

# 1998 LONG-RANGE PLAN CHAPTER THREE

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### III. TRENDS & RELEVANT PLANNING DATA

This chapter contains information on relevant trends, factors and information used or considered by transportation planners to forecast and address travel demands. Past and projected demographic trends such as population, employment, housing and vehicle ownership are presented because they provide a general basis, along with land use, economic and other factors, for understanding the underlying variables that effect changes in travel. Commuting patterns, mode of commuting, congestion levels, traffic volumes and safety in critical travel corridors, and developments and trends in the movement of goods are discussed to give an overview of travel patterns and conditions that more directly affect the transportation network. Additionally, relevant projects and information discussed in the long-range transportation plans of adjacent states are presented.

#### A. POPULATION TRENDS: OPM Population Projections

##### 1. STATEWIDE POPULATION PROJECTIONS

Population in the state has grown in the past three decades, and state population projections from the Connecticut Office of Policy and Management call for a 9.27% increase in total state population from 3,289,090 in 1995 to 3,593,860 by 2020. As shown in **Figure III-1**, during the 1960's the state's population grew rapidly, but this growth slowed considerably during the 1970's and 1980's. From 1985 to 1995 the state's population increased by 3.44% from 3,179,613 to 3,289,090 persons. The current forecast of an annual growth rate of 0.36% indicates that this trend of slow steady growth will continue.

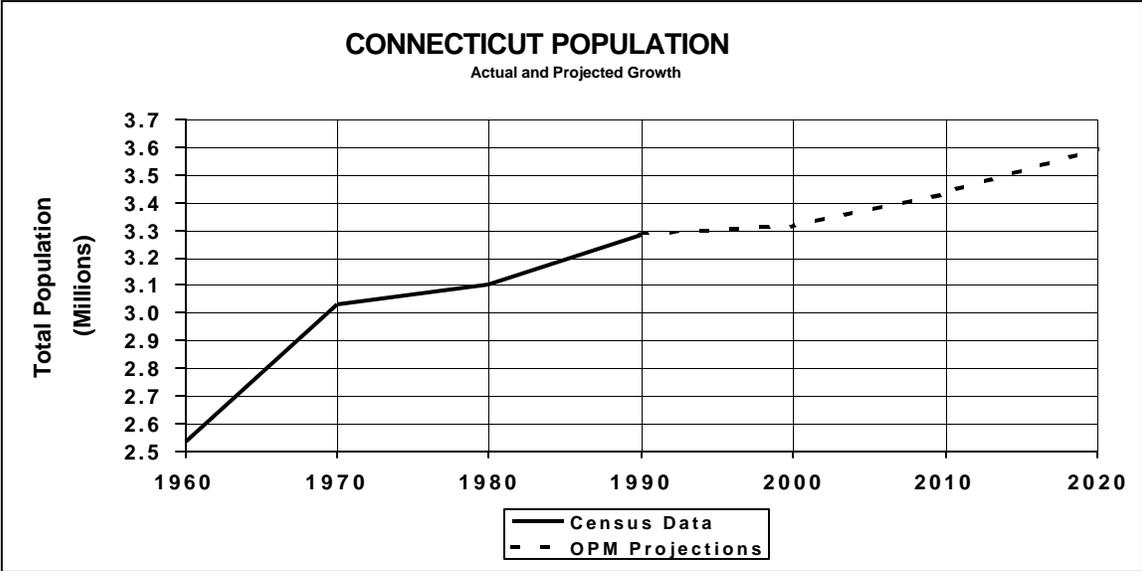


Figure III- 1. Connecticut Population, Actual and Projected

## 2. REGIONAL POPULATION PROJECTIONS

Within the State, actual and projected populations and rates of growth vary among the 15 planning regions and the two unaffiliated towns (Stafford and Union) which do not belong to any planning region. Between 1985 and 1995, as shown in **Table III-1** and in **Figure III-2**, the population increased in fourteen of the fifteen planning regions and decreased in one. The two unaffiliated towns, the Midstate Region, and the Northeastern Region experienced the highest growth rates: 19.44%, 12.55% and 10.43%, respectively; the Greater Bridgeport Planning Region experienced a population decrease of 4.03%.

In 1995 the Capitol Region comprising 29 towns with a total area of 763 square miles had the largest population: 700,684. The two unaffiliated towns comprising an area of 90.7 square miles and 138.14 persons per square mile, and the Northwestern Region comprising 9 towns with a total area of 364.3 square miles, had the smallest populations: 12,529 and 23,203, respectively. In 1995 47.72% of the State's population (1,562,752 persons) lived in three regions: the Capital Region, the South Central Region and the South Western Region. Differences in the populations of the regions in 1995 are shown in **Figures III-3** and **III-4** and listed in **Table III-1**.

For the period 1995 through 2020 the State's Office of Policy and Management (OPM) has projected that the populations of 14 planning regions will increase by percentages ranging from 23.54% in the Windham Region to 6.55% in the South Western Region. The population of one region, the Northwestern Region, is projected to decrease by 3.65%. Population projections for each region and the unaffiliated towns are listed in **Table III-1** and presented graphically in **Figure III-5**.

PLANNING REGION	NUMBER OF TOWNS	SQUARE MILES	POPULATION			%CHANGE 85-95	%CHANGE 95-2020	PERS./SQ MI 1995
			1985	1995	2020			
1 SOUTH WESTERN	8	226.4	335,210	335,368	357,340	0.05%	6.55%	1,481.31
2 HOUSATONIC VALLEY	10	337.7	180,390	193,714	216,520	7.39%	11.77%	573.63
3 NORTHWESTERN	9	364.3	21,570	23,208	22,360	7.59%	-3.65%	63.71
4 LITCHFIELD HILLS	11	418.6	73,040	78,862	93,430	7.97%	18.47%	188.39
5 CENTRAL NAUGATUCK VALLEY	13	312.3	245,760	264,660	290,500	7.69%	9.76%	847.45
6 VALLEY	4	57.6	78,560	79,746	86,000	1.51%	7.84%	1,384.48
7 GREATER BRIDGEPORT	6	145.5	305,020	292,740	313,690	-4.03%	7.16%	2,011.96
8 SOUTH CENTRAL	15	382.8	524,580	526,700	575,160	0.40%	9.20%	1,375.91
9 CENTRAL	7	166.8	220,950	223,542	247,490	1.17%	10.71%	1,340.18
10 CAPITOL	29	763.0	687,910	700,684	752,450	1.86%	7.39%	918.33
11 MIDSTATE	8	257.8	89,670	100,921	112,010	12.55%	10.99%	391.47
12 CT RIVER ESTUARY	9	190.1	52,150	55,701	59,560	6.81%	6.93%	293.01
13 SOUTHEASTERN	18	585.1	234,030	235,485	273,670	0.62%	16.22%	402.47
14 WINDHAM	10	326.9	72,580	77,568	95,830	6.87%	23.54%	237.28
15 NORTHEASTERN	10	388.2	66,320	73,234	84,310	10.43%	15.12%	188.65
16 UNAFFILIATED	2	90.7	10,490	12,529	13,540	19.44%	8.07%	138.14
<b>STATE TOTAL</b>	<b>169</b>	<b>5013.8</b>	<b>3,198,230</b>	<b>3,274,662</b>	<b>3,593,860</b>	<b>2.39%</b>	<b>9.75%</b>	<b>653.13</b>

**Table III- 1. Population Data By Region**

**Figure III- 2. Percent Change in Population of Regions (1985-1995)**

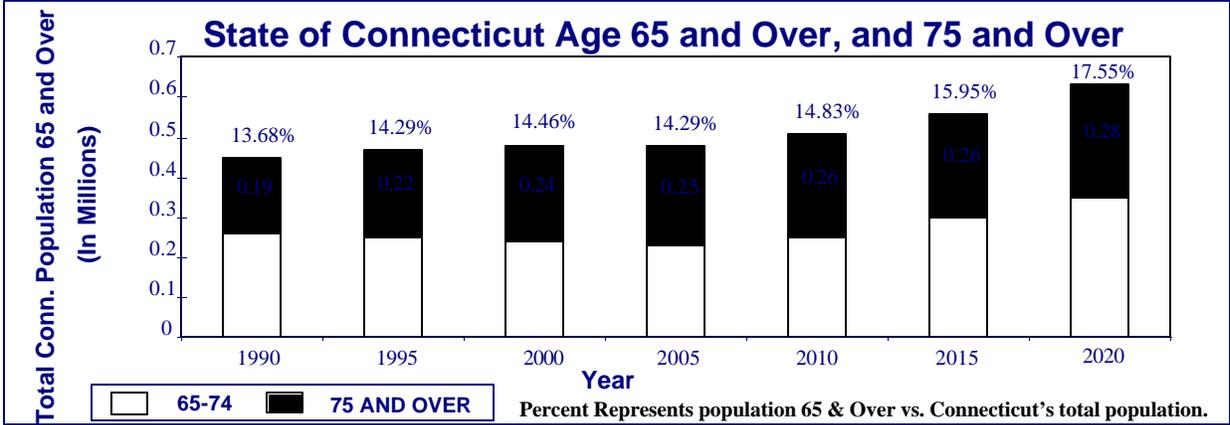
**Figure III- 3. Populations of Regions in 1995**

**Figure III- 4. Population Density of Regions in 1995**

**Figure III- 5. Projected Percent change in Population of Regions (1995-2020)**

**3. COMPOSITION OF POPULATION: TRENDS AND IMPLICATIONS**

In contrast to this slow growth of the overall population, persons age 65 and older are a group which is growing rapidly. As shown in **Figure III-6**, from 1990 to 2020 the population of those over 65 is projected to grow over 41%, from 445,907 to 629,874, increasing their proportion from 13.6% to 17.5% of the total state population. The proportion of those 80 years or older (i.e. the so-called "very aged"), meanwhile, is projected to grow by almost 65%, from 102,316 to 168,499, increasing this group's share of total state population from 3.1% to 4.7%. On a regional level, as shown in **Table III-2**, projected increases in the population over age 65 range from 90.22% in the Housatonic Region to 12.92% in the Greater Bridgeport Region.



**Figure III- 6. Connecticut’s Population Age 65 and Over, and 75 and Over**

These figures illustrate the continuing increase in both the numbers and proportion of the older population segments of society, a phenomenon often referred to as the "aging" of U.S. society. Because persons age 65 and older represent a segment of society with specific needs and habits, the continuing expansion of this demographic group is exerting a growing influence on the future shape of society. One consequence of this phenomenon will be an increase in demand to expand paratransit (i.e. "dial a ride") and other transportation services designed to meet the needs of this demographic group; another will be the need to change components of highway, bus, rail and air transportation systems to address the safety and mobility needs of older drivers and pedestrians.

PLANNING REGION	1990	1995	2000	2005	2010	2015	2020	1990-2020 CHANGE
1 SOUTH WESTERN	44,109	46,489	46,845	46,972	49,518	53,616	59,035	33.84%
2 HOUSATONIC VALLEY	18,588	19,888	21,304	23,155	26,790	31,315	35,359	90.22%
3 NORTHWESTERN	4,001	3,879	3,789	3,822	4,156	4,766	5,530	38.22%
4 LITCHFIELD HILLS	11,884	12,268	12,537	12,747	13,706	15,511	18,063	51.99%
5 CENTRAL NAUGATUCK VALLEY	38,859	40,175	40,421	39,199	40,545	44,273	48,984	26.06%
6 VALLEY	11,774	12,766	13,262	13,569	14,302	15,504	17,078	45.05%
7 GREATER BRIDGEPORT	45,274	46,355	45,986	44,427	44,409	46,912	51,123	12.92%
8 SOUTH CENTRAL	76,751	79,728	80,224	79,699	83,243	91,777	102,889	34.06%
9 CENTRAL	32,657	34,210	34,148	33,409	34,585	37,655	42,253	29.38%
10 CAPITOL	95,299	101,712	104,923	107,089	113,758	125,641	139,869	46.77%
11 MIDSTATE	11,725	12,231	12,348	12,682	13,760	15,720	18,163	54.91%
12 CT RIVER ESTUARY	8,380	8,953	9,343	9,849	11,083	12,663	14,373	71.52%
13 SOUTHEASTERN	28,611	30,974	32,261	33,444	36,514	40,766	46,896	63.91%
14 WINDHAM	7,397	7,987	8,283	8,641	9,646	11,102	13,497	82.47%
15 NORTHEASTERN	9,146	9,362	9,551	9,889	10,672	12,097	14,120	54.38%
16 UNAFFILIATED	1,452	1,481	1,402	1,414	1,492	1,692	1,990	37.05%
<b>TOTAL</b>	<b>445,907</b>	<b>468,458</b>	<b>476,627</b>	<b>480,007</b>	<b>508,179</b>	<b>561,010</b>	<b>629,222</b>	<b>41.11%</b>

**Table III- 2. Population Age 65 and Over By Region (1990-2020)**

## **EMPLOYMENT: Economic Recovery, Growth of Gaming**

### **1. STATEWIDE EMPLOYMENT**

In recent years, the state has been recovering from the economic recession of 1989-1992, when employment declined from its peak back to mid-80's levels. New jobs currently are being created at a slow but steady pace.

During the 1980's employment was a fast growing element in the state's economy, and between 1980 and in the peak year, 1989, the state's total Non-Farm Employment grew by 255,510 to 1,676,180 jobs. From 1990 to 1992 the state lost approximately 150,000 jobs, with employment sinking to a low of 1,516,700 in 1992. This figure put employment back roughly to its 1984 level. Currently employment in the state is slowly returning to its previous peak; however, there is a shift in the types of jobs being created.

Specifically, current job growth is concentrated in the service sector, where casino-related jobs are the fastest growing employment sector. With the opening of Foxwoods Resort and Casino by the Mashantucket Pequot Indians in Ledyard in 1992, casino gambling obtained a foothold in Connecticut. From an initial level of 2,000 to 3,000, employment at Foxwoods has grown to an estimated 13,000 - 15,000 employees, and the casino has undergone three successive expansions including the construction of two large tourist hotels. In 1996 the Mohegan Tribe opened its own casino, Mohegan Sun, which, at the time of opening, employed an estimated 2,000-3,000 workers, swelling the statewide total for this sector of employment to somewhere between 15,000 and 20,000.

In the future, it is projected that employment in Connecticut will increase from 1995 employment figures at a slow, annual growth rate of .84% to 1,917,740 in 2020. Of the 1,917,740 jobs available in the year 2020, 1,571,630 are projected to be in the non-retail field and 346,110 are projected to be in retail.

### **2. REGIONAL EMPLOYMENT**

On a regional level, as shown in **Figure III-7** and in **Table III-3**, from 1985 to 1995 employment increased in nine regions and decreased in six. The increases ranged from highs of 29.32% and 14.84%, respectively, in the two unaffiliated towns and the Northwestern Region to lows of .04% and 1.63% in the South Central and Housatonic Valley regions. The decreases in employment ranged from 13.59% in the Greater Bridgeport Region to .20% in the Central Naugatuck Valley Region.

In 1995, as shown in **Figure III-8** and in **Table III-3**, the Capitol, South Central and South Western regions had the greatest number of jobs: 411,180, 251,190, 192,000, respectively. The total employment in these regions represented 55.75% of the State's total employment in 1995. The two unaffiliated towns and the Northwestern and Connecticut River Estuary regions had the lowest numbers of jobs: 3,970, 8,980, and 21,080, respectively. With respect to employment density in 1995, **Figure III-9** shows that the South Western, Greater Bridgeport and South Central Connecticut regions had more than 600 jobs per square mile. In contrast, the two unaffiliated towns and the Northwestern Region had less than 50 jobs per square mile in 1995.

**Figure III- 7. Percent Change in Employment (1985-1995)**

**Figure III- 8. Employment By Region in 1995**

**Figure III- 9. Employment Density in 1995**

**Figure III-10. Projected Percent Change in Employment in Regions (1995-2020)**

For the period 1995 through 2020, ConnDOT has projected increases in regional employment ranging from 41.32% in the Southeastern region to 15.97% in the South Western region. These projected increases represent average regional annual employment growth rates of 1.40% and .55%, respectively. The projected percent change in employment in each of the regions is listed in **Table III-3** and shown in **Figure III-10**.

PLANNING REGION	SQUARE MILES	EMPLOYMENT			PERCENT CHANGE 85-95	PERCENT CHANGE 95-2020	EMPLOYMENT PER SQ. MILE 1995	AVERAGE ANNUAL GROWTH
		1985	1995	2020				
1 SOUTH WESTERN	226.4	195,630	192,000	220,490	-1.86%	14.84%	848.06	0.55%
2 HOUSATONIC VALLEY	337.7	79,841	81,140	104,030	1.63%	28.21%	240.27	1.00%
3 NORTHWESTERN	364.3	7,840	8,980	10,790	14.54%	20.16%	24.65	0.73%
4 LITCHFIELD HILLS	418.6	26,128	27,620	33,880	5.71%	22.66%	65.98	0.82%
5 CENTRAL NAUGATUCK	312.3	97,833	97,640	119,440	-0.20%	22.33%	312.65	0.81%
6 VALLEY	57.6	26,561	29,650	38,360	11.63%	29.38%	514.76	1.03%
7 GREATER BRIDGEPORT	145.5	137,360	118,690	151,770	-13.59%	27.87%	815.74	0.99%
8 SOUTH CENTRAL	382.8	251,078	251,190	302,650	0.04%	20.49%	656.19	0.75%
9 CENTRAL	166.8	88,680	84,690	101,590	-4.50%	19.96%	507.73	0.73%
10 CAPITOL	763.0	436,270	411,180	526,930	-5.75%	28.15%	538.90	1.00%
11 MIDSTATE	257.8	42,890	42,750	55,370	-0.33%	29.52%	165.83	1.04%
12 CT RIVER ESTUARY	190.1	19,749	21,080	27,230	6.74%	29.17%	110.89	1.03%
13 SOUTHEASTERN	585.1	108,889	114,170	161,520	4.85%	41.47%	195.13	1.40%
14 WINDHAM	326.9	20,671	23,040	29,830	11.46%	29.47%	70.48	1.04%
15 NORTHEASTERN	388.2	22,689	24,840	28,620	9.48%	15.22%	63.99	0.57%
16 UNAFFILIATED	90.7	3,070	3,970	5,240	29.32%	31.99%	43.77	1.12%
<b>STATE TOTAL</b>	<b>5,013.8</b>	<b>1,565,179</b>	<b>1,532,630</b>	<b>1,917,740</b>	<b>-2.08%</b>	<b>25.13%</b>	<b>305.68</b>	<b>0.90%</b>

**Table III- 3. Employment By Region**

**C. HOUSING: Continuing Decrease in Average Household Size**

**1. STATEWIDE HOUSEHOLDS**

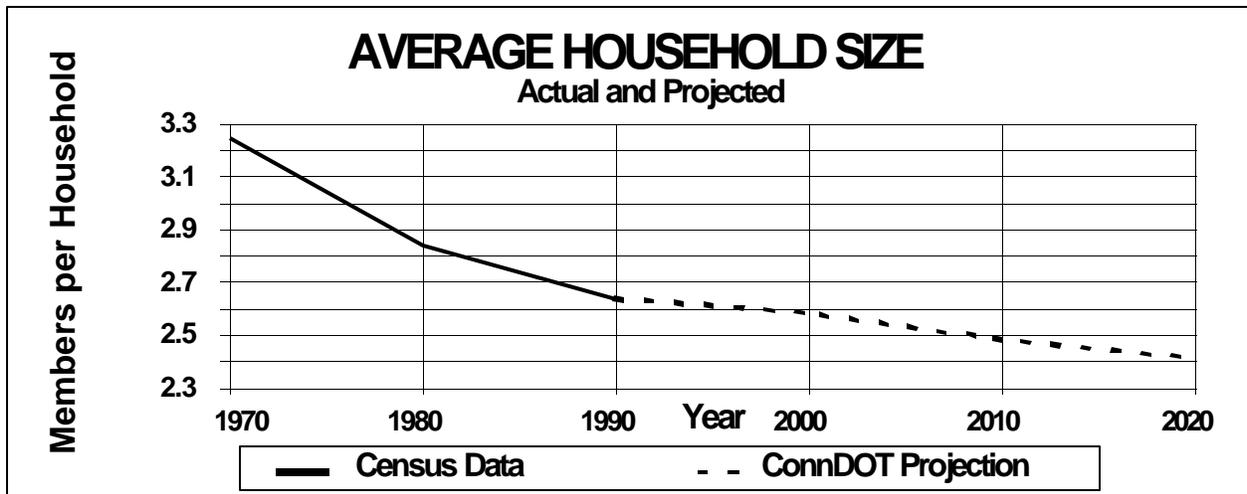
ConnDOT estimated that between 1985 and 1995 the number of households in Connecticut increased by 5.43%, from 1,189,441 households to 1,254,056 households. During the period 1995 to 2020 the number of households in the state is projected to increase by 19.15%, to 1,494,180 households.

While the number of households has been increasing the average number of people per household in the state has been decreasing. From 1985 to 1995 the average household size declined from 2.67 to 2.62 persons. It is projected that the average household size will continue to decline through the year 2020, to an average of 2.41 persons. This trend of decreased household size is a large contributor to the overall increase in households, and is not unique to Connecticut.

Higher rates of separation and divorce, the aging of the population and a trend toward delayed marriages by younger people have resulted in more younger and older people living alone, more single parent households, and more couples without children than in the past. These changing social patterns contribute to the decreasing number of people per household unit and the increasing number of non-family households.

**2. REGIONAL HOUSEHOLD DATA & PROJECTIONS**

Regional information on households is presented in **Table III-4** and shown graphically in **Figures III-12 to III-14**. Between 1985 and 1995 the undefined towns and 14 of 15 regions



**Figure III-191. Connecticut Average Household Size**

experienced an increase in the number of households; in one region, Greater Bridgeport the number of households decreased. The increases in households ranged from 16.89% and in the unaffiliated towns to 1.32% in the South Western Region.

In 1995, as shown in **Figure III-13**, the Capitol and South Central regions had the greatest numbers of households (271,663 and 206,015, respectively); the Northwestern Region and the unaffiliated towns had the smallest numbers (9,265 and 4,477, respectively). As shown in **Table III-4**, the average household size ranged from 2.97 persons in the Windham Region to 2.42 persons in the Northwestern Connecticut Region.

For the period 1995 through 2020 it is projected that the number of households in all 15 regions will increase. The projected increases range from 34.25% in the Windham Region to 8.93% in the Northwestern Region. As shown in **Figure III-14**, the number of households in seven regions, four and one half of which are in Eastern Connecticut, will increase by more than 20%.

PLANNING REGION	SQUARE MILES	HOUSEHOLDS			% CHANGE 85-95	% CHANGE 95-2020	HOUSEHOLD SIZE 1995
		1985	1995	2020			
1 SOUTH WESTERN	226.4	126,077	127,738	151,310	1.32%	18.45%	2.58
2 HOUSATONIC VALLEY	337.7	63,142	69,071	85,513	9.39%	23.80%	2.76
3 NORTHWESTERN	364.3	8,369	9,265	10,092	10.71%	8.93%	2.42
4 LITCHFIELD HILLS	418.6	28,461	31,230	40,146	9.73%	28.55%	2.53
5 CENTRAL NAUGATUCK	312.3	89,625	102,056	119,578	13.87%	17.17%	2.63
6 VALLEY	57.6	29,190	31,104	35,897	6.56%	15.41%	2.61
7 GREATER BRIDGEPORT	145.5	112,980	110,758	127,189	-1.97%	14.84%	2.69
8 SOUTH CENTRAL	382.8	197,341	206,015	241,789	4.40%	17.36%	2.59
9 CENTRAL	166.8	84,341	88,429	105,652	4.85%	19.48%	2.55
10 CAPITOL	763	259,438	271,663	318,555	4.71%	17.26%	2.59
11 MIDSTATE	257.8	34,262	38,106	47,360	11.22%	24.28%	2.59
12 CT RIVER ESTUARY	190.1	20,088	21,649	25,537	7.77%	17.96%	2.55
13 SOUTHEASTERN	585.1	83,954	89,218	110,657	6.27%	24.03%	2.69
14 WINDHAM	326.9	24,159	26,325	35,342	8.97%	34.25%	2.97
15 NORTHEASTERN	388.2	24,184	26,952	34,065	11.45%	26.39%	2.69
16 UNAFFILIATED	90.7	3,830	4,477	5,498	16.89%	22.81%	2.67
<b>STATE TOTAL</b>	<b>5,014</b>	<b>1,189,441</b>	<b>1,254,056</b>	<b>1,494,180</b>	<b>5.43%</b>	<b>19.15%</b>	<b>2.62</b>

**Table III- 4. Household Data By Region**

**Figure III-12. Percent Change in Number of Households (1985-1995)**

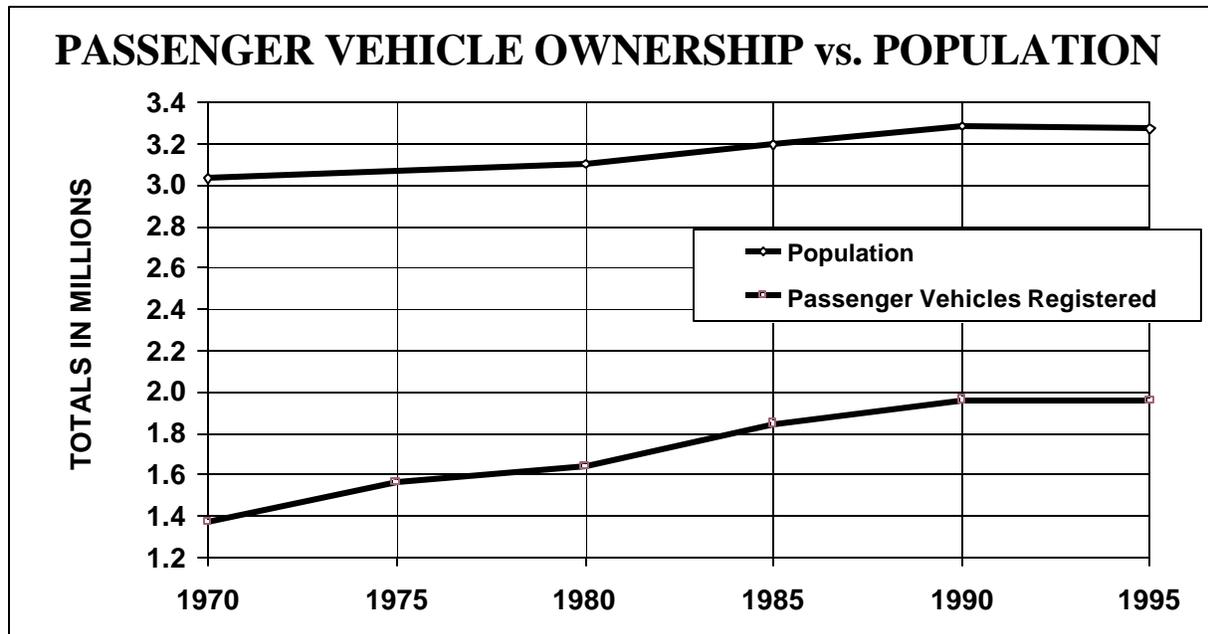
**Figure III-13. Number of Households**

**Figure III-14. Projected Percent Change in Number of Households (1995-2020)**

#### D. MOTOR VEHICLE OWNERSHIP: Cars per Household on the Rise

As **Figure III-15** shows, during the period from 1970 to 1990 Connecticut's population grew from 3,032,487 to 3,287,116, an increase of 8.4%. By contrast, during this same period, motor vehicle ownership, as reflected by the number of passenger vehicles registered in the state's cities and towns, grew by over 43%, increasing from 1,369,795 to 1,963,809. As shown in **Table III-5** from 1980 to 1995 vehicle ownership increased by 19.26% to 1,959,329 passenger vehicles registered in Connecticut.

As shown in **Figure III-16**, the largest increases in vehicle ownership during this period were in the Housatonic Valley, Connecticut River Estuary, Midstate and Northeastern Regions.



**Figure III-15. Passenger Vehicle Ownership vs. Population**

In addition, the average number of vehicles available per household has been increasing. Between 1980 and 1990 the percentage of one-vehicle households declined by 4% to 31%, the percentage of two-vehicle households increased by 2% to 40%, and the percentage of three-vehicle households increased by 2% to 19%. The percentage of households not owning a vehicle declined by 1% to 10% during this time.

Passenger vehicle ownership in 1995 by region is shown in **Figure III-17**. As shown in **Figure III-17** and in **Table III-5**, in 1995 vehicle ownership was the highest in the Capital and South Central regions and the lowest in the unaffiliated towns and the Northwestern region.

These demographic trends form the foundation for assessing future transportation needs and for developing a transportation program which will meet those needs.

PLANNING REGION	SQUARE MILES	VEHICLES		% CHANGE 80-95	VEHICLES/SQ. MI. 1995
		1980	1995		
1 SOUTH WESTERN	226.4	200,077	236,957	18.43%	1046.63
2 HOUSATONIC VALLEY	337.7	94,297	129,635	37.48%	383.88
3 NORTHWESTERN	364.3	12,611	15,564	23.42%	42.72
4 LITCHFIELD HILLS	418.6	38,074	47,068	23.62%	112.44
5 CENTRAL NAUGATUCK VALLEY	312.3	119,643	149,188	24.69%	477.71
6 VALLEY	57.6	42,345	52,098	23.03%	904.48
7 GREATER BRIDGEPORT	145.5	156,224	163,735	4.81%	1125.33
8 SOUTH CENTRAL	382.8	257,220	295,624	14.93%	772.27
9 CENTRAL	166.8	115,358	131,882	14.32%	790.66
10 CAPITOL	763.0	357,766	423,889	18.48%	555.56
11 MIDSTATE	257.8	46,580	60,936	30.82%	236.37
12 CT RIVER ESTUARY	190.1	29,342	38,978	32.84%	205.04
13 SOUTHEASTERN	585.1	107,814	128,686	19.36%	219.94
14 WINDHAM	326.9	30,483	39,616	29.96%	121.19
15 NORTHEASTERN	388.2	29,766	38,795	30.33%	99.94
16 UNAFFILIATED	90.7	5,257	6,678	27.03%	73.63
<b>STATE TOTAL</b>	<b>5013.8</b>	<b>1,642,857</b>	<b>1,959,329</b>	<b>19.26%</b>	<b>390.79</b>

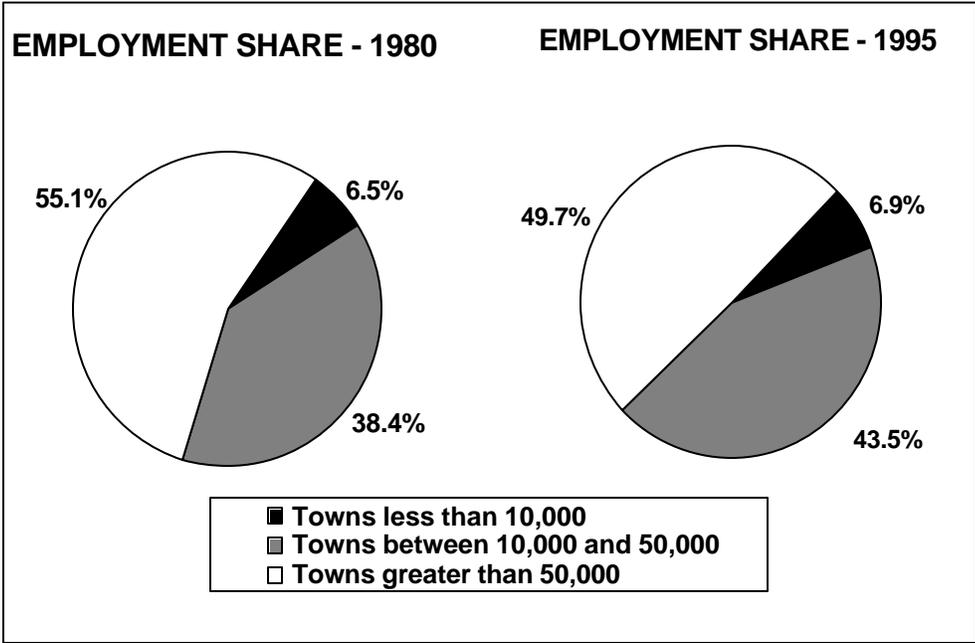
**Table III- 5. Vehicles Data by Region**

**Figure III-16. Percent Change in Passenger Vehicles Owned By Region (1980-1995)**

**Figure III-17. Passenger Vehicle Ownership By Region in 1995**

**E. COMMUTING: Changes in Traditional Patterns Continue**

Getting people from their homes to their place of employment is a critical demand placed on the state's transportation system. The continued movement of population and employment to the suburbs has been accompanied by increases in suburban travel. This, in turn, has placed added strain on the transportation system. **Figure III-18** shows that from 1980 to 1995, the percentage of total state employment located in towns larger than 50,000 fell by 11.6%, from a 55.1% share of the state total to a 43.5% share. During the same period, the percentage of total jobs located in towns with populations between 10,000 and 50,000 rose 11.3%, from 38.4% to 49.7%. The employment share of towns with populations less than 10,000 remained virtually unchanged.



**Figure III-18. State Employment by Town Size**

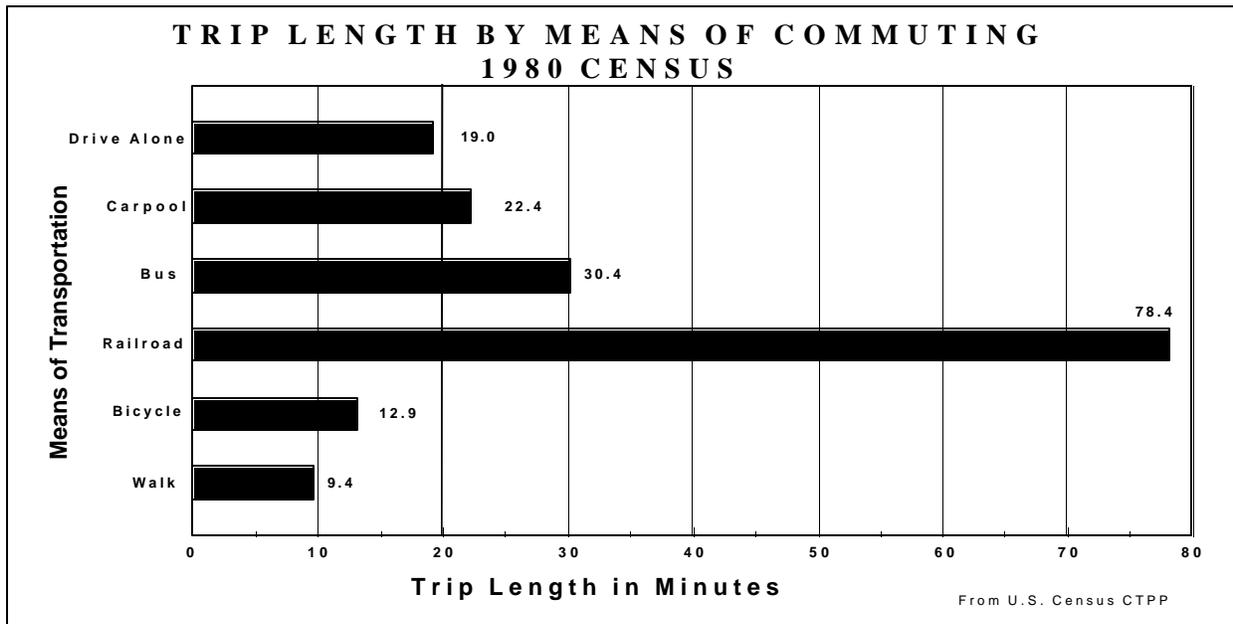
This trend has also been accompanied by an increase in the percentage of Connecticut's work force commuting to employment sites outside their place of residence. As **Table III-6** illustrates, from 1980 to 1990 the percentage of workers who commuted to a job located outside their town of residence increased overall by about 4.5% statewide.

YEAR	WORK IN TOWN OF RESIDENCE	PERCENT WORK IN TOWN	WORK OUTSIDE OF TOWN	PERCENT OUTSIDE OF TOWN
1980	548,791	40.5%	805,990	59.5%
1990	601,642	36.0%	1,071,800	64.0%

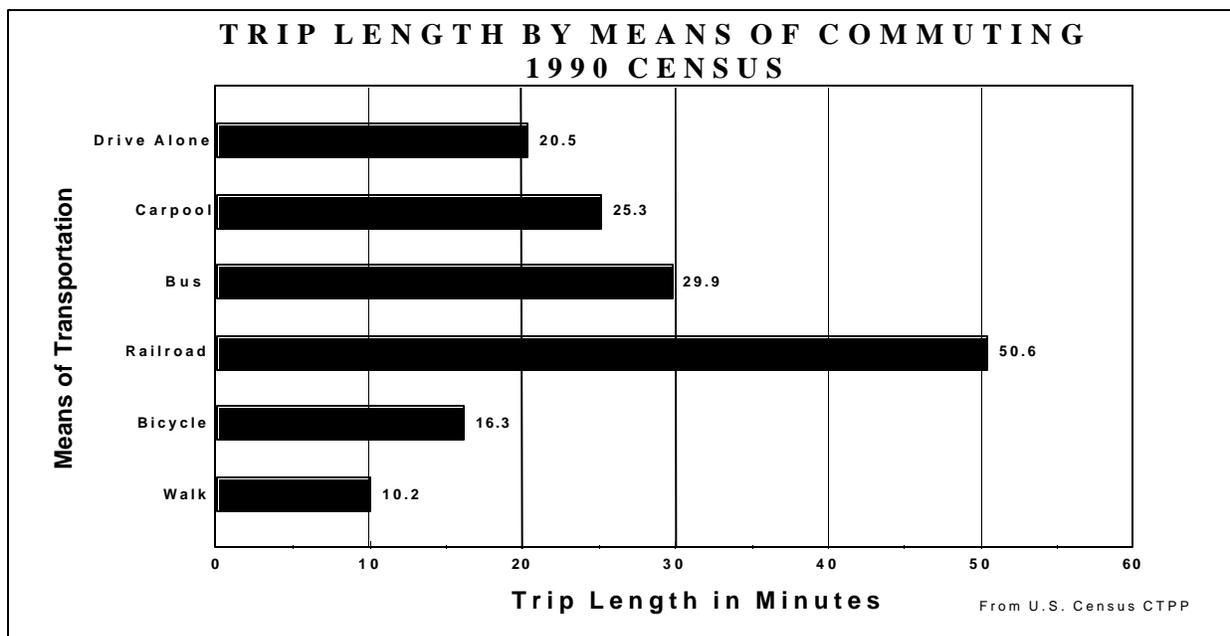
**Table III- 6. Place of Work - Town of Residence**

## F. TRIP LENGTH

The aforementioned demographic changes have affected the amount of time it takes commuters to make trips. **Figures III-19 and III-20** show the average trip length in terms of time, by mode of transportation for 1980 and 1990. They show that from 1980 to 1990 the average length of commuter trips by automobile, bicycle and walking trips increased while the average length of commuter trips by railroad and bus decreased.



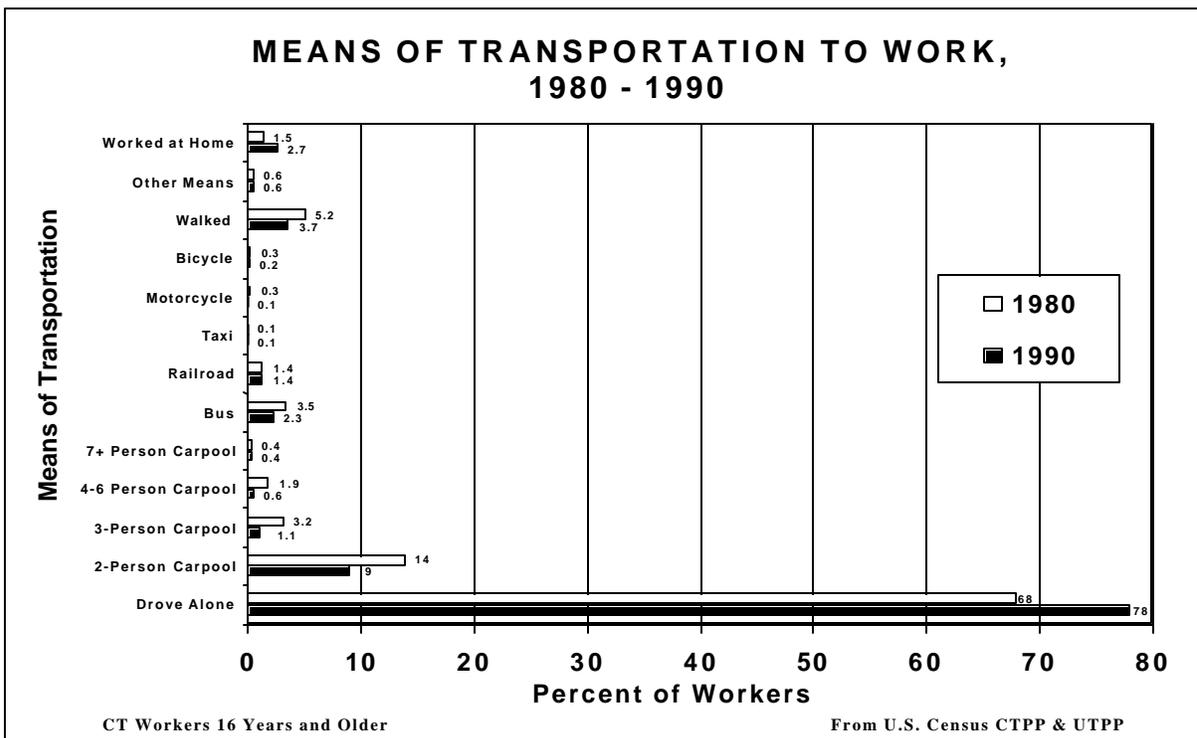
**Figure III-19. Trip Length By Means of Commuting - 1980 U.S. Census**



**Figure III-20. Trip Length By Means of Commuting - 1990 U.S. Census**

## G. MEANS OF TRANSPORTATION TO WORK

The primary means of transportation for the state's commuters remains the private automobile. The largest category of commuters consists of those who drive alone to work. The next largest category consists of carpoolers, including both private autos and vanpools. Approximately 78% of today's commuters drive alone to work. Carpoolers comprise about 11% of commuters, while 4% of commuters travel to work by bus or rail, another 4% walk to work, and about 1% get to work by other means. During the past decade, there was an increase in the number of "drive alone" commuters, and a decrease in the number of carpoolers, bus riders and walkers. This trend has contributed to the growth in traffic volume and has placed strains on the existing transportation system. A comparison between commuters' choice of mode is shown in **Figure III-21** for 1980-1990.



**Figure III-21. Means of Transportation to Work, 1980 - 1990**

The increase in the number of commuters driving alone to work happened despite the higher cost compared with carpooling. The continuing dispersion of employment and other services into the suburbs coupled with a shift toward more family-friendly work environments that offer greater work-schedule flexibility are contributing factors to this behavior. Another significant and somewhat related factor is the increasing numbers of women, particularly women with young children, in the labor force. Women now make more trips than men do by all modes and are more likely to "trip-chain"- to link together a series of trips for different purposes in one outing. The increase in trip-chaining associated with providing child care and managing a household is directly related to the increase in the number of commuters driving alone.

Reducing the number of single occupancy vehicles has proved to be a difficult objective. Several factors contribute directly to a successful carpool. These include: a large employer that serves as a "magnet", a long commuting distance (greater than 10 miles), and a work location where free parking is not readily available. Another factor which has been observed in other areas of the country and that may start affecting Connecticut commuters is the decision to avoid congestion and decrease travel times during the peak period by using High Occupancy Vehicle (HOV) lanes. Connecticut now has approximately 21 miles of HOV lanes in operation on I-84, I-384 and I-91 extending northward and eastward from Hartford. These lanes carry approximately 6,400 commuters toward Hartford during the morning peak period.

Rail commuters in Connecticut have historically been destined mainly for New York City. Data, however, indicates that the number of people traveling in the reverse commute direction and between Connecticut stops is increasing. The most heavily traveled rail portion in Connecticut is between Norwalk and Greenwich, which is the area of residence for the majority of the state's rail commuters who work in Manhattan. Rail service provides the most convenient means of traveling to Manhattan and captures most of the commuter market to that destination. Rail ridership between Connecticut towns is increasing, and although it still remains a small percentage of total rail ridership, it represents a growth component which is a priority for the state.

Local bus service tends to be centered around urban areas. Express bus service primarily connects suburban towns with urban centers. While rail ridership has increased during the past ten years, bus ridership has declined overall, but has increased over the past three years. The Capitol Region (Greater Hartford Area) shows the heaviest use of bus service in the state. Capitol Region ridership accounts for nearly 50% of the state total. The median household income for bus riders is lower than for any other mode of transportation, and many bus riders have limited access to automobiles. Low household income and lack of auto availability continue to be significant factors in the use of bus service.

**Table III-7** shows the number and relative share of transit passengers carried by bus and by rail in 1990 and in 1996.

TRANSIT MODE	1990 RIDERS	1990 % SHARE OF TRANSIT PASSENGERS	1996 RIDERS	1996 % SHARE OF TRANSIT PASSENGERS
BUS	35,962,710	57.3%	33,286,457	53.6%
RAIL	26,764,364	42.7%	28,870,011	46.4%

**Table III- 7. Annual Transit Passengers.**

Walking and biking are important modes of transportation because they allow people to get to work without adding to the load on the existing transportation network. Walkers and bikers make the shortest average trip length of all commuters (10 to 16 minutes).

**H. TELECOMMUTING**

The advent of the Information Age has brought about a multitude of technological advances that are changing the face of the world and how communications and business transactions are conducted today.

Personal computers, modems and fax machines have made possible another growing employment trend, telecommuting. With telecommuting, information transfer is utilized as a substitute for the traditional journey to work on either a part-time or a full-time basis. At present, 3% of the state's labor force work at home, up from 1.5% in 1980. Nationally, telecommuters increased 38% between 1991 and 1993, climbing from 4.5 percent of U.S. workers to 6.1 percent. Telecommuting programs provide multiple benefits because they allow greater schedule flexibility and reduce commuting times to zero for the participants, while at the same time they save fuel and reduce congestion for society at large. Because of the continuing development of communications technology, this mode of employment will play a growing role in satisfying the demand for transportation services.

## I. AUTO USAGE

Transportation requires a massive amount of energy, and, except for bikers and walkers, this energy is provided by one of the various types of transportation fuels. The term motor fuel applies to gasoline and all other fuels which are used for transportation. In Connecticut, fuel vendors record the amounts of fuels sold and submit this information to the State for tax purposes. This recorded fuel sales volume also serves as a measure of vehicle use. Despite technological advances in fuel efficiency which considerably reduced the amount of fuel needed by vehicles, **Figure III-22** shows that the overall trend during the 1970's and 1980's was an increase in the volume of motor fuel sold, except for significant dips in fuel use which occurred during the energy crises of the mid-1970's and early 1980's. This increase reached a peak in 1989, and was due primarily to the rapid increase in the number of vehicles and growth in the number of vehicle miles traveled in the state. Since 1989 motor fuel consumption has been declining. In 1995 1.46 billion gallons of motor fuel were sold in Connecticut, about the same amount as was sold a decade earlier.

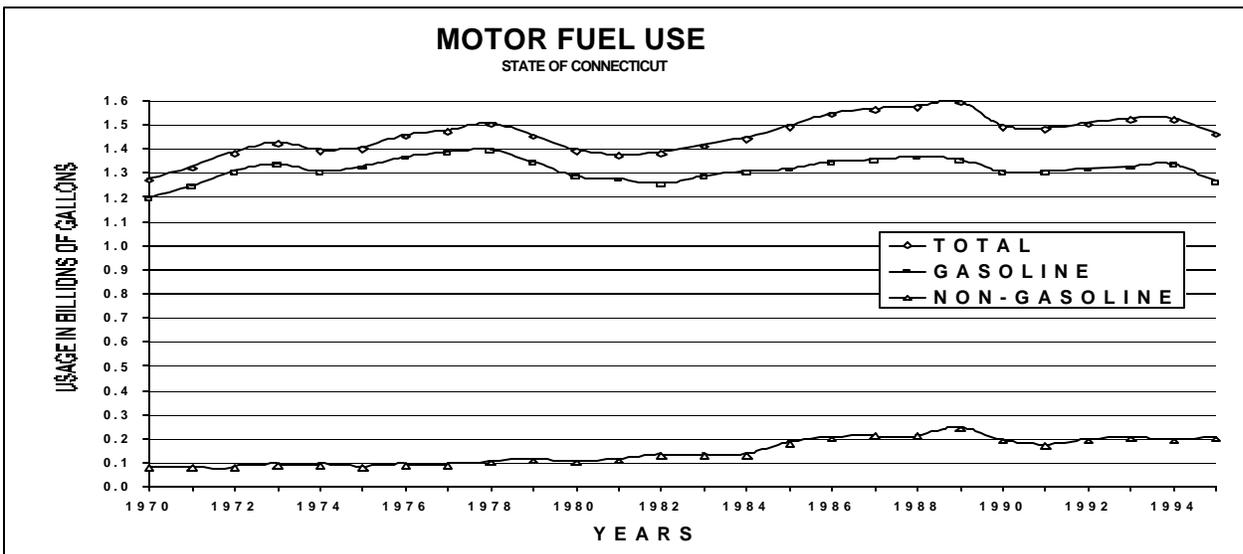
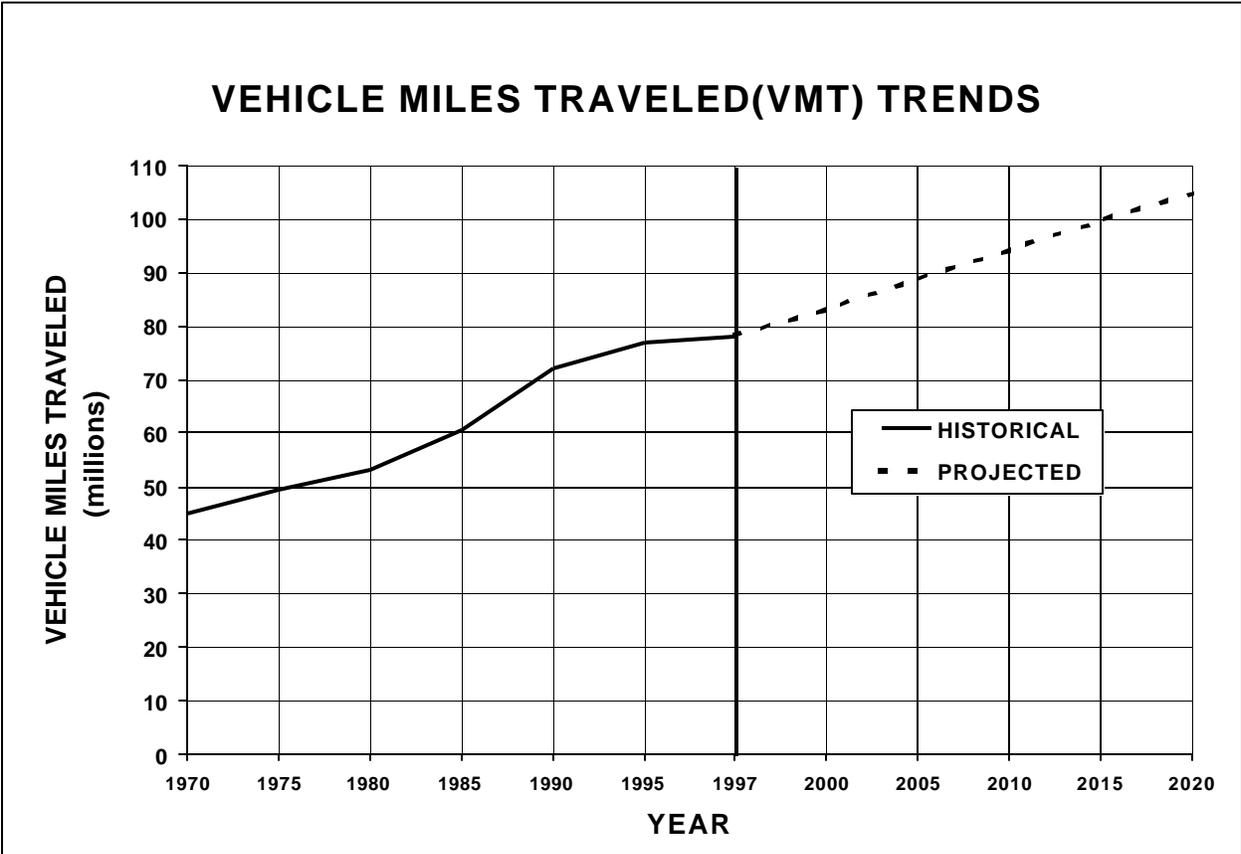


Figure III-22. Motor Fuel Usage

The transportation industry has traditionally relied upon fuels which are inexpensive and readily available. Petroleum has dominated the fuel market during the past century, and despite growing concerns about pollution, it will no doubt continue to play a major role as a transportation fuel for many years to come. At the present time, a significant amount of time and money is being spent on research to develop alternative fuels which are cleaner and less expensive than those presently in use. Environmental concern over the pollution caused by the use of traditional fossil-based fuels is the driving force behind this research. Two technologies which hold promise are natural gas and electric vehicles. As cleaner and less expensive fuels make their way into the marketplace, the transportation industry will no doubt adapt to make use of them as it has in the past.

Another index of vehicle use is Daily Vehicle Miles of Travel, or VMT. As **Figure III-23** shows, daily VMT in Connecticut has been growing steadily since 1970. However, during the period from 1990 to 1995, the rate of growth was less than half what it was during the 1980's. Future projections call for continued slow growth in VMT as the state and the economy continue to grow.



**Figure III-23. VMT Trends (1970 - 2020)**

**J. CAPACITY STATUS OF STATE HIGHWAYS**

As the number of vehicles on the state's highways has increased, along with the number of miles these vehicles are traveling, transportation corridors exhibiting congestion have increased. The Federal

Government has identified a network of routes it considers to be of prime importance to regions throughout the nation as the National Highway System, or NHS. The highways in Connecticut that are part of the NHS are shown in **Figure III-24**. **Figures III-25 through III-28** show the projected future capacity status of Connecticut's NHS Expressways, NHS Non-Expressways and the remainder of the state route system. In 1996 10% of the National Highway System (NHS) Expressways, and 7% of the NHS Non-Expressways were approaching capacity: 21% and 34%, respectively, were over capacity. As the figures show, the portions of Connecticut's NHS and non-NHS routes which are over capacity due to congestion will continue to grow. For the year 2015, it is forecasted that 8% of the NHS Expressways and 6% of the NHS Non-Expressways would be approaching capacity; 41% of the NHS Expressways and 50% of the NHS Non-Expressways are forecasted to be over capacity. **Table III-8** shows that in 2015, of the 3,357.62 miles of state-numbered routes in Connecticut, 184.84 (5%) will be approaching capacity and 849.85 (23%) will be over capacity.

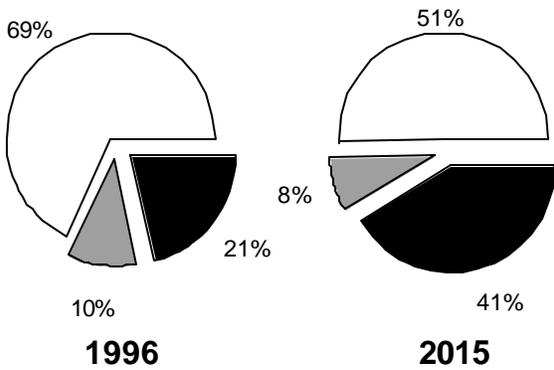
The current and projected capacity status of state-numbered routes is presented by region in **Table III-8** and in **Figures III-29 through III-44**. As shown in **Table III-8**, the percentage and miles of state-numbered route miles over capacity in 1996 ranged from highs of 37% (53.48 miles) and 31% (55.32 miles), respectively, in the Greater Bridgeport and South Western regions to lows of 0% in the Northeastern and Northwestern regions. For 2015 ConnDOT has forecasted that the percentage and miles of state-numbered route miles over capacity will range from highs of 52% (95.37 miles) and 48% (68.94 miles), respectively, in the Greater Bridgeport and South Western regions to lows of 3% (6.41 miles) and 0% (.68 miles), respectively, in the Northeastern and Northwestern regions.

<b>CURRENT AND PROJECTED CAPACITY ON STATE HIGHWAYS</b>											
		<i>1996 Actual</i>					<i>2015 Projected Data</i>				
		Total Miles of State	Approaching Capacity		Over Capacity		Total Miles of State	Approaching Capacity		Over Capacity	
No.	Planning Region		Routes	Miles	%	Miles		%	Routes	Miles	%
1	South Western	179.64	19.98	11%	55.32	31%	181.72	4.61	3%	95.37	52%
2	Housatonic Valley	213.75	17.05	8%	33.43	16%	219.33	4.10	2%	42.25	19%
3	Northwestern	183.81	-	0%	-	0%	183.81	-	0%	0.68	0%
4	Litchfield Hills	252.23	0.47	0%	4.93	2%	252.23	4.19	2%	11.36	5%
5	Central Naugatuck	249.08	11.59	5%	27.92	11%	249.08	20.28	8%	56.85	23%
6	Valley	65.09	6.99	11%	9.50	15%	65.09	8.47	13%	23.82	37%
7	Greater Bridgeport	143.97	8.23	6%	53.48	37%	143.97	9.16	6%	68.94	48%
8	South Central	384.59	32.59	8%	74.49	19%	384.59	31.13	8%	149.49	39%
9	Central	142.03	10.51	7%	23.55	17%	142.03	11.85	8%	57.76	41%
10	Capitol	640.41	35.94	6%	123.97	19%	649.93	43.82	7%	198.86	31%
11	Midstate	172.62	7.32	4%	16.64	10%	172.62	8.71	5%	30.23	18%
12	CT. River Estuary	140.74	0.83	1%	6.74	5%	140.74	7.01	5%	18.12	13%
13	Southeastern	463.13	14.58	3%	32.17	7%	463.13	23.84	5%	75.54	16%
14	Windham	201.64	1.14	1%	4.32	2%	210.95	5.16	2%	10.58	5%
15	Northeastern	248.81	2.04	1%	1.21	0%	248.81	2.51	1%	6.41	3%
16	Unaffiliated	49.59	2.48	5%	1.03	2%	49.59	-	0%	3.59	7%
<b>State Total</b>		<b>3,731.13</b>	<b>171.74</b>	<b>5%</b>	<b>468.70</b>	<b>13%</b>	<b>3,757.62</b>	<b>184.84</b>	<b>5%</b>	<b>849.85</b>	<b>23%</b>

**Table III- 8. Current and Projected Capacity on State Numbered Routes.**

**Figure III-24. Connecticut National Highway System**

### NHS Expressway Totals



NHS Expressway Totals

NHS Expressway Totals

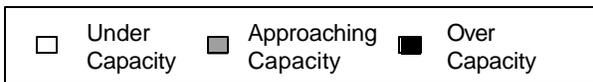
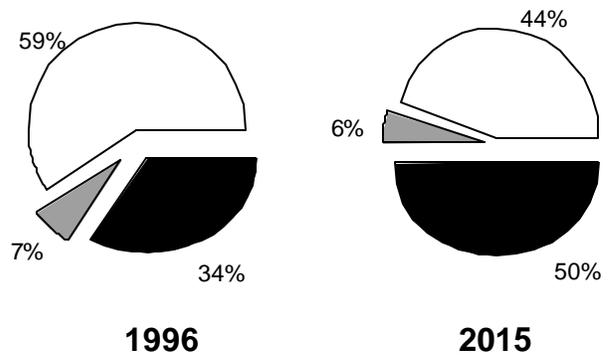


Figure III-25. Capacity on NHS Expressways

### NHS Non-Expressway Totals



NHS Non-Expressway Totals

NHS Non-Expressway Totals

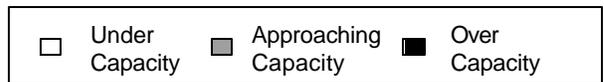
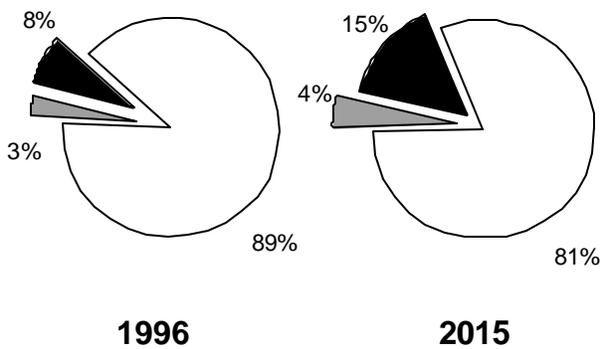


Figure III-26. Capacity on NHS Non-Expressways

### Non-NHS Totals (State Routes Only)



Non NHS Totals

Non NHS Totals

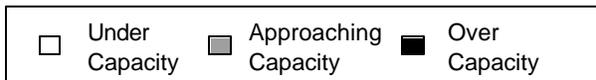
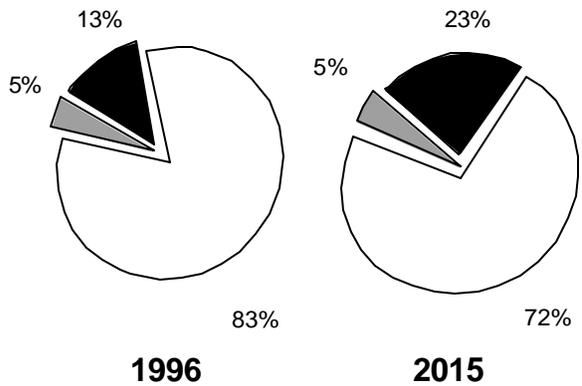


Figure III-27. Capacity on Non-NHS Routes

### Statewide Totals All State Routes



Statewide Totals

Statewide Totals

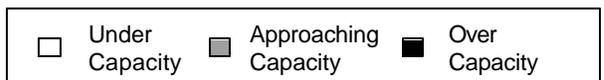


Figure III-28. Capacity on All State Routes

**Figure III-29. Volume to Capacity Ratios South Western Region**

**Figure III-30. Volume to Capacity Ratios Housatonic Valley Region**

**Figure III-31. Volume to Capacity Ratios Northwestern Region**

**Figure III-32. Volume to Capacity Ratios Litchfield Hills Region**

**Figure III-33. Volume to Capacity Ratios Central Naugatuck Valley Region**

**Figure III-34. Volume to Capacity Ratios Valley Region**

**Figure III-35. Volume to Capacity Ratios Greater Bridgeport Region**

**Figure III-36. Volume to Capacity Ratios South Central Region**

**Figure III-37. Volume to Capacity Ratios Central Connecticut Region**

**Figure III-38. Volume to Capacity Ratios Capitol Region**

**Figure III-39. Volume to Capacity Ratios Midstate Region**

**Figure III-40. Volume to Capacity Ratios Connecticut River Estuary Region**

**Figure III-41. Volume to Capacity Ratios Southeastern Connecticut Region**

**Figure III-42. Volume to Capacity Ratios Windham Region**

**Figure III-43. Volume to Capacity Ratios Northeastern Connecticut**

**Figure III-44. Volume to Capacity Ratios Unaffiliated Towns**

## K. GOODS MOVEMENT

The freight transportation industry in the United States has undergone dramatic changes in the last twenty years. Developments in “containerization”, shifts in the manufacturing industry to “just-in-time” delivery; the deregulation of the rail, trucking and aviation industries and the development of new trading patterns in a global economy have led to consolidation and restructuring within, and partnerships between, all freight transportation modes.

The development of an extensive cross-country expressway network, the trend toward larger and heavier trucks, lower fuel prices, more time-sensitive shipping requirements, increasing competition, and railroad branchline reductions have contributed to the trucking industry attracting a large market share of goods movements. But, while the number of truck trips is increasing, the length of such trips is decreasing. Many shippers are using more cost-effective rail, air or water transport for the long-haul portion of freight delivery, with trucking firms supplying the pick up and delivery portion of trips rather than supplying end-to-end service. Thus truck/intermodal traffic has increased dramatically in recent years and should continue to increase. The State of Connecticut, however, because of its small geographic area and its close proximity to some of the nation’s largest ports, intermodal rail facilities and airports (see **Figure IV-E10**), can expect to continue to see primarily the truck portions of intermodal freight trips.

Trucking is and, in the foreseeable future, will be the backbone of goods movement in Connecticut. For 1995 it was estimated that truck shipments accounted for at least 12 million tons of interstate freight movement (that is at least one origin or destination outside of the State)\* and an even greater volume of intrastate and local distribution activity. This represents, at a \* minimum, 60 to 70 percent of all goods movement (by volume) in the state, in comparison with rail and waterborne movement which represent less than thirty percent. It was stated in the Connecticut Intermodal Management System report published in 1996, that these proportions are not likely to change appreciably in the future regardless of state policies or programs.

The Interstate highway system carries the predominate number of interstate truck movements. Of these corridors I-95 between the New York state line and New Haven carries the greatest volume. (See **Figure III-45**). I-91, especially from Meriden to Hartford, carries a high volume because a portion of the I-84 east-west movement joins with the north-south movement. Other routes, for example U.S. 6, U.S. 2, U.S. 7, and U.S. 8, provide regionally important truck accessibility.

The 1996 Connecticut Intermodal Management System report concluded that due to the concentration of truck trip generation and truck traffic in some of the state’s most congested urban core areas, such as the I-95 corridor, intermodal planning must be coordinated with congestion management planning.

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\* Rough estimate based on 1992 Reebie Associates data contained in 1998 ConnDOT Goods Movement Issues Report and factored by Wilbur Smith Associates to 1995 volumes for publication in 1996 in ConnDOT’s Connecticut Intermodal Management System Report.

**Figure III-45. Highway Truck Flows**

## L. LONG-RANGE PLANS OF ADJACENT STATES

In order to ensure the connectivity of Connecticut's Long-Range Transportation Plan, the LRPs of adjacent states were reviewed. The plans which were reviewed are listed below:

<u>State</u>	<u>Title</u>	<u>Published</u>
Rhode Island	Transportation 2010: Ground Transportation Plan	1992
Massachusetts	Accessing the Future: Intermodal Transportation Plan for the Commonwealth of Massachusetts	1995
New York	The Next Generation ...Transportation Choices for the 21st Century	1996

### 1. COMMON THEMES, GOALS, EFFORTS, AND CONCERNS

The following common themes are present in the aforementioned LRPs and the Connecticut Department of Transportation's LRP.

- The transportation network must meet the needs of and satisfy its users. Users of the complex transportation network must be satisfied with their traveling experience, whether they are residents, international travelers, shippers of commercial goods, businesses using transportation to move their goods and services, or tourists simply enjoying themselves. Trips must be safer, less polluting, more reliable, more convenient, and more energy-efficient. Travelers must have nearly complete confidence that they will reach their destinations on time.
- Transportation should be user friendly. The traveling public does not know who owns or operates a specific bridge, bus or ferry. They only know how well it serves their needs. Therefore, we need to focus on creating a seamless transportation system that allows people and goods to move from origin to destination using the most efficient modes available. Our future transportation system will be an important contributor to the State's and the nation's economic health: it must support continued economic growth.
- Our future transportation system will be a key ingredient for improving the environment. It is important and possible for transportation agencies and providers to contribute to a cleaner, healthier natural environment for the people of the State. Mobile sources, meaning motor vehicles and other forms of transportation, are major sources of air pollution. Another factor contributing to the quality of air is the growing age of the nation's vehicles. These older vehicles have less effective emissions controls than new cars and, therefore, pollute more.
- Increases in noise levels can be a major environmental problem. Operation of airports, railways, highways, and ports, and construction of transportation projects contribute to noise impacts. Noise

abatement measures should be considered for all major transportation projects where there are noise impacts.

- Planning and design for transportation projects should continue to be sensitive to environmental and historic resources. Transportation facilities themselves, such as a covered bridge, a railroad station, etc. may be of historic importance. Construction and maintenance practices also affect the environment. Toxic and environmentally harmful components contained in building and maintenance materials such as lead based paints, volatile compounds in pavement coatings, and salt for snow and ice removal can harm the environment. Continuing research and development in materials and applications has made it possible for transportation agencies to reduce or eliminate many of these harmful components. Agencies are also reusing or recycling construction materials whenever practical, thus lessening the need for new landfills.
- Management of transportation systems in the future will incorporate the use of advanced computers, electronics, and communications to integrate activities for the entire surface transportation system. These intelligent transportation systems (ITS) will utilize a full range of technologies to develop a truly intermodal system that offers user services in the areas of travel planning, traveler information, travel management, travel payment, commercial vehicle operations, emergency management, and advanced vehicle control. An intelligent transportation system is a key tool for better traffic management in metropolitan areas. Some examples are variable message signs, automated high occupancy vehicle (HOV) lanes, and synchronized signals. A well-designed ITS can eliminate the need for additional highway lanes in some areas, allow buses, carpools, and emergency vehicles to travel faster than other vehicles, alert motorists to reroute because of traffic congestion, direct motorists to their destination, locate and identify buses and trucks making their operation more efficient, and adjust traffic signals to optimize traffic flow. To use with ITS, transportation agencies need to explore with communication companies the possibilities for fiber optics installed on transportation rights of way. Fiber optic cables can transmit information to and from closed circuit television cameras, variable message signs, and traffic operation centers more efficiently.
- States can expect and will need to respond to an increase in the demand for transportation services for elderly and physically and mentally impaired persons in future years. The need for transportation services for the elderly is expected to continue to grow at a pace exceeding population growth. There is no apparent limit to the demand for transportation services for the elderly. Also, the mobility-handicapped are becoming more “mainstreamed” into society and more able to travel as buildings and other facilities become accessible. The mentally handicapped are moving into the community. People needing medical service for cancer and kidney treatment are requesting specialized transportation in growing numbers. While it is difficult to project just how great the need will be, it will probably also grow to meet whatever level of service can be supplied.
- Federal and state financial constraints must be addressed to respond to the increasing demand for transportation by elderly and handicapped persons and the rising costs of providing such services. Not only are needs growing for elderly and handicapped transportation, but the cost of service is rising. Funding has to be increased just to continue present service levels, without addressing the

desirability or need for expansion. There is a great need for transportation for elderly and handicapped persons, far beyond the level now being provided, and this need will continue to grow in the future. Federal and state financial constraints must be addressed to accommodate these needs.

## **2. SIGNIFICANT PROJECTS AND EFFORTS OF ADJACENT STATES**

The following ground transportation activities and projects, which were listed in the aforementioned LRPs of the adjacent states of Rhode Island, Massachusetts and New York, are relevant to Connecticut.

### **a) Rhode Island**

Upgrading of US-6. In its 1992 plan, Rhode Island DOT advocated the completion of an upgraded, controlled-access US-6 in western Rhode Island, connecting to Hartford. This project was regarded as essential to maximizing the economic development potential of the Providence Metropolitan Area, especially in terms of providing regional accessibility for service industries. This project would conform to the state's land use plan objectives of maintaining low-intensity development and rural conditions throughout the western section of the state. RIDOT stated that, if properly designed and constructed, it would also achieve water supply objectives of improving protection of the Scituate Reservoir watershed.

New Haven - Boston Electrification Project. In discussing this project the State of Rhode Island expressed concern not only with the passenger rail trip time but also with the impact on freight rail service, which shares the main line. Electrification could affect existing service as well as potential high-wide freight operations.

Commuter Rail Services. Continuation of the Providence-Boston commuter rail service, and possible links with commuter rail lines in Massachusetts and Connecticut were discussed. It was felt that Rhode Islanders could benefit if Shoreline East, Connecticut's commuter rail service along its southern shore from New Haven to Old Saybrook, (and now to New London on a limited basis) were extended to Westerly, which is about 40 miles beyond Old Saybrook. This would serve a large number of southern Rhode Island residents who work in the New London-Groton area.

### **b) Massachusetts**

Electrification of the Northeast Corridor. Electrification of the Northeast Corridor is underway and will reduce rail travel time to New York City to three hours. Amtrak is also making plans to extend rail service to Portland, Maine. Fast and affordable train service will preclude the need for major new airport facilities in Massachusetts.

Old Colony Commuter Rail Restoration. The Old Colony Commuter Rail Restoration project, the largest public transportation project in the region, is also underway and will provide South Shore commuters with an additional alternative to the Southeast Expressway. The Middleborough, Plymouth, and Greenbush Lines will restore service to 23 cities and towns.

Extension of Commuter Rail Services. In addition to the Old Colony project, commuter rail has also been extended from Framingham to the city of Worcester. Currently, the MBTA is acting to locate and construct new stations along the Worcester line in Ashland, Southborough, Westborough, Grafton, and Millbury. Also, design has begun on extending commuter rail service to Newburyport, and a funding source has been dedicated to the design and construction of commuter rail service into both Fall River and New Bedford.

**c) New York**

The State's vision is for its future transportation infrastructure to be maintained in good repair to provide for seamless movement among the various modes, and be model for transportation systems nationwide. The following initiatives and projects were identified in the State's 1996 LRP as means of making this vision a reality.

- Provide electronic toll collection at tolled bridges, tunnels, and on the Thruway. Initial efforts to install electronic toll collection at toll plazas on several Thruway sections have improved traffic flow through plazas about 50 percent. This needs to be expanded to other tolled areas of the Thruway and other tolled bridges and tunnels in the State. To maximize the benefits of the electronic toll collection, toll plazas with high traffic volumes should be reconfigured to allow those who use electronic toll collection to pass through toll plazas more rapidly.
- Create a priority treatment network of existing highways in the New York City, Long Island, and lower Hudson Valley area. Although the primary focus of the mobility program for New York City will be on the maximum use of public transit, congestion will still exist. This will require strategies to promote the use of other alternatives to the single occupant vehicle. The 300-mile network of existing highways will move people and goods more safely and quickly in travel corridors throughout the metropolitan region not well served by subways or rail. Key attributes of the priority treatment network include providing bus and carpool lanes to move people more quickly, and truck lanes in off-peak hours to move goods about the region less expensively. Ramp metering, electronic toll collection, congestion detection, priority snow and ice control, accident response, and motorist information will provide everyone using the network with faster, more efficient, priority service. Since one network goal would be to encourage people who can leave their cars home, the carpool/bus lanes should provide significant time savings. Other features will encourage people to use subways, commuter rail, and bus service that is available.
- Complete the full freight access program. Completing the Oak Point link and the Harlem River Yard will allow many commodities currently trucked into New York City from rail terminals in New Jersey to be redirected to rail. Constructing direct rail access from New Jersey to Long Island or developing improved clearances or other alternatives to allow doublestack movements should also be considered. Additionally, better integration of the several metropolitan region rail carriers is being explored to provide a comprehensive, coordinated, economically competitive downstate regional rail network.

- Encourage innovative programs to consolidate deliveries by trucks. Explore share-a-load programs that match shipments to large office building complexes and retail centers thus reducing the need for multiple truck trips.

Additionally, in 1998 New York State enacted legislation requiring the 160 trucks and buses in New York State to begin undergoing the emission tests that have long been required of automobiles. The law will require testing of all diesel vehicles, from tractor-trailers to excursion buses. Under the new guidelines, all buses and trucks registered in New York State will have to undergo yearly inspections, and all trucks operating in the state will be subject to random inspections. The New York State Department of Environmental Conservation estimates that the inspection program will reduce those emissions by 55 percent.

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