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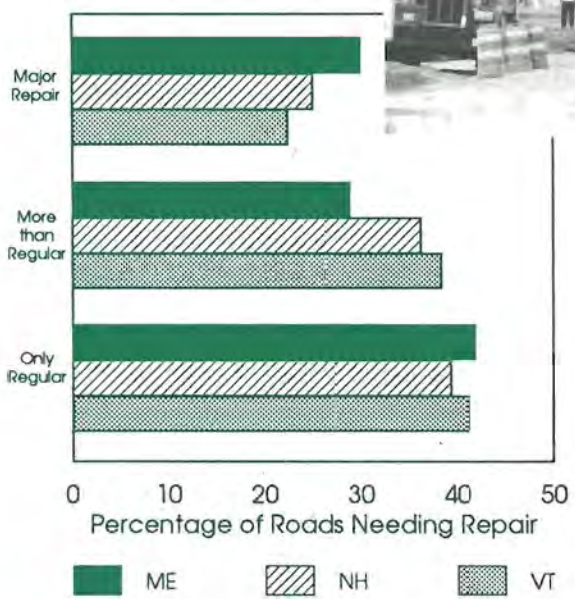

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Financing Rural Roads and Bridges in the Northern New England States

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Contribution made by the earlier work of David Chicoine, University of Illinois, and Norm Walzer, Western Illinois University, can not be overemphasized. It was their initial concerns about the rural road system and efforts at providing basic information about the local road system that stimulated this research. Much of the work presented here follows their lead.

As usual, any error of commission or omission are the sole responsibility of the authors.

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PREFACE

During the 1980s the status of the rural stock of infrastructure has received much attention. Concern has been expressed over the safety of the stock of infrastructure and its ability to support future economic activities in rural areas. Although general information pertaining to the quantity and quality of rural infrastructure across the nation is available in a patchwork of studies, information specific to New England is lacking. The lack of information related to the most important rural infrastructure, the local road and bridge system, is particularly disturbing. The local road system is of vital importance to rural residents and businesses. This system provides links between rural residents and employment opportunities, shopping districts, and health care facilities, in addition to the links it provides rural businesses with markets. Without a viable local road system, rural residents and businesses would be isolated from not only each other but also from urban centers and markets.

Because of the concern for the deteriorating condition of the local road system and the financial difficulties facing the local governments vested with the responsibility for maintaining and repairing the local road system, the Northeast Regional Center for Rural Development authorized this study of the local road system in the three states composing northern New England: Maine, New Hampshire, and Vermont. These states were selected due to the general lack of information about the local road system in the three states, the general similarities in institutional arrangements for the maintenance of the system, and the common rural nature of the states.

EXECUTIVE SUMMARY

The provision of the physical infrastructure that supports local economic activity in both urban and rural areas is a cause for major concern. Uneasiness over the ability of smaller rural governments to finance infrastructure, particularly in times of economic recession, is evident. As tax revenues decline in rural areas, regularly scheduled maintenance and repair of the existing stock of infrastructure has been delayed. The result has been a general deterioration of our nation's stock of infrastructure.

The local road network is at the heart of the stock of infrastructure supporting economic activities in rural areas. An effective road network is essential for the efficient transportation of goods produced in rural areas to and from markets as well as for linking rural residents to employment opportunities, shopping districts, and health care facilities. Despite the importance of the local road network, the combined effects of age and deferred maintenance have greatly reduced the effectiveness of the network.

This study examines the current status and financing of the local road system in three New England states: Maine, New Hampshire, and Vermont. Primary information was gathered through mail survey of town road officials. The study was designed to complement other recent studies of the local road network in other parts of the U.S. The themes of the study focus on financing patterns and the condition of the existing local road network. Special attention is paid to the management practices followed in maintaining the local road network in an attempt to assess the need for improving managerial practices, abilities, and institutional arrangements. Specific recommendations for improving the delivery of transportation services are provided in the summary of the report.

Background and Introduction (Chapter One)

Consistent with the historical institutional arrangements characterizing New England, the town government is vested with the responsibility of maintaining and repairing the majority of the local road network. Within the study area, 52.6 percent of the 50,508 total road mileage falls under the jurisdictional responsibility of town governments. Given the smallness of New England towns, with respect to both population and geographic size, the average town is responsible for 40.1 miles of road. The resulting smallness of operation becomes apparent when compared to the 728 miles of road for which the average county located outside of New England is

responsible. The potential additional costs imposed on town governments through unrealized economies of scale may be significant.

Financing Town Governments (Chapter Two)

Revenues used to finance the provision of local road services come from a variety of sources. A combination of historical tradition and statutory limitations restrict the town government to the property tax as the principal source of locally generated funds. In all three study states, the property tax accounted for over half of the average town's revenue base. Examining growth in revenues over the period 1977 through 1987, increases in the property tax accounted for nearly all town revenue growth. Pressures on property tax burdens have made the property tax a very unattractive source of additional revenues. When queried preferences for sources of additional revenues, local road officials identified aid from higher levels of government (state and federal) as the most preferred, and increases in the property tax were the least preferred.

Condition of the Local Network (Chapter Three)

The majority of the local road system can be characterized as low to medium volume in nature. For the study area, approximately one in four miles of road has an average daily travel (ADT) load of more than 400 daily trips. This low- to medium-volume pattern is reflective of the institutional arrangement where the state is responsible for the more highly traveled main arteries. Over half of the town-maintained road mileage has a hard (paved or bituminous) surface. Given the limited number of high-volume mileage within the jurisdictional responsibility of towns, the incidence of hard surfaced road mileage, while surprising, is indicative of a high-quality local road network.

The condition of mileage maintained by towns is a cause for concern. Based on the assessment of local road officials, 26.8 percent of the mileage is in need of major repair. On average, only 40.1 percent of road mileage was in sufficient condition as to require regular maintenance only.

Of equal importance is the condition of the network of bridges supporting the local road network. While the respective state departments of transportation are responsible for the maintenance and repair of the majority of bridges across northern New England, local officials expressed concern over the status of the bridge network. On average, nearly one in five (17.9%) bridges was deemed by local officials in need of complete replacement. Nearly one in six (16.2%) bridges was considered in need of major renovation. Only

half of the bridge network (48.4%) was assessed as requiring only regular maintenance. The resulting pattern of weight-posted bridges negatively affects traffic patterns in nearly every town responding to the survey.

In light of the fiscal difficulties faced by many rural communities, reconditioning both road mileage and bridges up to acceptable levels may be beyond the reach of most towns.

Management Practices (Chapter Four)

The maintenance and repair of the local road network is dependent upon the quality of the town road personnel and the equipment at their disposal. In the three states examined the responsibility of town road maintenance falls to the town road commissioner. Although the majority of local road officials are appointed to the position (42.3%), the vast majority of road officials in New Hampshire and Vermont view the position as a full-time commitment. Consistent across the three states, however, is the share of the commissioner's time devoted to actual road maintenance. The single most time-consuming activity of the road commissioner is direct road maintenance and supervision of road projects.

A profile of the town commissioner indicates a person with an average age of 47 years, more than four years experience as road commissioner, and a high school education. The general lack of formal training received by the average road official is of particular concern; only half of the responding officials indicated that they had received any formal training. Still, the majority (73.8%) of road officials expressed interest in receiving additional training. Given the relatively technical nature of road maintenance practices, the relative lack of training is a cause for concern.

Although it is aging, equipment used by the town in the maintenance of the local road system appears to be in satisfactory condition, as assessed by the users of the equipment.

Of the towns responding to the survey, 39.8 percent noted that the town participated in some form of cooperative arrangement with another unit of government. Of those with cooperative arrangements, nearly all were with another town. The most common arrangement was in joint efforts as snow removal and/or sanding and sharing of equipment. The most commonly cited advantage to cooperative arrangements was as a cost reduction option. Given the relative smallness of most New England town governments, the potential cost savings of cooperative arrangements warrants further consideration.

General Observations

The financing of the public infrastructure will continue to be a subject of national and local debate for many years in the future. The costs of maintaining the current stock of infrastructure coupled with the need for upgrading it are staggering and often beyond the resources available to the local governments involved. The local official is often faced with reducing service levels, raising taxes, or stretching available resources further.

Although there are few comprehensive solutions that can be readily implemented, there are realistic options identified within this research that warrant consideration. A few of these option are provided in the closing chapter of this report.

CHAPTER ONE
BACKGROUND AND INTRODUCTION

Considerable attention has recently been paid to the status of the nation's public infrastructure. The national report *America in Ruins* (Choate and Walter 1981) renewed interest in the vitality of our road and bridge network, sewer and water distribution systems, and other forms of public infrastructure. The general conclusions of the report suggested that (Choate and Walter 1981:3) "America's public facilities are wearing out faster than they are being replaced. The deteriorated condition of the basic public facilities that underpin the economy presents a major structural barrier to the renewal of our national economy." Subsequent studies have concurred with the grim status of this nation's stock of infrastructure. Using an academic grading scale, the National Council on Public Works Improvement (NCPWI) (1988) graded America's infrastructure a scant C-, or barely adequate to support current needs. The NCPWI warned of the possible barrier the current stock of infrastructure may place on future economic growth and development.

One particular basis for concern is the declining rate of investment in the nation's infrastructure. The NCPWI observed that over the past two decades the percentage of national resources devoted to infrastructure investment declined from 3.5 percent of Gross National Product (GNP) in the 1960s to 2.5 percent of GNP in the mid-1980s. The decline in new infrastructure investment is even more striking, declining from 2.5 percent of GNP in the early to mid-1960s to slightly more than 1 percent in the mid-1980s.

Though the majority of the infrastructure required to support current economic activity is in place, a significant proportion of the current stock is beyond its engineered design life. The rural road network, for example, was constructed during an era of relatively slow travel, and many bridges were constructed in the early 1900s or during the 1930s. Repairs have been made, but with growth in automobile and truck usage, heavier loads, and greater reliance on the road system after deregulation of the trucking industry, many structures are depleted or are no longer sufficient to accommodate the demands currently placed on the network. These higher levels of demand have accelerated rates of deterioration. Unfortunately, this increase has not been sufficiently compensated for by a higher level of public resource commitment for repair and/or replacement.

There are several reasons why infrastructure projects do not receive the attention they deserve. One reason is that once infrastructure investments have been made, the services derived from

that investment are taken for granted. Sewer and water systems are subject to the 'out-of-sight-out-of-mind' syndrome. For example, when a street has potholes, patches are made to bring the road back into service, but little attention is paid to the deteriorating structural condition.

A second reason is that infrastructure expenditures appear postponable. A street can be repaired and made to serve for another year. A bridge not yet in critical condition will accommodate traffic for several years. The importance of preventive maintenance as an ultimate cost-saving management practice is often not well understood.

Third, infrastructure projects are usually expensive. In a period of declining tax bases, a shrinking flow of federal and state aid to town governments, and a growing reluctance of local taxpayers to approve tax increases, the fiscal resources available to support infrastructure investments are limited. In addition, when tax increases are approved, public officials would rather increase the overall quantity of infrastructure available to the public than make repairs to existing facilities since the repairs will be largely unnoticeable to the taxpayer.

These reasons, coupled with the fact that roads, bridges, and other public infrastructure have a limited design life, have brought concerns over the nation's infrastructure to the forefront of national policy. There are two reasons for this growing concern. The first reason is the link between a quality stock of infrastructure and the safety and health of the public. The purity of water supplies, safety of roads and bridges, and the safe disposal of solid waste are all dependent upon a stock of quality infrastructure.

A second, perhaps more fundamental, reason focuses on the relationship between infrastructure and sustainable economic development and growth. There is a general belief that without adequate infrastructure both rural and urban areas would find it difficult to support acceptable levels of economic activity. Many studies examining the role of infrastructure in economic development and growth suggest that infrastructure may play either a direct or indirect role in a region's economic development.[1] Infrastructure can enter directly into a firm's production process, as water does in some manufacturing and agricultural processes. Infrastructure can also play an indirect role by inducing an increase in the productivity of other private and public capital. An inad-

[1] Deller, S.C. 1991. Economic and social outcomes of public and private investments in physical infrastructure for growth and stability of rural economics. In *Economic Productivity & Adaptability*, Northeast Regional Center for Rural Development, University Park, PA. pp. 50-73.

equate stock of infrastructure may inhibit the firm's ability to compete in the economy, hence dampening the prospect for future economic growth and development.

The condition of the public stock of infrastructure is also important to the quality of life in both rural and urban areas. Poor roads and narrow bridges in rural areas not only limit the areas' potential for economic growth, but also negatively affect the quality of day-to-day living. Because of deficient bridges, rural residents often travel greater distances than necessary. The cost in terms of time, money, and inconvenience placed on rural residents warrants a closer examination of the stock of infrastructure.

Purpose of the Project

The lack of quality information about the local road network in New England was the stimulus for this report. These structures have not made national news in proportion to the attention paid to urban infrastructure decay, but are critical to the economic competitiveness of small towns and the quality of life for rural residents. Many of the roads and bridges constituting the local road network are in a state of disrepair, and the town governments responsible for their maintenance are often not in a financial position to adequately perform the needed repairs.

Previous studies of the rural road network have identified serious deficiencies in the quality of the network and the ability of the responsible unit of government to offset decay. In a study of low-volume rural roads in the Midwest, Chicoine and Walzer (1984) found that 50 percent of all road mileage requires more than regular maintenance and almost half of the system's bridges require more than regular maintenance. Indeed, nearly one in five bridges needs to be completely replaced.

In a subsequent national study of county- and town-maintained roads, Walzer and Chicoine (1989) found that on average, 25 percent of county road mileage and 32 percent of town road mileage were reported as less than barely adequate. Similarly, over 40 percent of county-maintained bridges nationwide are placed in the high priority to repair category by road officials. Based on information available from the National Bridge Inventory (NBI) conducted by the Federal Highway Administration of the U.S. Department of Transportation, Walzer and Chicoine estimated that nationwide, 57 percent of bridges maintained by towns were rated at less than barely adequate.

Local road officials surveyed in both the Midwestern and national studies consistently identified revenue constraints, coupled with heavier traffic loads, as the primary determinate of the

deteriorating local road network. Public officials consistently expressed concern over their ability to respond to a growing infrastructure crisis.

Although the work by Walzer and Chicoine (1989) was intended to be national in focus, New England towns were not included in the study. Thus, information specific to the local road network in New England is lacking. The intent of this study is to help fill the void in our understanding of the local road network located in the northern three New England states. Specifically, the research presented in this report examines the financing and provision of town-maintained roads and bridges in Maine, New Hampshire, and Vermont. The survey instruments of Walzer and Chicoine are mirrored in this study to allow for consistent comparison across this study, the Midwestern study, and the more recent national study. Such a detailed comparison, unfortunately, is beyond the scope of this report and is left to the reader. Specific objectives of this report are to:

- assess the ability of town governments to raise sufficient levels of funding to support the local road system,
- assess the current condition of the local road system,
- assess the management practices of local road officials,
- provide local and state policy makers with an overview of the relevant issues pertaining to the local road system.

Organization of Report

The remainder of this report is composed of four chapters. A discussion of data sources used in this analysis and an overview of governmental structures having local road responsibilities concludes the Introduction. Governmental finances characterizing towns in the northern New England states are outlined in Chapter Two. The analysis presented here is particularly important because the cost of maintaining the local road system may be outpacing the ability of towns to raise sufficient levels of funding. Particular attention is paid to the planning process that towns undergo. The condition of the local road system is described in detail in Chapter Three. Attention is paid to the characteristics of the local road system in terms of traffic volume and surface types. Based on the assessment of local road officials, the overall quality of the local road system is portrayed. The management practices of local road officials are outlined in Chapter Four. Issues ranging from the

educational and training level of local officials to hiring practices to equipment condition to the use of cooperative arrangements are examined in detail. The concluding chapter of this report highlights the findings of the analysis and provides a collection of specific recommendations for consideration by both local and state officials.

Data Sources

The data used in the analysis provided in this report are available from three sources: Census of Governments publications, publications of the U.S. Department of Transportation, Federal Highway Administration (FHWA); and a survey of town road commissioners. In the summer of 1990, a survey was sent to 981 towns in the three northern New England states of Maine, New Hampshire, and Vermont. A total of 316 surveys providing usable information were returned: 176 from Maine (55.7% of the total sample), 63 from New Hampshire (26.9% of the total sample), and 77 from Vermont (24.4% of the total sample).

The survey contained questions on road and bridge conditions, hiring practices, equipment condition, management practices, revenue structure, and road commissioner characteristics. A copy of the survey instrument is provided in the Appendix.

Although the compiled data represent one of the most complete sources of information on New England's local road system, there are limitations to the data. Town road officials often do not possess adequate information to answer even the most basic questions. For example, many road officials do not maintain records in sufficient detail to estimate the annual operative cost of a particular piece of equipment. When specific information was not available to the official, an informed judgement was often made. In this case, caution must be used in drawing conclusions from the analysis. In addition, even though a response rate of 33 percent is satisfactory, only one in three local road officials responded to the survey. The information contained in this report should be viewed as a first step toward providing definitive answers to pressing policy questions.

An Overview of Governmental Organization

The organization of road responsibility varies dramatically across the U.S. In some states, such as North Carolina and Delaware, the local road network is the responsibility of the state government. In these states, lower levels of government, such as the county or town, have no road responsibility. In most states, primarily in the south and west, the county is the principal level of government vested with maintaining the local road network. Some

states, such as New York and those in the Midwest, have a tiered system of responsibility shared across counties and town governments. In these states higher service level roads, such as connector routes, are the responsibility of county governments, whereas lower service roads are the responsibility of the town.

Road responsibility in New England is the most decentralized in the U.S. with the bulk of the local road system falling into the hands of town governments. New England states are unique in that the county has limited or no road responsibility. Vermont is the most decentralized system of the three study states with nearly 80 percent of total public road mileage falling under the authority of town or municipal government (Table 1.1). State government in Maine, while the most centralized system in the northern New England states, still is only responsible for one in three miles of road.

The total mileage responsibility for the average town in Maine, New Hampshire, and Vermont is relatively small at 40.1 miles of road. The town with the smallest mileage responsibility tends to only 1/3 of a mile a road, whereas the town with the largest mileage responsibility within the sample is responsible for 152 miles of road. The smallness of operation becomes most evident when compared to the average size county in the U.S. with road responsibility is liable for 728 miles. The potential for cost saving through economies of scale becomes very real at the scale of operation prevalent in the northern New England states.

Table 1.1 Public Road Mileage by Jurisdiction

	ME	NH	VT	Total
Federal	179	142	80	401
(%)	(0.8%)	(1.0%)	(0.6%)	(0.8%)
State	7,946	4,092	2,800	14,838
	(36.2)	(28.2)	(19.9)	(29.4)
Town	11,011	6,256	9,285	26,552
	(50.1)	(43.2)	(69.9)	(52.6)
Municipal	2,832	4,001	1,344	8,177
	(12.4)	(27.6)	(9.6)	(16.2)
Total	21,968	14,491	14,049	50,508
	(100.0)	(100.0)	(100.0)	(100.0)

Source: USDOT, *Highway Statistics 1986* (Washington, DC:USGPO, 1987)

Responsibility for the bridges network in contrast to road networks tends to be more highly centralized. In Maine, for example, 72.9 percent of all bridges are the direct responsibility of state government, whereas in Vermont well over half of the bridge network falls under the auspices of local governments (Table 1.2). One reason for this variation in bridge responsibilities is the topographical nature of the study states. Many of the bridges in Maine cover large expanses and are beyond the maintenance ability of most Maine towns; many others are located on state-maintained roads. The typical town in the northern New England states is responsible for slightly more than six bridges with over 50 percent of the sample towns responsible for three bridges or fewer.

The implication of such a highly decentralized system of road service provision focuses on the costs of adequate maintenance schedules, investments in new road infrastructure, and the ability of the typical northern New England town to adequately perform road functions. Limited financial resources and institutional barriers to realizing economies of scale present local policy makers and taxpayers with a very real set of problems in providing road services in a cost effective manner.

Summary

Improving and rebuilding the nation's infrastructure will be one of the major, if not the single most important, policy issues of the 1990s. Roads and bridges, water and waste water systems, telecommunication, and mass transit are necessary for continued economic

Table 1.2 Custodial Bridge Responsibilities by Jurisdiction

	ME	NH	VT	Total
Federal	15	5	8	28
(%)	(0.6%)	(0.2%)	(0.3%)	(0.4%)
State	1,722	1,288	945	3,955
	(72.9)	(55.0)	(37.5)	(54.7)
City/Local	435	982	1,540	2,957
	(18.4)	(41.9)	(61.0)	(40.9)
Other	191	67	30	288
	(8.1)	(2.8)	(1.2)	(4.0)
Total	2,363	2,342	2,523	7,228
	(100.0)	(100.0)	(100.0)	(100.0)

Source: USDOT, *Highway Statistics 1986* (Washington, DC:USGPO, 1987)

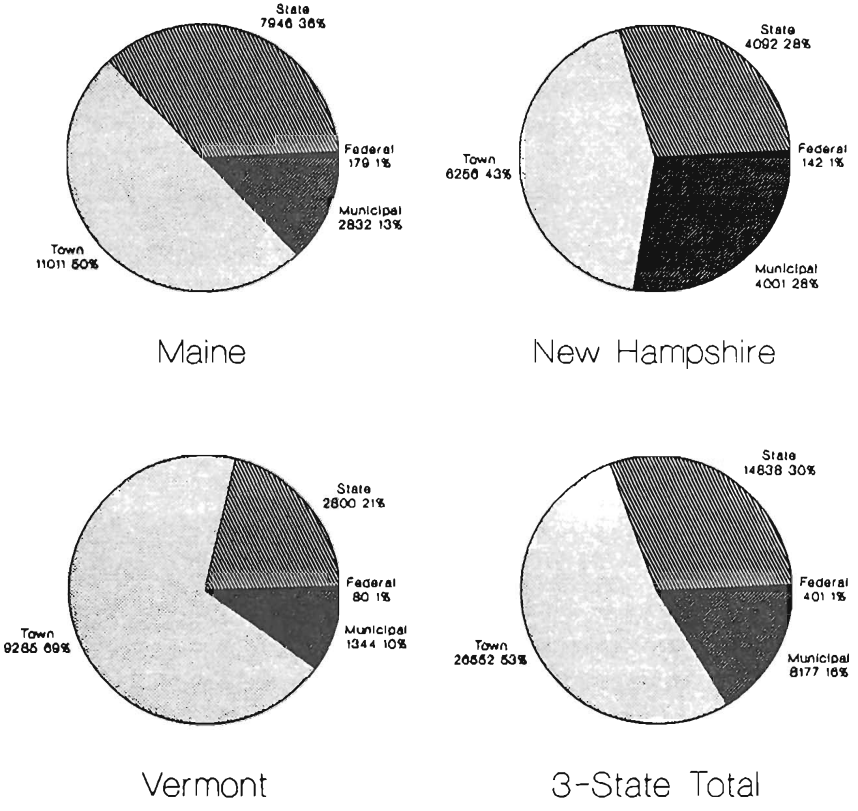

Figure 1.1. Jurisdictional Responsibility

growth and development. The postponement of major reinvestment efforts in the past in favor of minor repair work has resulted in a cumulative problem reaching epic proportions.

Shifting population patterns and changes in user demands has altered the way in which the local road network services its users. The rapid suburbanization of many areas in the Northeast coupled with increased seasonal activity in the form of tourism and heavy traffic loads in general has pushed much of the local road system beyond its engineered design life. The resulting slowdown in traffic flows has hindered not only the quality of life in many rural areas, but also the economic competitiveness of these same areas.

The study presented in this report examines the current status of roads and bridges in the northern New England states of Maine, New Hampshire, and Vermont. Special attention is paid to financing patterns, management practices, and condition of the local road network.

CHAPTER TWO
FINANCING TOWN GOVERNMENTS

A difficulty in any study of local public infrastructure is adjusting for variations in sources of revenue and responsibility for the provision of infrastructure services under consideration. Apart from institutional differences, non-comparabilities arise in the case of the local road system due to variation in levels of services at which roads and bridges are maintained, including, but not limited to, differences in surface types.

For states located in New England, part of the difficulty is minimized due to the historical strength of the town form of government. Town governments are responsible for the local road network, police and fire protection, water and waste-water systems, solid waste management, economic development initiatives, and a vast array of other public services. Historically, New England towns have operated in a very independent manner, seeking little cooperation from neighboring communities or the state. Given the rapidly changing complexity of problems facing New England communities, a sense of cooperation is slowly developing. Towns in New England are just beginning to realize the limitations of small, informally operated town governments. The ability, or inability, of the town government to raise revenues to meet rapidly changing demands for local services has changed the face of the New England town.

Financing of town government in the three northern New England states studied in this project is examined in this chapter. Although town financing is a complex problem, special attention must be paid to the town's ability to respond to a changing environment. Particular attention is paid to revenue and expenditure patterns of town governments pertaining to road and bridge maintenance and construction.

Town Revenues

Methods of funding local public services differ due to variations in the tax base of the community and historical patterns. Local governments have traditionally relied upon the property tax to fund services that provide a local benefit. Certainly, the local road network would fall into this category. Indeed, in the three study states, the town's reliance on the property tax as source of revenue has increased during the last ten years. For example, in Maine the property tax accounted for 47 percent of all revenue in 1977, but more than 56 percent in 1987 (Table 2.1). This pattern is even more pronounced in New Hampshire where dependence on the property

tax increased from 48.6 percent in 1977 to 61.7 percent in 1987. In terms of the average level of property tax paid per person, the property tax burden has increased by a factor of nearly three in each of the study states. Even if the effects of inflation are removed from the data, the average person in each of the three northern New England states paid more in property taxes in 1987 than in 1977 (Table 2.2).[2] Given the rapid escalation in property values and corresponding property tax bills in New England during the 1980s, the ability of New England towns to raise significant additional revenues from this source has been called into question.

The second most important source of revenues for towns in northern New England is intergovernmental aid. In 1977, intergovernmental aid accounted for nearly a third of all revenue. In Maine, most aid came from the state government, whereas in Vermont most intergovernmental aid was in the form of general revenue sharing from the federal government. More recently, however, town governments' dependence on intergovernmental aid has declined to about 25 percent of all revenue. Although state aid declined in percentage terms for Maine communities, state aid remained fairly constant in New Hampshire and actually increased in Vermont. The bulk of the decline in intergovernmental aid for these New England towns centers on the demise of federal revenue sharing. In each of the three study states, federal aid as a percentage of total revenue declined significantly. Although nominal dollars received remained constant (Table 2.1), real dollars received (i.e., adjusted for inflation) decreased profoundly. The termination of federal revenue sharing was particularly important to rural road systems and will be discussed in greater detail later in this chapter.

While many local governments throughout the U.S. have been able to diversify their tax base and move away from the property tax, northern New England towns appear to be experiencing difficulty in shifting to other forms of revenue. This is partially explained by state-imposed limitations prohibiting town governments from tapping alternative funding sources. For example, Maine towns are barred from imposing many types of user fees or a local sales tax. Some towns, however, are reluctant to impose new taxes even when permitted by state law. In addition, the potential revenues from many alternative sources, such as fees, are not sufficiently high in some rural areas to warrant their consideration. The limited flexibility to alter the local tax base, self-imposed and imposed from higher levels of government, has forced monies from the property tax to replace declining federal aid.

[2] If growth rates in income are considered, however, percentage of personal income going to the property tax has remained constant and is actually declining in some cases.

Table 2.1 Per Capita Revenues of Town Governments, 1977–87

	ME			NH			VT		
	1977	1982	1987	1977	1982	1987	1977	1982	1987
Total Revenue	126.43	195.56	309.47	39.82	65.20	114.77	38.23	55.04	83.36
(%)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)
Intergovernmental	54.72	60.47	96.15	11.96	15.06	21.78	13.20	15.21	19.00
	(43.28)	(30.92)	(31.07)	(30.04)	(23.10)	(18.98)	(34.53)	(27.63)	(22.79)
Federal	14.74	14.04	15.91	5.22	4.57	4.74	8.12	8.13	5.51
	(11.66)	(7.18)	(5.14)	(13.11)	(7.01)	(4.13)	(21.24)	(14.77)	(6.61)
State	39.97	42.88	76.09	6.75	10.49	16.33	5.08	6.56	12.99
	(31.61)	(21.92)	(24.59)	(16.95)	(16.09)	(14.23)	(13.29)	(11.92)	(15.58)
Own Source	68.97	133.68	208.04	27.84	46.06	87.03	24.88	37.73	59.11
	(54.55)	(68.36)	(67.22)	(69.91)	(70.64)	(75.83)	(65.08)	(68.55)	(70.91)
Taxes	59.81	112.83	175.86	20.87	35.94	72.39	20.24	31.07	48.23
	(47.31)	(57.70)	(56.83)	(52.41)	(55.12)	(63.07)	(52.94)	(56.45)	(57.86)
Property	59.26	111.96	173.79	19.35	34.29	70.87	19.33	30.50	47.46
	(46.87)	(57.25)	(56.16)	(48.59)	(52.55)	(61.75)	(50.56)	(55.41)	(56.93)
Other	0.55	0.87	2.08	1.52	1.65	1.52	0.91	0.57	0.78
	(4.35)	(4.45)	(6.72)	(3.82)	(2.53)	(1.32)	(2.38)	(1.04)	(0.94)
Charges	4.55	9.03	14.04	2.40	4.51	7.14	2.11	3.23	6.29
	(3.60)	(4.62)	(4.54)	(6.03)	(6.92)	(6.22)	(5.52)	(5.87)	(7.55)
Misc.	4.12	11.82	18.14	2.40	5.61	7.50	1.47	3.43	4.58
	(3.26)	(6.04)	(5.86)	(6.03)	(8.60)	(6.53)	(3.06)	(6.23)	(5.49)

Source: *Census of Governments*, U.S. Bureau of the Census, Washington, DC (respective years).

Table 2.2 Per Capita Revenue of Town Governments, Adjusted for Inflation[a], 1977–87

	ME			NH			VT		
	1977	1982	1987	1977	1982	1987	1977	1982	1987
Total Revenue	253.37	236.76	309.47	79.80	78.93	114.77	76.61	66.63	83.36
%	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)
Intergovernmental	109.66	73.21	96.15	23.97	18.23	21.78	26.45	18.41	19.00
	(43.28)	(30.92)	(31.07)	(30.04)	(23.10)	(18.98)	(34.53)	(27.63)	(22.79)
Federal	29.54	17.00	15.91	10.46	5.53	4.74	16.27	9.84	5.51
	(11.66)	(7.18)	(5.14)	(13.11)	(7.01)	(4.13)	(21.24)	(14.77)	(6.61)
State	80.10	51.91	76.09	13.53	12.70	16.33	10.18	7.94	12.99
	(31.61)	(21.92)	(24.59)	(16.95)	(16.09)	(14.23)	(13.29)	(11.92)	
Own Source	138.22	161.84	208.04	55.79	55.76	87.03	49.86	45.68	59.11
	(54.55)	(68.36)	(67.22)	(69.91)	(70.64)	(75.83)	(65.08)	(68.55)	(70.91)
Taxes	119.86	136.60	175.86	41.82	43.51	72.39	40.56	37.62	48.23
	(47.31)	(57.70)	(56.83)	(52.41)	(55.12)	(63.07)	(52.94)	(56.45)	(57.86)
Property	118.76	135.54	173.79	38.78	41.51	70.87	38.74	36.92	47.46
	(46.87)	(57.25)	(56.16)	(48.59)	(52.55)	(61.75)	(50.56)	(55.41)	(56.93)
Other	1.10	1.05	2.08	3.05	2.00	1.52	1.82	0.69	0.78
	(4.35)	(4.45)	(6.72)	(3.82)	(2.53)	(1.32)	(2.38)	(1.04)	(0.94)
Charges	9.12	10.93	14.04	4.81	5.46	7.14	4.23	3.91	6.29
	(3.60)	(4.62)	(4.54)	(6.03)	(6.92)	(6.22)	(5.52)	(5.87)	(7.55)
Miscellaneous	8.26	14.31	18.14	4.81	6.79	7.50	2.95	4.15	4.58
	(3.26)	(6.04)	(5.86)	(6.03)	(8.60)	(6.53)	(3.06)	(6.23)	(5.49)

[a] All Figures in 1987 Dollars.

Source: Census of Governments, U.S. Bureau of the Census, Washington, DC (respective years).

Town Expenditures

Understanding differences in revenues collected for public services is useful, but the more important issue for residents is the manner in which the revenues are spent, or more specifically, which services are provided. Although a direct comparison of town expenditures across the three states is difficult due to institutional arrangements, several general patterns can be discussed.

The first apparent discrepancy is evident from the education category. In Maine, the school district may or may not be a part of the local town government. The institutional structure in Maine is such that towns make direct payments, in the form of transfers, to school districts. Thus, educational expenditures are a legitimate budget item for some Maine towns. Public educational services in New Hampshire and Vermont, however, are independent of the town, thus do not appear as a town expenditure. This institutional difference also explains in part the vast difference in general levels of revenue raised in Maine towns as opposed to New Hampshire and Vermont towns.

Beyond this fundamental difference, an important pattern becomes apparent in town expenditures; specifically, the local road system is the primary source of town expenditures (Tables 2.3 and 2.4). On average in Maine, one in six dollars spent by towns went to the provision of road services. In New Hampshire, one in four dollars spent, and in Vermont, more than one in three dollars spent by the average town went to the local road system. The next largest expenditure categories tend to be general administration of town government, followed by sewer services and police services. While this distribution of expenditures varies in part to institutional differences (for example, school expenditures in Maine), it is also reflective of the importance of the local road system to the local citizenry. Given this, it is important to develop a better understanding of the sources of revenue for roads and the nature of road expenditures.

Town Revenue for Roads

Locally generated revenues, or for the three study states the property tax, are the single most important source of funds used to support local roads. Nationally, nearly 50 percent of all revenues devoted to roads are from local sources (Walzer and Chicoine 1989). In Maine, of the $37.7 million devoted for local roads in 1987, $27.4 million or nearly 73 percent was raised from local sources, whereas in New Hampshire, of the $46.7 million raised for roads, $39.3 million or 84 percent was from local sources.[3] Vermont's revenue

[3] All data are from the USDOT, *Highway Statistics*, Washington, DC.

Table 2.3 Per Capita Expenditures of Town Governments, 1977–87

	ME			NH			VT		
	1977	1982	1987	1977	1982	1987	1977	1982	1987
Total Expen.	134.51	189.19	294.91	35.70	64.09	97.89	37.50	52.77	75.33
%	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)
Education	56.43	84.32	127.22	0.01	1.92	0.38	*	0.25	0.09
%	(41.95)	(44.57)	(43.14)	(0.01)	(3.00)	(0.39)	*	(0.47)	(0.12)
Libraries	0.59	1.46	2.24	0.36	1.44	2.88	0.28	0.71	1.09
%	(0.44)	(0.77)	(0.76)	(1.02)	(2.24)	(2.95)	(0.75)	(1.35)	(1.45)
Public Welfare	1.69	1.75	2.27	0.51	1.12	0.93	0.03	0.08	0.24
%	(1.26)	(0.93)	(0.77)	(1.43)	(1.74)	(0.95)	(0.09)	(0.15)	(0.32)
Hospitals	0.46	0.03	0.02	0.01	0.06	0.12	0.48	0.01	0.00
%	(0.34)	(0.01)	(0.01)	(0.03)	(0.09)	(0.12)	(1.28)	(0.01)	(0.00)
Health	0.82	1.19	1.56	0.53	0.75	1.64	2.39	0.73	0.91
%	(0.61)	(0.63)	(0.53)	(1.49)	(1.18)	(1.68)	(6.38)	(1.38)	(1.21)
Highways	20.02	30.40	46.09	8.42	14.96	24.29	13.46	20.34	30.27
%	(14.88)	(16.07)	(15.63)	(23.60)	(23.35)	(24.82)	(35.90)	(38.55)	(40.18)
Police	5.88	8.68	13.75	4.00	7.58	12.97	2.10	3.67	5.64
%	(4.37)	(4.59)	(4.66)	(11.21)	(11.82)	(13.25)	(5.61)	(6.96)	(7.49)
Fire	5.36	8.97	12.21	2.81	4.89	8.00	0.86	2.90	3.87
%	(3.99)	(4.74)	(4.14)	(7.88)	(7.64)	(8.17)	(2.28)	(5.49)	(5.13)
Parks & Rec.	2.22	2.69	4.39	1.02	1.25	1.98	0.15	1.23	2.02
%	(1.65)	(1.42)	(1.49)	(2.85)	(1.95)	(2.02)	(0.39)	(2.34)	(2.68)
Housing & CD.	0.03	1.09	0.91	0.02	0.08	0.56	2.16	0.60	0.29
%	(0.02)	(0.58)	(0.31)	(0.06)	(0.12)	(0.57)	(5.75)	(1.14)	(0.39)
Sewerage	6.78	5.77	19.17	5.03	7.45	10.72	0.46	5.52	5.07
%	(5.04)	(3.05)	(6.50)	(14.10)	(11.63)	(10.95)	(1.24)	(10.45)	(6.73)
Other Sanitation	1.72	4.57	8.32	3.73	1.29	3.71	1.67	1.36	3.04
%	(1.28)	(2.42)	(2.82)	(10.44)	(2.01)	(3.79)	(4.47)	(2.59)	(4.04)
Gov. Admin.	6.81	13.59	21.32	3.43	8.33	12.66	3.69	7.83	10.60
%	(5.06)	(7.19)	(7.23)	(9.60)	(13.00)	(12.93)	(9.83)	(14.83)	(14.07)
Int. on Debt	3.26	7.63	10.80	1.30	3.35	4.20	0.50	0.71	1.72
%	(2.43)	(4.03)	(3.66)	(3.63)	(5.23)	(4.29)	(1.33)	(1.35)	(2.29)

* not reported.

Source: *Census of Governments*, U.S. Bureau of the Census, Washington, DC (respective years).

Table 2.4 Per Capita Expenditures of Town Governments, Adjusted for Inflation[a], 1977–87

	ME			NH			VT		
	1977	1982	1987	1977	1982	1987	1977	1982	1987
Total Expen.	269.56	229.05	294.91	71.54	77.59	97.89	75.14	63.88	75.33
%	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)
Education	113.08	102.08	127.22	0.01	2.32	0.38	*	0.30	0.09
%	(41.95)	(44.57)	(43.14)	(0.01)	(3.00)	(0.39)	*	(0.47)	(0.12)
Libraries	1.18	1.77	2.24	0.73	1.74	2.88	0.56	0.86	1.09
%	(0.44)	(0.77)	(0.76)	(1.02)	(2.24)	(2.95)	(0.75)	(1.35)	(1.45)
Public Welfare	3.39	2.12	2.27	1.02	1.35	0.93	0.06	0.10	0.24
%	(1.26)	(0.93)	(0.77)	(1.43)	(1.74)	(0.95)	(0.09)	(0.15)	(0.32)
Hospitals	0.93	0.03	0.02	0.02	0.07	0.12	0.96	0.01	0.00
%	(0.34)	(0.01)	(0.01)	(0.03)	(0.09)	(0.12)	(1.28)	(0.01)	(0.00)
Health	1.64	1.44	1.56	1.07	0.91	1.64	4.79	0.88	0.91
%	(0.61)	(0.63)	(0.53)	(1.49)	(1.18)	(1.68)	(6.38)	(1.38)	(1.21)
Highways	40.11	36.80	46.09	16.88	18.12	24.29	26.97	24.63	30.27
%	(14.88)	(16.07)	(15.63)	(23.60)	(23.35)	(24.82)	(35.90)	(38.55)	(40.18)
Police	11.77	10.51	13.75	8.02	9.17	12.97	4.21	4.45	5.64
%	(4.37)	(4.59)	(4.66)	(11.21)	(11.82)	(13.25)	(5.61)	(6.96)	(7.49)
Fire	10.74	10.86	12.21	5.64	5.92	8.00	1.71	3.51	3.87
%	(3.99)	(4.74)	(4.14)	(7.88)	(7.64)	(8.17)	(2.28)	(5.49)	(5.13)
Parks & Rec.	4.44	3.26	4.39	2.04	1.51	1.98	0.29	1.49	2.02
%	(1.65)	(1.42)	(1.49)	(2.85)	(1.95)	(2.02)	(0.39)	(2.34)	(2.68)
Housing & CD.	0.05	1.32	0.91	0.04	0.09	0.56	4.32	0.73	0.29
%	(0.02)	(0.58)	(0.31)	(0.06)	(0.12)	(0.57)	(5.75)	(1.14)	(0.39)
Sewerage	13.59	6.99	19.17	10.09	9.02	10.72	0.93	6.68	5.07
%	(5.04)	(3.05)	(6.50)	(14.10)	(11.63)	(10.95)	(1.24)	(10.45)	(6.73)
Other Sanitation	3.44	5.54	8.32	7.47	1.56	3.71	3.36	1.65	3.04
%	(1.28)	(2.42)	(2.82)	(10.44)	(2.01)	(3.79)	(4.47)	(2.59)	(4.04)
Gov. Admin.	13.64	16.46	21.32	6.87	10.09	12.66	7.39	9.48	10.60
%	(5.06)	(7.19)	(7.23)	(9.60)	(13.00)	(12.93)	(9.83)	(14.83)	(14.07)
Int. on Debt	6.54	9.24	10.80	2.60	4.06	4.20	1.00	0.86	1.72
%	(2.43)	(4.03)	(3.66)	(3.63)	(5.23)	(4.29)	(1.33)	(1.35)	(2.29)

* Not Reported.

[a]: All Figures in 1987 Dollars.

Source: *Census of Governments*, U.S. Bureau of the Census, Washington, D.C. (respective years).

sources more closely matched the national average with 59 percent of its total $49.2 million derived from local sources. This high level of dependence of northern New England towns on own sources of revenue for roads is reflective, in part, of the strong heritage of the town form of local government.

In all three study states, the state government historically has provided more funds for local roads than the federal government. In each of these states, as well as nationally, the bulk of these state monies are derived from state-levied motor fuel taxes. Federal funds, through either the Federal-Aid Highway Program, the Federal-Aid Secondary Program, or to a limited extent the Federal-Aid Urban System, have shrunk to marginal levels over previous funding levels. The demise of General Revenue Sharing in 1987, which many rural towns used for the local road system, accounts for much of this decline.

In New Hampshire, the state provided 15.4 percent of total town road revenues; only 0.5 percent of their revenues were from the federal government in 1987. This level of intergovernmental support for New Hampshire local roads, however, represents a decline over previous years. For example, in 1977, after adjusting for the effects of inflation, the state provided 21.3 percent of all road revenues, and the federal government 1.4 percent (Table 2.5). While this trend suggests increased dependence on the property tax for New Hampshire local road services, the limited historical use of federal monies implies that the demise of federal revenue sharing will have limited impacts on New Hampshire roads.

Vermont towns tend to be more dependent on state aid for the local road system. In 1987, 31 percent of all road monies, or $15.3 million, were from state government. This level of state support represents an increase of 21.9 percent above the 1977 level. In addition, in 1987, 4.6 percent of revenues devoted toward local roads were from the federal level. This represents a decrease from previous federal funding levels. In Vermont, the decline in federal support appears to have been compensated for by increasing levels of state support.

The Maine local road system has witnessed a significant shift in the mix of federal and state support over the past decade. In 1977, 16.2 percent of all road revenue was in the form of federal aid, whereas state support represented only 15.1 percent. By 1987, federal aid had declined in real dollars (i.e., adjusted for inflation) by 75 percent, representing 3.7 percent of all local road revenues. The state's level of support increased in real dollars by 67.7 percent, representing 23.5 percent of all local road revenue. As in Vermont,

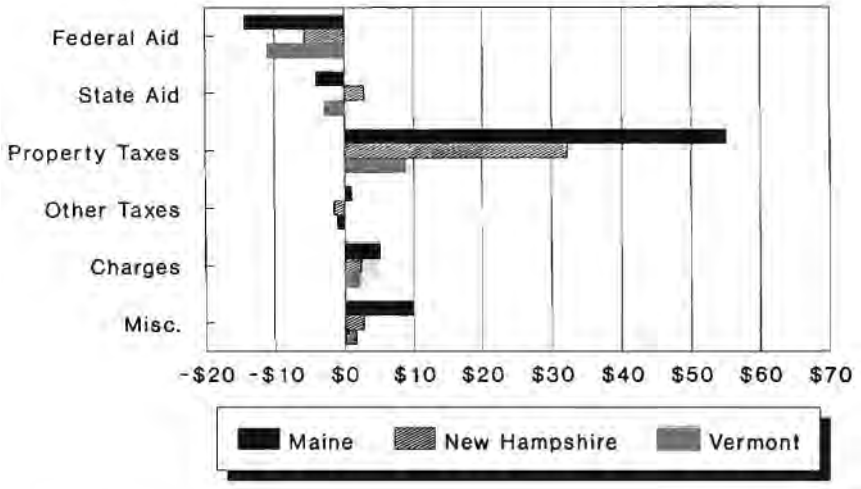

Figure 2.1. Real Change in Source of Town per Capita Revenue (1977–1987) (Adjusted for Inflation)

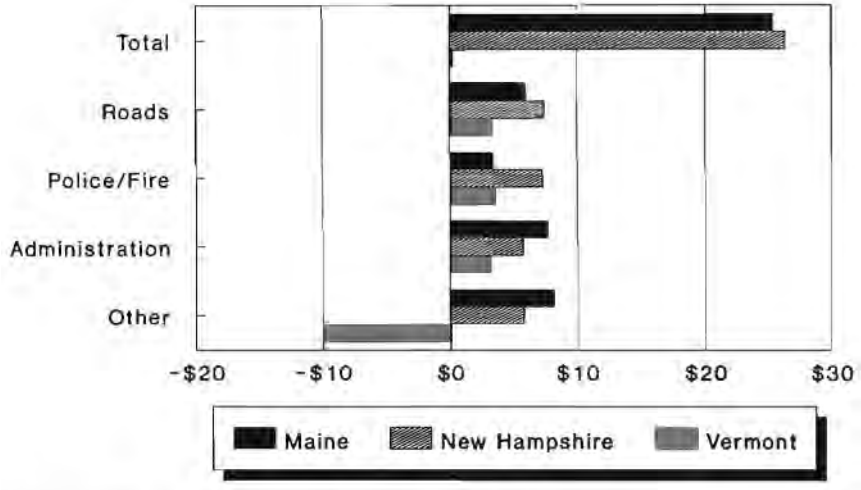

Figure 2.2. Real Change in Source of Town per Capita Expenditures (1977–1987) (Adjusted for Inflation)

the decline in federal support appears to have been compensated for by increasing levels of state support. Unlike Vermont, however, the level of state support in Maine has not been stable during the 1980s. Instability in intergovernmental aid can lend uncertainty into the long-term planning process and can confound capital investment planning.

Table 2.5. Town Road Revenue, per Mile, Adjusted for Inflation[a], 1977–87

	Local	State	Federal	Total
		Maine		
1977	$3,036	$ 669	$ 717	$4,422
1980	2,843	387	416	3,646
1981	3,026	390	307	3,723
1983	1,458	1,039	251	2,748
1985	2,224	998	292	3,514
1987	2,486	808	126	3,420
		New Hampshire		
1977	$3,160	$ 858	$ 56	$4,074
1980	NA	NA	NA	NA
1981	2,684	987	33	3,704
1983	2,607	467	8	3,082
1985	5,699	988	42	6,729
1987	6,283	1,152	39	7,474
		Vermont		
1977	$3,006	$1,046	$ 725	$4,777
1980	2,851	1,054	426	4,331
1981	2,610	1,112	432	4,154
1983	2,534	1,511	308	4,353
1985	2,752	1,504	448	4,704
1987	3,159	1,644	244	5,047

Source: USDOT, *Highway Statistics 1975–85* (Washington,DC:USGPO) USDOT, *Highway Statistics 1988* (Washington, DC:USGPO).
[a] All figures in 1987 dollars.
NA: Not Available

Town Road Expenditures

Expenditures on the local road system can take many forms ranging from the purchase of small tools for equipment maintenance to land acquisition for new road or bridge construction. Expenditures, however, can be classified into two general broad-based categories: maintenance expenditures and capital outlays. The former includes expenditures associated with day-to-day operations such as filling potholes and grading easements, while the latter category includes equipment purchases and major construction projects. This convenient classification of road expenditures is satisfactory for the purposes of this report.

Traditionally, levels of expenditure have served as a proxy measure for the quality and quantity of the local road system. Higher levels of expenditure generally are associated with higher quality roads while lower expenditure levels are an indication of lower quality roads, other things being equal. This pattern generally holds true in most cases, but there are examples where the relationship fails. For example, in many cases roads that are in poor condition require accelerated maintenance schedules, hence higher expenditure levels, to maintain a minimum acceptable service level. Conversely, higher-quality roads may continue to provide a minimum service level with minimal maintenance efforts. In addition, external factors such as the geography of the area and economies of scale can further distort expenditure comparisons. Therefore, discussions focusing on the change in expenditure levels over time, or across states, must take place in light of this potential shortcoming of the expenditure data. To adjust for the relative differences in the total road mileage across the three study states, total expenditure and expenditure by category have been placed in terms of per mile expenditure. Finally, all figures have been adjusted for the effects of inflation and are in 1987 dollars.

In 1987 the typical town in Maine spent an average of $2,968 per mile on maintenance functions (Table 2.6). Although this figure is $529 less per mile than 1977 levels, it is a general increase over a low of $1,220 shortly after the recession of the early 1980s. The significant downturn in 1983 reflects the decision by many Maine towns to defer maintenance expenditures despite generating sufficient levels of revenue. Deferment of regular road maintenance schedules is a common practice among smaller communities. This is in part due to the relatively large share of total town expenditures devoted to road services. Even though this practice may yield solutions to short-term revenue shortfalls, the long-term implication on the quality of the local road system is important. Specifically,

shortfalls or delays in routine maintenance may result in more costly reconstruction efforts in the long run. Such decisions must take into account the conditions of specific roads and future anticipated demands. In short, certain roads may be viable candidates for deferred maintenance while others are not. This distinction must be considered in decisions addressing short-term revenue shortfalls.

Table 2.6. Town Road Expenditures, Per Mile, Adjusted for Inflation[a].

	Maintenance	Capital Outlaw	Total
		Maine	
1977	$3,497	$ 267	$4,422
1980	3,079	149	3,646
1981	3,221	120	3,723
1983	1,220	117	2,038
1985	2,765	274	3,514
1987	2,968	379	3,420
		New Hampshire	
1977	$2,417	$ 840	$4 074
1980	NA	NA	NA
1981	2,352	383	3,704
1983	1,450	513	2,517
1985	3,753	1,742	6,729
1987	4,316	1,598	7,474
		Vermont	
1977	$3,574	$ 938	$4,774
1980	3,243	823	4,331
1981	3,157	517	4,154
1983	3,269	771	4,353
1985	3,371	953	4,704
1987	3,636	1,267	5,047

Source: USDOT, *Highway Statistics 1975–85* (Washington, DC:USGPO): USDOT, *Highway Statistics 1988* (Washington, DC:USGPO).

[a] All figures in 1987 dollars.

[b] Total expenditure includes non-direct road expenditures such as administrative interest payment and debt retirement.

NA: Not Available

New Hampshire towns spent an average of $4,316 per mile on maintenance functions in 1987. Unlike Maine, this level of maintenance expenditure represents a real increase over previous levels. Similar to Maine, New Hampshire communities witnessed a significant slowdown in maintenance expenditures immediately following the recession of the early 1980s. Vermont towns, on the other hand, have maintained a stable level of maintenance expenditures over the entire period examined. While there appears to have been a slight decline during the recession of the early 1980s, the slowdown was much less than in Maine or New Hampshire.

Capital outlay on local roads tends to be dependent upon two factors: revenue availability and demands placed on the road system. The rapid economic growth experienced by many New England communities during the 1980s required the construction of new roads and bridges, and predominately, significant upgrades of existing mileage. Both of these effects are evident in the capital outlay reported by towns in the northern New England states. This is particularly true for New Hampshire communities where per mile capital outlays in 1987 were three times higher than in 1985. A similar pattern is found in Vermont and to a much lesser extent in Maine. The level of such investments in the local road system will slow in response to the current economic recession.

Responses to Lost Revenue

The 1980s was a unique period for New England towns. The rapid economic growth of the mid-1980s followed by the recent economic downturn have placed great strains on small towns. For Maine and Vermont, the demise of federal revenue sharing in 1987 resulted in a significant downward shift in available revenues. In addition, in 1981 the state of Maine actually returned the maintenance responsibilities of a significant proportion of the local road system back to the town government. This policy, unique in that higher levels of government are assuming greater responsibilities for road service provision in most states across the nation, accounts for part of the shift in expenditures in the early 1980s.

Prior to the boom/bust period of the 1980s, most rural communities in the northern New England states were characterized as stable, both socially and economically. The difficulties of providing local road services were minimal. The rapid growth between 1985 and 1988 caught many communities off-guard, resulting in "reactive" rather than "proactive" planning. Today, nearly half of the northern New England communities do not have a specific road improvement plan or budget outlining future road investment

policy (Table 2.7). Of those communities that have no strategic road plan, 63.1 percent indicated that they have no immediate intention of developing such a plan. Although 46.9 percent of the communities responding to the survey indicated that their town had a general plan, only 6.5 percent currently have a detailed strategic road improvement plan.

This pattern is troublesome for several reasons. First, strategic planning can help the local government and other public agencies deal with change by overlapping and complementing comprehensive planning. Because the flow of services derived from the local road system does not stop at any particular town's boundaries, there must be a unified regional approach to strategic road planning. Second, residential and commercial development tends to follow the existing road network. Specifically, roads provide access to otherwise remote areas and development hinges on access. Therefore developers will seek areas to develop that are accessible. Strategic road planning provides the community with the opportunity to channel development toward specific geographic areas. In addition, the community decreases the likelihood of financing forced surface upgrades in response to unplanned traffic congestion. Strategic planning also helps the community identify future trouble areas in the local road system, hence allowing the community to develop proactive policies.

Strategic road planning can also help the town in responding to declining revenues. As previously discussed, downturns in revenue often result in deferred maintenance schedules which, unless well thought-out, may result in more expensive repairs in the long-term. A well-developed strategic road plan can help minimize the likelihood of such an occurrence. Elements of a strategic road plan addressing tighter fiscal resources may be composed of two general budget options: selected expenditure reductions and revenue enhancement.

Table 2.7. Long-Term Road Improvement Plan

	ME	NH	VT	Total
None	33.3%	21.0%	29.6%	29.4%
No, but being considered	15.2	22.6	16.9	17.2
Yes, general plan	45.6	45.2	50.7	46.9
Yes, detailed plan	5.8	11.3	2.8	6.5

Source: Survey of Town Road Officials, Summer 1990.

Status of the Current Road Budget

In light of the rapid change in performance of the New England economy, town road officials were asked to describe the status of their current road budget. Nearly one in five local officials indicated that their budget is adequate for current road traffic levels, and 17.3 percent felt that their budget would be adequate for the next five to ten years after accounting for expected increases (Table 2.8). There is, however, notable variation across the three states. Only 7.3 percent of New Hampshire officials believed that their current budget is adequate for current demand placed on the system while one in four Maine officials felt comfortable with current funding levels.

The 63 percent of responding road officials who indicated that current levels of funding are insufficient raises concern about the ability of towns to maintain local roads and bridges at current funding levels. Towns may either plan strategic reductions in expenditures, or generate additional revenues. To gain insight into these selective options, respondents were asked to describe their position as public officials on specific policy actions.

Table 2.8 Road Budget Status

	ME	NH	VT	Total
	---- Percentage Responding ---			
Adequate for current road traffic	25.1	7.3	13.3	19.7
Inadequate for current traffic	32.3	21.9	33.7	34.7
Adequate for next 5-10 years	17.6	9.5	16.3	17.3
Current tax base not adequate	20.1	13.1	30.6	23.5
Property tax decline	2.5	46.0	2.0	1.9
Other	2.0	2.2	4.1	2.9

Source: Survey of Town Road Officials, Summer 1990.

Expenditure reduction preferences

Town road officials ranked the strategies they would implement if and when expenditures had to be reduced due to tightening revenue constraints. The options ranged from reducing maintenance of all roads to the selected closing of some roads in the spring. Not all of the options are equally suitable for all towns, nor do the options represent the same potential cost savings to all towns or the same loss of services to local road users. Respondents were asked to

rank five options from 1, the most preferred option, to 5, the least preferred option. The mean rankings for the five expenditure reduction options are reported in Table 2.9.

The reduction of surface types from higher levels to lower levels was the most preferred option expressed by town road officials. Generally, roads with lower surface levels, such as gravel versus paved surfaces, require less intensive maintenance schedules, hence fewer dollars are required. This option, however, may prove troublesome for some towns unless state legislation absolving them from liability is enacted. The 'primitive road' concept has been approved in many states. The usual procedure is to designate certain roads as eligible for reduced maintenance and post the road as such. Users must travel at their own risk as long as liability is not

Table 2.9. Preferences for Compensating Revenue Loss

	ME	NH	VT	Total
	---------- Mean Ranking ----------			
Expenditure Reduction				
"1" = highest; "5" = lowest				
Reduce Surface Types	1.9	2.2	2.5	2.1
Reduce Maintenance/ Repair of all Roads	2.2	2.2	2.4	2.3
Close Some Roads for Spring	3.2	3.2	3.2	3.2
Reduce Snow Plowing	3.5	3.3	3.6	3.5
Close Some Roads Completely	4.2	4.1	3.4	3.9
Revenue Enhancement				
"1" = highest; "6" = lowest				
State Aid	2.6	2.8	2.6	2.6
Federal Aid	2.6	3.1	2.5	2.7
Dedicated Fees	3.1	2.4	2.6	2.9
Motor Fuel Tax	3.0	2.7	3.5	3.1
Sales Tax	3.8	4.6	4.3	4.1
Property Tax	5.7	5.4	5.6	5.6

Source: Survey of Town Road Officials, Summer 1990.

an issue. The minimal cost of posting the road is more than outweighed by the cost savings in lower maintenance schedules. As long as the road is open for travel it qualifies for state and federal aid. The additional cost in terms of user travel-time, however, may be prohibitive.

The second cutback preference reduces maintenance and repair expenditures on all roads. Although a common practice, repeated appeal to this option will result in more costly reconstruction in the long-term. In addition, increased travel-time in the form of slower traffic flows imposes private costs on local users which may outweigh short-term public cost savings. Such a policy may also result in an impediment to future economic activity. Similar to the primitive road concept, reduced maintenance and repair schedules may raise liability costs.

Restricting road use for a short period of time during spring thaws, the third most preferred option, may hold promise because heavy truck traffic in the spring can cause immense damage, increasing maintenance and repair costs. If the sections of a road particularly subject to this damage are closed to heavy trucks, much of the damage can be avoided. The length of time the road is closed need not be very long, in some cases only a few weeks. The main problems involve access for school buses and emergency vehicles.

The fourth expenditure reduction option is reduced snow plowing. This is usually not a realistic option, a fact reflected by its lower ranking by town officials. Residents commuting to work protest if they are delayed and will exert considerable pressure on road personnel. In addition, school buses and emergency vehicles must have ready access.

The lowest rated strategy involves closing roads completely. Political opposition is a major concern with this strategy. Residents served by the road to be closed may experience decreased property values because of limited access. Because it is perceived to target certain residents of the community, selecting roads to close becomes a difficult decision. In addition, state policy is not always conducive to such a policy. Specifically, the town risks a reduction in state aid if the total mileage within the community declines.

It is of interest to note that the preferences expressed by road officials in the northern New England states parallel the preferences of other local road officials across the county. Indeed, the preferences of township and county officials in the rural Midwest revealed almost identical preferences to those of the New England road officials (Chicoine and Walzer 1984; Walzer and Chicoine 1987). This latter finding suggests that expenditure reduction

options identified and implemented in the rural Midwest may be applicable to the northern New England region.

Revenue enhancement preferences

Often communities are already providing a minimal level of local road services and any expenditure reduction would result in an unacceptable level of road services. Communities in this position have no choice but to raise additional revenues. Respondents were asked to rank six revenue enhancement options from 1, the most preferred option, to 6, the least preferred option. The mean ranking for the six revenue options are reported in Table 2.9. Initiating some of these revenue options would require an act of the state legislature.

The most preferred option is an increase in state aid, followed closely by an increase in federal aid. Generally, local road officials recognize that the local road system is used by many non-residents. Because of this 'spill-over' of local road benefits to non-residents, higher levels of government such as the state and federal governments are the most appropriate sources of additional revenue. The drawback to this option is reflected in the current budgetary crisis most state governments are experiencing along with the looming federal deficit.

The third most preferred revenue source is user fees, such as licensing fees, with the generated funds dedicated to road construction and repair. Increased reliance on fees would likely place responsibility for financing more closely in line with the users of the local road system.

The use of the motor fuel tax, the primary source of state support monies, is the fourth source of additional revenues preferred by local road officials in the northern three New England states. This relatively low ranking is somewhat surprising because motor fuel taxes, as a targeted tax, are generally accepted by the public because they are based on road usage. Those traveling the roads pay for improvements. For many communities in the study area, the motor fuel tax represents the only viable vehicle for taxing seasonal users, such as tourists. Nevertheless, an increase in motor fuel taxes with increased allocations to towns should be considered, especially when tied to improvements in the local economy and infrastructure. Dedicating a portion of the motor fuel tax to infrastructure investments represents an opportunity to rebuild the foundation upon which local economies depend.

Of particular interest is the low ranking given to the property tax and the sales tax. In recent years there has been a strong

negative reaction to increases in the property tax for schools and other local services. Recent escalations in property values have pushed property tax burdens dangerously high. The use, and threatened use, of spending caps to curb increasing property tax burdens has made this tax a very unlikely source of additional revenues for the local road system. The relatively low ranking of the sales tax may, in part, reflect the inability of Maine, New Hampshire, and Vermont towns to impose such a tax. Indeed, the lack of a general state-imposed sales tax in New Hampshire further reinforces this assessment. The fact that New Hampshire officials rank the property tax below the sales tax in this light lends additional support to the strong dislike of the property tax.

Impact of assistance funding

Given the increased dependence on state revenues devoted to supporting the local road system, coupled with the high preference local officials have expressed for increasing this dependence, it is valuable to investigate how these funds are used. A large majority, 86.4 percent, of towns in the three states receive state road assistance monies and virtually all of those funds are devoted to roads (Table 2.10). Towns in Vermont, however, reported that far fewer, 62.3 percent, received state assistance. The reasons for such a wide difference for Vermont are not readily clear.

The uses of these funds vary widely from locale to locale. Numerous communities reported that they use state assistance funds for more than one purpose. The most common use of these monies is for surface upgrades. Oftentimes these funds are available through one-time grants by programs such as Vermont's Town Highway Grants Program, or New Hampshire's four State-Aid programs. Because these monies are often viewed as special grants, they are often applied to specific projects, such as one-time resurfacing projects. Other less common uses of these funds include bridge repair and/or replacement. This pattern of use is comparable to other local road systems located outside the study area (Chicoine and Walzer 1984).

Another popular use of these funds across the three states is to substitute state monies for local monies. About half of the responding town officials reported that they use state monies to reduce local tax burdens. In addition, 47.6 percent reported that the availability of these monies prevented a tax increase. This practice is not surprising in light of the significant property tax burden many New England residents bear. It is important to note, however, that in most towns, these funds were devoted to improving the local road

system above the levels that would prevail in the absence of such programs. In other words, state monies are not used simply to reduce local tax burdens by an amount equal to the grant. In some cases, state funds served as seed money in that they are a catalyst to projects that would not have otherwise taken place.

Table 2.10. Impact of State Local Road Assistance Funds

	ME	NH	VT	Total
Percentage Receiving Block Road Grant Funds	95.4%	88.7%	62.3%	86.4%
Average Percentage of Block Grant Funds Devoted to Roads	94.9	93.3	87.3	93.3
Impact of Block Grant Monies (percentage responding yes)				
Reduce Taxes	48.2%	43.1%	35.4%	44.9%
Avoid Tax Increase	50.0	44.8	40.8	47.6
Equipment Purchases	8.5	6.9	12.2	9.1
Supply Purchases	11.6	17.2	14.3	13.5
Upgrade Surfaces	64.0	65.5	59.2	63.3
Bridge Repair	9.1	17.7	40.8	16.4
Bridge Replacement	3.7	12.1	28.6	9.8
Shed Construction	2.4	0.0	4.2	2.2

Source: Survey of Town Road Officials, Summer 1990.

Summary

The ability of town governments to provide public services is primarily dependent upon the available revenue structure. Towns in the three-state northern New England region examined in this study have limited ability to generate their own sources of revenue. A combination of historical tradition and statutory limitations hold the town government to the property tax as the principal source of locally generated revenues. Recent pressures on property tax burdens have made this very unattractive as a source of additional revenues.

In addition, towns have suffered a setback with the demise of federal revenue sharing. Although a relatively small share of total revenue, these monies have proven to act as a catalyst for infrastructure investment projects. Some states have attempted to replace a portion of these revenues, but many states, particularly those examined in this study, are not in a fiscal position to provide major relief to town governments.

Expenditures to support the local road system represent an important component of the town budget in the three New England states examined here. Beyond education expenditures in Maine, road services represented the single most expensive function performed by town governments. An increasing number of state and federal mandates in such areas as the supply of quality water and solid waste disposal, however, may force a reallocation of limited funds away from the local road system. The impact of this reallocation on the road system which underpins economic activity in more rural areas is a major cause for concern.

The primary concern of local residents and taxpayers is often not the level of taxation or how monies are spent. What is important is the quality of the local road system. Rural residents in particular are dependent upon a viable local road system for their livelihood and for access to consumer markets or employment centers. The characteristics and condition of local roads and bridges are discussed in the next chapter.

CHAPTER THREE
CONDITION OF THE LOCAL ROAD NETWORK

The condition of the infrastructure supporting local economic activity is of vital concern to local residents. The linkages that the local road and bridge system provide local residents with employment and shopping opportunities, as well as medical services and access to recreational areas, are vital to the economic health of rural areas. The role of the town-maintained road system is particularly important because these roads and bridges provide the major linkages between rural residents and economic opportunities. The condition of the town-maintained road system, as reported by town road officials, is reported in this chapter. Special attention is paid to areas where local officials perceive potential problems.

Distribution of Road Mileage by Traffic Volume

The cost of maintaining the local road network is directly related to the traffic volume that the system must bear. Differences in traffic volume not only influence maintenance costs, but also reflect the level of demand placed on the local system. The level of demand or traffic volume for a particular road or bridge bears a direct relationship with the quality of the road surface type, hence maintenance expenditures. For example, roads with higher traffic volumes, or higher levels of demand, require higher quality surfaces, whereas roads with lower demand may be maintained at reduced service levels with no appreciable decline in safety conditions.

For comparison across the three states studied in this analysis and previous studies examining other regions, town roads have been categorized by five average daily travel (ADT) classifications. Roads facing the lowest level of demand are characterized by 0 to 25 ADT, whereas roads facing the highest level of demand are characterized by more than 400 ADT. The distribution of town-maintained roads in Maine, New Hampshire, and Vermont is reported in Table 3.1.

Consistent across the three state study area, the largest single traffic load category in road mileage is 400 plus ADT in which nearly a fourth of all town road mileage has been categorized. The smallest category, approximately 15 percent of total mileage, falls under the 0 to 25 ADT category. This relatively high concentration of travel patterns across fewer roads is partially a product of the relatively sparse density of the local road network characterizing the northern New England states. Specifically, there tend to be fewer roads on which to travel. Still, the overall road network can be characterized as low- to medium-volume in nature.

Table 3.1. Average Miles of Road in Average Daily Traffic Trip Categories, by Town

	ME	NH	VT	Total
0–25 ADT	9.5	8.1	12.3	9.9
26–50 ADT	13.0	10.7	14.6	12.9
51–150 ADT	13.4	14.9	16.8	15.0
151–400 ADT	13.6	13.7	13.6	14.0
400 ADT and Above	21.7	17.3	20.1	20.7

Source: Survey of Town Road Officials, Summer 1990.

Distribution of Road Mileage by Surface Type

The cost of maintaining a viable local road network is also directly linked to the service level of the road. Generally, the service level of a road is a function of the surface type, where paved surfaces provide the highest service level and gravel or earth roads provide the lowest level. The cost of maintaining road services varies directly with surface type or service level. The distribution of road mileage by surface type for Maine, New Hampshire, and Vermont is provided in Table 3.2.

Given the relatively low- to medium-volume traffic patterns identified in Table 3.1, it is surprising to find that the majority of roads (65.9 percent) are of the higher surface types (i.e., paved and bituminous).[4] The lower surface type roads, gravel and earth, account for a fairly small portion of total town road mileage. The small number of gravel and earth roads reported in Table 3.2 may

Table 3.2 Average of Miles of Road by Surface Type, by Town

	ME	NH	VT	Total
Paved Surface	23.4	21.3	18.3	21.8
Bituminous Surface	20.4	20.5	12.0	19.7
Gravel Surface	8.9	17.2	32.4	16.7
Earth Surface	5.3	9.1	11.4	8.8

Source: Survey of Town Road Officials, Summer 1990.

[4] Paved surfaces are concrete or blacktop, whereas bituminous surfaces are crushed rock within oil seal coating.

appear as surprising since in Maine, as well as portions of New Hampshire, there is an extensive gravel road network servicing remote areas. Many of these roads, however, are not under the jurisdiction of the local town, but rather are privately owned and maintained. Indeed, the extensive network of paper company owned and maintained roads has made nearly all parts of Maine accessible. These roads, while generally open to the public, are not part of this analysis.

Measures of Road Condition

Many methods of determining the condition of roads and bridges, and the costs associated with improvements, are available. Not all approaches are equally suitable nor do they always yield consistent results. One method of evaluating condition, and ultimately obtaining a needs assessment, is to develop a set of engineering standards for roads and bridges, depending on travel demands. Professionally trained engineers then inspect the roads and bridges and conduct valuations based on the engineering criteria. This is the preferred approach and provides the most accurate information about quality for the roads and bridges being examined. For bridges, this approach is required by a federal program of bridge inspections in which most local governments participate.

Inspection of roads, however, may be difficult and costly. A mile of road may have sections in good condition along with sections that present consistent problems. Therefore, a mile of road may be rated as average condition despite good and bad sections. Still, evaluating the condition of roads and bridges according to engineering standards is useful and essential for developing sound management practices. In practice, however, available funds may dictate a set of feasible corrective actions that do not meet accepted engineering standards. Indeed, a common complaint by local road officials is that inadequate funds are available to provide road and bridge services at recommended engineering standards.

Another method of determining local road and bridge condition is to ask the town official responsible for the local road network to evaluate their network using more general criteria. This approach, while subject to the experience and ability of the local road official and not always consistent, is a viable cost-effective alternative to engineering needs assessments. Inconsistencies can be minimized by providing survey respondents with simple, broad-based categories into which roads and bridges can be classified. In this study, town road officials in the three study states were asked

to classify their road network by three broad classifications and their bridge network by four broad classifications.

Town officials were asked to classify road mileage under their jurisdictional responsibility into three broad classifications: roads needing major repair; roads needing more than regular maintenance; and roads requiring only regular maintenance. While these classifications may represent an over-simplification of the complexity of the local road problem, the measures obtained are a reasonable reflection of the condition of the local road system. In addition, this classification scheme has been used in other studies of rural roads and thus allows for comparison with those findings.

Condition of town-maintained roads

Summaries of town road conditions are presented in Table 3.3. Across the three states, there appear to be consistent patterns in road condition. For example, the average town responding to the survey indicated that 40.1 percent of all road mileage within their jurisdiction required only regular maintenance. Generally, roads falling into this classification may be deemed as in good condition. The percentage of local roads requiring more than regular maintenance averaged 32.3 percent across the three states. The percentage of local road mileage requiring major repairs suggests that one in four miles is in poor or inadequate condition.

Comparing cross-state variations indicates that the percentage of total local road mileage requiring only regular maintenance tends to be constant across the three states. The percentage of roads requiring major repair, however, is higher in Maine (30.0 percent) than in New Hampshire (25.2 percent), whereas the Vermont network has the least number of roads requiring major repairs (20.7 percent). The overall pattern in road condition across the study states tends to mirror the results of other studies (Walzer and Chicoine 1987; Chicoine and Walzer 1984).

Table 3.3. Percentage of Road Mileage Needing Repair, by Town

	ME	NH	VT	Total
Major Repair	30.0%	25.2%	20.7%	26.8%
More Than Regular	28.7	34.9	38.9	32.3
Only Regular Maintenance	41.3	39.9	40.4	40.1

Source: Survey of Town Road Officials, Summer 1990.

These condition ratings represent a snapshot for 1990. Information was not available to discern a trend because condition data were not available in these states for earlier years. Thus, the condition of town roads may be improving or declining. Unfortunately, given current strains on the level of local revenues available for supporting the local road network, coupled with increasing repair costs and travel demands, the likelihood of improving conditions seems small.

Condition of town bridges

The condition of town bridges is also an important issue. A quality road network is of limited value if connecting bridges cannot accommodate traffic. Bridges pose a particular difficulty because there is a limit to repairs that can be performed before a bridge must be completely replaced. Entirely replacing a bridge is very expensive. It is important to note that many town bridges were constructed earlier in this century and have outlived their normal engineered design life.

Because the network of local bridges is crucial to both traffic flow and safety, town road officials tend to rely heavily on state department of transportation engineers for evaluation and general assistance. Indeed, many longer bridges (longer than 20 feet in length) are not the responsibility of the town despite the fact that the bridge supports a town-maintained road. In Maine, for example, many bridges supporting the local road system are the responsibility of the State Department of Transportation. Many of these larger bridges are part of the Federal Highway Bridge Replacement and Rehabilitation Program and are therefore subject to the Federal Bridge Inspection Program. For a detailed examination of the condition of these bridges, the reader is referred to the U.S. Department of Transportation, Federal Highway Administration, National Bridge Inventory report (1987).

To determine the condition of smaller bridges under direct responsibility of the town, officials were asked to classify bridges in a similar fashion to the method for rating town roads.[6] These classifications are provided in Table 3.4. On average, nearly half (48.4 percent) of the bridges supporting the town road network require regular maintenance only. Of the remaining 51.6 percent, 17.5 percent require more than regular maintenance, and 16.2 percent are in need of major renovation. Nearly one in six local

[6] Because of the strong role of the State DOTs in maintaining the network of bridges, local road officials may not be in the best position to evaluate the bridge network. Therefore, the survey results pertaining to bridges should be approximately discounted.

Table 3.4. Percentage and Type of Repairs Bridges Need, by Town

	ME	NH	VT	Total
Complete Replacement	16.9%	20.5%	16.9%	17.9%
Major Renovation	15.7	15.9	17.5	16.2
More than Regular Maintenance	16.8	18.8	18.1	17.5
Regular Maintenance Only	50.7	44.7	47.5	48.4

Source: Survey of Town Road Officials, Summer 1990.

bridges (17.9 percent) in the three-state study area needs to be completely replaced or closed.

There is little variation in the pattern across the three states. New Hampshire towns, however, tend to have a greater number of bridges that need to be completely replaced. On average, a town in Maine has two bridges rated as obsolete or deficient, New Hampshire, 4.3 bridges, and Vermont towns, three bridges (Table 3.5).

Another perspective of bridge quality is whether the maximum load of the bridge is posted, and at what limits, or if the bridge is deemed too narrow for current traffic demands. In response to an inquiry about the number of bridges that are either posted at below-maximum load limits or as narrow, town road officials indicated that an average of 7.5 bridges per town fit into this category. Consistent with the previous discussion, New Hampshire towns expressed a greater concern for their bridges than either Maine or Vermont officials. Care should be taken in interpreting these comparisons, however, because a posted bridge is only a problem if it negatively affects traffic flows.

Based on survey responses, approximately one in three bridges (33.2 percent) negatively affect traffic flow. Consistent with the preceding discussion, the quality of bridges in New Hampshire tends to be lower than in either Vermont or Maine. Indeed, nearly half (45.1 percent) of the bridges in New Hampshire negatively affect traffic flows or delivery of services. The relatively small number of town bridges in Maine deemed troublesome may be due in part to the large role of the State Department of Transportation in maintaining the local bridge network. Note, however, that these estimates may be subject to error because of a personal judgement factor involved in the effect on traffic flow.

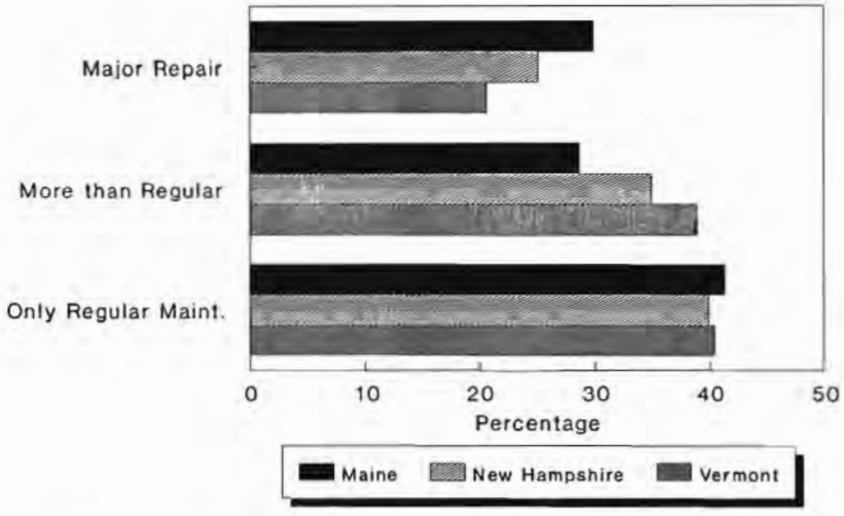

Figure 3.1. Percentage of Road Mileage Needing Repair

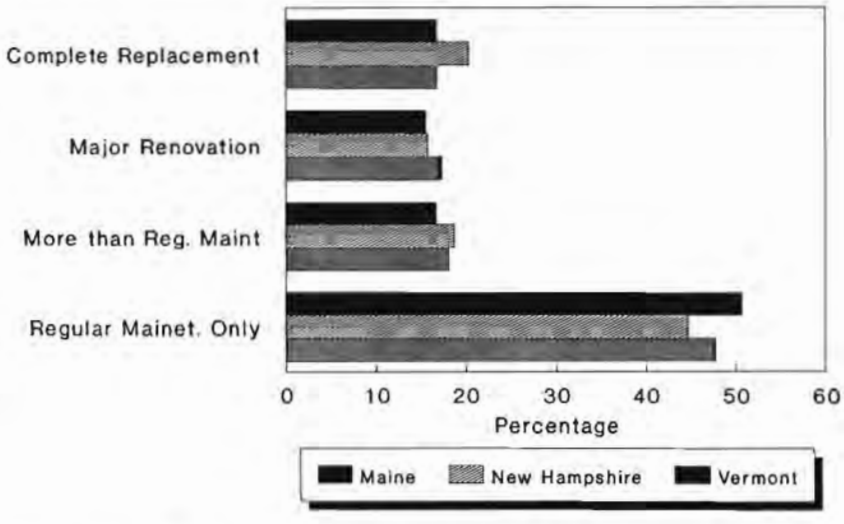

Figure 3.2. Percentages of Bridges Needing Repair

Town road officials also reported a large number of bridges to which the town had deferred maintenance for more than one year (recall deferring regularly scheduled maintenance is a common short-term cost-saving measure). This practice is evident here, particularly in New Hampshire where 60.3 percent of town bridges have been subject to deferred maintenance practices. In general, nearly half of the bridges in the three-state study area have had regular maintenance deferred.

Table 3.5. Percentage and Type of Repairs Bridges Need, by Town

	ME	NH	VT	Total
Average number of bridges rated obsolete or deficient	1.7	4.3	3.0	2.7
Average number of bridges posted at less than maximum load limits or as narrow bridge	5.3	11.9	6.6	7.5
Percentage of bridges with maintenance deferred more than one year	54.9%	60.3%	35.1%	49.4%
Percentage of bridges that negatively affect traffic flows or delivery of services	25.7%	45.1%	35.4%	33.2%

Source: Survey of Town Road Officials, Summer 1990.

Current Issues

To assess the impact of current issues on the quality of the service provided by the local road system, local road officials were asked to rate on a scale of one to four a series of issues from either major problem (rating of one) to no problem (rating of four). The responses are tabulated in Table 3.6.

In interpreting the responses, one needs to recall that a lower overall score (1 to 4) indicates a more pressing problem. Thus, in the three states, the most serious problem facing road officials today is the need for additional revenues. Fifty-seven percent of the responding road officials gave the need for additional revenues the highest possible ranking (1, or major problem). This is not surprising given the current economic slowdown and the corresponding decline in state aid and pressures on property tax revenue collections. This finding is consistent with the central thrust of the discussion in Chapter Two.

Table 3.6 Problems Facing Town Road Officials.

	ME	NH	VT	Total
	---------- Mean Ranking ---------			
"1"= major problem; "4"= not pressing				
Need for Additional Revenues	1.6	1.7	1.6	1.6
Inflation	2.0	2.0	1.8	1.9
Wear/tear--Heavy Equipment	1.8	2.2	2.0	2.0
Need to Upgrade High Traffic Roads	2.1	2.1	2.0	2.1
Need for Improved Drainage	2.0	2.3	2.2	2.1
Need to Upgrade All Roads	2.1	2.3	2.3	2.2
Need for New or Additional Equipment	2.5	2.5	2.4	2.5
Bridge Replacement and Repair	2.9	2.7	2.3	2.7
Wear/tear--Construction Traffic	2.6	2.6	2.8	2.7
Salary Level	2.7	2.8	2.4	2.7
Wear/tear--Tourist Traffic	3.1	3.2	2.7	3.0
Wear/tear--Subdivisions	3.1	2.6	3.1	3.0
Hiring/Retaining Qualified Persons	3.0	3.1	3.0	3.1
Turnover of Officials	3.3	3.0	3.4	3.2
Wear/tear--School Buses	3.2	3.3	3.3	3.3
Relation with State DOT	3.4	3.3	3.5	3.4

Source: Survey of Town Road Officials, Summer 1990.

Town officials ranked the impact of inflation on the costs of material and labor as the next most pressing problem. This finding was not expected due to the relative stability of general price increases during the mid- to late 1980s. The last few years, however, have seen dramatic swings in the cost of petroleum-based products. These swings have introduced a major degree of uncertainty with respect to fuel costs for trucks, graders, and tractors as well as many oil-based road-surfacing materials. Unless dramatic short-term swings are accounted for in the town's road budget, short-term cash shortfalls are troublesome, and it maybe necessary to divert funds from road repair projects to cover fuel costs.

The next most pressing problem is the wear and tear of heavy equipment on road surface conditions. This finding is consistent

with the overall observation of changing traffic demands outlined in the introductory chapter. In essence, many of the roads composing the local road system are not designed to handle the weight of today's heavy equipment. The wear and tear from school buses, subdivision traffic, or tourist traffic was not considered by road officials to be as pressing as the problem caused by heavy equipment. These results are consistent with the engineering principle that weight can cause more damage to a road than frequency of use. The responding local road officials were also concerned about the need to improve road drainage and to upgrade the surface of high-traffic roads. Relations with the state departments of transportation, high turnover rates of road officials, or the hiring and retaining of qualified persons for the road crew were rated as less pressing or not a problem at all (mean score > 3.0). Some of these issues, such as turnover rates of local officials, will be discussed in greater detail in Chapter Four.

The deregulation of the trucking industry and the corresponding legislation permitting heavier truck loads on state and federal highways have caused concern for local road officials. The local road system may be subject to increased stress from vehicles that are heavier than the current system can safely accommodate. In Maine, the weight limit on tractor-trailer trucks on the interstate system (I-95) is 20,000 pounds lower than the limit on rural roads. Some tractor-trailer trucks will travel rural roads to avoid the lower load limit on I-95. A valid concern expressed by officials is that they may be asked to upgrade certain roads for use by these heavier trucks without additional funds.

A portion of the added weight on town roads and bridges can be traced in part to a reduction in rail services to rural areas. The extra road traffic will be most prominent in areas where the rail service has been discontinued or reduced. In some towns, however, the change in traffic load will be negligible.

To estimate the effects of rail abandonment on the local road system, town officials were asked if they observed a noticeable change in heavy truck use during the 1980s. Nearly half, 48.2 percent, of the local road officials responded that rail abandonment has changed the use of heavy trucks within their town. The most notable change was in Vermont where 58.9 percent of the road officials reported increased use of heavy trucks. The least notable change was in New Hampshire where only one in three officials reported an increase. Maine officials mirrored the three state average. Clearly policies aimed at diverting or lowering heavy truck traffic need to be considered.

Given the traffic patterns, general road and bridge conditions, and the issues identified in this chapter, coupled with the priorities outlined in Chapter Two, local road officials were further asked to state their preferences for work priorities. Specifically, given limited revenues and demands placed upon the system, officials were asked to rank seven access priorities from highest (1) to lowest (7). The average ranking of these priorities is provided in Table 3.7.

For the sample of responding town road officials access to emergency routes took priority in determining the condition at which roads and bridges must be maintained. This high ranking was consistent across the three study states. This result implies that care must be taken to provide access for police, fire, and ambulance vehicles in designing programs for road closure or surface downgrading. The next highest priority routes are school bus routes. Note that there may be latitude for altering school bus routes if school administrators are willing and able to do so.

Access to state primary roads was considered the next most important by town officials. Access to these main traffic arteries is vital to the efficient flow of daily traffic. Policies designed to provide such access can be most effective in diverting heavy traffic away from certain roads and areas to roads more capable of handling the heavier traffic. If traffic to and from state-maintained arteries can be successfully channeled, roads from which traffic is diverted may be suitable candidates for surface downgrades or reduced maintenance schedules.

Access to homes was considered the next most important priority by town officials. Maintaining such access may be politically

Table 3.7. Preferences for Work Priorities

	ME	NH	VT	Total
"7" = lowest; "1" = highest	---------- Mean Ranking ----------			
Emergency Routes	1.9	2.3	2.1	2.0
School Bus Routes	2.6	2.8	2.5	2.6
Access to State Primary Roads	3.1	3.4	3.6	3.3
Access to Homes	3.4	3.2	3.5	3.4
Rural Mail Routes	4.9	4.8	5.1	4.9
Access to Farms	5.2	5.0	4.2	4.9
Access to Recreational Areas	6.7	6.5	6.9	6.7

Source: Survey of Town Road Officials, Summer 1990.

important, since the residents of these homes partially determine the road budget through the town meeting process. A comprehensive policy of equal access, however, may be difficult because of the remoteness of some homes.

The least important priorities are rural mail routes, access to farms and access to recreational areas. Because mail routes are designed to reach nearly all residents and businesses within a community, maintaining all routes may be difficult. The placement of mail boxes in clusters for groups of remote addresses may provide the town road official with increased flexibility. Mail delivery vehicles, however, are not usually heavy enough to require special road facilities.

The lowest priority, access to recreational areas, can cause difficulty for many town road officials. Many of the areas serviced by these roads are infrequently visited by a small handful of sport enthusiasts. These groups, often organized as sports clubs, regularly are outspoken with regard to access rights. The maintenance of these roads is expensive and benefits few users. One potential solution may be to work with the users to coordinate the privatization of the access road. Although an unpopular approach, as revenues become tighter and costs increase, these choices may become more common.

Summary

Town roads and bridges need improvements. Approximately one in four miles of town-maintained road is in need of major repair and nearly one in three miles requires more than regular maintenance. In addition, one in three bridges supporting the local road network are either in need of major renovation or complete replacement. The additional strain placed on the system from increased usage by heavy vehicles will likely accelerate the rate of deterioration.

The inadequacy of the current road budget outlined in Chapter Two, coupled with rising costs of providing road services and the overall poor condition of the local road network in the three northern New England study states, calls for effective fiscal management. Local managers must make the most of their limited resources in providing as high a level of road service as possible. The management environment and practices followed by town road officials, as reported by those officials, are discussed in the next chapter.

CHAPTER FOUR
MANAGEMENT PRACTICES

The quality of services provided by the local road system is largely determined by the quality of the labor and equipment used in producing the service. Sound management practices are particularly important in providing quality service, particularly in times of fiscal restrictiveness. Poor management decisions and/or inadequate maintenance procedures can result in higher than necessary costs in both the short- and long-term. The responsibilities, background, experience, and training level of town road officials in the three northern New England states are examined in this chapter. Attention is also paid to the employees hired by the town to aid in providing road services. The age and condition of the equipment used in constructing and maintaining town roads and bridges are also examined in this chapter. Regardless of the capabilities of the local road staff, unless a sufficient level of usable equipment is available, a quality road system cannot be ensured.

As previously outlined, the New England town government has historically functioned in an independent manner. As resources become increasingly limited and the demand for local road services continues to grow, cooperative arrangements between towns are becoming increasingly important as a potential revenue-saving option, and they deserve particular attention as a management decision.

Town Road Officials

Management of the town road system is usually the responsibility of the town road superintendent or highway commissioner. Although specific institutional arrangements vary across the three study states, each town has one person identified as responsible for the maintenance and repair of the town's road system. The road commissioner is a publicly elected official in one of three towns across the three-state study area (Table 4.1). In Vermont, however, fewer than one in five are elected, whereas in Maine nearly half of the town road commissioners are elected officials. Most (42.3 percent) road officials in northern New England are appointed to the position. The least common method of placing a person in the position of road commissioner is to hire them at large. Although more common in Vermont, on average only one in five road officials is hired. One arrangement need not be superior to another, but care must be taken if the most qualified person for the position of road commissioner is to be retained.

Table 4.1. Percentage Elected, Appointed or Hired as Road Commissioner

	ME	NH	VT	Total
Elected	42.7	33.9	17.8	34.9
Appointed	38.0	45.8	47.9	42.3
Hired	19.3	20.3	34.2	22.8

Source: Survey of Town Road Officials, Summer 1990.

Time commitments

The amount of time required to perform the functions of road commissioner varies significantly across the three study states. In Maine, the typical road official spends 15 hours per week performing specific road-related functions (Table 4.2), whereas in Vermont and New Hampshire the responsibility of the local road official approaches a full-time commitment at 31.6 and 38 hours per week, respectively. This pattern of overall time commitment is further reflected in the opinion of the local official as to whether there is a need for a part- or full-time road commissioner. A large majority of New Hampshire (81.7 percent) and Vermont (73.0 percent) officials believed that the duties of the position of road commissioner required a full-time commitment. A minority (37.3 percent) of Maine officials believed that a full-time commitment was required.

To better understand the differences in responsibilities and time commitments across the three states, town road officials were asked to indicate the number of hours per month spent on each of

Table 4.2. Time Requirements of Road Officials

	ME	NH	VT	Total
Hrs/week as road commissioner	15.1	38.0	31.6	26.1
If part-time, hours per week in summer	14.7	13.7	17.2	15.4
Need full-time commissioner	37.3%	81.7%	73.0%	55.4%
Need part-time commissioner	62.7%	18.3%	27.0%	44.6%

Source: Survey of Town Road Officials, Summer 1990.

several activities. These results are presented in Table 4.3. Note, however, that these times will vary throughout the year.

The distribution of time commitment across the various activities is surprisingly similar, particularly for New Hampshire and Vermont officials. The typical road official spent 5.4 hours per month meeting with town officials. These meetings would include not only the annual town meeting but also more frequent meetings between various town officials. Town road officials were also asked about the time devoted to general administrative activities. Again, there is little variation across the three states with the average road official spending 20.6 per month, or about 5 hours per week, on administrative functions.

When attention is focused toward direct road service provision activities, a greater variation in time commitment across Maine, New Hampshire, and Vermont becomes apparent. For example, the number of hours per month a Maine road official spends on the supervision of projects is 23.9, but the typical New Hampshire official spends 11 more hours per month performing the same function. The largest divergence occurs in time commitment to direct road maintenance. In New Hampshire and Vermont, the average road official spends over 60 hours per month on direct road

Table 4.3. Average Number of Hours Spent Per Month on Tasks

	ME	NH	VT	Total
Town Meetings	5.4	6.6	4.6	5.4
Administrative Work	20.9	20.2	19.9	20.6
Supervision of Projects	23.9	34.9	29.2	27.4
Direct Road Construction	9.4	14.6	13.3	11.3
Direct Road Maintenance	30.7	66.9	61.0	47.5
Equipment Maintenance	16.3	18.4	15.0	16.4
Discussing Road Issues with Others	6.2	6.8	7.3	6.6
Direct Bridge Maintenance	5.6	5.5	5.8	5.7
Other Direct Road/Bridge Work	8.8	15.1	8.3	10.6

Source: Survey of Town Road Officials, Summer 1990.

maintenance, but the typical Maine official spends 30.7 hours per month. The large variation in time spent on direct road maintenance and construction explains in part the variation in the number of part- and full-time officials.

The relatively small number of hours spent on bridge maintenance in each of the three states is partially reflective of the shared responsibility of bridge maintenance with the respective state departments of transportation. Finally, the typical road official spends 16.4 hours per month on equipment maintenance.

The compensation road officials receive for their efforts varies greatly across the three states. Local officials may be paid either an hourly rate or an annual fixed salary (a small number are paid on a per-diem basis). In Maine and Vermont the difference in the distribution of officials across the two payment methods is minimal (Table 4.4). In New Hampshire, however, a majority (60 percent) are paid on an hourly basis.

The annual level of compensation, regardless of the form of payment (hourly versus salary) is reflective of the time commitment previously outlined. In Maine, the typical road official receives compensation of $16,050, whereas the typical New Hampshire official received $22,791 and Vermont officials $20,478 per year (Table 4.4). Given the high percentage of time committed to technical functions, such as road construction projects, the prevailing level of pay calls into question the ability to attract and retain qualified persons. For example, county highway engineers in the Midwest earn on average between $33,000 and $37,000 annually.[6] This consideration is an important factor in the provision of road services and will be discussed in greater detail later in this chapter.

Table 4.4. Road Official Compensation

	ME	NH	VT	Total
Per-diem	5.5%	1.7%	0%	3.3%
Hourly	42.1	60.0	52.1	48.5
Salary	52.4	38.3	47.9	48.2
Average annual compensation (1989)	$16,050	$22,791	$20,478	$18,723

Source: Survey of Town Road Officials, Summer 1990.

[6] Based on personal communication with Midwestern highway engineers.

Nearly a third (31.7 percent) of the road officials in the three-state area are employed in occupations other than town government (Table 4.5). Given the relatively larger number of part-time road officials in Maine, it is consistent that a larger share of road officials in Maine are employed outside of town government than in either New Hampshire or Vermont. Although half of the officials who are employed outside of town government earn less than $5,000 annually from outside employment, one in five earn more than $30,000 annually.

Table 4.5. Non-Town Income of Road Officials in 1989

	ME	NH	VT	Total
Percentage of officials employed outside town government	36.2%	25.4%	27.3%	31.7%
		Percentage Responding		
less than $5,000	43.1	48.5	53.2	46.2
5,000 to 9,999	12.9	12.1	12.8	13.1
10,000 to 14,999	7.8	9.1	0	6.0
15,000 to 19,999	8.6	3.0	0	5.5
20,000 to 24,999	6.9	3.0	12.8	7.5
25,000 to 29,999	2.6	3.0	4.3	3.5
30,000 and over	18.1	21.2	17.0	18.1

Source: Survey of Town Road Officials, Summer 1990.

Road official experience and training

The ability of local road officials to effectively perform their functions is dependent upon several factors including their own experience as road commissioner and level of training. Increases in revenues devoted to the local road system may be of little value in enhancing the quality of road services if the official charged with distributing those monies is prone to making poor management decisions. Previous studies of the rural road system across the U.S. have identified a heightened training program as one of the most cost-effective methods of providing quality road services during times of tight financial resources. In essence, the provision of road services is a technical process that requires at least a minimum understanding of certain engineering-related problems. To assess the potential effectiveness of additional training programs in the three study states, a fundamental appreciation of the level of expertise of current road officials is required.

Perhaps the simplest indicator of a road official's experience is age. The typical road official for the states ranged from 46.9 years old in Vermont to 47.2 years old in Maine and New Hampshire (Table 4.6). Perhaps of more interest is the extended range of ages. The youngest officials were 23 years of age while the eldest was an 81-year-old Vermont official. This range in age is not unlike the ranges identified in other studies of local road officials.

The level of education of town road officials, classified into six categories, is also presented by state in Table 4.6. On a whole, Maine officials were slightly better educated than those in other states. This is somewhat surprising given the part-time nature of the Maine positions and the corresponding lower pay scale. However, Maine road officials are more likely to be elected rather than appointed or hired, and they are also more likely to be employed outside of town government. This pattern suggests that Maine road officials are more likely to be civic-minded citizens performing their civic duty as road commissioner.

The vast majority (85.6 percent) of road officials in the three study states possess at least a high school diploma, and over two in five have at least some college experience. Considering that the position of road commissioner requires at least some engineering skills, the level of education characterizing road officials may be cause for concern. First, the limited level of overall education is an indication of the officials, abilities to make informed and effective decisions. Second, when additional training opportunities arise, officials with limited educational backgrounds may not be in a position to fully benefit from these opportunities. Future discussions of local road policy should recognize the general level of town road official education.

Table 4.6. Age and Education Completed by Road Commissioner

	ME	NH	VT	Total
Average Age	47.2	47.2	46.9	47.1
Youngest	23	28	23	23
Eldest	77	71	81	81
	---------- Percentage Responding ----------			
Grade School	4.1	4.1	3.2	3.8
Some High School	11.2	10.8	7.9	10.6
High School Graduate	39.4	51.4	49.2	44.2
Some College	17.1	10.8	33.3	18.6
College Graduate	18.2	14.9	6.3	15.1
Post Graduate Work	10.0	8.1	0	7.7

Source: Survey of Town Road Officials, Summer 1990.

To understand the experience of the town road official, respondents were asked to indicate length of service as road commissioner. Officials with a greater length of service should have a better grasp of problems facing the local road system and a better understanding of the maintenance history of the local roads. Six classifications of experience were constructed and the results of the survey are provided in Table 4.7. Nearly one in three officials had more than ten years of experience as road commissioner. Still, a slightly smaller proportion of road officials had less than four years of experience. Maine officials encounter the greatest turnover rate amongst the three states. This higher rate is partially reflective of the part-time nature of Maine officials and concurs with the observations cited before: Maine officials are more likely civic-minded citizens performing their community duty. While a high turn-over rate may be acceptable for policy makers, such as select persons, the technical charge of road commissioner requires a person with training and experience.

Table 4.7. Number of Years as Road Commissioner

	ME	NH	VT	Total
One	11.8%	3.2%	6.9%	8.8%
Two	11.2	8.1	8.3	10.1
Three	12.4	16.1	9.7	12.3
Four to six	21.3	19.4	19.4	20.5
Seven to Ten	14.8	11.3	22.2	15.9
More than Ten	28.4	41.9	33.3	32.5

Source: Survey of Town Road Officials, Summer 1990.

For the majority of towns within the three-state study area, the position of road commissioner does not require any formal training as a prerequisite. Given the high percentage of the commissioner's time that is devoted to technical issues (see Table 4.3), the level of formal training becomes a concern. When queried, only half of the responding road officials acknowledged that they had received any formal training (Table 4.8). Maine officials received the lowest level of formal road-related training, which may be a reflection of the part-time nature of most Maine positions.

When asked how the formal training, if any, was obtained, officials most frequently reported workshops conducted by their respective state department of transportation and state road asso-

ciations. Conferences sponsored by suppliers of road materials was the next most common source of formal training. Other important sources of formal training included Federal Highway Administration programs and the university Cooperative Extension. The system of community colleges provided few training opportunities, except in Vermont.

Towns are served by several groups and associations. Based on available information, comments about the prospects for coordination amongst the various programs are difficult to make. Most important, however, local officials are attending workshops intended to enhance their effectiveness as town road commissioner. In light of the limited formal background of many road officials in road-engineering practices, access to workshops is especially important.

Table 4.8. Training of Town Road Commissioner

	ME	NH	VT	Total
Percentage of Road Commissioners Receiving Formal Training	43.6	60.3	58.9	50.8
Source of Training		(percentage)		
State DOT	65.8	55.3	55.3	60.6
FHA	26.6	42.1	25.0	29.9
Community College	10.1	10.5	22.7	13.4
State Association Workshops	60.8	65.6	56.8	61.0
Conferences	44.3	50.0	40.9	45.1
University Extension	25.3	55.3	36.4	35.4
Other	32.9	26.3	42.9	33.3

Source: Survey of Town Road Officials, Summer 1990.

To assess the market for short-term training, town road officials were asked to indicate their overall interest in additional formal training and list specific program areas. Almost three-quarters of the responding road officials expressed interest in additional training (Table 4.9). This high level of desire for training is encouraging and is reflective of the needs expressed by town officials. Across the three states, town officials expressed the need for increased road management and planning education along with training in road drainage design. It is important to note that both of these subject areas are technical in nature with a heavy emphasis on engineering needs and methods. The third most important area

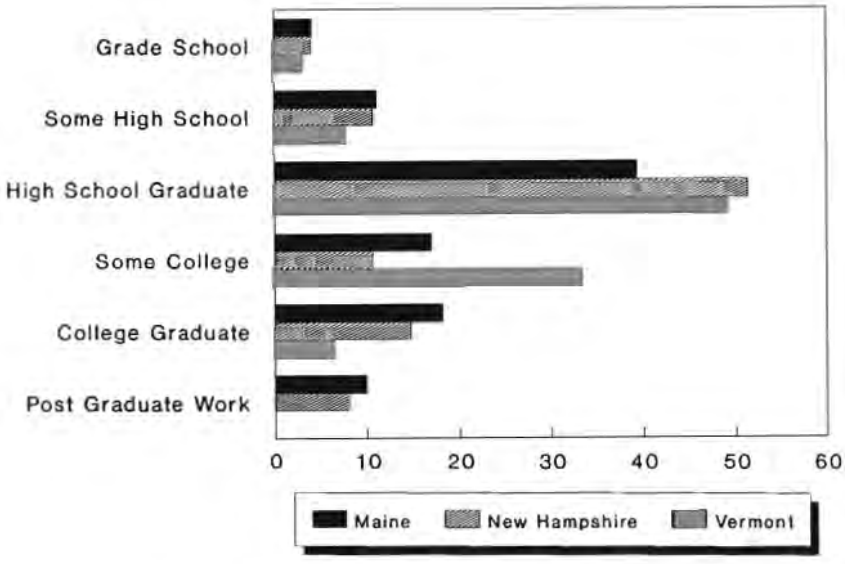

Figure 4.1. Road Commissioner Education

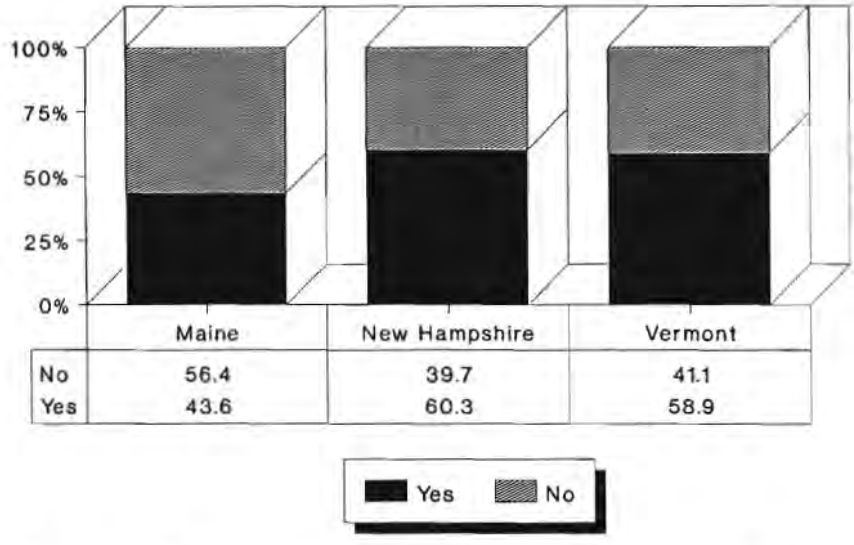

Figure 4.2. Percentage of Road Commissioners Receiving Formal Training

Table 4.9. Needed Training of Town Road Commissioners

	ME	NH	VT	Total
	------ Percentage Responding Yes ------			
Are You Interested in Additional Training?	69.6	88.5	70.8	73.8
Which Topics?				
Office Management	14.4	24.5	12.0	16.1
Payroll Management	10.2	34.0	8.0	9.8
Personnel Management	24.6	34.0	32.0	28.6
Road Drainage Technique	79.7	83.0	70.0	78.1
Road Management and Planning	84.7	86.8	78.0	83.9
Equipment Maintenance	44.9	52.8	64.0	50.9
Cooperative Purchasing	44.1	52.8	52.0	48.2
Bridge Maintenance	41.5	49.1	66.0	49.1
Equipment Repair	45.8	58.5	58.0	51.3
Cost Cutting Techniques	70.3	64.2	72.0	69.2
Other	4.5	9.4	4.2	5.6

Source: Survey of Town Road Officials, Summer 1990.

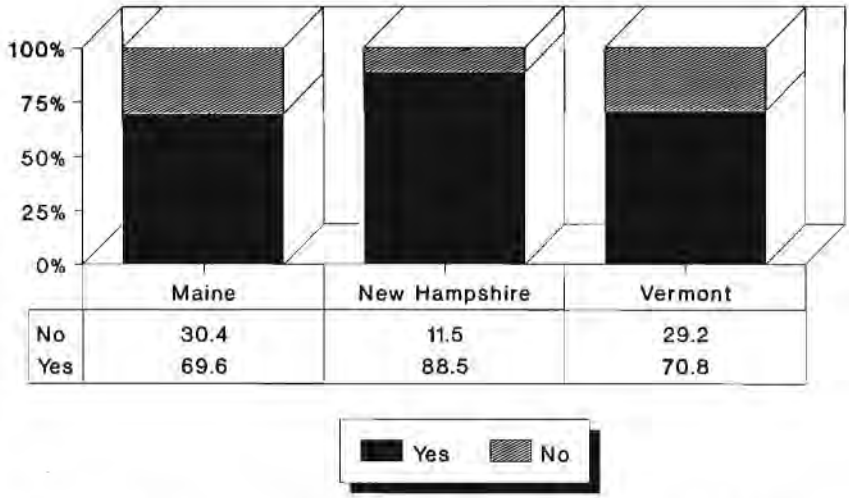

Figure 4.3 Percentage of Road Commissioners Requesting Additional Training

for additional training is in cost-cutting techniques. This response is partially reflective of the current financial hardships most New England communities are facing. Of the eleven categories from which respondents were asked to select, office management practices were deemed the least useful at this time. Of interest to note is the parallel between time commitments discussed before and the revealed need for additional formal training.

In formulating local road policies, special attention must be paid to the experience and training level of the local officials vested with execution of the policy. Policies aimed at providing the local road official adequate monies are only a partial solution to the local road problem. Policies that aid the local official to best use available resources are of the utmost importance. In light of the high turnover rates of road officials in many northern New England towns, training workshops must be part of a continual long-run comprehensive road policy.

Staffing practices

Few towns responding to the survey indicated that they do not hire additional employees, either full- or part-time, to aid in providing town road services (Table 4.10). Of those indicating that some help is hired, most are full-time employees of the town and are hired during the winter months. On an annual basis, the typical town in the northern New England states hires about five additional full-time employees, but only two part-time employees. Given the multiple functions of many small town governments, however, it is difficult to separate the amount of time these employees spend solely on road functions. In some larger towns, the road commissioner is also the director of public works, a position that encompasses functions in addition to the provision of road services. Therefore, it is difficult to conclude that all of these additional employees are committed solely to road functions.

Table 4.10. Average Number of Employees

	ME	NH	VT	Total
Does the Town Hire Additional Employees (percentage responding yes)	67.4	81.0	81.6	74.1
Number of Full-Time Summer	4.8	3.9	4.2	4.4
Number of Full-Time Winter	5.8	4.0	6.2	5.2
Number of Part-Time Summer	1.4	1.1	0.4	1.1
Number of Part-Time Winter	2.9	2.7	1.4	2.6

Source: Survey of Town Road Officials, Summer 1990.

Of the additional help that is hired, almost all (96.8 percent) are paid on an hourly basis with the typical worker earning $5.90 per hour (Table 4.11). New Hampshire paid the highest hourly rate at slightly more than $7 an hour, and Maine towns tended to pay the lowest at slightly more than $5 per hour. Most of the responding road officials, 78.8 percent, indicated that the current pay is satisfactory for attracting qualified persons to work on the road crew.

In addition to the towns, regular road staff, 87.2 percent of the towns in the northern New England states hire additional labor for specific projects (Table 4.12). The most commonly cited project requiring additional labor is snow plowing. This pattern matches the pattern mentioned earlier of hiring more staff during the winter months identified in Table 4.10. The need for help on larger projects, such as bituminous resurfacing and construction or reconstruction projects, was another reason for hiring additional help.

Table 4.11. Pay Basis of Road Employees

	ME	NH	VT	Total
Employee Paid				
Hourly	95.3%	100%	96.8%	96.8%
Salary	4.7%	0%	3.2%	3.2%
Average Wage Rate	$5.04	$7.06	$6.69	$5.90
Satisfactory Pay for Road Crew (percentage responding yes)	77.6%	87.1%	75.3%	78.8%

Source: Survey of Town Road Officials, Summer 1990.

Table 4.12. Extra Labor Needed in Addition to Full-Time Staff

	ME	NH	VT	Total
	----- Percentage Responding Yes -----			
None	9.5	13.1	20.3	12.8
Bituminous Resurfacing	42.8	44.3	44.0	43.3
Grading	28.9	19.7	8.0	21.3
Snow Plowing	53.5	62.3	34.7	51.0
Construction/ Re-Construction	47.8	36.1	42.7	43.7
Other	28.9	29.5	24.0	27.7

Source: Survey of Town Road Officials, Summer 1990.

Town Road Equipment

The ability of the town road officials to provide road services effectively is dependent not only upon their personal expertise and that of the road crew, but also the equipment that is at their disposal. The amount and condition of this equipment in turn depends on the number of miles of road within the town, the composition of those roads, and the ability of road personnel to adequately maintain the equipment.

The equipment used in the provision of road services ranges from major pieces of equipment, such as a motorized grader, to smaller hand tools. The most commonly owned piece of major equipment was a snow plow (69.6 percent), followed by trucks (62.6 percent), then a motor grader (58.8 percent) (Table 4.13). The distribution of equipment ownership across states is reflective of the services provided. For example, a much higher percentage of towns in Vermont own motor graders than in either Maine or New Hampshire. Recalling the distribution of road surface types, Vermont towns have a higher number of gravel surface miles, hence the need for a grader. Road officials also indicated the number of pieces of each type of equipment. Most towns own one piece of each type of equipment, except for trucks and snow plows (Table 4.14).

The ability of these pieces of equipment, however, to constructively aid in the provision of road services is not so much a product of the stock of equipment (i.e., the number of pieces of equipment), but rather the flow of services derived from the equipment. For

Table 4.13. Percentage of Towns Owning Equipment

	ME	NH	VT	Total
	-------- Percentage Responding Yes ---------			
Motor Grader	45.3	65.1	86.7	58.8
Snow Plow	54.7	85.7	89.3	69.6
Loader	42.7	65.1	76.0	55.4
Mower	20.8	31.7	46.7	29.1
Tractor	14.5	30.2	30.7	21.8
End Loader/Tractor	6.9	11.3	8.0	8.6
End Loader/Backhoe	36.0	50.0	49.3	42.4
Truck	45.0	82.3	85.3	62.6

Source: Survey of Town Road Officials, Summer 1990.

Table 4.14. Average Number of Pieces of Equipment

	ME	NH	VT	Total
Motor Grader	1.3	1.1	1.1	1.2
Snow Plow	4.2	4.7	4.2	4.3
Loader	1.8	1.2	1.2	1.5
Mower	1.6	1.5	1.1	1.4
Tractor	1.1	1.4	1.0	1.1
End Loader/Tractor	1.1	1.0	1.0	1.0
End Loader/Backhoe	1.1	2.2	1.1	1.3
Truck	3.7	3.3	3.2	3.4

Source: Survey of Town Road Officials, Summer 1990.

example, the flow of service from new equipment in good condition will be higher than that from a piece in disrepair.

To gain insight into the flow of services from town road equipment, road officials were asked to provide an average age for a particular type of equipment, and to rate its overall condition. Officials ranked the average of the equipment into one of four categories: excellent (1), serviceable (2), needs major repairs (3), and inadequate (4). The lower the average ranking, the better the equipment condition. This information is provided in Tables 4.15 and 4.16, respectively.

Table 4.15. Average Age of Town Equipment (Years)

	ME	NH	VT	Total
Motor Grader	17.7	13.3	11.4	14.4
Snow Plow	8.2	9.2	9.5	8.8
Loader	8.5	8.9	8.8	8.6
Mower	8.9	7.0	7.1	8.1
Tractor	10.6	14.5	13.6	12.6
End Loader/Tractor	15.7	7.7	11.8	13.0
End Loader/Backhoe	7.4	8.4	7.6	7.7
Truck	6.9	9.0	5.5	7.1

Source: Survey of Town Road Officials, Summer 1990.

The larger, less commonly used pieces of equipment tend to be older than the smaller more highly used equipment. In addition, the more expensive pieces also tend to be replaced less often. For example, motor graders are expensive to replace, therefore the typical motor grader owned by towns tends to be the single oldest piece of equipment. The distribution of grader age across the three states is reflective of the use of that particular piece of equipment. In Vermont, where there is a higher incident of gravel roads, the need for a grader is greater than in Maine which has few town-maintained gravel roads.

This pattern of use intensity and replacement cost has resulted in large variation in age across equipment types. Some equipment listed by officials is well beyond its expected useful life. The oldest piece of equipment listed was a 65-year-old truck in New Hampshire. In addition, 15 percent of all graders are at least 25 years old, but 26 percent were newer than five years old. Other aging pieces of equipment include tractors and end-loader/tractor combinations.

This brief review of the age of town equipment indicates that many pieces may need replacement in the near future. The observed pattern of deferred equipment replacement maybe motivated by the same factors motivating deferred maintenance. Replacing this equipment is a major expense for towns and finding funds for equipment overhauls may not be a simple task in tight budgets. A new motor grader, for example, may cost in excess of $100,000 although a recondition or used machine may cost less. A potential problem of purchasing older equipment is heightened maintenance costs which erode the town's road operating budget.

Table 4.16. Condition of Town Equipment

	ME	NH	VT	Total
"1"=excellent; "4"=very inadequate				
	---------- Mean Ranking ----------			
Motor Grader	2.0	2.2	1.6	1.9
Truck	1.6	1.6	1.4	1.6
Snow Plow	1.7	1.8	1.7	1.7
Tractor	2.0	2.0	2.0	2.0
Mower	1.9	1.9	1.9	1.9
Loader	1.5	1.6	1.7	1.6

Source: Survey of Town Road Officials, Summer 1990.

Age is not the sole determinant of the flow of services derived from a piece of equipment. Indeed, an older piece of equipment in good condition may be more serviceable than a newer piece that has been neglected. As reported in Table 4.16, the typical piece of road equipment is considered to be in at least serviceable condition by town road officials. The typical motor grader, although averaging 14.4 years in age, is still serviceable (average rating of 1.9). Less than 15 percent of graders across the three study states were rated either as needing major repairs or as very inadequate.

It is of interest to note the similarity in condition ratings across equipment of different ages. For example, the typical mower was rated as serviceable (rating of 1.9), yet graders, which tend to be nearly twice as old as mowers, received similar condition ratings. One explanation might be the life expectancy of the various pieces of equipment. The wear-and-tear placed on a mower tends to be greater than that of a grader, thus mowers tend to deteriorate faster than graders.

In light of the aging equipment, the relatively high rating received by most pieces of equipment is somewhat surprising. One reason for this pattern might be the superior maintenance job performed by town road officials (recall the notable amount of road officials time devoted to equipment maintenance [Table 4.3]). Alternatively, the equipment may be in a state of disfunction but road officials simply accept it and make do. Because road officials are directly responsible for maintenance and are aware of replacement costs, expectations surrounding the equipments service delivery may be low. Regardless of the reason for the high ratings, the respondents indicated that equipment serviceability does not pose a major obstacle to the effective provision of road services. The average age of the equipment, however, suggests that road equipment will require major attention in the near future.

Cooperative Arrangements

A common criticism of the arrangements for providing local road services in Maine, New Hampshire, and Vermont, as well as other rural areas, is the small size of operation. As outlined in the first chapter of this report, the town government in New England has historically been responsible for providing local road services, an institutional arrangement that makes New England the most decentralized system in the U.S. This highly decentralized system of road service provision has profound implications for the cost of adequate maintenance schedules, investments in new road infrastructure, and the ability of the typical New England town to adequately perform functions.

In essence, such a system often creates institutional barriers to the achievement of economies of scale. The result is the lack of an adequate base upon which to raise revenues to fund the local road system and a higher overall cost to the local resident. The limited size of the resulting jurisdictional responsibility often prohibits the hiring of a trained engineer to carry out road maintenance and repair schedules. As has already been discussed, this latter consideration may result in a piecemeal network of local road officials who lack adequate training or experience.

A long-term policy designed to achieve economies of scale in the provision of road services has been to reorganize functions to higher levels of government. Many states within the U.S. have adopted this policy by placing more responsibility at the county level. At this level the size of the road system under any one county is sufficiently large to justify the hiring of a trained engineer. In addition, the excessive costs associated with duplication of equipment and personnel are often avoided.

This option, unfortunately, is not currently viable in New England. Although the county exists as a political entity in New England, its functions are limited in scope. Indeed, in some states, such as Maine, the county is considered expendable and legislation is continually introduced to eliminate the county as a political entity. This attitude toward the county in New England is unfortunate for several reasons. The primary reason pertinent to the local road system is the ability of the county to provide technical assistance in the form of a county highway engineer. A national survey of county highway engineers revealed that over a quarter of responding engineers provided some type of engineering service for lower levels of government (Walzer and Chicoine 1989).

An additional reason why such an attitude is unfortunate is the county's ability to serve as a coordinating agent for group purchases of supplies and equipment as well as daily maintenance functions such as snow removal activities. The reluctance to turn to the county for this type of assistance in New England is counter to the national trend and may prove detrimental to the quality of the local road system in the long-run. This latter point is particularly true as the demands placed on town governments for such services as municipal solid waste, clean water supplies and waste water treatment increase while revenue raising capabilities are strained.

Many towns in the northern New England region, however, have attempted to capture economies of scale by forming cooperative arrangements with other governmental entities charged with road responsibilities. In all, 39.8 percent of the responding towns participate in some form of cooperative arrangement (Table 4.17).

New Hampshire towns are the most likely to benefit from such an arrangement with 58.1 percent of towns participating, whereas Maine towns are the least likely with only 32.5 percent participation. Of those towns with such cooperative agreements, the most common link is between towns. Almost a third of the responding towns have cooperative arrangements with their respective state department of transportation. This latter arrangement often takes the form of the town contracting with the state to perform most, if not all, road functions.

The range of agreements is extensive and surprisingly similar across the three states (Table 4.17). In total, the most common type of agreement is in the area of snow removal and sanding. Given the geographical location of the study states, this type of agreement is both logical and intuitive. A larger team of coordinated plows can remove snow and maintain driveable conditions in a much more effective manner then a small handful of independently operating plows.

The sharing of equipment was also a commonly (44.6 percent) cited type of agreement. This option is most popular in New Hampshire where 70.3 percent of cooperating towns shared equipment and least popular in Maine with only 22.4 percent of towns participating. Sharing of expensive equipment provides towns with access to sometimes expensive equipment that may be inefficiently used when purchased by a single town. A potential determinant to sharing equipment is the problem of distribution of maintenance and repair responsibilities. In other words, disagreements over which town assumes responsibility for repair and upkeep of equipment can lead to bad relations among communities. This problem is more evident when towns share the lease of a particular piece of equipment; however, the problem can be circumvented if the sharing agreement is well thought out and documented in advance.

Somewhat surprising is the finding that relatively few towns reported cooperative agreements to purchase gravel, asphalt, or salt, the exception being Maine towns with the shared purchase of salt. Given the potential advantages of group purchases (i.e., volume discounts) it is surprising that more towns do not form purchasing groups. A more careful examination of the potential of group purchases would seem to be in order. The county may serve a role in coordinating such activities.

When asked the advantages obtained from cooperative arrangements, the most commonly cited reason was cost savings. One town, for example, cited an agreement with its neighboring town for use of its grader to maintain one mile of gravel road in return for the

Table 4.17 Percentage of Towns with Cooperative Arrangements

	ME	NH	VT	Total
Any Cooperative Arrangements	32.5%	58.1%	40.5%	39.8%
With Other Towns	77.2	94.1	87.5	84.9
With Villages or Plantation	12.3	5.9	16.1	12.0
With State DOT	34.5	23.5	29.0	31.7

Source: Survey of Town Road Officials, Summer 1990.

use of an extra snow plow that the town could not use. The cost savings of borrowing an expensive piece of equipment that is used only one or two days a year was considered quite significant. An additional advantage was the time savings, hence shorter traffic flow interruptions, involved in major projects.

An alternative approach to capture economies of scale is for the town to hire a private contractor for road services. The town retains policy-making authority related to determining the level of road services required by its residents, but the actual production-related activities are contracted to a second party. The advantages of this road service delivery option are threefold. First, the contractor may have the technical or engineering expertise that the local road official in all likelihood does not possess. Second, the contractor may be sufficiently large to capture the advantages of economies of scale. Third, the town incurs additional savings on fringe benefits due town workers, such as pension funds and health insurance. The goal of such an approach is a higher quality road system at a lower cost to the local taxpayer than would be obtained if the town were to retain production-related responsibilities. A potential disadvantage, however, is that the contractor may be from outside the community, thus costing the town a source of local employment.

Over half of the responding towns had some form of contract with a private contractor for performing some road functions (Table 4.19). The most common (50.8 percent) form of agreement across all three states was the contracting of some summer road maintenance, whereas the least common (16.9 percent) was the contracting of all summer road maintenance. The low percentage of New Hampshire and Vermont towns contracting for either all summer or winter road maintenance indicates that a large majority of towns in these two states retain some road maintenance functions. In Maine, however, 22.4 percent of the responding towns contracted with private contractors for all summer road maintenance, and 37.9 percent

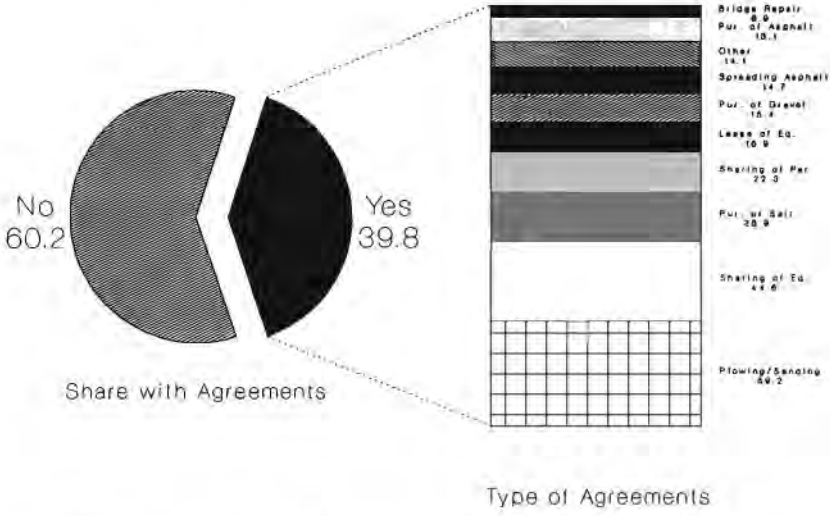

Figure 4.4. Patterns of Towns with Cooperative Agreements (All terms are in percentages)

Table 4.18. Type of Cooperative Arrangement

	ME	NH	VT	Total
	-------- Percentage Responding Yes -------			
Lease of Equipment	17.2	21.6	12.5	16.9
Purchase of Gravel	12.1	16.2	21.9	15.4
Purchase of Asphalt	12.1	16.2	9.4	13.1
Purchase of Salt	41.4	18.9	12.5	26.9
Sharing of Personnel	10.3	32.4	31.3	22.3
Sharing of Equipment	22.4	70.3	53.1	44.6
Spreading Asphalt	10.5	24.3	9.4	14.7
Bridge Repair	8.6	5.4	6.3	6.9
Snow Removal/Sanding	62.1	48.6	62.5	59.2
Other	12.1	16.7	16.1	14.1

Source: Survey of Town Road Officials, Summer 1990.

contracted for all winter road maintenance. The higher incidence of Maine towns contracting with private firms explains in part the much larger number of Maine road officials operating on a part-time basis.

The potential benefits of privatizing road service delivery responsibility are significant. In effect, many of the difficulties outlined above may be circumvented by hiring a professional road contractor. For some more rural communities, this may not be a viable option. Specifically, a private contractor may not be available. The feasibility and cost savings of privatizing road service warrant further attention.

Table 4.19 Contract with Private Contractors

	ME	NH	VT	Total
	--- Percentage Responding Yes -			
All Summer Road Maintenance	22.4	6.6	13.5	16.9
Some Summer Road Maintenance	43.7	55.7	63.5	50.8
All Winter Road Maintenance	37.9	14.8	13.5	27.5
Some Winter Road Maintenance	24.1	45.9	20.3	27.5

Source: Survey of Town Road Officials, Summer 1990.

Summary

An important element in the ability of local governments to provide road services is the availability of qualified personnel and adequate equipment. The technical nature of constructing and maintaining roads and bridges makes this need particularly acute. The multitude of cooperative and contractual arrangements reviewed by this study makes it difficult to draw generalizations. When towns provide a full range of road-related services with little outside help, there is a need for a relatively large amount of equipment and adequately trained road personnel. In those towns that contract with the state, other towns, or private providers for road construction and maintenance, the need for equipment and trained employees is more limited.

Several important patterns were identified within the data. First, the typical road official spends a significant proportion of time directly on road construction and maintenance projects as well as equipment maintenance. These tasks require a minimum understanding of basic engineering practices. Many local road officials,

however, may not possess a sufficient understanding of these practices, but most officials appreciate this need and are willing to take steps to solve the problem. Policy must be developed to ensure that local road officials have access to the technical information they require. Such information may be disseminated through an expansion of current educational programs sponsored by the state or road associations or through increased access to trained engineers.

Second, although road officials are comfortable with the serviceability of current stocks of equipment, the advancing age of most equipment will require attention in the not-too-distant future. Planning now for the required investments will help to ensure an adequate stock of road equipment.

Third, the potential costs savings from either cooperative arrangements or privatization of road responsibilities warrants further attention. The formation of purchasing agreements for items such as gravel, asphalt, and salt may prove advantageous. Although currently not an option in the northern New England region, the county may serve a role in providing technical support and coordinating functions. The limitations imposed on New England towns due to their geographic size need to be addressed.

CHAPTER FIVE
SUMMARY AND RECOMMENDATIONS

The legacy of Reagan's Fiscal Federalism, coupled with a growing number of federal- and state-imposed mandates, have forced many local governments to face problems they have not had to address in the past. Students of public administration have observed that running a small town government ten years ago was a relatively simple matter. Today, these same town governments are confronting concerns over municipal solid waste problems, safe drinking water mandates, a crisis in public education, and a rapidly deteriorating local road network. Major investments in new, previously nonexisting infrastructures and reinvestments in current stocks of infrastructure may overburden many towns' existing tax bases.

Currently many town governments, both urban and rural, are experiencing financial difficulties at levels not encountered in years. Revenue shortfalls at the local level have forced significant increases in property tax burdens and declines in services provided by towns. For many of the more rural towns in northern New England, the largest single budget item is the maintenance and repair of the local road system. In 1987, 40 percent of Vermont town expenditures and 25 percent of New Hampshire town expenditures were devoted to the local road system. In Maine, roads were the largest single budget item after schools.

Given these expenditure patterns and the growing need to reduce overall expenditures, the resources devoted to the maintenance and repair of the local road system may be curtailed. Yet, over half (60 percent) of the local road officials responding to the questionnaire expressed concern over the adequacy of the current road budget. When queried if the town had a long-term strategy to assist in planning for short-term budget shortfalls, only half of the responding road officials had any type of a plan in place.

A common approach to managing shortfalls in town revenue is to defer regularly scheduled maintenance and repair of the road system. When asked to rank five expenditure reduction strategies, road officials consistently selected the reduction of maintenance and repairs to all roads as the number one preference, or second only to reduction of surface types. This strategy, while perhaps unavoidable in the short-run, will lead to further deterioration and higher long-term costs, as well as possible serious injury to residents. As the local road system continues to age and deferred maintenance and repairs accelerate the aging process, potential liabilities facing the

town will become significant. Specifically, as the safety of the network deteriorates, the potential for lawsuits by citizens following vehicle accidents increases significantly.

The intent of this project was to provide local road officials and state policy makers with a basic set of summary information concerning the local road system in the three northern New England states: Maine, New Hampshire, and Vermont. These states were selected for study due to their common characteristics including, but not limited to, jurisdictional responsibilities, predominance of rural areas, and economic base. In addition, these New England states have been overlooked in many of the broader national studies of the local road system. The intent of this chapter is to summarize some of the key findings of a survey and issues faced by local officials. Finally, recommendations for policy consideration and change are also presented.

Review of Findings

The findings of this research project are briefly summarized in approximately the same order as they were presented in the report. For a more detailed discussion of these key findings and other relevant findings, the reader is referred to the respective chapters.

Town government financing

The 1987 Census of Governments reveals that the provision of road services is the single most important function, behind education, that town governments perform. The typical Maine town spends $3,429 per mile on road service, New Hampshire towns spend $7,475 per mile, and Vermont towns spend $5,303 per mile. Most of the funds available to support these expenditures are from local sources, which for New England towns translates into property tax revenues. Although federal monies have been decreasing throughout the 1980s, state monies have increased in real terms over time.

There can be little question that town officials are facing a cost squeeze. The recent escalation of property values in most parts of the study area has made residents resistant to further increases in the property tax. In some of the faster growing communities, the term "tax revolt" has taken on a very real meaning. Given respective state statutes, the ability of town governments to shift to alternative forms of local revenue generation is severely limited. In light of increasing demands placed on local governments and the rapidly deteriorating rural infrastructure, problems of fiscal stress will become more pronounced.

Road and bridge condition

The size of each local system across the responding towns is quite small, with the typical town responsible for 40.1 miles of road. One New Hampshire town had jurisdictional responsibility for only 1/3 of a mile of road, whereas Maine town had 152 miles of road to maintain. Considering that the average county in New York, for example, is responsible for 305 miles of road, the relative smallness of each town system becomes apparent. Although town-maintained roads account for 53 percent of all road mileage in the three study states, the average individual town-maintained system is relatively small.

The distribution of traffic across these town-maintained systems indicates that most of these roads are low- to medium-volume roads. One in four miles has fewer than fifty vehicles per day, and only 20.7 percent of the mileage carries 400 or more vehicles per day. Despite the smallness of the individual systems and the lower traffic loads, the majority of roads are of a higher surface type, with 32.5 percent of the roads paved and 29.4 percent composed of bituminous materials. The remaining road surfaces are either gravel or earth.

In total, 40.1 percent of the local road mileage requires regular maintenance only and 32.3 percent is in need of more than regular maintenance. One in four miles, however, is in need of major repair. Given the distribution of surface types and the relatively high expense of maintaining and replacing paved and bituminous roads, the cost of returning the system to an acceptable level will be significant.

The network of bridges that supports the local road system is also in dire need of attention. Road officials estimated that 17.9 percent of the town-maintained bridges require complete replacement and 16.2 percent need major renovation. Indeed, nearly one in three bridges is in such a state of disrepair that traffic flows are negatively affected. Based on previous studies (Chicoine and Walzer 1984; Walzer and Chicoine 1987, 1989) of the cost of returning local road systems to acceptable condition, the cost of returning New England's local road system to an adequate level is well beyond the financial resources of many town governments.

According to town officials the single most pressing problem affecting the quality of the local road system, next to the effects of inflation, was the wear and tear of heavy equipment on the system. Many of the roads and bridges constituting the local system were not designed to handle the heavy trucks that are common today. The excessive weight of some equipment, in particular larger trucks, is stressing local roads and bridges beyond their engineered limits.

Over half (51.8 percent) of the responding officials acknowledged that heavy truck use has changed due to abandonment of railroad lines in the 1980s.

Management practices

Town road system services typically are provided through a relatively small, unsophisticated operation. Typically in the three states the town road official responsible for the provision of road services is a local citizen with little, if any, formal training in road engineering practices. On average, only half (50.8 percent) of the responding road officials have any formal training. In Maine, the majority of road officials view their responsibilities as a part-time commitment.

The duties of a road commissioner are diverse, ranging from administrative functions to direct road and equipment maintenance. In each of the three study states, the vast majority of the road officials' time is devoted to functions that require some form of formal engineering-related training. Despite the generally low level of technical training, road officials are expected to be 'jack-of-all-trades.' The majority of officials (nearly three in four) recognizes a need for training in all aspects of official duties ranging from basic engineering practices to administrative cost-cutting techniques.

The equipment used by road officials in providing road services received mixed reviews. Although the majority of this equipment was rated in serviceable condition, the aging of the equipment calls into question its effectiveness in the not-too-distant future. For example, the typical motor grader owned by a town is 14.4 years old, and the typical snow plow is 8.8 years old. While this equipment may be serviceable today, much of it will need to be replaced within the foreseeable future.

One method of affecting cost savings is through cooperative arrangements with other governmental units, such as other towns or the state. Towns cooperate in snow removal and sanding to open road faster and maintain a higher level of driving safety. Cooperative purchasing programs can allow participating governments to obtain substantial discounts, at times, on large purchases. Group purchase of snow plows, for example, can save the town thousands of dollars. Only 39.8 percent of the survey towns reported participating in some form of a cooperative arrangement with other governmental units. New Hampshire towns reported a higher rate of cooperation. Alternatively, towns may contract with private contractors to provide road services. Half of the towns contract out a portion of their road responsibility.

Recommendations

Decisions to act upon the following recommendations may be made at either the local or state level. Some recommendations may require a change of state statute, others may be directly undertaken by local officials. Before any of these recommendations are adopted, a full debate of the issues is warranted. In addition, several strategies have been presented through the text of the report.

Recommendation #1

Town governments need to enhance their revenue-generating capabilities. Currently, the majority of monies available to support the local road system is from local revenues and in particular the property tax. As local governments are faced with increasing responsibilities and escalating costs, the need for additional revenue is unquestionable. Survey responses indicate that road officials do not necessarily agree on the best alternative to pursue. Alternatives such as a local option sales tax, user dedicated fees, or increases in state aid through the motor fuel tax all require serious consideration.

Recommendation #2

Town officials can work to upgrade the management and basic engineering skills of their road commissioners. This can be achieved through attending seminars and workshops sponsored by the respective state local road programs, Cooperative Extension Services, and other educational programs. Many town officials reported a need for these types of programs and a strong interest in attending such programs. Funds to expand and upgrade programs already in existence will be recaptured through cost savings at the local level.

Recommendation #3

Towns need to develop detailed long-term strategic plans for road improvements. By developing such a plan local road officials would be in a better position to adapt to changing revenues, making better use of revenue windfalls and minimizing the impact of budget shortfalls. In addition, the community can decrease the likelihood of financing forced surface upgrades in response to traffic congestion. Strategic planning also helps the community identify future trouble areas in the local road system, hence allowing the town time to develop proactive policies.

Recommendation #4

Town officials must consider alternative arrangements for providing road services. Cooperative arrangements between neighboring towns to share equipment and personnel can result in significant cost savings. Group purchases of materials and certain pieces of equipment may also be helpful. Policies aimed at capturing economies of scale must be developed.

Recommendation #5

A larger network of technical assistance must be developed. Circuit-rider programs providing engineering expertise should be examined. Giving the county the authority and responsibility of hiring a highway engineer to aid town road officials within the county should also be considered.

REFERENCES

Chicoine, D.L., and N. Walzer. 1984. *Financing Rural Roads and Bridges.* Washington, DC: USDA Office of Transportation.

Choate, P., and S. Walter. 1981. *America in Ruins: Beyond the Public Works Pork Barrel.* Washington, DC: Council of State Planning Agencies.

Deller, S.C. 1991. Economic and social outcomes of public and private investments in physical infrastructure for growth and stability of rural economics. In *Economic Productivity & Adaptability,* 50–73. University Park, PA: Northeast Regional Center for Rural Development.

National Council on Public Works Improvement. 1988. *Fragile Foundations: A Report on America's Public Works.* Final Report to the President and The Congress, Washington, DC: U.S. Government Printing Office.

USDA. *Finance and Administration by Counties,* Washington, DC: USDA Office of Transportation.

U.S. Department of Transportation. *Highway Statistics,* Washington, DC: U.S. Department Of Transportation.

Walzer, N., and D.L. Chicoine, 1987. *Rural Roads and Bridges in the Midwest.* Washington, DC: USDA Office of Transportation.

Walzer, N., and D.L. Chicoine. 1989. *Rural Roads and Bridges: A Dilemma for Local Officials.* Washington, DC: USDA Office of Transportation.

Walzer, N., and D.L. Chicoine. 1989. *Rural Roads and Bridges: Federal and State Financing.* Washington, DC: USDA Office of Transportation.

APPENDIX

RURAL ROADS AND BRIDGES: A SURVEY OF LOCAL OFFICIALS

A Joint Project of the
University of Maine,
University of New Hampshire,
and University of Vermont

COUNTY_____

BACKGROUND INFORMATION:

MUNICIPALITY_____ 1990 ASSESSED VALUATION_____

POPULATION_____ MILES OF MUNICIPALITY ROADS_____

NUMBER OF BRIDGES ON MUNICIPALITY ROADS_____

EMPLOYMENT CONDITIONS:

1. A. Were you originally elected, appointed, or hired to be road commissioner or equivalent?

   Elected.....1
   Appointed....2
   Hired.....3

   B. On which basis are you paid?

   Per-Diem.....1
   Hourly.....2
   Salary.....3

2. A. How would you describe your road budget status?

   ___ adequate for current road traffic
   ___ inadequate for current road traffic
   ___ likely to be adequate for next 5 to 10 years with expected increases
   ___ current tax base is not adequate for expected demands on roads and bridges
   ___ property tax base has declined in recent years
   ___ other, specify_____

   B. If your town hires people for a road crew, does the level of pay you can offer enable you to hire satisfactory employees?

   Yes.....1
   No.....2

   If no, what hourly rate is needed: $_____/hr.

3. A. Approximately how many hours per week, on average, do you spend as road commissioner or equivalent?..... _____hrs/week

   B. Do you think that the duties of road commissioner or equivalent in your town requires a full-time (40 hours per week) or part-time commissioner?

   Full-time.....1
   Part-time.....2

   C. If part-time, how many hours per week are needed in summer work schedule?..... _____hrs/week

4. Approximately how many hours per month do you spend on each of the following tasks? (if none, please put "0" in appropriate blank)

   A. Town meetings..... ___hrs/mo.
   B. Administrative work (budget preparation, payrolls, other paperwork)..... ___hrs/mo.
   C. Supervision of projects (resurfacing, repairs etc.)... ___hrs/mo.
   D. Direct road construction..... ___hrs/mo.
   E. Direct road maintenance..... ___hrs/mo.
   F. Equipment maintenance..... ___hrs/mo.
   G. Discussing road issues with other town officials..... ___hrs/mo.
   H. Direct bridge maintenance..... ___hrs/mo.
   I. Other direct road/bridge work (please specify)..... ___hrs/mo.

   _____

   _____

5. A. Do you have other full-time or part-time town employees for road work?

   Yes.....1
   No.....2 (If no skip to Question 6)

   B. How many full-time employees do you have?

   _____ in summer
   _____ in winter

How many part-time employees so you have?

_____ in summer
_____ in winter

C. Is the employee or employees paid on an hourly or salary basis?

Hourly (skip to D).....1
Salary (skip to E).....2

D. What is the hourly wage rate?.....$_____/per hr.

E. What is the annual salary?.....$_____annual

6. For what jobs do you hire extra labor (in addition to full-time employees)? (Circle as many as apply)

None.....1	Snow plowing.....4
Bituminous resurfacing...2	Construction/ re-construction.....5
Grading.....3	Other (specify).....6

_____

7. Does your town contract with private contractors? (Circle all that apply)

All summer road maintenance.....1
Some summer road maintenance.....2
All winter road maintenance.....3
Some winter road maintenance.....4

8. Are you gainfully employed in an occupation other than town government?

Yes.....1
No.....2

If yes, please list the occupation:_____

9. In 1989, what was your approximate income from sources other than municipal?

____less than 5,000	___15,000 to 19,999
____5,000 to 9,999	___20,000 to 24,999
____10,000 to 14,999	___25,000 to 29,999
	___30,000 or over

TRAINING

10. Have you had formal training to prepare you for working with rural roads?

Yes.....1
No.....2 (If no skip to Question 11)

If yes, how was it obtained?

A.	State Department of Transportation programs.....	Yes....1	No....2
B.	Federal Highway Administration Programs (e.g. pavement management workshop).....	Yes....1	No....2
C.	Community College programs.....	Yes....1	No....2
D.	Workshops provided by state associations.....	Yes....1	No....2
E.	Conferences provided by supplies.....	Yes....1	No....2
F.	University extension programs.....	Yes....1	No....2
G.	Other (specify).....	Yes....1	No....2

_____

11. Are you interested in attending additional workshops or training programs?

Yes.....1
No.....2 (If no skip to question 12)

If yes, on what topics?

A.	Office management practices.....	Yes....1	No....2
B.	Payroll management.....	Yes....1	No....2
C.	Personnel management.....	Yes....1	No....2
D.	Road drainage technique.....	Yes....1	No....2
E.	Road management and planning.....	Yes....1	No....2
F.	Equipment maintenance programs.....	Yes....1	No....2
G.	Cooperative purchasing opportunities.....	Yes....1	No....2
H.	Bridge maintenance programs.....	Yes....1	No....2
I.	Equipment repair programs.....	Yes....1	No....2

J. Cost cutting techniques..... Yes....1 No....2
K. Other, Specify_____
_____

ROAD CONDITIONS

12. Please estimate the miles of road in each of the following average daily traffic trip categories.

Miles of Road	Average Daily Trips (ADT)
_____	0 through 25 ADT
_____	26 through 50 ADT
_____	51 through 150 ADT
_____	151 through 400 ADT
_____	400 ADT and above

13. In your town, what is the number of miles of:

paved surface?____mi. gravel surface?____mi.
earth surface? ____mi. bituminous surface?____mi.

14. What percentage of the road mileage needs:

major repair.....____%
not major, but more than regular maintenance...____%
only regular maintenance.....____%
100%

In your estimation how much would it cost to bring all the roads in your town to acceptable condition?.....$_____

15. A. What percentage of your bituminous roads are resurfaced:

Annually.....____%
every two years.....____%
less often than every two years.....____%

B. What is the approximate per mile price of bituminous material? $_____

____ No bituminous roads (check if applies)

C. What percentage of your gravel roads are graded:

Monthly....._____%
between 1 & 6 months....._____%
between 6 mos. & 1 year....._____%
Less often than once a year....._____%

D. What is the approximate per mile price of delivered gravel? $_____

16. A. What percentage of the bridges in your town need: (percentages should add to 100%)

____% complete replacement
____% not replacement, but major renovation
____% not major renovation, but more than regular maintenance
____% regular maintenance only

B. How much would it cost to bring the bridges in you town up to acceptable condition.....$_____
C. How many bridges have been rated as functionally obsolete or deficient....._____
D. How many are posted at less than maximum load limits or as narrow bridges....._____
E. On what percentage of bridges was maintenance deferred more than one year....._____
F. Are there instances in which these bridges negatively affect traffic flows or inhibit delivery of services..... Yes.....1 No.....2

EQUIPMENT

17. A. Does your town or road district own

	Yes	No	If Yes No. of each	Approx. age	Approx. annual operating cost
motor grader	1	2			
snow plow	1	2			
loader	1	2			
mower	1	2			
tractor	1	2			
end loader/tractor	1	2			
end loader/backhoe	1	2			

	Yes	No	If Yes No. of each	Approx. age	Approx. annual operating cost
truck (specify types and weights).....	1	2	_____	_____	_____
_____					
_____					
other(specify).....	1	2	_____	_____	_____
_____					
_____					

B. Rate the condition of your major equipment: (check appropriate rating)

	Excellent	Serviceable	Needs Major Repair	Very Inadequate
Motor Grader	_____	_____	____	_____
Truck(s)	_____	_____	____	_____
Snow plow	_____	_____	____	_____
Tractor	_____	_____	____	_____
Mower	_____	_____	____	_____
Loader	_____	_____	____	_____

18. A. Do you have cooperative arrangements with towns, villages, plantations?

Yes.....1
No.....2

B. Are these arrangements for: (circle as many as apply)

a. lease of equipment..... 1
b. purchase of gravel.....2
c. purchase of asphalt.....3
d. purchase of salt.....4
e. sharing of personnel....5
f. sharing of equipment...5
g. spreading asphalt.....6
h. bridge repair.....7
i. snowplowing/sanding...8
j. other (specify).....9
_____

C. Who are these arrangements with? (circle as many as apply)

I. other towns.....1
II. villages or plantations.....2
III. State DOT.....3

D. What are the major advantages obtained from cooperative arrangements?

_____

_____

19. Indicate the source of your information about new products and new techniques: (circle one)

State Dept. of Trans.....1
Other Municipalities.....2
Trade publications.....3
Other (specify).....7
Suppliers.....4
Conferences.....5
Assoc. Magazine.....6
_____

SOURCES OF REVENUE

20. A. Do you use State Local Road Assistance (Block Grant) money for road purposes?

Yes.....1
No.....2

B. If yes, approximately what percentage of the block grant receipts is spent on roads each year?_____%

C. What has been the impact of block grant monies (circle as many as apply)?

reduce taxes.....1
avoid tax increase.....2
purchase needed equip..3
upgrade surfaces.....4
purchase maintenance supplies.....5
repair bridges.....6
replace bridges.....7
construct sheds.....8
other (specify).....9
_____
_____

21. How can the financing of roads and bridges be improved? (check as many as apply)

__a. improved communications with public
__b. improved grant administration
__c. state legislative action
__d. federal legislative action
__e. working with state municipal associations
__f. greater technical assistance regarding existing programs
__g. local participation on state advisory groups
__h. local participation in county or regional advisory groups

22. If additional funds were raised for towns roads and bridges, what revenue sources would you prefer to be added or increased? (please rank 1 through 6)

__ property tax
__ motor fuel tax
__ sales tax
__ fees with revenues dedicated to road construction and repair
__ State aid
__ Federal aid
__ other (please specify)_____

SETTING WORK PRIORITIES

23. Does your town have a specific road improvement plan or budget for the next several years?

__ No
__ No, but being considered
__ Yes, a general plan
__ Yes, a specific and detailed plan

24. A. If towns had to cut back on road and bridge expenditures, in what order would you proceed in your town? (please rank 1 through 5)

__ close some roads completely
__ close some roads for the spring
__ reduce maintenance and repair of all roads
__ reduce snow plowing
__ reduce certain roads to a lower service level or surface type
__ other, specify_____

B. Assuming expenditures on town roads had to be reduced and that you could not do everything needed, as a local official, what are the items you feel most important in setting priorities for road and bridge work? (please rank 1 through 7)

___ access to farms
___ school bus routes
___ access to state primary roads
___ access to homes
___ rural mail routes
___ access to recreational areas
___ fire and emergency vehicle routes
___ other, specify_____

C. Could some roads and bridges in your town be permanently closed without imposing a major inconvenience on the citizens in your town?

Yes.....1 No.....2

If YES, approximately how many miles....._____mi.
If YES, approximately how many bridges....._____bridges

25. How pressing do you find the problems listed below?

		Major Problem			No Problem
a.	Bridge replacement and repair	1	2	3	4
b.	Impact of inflation on costs of materials and labor	1	2	3	4
c.	Need for additional revenue	1	2	3	4
d.	Need for new or additional equipment	1	2	3	4
e.	Need to upgrade heavily travelled roads or crossings	1	2	3	4
f.	Need to upgrade all road surfaces	1	2	3	4

		Major Problem			No Problem
g.	Wear and tear on roads due to construction traffic	1	2	3	4
h.	Wear and tear on roads due to subdivisions	1	2	3	4
i.	Wear and tear on roads due to school buses	1	2	3	4
j.	Wear and tear on roads due to heavy vehicles	1	2	3	4
k.	Wear and tear on roads due to seasonal tourist traffic	1	2	3	4
l.	Wear and tear on roads for other reasons (specify) _____	1	2	3	4
m.	Improvement on drainage structures	1	2	3	4
n.	Annual turnover of local officials	1	2	3	4
o.	Hiring or retaining qualified personnel	1	2	3	4
p.	Salary level	1	2	3	4
q.	Working relationship with State Dept. of Transportation	1	2	3	4

26. Has the use of roads by heavy trucks changed due to abandonment of railroad lines in the 1980's?

Yes.....1
No.....2

27. As town officials, who do you feel should pay for local road services? (please list the percent of each item)

_____ landowners or developers
_____ local road users
_____ users of all roads, state and local, in the state
_____ all local taxpayers
_____ all state taxpayers
_____ users of all roads in the United States
_____ other (please specify)_____
100%

CHARACTERISTICS OF ROAD COMMISSIONER OR EQUIVALENT

28. A. Please list your age. _____

B. What is the highest level of your education completed?

grade school.....1
some high school.....2
high school grad.....3
some college.....4
college graduate.....5
post grad. work.....6

C. How many consecutive years have you served as road commissioner?

One.....1
Two.....2
Three.....3
Four to six.....4
Seven to ten.....5
more than ten.....6

D. What was your approximate salary from the town in FY 1989 (nearest $500)? _____

29. Other comments that might draw attention to the financial status of rural roads:

_____

_____

_____

_____

THANKS FOR YOUR PARTICIPATION IN THIS SURVEY.
PLEASE RETURN THE COMPLETED QUESTIONNAIRE IN THE ENCLOSED ENVELOPE.