

# TABLE OF CONTENTS

---

	<b>Page</b>
<b>Abstract</b> .....	iii
<b>Preface</b> .....	iv
<b>PART 1: Introduction</b>	
Introduction.....	1
Background and Definitions .....	3
<b>PART 2: Growth and Development Analysis</b> .....	8
Trend 1: Population Has Increased but the Rate of Growth Has Slowed .....	8
Trend 2: Rhode Island Has Become More Developed.....	10
Trend 3: Development Has Increased Eight Times Faster Than Population .....	11
Trend 4: The Largest Source of Development is Residential Land Use.....	12
Trend 5: Population Has Migrated More Toward the Rural Parts of the State .....	13
Trend 6: Employment Centers Are Expanding Away from Central Cities.....	19
Trend 7: Industrial Land Use Has Increased and Moved Farther Into the Suburbs ...	22
Trend 8: The Most Visible Source of Development is Commercial Land Use.....	26
Trend 9: The Amount of Land Dedicated to Transportation Has Increased .....	29
Trend 10: Agricultural Use of Land is in Long-term Decline.....	31
Trend 11: Protection of Undeveloped Land Has Increased .....	32
Trend 12: The State is Increasingly Urban and there is a Qualitative Difference Between the Traditional Central Cities and the Newly Urbanized Suburbs	34
<b>PART 3: Summary and Conclusions</b> .....	36
<b>Sources Consulted</b> .....	37

## List of Tables

Table 1	Land Use Comparison, 1970 and 1988.....	10
Table 2	Rhode Island Employment by Spatial Zone, 1960-1990 .....	20
Table 3	Rhode Island Employment by Community Type, 1960-1990.....	20

## List of Figures

Figure 1	Rhode Island Population, 1900-2000.....	8
Figure 2	Population Density Per Square Mile, 1900-2000 .....	9
Figure 3	Developed Square Feet Per Person, 1960-1990 .....	11
Figure 4	Developed Land Use Trends, 1961-1988.....	12
Figure 5	Population by Spatial Zone, 1930-2000.....	16
Figure 6	Population Growth Rates by Spatial Zone, 1930-2000.....	17
Figure 7	Industrial Land Use, 1961-1997 .....	22
Figure 8	Industrial Land Use by Spatial Zone, 1961-1997 .....	24
Figure 9	Industrial Land Use by Community Type, 1961-1997 .....	25
Figure 10	Commercial Land Use by Spatial Zone, 1961-1988.....	27
Figure 11	Commercial Land Use by Community Type, 1961-1988.....	28
Figure 12	Rhode Island Public Road Miles, 1950-1995.....	30
Figure 13	Percent of Land in Agricultural Use, 1850-1990.....	31
Figure 14	Protected Open Space, 1965-1990.....	33

## List of Maps

Map 1	Urban, Suburban, and Rural Communities, 1988.....	6
Map 2	Communities by Spatial Zone Analysis.....	15
Map 3	Population Shifts in Rhode Island, 1940-1960.....	18
Map 4	Population Shifts in Rhode Island, 1960-1980.....	18
Map 5	Population Shifts in Rhode Island, 1980-1990.....	18
Map 6	Employment Shifts in Rhode Island, 1960-1970.....	21
Map 7	Employment Shifts in Rhode Island, 1970-1980.....	21
Map 8	Employment Shifts in Rhode Island, 1980-1990.....	21

## ABSTRACT

**TITLE:** *An Analysis of Rhode Island Land Use*

**SUBJECT:** Land use planning

**DATE:** July 1999

**AGENCY  
AND  
SOURCE OF  
COPIES:** Statewide Planning Program  
Rhode Island Department of Administration  
1 Capitol Hill  
Providence, RI 02908

**SERIES NO.:** Technical Paper Number 147

**NO. OF  
PAGES:** 43

**ABSTRACT:** This technical paper examines and analyzes demographic, economic, and land use development patterns in Rhode Island.

## PREFACE

The Statewide Planning Program is preparing an update of State Guide Plan Element 121, *Land Use 2010: State Land Use Policies and Plan*, published 1989. This technical paper is intended to be a source for the updated land use plan. It is a companion piece to Technical Paper 146, *Land Use Trends in Rhode Island 1961 - 1988*, which was published in July 1998.

Many different sources were used in gathering the data for this report. Some sources, such as the U.S. Bureau of the Census, have detailed data reaching back to the origin of Rhode Island as a State. Other sources only had reliable data reaching back a decade. Rather than be constrained by the weakest link in the data chain, we chose to report whatever we could reasonably obtain and have confidence in. We note in the text those areas where data had to be extrapolated or estimated. We should note that some of the population data from the 1990 census has been questioned for undercounting inner-city residents. While this may be so, it is the best that is currently available.

This report was prepared by Kathleen Leddy, Principal Environmental Planner and Kevin J. Nelson, Principal Planner. Supervision and direction was given by Victor J. Parmentier, Supervising Planner and John P. O'Brien, Acting Chief Statewide Planning. The final word processing was completed by Kim A. Gelfuso and Linda O. Resendes.

# PART 1: INTRODUCTION

A central mission of comprehensive planning is to promote the appropriate use of land, water, and finite natural resources while coordinating growth and intensity of development with provisions for services and public infrastructure. The first step in providing effective, efficient, and equitable public infrastructure investment and decisionmaking regarding land use is to review where we are now and how we got here.

The purpose of this paper is to provide a basis for updating the state's 1989 land use plan and is a companion piece to *Technical Paper Number 146: Land Use Trends in Rhode Island 1961-1988*. It is intended to present information related to statewide development trends such as sprawl, population shifts, economic and employment patterns, preservation of open space, and transportation patterns. This analysis concentrates on trends past to present. Due to inconsistencies in the availability of historical data, some trends can be examined over a much greater timeline than other trends. Forward-looking trend analysis will be done in a future paper. A full understanding of our development patterns is vital to promoting long-range plans that preserve Rhode Island's environment, economy, and quality of life.

To paraphrase Justice Stuart, we may find it difficult to define sprawl, but we know it when we see it. As a weed is just a plant that is growing where we don't want it, perhaps we can consider sprawl as growth where we don't want it. Sprawl typically encompasses environmental degradation, excessive demands on infrastructure capacity, and a loss of the character that defines a particular community's quality of life. In order to prepare the state for growth without sprawl we must answer the following questions:

- How much growth is expected?
- Where is it likely to occur?
- How will growth change local neighborhoods and communities?
- How will development affect local taxes and expenditures?
- How will development affect the environment and landscape?
- Are we prepared to accommodate increased demands on public services?
- What are the anticipated effects of growth on the economy and transportation network?

This paper will begin the process of answering some of these questions.

It is the duty of our elected government to shape future growth and development in Rhode Island in a manner that is consistent with the region's character and quality of life. Landmark legislation, the *Rhode Island Comprehensive Planning and Land Use Regulation Act of 1988*, established a process to promote orderly growth and development that recognizes the natural characteristics of the land, its suitability for various uses, and the availability of existing or proposed public and/or private services and facilities. As of this writing, all Rhode Island communities have adopted a Comprehensive Plan establishing goals for that community. A future paper will attempt to evaluate how well various growth management strategies have worked.

We need to implement effective growth strategies that respond to the needs of people at all income levels. It will be difficult to face these challenges as a community and not as

individuals. The debate balancing the desires of individuals and the community will be lively and spirited. But as in all good debates, we must prepare by gathering information and facts.

Land is a limited natural resource and this paper seeks to identify the intended and unintended choices that Rhode Island is making in committing this limited resource to certain uses. The state land use plan is the proper forum for making value judgements as to whether those choices are wise.

# Historical Overview

Almost from its inception, Rhode Island has been characterized by comparatively dense development. By 1774, Rhode Island was the most densely populated of the colonies. Two hundred and seventeen years later, the U.S. Bureau of the Census ranked Rhode Island as the second most densely populated state in the nation. Although the ranking has not changed by much, the total population has changed dramatically. There is an important qualitative difference between 65 persons per square mile (1790 census) and the 1990 census count of nearly 950 persons per square mile.

Rhode Island is considered the birthplace of the American Industrial Revolution. The industrial age led to increasing material wealth among a growing middle class. It also led to overcrowded and heavily polluted urban areas. Urban residents wanted better living conditions and had sufficient affluence to afford purchases beyond the basic necessities. When affordable assembly line produced automobiles were added to this mix, a new development pattern, regarded as a solution to the urban problem, was born.

By the 1930's, Rhode Island's urban population had essentially stagnated, and by the 1940's, people began a net emigration from polluted and crowded cities for a more pleasant life in suburbia. In recent years the quality of life that drew people to suburbs has changed to the point where in 1989 the Providence Sunday Journal Magazine ran a feature article entitled, *How the American Dream Turned into Suburban Nightmare!*<sup>1</sup>. The article began with the warning, "Warwick has become synonymous with uncontrolled growth. Other communities had better look out – the same pressures that transformed Warwick are headed your way." Apparently they arrived. Nine years later, the Providence Journal ran another major article entitled, "*Sprawling all over Rhode Island*".<sup>2</sup>

Rhode Island is faced with significant land use related challenges. Development patterns over the past fifty to sixty years have been characterized by diffuse residential construction, declining forests and farmland, automobile centered transportation systems, commercial strips and malls, and other land use patterns that can be described as development sprawl. These patterns of low-density development have exacted unintended social, environmental, and economic costs. Degraded water resources, air pollution, diminished biodiversity, congested roadways, and increased infrastructure costs are all linked to poorly planned development.

"In a headlong rush to spread ourselves diffusely across the land we never paused sufficiently to contemplate the implications such patterns would have for our landscape or for our lives."  
~ *A Greener Path... Greenspace and Greenways for RI's Future*

At the heart of the issue is the quintessential American dream; to live in a new home in the country. Strongly associated with well-being, open space increases property values and is frequently a prime factor in business location decisions. However, as spreading development adds to the desire for additional open

space, it decreases the total amount of open space available. It seems ironic that a quest for improved quality of life is one of the biggest threats to it.

---

<sup>1</sup> Peter Lord, *Sunday Journal Magazine*, July 30, 1989.

<sup>2</sup> Peter Lord, *Providence Sunday Journal*, February 22, 1998.

## Definitions

Traditionally, land use has been characterized as either urban or rural. However, the definitions of “urban” and “rural” are not necessarily consistent between agencies and time periods. Prior to 1950, the U.S. Census Bureau defined urban as *incorporated* places of 2,500 or more persons. With the 1950 census, the Bureau expanded the definition to include *unincorporated* places of 2,500 or more persons.

There is an additional problem, the Bureau of the Census definition of urban is designed for large states that are characterized by population centers surrounded by hinterlands. Since the total area of Rhode Island is only equivalent to a typical county in most other states, a statistical anomaly occurs. The Census Bureau classified 86% of the Rhode Island population as residing in urban areas (1990). This may be a useful statistic when comparing Rhode Island to other states but it can be very misleading when comparing intermunicipal population trends within the state. For example, the Census Bureau ranks Cumberland, Middletown, and Warren as being 80 to 90 percent urban, just below communities like Central Falls, Pawtucket, and Providence. These seemingly misidentified categorizations are based on factors relating to population densities, incorporation status, and other parameters nestled within the Census’ definition of Urban Areas. For the Bureau of the Census, the percentage of a community defined as urban or rural is not defined by, nor does it define, the geography of the land. Communities defined as being predominantly urban may actually contain urban centers with densely populated areas surrounding the core, and still maintain the majority of land in rural uses.

In 1998, the Rhode Island Public Expenditure Council published a report dealing with an urban strategy for the state<sup>3</sup>. In seeking a more appropriate characterization of urban, the Urban Strategy Project’s first step was to define “What is ‘urban’ in Rhode Island?” Six indicators were selected. Communities had to meet three of the indicators:

1. *Urban Land Uses* - More than 45% of the land area is classified as an urban land use (see definition of developed land).
2. *Population Density* - The municipality contains 2,000 or more persons per square mile.
3. *Economic Activity* - The ratio of jobs to residents exceed the state average (i.e. the municipality is an employment center).
4. *Mixed Housing Types* - The percentage of multifamily housing units exceeds the state average of 42.4%.
5. *Ethnic Diversity* - The percentage of the 1990 non-white population equals or exceeds the state average of 8.6%.
6. *Population Stability* - Population growth that is less than the state average (5.9%) during the last census decade.

Many land use terms are matters of degree and interpretation. In the post World War II period, the division between urban and rural became a division between urban, suburban, and rural. Some analysts have added the category of “exurban”. It has become difficult to discern

---

<sup>3</sup> Rhode Island Public Expenditure Council, *Strengthening Cities: A Report of the Urban Strategy Project*, January 1998

where one ends and another begins. Ideally, political boundaries should not be a factor in this determination. Practically, we cannot ignore municipal borders in our designations. So, in order to minimize possible confusion, we will use the following definitions:

**Urban:** A municipality with a population density of 2,500 or more persons per square mile *and* 50% or more of the land area within the municipality is classified as developed land (see definition of developed land, below). Based on the 1990 census and the State's 1988 land use survey, ten communities are considered urban. (Interestingly, the Urban Strategy Project's urban indicators criteria resulted in the same ten municipalities being designated as urban.)

They are:

Central Falls	North Providence	Warwick
Cranston	Pawtucket	West Warwick
East Providence	Providence	Woonsocket
Newport		

If the preceding ten municipalities are classified as urban then it follows that Rhode Island's other twenty-nine municipalities are non-urban. These non-urban communities can be subdivided into suburban and rural.

**Suburban:** A municipality with a population density of 500 to 2,499 persons per square mile *and* 25% or more of the land area is classified as developed. Based on this standard, fourteen communities are considered suburban.

They are:

Barrington	Johnston	Portsmouth
Bristol	Lincoln	Smithfield
Cumberland	Middletown	Warren
East Greenwich	Narragansett	Westerly
Jamestown	North Kingstown	

**Rural:** A municipality with a population density of less than 500 persons per square mile *or* a developed land area of less than 25%. Based on this standard, fifteen communities are considered rural.

They are:

Burrillville	Glocester	Richmond
Charlestown	Hopkinton	Scituate
Coventry	Little Compton	South Kingstown
Exeter	New Shoreham	Tiverton
Foster	North Smithfield	West Greenwich

**Community Type:** For purposes of analysis, several charts presented in this report divided communities into Older Central Cities (Central Falls, Newport, Pawtucket, Providence, and Woonsocket), New Urban communities (Cranston, East Providence, North Providence, Warwick, and West Warwick), Established Suburbs (see “Suburban” in definition above), and Rural (see “Rural” in definition above).

**Developed Land:** Rhode Island uses a modified version of Anderson’s Level II land classification system. Developed land use categories consist of residential, commercial, industrial, infrastructure (e.g. highways, airports, water and sewerage facilities, etc.), developed recreation, institutions such as colleges and hospitals, cemeteries, quarries, waste disposal areas, and vacant land located in urban areas.

**Greenspace:** Land and water permanently protected from development.

**Open Space:** Land and water that is currently undeveloped or is developed for certain recreational uses such as golf courses, but has no permanent protection from future development.

**Spatial Zone:** A descriptive framework in which Rhode Island’s municipalities are geographically categorized according to roughly concentric zones from a major urban nucleus. The spatial zones used in this report are: Older Central Cities, Inner Ring, Outer Ring, Western, and Coastal.

**Total State Area:** The Rhode Island Geographic Information System calculates the state’s area as 691,610 acres (1988). The U.S. Census Bureau calculates a smaller figure, 650,016 acres, by excluding certain water bodies.

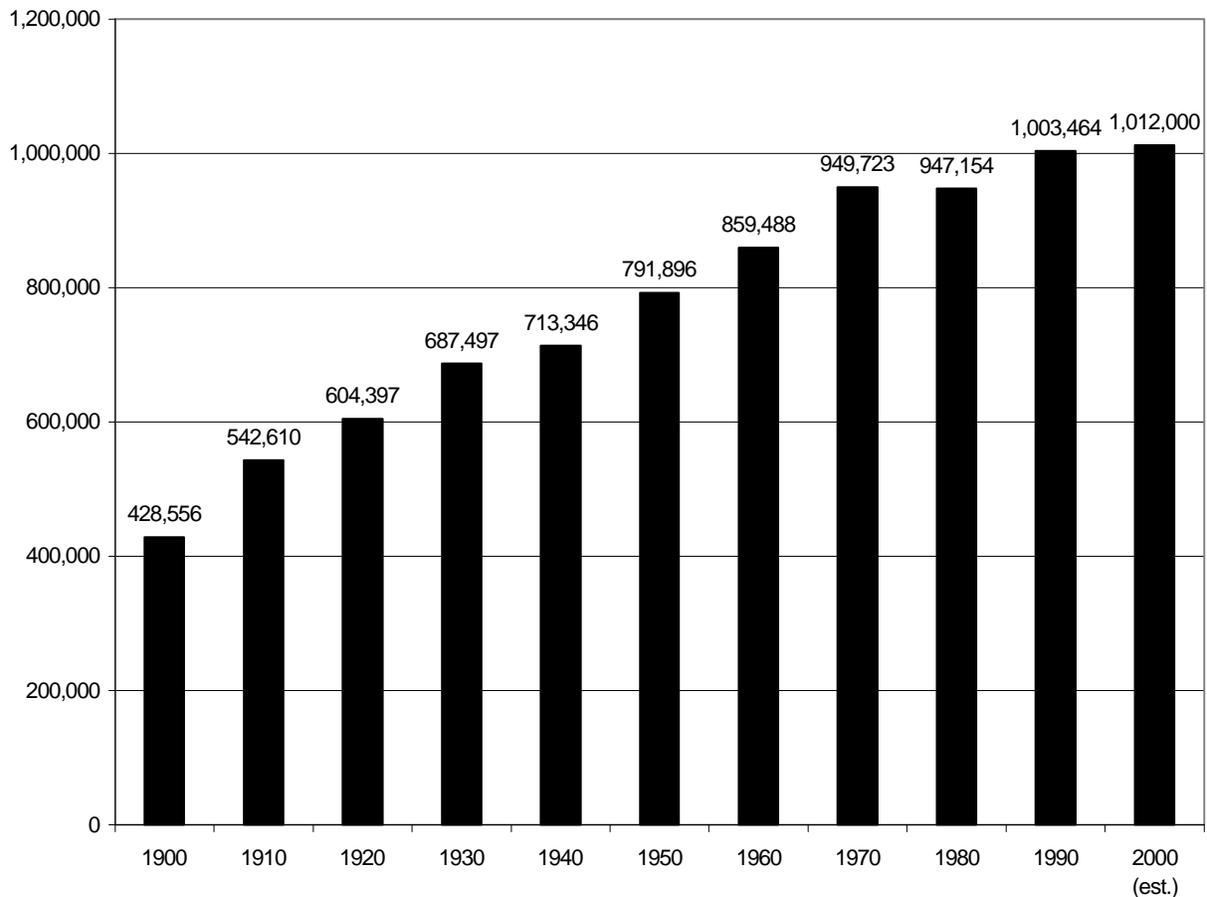
## Part 2: Growth and Development Analysis

*Trend 1: Population has increased but the rate of growth has slowed*

While this trend may be stating the obvious, it is the foundation on which land use analysis is built. The societal importance of how land is used is directly related to the size of the population residing on the unit of land. A hog farm in an isolated countryside is not likely to engender much opposition. A hog farm in a city would cause outrage.

Population increased by an average of 14% per decade from 1900 to 1970. The decade of the 1970's witnessed a decrease in population, largely due to the closure of significant U.S. Navy installations in the state. While the population rebounded somewhat during the 1980's, increasing by 6%, the growth was less than previous decades. This level of low population growth rates is a trend anticipated to continue into the next millennium.

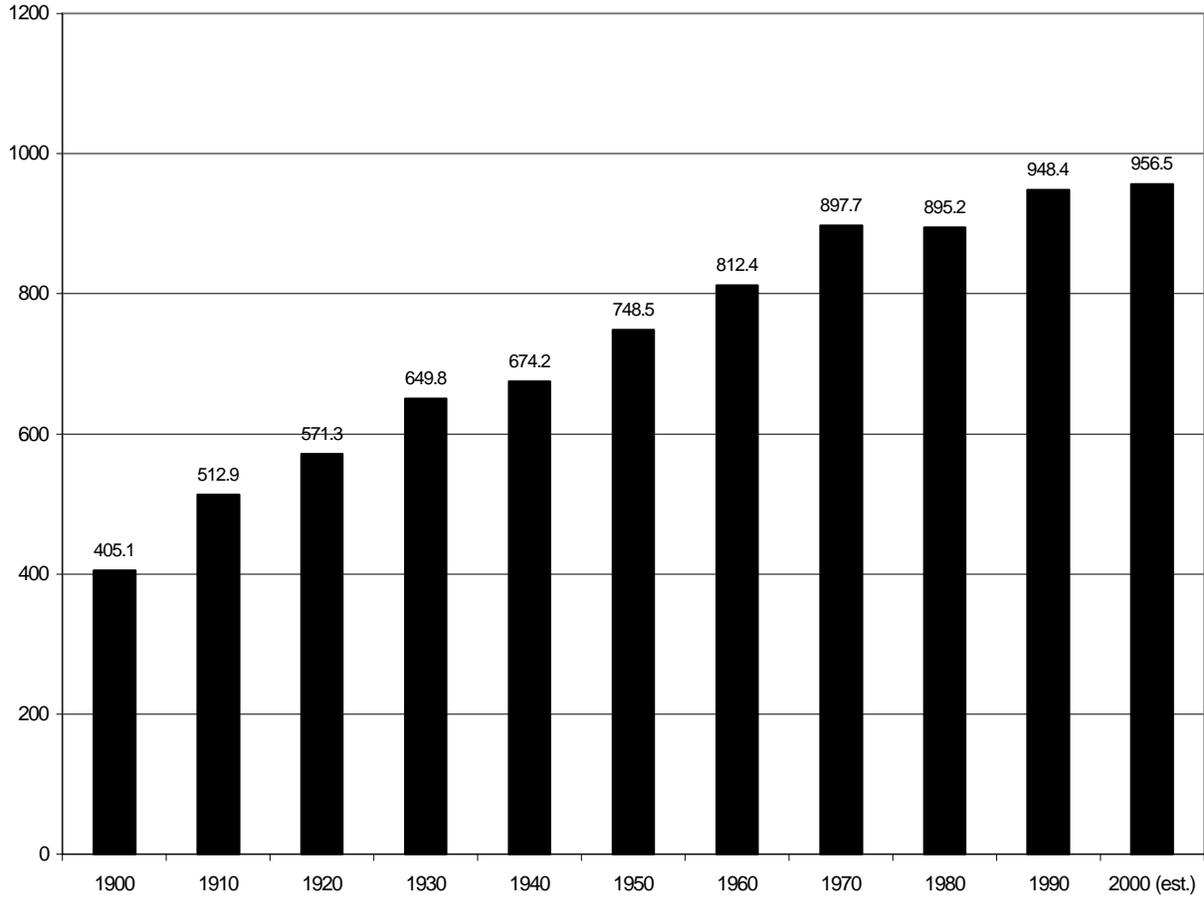
**Figure 1**  
**Rhode Island Population**  
**1900 - 2000**



source: U.S. Bureau of the Census and RI Statewide Planning Program

**Figure 2**

**Population Density per Square Mile\*  
1900 - 2000**



source: U.S. Bureau of the Census and RI Statewide Planning Program

\* 1058 square miles of *land*, waterbodies are excluded from this calculation

Trend 2: *Rhode Island has become more developed*

The most recent land use surveys for the state were conducted in 1970 and 1988. During this eighteen year period, the portion of Rhode Island's land area in developed uses increased from approximately 143,000 acres to 200,000 acres, a 40 percent increase. The total acreage of major land uses is shown in Table 1.

**Table 1**  
**Land Use Comparison, 1970 and 1988**

<b>LAND USE/TYPE</b>	<b>1970</b>	<b>1970</b>	<b>1988</b>	<b>1988</b>	<b>change</b>
	(in acres)	(by %)	(in acres)	(by %)	(by %)
Residential	89,142	12.8	129,002	18.7	+45
Commercial	7,050	1.0	12,553	1.8	+74
Industrial	5,344	0.8	7,231	1.0	+35
Commercial/Industrial Mixed	n/a	n/a	1,427	0.2	---
Roads <sup>4</sup>	5,483	0.8	6,277	0.9	+14
Transportation & Utilities <sup>5</sup>	6,414	1.0	6,826	1.0	+6
Developed Recreation	9,624	1.4	12,276	1.8	+28
Institutions & Cemeteries	10,012	1.4	11,374	1.6	+14
Urban Vacant	5,780	0.8	5,679	0.8	-2
Mining, Quarries, & Gravel Pits	3,328	0.5	5,378	0.8	+62
Waste Disposal	1,380	0.2	2,611	0.4	+89
<b>Total Developed</b>	<b>143,557</b>	<b>20.7</b>	<b>200,634</b>	<b>29.0</b>	<b>+40</b>
Forest	410,640	59.2	310,856	44.9	-24
Agriculture	62,120	9.0	50,583	7.3	-19
Barren, Brush, Water, Wetlands and Other Undeveloped <sup>6</sup>	77,643	11.1	129,519	18.8	+67
<b>Total Undeveloped</b>	<b>550,403</b>	<b>79.3</b>	<b>490,958</b>	<b>71.0</b>	<b>-11</b>
<b>Total State Acres</b>	<b>693,960</b>		<b>691,610</b>		

source: RI Statewide Planning Program, *Land Use Trends in Rhode Island 1961 to 1988*, Technical Paper 146. July 1988.

<sup>4</sup> Defined as divided highways with 200 feet or more of right-of-way for 1970 and as divided highways with 100 feet or more of right-of-way for 1988.

<sup>5</sup> The 1970 total includes airports, railroads, terminal facilities for truck freight, land based facilities for water transportation and fishing, and power lines. The 1988 total includes airports, railroads, water & sewer treatment facilities, water-based transportation facilities, and power lines with rights-of-way of at least 100 feet.

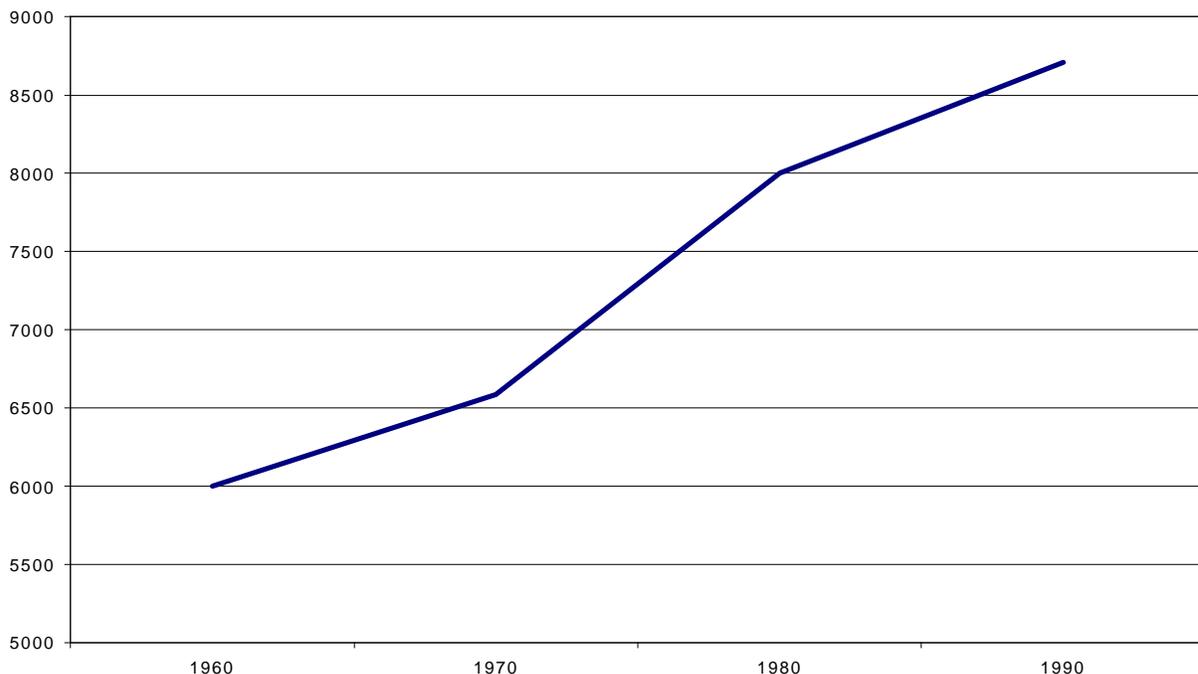
<sup>6</sup> Includes abandoned orchards and fields, sandy non-beach areas, and heath covered land from the 1970 study, and brushland (land use code 400), sandy non-beach areas (land use code 720), and rock outcrops (land use code 730) from the 1988 study. Brushland areas were included in the forest category in the 1970 study.

*Trend 3: Development has increased eight times faster than population*

While developed land increased by forty percent from 1970 to 1988, state population increased by only five percent over the same period. The implications of this are quite significant. Science has long recognized that land has a certain “carrying capacity.” Carrying capacity was originally defined as the largest number of any given species that a habitat can support indefinitely. When the carrying capacity is exceeded, the species population either crashes or expands into new regions. Urban planners have adapted the concept of carrying capacity to include the ability of natural and human engineered systems to absorb population growth or physical development without significant degradation or breakdown.<sup>7</sup>

Rhode Island contains 691,610 acres of land and water, and each resident inevitably uses a certain amount of these resources for their very existence. We require land to build our homes, to purchase goods and services, land to earn our living, land to enjoy recreation, land to dispose of our wastes, and land to provide food and water. The acceleration of development over population growth means that the state’s carrying capacity will be reached much sooner than would be expected by population growth alone.

**Figure 4**  
**Developed Square Feet Per Person**  
**1960-1990**



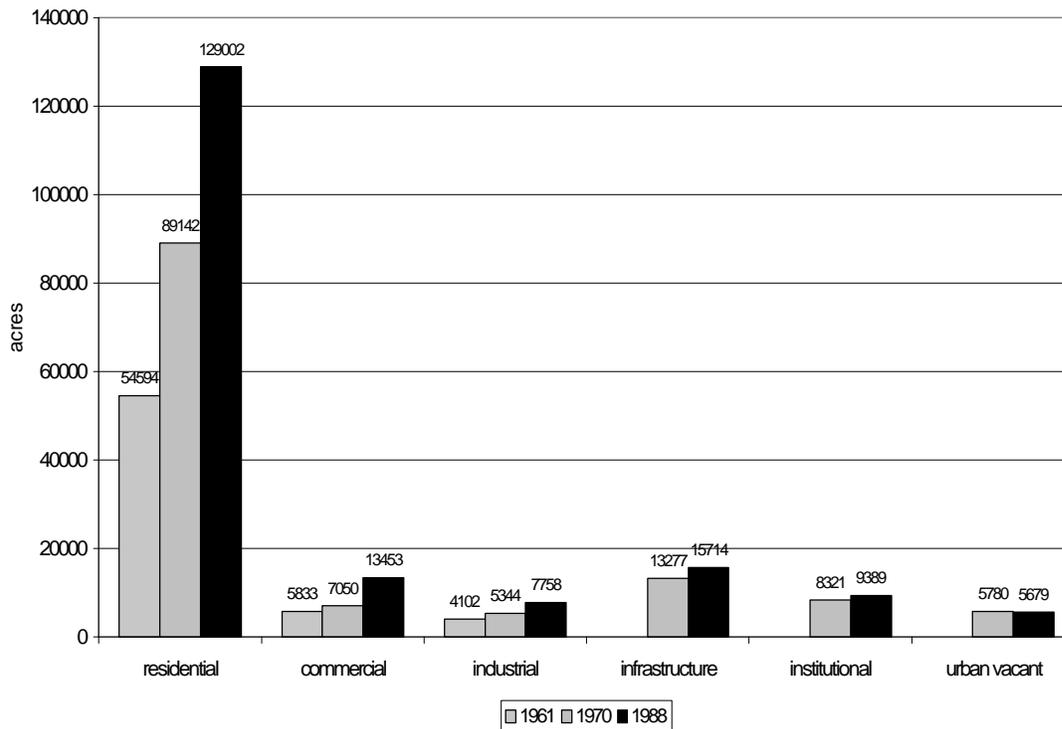
source: U.S. Bureau of the Census and RI Statewide Planning Program. Data for 1960 is an estimate from *A Greener Path: Greenspace and Greenways for Rhode Island’s Future, Report Number 84, 1994*

<sup>7</sup> Sierra Club, *Saving for the Future, A Sierra Club Guide to Local Carrying Capacity*, 1995.

*Trend 4: The largest source of development is residential land use*

Between 1970 and 1995, the state added two units of housing for every *one* new addition to the population!<sup>8</sup> Reasons for this are complicated. Factors include demographic trends such as smaller households, more elderly persons living independently, and economic trends such as the building boom of the mid-1980's. The resulting effect on land use is quite clear, as is shown on the chart below. (Information for infrastructure, institutional, and urban vacant land is not available for 1961.)

**Figure 4**  
**Developed Land Use Trends, 1961-1988**



source: RI Statewide Planning Program, *Land Use Trends in Rhode Island 1961 to 1988*, Technical Paper 146. July 1988.

Also notable, due to the combination of rate of growth and total acres consumed, is commercial land use. Between 1961 and 1988, land committed to residential use increased by 136%. Commercial land use followed very closely behind at a 131% increase. See Trends 5 and 6 for additional information.

<sup>8</sup> Rhode Island Statewide Planning Program, Housing Section

*Trend 5: Population has migrated more toward the rural parts of the state*

Population shifts depicted in Figure 5, and Maps 3 through 5 document the suburbanization of formerly rural areas and the trend of migration from older central cities that first began in the 1940's. Providence, Central Falls, and Woonsocket each lost population starting in the 1930's. At first, Pawtucket absorbed some of this migration and achieved a slight increase in population. By the 1950's, Pawtucket joined its other urban neighbors in net population loss. The population decline in the central cities would have been even more notable if not for the offsetting increase in the population of Newport that continued until the naval base closure in the 1970's. However, since 1980 the decline in central city residents has slowed considerably and in some instances shown slight increases. Population growth rates are shown in Figure 6.

We can examine the correlation between population shift and land use from a spatial perspective by classifying communities based on their geographic and historic relationship to an urban core. Providence, Pawtucket, and Central Falls can be treated as a single urban core, with Newport and Woonsocket as outlying, secondary cores. Remaining communities were divided into inner ring, outer ring, western, or coastal. We refer to this as *spatial zone analysis*.

The inner ring communities, with the exception of Warwick<sup>9</sup>, were categorized by a common border with an urban core city. Outer ring communities lie slightly farther from the core cities. Communities could arguably be assigned to a different classification than is presented here. Decisions must be made however, and we decided the following classification presents the information in a manner most useful to the majority of readers. See Map 2.

Older Central Cities: Central Falls, Newport, Pawtucket, Providence, and Woonsocket.

<u>Inner Ring</u>	<u>Outer Ring</u>	<u>Western</u>	<u>Coastal</u>
Cranston	Barrington	Burrillville	Charlestown
East Providence	Bristol	Coventry	Jamestown
Johnston	Cumberland	Exeter	Little Compton
Lincoln	East Greenwich	Foster	Narragansett
Middletown	North Kingstown	Glocester	New Shoreham
North Providence	North Smithfield	Hopkinton	South Kingstown
Warwick	Smithfield	Richmond	Westerly
	Portsmouth	Scituate	
	Tiverton	West Greenwich	
	Warren		
	West Warwick		

As city residents dispersed to suburbs and new residents moved into the state, the patterns of housing have changed. Proportionally, less multifamily housing has been constructed in the

---

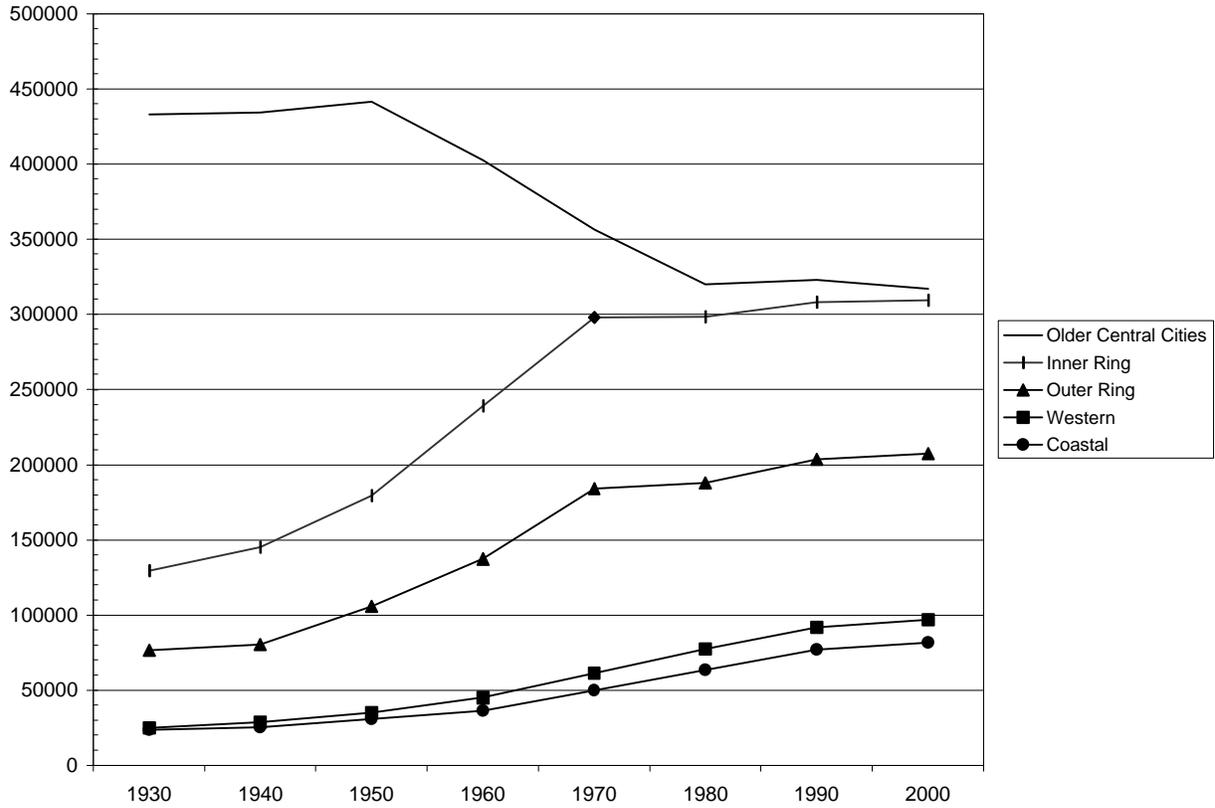
<sup>9</sup> There is a mile and one-half wide portion of eastern Cranston that separates Warwick from a direct border with Providence. We did not consider this to be significant.

suburbs, and the relatively inexpensive price of land enabled single family homes to be constructed on larger lots than in central cities. Historically, housing has been densest in the communities of Central Falls, Pawtucket, Providence, and Woonsocket.

How does this shifting pattern in population correlate with land use? Several formerly suburban communities have become urbanized. Four of the seven municipalities listed as inner ring (Cranston, East Providence, North Providence, and Warwick), and one of the communities listed as an outer ring (West Warwick), have developed to the point where they fit the definition of urban (see page 5).

Figure 5

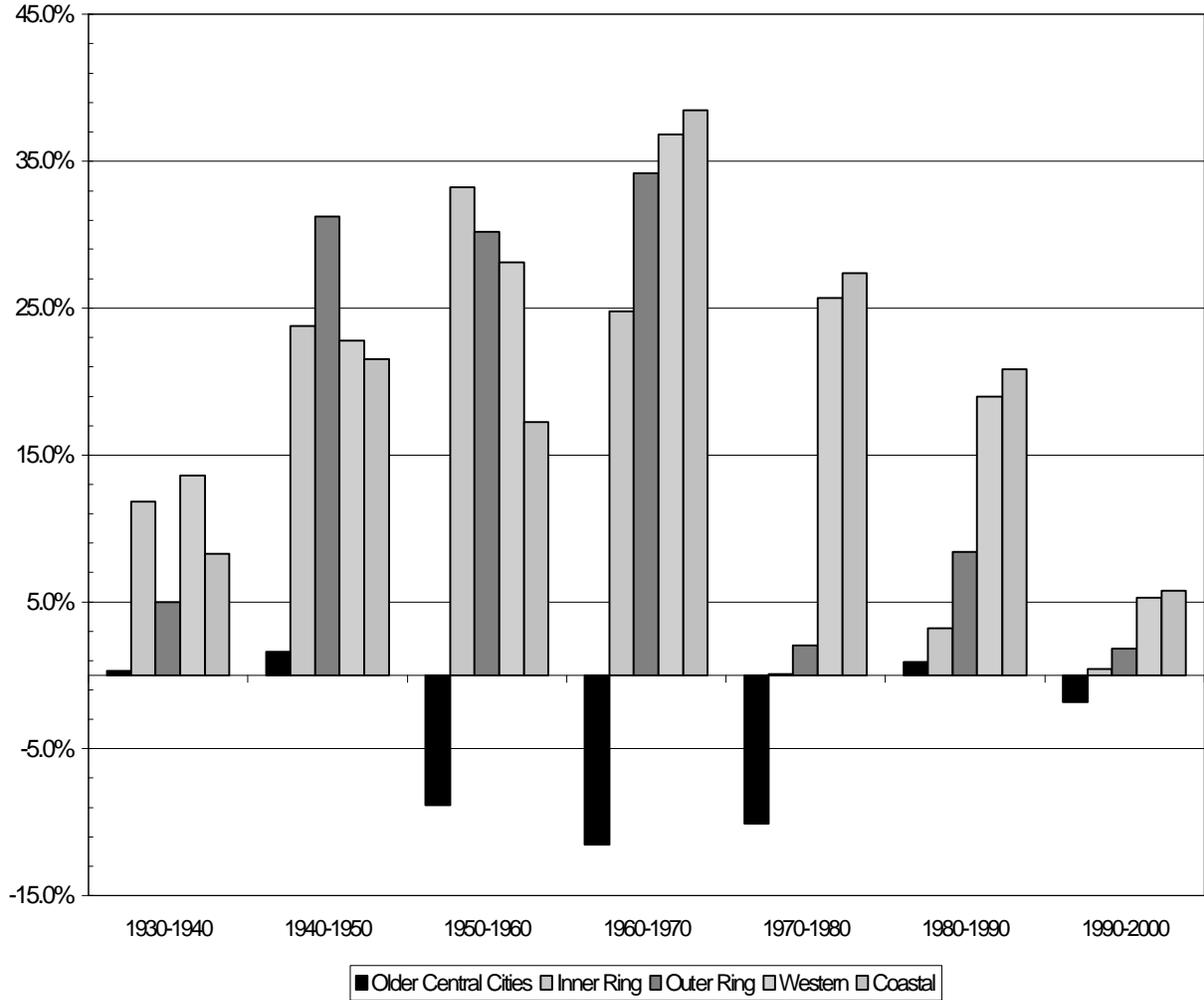
Population by Spatial Zone  
1930-2000



source: U.S. Bureau of the Census and RI Statewide Planning Program

Figure 6

### Population Growth by Spatial Zone 1930-2000



source: U.S. Bureau of the Census and RI Statewide Planning Program

*Trend 6: Employment centers are expanding away from central cities*

There are many factors that influence the decision on where to locate a business. Land prices, proximity to markets, accessibility to infrastructure (e.g. highways, sewers, water, etc.), and availability of labor, must all be taken into account in choosing a suitable site. While population was increasing by only five percent between 1970 and 1988, industrial land use increased by 45% and commercial land use increased at twice that rate (90%). Between 1960 and 1990, growth in both employment and number of businesses was greatest in the inner ring communities. Western and coastal communities increased by a greater *percentage* but this is due to the very low number of jobs in the base year of 1960. Although by 1990, there were almost 15,000 fewer jobs available in the central cities than in 1960, the state's central cities remained the primary employment location, with more than 43 % of all jobs (see Table 2).

Data can be viewed in more than one way. In addition to spatial analysis, we can also analyze data according to community type i.e. urban, suburban, or rural. Since this changes over time, we felt it would be helpful to subdivide our ten urban communities into Older Central Cities (the state's five historic urban centers of Central Falls, Newport, Pawtucket, Providence, and Woonsocket), and the five communities that have become urbanized since the 1940's (see Table 3). The results are similar to the spatial zone analysis. Rural communities increased by the greatest percentage, again largely due to the low number of jobs in the base year of 1960. As of 1990, older central cities still contained four times the number of jobs in rural areas.

We must conclude that if this dispersion trend continues for a long enough period of time, there will be a homogenization of employment centers spread more or less evenly across all parts of the state. As employment centers are inextricably linked to both population and land use (see Trends 7 and 8), some currently suburban communities will become urban and some currently rural communities will become suburban.

Employment shifts by number of available jobs are also shown on Maps 6 through 8.

**Table 2**  
**Rhode Island Employment by Spatial Zone**  
**1960-1990**

<b>Spatial Zone</b>	<b>1960</b>	<b>1970</b>	<b>1980</b>	<b>1990</b>	<b>1960-1990 % change</b>
Older Central Cities	212,410	209,875	197,172	193,838	-8.7
Inner Ring	58,372	87,817	121,987	146,908	151.7
Outer Ring	40,748	56,722	66,171	70,475	73.0
Western	6,846	12,894	15,942	18,773	174.2
Coastal	10,771	14,798	19,728	27,749	157.6
State Total	329,147	382,106	421,000	457,743	39.0

source: RI Statewide Planning Program, *RI Employment Forecasts, Year 2010 – The State, Cities and Towns, and Analysis Zones*, Technical Paper Number 127, August 1987

**Table 3**  
**Rhode Island Employment by Community Type**  
**1960-1990**

<b>Community Type</b>	<b>1960</b>	<b>1970</b>	<b>1980</b>	<b>1990</b>	<b>1960-1990 % change</b>
Older Central Cities <sup>10</sup>	212,410	209,875	197,172	193,838	-9%
New Urban <sup>11</sup>	56,088	82,082	106,319	119,449	113%
Established Suburbs <sup>12</sup>	46,087	62,660	84,085	104,165	126%
Rural <sup>13</sup>	14,562	27,493	33,424	40,291	177%
State Total	329,147	382,110	421,000	457,743	39%

source: RI Statewide Planning Program, *RI Employment Forecasts, Year 2010 – The State, Cities and Towns, and Analysis Zones*, Technical Paper Number 127, August 1987

<sup>10</sup> Central Falls, Newport, Pawtucket, Providence, and Woonsocket

<sup>11</sup> Cranston, East Providence, North Providence, Warwick, and West Warwick

<sup>12</sup> Barrington, Bristol, Cumberland, East Greenwich, Jamestown, Johnston, Lincoln, Middletown, Narragansett, North Kingstown, Portsmouth, Smithfield, Warren, Westerly

<sup>13</sup> Burrillville, Charlestown, Coventry, Exeter, Foster, Glocester, Hopkinton, Little Compton, New Shoreham, North Smithfield, Richmond, Scituate, South Kingstown, Tiverton, West Greenwich

*Trend 7: Industrial land use has increased and moved farther into the suburbs*

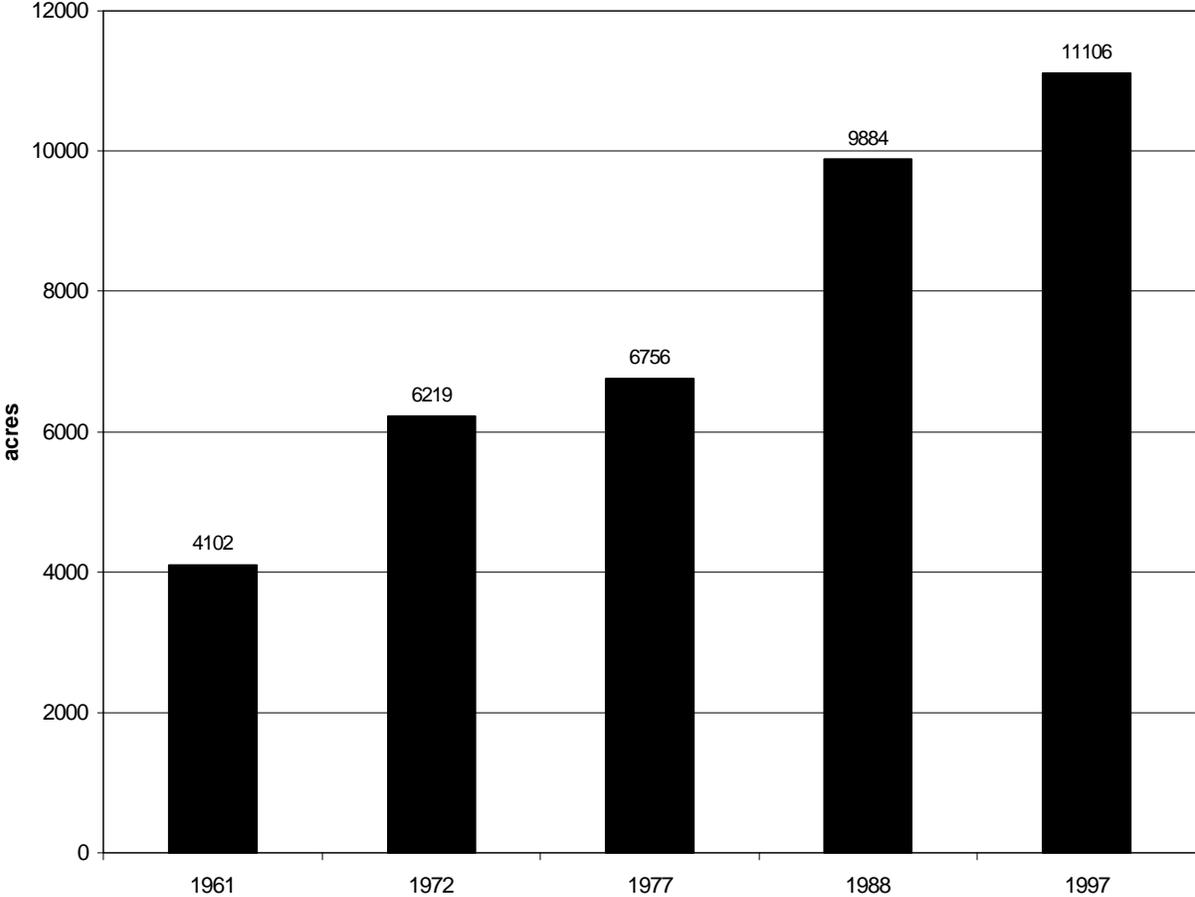
Many factors influence the suitability of land for industrial development. Good access to transportation, availability of utilities, accessibility to the labor force, and limited or no physiographic or environmental constraints are all relevant to industrial siting. The original pattern of industrial sites in the state was along river systems. Rivers provided power and transportation access. Furthermore, factories require workers, and it made practical sense to locate clusters of people near sources of water. As a result, Providence, Pawtucket, Woonsocket, and Central Falls were the first manufacturing centers of the state but by 1930, this pattern began to change.

A variety of evolving circumstances led to the dissemination of industry into the surrounding countryside. Power and water were available in ever more areas as public infrastructure increased. Railroads and highways provided transportation alternatives. As populations increased in suburban areas, so did the availability of labor. And, the very nature of what is “industrial” changed with technology and shifting economic forces. As traditional industries of textiles and jewelry declined, other industries developed that used different siting criteria. By 1961, the Rhode Island Development Council’s publication, *Analysis of Rhode Island Land Use* noted,

There has been a trend for new and existing industry to relocate in the suburban areas of the State. This mobility of industry stems primarily from the inability of cities to meet their needs. That is, suburban communities now have the advantage of possessing large tracts of land suitable for development and future expansion. New highways, public utilities, and land use controls have added to the attractiveness of suburbia.

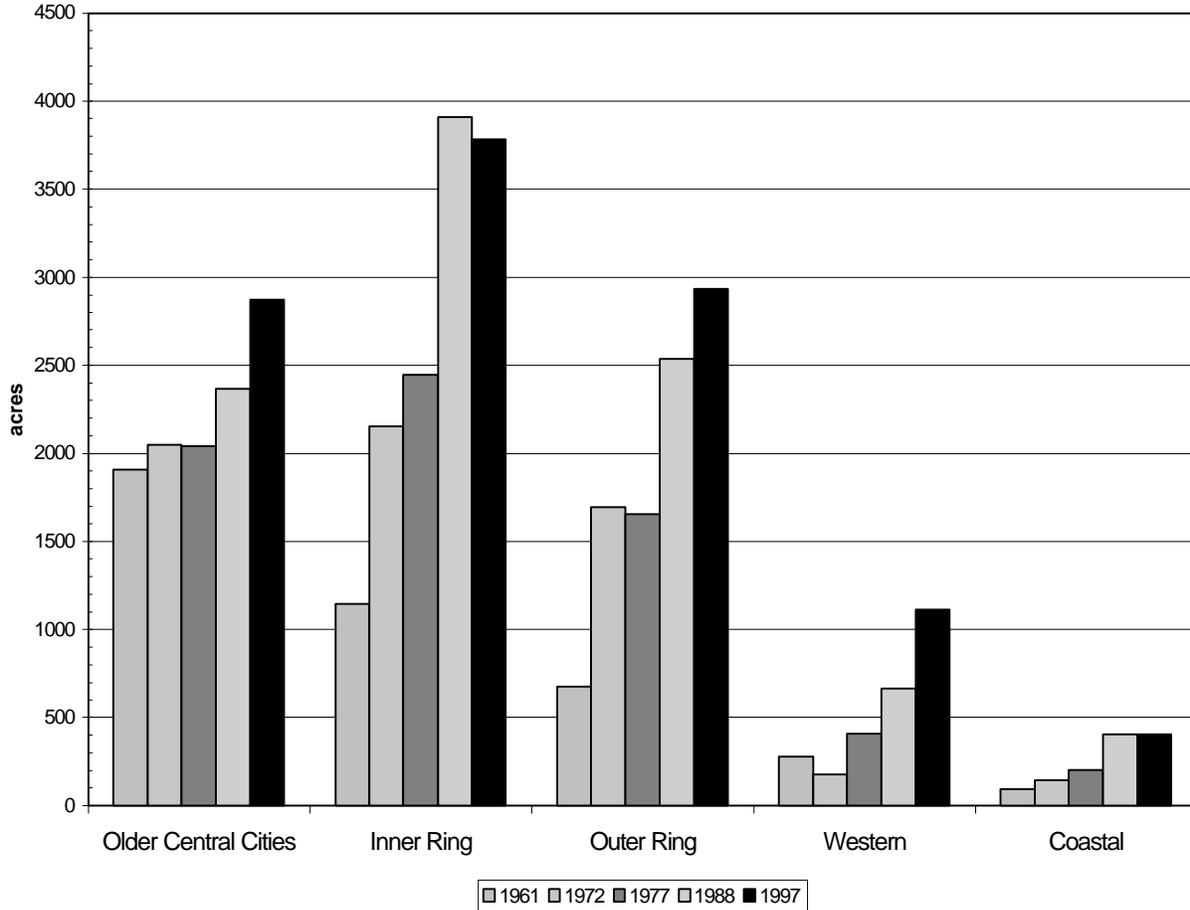
It is important to note that a considerable amount of the vacant land zoned for industrial use in Rhode Island has significant constraints due to environmental factors and/or the lack of public water or sewer facilities. It is very improbable that all industrially zoned land will actually be developed for industrial uses. Figure 7 displays the total amount of acres actually occupied for industrial use. Figure 8 displays the geographic distribution of industrially occupied sites.

**Figure 7**  
**Industrial Land Use**  
**1961-1997**



source: RI Statewide Planning Program, *Land Use Trends in Rhode Island 1961 to 1988*, Technical Paper 146, July 1988 and *Industrial Land Use Plan*, Report Number 66, May 1990.

**Figure 8**  
**Industrial Land Use By Spatial Zone**  
**1961-1997**



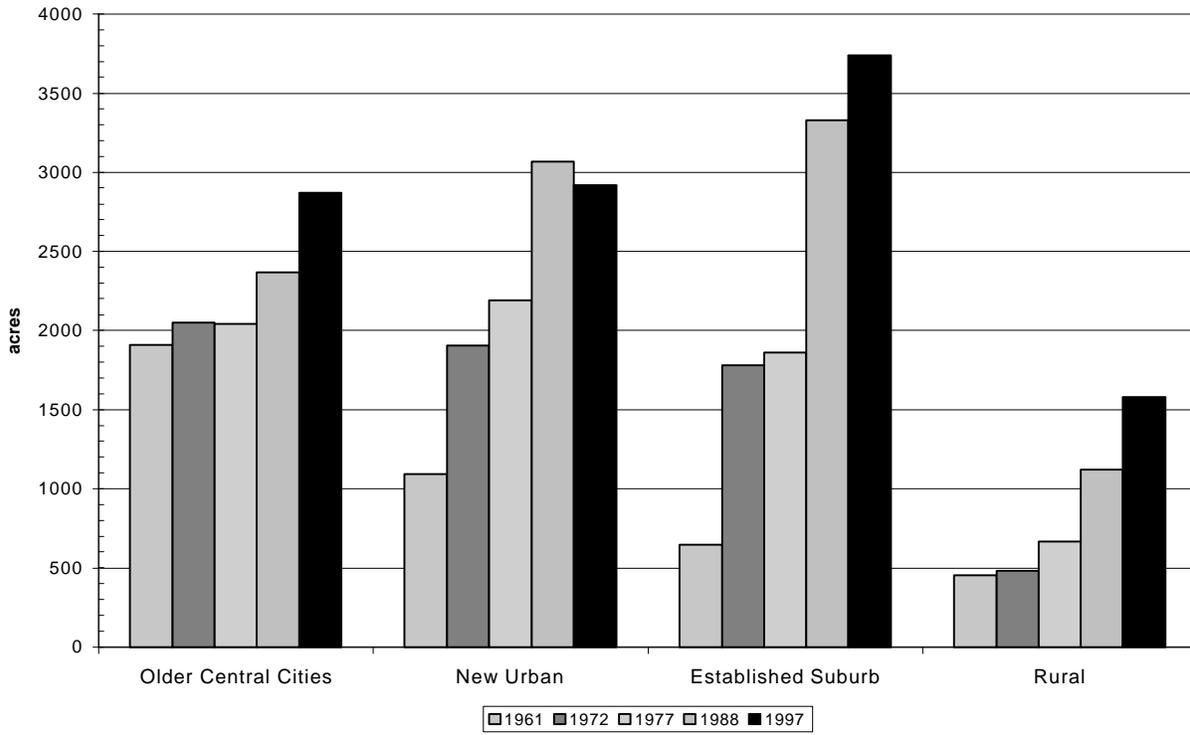
source: Rhode Island Statewide Planning Program, *Land Zoned for Industrial Use*, Technical Paper Number 20, January 1972.

Rhode Island Statewide Planning Program, *Land Zoned for Industrial Use: Inventory and Analysis*, Technical Paper Number 76, November 1978.

Rhode Island Statewide Planning Program, *Industrial Land Use Plan*, Report Number 66, May 1990

Rhode Island Statewide Planning Program, *Draft Industrial Land Use Plan*, 1999

**Figure 9**  
**Industrial Land Use By Community Type**  
**1961-1997**



source: Rhode Island Statewide Planning Program, *Land Zoned for Industrial Use*, Technical Paper Number 20, January 1972.

Rhode Island Statewide Planning Program, *Land Zoned for Industrial Use: Inventory and Analysis*, Technical Paper Number 76, November 1978.

Rhode Island Statewide Planning Program, *Industrial Land Use Plan*, Report Number 66, May 1990

Rhode Island Statewide Planning Program, *Draft Industrial Land Use Plan*, 1999

To help spur large-scale commercial and industrial redevelopment, primarily in older central cities, the state has enacted a law to encourage re-use of “brownfields.” Brownfields are either abandoned or underutilized industrial sites that are often strategically located near population centers and transportation hubs. They have been unattractive to developers because of cleanup costs and uncertainty about future environmental liabilities. Lending institutions traditionally shy away from brownfields because of liability issues: if a mortgagee defaults on a property, a bank could be financially responsible for cleanup.<sup>14</sup> The brownfields law is intended to address this.

Many brownfields are situated on prime industrial land and their redevelopment would provide new economic development opportunities and help revitalize cities and towns. Redevelopment of brownfields would help to prevent sprawl to new industrial sites in rural areas. The State recently made special tax credits available to encourage the reuse of older manufacturing buildings.

<sup>14</sup> Rhode Island Statewide Planning Program, *RI Overall Economic Development Program Update*, 1997, p. 29.

*Trend 8: The most visible source of development is commercial land use*

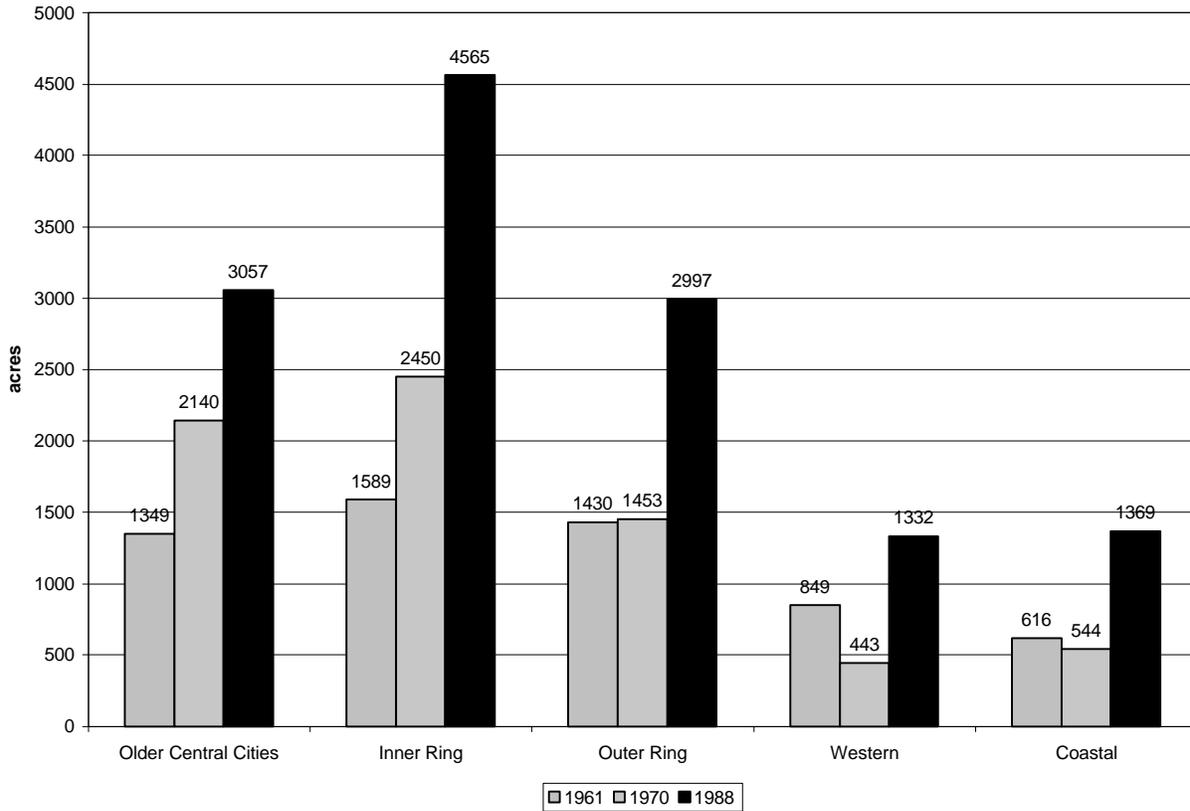
Unlike residential property, commercial land concentrates along the most heavily traveled roadways. The 1970 Rhode Island Land Use Study subdivided commercial land classifications to include strip development along roadways, and shopping centers away from the urban core. Almost 60 percent of commercial development fell into one of these two land use patterns. It is this pattern of strip development that most people readily identify as sprawl. Additionally, most commercial development tends not to be as aesthetically pleasing as residential property. In this sense, commercial land development has had a disproportionate effect on people's perceptions. There have been numerous examples of local residents actively opposing commercial development whereas residential developments (while actually consuming more land) generally have not aroused opposition.

As previously mentioned under Trend 4, from the period 1961 to 1988 growth in commercial land use has been nearly identical to growth in residential land use, 131 percent compared to 136 percent. It seems probable that as population spread into less developed parts of the state, critical densities were reached that provided opportunities for businesses to both serve this population and draw upon them as a labor force. All regions of the state have experienced this growth, but the most rapid growth has occurred in the ring of suburban communities surrounding the older central cities of Providence, Pawtucket, Central Falls, and Woonsocket.

For the purposes of this analysis, commercial land is treated as a single category. In fact, there is more than one type of commercial land. One major division within commercial land is between office use and retail use. While not significant in terms of statewide land use, at a local level the difference in services needed and traffic patterns generated can be quite significant.

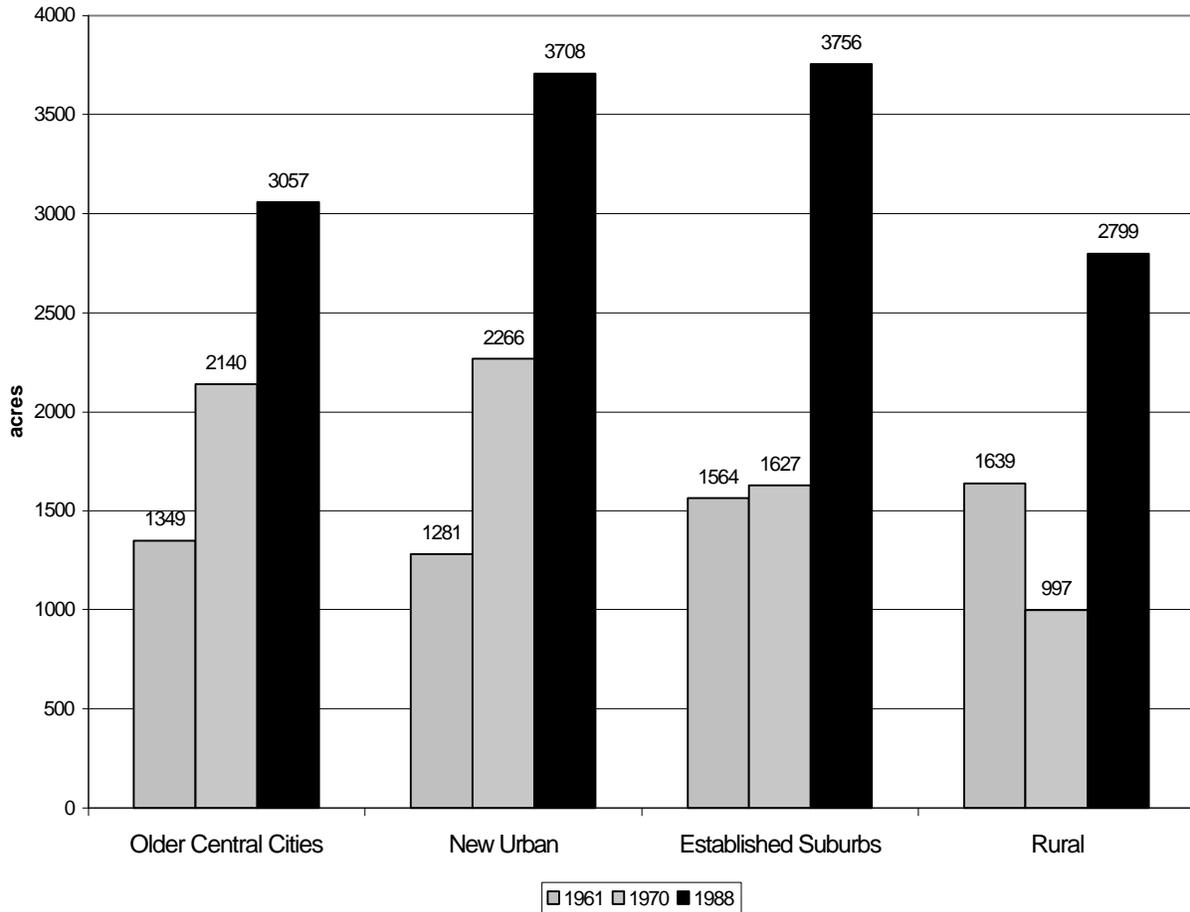
The chart below displays the changes in commercial land use for various regions of the state. (Note: There is an apparent reduction in commercial land use in rural communities between 1961 and 1970. We believe this does not reflect an actual decrease, but is a reflection of different land use survey methods used for those years. We suspect the 1961 survey over-estimated commercial land use.)

**Figure 10**  
**Commercial Land Use by Spatial Zone**  
**1961-1988**



source: RI Statewide Planning Program, *Land Use Trends in Rhode Island 1961 to 1988*, Technical Paper 146. July 1988.

**Figure 11**  
**Commercial Land Use by Community Type**  
**1961-1988**



source: RI Statewide Planning Program, *Land Use Trends in Rhode Island 1961 to 1988*, Technical Paper 146. July 1988.

*Trend 9: The amount of land dedicated to transportation has increased*

The out-migration from the cities, largely enabled by the automobile, has changed the map of Rhode Island in more than one way. The population shift toward suburban and rural municipalities resulted in significant growth in many individual communities. The cars that “drove” that growth pattern needed to travel on roads. Roads that were originally designed for light amounts of local traffic soon exceeded their capacity to safely and efficiently handle the new pattern of commuting substantial distances from one’s residence to one’s job. Additionally, suburbanites continued to take advantage of other trip-generating aspects of the urban environment such as educational institutions, stores, and cultural events.

As previously noted, commercial enterprises followed populations moving to suburban and rural communities. Roads became commercial strips for retail business. Successful suburban businesses became new trip-generators, adding to the pressure for new and/or improved roads.

Roads had additional lanes added and entirely new roads were constructed. The most rapid increase in road construction occurred from the mid 1950’s to the mid 1980’s. Construction of the three Interstate highways, I-95, I-195, and I-295 was completed by 1975. The Interstates accounted for only 72 miles of the approximately 5,200 miles of public roads in 1975. The remainder was divided between State and local roads. However, we cannot be precise in allocating mileage between the two. One problem is that accurate statistics are hard to find. A second problem is that roads can be transferred from local jurisdiction to the State or vice-versa. Perhaps the best we can do is to quote from the 1992 Ground Transportation Plan which, in noting the 35% increase in road mileage from 1962 to 1985 stated, “*Much* (emphasis added) of the increase is due to newly opened residential neighborhood streets.” We can say with some certainty that the state road network currently consists of approximately 6,000 miles that, in addition to the 72 miles of Interstates, includes State roads totaling 1,200 miles and a network of local streets totaling 4,700 miles.<sup>15</sup>

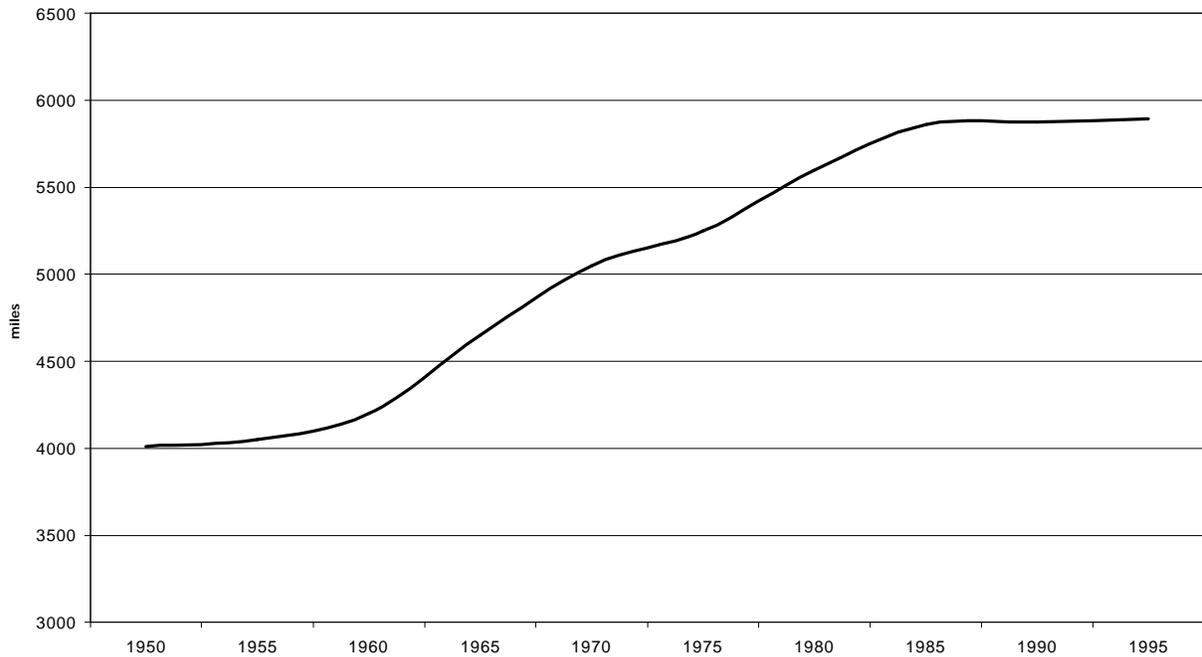
It is not the purpose of this paper to project long-term transportation trends. But, given the realities of fiscal constraints, environmental constraints, and a recent change in public policy to emphasize traffic management over highway system expansion, it is safe to say that the flattened trend line from 1985 to 1995 on Figure 12 is not an anomaly.

Figure 12 displays the growth in miles of public roads over time. All public roadways, including interstates, state highways, and local roads are included in the totals. Finding reliable and consistent data regarding roads is a major problem. Historical data is spotty and often was not collected in a systematically responsible manner. Accordingly, we have extrapolated data for several time periods, in order to present a continuous trendline. Therefore, readers are cautioned not to give as much credence to actual figures as to the overall trend.

---

<sup>15</sup> Rhode Island Department of Transportation, RIGIS data report, 1995.

**Figure 12**  
**Rhode Island Public Road Miles**  
**1950-1995**



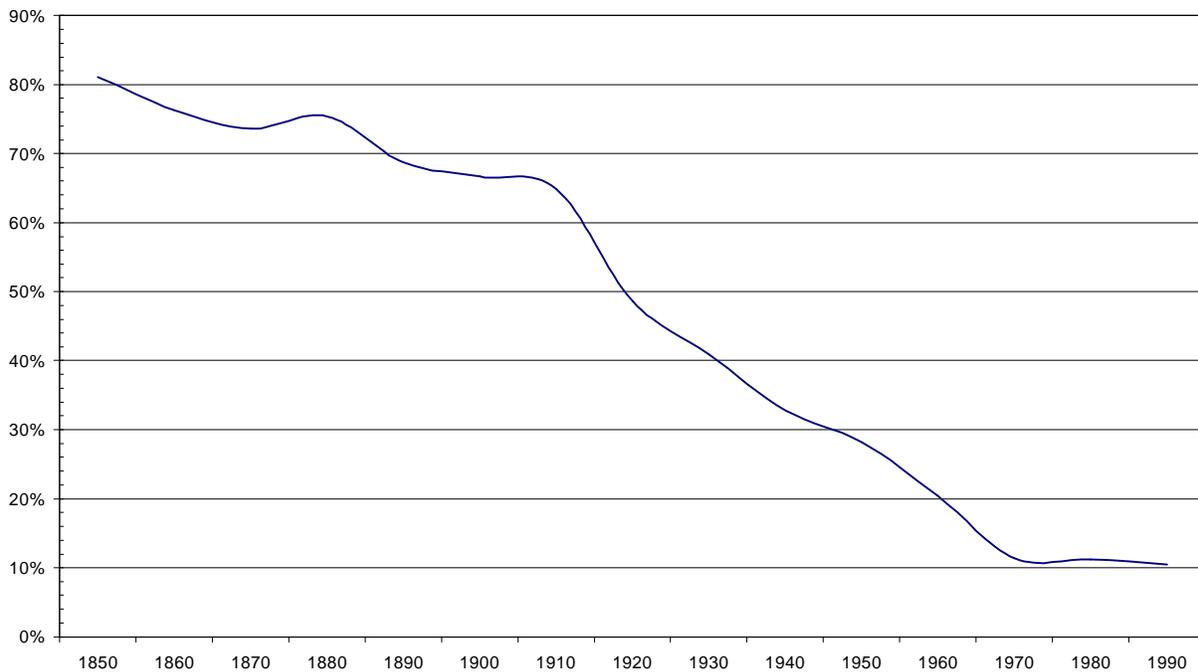
source: Governor's Highway Commission. *Rhode Island Roads*. 1958  
Rhode Island Department of Public Works. *Rhode Island Statewide Traffic Study*. 1964.  
Rhode Island Statewide Planning Program. *1968 Rhode Island Highway Classification Study*. 1969.  
Rhode Island Statewide Planning Program. *A Department of Transportation for Rhode Island*, Report Number 15. March 1971.  
Rhode Island Statewide Planning Program. *1972 Rhode Island Transportation Inventory for 1974 NTS*, Technical Paper Number 34. March 1973.  
Rhode Island Statewide Planning Program. *Transportation 2010 - Ground Transportation Plan*, Report Number 75. March 1992  
Rhode Island Department of Transportation. *Rhode Island Road Facts*. 1998

*Trend 10: Agricultural use of land is in long-term decline*

The overall acreage of land dedicated to agricultural use has been in steady decline since the 1800's. With Rhode Island's relatively poor agricultural soils and harsh climate, and with the advent of widespread rail and highway systems, it has become more cost-efficient to import agricultural products from other regions of the country than to grow it locally. Contrary to popular conception, at least in the state of Rhode Island, the post World War II suburbanization trend did not accelerate the decline in active farmland. However, suburbanization did halt the trend of abandoned farmland reverting to forests. As active farming decreased, the agricultural land proceeded to revert to meadows and then to forests. (In fact, from the late 1800's to the 1950's the total area of forestland more than doubled) Theoretically, this land was still available for agriculture at some future time. Development precludes this option. Figure 13 illustrates the decline of active farmland.

**Figure 13**

**Percent of Land Area in Agricultural Use, 1850-1990**



source: Lucy W. Griffiths, *One Hundred Years of Agriculture in Rhode Island (Statistics and Trends)*, University of Rhode Island, Bulletin 378, January 1965, and RIDEM Division of Agriculture

Beginning in the mid-1980's, the state began initiatives to preserve farmland. One program is to have the state purchase development rights from farmers. Another program is the Farm, Forest, and Open Space Act, which mandates that municipalities assess farmland at a lower tax rate.

*Trend 11: Protection of undeveloped land has increased*

"Concern for the environment and access to parks and open space is not frivolous or peripheral; rather it is central to the welfare of people--body, mind, and spirit."  
~ Laurance S. Rockefeller

Although the overall area of undeveloped land has declined (see Trend 2), permanently preserved open space achieved through local, state, and federal initiatives, and through private land trusts has increased. Protection comes from both the outright purchase of undeveloped land and by the acquisition of development rights (conservation easements). These lands, referred to as greenspace areas, comprise approximately 100,000 acres, or 14.5 percent of the state.<sup>16</sup> The vast majority of open and undeveloped land remains however, in private ownership and is potentially subject to development.

Conservation in recent years has achieved a substantial level of sophistication. Better data and analysis has allowed protection efforts to focus on areas of critical environmental concern and the highest quality recreational value. Data of the state's Geographic Information System, RIGIS, were used as a basis for developing the *Greenspace and Greenways for Rhode Island's Future*.

Figure 14 illustrates approximate federal, state, and municipal land holdings dedicated to natural resource conservation/protection and public outdoor recreation. Commercial recreational land, such as golf courses and campgrounds, are not included as protected lands. Also, generally excluded from these figures are state-owned facilities devoted to educational or other institutional uses, even though they may contain large areas of open space. In order to provide consistency between years, we were unable to include land owned for watershed protection and land owned by nonprofit conservation organizations or land trusts. The data was simply not available for all years.

---

<sup>16</sup> Rhode Island Division of Planning, *RI Recreation, Conservation, and Open Space Inventory*, 1989, updated with unpublished RIGIS data thru 1995.

*Trend 12: The state is increasingly urban and there is a qualitative difference between the traditional central cities and the newly urbanized suburbs*

Roger Williams founded a settlement in Providence in 1636. In doing so, he also began a trend toward development and urbanization. The first federal census, taken in 1790, showed that Rhode Island was 19 percent urban and 81 percent rural. Sometime during the 1840's, the state was evenly split between urban and rural territory. The pace of urbanization did not level off until the 1930's when Rhode Island reached its highest level of urban population, 92 percent<sup>17</sup>. The first urban population centers grew around Newport and Providence. The rise of the industrial revolution fostered the growth of new urban communities such as Pawtucket, Central Falls, and Woonsocket along the Blackstone River.

As discussed in the Definitions section, the meaning of “urban” can be somewhat fluid. One should not make a direct comparison between urban as defined by the U.S. Census Bureau and urban as it is used in this report. Based on our standard of a municipality having a population density of 2,500 or more persons per square mile and 50% or more of its land area classified as developed land, the state currently has ten urban communities. They are:

Central Falls	Pawtucket
Cranston	Providence
East Providence	Warwick
Newport	West Warwick
North Providence	Woonsocket

While there are areas of some of these communities that do not fit the criteria for urban (e.g. western Cranston), and there are sections of other municipalities not on this list that do fit the criteria for urban, it is too difficult to classify communities on a sub-municipal level.

Five of Rhode Island's urban municipalities may be considered “old” or traditional central cities: Providence, Pawtucket, Central Falls, Newport, and Woonsocket. Cranston, East Providence, North Providence, Warwick, and West Warwick are the new urbanized suburbs. How do they differ?

Our traditional cities were designed with high-density in mind from their inception. As such, businesses and residences are built in near proximity. Lot sizes are relatively small and multi-family housing is relatively abundant. Mass transit is widely available and sidewalks are everywhere. Public infrastructure such as water and sewers extend into almost all neighborhoods. Neighborhoods have readily defined character and boundaries.

In contrast, suburbs were designed with low-density in mind. Housing and businesses are segregated. Lot sizes are relatively large and multi-family housing relatively scarce. Due to the low-density, scattered patterns of housing, mass transit is mostly impractical. Since residences and businesses are not generally within walking distance, few sidewalks are needed. While some infrastructure such as public water is fairly common, other infrastructure such as sewers are

---

<sup>17</sup> As defined by the U.S. Census Bureau, “urban” comprised all territory and persons in incorporated places of 2,500 or more persons.

widely scattered. Neighborhoods generally do not have a clear sense of identity and neighborhood boundaries are ill defined.

One is not inherently “better” than the other. Each was designed for very different purposes. Central cities were designed to bring people and commerce close together. Suburbs were designed to allow people to “escape” the perceived drawbacks of urban life. People could spend their days working and shopping in central cities but could spend their leisure time and raise their children in suburban bedroom communities. In retrospect, we can see that without proper long-term planning and land use control, this pattern of development is intrinsically flawed because it leads to sprawl.

The first flaw we have already mentioned. As people move to low-density rural communities, they begin to change the very characteristics that attracted them in the first place. At some point those characteristics are lost. In other words, unless populations can be kept level or new land added, low-density scattered development is unsustainable.

*"The sprawl pattern discourages a sense of community. It encourages land speculation. It requires high infrastructure investments. It requires high energy consumption and is a major source of air and water pollution."*

~ Anton Nelessen,  
Visions for a New American Dream

The second flaw is reminiscent of the people that moved to Arizona in order to find relief from the hayfever that plagued them in their home regions. Finding Arizona to be too desert-like, they began to plant lawns and trees. After a few years, they discovered that their hayfever had returned. To make matters worse, they had to spend inordinate amounts of money on fertilizer and irrigation to keep their lawns and trees healthy in the Arizona desert.

Similarly, people living in suburbs found they missed the convenience of nearby shopping. Business enterprises filled this void by creating commercial strips along well traveled highways. Furthermore, municipalities in their efforts to increase the property tax base, encouraged ever more commercial and industrial development. In other words, urban land uses kept increasing, and thereby transforming, suburban communities into urban communities.

Rhode Island’s five urbanized suburbs still retain qualities that make them valuable in their own right, but unlike traditional cities that were designed to be compact, these former suburbs were designed to be diffuse with a resulting land use pattern that is not as efficient as our traditional cities.

## Summary/Conclusions

Rhode Island's land use patterns have changed as the societies that created them have changed. As the number of people living in the state, where they choose to reside, the prevailing technology, and the economic base have evolved, so have the patterns of land use. The history of the state has witnessed agriculture as the dominant land use with population nodes in the cities and the remainder of the population scattered about the rural countryside and small villages. As manufacturing replaced agriculture, Rhode Islanders clustered evermore into the cities and towns that hosted the new industry. During the last 40 to 50 years society has continued to change and has changed our land use patterns with it.

Rhode Island's population growth rate was moderate from the beginning of the century through 1970. From 1970 to the present, the growth rate has been almost flat. Despite this, development of land has been high.

- Residential land use has increased at a rate greater than population growth.
- Commercial land use has increased at a rate greater than population growth.
- Industrial land use has increased at a rate greater than population growth.
- Road and highway construction increased at a rate greater than population growth for a period of time but has leveled off.
- Developed recreational land use has increased at a rate greater than population growth.

Other significant trends are:

- Agricultural land use has been in long-term decline.
- Protection of undeveloped land has been increasing.

Overall we can characterize the trend for the past 50 years as one of urban decline and suburban expansion. Where people are living and how they are using land has been changing dramatically. People are living and working farther from urban centers and consuming undeveloped land. Urban job centers have decentralized to the suburbs, and new housing tracts have moved even deeper into agricultural and formerly forested areas.

The desire has been for a more pleasant lifestyle. The unintended side effects have included:

- Increased infrastructure costs in the form of new schools, new roads, new sewers, etc.
- Strains on municipal services as the cost of services incurred from many residential areas exceeds the taxes paid for those properties.
- Increased travel as residences, jobs, retail centers, and recreational opportunities spread farther from each other.
- Increased air and water pollution.
- Ecological damage to ecosystems such as fields and forests that have been fragmented by subdivisions.
- An increased sense of congestion as a community transforms from rural to urban.
- A decline in the urban tax base which leads to higher taxes which leads to more urban flight.

## Sources Consulted

### Agriculture and Open Space

Griffiths, Lucy W. *One Hundred Years of Rhode Island Agriculture*. (Kingston, RI: University of Rhode Island, 1965)

Rhode Island Division of Planning, Report Number 84: *A Greener Path... Greenspace and Greenways for Rhode Island's Future*. (Providence: Rhode Island Statewide Planning Program, November 1994)

Rhode Island Department of Natural Resources; Rhode Island Development Council; Rhode Island Statewide Planning Program, Report Number 8: *Plan for Recreation, Conservation, and Open Space*. (Providence: Rhode Island Statewide Planning Program, February 1968)

Rhode Island Statewide Planning Program and the Rhode Island Department of Natural Resources, Report Number 14: *Plan for Recreation, Conservation, and Open Space*. (Providence: Rhode Island Statewide Planning Program, January 1971)

Rhode Island Statewide Planning Program and the Rhode Island Department of Natural Resources, Report Number 28: *Plan for Recreation, Conservation, and Open Space*. (Providence: Rhode Island Statewide Planning Program, January 1976)

Rhode Island Statewide Planning Program and the Rhode Island Department of Environmental Management, Report Number 33: *Plan for Recreation, Conservation, and Open Space*. (Providence: Rhode Island Statewide Planning Program, January 1981)

Rhode Island Development Council, *Recreation Guide Plan*. (Providence: Rhode Island Development Council, June 1965)

Rhode Island Division of Planning, Report Number 52A: *Rhode Island Outdoor Recreation, Conservation, and Open Space Inventory*. (Providence: Rhode Island Division of Planning, January 1981)

### Economic Development and Employment

Rhode Island Statewide Planning Program, Report Number 51: *Economic Development Strategy*. (Providence: Rhode Island Statewide Planning Program, March 1986)

Rhode Island Division of Planning, Report Number 66: *Industrial Land Use Plan*. (Providence: Rhode Island Statewide Planning Program, May 1990)

Rhode Island Statewide Planning Program, Report Number : *Industrial Land Use Plan*. (Providence: Rhode Island Statewide Planning Program, 1998)

Rhode Island Statewide Planning Program, Technical Paper Number 76: *Land Zoned for Industrial Use: Inventory and Analysis*. (Providence: Rhode Island Statewide Planning Program, November 1978)

Rhode Island Statewide Planning Program, Technical Paper Number 20: *Land Zoned for Industrial Use: Inventory and Analysis*. (Providence: Rhode Island Statewide Planning Program, January 1972)

Rhode Island Statewide Planning Program, *Overall Economic Development Program Update*. (Providence: Rhode Island Statewide Planning Program, June 1997)

Rhode Island Division of Planning, Technical Paper Number 127: *Rhode Island Employment Forecasts, Year 2010: The State, Cities and Towns, and Analysis Zones*. (Providence: Rhode Island Statewide Planning Program, August 1987)

## **Housing**

Rhode Island Division of Planning, Report Number 88: *Housing Data Base*. (Providence: Rhode Island Statewide Planning Program, February 1996)

## **Land Use**

Rhode Island Development Council, Publication Number 11: *Analysis of Rhode Island Land Use*. (Providence: Rhode Island Development Council, 1965)

Rhode Island Division of Planning, Report Number 64: *Land Use 2010*. (Providence: Rhode Island Statewide Planning Program, June 1989)

Rhode Island Public Expenditure Council, *Strengthening Cities: A Report of the Urban Strategy Project*. (Providence: Rhode Island Public Expenditure Council, January 1998)

## **Population**

Griffiths, Lucy W. *One Hundred Years of Rhode Island Agriculture*. (Kingston, RI: University of Rhode Island, 1965)

Rhode Island Development Council, *Population Trends in Rhode Island*. (Providence: Rhode Island Development Council, April 1958)

## **Transportation**

Governor's Highway Study Committee, Joseph M. Vallone, Chair, *Rhode Island Roads*, (Providence: Governor's Highway Study Committee, 1958)

Rhode Island Department of Transportation, *Rhode Island Road Facts*. (Providence: Rhode Island Department of Transportation, 1998)

Rhode Island Statewide Planning Program, Technical Paper Number 34: *1972 Rhode Island Transportation Inventory*. (Providence: Rhode Island Statewide Planning Program, March 1973)

Rhode Island Statewide Planning Program, Report Number 15: *A Department of Transportation for Rhode Island*. (Providence: Rhode Island Statewide Planning Program, March 1971)

Rhode Island Statewide Planning Program, Report Number 19: *Rhode Island Transportation Plan 1990*. (Providence: Rhode Island Statewide Planning Program, January 1975)