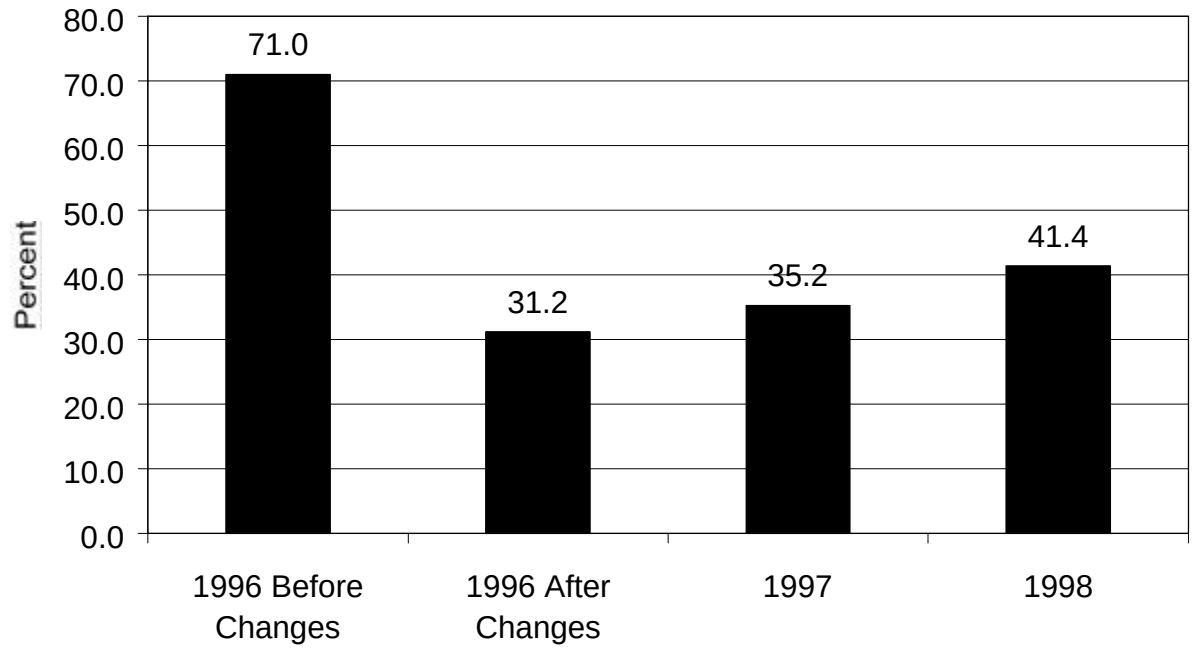

Figure 3 Percent in Violation of the Speed Limit on Iowa's Rural Freeways and Expressways

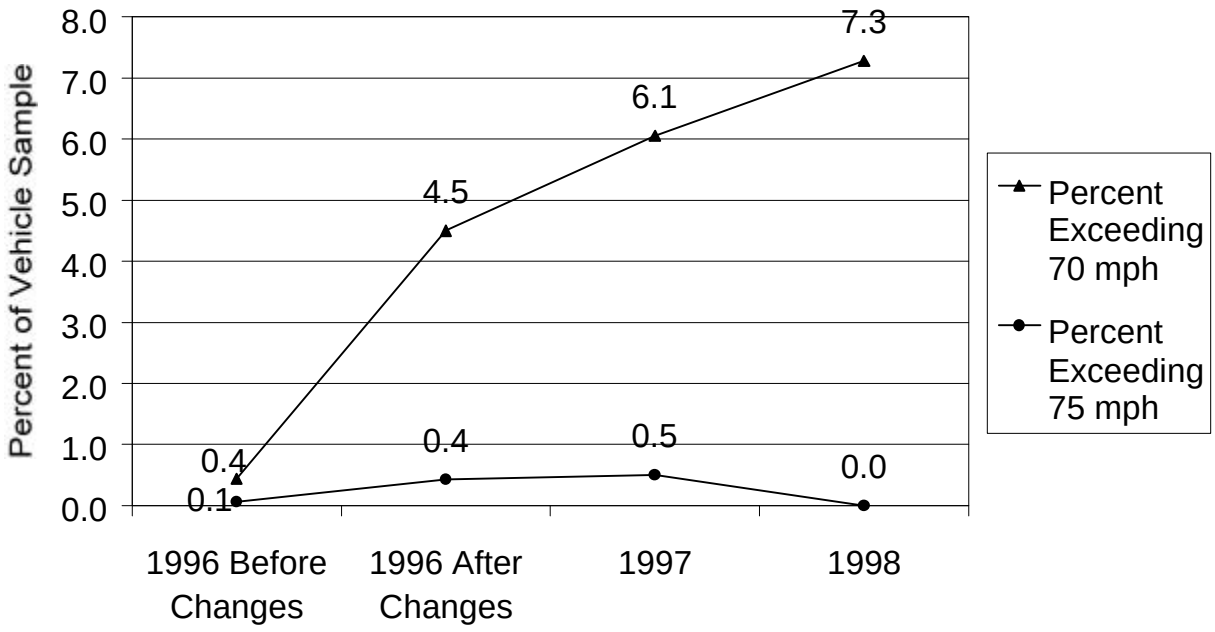

Figure 4 Percent Exceeding High Speeds on 65 mph Iowa Freeways and Expressways

CRASH DATA FOR IOWA

Rural Interstate and Primary Systems

Table 5 and Table 6 are compiled from the historical tables for the rural Interstate and rural Primary Systems shown in Appendix A. Table 5 illustrates the historical trend in travel on these systems during the six-year periods before and after the Interstate and freeway speed limit revisions in 1987, and also during the past four years.

Table 5 Historical Travel Trends in Iowa - Average Annual Travel in Hundred Million Vehicle Miles (HMVM)

	Rural Interstate		Rural Primary	
Time Period	Travel HMVM	Percent Change	Travel HMVM	Percent Change
1981 - 1986 (Six Years)	25.3	*	56.9	*
1988 - 1993 (Six Years)	36.0	42%	65.9	16%
1994 - 1997 (Four Years)	43.3	20%	75.2	14%

As shown, average annual rural Interstate travel increased 42 percent from the 1981-1986 period to the 1988-1993 time period and another 20 percent from 1988-1993 to 1994-1997. During the same time periods, travel on the rural Primary System increased 16 percent and 14 percent respectively.

In Table 6, crash information for the same time periods is compared on the two road systems. On the rural Primary System, fatal crash rates and fatality rates per hundred million vehicle miles (HMVM) of travel declined during each of the three time periods, with the 1994-1997 rates about 23 percent less than the respective rates of 2.48 and 2.96 during the 1981-1986 period. After speed limits were raised to 65 mph on the rural Interstate System in 1987, fatal crash and fatality rates increased slightly during the 1988-1993 period from 0.65 to 0.72 fatal crashes per HMVM and from 0.82 to 0.86 fatalities per HMVM. Also shown in Table 6 are the rates for fatal plus injury crashes for the same time periods.

Table 6 Historical Crash Trends in Iowa - Rural Interstate and Primary Systems

Road System Time Periods	Average Annual Number of: Fatal Crashes	Fatalities	Rates Per 100 Million Vehicle Miles of Travel Fatal Crashes	Fatalities	Fatal+Injury Crashes
Rural Interstate System					
1981 - 1986 (Six Years)	17	21	0.65	0.82	20
1988 - 1993 (Six Years)	26	31	0.72	0.86	18
1994 - 1997 (Four Years)	24	31	0.54	0.72	18
Rural Primary System					
1981 - 1986 (Six Years)	141	168	2.48	2.96	44
1988 - 1993 (Six Years)	143	175	2.17	2.66	40
1994 - 1997 (Four Years)	143	173	1.90	2.29	41

Notes: Interstate speed limits were raised from 55 mph to 65 mph in 1987.
1996 and 1997 crash and injury information is based on preliminary data.

During the 1994-1997 time period, fatal crash and fatality rates fell to 0.54 and 0.72. These decreases of 17 percent and 12 percent respectively, again compared to the average rates for 1981-1986, are somewhat less than the 23 percent reduction on the rural Primary System for the same two time periods.

Expressway and Freeway Crash Information

Speed limits on several sections of expressway were raised from 55 mph to 65 mph during 1996. Last year's report include very limited crash data (from four to seven months) on these sections after the speed limit increase along with "before" data for the same months for previous years. Table 7 in this report adds another year (1997) to the "after" data. Some of the mileage that was included with the expressway information in the 1998 Report is actually from freeways. This mileage has been excluded from the expressway data in Table 7 and included in the 65 mph freeway information in the same table.

The "after" data for the 65 mph expressways is based on crash experience on 177 miles of expressway where the speed limit was increased to 65 mph sometime during 1996. The "before" data is based on corresponding months for individual sections in 1994-1995 and 1992-1993. Total mileage in the two "before" periods is somewhat less

Table 7 Expressway, Freeway, and Rural Interstate Summary of Crash and Injury Rates by Speed Limit

Roadway Type - Speed Limit	Number of Miles	100 Million Vehicle Miles (HMVM)	Crash/Injury Summaries - Numbers and Rates Per HMVM of Travel						
			Legend	Fatal Crashes	Fatal + Injury Crashes	Total Crashes	Fatalities	Fatal + Major Injuries	Other Injuries
Expressways - 65 mph (After) **Approximately July, 1996 - December, 1997** From month after speed limit increase to 65 mph through December, 1997 on sixteen (16) sections.	**177.3**	**6.82**	(Number)	(13)	(232)	(734)	(15)	(52)	(334)
			Rate	**1.91**	**34**	**108**	**2.20**	**7.6**	**49**
Expressways - 55 mph (Before) **Approximately July, 1994 - December, 1995** Corresponding months in 1994 -1995 for same sections listed above, excluding three (3) sections not four-lane divided before 1994.	**140.1**	**5.52**	(Number)	(1)	(123)	(423)	(1)	(25)	(167)
			Rate	**0.18**	**22**	**77**	**0.18**	**4.5**	**30**
Expressways - 55 mph (Before) **Approximately July, 1992 - December, 1993** Corresponding months in 1992 -1993 for same sections listed above, excluding six (6) sections not four-lane divided before 1992.	**117.6**	**4.40**	(Number)	(0)	(128)	(390)	(0)	(30)	(158)
			Rate	**0.00**	**29**	**89**	**0.00**	**6.8**	**36**
Expressways - 55 mph **July, 1996 - December, 1997** Includes ten (10) Expressway sections at least four (4) miles in length where speed limit remained at 55 mph.	**72.1**	**3.95**	(Number)	(4)	(165)	(411)	(5)	(43)	(254)
			Rate	**1.01**	**42**	**104**	**1.27**	**10.9**	**64**
Non-Interstate Freeways - 65 mph **July, 1996 - December, 1997** Includes eight (8) Freeway sections at least four (4) miles in length with speed limit of 65 mph.	**123.3**	**5.78**	(Number)	(6)	(200)	(622)	(6)	(36)	(272)
			Rate	**1.04**	**35**	**108**	**1.04**	**6.2**	**47**
Rural Interstate - 65 mph **January, 1996 - December, 1997** Includes all Rural Interstate sections in the state.	**658.0**	**89.31**	(Number)	(49)	(1,691)	(5,089)	(62)	(421)	(2,401)
			Rate	**0.55**	**19**	**57**	**0.69**	**4.7**	**27**

Interstate or Freeway: Fully controlled access with access points only at interchanges.
Expressway: Partially controlled access with at-grade intersections. (May include some interchanges)

Note: 1996 and 1997 crash and injury information is based on preliminary data files.

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because some sections were not included in the “before” data because they were not four-lane divided during the earlier time periods.

Also shown in Table 7 is crash experience for ten sections of expressway, which remained at the 55-mph speed limit. Only applicable sections that were at least four miles in length were included in this group. Note that only 72 miles of expressway was able to be included under this criteria and the time period covered July 1996 through December 1997, approximately the same time period for the 65 mph expressway “after” data. Most of the rates shown for this group of 55 mph expressways are very similar to those shown for the 65 mph “after” group. This may be explained by the somewhat lower design standards on some of these sections, and it may also indicate that motorists are traveling at higher speeds on these roads as well, not recognizing the subtle differences in design standards.

This year, approximately 123 miles of 65 mph non-Interstate freeways were analyzed and this summary data is also shown in Table 7. Here again, the time period studied was from July 1996 through December 1997. The rates from this group, which you would expect to be fairly close to the rates for the rural Interstate System, are in general almost twice as high as those shown in Table 7 for the 1996-1997 summary for the rural Interstates.

Table 8 shows a comparison of crash rates during the approximately 1.5 years after the speed limit increase with composite rates based on the two “before” time periods in Table 7. As shown, crash and injury rates have increased substantially during the still somewhat short “after” period.

Preliminary data for fatal crashes during 1998 became available just before this report was finalized. The sections of 65-mph expressway included in Table 7 continue to show a high frequency of fatal crashes. The preliminary totals for 1998 include 9 fatal crashes involving 12 fatalities. This experience closely matches the totals for 1997 which were 10 fatal crashes involving 11 fatalities.

Table 8 Crash and Injury Rate Comparisons on Iowa Expressways

	"Before" Rates * Per HMVM	"After" Rates Per HMVM	Percent Change
Crashes			
Fatal Plus Injury	25	34	+36%
Total	82	108	+32%
Injuries			
Fatal Plus Major	5.6	7.6	+36%
Other Injuries	33	49	+48%

* "Before" Rates are based on composite totals from the 1992-1993 and 1994-1995 data shown in Table 7.

All of these systems will continue to be monitored to see what happens with the crash, fatality, and injury numbers and rates.

SURVEY OF SPEED LIMITS AND SPEEDS IN OTHER STATES

As was done for the January 1997 *Report on Results of Speed Limit Changes After Repeal of the National Maximum Speed Limit* and the January 1998 *Update Report on Speed Limits in Iowa,* a survey was done with several states to obtain information on changes in speed limits. For this report, only the states bordering Iowa were surveyed. Some of these states have raised their speed limits and others have not. There were two basic areas of interest: (1) have there been further changes in speed limits from what was reported a year ago and (2) how have operating speeds changed in 1998. The following sections summarize the findings from these surveys.

Included in the survey were the six states that border Iowa (South Dakota, Nebraska, Missouri, Illinois, Wisconsin and Minnesota) as well as Kansas because of their close proximity to Iowa. The following paragraphs explain what has happened in these states relative to speed limits and travel speeds during 1998. There has been little change in posted speed limits. Overall, operating speeds have been relatively stable with 85th percentile speeds up at most 2 mph from operating speeds in 1997. The operating speeds in 1997 were 1 mph to 3 mph higher than the 1996 operating speeds. None of the states changed speed limits in 1998. The following paragraphs summarize the limited data collected from the survey of surrounding states. Some comparison data is shown in Table 9.

South Dakota

South Dakota had no changes in speed limits in 1998. The Interstate is posted at 75 mph and all other primary and secondary routes are posted at 65 mph. These changes were made in April of 1996.

Speed monitoring data shows that in the past year, the 85th percentile speed on the Interstate has increased 1.2 mph from 77.7 mph to 78.9 mph. This small increase compares with a 4.9 mph change from 1995 to 1997 when the speed limit was increased 10 mph. In 1995, it was 72.8 mph (posted 65 mph) and in 1997, it was 77.7

Table 9 Speed Limits and Speeds in Surrounding States

State	1997 Speed Limit Change?	System	Current Speed Limit (mph)	85th Percentile Speed (mph) 1996	1997	1998
South Dakota	No	Interstate	75	77.3	77.7	78.9
		Primary	65	69.2	70.2	70.4
		Secondary	65			
Nebraska	No	Interstate	75	78	78	78
		Expressway/Primary	65	59	63	63
		Secondary	55	64	65	66
Kansas	No	Interstate	70			
		Expressway	70			
		Primary	65			
		Secondary	65			
Missouri	No	Interstate	70		73.4	
		Expressway	70		74.1	
		Primary	65		65.8	
		Secondary	65			
Illinois*	No	Interstate	65	70.0	71.6	72.1
		Expressway	65			
		Primary	55	64.3	65.4	65.5
		Secondary	55	63.0	62.8	64.2
Wisconsin	No	Expressway	65		71.3	71.8
Minnesota	Yes	Interstate	70		72.0	75.1
		Expressway	65		68.0	70.4
		Primary	55			64.9
		Secondary	55			
Iowa	No	Interstate	65	74.0	73.8	74.0
		Expressway	65	67.6	68.2	69.0
		Primary	55	66.6	66.3	68
		Secondary	55	63.4	64.8	68

* Illinois has a car / truck speed limit differential of 65 mph and 55 mph, respectively.

mph (posted 75 mph). It was found that 29.6 percent of the motorists were exceeding the 75 mph rural Interstate speed limit. Last year the percent exceeding the speed limit was 22.9 percent.

The results were similar on arterial primary routes. In 1998, the 85th percentile speed increased 0.2 mph from 70.2 mph to 70.4 mph. There was a 5.8 mph increase between 1995 and 1997 when the speed limit on these routes was raised 10 mph from 55 mph to 65 mph. The proportion of motorists exceeding the 65 mph primary highway speed limit was 44.6 percent. In 1997 the percent exceeding the speed limit was 38.4 percent.

The percent compliance with posted speed limits has decreased in the last year. The lower violation figure for the Interstates (29.6 percent), compared with that on primary highways(44.6 percent), shows that there may be a carryover factor from Interstate to primary or that a speed limit higher than 65 mph is preferred by some motorists on the primary.

Nebraska

Posted speed limits in Nebraska have remained the same since 1996, with the exception of a few locations where the roadways have been improved. Rural Interstates have posted speed limits of 75 mph, while all other road types are set at 55, 60, or 65 mph, depending on their design. Expressways have a maximum limit of 65 mph, while primary highways are all 55 or 60 mph.

Operating speeds on the urban Interstates are up 2 mph and remained the same on rural Interstates.

Kansas

The State of Kansas advised that they had not changed their speed limits this past year. There have been spot changes resulting from engineering studies. In 1996, Interstates and expressways were raised to 70 mph while all other routes were raised to 65 mph. They do not have data on any changes in operating speeds or any shifts in traffic patterns.

Missouri

Missouri did not respond to this year's survey. They have maximum allowable limits of 70 mph on rural Interstates and expressways, 60 mph on urban Interstates, and 65 mph on primary and secondary facilities. Furthermore, the 65 mph speed limit on primary and secondary facilities is only posted on approved highways. Many of those facilities have posted speed limits of 55 mph or 60 mph.

Illinois

Illinois has had a rural speed limit of 65 mph on freeways (Interstate and other freeways) since April 1987 and, since December 1995, on some expressways as well. In December 1995 an additional 126 freeway miles were increased to 65 mph and 118 expressway miles were increased from 55 mph to 65 mph. All other primary and secondary routes in Illinois carry a 55 mph speed limit. There is a car/truck differential with trucks over 4 tons, campers, and vehicles towing trailers limited to 55 mph on all routes.

There were some minor changes in 85th percentile operating speeds on Illinois highways in 1998 compared to 1997. For the freeways, there was an increase of 0.5 mph from 71.6 to 72.1 mph or 2.1 mph higher than the 1996 speeds. Data are not available for expressways. On primary routes, there was a 0.1 mph increase in speed from 65.4 to 65.5 mph an 1.2 mph increase in speed from 1996. Secondary speeds went up 1.4 mph from 62.8 to 64.2 mph, 1.2 mph higher than in 1996.

Wisconsin

Wisconsin did not change their speed limits this past year. Interstate and expressway speed limits are 65 mph and they are 55 mph on primary and secondary roads. They indicate that operating speeds on expressways, other freeways and 2-lane highways have increased less than 1 mph. Overall the 85th percentile speeds have increased since 1995 when the speed limit was changed on the expressway. The increase ranges from 0.6 mph on rural freeways to 5.8 mph on expressways.

Minnesota

The State of Minnesota changed speed limits in 1997 on Interstates from 65 to 70 mph and on expressways from 55 to 65 mph. A total of 700 miles of each class was reported. Travel speeds on Interstates appear to be up approximately 0.3 mph with a 0.8 mph decrease on 55 mph highways. They reported no apparent shift in traffic patterns. The before/after 85th percentile speed on freeway and expressway routes showed an increase of 0.8 mph.

INJURY AND FATALITY COMPARISONS WITH SURROUNDING STATES

Rural Interstate Injuries

The Speed Limit Task Force gathered traffic injury data for rural Interstate highways from Iowa's neighboring states if this information was available.

In order to make a better, more complete determination of the possible impact of speed limit changes on rural Interstate injuries, data from 1993 to 1995 was compared with data from 1996 to 1997. Neighboring states Nebraska and South Dakota increased rural Interstate speed limits from 65 to 75 mph during the spring of 1996. Minnesota increased their rural Interstate speed limit from 65 to 70 MPH.

By using three years of data prior to the change and two years of data after the speed changes, any trends that may have occurred can be viewed from a broader perspective rather than a single years' data. In the case of Minnesota, which raised rural Interstate speed limits to 70 mph in 1997, data from 1993 to 1996 is compared to 1997 data. However, the Minnesota comparison may be of limited value since only 6 months of data is available after the speed limit change.

Table 10 Rural Interstate Traffic Injuries in Surrounding States

State	Limit Change?	1993	1994	1995	'93-'95 Ave.	1996	1997	'96-'97 Ave.	Percent Change in Averages
SD	Yes- 75 mph	569	463	513	**515**	742	764	**753**	**+46.2%**
NE	Yes-75 mph	797	868	886	**850**	1000	998	**999**	**+17.5%**
IA	No	1272	1119	1185	**1192**	1339	1421	**1380**	**+15.3%**
MN	Yes-70 mph	862	908	807	**929** [5]	1139	1155	**1155** [5]	**+24.3%**

Generally, rural Interstate traffic injuries have been on the increase in Iowa and all neighboring states; however, the magnitude of this increase is greater in those states which increased rural Interstate speeds.

[5] Minnesota changed their Interstate speed limit to 70 mph in mid-summer 1997, therefore 1993-1996 injuries were compared to 1997.

In South Dakota, for example, rural Interstate traffic injuries averaged 515 annually from 1993 through 1995; after speed limits increased from 65 to 75 mph, 1996-1997 injuries averaged 753 per year, an average increase of 238 injuries or 46.2 percent.

In Nebraska, average rural Interstate injuries climbed from 850 to 999, an increase of more than 17 percent.

In Minnesota, 1997 rural Interstate injuries, were "on par" with 1996 totals, but over 24 percent higher than the 1993-1996 average.

Iowa, which was the only one of the four states which did not change rural Interstate speed limits, also experienced the lowest increase in rural Interstate injuries, just over 15 percent.

The rural Interstate injury trends help to confirm and substantiate the trends observed in fatalities. That is, states with rural Interstate speed limit increases generally experienced greater increases in both injury and fatality numbers than states that did not increase limits.

Fatalities on Interstate Highways

It is on the Interstate highways where the experiences of states that raised their speed limits above 65 mph provide the starkest contrast with the states that did not raise their speed limits. This is understandable because all of states that raised their speed limits above 65 mph did so on Interstate highways. Some states raised only Interstates, while some states raised limits on selected other roads and still other states raised limits on virtually all roads.

Nebraska reports that rural Interstate fatalities have increased 60.9 percent from an average of 19.7 for the three years preceding their speed limit change to an average of 31.7 in the three years following the speed limit change. South Dakota also reports that rural Interstate fatalities have risen 26.7 percent since the speed limit was raised for those roadways. Fatalities averaged 15 for the three years before the speed limit was raised and 19 for the two years following the speed limit increase. Missouri has reported

annual Interstate fatal crashes 34.4 percent and 49.6 percent higher than the annual average prior to the speed limit increase. Missouri averaged 125 fatal crashes per year on their Interstate for the three years preceding the speed limit change. Following the speed limit increase in 1996, the number of fatal crashes increased to 168 and 187, in 1996 and 1997 respectively. By contrast, Iowa's average annual fatalities on rural Interstates increased by 48 percent (from 21 to 31) following the increase in speed limits from 55 mph to 65 mph but have remained stable at approximately 31 since 1988.

All Roads

In the Midwest, as of the end of 1998, five states raised their speed limits beyond 65 mph (South Dakota, Nebraska, Kansas, Minnesota and Missouri), and three states did not (Iowa, Illinois and Wisconsin). Of the states that raised their speed limit above 65 mph, all but South Dakota saw an increase in their total fatalities in 1997. Of the states that did not raise their speed limits above 65 mph, all three had a decrease in total traffic fatalities in 1997.

A study was also made of fatalities through the first eight months of 1998 and compared with the first eight months of 1997. Using the January-August time allows the use of complete data for those months for the year 1998 (which will eventually provide the second complete year of data following the speed limit increases except for Minnesota[6]).

Table 11 shows that states that did not raise their speed limit above 65 mph each had a decrease, ranging from 4.8 to 3.7 percent, in fatalities when comparing January through August 1998 with the same period in 1997. Of the states that raised their speed limit above 65 mph, all but Missouri have experienced increases in their traffic fatalities (ranging from 2.2 to 21.7 percent). Missouri had the same number of total fatalities for January through August in both 1997 and 1998.

Table 12 compares traffic fatalities for surrounding states for the last year before some states raised their speed limits above 65 mph (1995) and the first full year after some

[6] Minnesota changed their Interstate speed limit to 70 mph in mid-summer 1997.

states raised their speed limits beyond 65 mph (1997). Table 12 was included in the January 1998 *Update Report on Speed Limits In Iowa*.

Table 11 Change in January Through August Total Traffic Fatalities from 1995 to 1998

States That **Did Not** Change Speed Limits Above 65 mph		States That **Did** Change Speed Limits Above 65 mph	
Iowa	- 19.9%	Kansas	+ 11.9%
Illinois	- 8.3%	Minnesota[7]	+ 4.3%
Wisconsin	- 19.6%	Missouri	+ 12.0%
		Nebraska	+ 14.5%
		South Dakota	+ 10.0%

Table 12 Changes in January Through August Traffic Fatalities from 1995 to 1997

States That **Did Not** Change Speed Limits Above 65 mph		States That **Did** Change Speed Limits Above 65 mph	
Iowa	- 14.7%	Kansas	+ 5.3%
Illinois	- 4.0%	Missouri	+ 12.0%
Minnesota[6]	- 6.4%	Nebraska	+ 4.2%
Wisconsin	- 6.8%	South Dakota	- 8.9%

[7] Minnesota changed their Interstate speed limit to 70 mph in mid-summer 1997.

SPEED LIMIT ENFORCEMENT

In reviewing the past five years of Iowa State Patrol speed citation information in Table 13, it appears that citations issued by the Iowa State Patrol have remained fairly constant.

Enforcement activity on Interstate highways and restricted zones increased slightly each year from 1993 through 1996 and then leveled off again in 1997 and 1998. Enforcement activity on primary highways remained constant from 1993 through 1996 with a slight decrease in 1997 and 1998. Secondary highway speed enforcement was constant each year with the exception of 1994 and 1998, when slight increases were observed. Total speed citations were fairly constant from 1994 through 1996 with slight decreases observed in 1993, 1997, and 1998.

The Iowa State Patrol will continue to actively enforce the speed limit, regardless of what speed limits are set.

Table 13 Iowa State Patrol Speed Limit Citations Issued

Year	Interstate	Primary	Secondary	Restricted Zones*	Total Citations
1993	21,294	72,691	11,390	1,540	106,915
1994	22,750	73,595	13,259	1,513	111,117
1995	26,142	72,497	12,654	1,724	113,017
1996	27,156	71,856	12,153	1,963	113,128
1997	25,956	68,369	12,538	1,847	108,710
1998	25,241	64,808	13,017	1,750	104,816

* Restricted Zones are roadway segments with lower speed limits for a particular reason such as a school or residential area.

DISCUSSION ON SPEED LIMIT MODIFICATIONS

Note: The following section is included verbatim from the January 1996 Report on Speed Limits and Safety for Iowa Highways *to provide historical perspective for readers unfamiliar with the issues and as a review for others. Previous sections of this Report, organized in the same format as the 1996, 1997, and 1998 Reports, have provided current information. Particular attention should be directed to the section in this Report titled Crash Data for Iowa, starting on Page 13. Comparison of that section to the projections made in the 1996 Report reveal that the actual increase in fatalities on Iowa's rural expressways was essentially double the initial projection of the Task Force.*

The consensus of the Task Force was that this report should not contain specific speed limit recommendations. The purpose of this report is to point out safety factors and to consider the impacts of speed on each. The task of weighing all of the relevant information and deciding whether speed limits should be modified is left to the Legislature and other policy makers. The Task Force urges these groups to be guided by the facts. The welfare of Iowans and visitors to the state should be considered.

All Classes of Highways

- In general, when speed limits are increased, accidents and fatalities will increase. Along with this is an increased cost to society for more severe injuries suffered in accidents.
- Differential speeds between cars, trucks and other vehicles are detrimental to traffic safety.
- If speed limits are increased, consideration should be given to repealing the "Right to Speed" law (Iowa Code 321.210(2)d).
- If speed limits are increased, consideration should be given to a day/night differential. Accident rates are three times higher during hours of darkness than during the day.
- Changing speed limits will require additional expenditures for changing sign messages or adding new signs.

- The increased kinetic energy in an accident at higher speeds may contribute to more severe injuries. An 18 percent increase in speed from 55 mph to 65 mph results in a 40 percent increase in the kinetic energy associated with a moving vehicle. Increasing the speed from 65 mph to 70 mph (an 8 percent increase in speed) results in a 16 percent increase in the kinetic energy.
- A vehicle traveling at 55 mph will require 540 feet to stop and the same vehicle traveling at 65 mph will require 725 feet to stop, a 34 percent increase in required stopping distance for an 18 percent increase in speed. A vehicle traveling at 70 mph will need 840 feet to stop. The additional stopping distance required when vehicle speed is increased from 65 mph to 70 mph, an 8 percent increase in speed, is 115 feet, or a 16 percent increase.

Urban Interstate

- An increase in Urban Interstate speed limits from 55 mph to 65 mph will likely result in an increase of at least three to six fatalities at an economic loss of $1.5 million to $3.0 million annually, using the Iowa DOT fatality costs.
- Since there is considerable variation in design and use of Urban Interstates, speed limits should be set by site-specific engineering studies rather than by the Legislative process.

Rural Interstate

- An increase in the speed limit from 65 mph to 75 mph on Rural Interstate will likely result in at least 31 additional fatalities at a cost of $15.5 million annually, using Iowa DOT fatality costs.
- Interstate speed limits should be based on the characteristics of the surrounding environment as opposed to arbitrary rural/urban boundaries. There should be continuity and uniformity of speed limits in suburban sections of metropolitan areas.

Freeways and Expressways

- An increase in the speed limit from 55 mph to 65 mph on Rural Expressways that “look like” Interstates will likely result in at least 3 additional fatalities at a cost of $1.5 million annually, using Iowa DOT fatality costs.

- The public does not perceive the subtle differences in these classifications of highways. Therefore, it may be acceptable to set speed limits on all rural multi-laned divided routes (Interstates, Freeways and Expressways) at the same posted limit.

Other Two-Lane Primary

- An increase in the speed limit from 55 mph to 65 mph on Rural Primary will likely result in at least 50 additional fatalities and a cost of $25 million annually, using Iowa DOT fatality costs.
- An increase in the Rural Primary speed limit will require a substantial additional expenditure to resurvey, remark and relocate signs for No Passing Zones.
- An increase in speed limits will lengthen the distance required to pass, while at the same time passing opportunities are reduced because of longer No Passing Zones.

Secondary Roads

- An increase in the speed limit from 55 mph to 65 mph on Secondary Roads will likely result in at least 44 additional fatalities and a cost of $22 million annually, using Iowa DOT fatality costs.
- The fatality rate on Secondary Roads is the highest of any of the road systems.
- Generally, the design characteristics and safety features of Secondary Roads are not sufficient to safely accommodate higher speed limits.
- The public tends to drive at higher speeds on the Secondary system than on the Rural Primary System. If the speed limit is increased on Rural Primaries, the speed on paved Secondaries will likely increase, regardless of the posted speed limit.
- An increase in the Rural Secondary speed limit will require a substantial additional expenditure to resurvey, remark and relocate signs for No Passing Zones.
- An increase in speed limits will lengthen the distance required to pass at the same time passing opportunities are reduced because of longer No Passing Zones.
- If different speed limits are posted on the Primary and Secondary Systems, it will require counties to install more signs.

VEHICLE OPERATING COSTS AT HIGHER SPEEDS

Note: *The following section is included verbatim from the January 1998* Update Report on Speed Limits in Iowa.

Many factors are impacted by raising speed limits, such as travel times, user costs, pollution, and user preference. Although most of those factors are outside of the scope of this Report, the Speed Limit Task Force was able to gather information on the impact of higher speeds on vehicle operating costs.

Trucks

The motor carrier industry has two primary considerations regarding speed limits. The first is safety. The second consideration is the cost of operation at various speeds. In 1987, The Maintenance Council (TMC) of the American Trucking Associations (ATA) conducted a study of the costs of operating trucks at 55 mph vs. 65 mph.

The study was conducted with the following three objectives in mind.

1. Determine the test fuel economy penalties of operating at a 65 mile per hour maximum speed with both old and new equipment.

2. Obtain the best possible estimates of component degradation at higher vehicle operating speeds.

3. Determine productivity gains to be realized by operating at 65 mph rather than 55.

Although the study was done 10 years ago, the three major truck engine manufacturers confirm that the study's conclusions on fuel economy and oil consumption remain relatively accurate. The study conclusions are listed below.

1. Speed costs money. The rule of thumb for all heavy trucks is that for every one mile per hour increase in average vehicle speed there is a 2.2 percent increase in fuel consumption or a 0.14-mile per gallon penalty in fuel economy. Current estimates are a 0.10-mile per gallon penalty.

2. Operating equipment at speeds higher than 55 mph generally decreases component service life and shortens preventative maintenance intervals. Some examples include:

   - A 10-mph increase in operating speed results in a 10 to 15 percent decrease in miles-to-engine overhaul.
   - Oil consumption can be expected to increase by 15 percent.
   - Tread life on tires was estimated to decrease 5 to 16 percent from 55 mph to 65 mph.
   - Brake life was estimated to decrease up to 15 percent with the speed limit increase.

3. On the issue of productivity gains, TMC concluded that it was not possible to prove any productivity gains by increasing the speed limit from 55 mph to 65 mph. The Task Force could not locate statistics to support or refute the productivity arguments.

Passenger Cars

The passenger vehicle segment of the motor vehicle industry has operated under the following “rules of thumb” as it relates to fuel economy and increased speeds. This information is based on all passenger cars and light trucks.

Fuel economy “rules of thumb”:

- As a vehicle’s speed increases from 65 mph to 70 mph there is typically a 10 percent decrease in fuel economy.
- The 10 percent decrease is not a linear relationship, meaning there is an increasingly greater decrease in economy as speed increases.
- Sport utility vehicles, as a class, experience approximately a 20 percent decrease in fuel economy for an increase in speed from 65 to 75 mph.
- Air resistance is the largest contributor to a decrease in fuel economy. More aerodynamic vehicles will incur a lower decrease in economy.

OTHER REPORTS

Many reports about the effects of increased speed limits on safety came to the Task Force's attention. The reports are as follows:

Impact of the 65 mph speed limit on Iowa's rural Interstate highways: An integrated Bayesian forecasting and dynamic modeling approach, November 1997. Sponsored by the Center for Transportation Research and Education, Ames, IA. Authored by Shanmuganathan Raju, Reginald Souleyrette, and T.H. Maze.

Effect of 1996 Speed Limit Changes on Motor Vehicle Occupant Fatalities, October 1997. Sponsored by the Insurance Institute for Highway Safety, Arlington, VA. Authored by Charles M. Farmer, Richard A. Retting, and Adrian K. Lund.

Did the 65 mph speed limit save lives?, 1994. Authored by Charles Lave and Patrick Elias, Department of Economics, University of California, Irvine, CA.

Impact of Speed Limit Increases on Crash Injury Severity: Analysis of Single-Vehicle Crashes on North Carolina Interstate Highways, Novermber 1998. Authored by Henry Renski and Asad J. Khattak, Department of City and Regional Planning, The University of North Carolina and Forrest M. Council, Highway Safety Research Center, The University of North Carolina, Chapel Hill, NC.

Deaths Go Up on Interstate Highways Where Higher Speed Limits are Posted, January 1999. Sponsored by the Insurance Institute for Highway Safety, Arlington, VA.

Report to Congress: The Effect of Increased Speed Limits in the Post-NMSL Era, February 1998. Sponsored by the National Highway Traffic Safety Administration, Federal Highway Administration, U.S. Department of Transportation, Washington D.C.

Special Report 254: Managing Speed, Review of Current Practice for Setting and Enforcing Speed Limits, 1998. Sponsored by the Transportation Research Board, National Research Council.

Copies of these reports are available by calling the Engineering Division at the Iowa Department of Transportation at 515-239-1513. Requests may also be made by e-mail at tcrouch@iadot.e-mail.com.

Other studies, reports and media articles are available. The Task Force did not do a literature search nor intend this report to be a summary of other's work. The Task Force compiled information believed to be helpful to Iowa's decision makers.

APPENDIX

Table A-1

RURAL INTERSTATE

SUMMARY OF TRAVEL, CRASHES, FATALITIES AND RATES IN IOWA

1970 THROUGH 1997

Year	Vehicle Miles (Millions)	Number of Crashes: Fatal	Injury	Property Damage	Total	Number of Fatalities	Rates Per 100 Million Vehicle Miles of Travel: Fatal Crashes	Fatalities	Fatal + Injury Crashes	Total Crashes
Minimum Property Damage Threshhold at $100										
Speed Limits: Interstate, 75 MPH Day/65 MPH Night - Primary, 70 MPH Day/60 MPH Night										
1970	1,902	38	454	873	1,365	57	2.00	3.00	26	72
1971	2,001	25	564	1,082	1,671	31	1.25	1.55	29	84
1972	1,977	35	560	1,045	1,640	37	1.77	1.87	30	83
1973	2,039	41	633	1,266	1,940	48	2.01	2.35	33	95
1970-1973	**7,919**	**139**	**2,211**	**4,266**	**6,616**	**173**	**1.76**	**2.18**	**30**	**84**
January 1, 1974 - Maximum Speed Limit Lowered to 55 MPH on all Road Systems										
1974	1,851	23	414	881	1,318	24	1.24	1.30	24	71
July 1, 1975 - Property Damage Threshhold Raised to $250										
1975	2,000	29	511	1,272	1,812	40	1.45	2.00	27	91
1976	2,242	20	NA	NA	NA	27	0.89	1.20	NA	NA
1977	2,326	19	523	1,169	1,711	21	0.82	0.90	23	74
1978	2,422	27	606	1,408	2,041	28	1.11	1.16	26	84
1979	2,296	19	472	1,160	1,651	20	0.83	0.87	21	72
1980	2,246	22	467	1,170	1,659	30	0.98	1.34	22	74
1974-1980	**15,383**	**159**	**2,993 ****	**7,060 ****	**10,192 ****	**190**	**1.03**	**1.24**	**24 ****	**78 ****
July 1, 1981 - Property Damage Threshhold Raised to $500										
1981	2,357	28	443	964	1,435	35	1.19	1.48	20	61
1982	2,330	15	521	1,179	1,715	22	0.64	0.94	23	74
1983	2,406	17	486	1,121	1,624	21	0.71	0.87	21	67
1984	2,620	13	466	1,100	1,579	15	0.50	0.57	18	60
1985	2,661	13	480	1,192	1,685	18	0.49	0.68	19	63
1986	2,806	13	510	1,213	1,736	14	0.46	0.50	19	62
1981-1986	**15,180**	**99**	**2,906**	**6,769**	**9,774**	**125**	**0.65**	**0.82**	**20**	**64**
May 12, 1987 - Rural Interstate Speed Limit Raised to 65 MPH										
1987	**2,962**	**21**	**502**	**1,309**	**1,832**	**23**	**0.71**	**0.78**	**18**	**62**
December 28, 1987 - Rural Non-Interstate Freeway Speed Limits Raised to 65 MPH										
1988	3,282	28	538	1,341	1,907	35	0.85	1.07	17	58
1989	3,454	26	569	1,413	2,008	28	0.75	0.81	17	58
1990	3,531	23	586	1,552	2,161	27	0.65	0.76	17	61
1991	3,565	25	589	1,625	2,239	32	0.70	0.90	17	63
1992	3,775	25	627	1,413	2,065	29	0.66	0.77	17	55
1993	3,965	29	776	1,793	2,598	34	0.73	0.86	20	66
1988-1993	**21,572**	**156**	**3,685**	**9,137**	**12,978**	**185**	**0.72**	**0.86**	**18**	**60**
1994***	4,156	26	691	1,504	2,221	36	0.63	0.87	17	53
1995***	4,249	19	740	1,590	2,349	26	0.45	0.61	18	55
Beginning in Mid-1996 Speed Limits on Selected Sections of Rural Four-Lane Divided Expressways Raised to 65 MPH										
1996***	4,423	20	770	1,794	2,584	30	0.45	0.68	18	58
July 1, 1997 - Property Damage Threshhold Raised to $1,000										
1997***	4,508	29	870	1,655	2,554	32	0.64	0.71	20	57
1994-1997***	**17,336**	**94**	**3,071**	**6,543**	**9,708**	**124**	**0.54**	**0.72**	**18**	**56**

*** For 1976, injury, property damage, and total crash data is not available by road system because only fatal crashes were fully coded into the data system for that year.**

**** Because of the unavailable crash data for 1976, these summary totals for the non-fatal categories do not include 1976 data.**

***** Data for 1994 through 1997 is shown as preliminary data because the Statistics Files for these years have not been fully edited and finallized at the time of the report.**

February 1999
Transportation Safety Office
Engineering Division
Iowa Department of Transportation

Table A-2

RURAL PRIMARY

SUMMARY OF TRAVEL, CRASHES, FATALITIES AND RATES IN IOWA

1970 THROUGH 1997

Year	Vehicle Miles (Millions)	Number of Crashes				Number of Fatalities	Rates Per 100 Million Vehicle Miles of Travel			
		Fatal	Injury	Property Damage	Total		Fatal Crashes	Fatalities	Fatal + Injury Crashes	Total Crashes
Minimum Property Damage Threshhold at $100										
Speed Limits: Interstate, 75 MPH Day/65 MPH Night - Primary, 70 MPH Day/60 MPH Night										
1970	5,498	317	3,991	7,041	11,349	398	5.77	7.24	78	206
1971	5,706	283	3,620	7,008	10,911	385	4.96	6.75	68	191
1972	5,560	316	4,146	7,447	11,909	397	5.68	7.14	80	214
1973	5,566	278	4,140	7,344	11,762	350	4.99	6.29	79	211
1970-1973	**22,330**	**1,194**	**15,897**	**28,840**	**45,931**	**1530**	**5.35**	**6.85**	**77**	**206**
January 1, 1974 - Maximum Speed Limit Lowered to 55 MPH on all Road Systems										
1974	5,563	224	3,091	5,777	9,092	288	4.03	5.18	60	163
July 1, 1975 - Property Damage Threshhold Raised to $250										
1975	5,494	244	3,180	6,215	9,639	296	4.44	5.39	62	175
1976 *	5,565	227	NA	NA	NA	282	4.08	5.07	NA	NA
1977	5,665	187	3,023	5,916	9,126	230	3.30	4.06	57	161
1978	6,031	185	2,883	5,900	8,968	224	3.07	3.71	51	149
1979	5,932	186	2,733	5,691	8,610	238	3.14	4.01	49	145
1980	5,644	162	2,525	5,015	7,702	198	2.87	3.51	48	136
1974-1980	**39,894**	**1,415**	**17,435** **	**34,514** **	**53,137** **	**1,756**	**3.55**	**4.40**	**54** **	**155** **
July 1, 1981 - Property Damage Threshhold Raised to $500										
1981	5,614	161	2,514	4,322	6,997	196	2.87	3.49	48	125
1982	5,560	129	2,318	4,385	6,832	143	2.32	2.57	44	123
1983	5,676	147	2,207	4,375	6,729	180	2.59	3.17	41	119
1984	5,896	123	2,519	4,792	7,434	148	2.09	2.51	45	126
1985	5,628	153	2,194	4,827	7,174	181	2.72	3.22	42	127
1986	5,771	134	2,311	5,173	7,618	161	2.32	2.79	42	132
1981-1986	**34,145**	**847**	**14,063**	**27,874**	**42,784**	**1,009**	**2.48**	**2.96**	**44**	**125**
May 12, 1987 - Rural Interstate Speed Limit Raised to 65 MPH										
1987	**5,846**	**147**	**2,231**	**5,253**	**7,631**	**166**	**2.51**	**2.84**	**41**	**131**
December 28, 1987 - Rural Non-Interstate Freeway Speed Limits Raised to 65 MPH										
1988	6,061	160	2,295	5,644	8,099	194	2.64	3.20	41	134
1989	6,302	151	2,385	5,596	8,132	186	2.40	2.95	40	129
1990	6,540	142	2,511	6,168	8,821	174	2.17	2.66	41	135
1991	6,623	149	2,324	5,947	8,420	188	2.25	2.84	37	127
1992	6,883	119	2,604	5,597	8,320	143	1.73	2.08	40	121
1993	7,122	137	2,761	5,908	8,806	165	1.92	2.32	41	124
1988-1993	**39,531**	**858**	**14,880**	**34,860**	**50,598**	**1,050**	**2.17**	**2.66**	**40**	**128**
1994* **	7,286	126	2,699	5,754	8,579	150	1.73	2.06	39	118
1995* **	7,383	163	2,879	6,331	9,373	207	2.21	2.80	41	127
Beginning in 1996 Speed Limits on Selected Sections of Rural Four-Lane Divided Expressways Raised to 65 MPH										
1996* **	7,582	149	3,041	7,153	10,343	166	1.97	2.19	42	136
July 1, 1997 - Property Damage Threshhold Raised to $1,000										
1997* **	7,837	133	3,195	6,528	9,856	167	1.70	2.13	42	126
1994-1997* **	**30,088**	**571**	**11,814**	**25,766**	**38,151**	**690**	**1.90**	**2.29**	**41**	**127**

*** For 1976, injury, property damage, and total crash data is not available by road system because only fatal crashes were fully coded into the data system for that year.**

**** Because of the unavailable crash data for 1976, these summary totals for the non-fatal categories do not include 1976 data.**

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February 1999
Transportation Safety Office
Engineering Division
Iowa Department of Transportation

Table A-3

FATALITIES AND SPEED LIMITS INCREASES

A Comparison of Fatalities 1995-1998

Fatalities by Month

States Without Speed Limit Increases

State	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total Fatalities	Change from 1994	Year	State
Illinois	**1995**	121	107	107	123	119	113	136	159	985		**1995**	**Illinois**
	1996	106	115	131	96	98	146	121	131	944		**1996**	
	1997	101	100	94	98	140	143	139	134	949		**1997**	
	1998	100	94	81	94	123	128	148	135	903	**-8.3%**	**1998**	
Iowa	**1995**	37	36	33	25	42	57	51	60	341		**1995**	**Iowa**
	1996	29	23	33	37	24	47	48	39	280		**1996**	
	1997	36	27	27	39	37	45	40	44	295		**1997**	
	1998	31	24	23	34	40	32	45	44	273	**-19.9%**	**1998**	
Wisconsin	**1995**	57	37	46	52	51	82	77	82	484		**1995**	**Wisconsin**
	1996	58	45	46	51	52	61	69	85	467		**1996**	
	1997	51	50	36	47	64	63	67	73	451		**1997**	
	1998	47	35	36	32	54	60	60	65	389	**-19.6%**	**1998**	

States With Speed Limit Increases

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total Fatalities	Change from 1994	Year	State
Kansas	**1995**	25	32	31	25	30	46	46	50	285		**1995**	**Kansas**
	1996	34	25	31	41	55	44	42	42	314		**1996**	
	1997	42	32	29	32	36	48	43	37	299		**1997**	
	1998	38	27	40	32	34	48	52	48	319	**11.9%**	**1998**	
Minnesota *	**1995**	34	40	46	43	49	57	70	54	393		**1995**	**Minnesota**
	1996	31	32	35	45	44	52	62	75	376		**1996**	
	1997	33	40	29	50	48	54	50	64	368		**1997**	
	1998	35	41	29	50	51	55	49	66	376	**-4.3%**	**1998**	
Missouri	**1995**	61	76	91	74	80	107	85	103	677		**1995**	**Missouri**
	1996	79	63	95	102	79	91	112	132	753		**1996**	
	1997	79	53	88	71	125	119	124	99	758		**1997**	
	1998	85	76	94	88	70	111	118	116	758	**12.0%**	**1998**	
Nebraska	**1995**	12	18	21	15	12	23	33	32	166		**1995**	**Nebraska**
	1996	20	11	28	21	25	33	26	24	188		**1996**	
	1997	22	13	20	17	28	17	23	33	173		**1997**	
	1998	21	23	22	23	24	26	19	32	190	**14.5%**	**1998**	
South Dakota	**1995**	8	9	8	6	6	19	20	25	101		**1995**	**South Dakota**
	1996	11	6	17	9	13	24	19	23	122		**1996**	
	1997	17	7	3	8	7	11	17	22	92		**1997**	
	1998	12	10	8	15	11	15	19	22	112	**10.0%**	**1998**	

***Minnesota increased speed limits on its' interstate and expressway systems on July 1st, 1997**

February 1999 by:
Office of Driver Services
Iowa Department of Transportation

Table A-4

FATAL CRASHES, FATALITIES & SPEED LIMIT INCREASES

A COMPARISON OF 1994-1997 FATAL CRASHES & FATALITIES

FATAL CRASHES BY MONTH

States Without Speed Limit Increases Beyond 65 MPH

State	Year	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Fatal Crashes Total Crashes	Fatal Crashes Change from 1994	Fatalities Total Fatalities	Fatalities Change from 1994	Year	State
Illinois	**1994**	98	74	94	111	106	136	131	150	123	153	105	113	1394		1554		**1994**	**Illinois**
	1995	100	99	97	107	107	101	124	137	150	138	107	135	1402		1586		**1995**	
	1996	93	105	113	87	92	124	120	142	128	108	96	100	1308		1475		**1996**	
	1997	92	90	87	93	124	122	126	124	85	118	94	104	1259	-9.7%	1395	-10.2%	**1997**	
Iowa	**1994**	29	22	31	29	40	33	53	32	28	29	51	39	416		479		**1994**	**Iowa**
	1995	32	32	30	23	37	51	45	50	52	42	29	23	446		527		**1995**	
	1996	25	19	29	35	21	43	38	35	37	48	44	37	411		465		**1996**	
	1997	28	27	25	30	36	41	34	41	38	35	36	40	411	-1.2%	468	-2.3%	**1997**	
Wisconsin	**1994**	42	43	38	58	51	52	73	61	51	59	49	45	622		715		**1994**	**Wisconsin**
	1995	54	31	39	43	49	86	66	72	65	66	54	48	673		745		**1995**	
	1996	54	35	40	45	52	53	59	74	59	52	71	64	658		759		**1996**	
	1997	47	39	33	40	55	55	60	67	58	50	66	65	635	2.1%	725	1.4%	**1997**	

States With Speed Limit Increases Beyond 65 MPH

State	Year	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Fatal Crashes Total Crashes	Fatal Crashes Change from 1994	Fatalities Total Fatalities	Fatalities Change from 1994	Year	State
Kansas	**1994**	24	24	24	33	34	35	41	44	22	34	35	31	381		442		**1994**	**Kansas**
	1995	24	28	27	23	27	44	38	44	36	41	36	26	394		442		**1995**	
	1996	28	25	30	39	51	37	37	39	30	38	46	43	443		491		**1996**	
	1997	38	28	26	28	33	40	36	31	33	44	33	49	419	10.0%	481	8.8%	**1997**	
Minnesota *	**1994**	31	30	37	43	42	50	62	44	58	52	47	56	552		644		**1994**	**Minnesota ***
	1995	28	35	37	39	41	48	54	48	42	57	43	43	515		597		**1995**	
	1996	5	26	35	39	37	42	52	70	60	49	31	37	483		576		**1996**	
	1997	33	31	23	44	44	50	42	48	61	54	55	43	528	-4.3%	600	-6.8%	**1997**	
Missouri	**1994**	65	58	61	74	96	83	84	80	96	89	67	94	947		1089		**1994**	**Missouri**
	1995	55	63	79	68	67	100	76	92	107	109	82	87	985		1109		**1995**	
	1996	70	59	80	86	69	82	97	116	94	84	68	101	1006		1148		**1996**	
	1997	72	46	75	63	109	100	109	89	84	92	96	94	1029	8.7%	1192	9.5%	**1997**	
Nebraska	**1994**	18	17	13	22	24	23	21	19	16	22	19	15	229		271		**1994**	**Nebraska**
	1995	11	14	21	13	12	20	29	28	17	24	24	13	226		254		**1995**	
	1996	15	11	19	19	23	25	20	21	18	28	22	19	240		293		**1996**	
	1997	18	11	19	16	23	17	22	31	21	27	31	25	261	14.0%	302	11.4%	**1997**	
South Dakota	**1994**	3	6	9	14	13	10	12	18	11	14	15	15	140		154		**1994**	**South Dakota**
	1995	7	8	8	6	6	15	16	23	15	16	10	10	140		158		**1995**	
	1996	8	4	11	7	10	20	15	22	11	18	11	5	142		175		**1996**	
	1997	10	6	3	8	7	11	16	20	14	10	13	10	128	-8.6%	148	-3.9%	**1997**	

Minnesota increased speed limits on its interstate and expressway systems on July 1, 1997

February 1999 by:
Office of Driver Services
Iowa Department of Transportation