Projected Household Costs of Mandated Environmental Infrastructure Investments

AUGUST 1995

New England Interstate Water Pollution Control Commission

and

EPA-New England

LETTER OF INTRODUCTION

On behalf of EPA New England, each of the six New England States, and the New England Interstate Water Pollution Control Commission, we are pleased to distribute this report on *Projected Household Costs for Mandated Environmental Infrastructure Investments.*

The states and EPA are responsible for assuring compliance with federal environmental laws and regulations. One of the key issues associated with these requirements is the cost of compliance—to communities, to business and industry, and to individuals. To date, the discussions on cost have been driven largely by anecdotes and have been hampered by a lack of reliable information on actual costs and impacts of compliance.

This report presents the results of a year-long effort by EPA and the six New England states to help fill this information gap. This effort is purposefully narrow in scope, with a focus on the household costs of compliance with current federal wastewater treatment, drinking water, and solid waste management requirements affecting New England communities. It is the only project of its kind in the country being done on a regional scale, and it is a significant step forward in raising the quality of the discussion on cost and affordability of environmental requirements by providing actual data. It is also an indication of our commitment to addressing the issue of cost of compliance head on with real data.

The bulk of this report consists of presentation and analysis of cost data from about 100 wastewater, drinking water, and solid waste facilities serving about 300 communities throughout New England. The analysis is limited to discussion of findings and trends that can be clearly seen when looking at the data; any broader analysis would be stretching the reliability of the data.

The cost data are presented as household costs for two reasons: this provides a common denominator for information from six states that come from cities, towns, villages within towns and groups of towns, and, more importantly, this puts the information in numbers that the average person can directly relate to.

Projected Household Costs of Mandated Environmental Infrastructure Investments is for federal, state and local officials, environmental groups, community organizations, economists, businesses, citizens—anyone who wants a better understanding of and appreciation for the costs and economic impacts of compliance with federal environmental requirements. It represents a significant contribution to the ongoing discussions about the actual costs of environmental "mandates." We commend it to you.

Robert W. Varney, Commissioner
NH Department of Environmental Services

John P. DeVillars, Regional Administrator
EPA New England

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ACKNOWLEDGMENTS

The New England Interstate Water Pollution Control Commission (NEIWPCC) wishes to thank each and every state staff person who participated in this study. (See Appendix C.) Our goal was an ambitious one, and the spirit of interstate and interagency cooperation carried us through to a successful completion. This pilot project would also not have proceeded as quickly, efficiently, and with such cost savings without the efforts of Steve Silva, EPA-New England, who developed, tested, and refined the household rate projection spreadsheet, developed all the guidance materials for state staff using the model, and provided technical oversight of this project from start to finish. Thanks also go to Larry MacMillan, EPA-New England, and Gary Champy, Vermont Department of Environmental Conservation, for their work in generating the graphics used in this report. A special thanks goes to the late Paul Keough, EPA-New England, whose support for this project at its inception is gratefully remembered.

This report was prepared by the NEIWPCC with a cooperative agreement (CP 001748-01) from the U.S. Environmental Protection Agency, New England Office.
 The New England Interstate Water Pollution Control Commission was established by an Act of Congress in 1947 and remains the oldest agency in the Northeast United States concerned with coordination of the multimedia environmental activities of the States of Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont.

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1 INTRODUCTION

Unfunded mandates... Underfunded mandates... The cost of environmental compliance... Affordability... Adequate financial assistance. These and other issues are being and will continue to be raised at the local, state, and federal levels of government as we all work to protect public health and the environment in the most cost effective and affordable ways. This report is an attempt by the New England states and EPA-New England to identify the costs of compliance with federal environmental regulations to the average household and to estimate the future costs of compliance while assuming no future financial assistance.

This report addresses only the public wastewater, drinking water, and solid waste facilities that have been or will be constructed as a result of federal regulation. Minimum national environmental standards for these environmental infrastructure projects are set forth in the Clean Water Act, the Safe Drinking Water Act, and the Resource Conservation and Recovery Act (RCRA). With this focus on federal requirements, the New England states gathered 1993 budget information for wastewater and drinking water systems and for costs associated with landfill closures in selected communities that must comply with one or more of these federal requirements. With the use of a spreadsheet designed by EPA-New England, the residential share of the cost information on systems and communities was translated into per household costs, projected over a 20-year period, and presented both as annual projected household costs and as percent of median household income (% MHI).

In a very short period of time, state agency staff were able to compile community budgetary and expense data for roughly 100 systems in the wastewater, solid waste, and drinking water programs areas. The roughly 300 communities involved in this project represent approximately 20 percent of the total number of cities and towns in New England. For 41 communities, cost information was gathered in all three program areas, making it possible to perform cumulative cost projections. The size of the communities studied varied greatly. For example, households served by wastewater systems ranged from 50 in Rutland Town, Vermont to 228,000 in Boston, Massachusetts.

The methodology piloted in this project has proven to be useful to states for generating comparative assessments of costs to communities. The experience has helped states develop a better understanding of what might be considered "typical" costs. The methodology can also be used as a means of checking cost projections developed by others.

This pilot project focused on the residential share of compliance costs, using a representative sample of New England communities. However, this report does not attempt to gauge the relative affordability of these projects against the costs of other governmental or private services or to assess the communities' ability to pay. The issue of affordability, while recognized in this report, was largely beyond the scope of the study.

> ***The mission of the New England Environmental Infrastructure Needs Analysis Project is to develop a better understanding and appreciation for the costs and economic impacts of compliance with wastewater treatment, drinking water, and solid waste management requirements affecting New England communities.***

I INTRODUCTION

BACKGROUND

In July 1993, the New England State Environmental Commissioners and EPA-New England agreed to work cooperatively to generate the information necessary for evaluating financial stress on households as a result of federal water, wastewater and waste disposal regulations. This was a major concern to Environmental Commissioner Robert Varney, State of New Hampshire, who advanced the idea to the other New England states. New England's environmental commissioners/secretaries have endeavored to ensure that the Clean Water and Safe Drinking Water Act reauthorizations are crafted in a manner that balances the financial assistance needed to achieve program compliance with annual household user cost affordability.

In November 1993, the six New England States, EPA-New England, and the New England Interstate Water Pollution Control Commission (NEIWPCC) set in motion a project to develop an accurate and consistent method for projecting the future costs of compliance with environmental requirements at the state and regional levels. The group's goal was to produce as much data as possible in a short period of time on household costs associated with federally mandated wastewater, water supply, and solid waste services. The information and methodology acquired through this project was designed to help the states calculate annual household costs, estimate future environmental infrastructure costs, assess the individual and cumulative costs of compliance in the areas of wastewater, water supply, and solid waste, and to share this cost information on a regional basis.

Infrastructure Needs Per Environmental Program

- **Wastewater:** federally enforceable projects (CSOs, updating WWTPs, secondary and advanced WWTP needs, sewers, sludge management).

- **Water Supply:** capital remediation projects (requirements to meet various national primary drinking water regulations, such as filtration, corrosion control, controls for VOCs and various organic and inorganic contaminants).

- **Solid Waste:** landfill closure, cost of waste management resulting from landfill closure.

As a starting point, EPA-New England staff developed a household cost rate projection model (spreadsheet), which was validated by comparing it with existing cost projections from a variety of municipal projects. The spreadsheet provides an accurate and consistent tool for projecting household cost rates in terms of "annual cost" and "percent median household income" (% MHI). (See Appendix A.)

During the spring and summer of 1994, state personnel from each program area (wastewater, water supply, and solid waste) collected and developed cost information for a sampling of communities and entered the cost information into the spreadsheets. The states forwarded the media-specific data to EPA for consolidation and summarization. EPA then worked with the states and NEIWPCC to depict the cost data graphically from various perspectives.

GENERAL FINDINGS

This project yielded a series of lists, tables, charts, and graphs that offer snapshots of the costs and economic impacts of complying with wastewater, drinking water, and solid waste management requirements in the sampled communities. In analyzing the results, members of the study team were able to make the following general observations:

- Estimated future capital costs of compliance for systems surveyed total approximately $3.5 billion and are apportioned in approximate amounts by program area as follows: $2.5 billion wastewater, $742 million drinking water, and $163 million solid waste.
- Cost projections vary widely among the three program areas, and within each media. Generally, per household costs for wastewater systems ($378 median annual cost) are higher than for drinking water ($272 median annual cost), both are higher than costs for solid waste ($204 median annual cost).
- Projected annual household costs resulting from a single federal requirement (either wastewater, drinking water, or solid waste) range from > $1,000 per year to < $100 per year. The results expressed as % MHI range from > 3% MHI to < 0.5% MHI.
- For the 41 communities with cost information for all three program areas, the projected combined annual per household costs ranged from a high of $1,692 per year to a low of $338 per year. In terms of % MHI, cost projections ranged from 6.19% MHI to 0.72% MHI. These data also show that approximately 80 percent of the 3-media communities studied have combined household costs greater than $500 per year. Of the 3-media communities, 68.2 percent face 25 to 75 percent rate increases.
- Some large as well as small communities are faced with disproportionately large costs. The study sample happens to include many very small communities (<1,000 households served).

I INTRODUCTION

COST VS. AFFORDABILITY

The projected costs presented in this report must be kept in perspective for two important reasons: First, the federal environmental compliance costs examined herein represent only part of the burden supported by communities. Costs for schools, bridges, and compliance with other federal and state requirements must be considered in any assessment of affordability.

Second, there has been no assessment of the communities' ability to pay these costs. Although "percent median household income" (% MHI) has been used as a general indicator or trigger level of affordability, % MHI is an incomplete measure of ability to pay. Other factors such as disposable income and bond indebtedness are also important. Thus, while the cost data in this report provide useful information on the costs and impacts of some environmental mandates, they should be used with caution.

To date, there is no national standard to measure affordability. Although an affordability "trigger" of 1.5 percent median family income was mentioned in the proposed Clean Water Act revision, that rate may not be an appropriate one to use. (In this study, data on communities with projected wastewater rates greater then 1.5% MHI are included for informational purposes only.) Since the choice of the 1.5% MHI trigger for affordability is questionable for a single program area, the appropriateness of trying to assign an affordability trigger for the cumulative costs associated with multiple projects facing a community is even more suspect.

The task of measuring affordability is complicated by an assortment of factors that affect a community's ability to pay—the availability and accuracy of the data, the site-specific nature of the situation, and the subjective nature of the analysis. Affordability decisions are influenced by factors such as property tax rates, land valuation, total revenues and expenses, population, number of tax payers, number of service users, outstanding debt/history of payments, growth index, percent of industrial/commercial base, delinquency rates, projects costs, and future regulatory requirements.

These factors must be identified for each community. Once identified, some important questions must be answered: Are the data readily available? Are the data routinely or periodically updated to reflect current conditions? Which data fairly portray affordability across a wide range of municipal services provided (schools, fire, police, ambulance, roads, etc., as well as services related to environmental compliance)? The question of affordability on a state or regional basis must draw on the expertise of economists, financial consultants, bond rating houses, as well as state and local financial managers.

PROJECT ASSUMPTIONS

- The spreadsheet model assumes an inflation rate of three percent and that all future capital expenses are bonded at six percent for 20 years.
- All rate projections are reported in current (1994) dollars, not in future year inflated dollars.
- The "current rate" or base annual costs for a community often include substantial amounts of financial assistance for past compliance with environmental mandates. However, the projected future costs to communities ("projected rate" and "% MHI") assume **no** additional grants or loans.
- Many communities put significant capital costs on the tax rate and operation and maintenance (O&M) costs on the user charge. Because, in this study, there was no way to know how a community might choose to apportion future costs, the following conservative assumption was used:

  > Future infrastructure capital and operation and maintenance (O&M) expenses are funded in the same manner that current expenses are raised (i.e. taxes vs. user charges).

This assumption is particularly important for smaller systems that serve a small percentage of households in the community. For example, if a community currently raises funds for a service, such as wastewater treatment, solely from user charges, the cost projection methodology assumes future revenues (both capital and O&M) will all be raised by user charges. If, in actuality, future capital costs were to be put on the tax base and spread over the entire community rather than just on the relatively small number of users tied into the treatment system, actual household rates would be much lower than those projected in this study.

- The 41 "3-media" communities are those for whom states had cost information in each of the wastewater, solid waste, and drinking water program areas. All 41 communities face future capital costs associated with an environmental mandate in at least one program area. In those communities, costs in the other two program areas represent past compliance costs that are included in the base or current annual cost. Of these 41 communities, 22 face future capital costs in two areas; 16 face future capital costs in all three program areas. (See Table 4.)
- The goals of this study were to project future household costs for as many communities or for as large a representation of the state population as possible and to assess the magnitude of cumulative costs where possible. Some communities have already complied with environmental mandates, but are still paying off the costs. For these communities, current costs of past compliance are reflected in the base or "current rate" and are carried into the projected annual costs (and % MHI). Future capital costs for future compliance are included only in the projected annual costs (and % MHI). For example, if the future costs (Tables 5-7) for a particular program area are greater than the current annual costs ("current rate" from data Tables 11-16), then the community faces a future capital cost for complying with an environmental mandate. If the future and current costs are the same, then the future annual costs ("projected rate") represent the future costs related to past compliance.

III

PROJECT QUALIFICATIONS

PROJECT QUALIFICATIONS

- The states made every effort to obtain the best data available for this study. Communities were not chosen by random selection, and states differed in their method of selection. An effort was made to include a sampling of both different-sized communities and a mix of communities affected by costs associated with one, two, and three program areas. Methods by which cost data were gathered also varied among states. Since this project was not designed as a rigorous scientific study, caution should be used in extrapolating any of these results to show statewide or regional cost trends.

- The lack of uniformity among community accounting practices made it difficult to gather data for this study and required that states use their best professional judgment in developing the figures. For example, if a community's accounting system lumped the costs together, the state may have had to apportion costs for a given program area between user charges and the tax base so that the data could be entered into the study spreadsheet . EPA-New England provided the states with guidance for consistency in data gathering, which is included in Appendix A.

- Political boundaries do not necessarily coincide with the physical boundaries of environmental infrastructure system service areas. In some cases, a system serves only part of a community; while other systems may serve several communities. This reality makes it difficult to gather financial information on a community-wide basis. For the purposed of this study, states used their own judgment in selecting communities and developing cost information to use in the spreadsheet. This same boundary issue means that, when looking at the cumulative costs for the 41 communities, the residents of one community may not all bear the same costs if different utility systems service the community.

- The cost rates, in terms of percent median household income for projects that don't serve the entire community, may need to be adjusted to reflect varying income levels in different parts of the community.

- This report reflects costs of compliance with federal mandates associated with wastewater treatment, drinking water, and solid waste. The report does not reflect those costs related to other federal program areas, or media (e.g., air program requirements), or with state-specific mandates associated with the cost of compliance.

- This study predates the pending reauthorization of the Safe Drinking Water Act. The new Act may add many requirements which are not included in this project and which could increase the costs for drinking water infrastructure.

- This report is not exclusively reflective of federal mandates; it also includes the base costs of providing service.

- The environmental costs identified in this study only include those capital costs foreseen by each state and may not include all the costs that will be needed to upgrade existing wastewater and drinking water treatment facilities.

III

PROJECT QUALIFICATIONS

- The assessment of cumulative impact in this report focuses on both projected capital costs and costs of past compliance that the "3-media" communities face in the three program areas. In terms of these communities, although cost information is available in each program area, it does not mean that a community faces future capital costs in all three areas. The study looks at the cumulative costs of compliance, not just the cost of future mandates.
- This project reports the impact of costs in terms of annual household cost and as % MHI. Neither of these rates are a measure of affordability. A community's ability to pay the cost is a function of many factors and is very site specific.
- States and communities are faced with a whole host of other mandates, such as schools, roads, prisons, bridges, and health care, not just environmental. All of these costs affect a community's ability to pay.

IV

DATA AND RESULTS PRESENTATION

RESULTS AT A GLANCE

This section consists of a series of graphics that depict the study results in a variety of formats, provide a description of the purpose of each category of graphics, and interpret the results shown by those graphics.

Tables and Figures

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TABLES 9-10
Cost Tables (by state and media).

TABLES 11-16
Summary database

SIZE OF SAMPLE

Tables 1-4 show the sample size in perspective by state and by media.

- **Table 1** - the total number of communities in each state.
- **Table 2** - the total number of public systems serving municipalities in each state.
- **Table 3** - the number of systems sampled, per program area and by state.
- **Table 4** - the number of communities in this study where data could be obtained in all three program areas.

Table 1 TOTAL NUMBER OF TOWNSHIPS/CITIES PER STATE

STATE	TOWNSHIPS/CITIES
Connecticut	169
Maine	492
Massachusetts	351
New Hampshire	234
Rhode Island	39
Vermont	255
Totals	**1,540**

Table 2 TOTAL NUMBER OF PUBLIC SYSTEMS SERVING MUNICIPALITIES PER STATE

STATE	WASTEWATER	SOLID WASTE	WATER	PUBLIC SYSTEMS
Connecticut	84 *	119	604 ***	807
Maine	154	36	118	308
Massachusetts	231	345	517 ***	1,093
New Hampshire	98	40	124	262
Rhode Island	19	4 **	30	53
Vermont	125	11 **	160	296
Totals	**711**	**555**	**1,553**	**2,819**

* 125 communities receive wastewater service in Connecticut.

** Rhode Island has 4 solid waste districts (one of which receives 93% of the state's municipal solid wastes.); Vermont has 11 districts serving all communities in the state.

*** The number of water supply systems in Connecticut and Massachusetts includes small private systems.

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DATA AND RESULTS PRESENTATION

Table 3 PUBLIC SYSTEMS SAMPLED IN THE STUDY PER STATE

STATE	WASTEWATER	SOLID WASTE	WATER	PUBLIC SYSTEMS
Connecticut	14	6	13	33
Maine	11	5	8	24
Massachusetts	15	16	19	50
New Hampshire	18	40	39	97
Rhode Island	5	5	4	14
Vermont	30	16	25	71
Totals	**93**	**88**	**108**	**289**

Table 4 NUMBER OF THREE MEDIA COMMUNITIES PER STATE

	NUMBER OF COMMUNITIES FACING FUTURE CAPITAL COSTS IN:			
STATE	3-MEDIA	2-MEDIA	1-MEDIA	TOTAL COMMUNITIES
Connecticut	2	9	1	12
Maine	4	1	0	5
Massachusetts	7	1	2	10
New Hampshire	2	0	0	2
Rhode Island	1	3	0	4
Vermont	0	8	0	8
Totals	**16**	**22**	**3**	**41**

RANKING OF SAMPLE COMMUNITIES BY COST (HIGH TO LOW) FOR EACH PROGRAM AREA & FOR 41 3-MEDIA COMMUNITIES*

Tables 5 - 8 list the sample communities. Residential cost information is provided in terms of projected future costs per year and as percent of median household income. The communities are sorted in descending order by projected annual household costs.

- **Tables 5 - 7** list the sample communities by media.
- **Table 8** ranks the 41 three-media communities by projected future annual household costs and shows percent of median household income for those communities.

RESULTS SHOW:

Residential cost projections vary widely among the three media and within each media.

Maximum projected future annual costs per community range from:

- $2,819 down to $71 in wastewater ($378 median value);
- $979 to $4 for solid waste ($204 median value);
- $1,073 to $85 for drinking water ($272 median value).

Communities exhibited the following ranges in percent median household income:

- 7.65% - 0.17% MHI wastewater;
- 3.06% - 0.01% MHI solid waste;
- 4.30% - 0.19% MHI drinking water.

In the 41 3-media* communities, costs ranged from:

- $1,692 - $338 max. annual cost ($898 median value);
- 6.19% - 0.72% MHI.

* See page 5 for definition of 3-media community.

IV

DATA AND RESULTS PRESENTATION

Table 5 PROJECTED COSTS FOR WASTEWATER COMMUNITIES SURVEYED, RANKED BY ANNUAL COST PER HOUSEHOLD

COMMUNITY	PROJECTED COSTS PER YEAR ($)	% MEDIAN HH INCOME
Oak Bluffs, MA	$2,819	7.65%
Charlton, MA	1,607	3.20
Newtown, CT	1,428	1.98
Ashfield, MA	1,059	2.68
Rangeley, ME	1,054	3.90
Thomaston, ME	894	2.98
Rollinsford, NH	857	1.92
N Brookfield, MA	814	2.16
Marshfield, MA	769	1.33
Rochester, NH	719	1.79
ColdbrookFD1, VT	705	2.58
Chicopee, MA	694	2.03
Northfield, VT	688	2.94
Fort Kent, ME	678	2.89
Scituate, MA	650	1.06
Bridgeport, CT	641	1.89
Jaffrey, NH	625	1.62
Brandon, VT	623	2.69
Sherburne, VT	591	1.87
Springfield, VT	565	2.29
Milford, NH	552	1.20
New Haven, CT	530	1.73
Boston, MA	500	1.45
Pittsford, VT	489	1.55
Barton, VT	483	2.81
Manchester, MA	480	0.77
Woodstock, VT	480	1.81
Randolph, VT	476	1.79
Swanton, VT	476	2.13
Newport City, VT	468	2.31
Orwell, VT	467	1.87
New Bedford, MA	459	1.71
Enosburg, VT	453	2.01
Bangor, ME	435	1.49
Winooski, VT	431	1.60
Milton, MA	431	0.68
Westboro, MA	429	0.82
Augusta, ME	429	1.41
Lisbon, ME	412	1.35
Orleans, VT	411	1.92
Bar Harbor, ME	405	1.29
Portland, ME	401	1.28
Richford, VT	398	2.05
Fair Haven, VT	396	1.64
West Warwick, RI	396	1.06
Chelsea, VT	378	1.48
Bridgewater, VT	372	1.25

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Table 5 PROJECTED COSTS FOR WASTEWATER COMMUNITIES SURVEYED, RANKED BY ANNUAL COST PER HOUSEHOLD *(CONTINUED)*

COMMUNITY	PROJECTED COSTS PER YEAR ($)	% MEDIAN HH INCOME
Rutland, VT	353	1.39
Morrisville, VT	349	1.80
Bath, ME	337	0.95
Ashland, NH	337	1.12
Jewett City, CT	328	2.26
Manchester, CT	326	0.68
Dover-Foxcroft, ME	326	1.16
Hampton, NH	324	0.67
Berlin, NH	320	1.08
W. Rutland, VT	320	1.11
Johnston, RI	314	0.81
N.Providence, RI	314	0.84
Providence, RI	314	1.20
Portsmouth, NH	308	0.85
Nashua, NH	302	0.63
Lebanon, NH	294	0.77
Hardwick, VT	293	1.32
Bellows Falls, VT	289	1.34
Milo, ME	287	1.05
Brighton, VT	283	1.55
Mars Hill, ME	281	1.30
Castleton, VT	279	0.92
Keene, NH	271	0.73
New Market, NH	271	0.71
Montpelier, VT	270	0.98
Greenfield, MA	268	0.85
Waterbury, CT	250	0.69
Durham, NH	238	0.47
Farmington, NH	227	0.62
Epping, NH	209	0.48
Manchester, NH	207	0.55
W. Hartford, CT	205	0.35
Orange, MA	193	0.62
Vergennes, VT	188	0.75
Newington, NH	187	0.35
Bennington, VT	184	0.74
Bloomfield, CT	178	0.31
Windsor, CT	171	0.29
Hartford, CT	163	0.62
Wethersfield, CT	154	0.30
Westfield, MA	140	0.35
Rocky Hill, CT	138	0.18
E. Hartford, CT	129	0.30
Merrimack, NH	116	0.18
Charlestown, RI	71	0.17

IV

DATA AND RESULTS PRESENTATION

Table 6 PROJECTED COSTS FOR SOLID WASTE COMMUNITIES SURVEYED, RANKED BY ANNUAL COST PER HOUSEHOLD

COMMUNITY	PROJECTED COSTS PER YEAR ($)	% MEDIAN HH INCOME
Moultonboro, NH	$979	2.81%
Errol,NH	811	3.06
Milton, NH	692	1.78
Rehobeth, MA	526	0.93
Groton, NH	494	1.26
Effingham, NH	432	1.47
Shelburne, VT	422	1.10
Bennington, VT	389	0.96
Kingston, NH	372	0.67
Plainfield, VT	371	1.10
Northfield, VT	371	1.34
Montpelier, VT	371	1.13
Swanton, VT	345	1.31
Tuftonboro, NH	335	0.94
Newport City, VT	321	1.34
Orleans, VT	321	1.27
Barton, VT	320	1.57
New Hampton, NH	313	0.79
Groton, CT	310	0.77
Fair Haven, VT	309	1.04
Farmington, NH	309	0.84
Freedom, NH	309	0.86
Alton, NH	302	0.82
Thornton, NH	301	0.78
Winchester, NH	300	0.90
Harrisville, NH	287	0.69
Deerfield, NH	274	0.56
Troy, NH	272	0.78
Windham, NH	263	0.76
Whitefield, NH	259	0.92
Unity, NH	255	0.69
Chester, NH	254	0.46
Marshfield, MA	253	0.44
Hardwick, VT	247	0.94
Colebrook, NH	242	0.84
Morrisville, VT	241	1.05
Wakefield, NH	234	0.70
Tamworth, NH	232	0.77
Bellows Falls, VT	227	0.89
Ashland, NH	222	0.74
Manchester, MA	214	0.34
Milton, VT	206	0.54
Hinesburg, VT	206	0.43
Richmond, VT	206	0.41
Goffstown, NH	204	0.41
Hampton, NH	199	0.41
Marborough, NH	196	0.53
Bedford, NH	189	0.25

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Table 6 PROJECTED COSTS FOR SOLID WASTE COMMUNITIES SURVEYED, RANKED BY ANNUAL COST PER HOUSEHOLD *(CONTINUED)*

COMMUNITY	PROJECTED COSTS PER YEAR ($)	% MEDIAN HH INCOME
ColdbrookFD1, VT	185	0.57
Nashua, NH	180	0.51
Manchester, NH	177	0.47
Sanbornton, NH	166	0.42
Greenfield, MA	163	0.51
Exeter, NH	162	0.37
Lisbon, ME	161	0.53
Walpole, NH	160	0.49
Hinsdale, NH	159	0.50
Merrimack, NH	156	0.25
Southampton, MA	154	0.29
Manchester, CT	149	0.26
N Brookfield, MA	137	0.36
Derby, CT	136	0.32
New Bedford, MA	133	0.50
Berlin, NH	129	0.44
Westfield, MA	120	0.30
Pittsford, VT	119	0.32
Littleton, NH	114	0.38
Providence, RI	110	0.42
Augusta, ME	109	0.36
Waterbury, CT	104	0.29
Charlestown, RI	101	0.24
New Haven, CT	95	0.31
Westboro, MA	76	0.24
Orange, MA	76	0.24
New Ipswich, NH	73	0.15
Yarmouth, MA	72	0.22
Portland, ME	68	0.22
Rangeley, ME	68	0.25
Edgartown, MA	65	0.15
Mars Hill, ME	64	0.30
Chicopee, MA	64	0.19
Newtown, CT	63	0.09
West Warwick, RI	54	0.14
N. Providence, RI	51	0.13
Scituate, MA	49	0.08
New Canaan, CT	42	0.04
Dover-Foxcroft, ME	36	0.10
Johnston, RI	35	0.09
Fairhaven, MA	4	0.01

Table 7 PROJECTED COSTS FOR DRINKING WATER COMMUNITIES SURVEYED, RANKED BY ANNUAL COST PER HOUSEHOLD

COMMUNITY	PROJECTED COSTS PER YEAR ($)	% MEDIAN HH INCOME
N. Hero, VT	$1,073	3.04
Wells River, VT	805	4.30
Berlin, NH	672	2.27
Fairfax, VT	639	1.79
Rutland Town, VT	563	1.45
Rangeley, ME	551	2.04
Bartlett, NH	546	1.62
Richmond, VT	545	1.29
Hyde Park, VT	530	2.10
Woodsville, NH	514	1.65
Manchester, CT	488	1.02
W. Rutland, VT	488	1.70
Bellows Falls, VT	477	2.22
Hinesburg, VT	463	1.15
Bridgeport, CT	448	1.32
Hardwick, VT	422	1.91
Jeffersonville, VT	418	1.26
New Haven, CT	418	1.37
Ashland, NH	393	1.30
Ossipee, NH	389	1.31
Milton, VT	387	1.21
Augusta, ME	385	1.26
Southampton, MA	377	0.71
Tisbury, MA	375	1.12
N. Stratford, NH	372	1.40
Milo, ME	370	1.35
Lebanon, NH	368	0.97
Freedom, NH	367	1.02
Wolfeboro, NH	366	1.05
Ashfield, MA	361	0.66
Andover, NH	360	1.23
Windsor, VT	359	1.18
Bethlehem, NH	356	1.04
Swanton, VT	353	1.58
Jaffrey, NH	352	0.91
Pittsford, VT	344	1.09
N.Bennington, VT	326	1.24
N Brookfield, MA	321	0.85
Edgartown, MA	321	0.75
Fair Haven, VT	320	1.27
Boscawen, NH	315	0.85
Adams, MA	314	1.06
Orleans, MA	312	0.89
Marshfield, MA	312	0.54
Morrisville, VT	308	1.59
Manchester, MA	308	0.49
Jewett City, CT	305	2.11
New Hampton, NH	296	0.75
Dover-Foxcroft, ME	296	1.05
Concord, NH	294	0.71
Stowe Village, VT	277	1.33
Hanover, NH	274	0.45
Plainfield, VT	274	0.96
Northfield, VT	272	1.16

(Continued on page 17)

Table 7 PROJECTED COSTS FOR DRINKING WATER COMMUNITIES SURVEYED, RANKED BY ANNUAL COST PER HOUSEHOLD *(CONTINUED)*

COMMUNITY	PROJECTED COSTS PER YEAR ($)	% MEDIAN HH INCOME
Portland, ME	272	0.86
Bristol, VT	266	1.06
Newport, NH	264	0.62
Tilton, NH	258	0.76
West Warwick, RI	256	0.68
Hartford, VT	251	0.80
New London, NH	248	0.45
Newport City, VT	243	1.20
Groveton, NH	242	0.78
Salem, NH	239	0.62
Laconia, NH	237	0.69
Mars Hill, ME	236	1.09
Carroll, NH	230	0.75
Keene, NH	226	0.61
Oak Bluffs, MA	221	0.60
W. Hartford, CT	221	0.38
Meredith, NH	217	0.68
Lancaster, NH	215	0.64
Campton Prec., NH	214	0.60
Littleton, NH	205	0.67
Newtown, CT	201	0.28
Troy, NH	200	0.57
Orange, MA	199	0.64
Scituate, MA	198	0.32
Fort Kent, ME	196	0.83
Pittsfield, NH	195	0.56
Goffstown, NH	195	0.39
Providence, RI	193	0.74
N. Providence, RI	193	0.50
Bloomfield, CT	192	0.34
Contoocook, NH	189	0.34
Windsor, CT	184	0.31
Somersworth, NH	183	0.47
Bangor, ME	178	0.61
Hartford, CT	177	0.67
Portsmouth, NH	176	0.49
Greenfield, MA	175	0.55
Exeter, NH	175	0.41
Milton, MA	173	0.28
Gorham, NH	168	0.41
Chicopee, MA	167	0.49
Charlestown, RI	166	0.39
Wethersfield, CT	166	0.32
Rocky Hill, CT	149	0.19
Hillsboro, NH	149	0.37
Fairhaven, MA	144	0.40
E. Hartford, CT	139	0.32
Proctor, VT	136	0.49
Lincoln, NH	134	0.52
Hancock, NH	126	0.26
Agawam, MA	121	0.27
Waterbury, CT	118	0.33
Westfield, MA	115	0.29
New Bedford, MA	85	0.32

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Table 8 PROJECTED COSTS FOR COMMUNITIES WITH AVAILABLE DATA FOR WASTEWATER, SOLID WASTE, AND DRINKING WATER, RANKED BY COMBINED ANNUAL COST PER HOUSEHOLD

COMMUNITY	PROJECTED COMBINED COSTS PER YEAR (DOLLARS)	% MEDIAN HH INCOME
Newtown, CT	$1,692	2.35%
Rangeley, ME	1,673	6.19
Marshfield, MA	1,334	2.30
Northfield, VT	1,331	5.70
Bridgeport, CT	1,214	3.57
Swanton, VT	1,174	5.24
N. Brookfield, MA	1,135	3.37
Berlin, NH	1,121	3.78
Milton, MA	1,048	1.67
New Haven, CT	1,043	3.41
Newport City, VT	1,032	5.15
Fair Haven, VT	1,025	4.24
Manchester, MA	1,002	1.60
Bellows Falls, VT	993	4.61
Manchester, CT	963	2.02
Hardwick, VT	962	4.34
Pittsford, VT	952	3.02
Ashland, NH	952	3.15
Chicopee, MA	925	2.70
Augusta, ME	923	3.02
Morrisville, VT	898	4.63
Scituate, MA	897	1.46
Jewett City, CT	809	2.39
Portland, ME	741	2.36
West Warwick, RI	706	1.89
New Bedford, MA	677	2.53
Dover-Foxcroft, ME	658	2.34
Providence, RI	617	2.35
Greenfield, MA	606	1.92
Windsor, CT	592	1.00
Mars Hill, ME	581	2.69
N. Provdence, RI	558	1.46
W. Hartford, CT	487	0.83
Bloomfield, CT	487	0.86
Waterbury, CT	472	1.31
Orange, MA	468	1.51
Hartford, CT	459	1.75
Rocky Hill, CT	415	0.72
E. Hartford, CT	378	0.87
Westfield, MA	375	0.95
Charlestown, RI	338	0.79

PROJECTED ANNUAL COSTS FOR 3-MEDIA COMMUNITIES RANKED BY HOUSEHOLDS SERVED

One goal of the study was to look at the cumulative impact of the costs of compliance on communities. **Figure 1** shows the effect of community size on the cost data, per program area (wastewater, solid waste, and drinking water) and collectively, for the 41 communities in the study with cost information in all three program areas.* The communities are ranked by households served in descending order. General benchmarks separate groups of communities.

RESULTS SHOW:

Cost projections vary widely among communities of different sizes; extreme costs are projected for both small and large communities. This study included a high proportion of small communities. In this particular subset of the data (3-media communities), 68 percent of the communities are small (< 10,000 households).

* The 41 "3-media" communities are those for whom states had cost information in all three program areas (wastewater, solid waste and drinking water). All 41 communities face future capital costs associated with an environmental mandate in at least one program area; in those communities, costs in the other two program areas represent past compliance costs that are included in the base or current annual cost. Twenty-two communities face future capital costs in two areas; 16 face future capital costs in all three program areas. (See page 5 for further explanation.)

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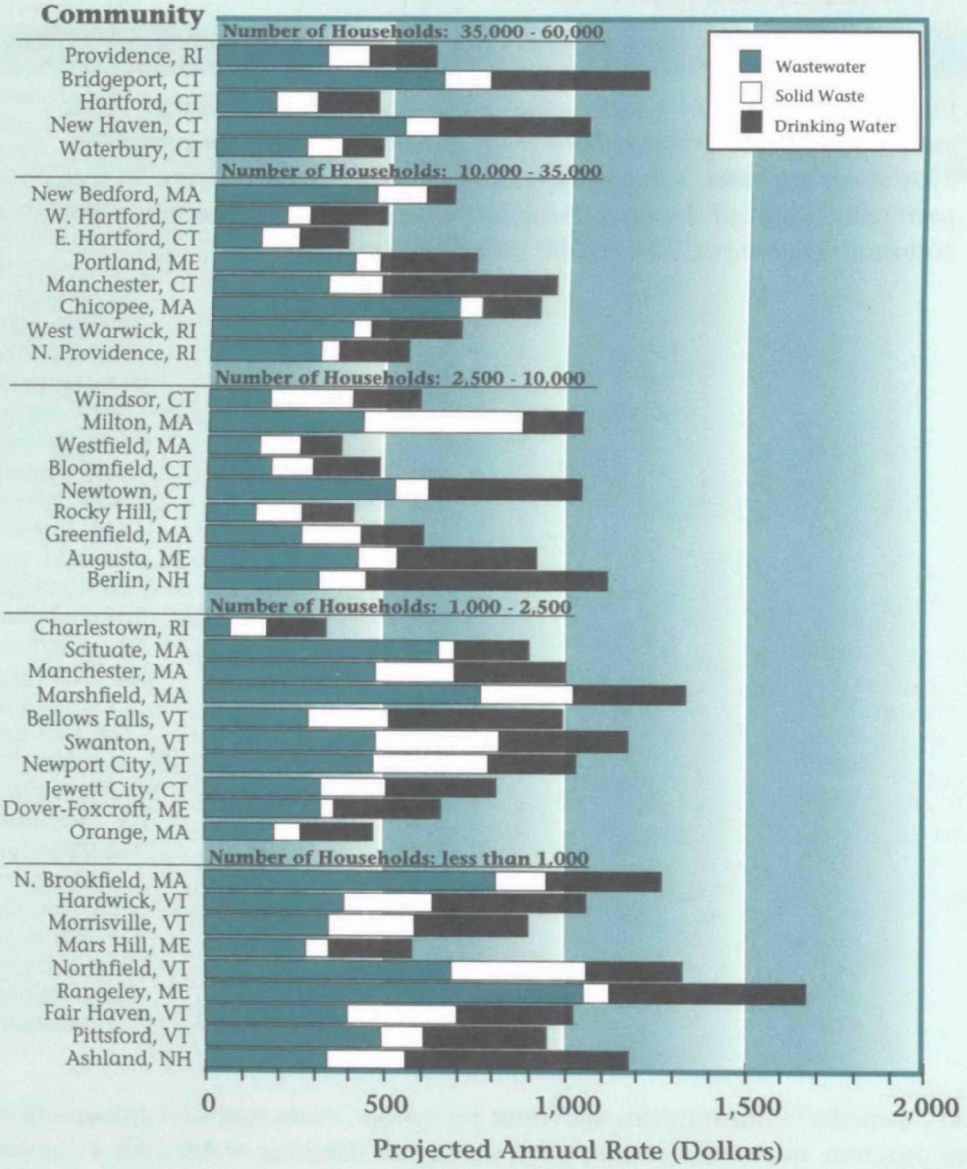
DATA AND RESULTS PRESENTATION

FIGURE 1

Wastewater, Solid Waste and Drinking Water Costs Combined for 41 3-Media Communities

(Communities sorted by households served in descending order)



Indicated trends are for the surveyed communities. These trends may not be representative of all affected communities.

BAR CHARTS SHOWING PERCENT OF COMMUNITIES VS. PROJECTED COSTS AND PERCENT MEDIAN HOUSEHOLD INCOME FOR EACH MEDIA AND COMBINED MEDIA

Figures 2-9 show the overall distribution of community cost projections for individual program areas and for the 3-media combined. The charts show the cost ranges within which the greatest number of communities fall, as well as overall range of the "outlying" communities. For each program area (wastewater, solid waste, and drinking water), and for the 3-media combined, there are two charts. The first shows the distribution of communities (in terms of % of communities) vs. projected annual costs. The second in each set shows the distribution of communities vs. percent median household income (% MHI).

RESULTS SHOW:

The communities tend to cluster in definite cost ranges, which are different for the three program areas. Generally, the costs for wastewater are higher than for drinking water, and both are higher than costs for solid waste.

The biggest grouping of wastewater impacts falls within the $300-500 per year and 1-2% MHI ranges. The biggest grouping of solid waste impacts falls within the $100-400 per year and 0.5% MHI ranges. The biggest grouping of drinking water impacts falls within the $200-400 per year and 0.5-1.5% MHI ranges. For the 3-media communities, the range is generally from $400-1,300 per year with peaks at $500 and $1,000. The distribution of communities is fairly broad, ranging from 1-4% MHI, with several communities exceeding 4% MHI.

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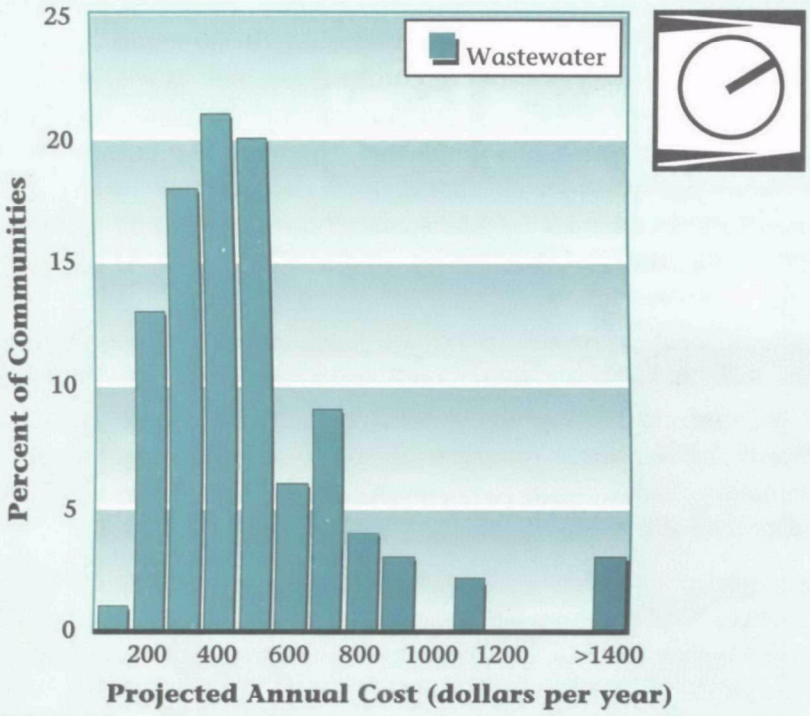
FIGURE 2

Wastewater: Projected Annual Household Costs

Percent of Communities vs. Dollars Per Year Per Household (current dollars)

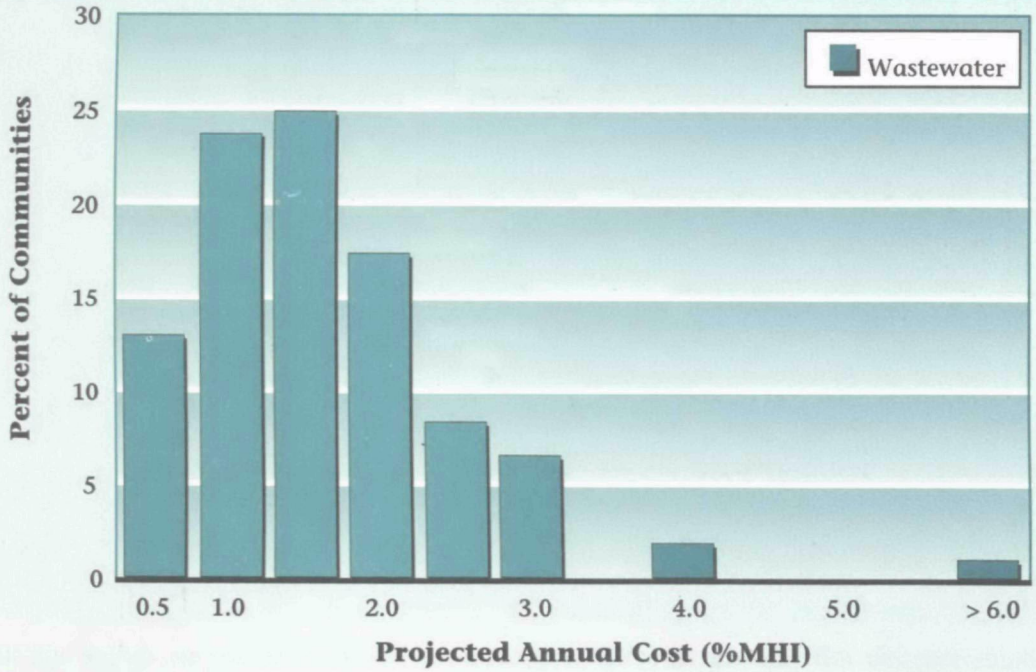


92 communities; 3 extreme values over $1400

FIGURE 3

Wastewater: Projected Annual Household Costs

Percent of Communities vs. Percentage of Median Household Income



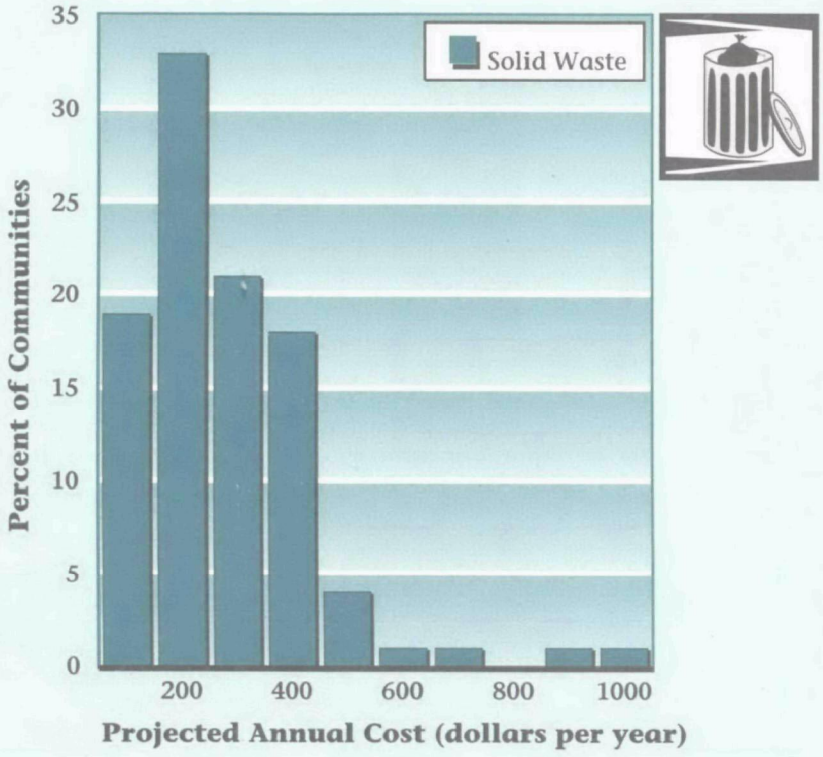
92 communities

Indicated trends are for the surveyed communities. These trends may not be representative of all affected communities.

FIGURE 4

Solid Waste: Projected Annual Household Costs

Percent of Communities vs. Dollars Per Year Per Household (current dollars)

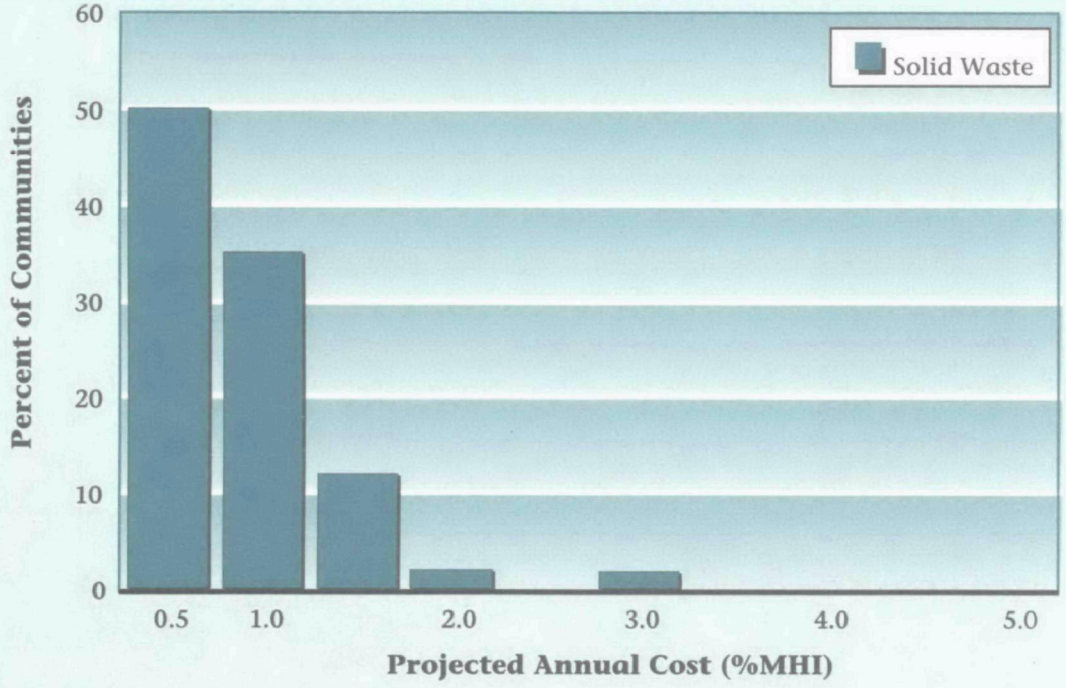


89 communities

FIGURE 5

Solid Waste: Projected Annual Household Costs

Percent of Communities vs. Percentage of Median Household Income



89 communities

Indicated trends are for the surveyed communities. These trends may not be representative of all affected communities.

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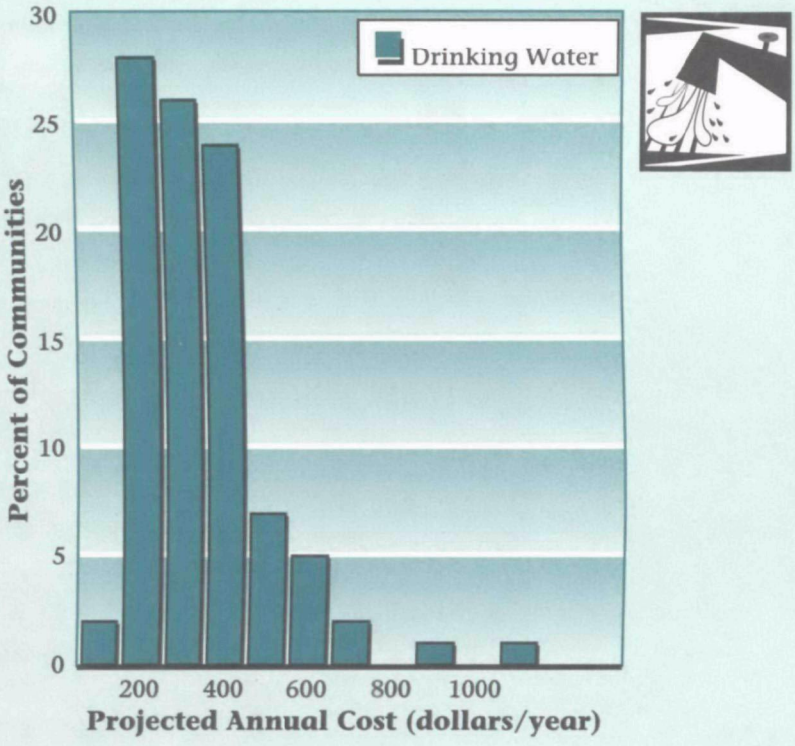
FIGURE 6

Drinking Water: Projected Annual Costs

Percent of Communities vs. Dollars Per Year Per Household (current dollars)

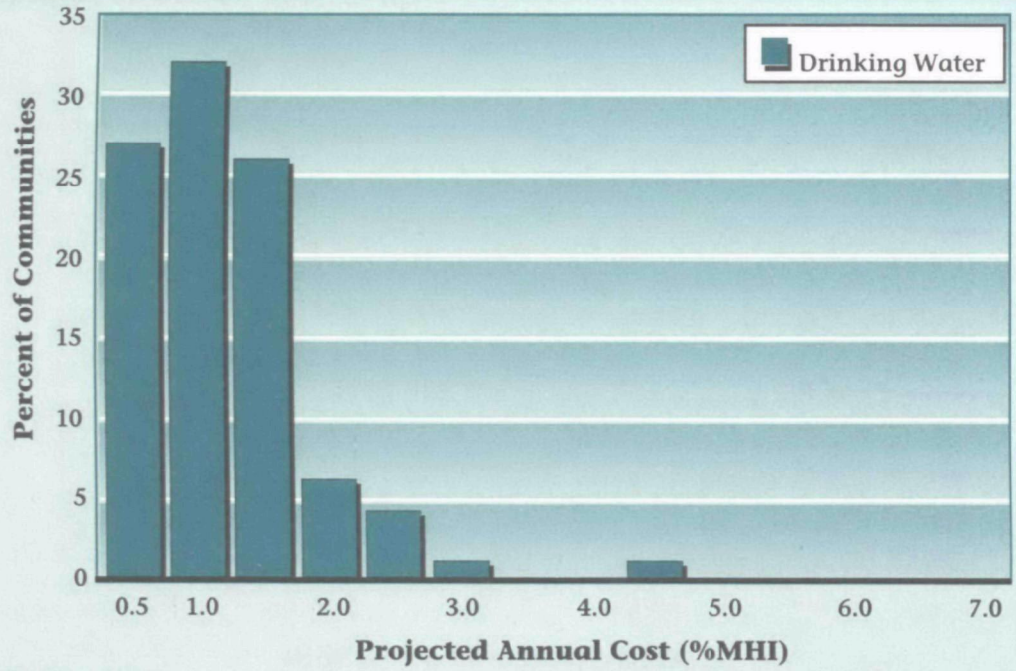


108 communities

FIGURE 7

Drinking Water: Projected Annual Costs

Percent of Communities vs. Percentage of Median Household Income



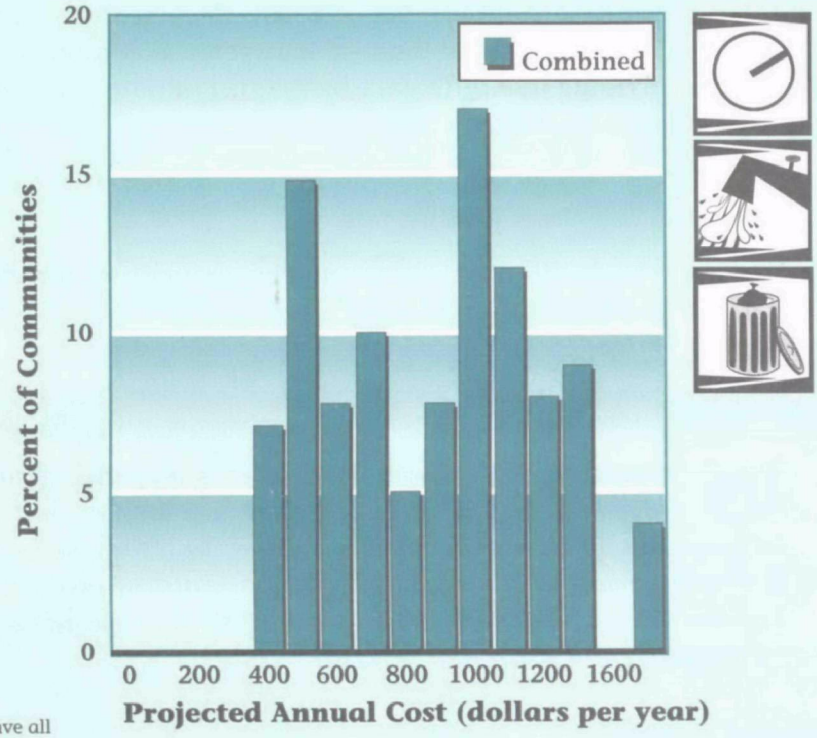
108 communities

Indicated trends are for the surveyed communities. These trends may not be representative of all affected communities.

FIGURE 8

Three Media Communities: Projected Annual Household Costs

Percent of Communities vs. Combined Annual Cost (dollars per year per household)

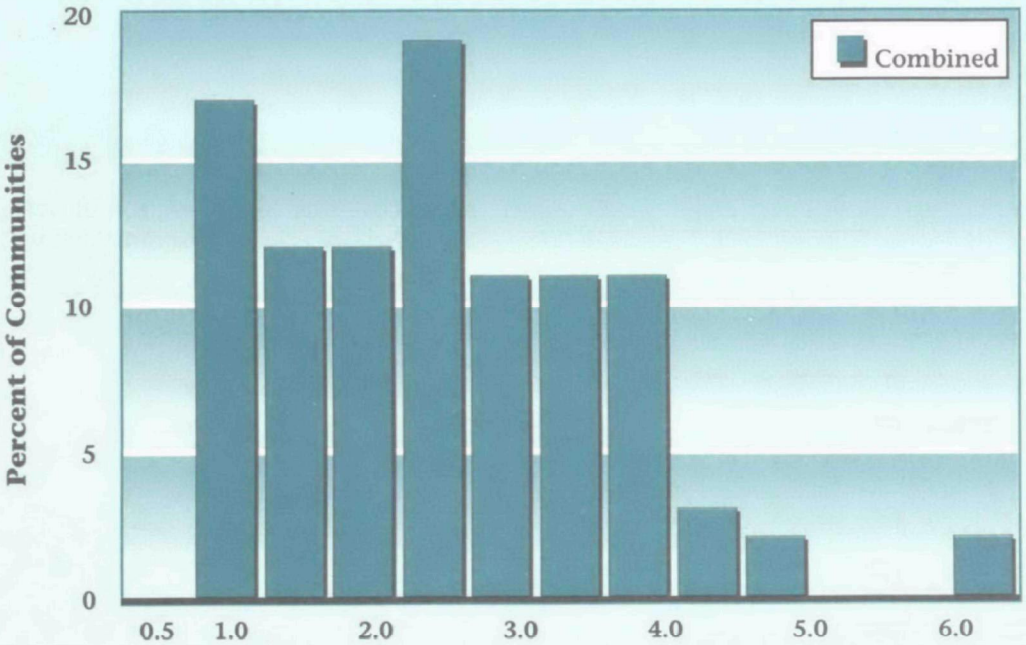


41 communities have all three media represented

FIGURE 9

Three Media Communities: Projected Annual Household Costs

Percent of Communities vs. Percentage of Median Household Income



41 communities have all three media represented

Indicated trends are for the surveyed communities. These trends may not be representative of all affected communities.

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BAR CHART SHOWING THE PERCENT INCREASE IN HOUSEHOLD COSTS DUE TO FUTURE COMPLIANCE

Figure 10 shows the economic impact of future compliance with environmental mandates for the 41 3-media communities. The percent increase in cost for each community is calculated by taking the difference between the combined projected rate and current rate and dividing that difference by the current rate (data are taken from right-hand "total" columns in Tables 11-16*):

$$\frac{\text{projected rate - current rate}}{\text{current rate}} = \text{percentage rate increase}$$

Figure 10 shows the distribution of percentage rate increases for the 41 3-media communities in the study.

RESULTS SHOW:

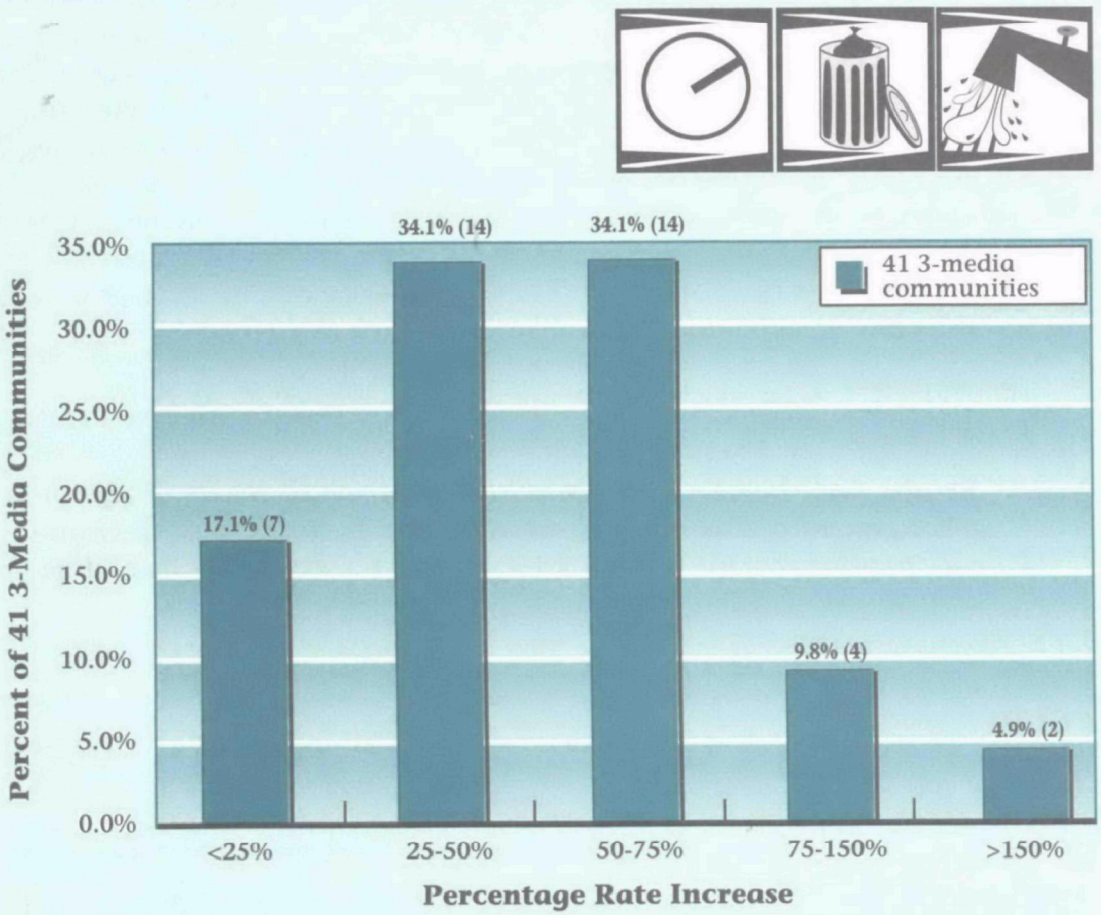
Of the 41 3-media communities studied, the majority of communities (68.2%) face cost rate increases between 25 percent and 75 percent. A smaller proportion (17.1%) face costs that represent less than a 25 percent increase; 9.8 percent of the communities face cost increases between 75 and 150 percent; 4.9 percent (two communities) face cost increases greater than 150 percent.

*The column for projected cost rate in Tables 11-16 is labeled as "max. rate."

FIGURE 10

Percent Increase in Houshold Costs Due to Future Compliance for 41 Three-Media Communities Surveyed

Percentage Rate Increase vs. Percentage of Communities



Indicated trends are for the surveyed communities. These trends may not be representative of all affected communities.

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LINE GRAPHS SHOWING PERCENT OF COMMUNITIES WITH COST IMPACTS LESS THAN PROJECTED ANNUAL HOUSEHOLD COSTS FOR EACH MEDIA & COMBINED MEDIA

Figures 11-14 show the cumulative distribution of cost projections for communities in the study in terms of percent of communities with costs less than a given projected annual household cost vs. annual costs or % MHI. Graphs 1 and 2 are useful for comparing data from the three program areas. Graphs 3 and 4 show the cumulative distribution of cost projections for the 3-media communities in the same terms. These graphs are useful for picking out percentages of households paying less than or equal to critical levels of cost. Using these graphs, it is possible to determine maximum annual cost or % MHI for a given percentage of communities. Alternately, the graphs can be used to pick a given annual cost or % MHI to see what percentage of communities have rates equal to or less than that value.

RESULTS SHOW:

Results from these graphs depend on what specific levels of cost or what percent of communities are of interest to the reader. For example, 20 percent of the communities sampled for wastewater had future annual costs less than approximately $200.

FIGURE 11

Projected Annual Household Costs by Media

Percent of Communities with Rates less than Annual Household Costs (current dollars)

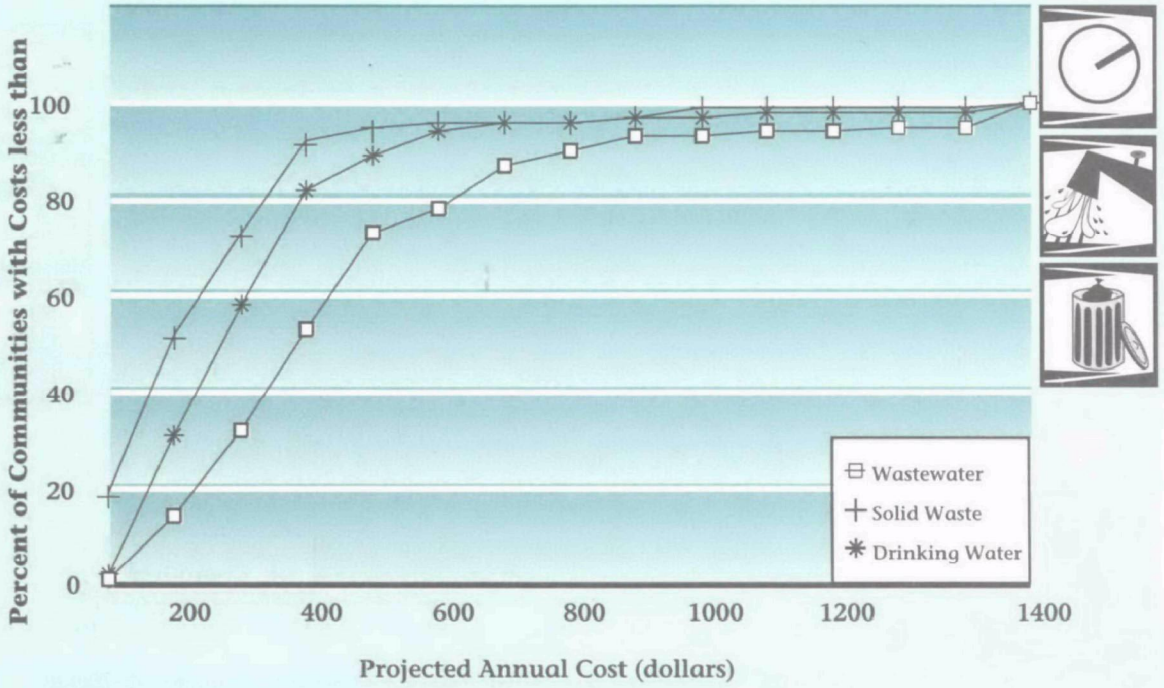
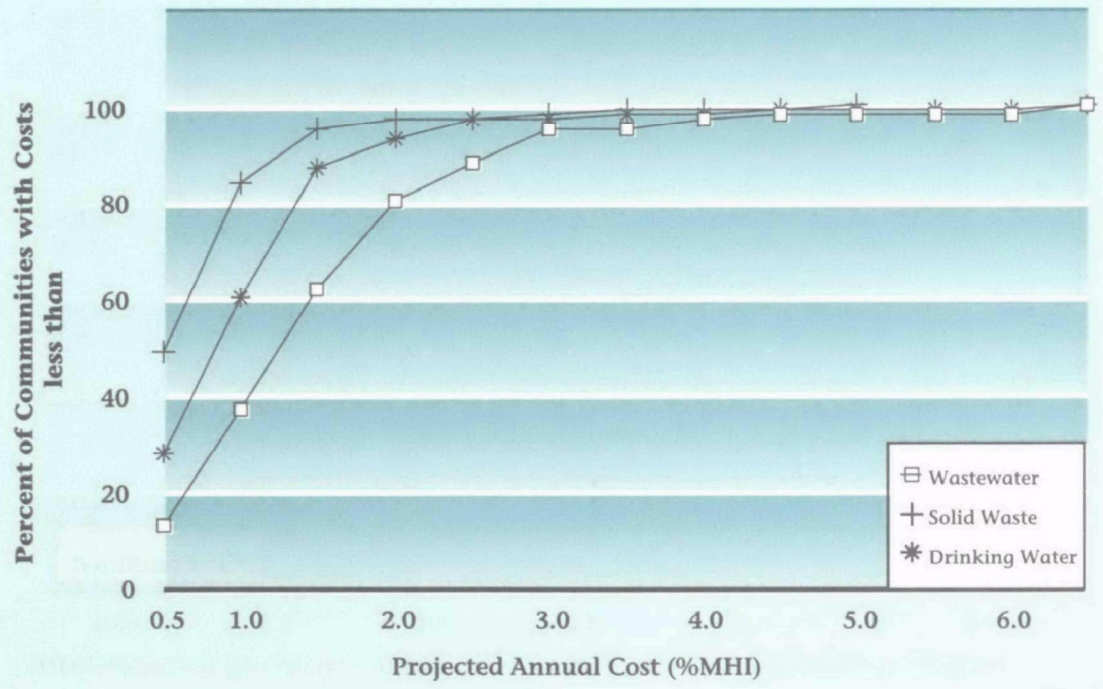


FIGURE 12

Comparison of Projected Annual Household Costs by Media

Percent of Communities with Rates less than the Percentage of Median Household Income



Indicated trends are for the surveyed communities. These trends may not be representative of all affected communities.

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FIGURE 13

Projected Annual Household Costs of the 41 Three-Media Communites

Percent of Communities with Rates less than Projected Annual Household Costs (current dollars)

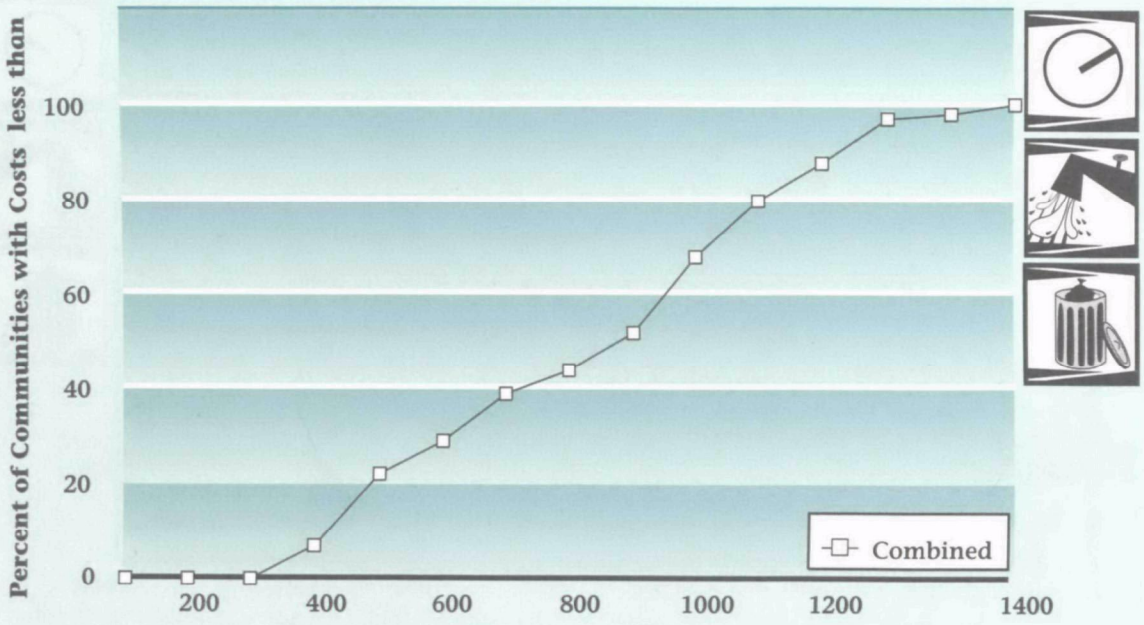
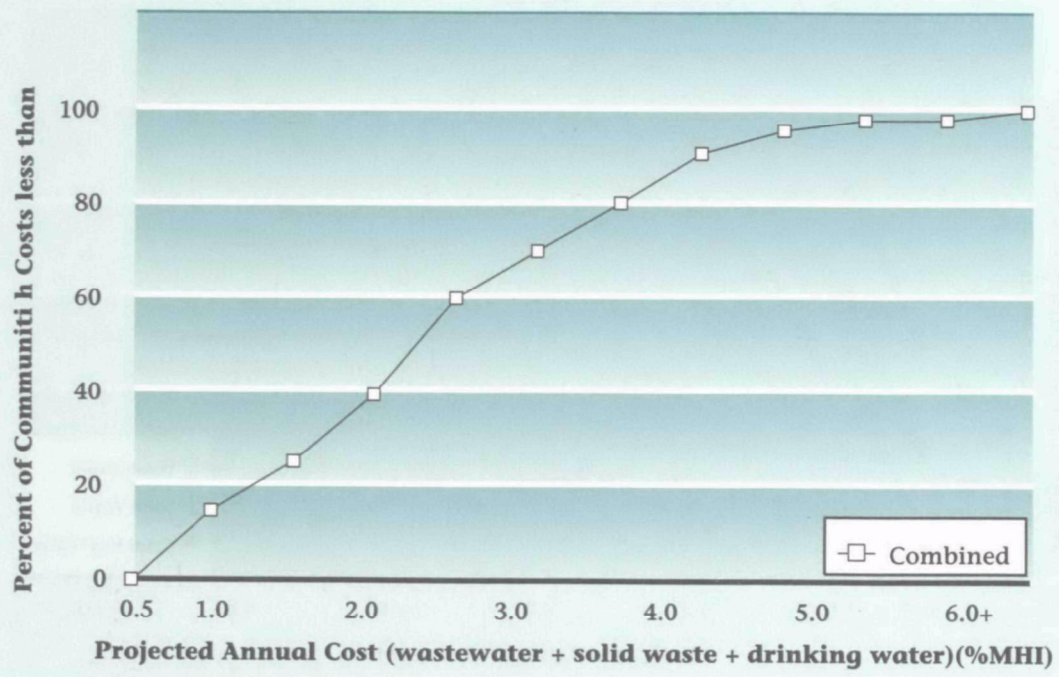


FIGURE 14

Projected Annual Household Costs of the 41 Three-Media Communites

Percent of Communities with Rates less than the Percentage of Median Household Income



Indicated trends are for the surveyed communities. These trends may not be representative of all affected communities.

SAMPLE WASTEWATER COMMUNITIES WITH COSTS GREATER THAN 1.5% MHI (SORTED BY NUMBER OF HOUSEHOLDS SERVED)

Figure 15 focuses on the annual costs for the subsection of wastewater communities that have costs greater than 1.5% MHI. The communities are sorted by number of households served in descending order. The sorting screen of 1.5% MHI was chosen simply to enable presentation of a data subset that would fit easily on one page. (See Table 5. for a complete data set of wastewater communities.) Although the 1.5% MHI level has been mentioned in the proposed Clean Water Act revisions, use of this same level here does not represent an endorsement of that level as a cut-off point for affordability.

RESULTS SHOW:

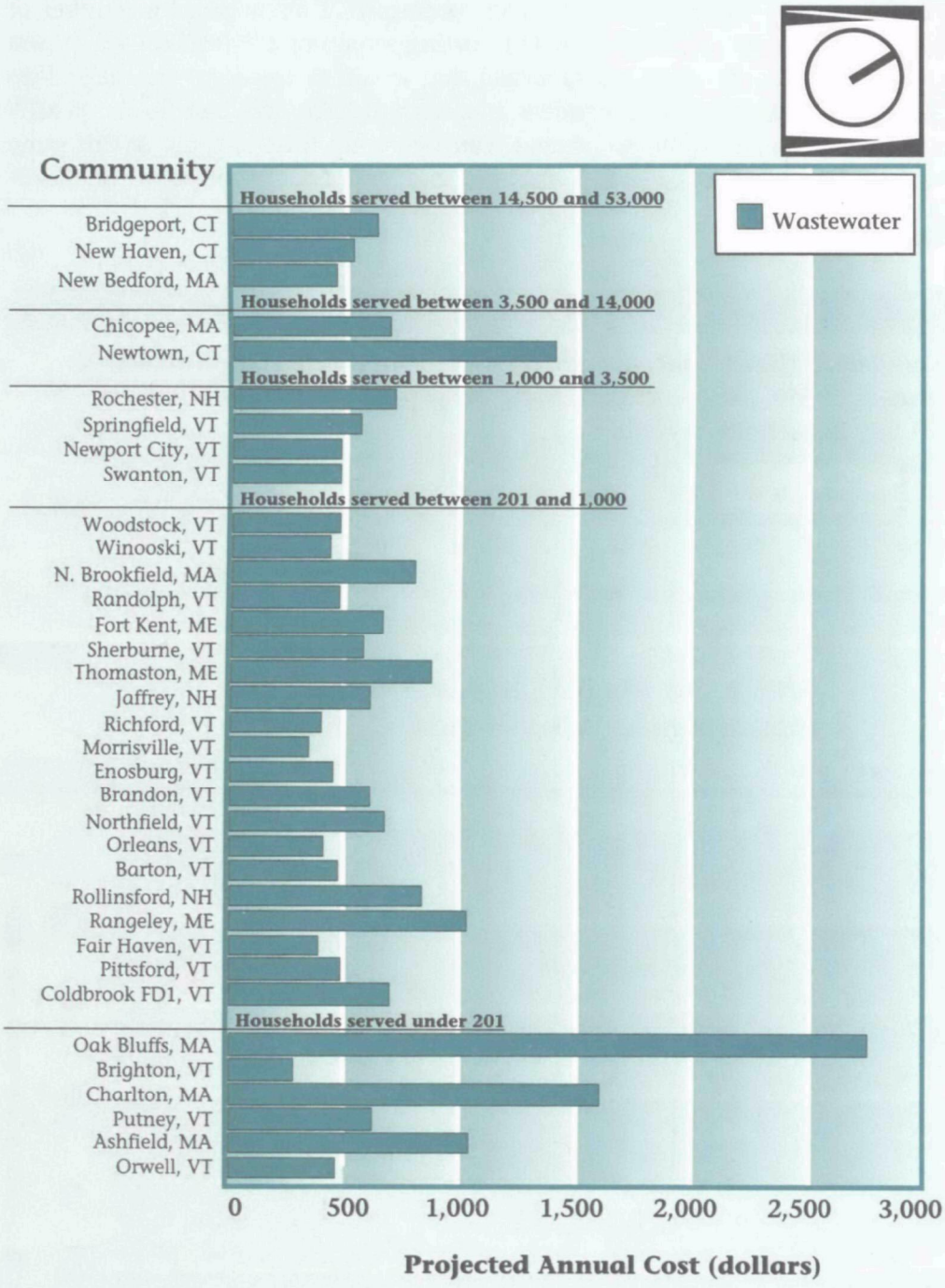
This chart shows that the universe of communities studied with costs > 1.5% MHI includes both large and small communities (<1,000 households served).

FIGURE 15

Wastewater: Projected Annual Costs (dollars)

Communities with costs exceeding 1.5% MHI

(Communities sorted by households served in descending order)



Indicated trends are for the surveyed communities. These trends may not be representative of all affected communities.

COST TABLES (BY STATE AND MEDIA)

Tables 9 and 10 provide a state-by-state breakdown of estimated capital costs and % MHI ranges for each program area.

- Table 9 provides the estimated future capital cost of environmental infrastructure for the three program areas, by state, **for the sampled communities only.**
- Table 10 places the costs of compliance for the systems in the study into three different ranges of % MHI.

RESULTS SHOW:

Overall, these tables show that, for the sampled communities, as far as future capital costs and % MHI are concerned, infrastructure costs vary among the program areas: wastewater is most costly, followed by drinking water, followed by solid waste.

For the sample communities studied:

- Future capital costs for wastewater are estimated at $2.5 billion; Costs for wastewater systems are fairly evenly distributed among the three ranges of % MHI, with the greatest number of system costs greater than 1.5% MHI.
- Capital costs for solid waste are estimated at $162 million; the vast majority of the solid waste system costs fall in the 0-0.99% MHI range.
- For drinking water, capital costs are estimated at $742 million; a majority fall in the 0-0.99% MHI.

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Table 9 ESTIMATED FUTURE CAPITAL COST OF COMPLIANCE ($) BY STATE AND PROGRAM FOR SYSTEMS SURVEYED IN THIS STUDY (OPERATION AND MAINTENANCE COSTS ARE NOT INCLUDED)

STATE	WASTEWATER	SOLID WASTE	WATER	FUTURE CAPITAL COST
CT	$740,000,000	$31,356,000	$539,275,000	$1,310,631,000
ME	156,093,000	834,000	13,625,000	170,454,000
MA	844,862,000	37,237,000	45,137,000	927,236,000
NH	275,336,000	86,921,000	61,837,000	423,892,000
RI	468,000,000	6,448,000	50,789,000	525,237,000
VT	63,873,000	*	31,631,000	95,504,000
Totals	**$2,548,164,000**	**$162,796,000**	**$742,294,000**	**$3,452,954,000**

* No major future solid waste expenditures predicted in Vermont.

Table 10 NUMBER OF PUBLIC SYSTEMS FOR WHICH COSTS OF COMPLIANCE FALL WITHIN SPECIFIC MEDIAN HOUSEHOLD INCOME PERCENT RANGES

STATE	WASTEWATER			SOLID WASTE			WATER		
	0-0.99	1-1.5	>1.5	0-0.99	1-1.5	>1.5	0-0.99	1-1.5	>1.5
CT	10	1	3	16	0	0	11	2	0
ME	1	5	5	5	0	0	3	4	1
MA	6	3	6	16	0	0	18	2	0
NH	11	4	3	39	1	0	32	7	0
RI	3	2	0	5	0	0	4	0	0
VT	3	7	20	7	8	1	4	13	8
Totals Systems	**34**	**22**	**37**	**88**	**9**	**1**	**72**	**28**	**12**

Indicated trends are for the surveyed communities. These trends may not be representative of all affected communities.

SUMMARY DATA TABLES (COST DATA LISTED BY COMMUNITY AND BY AREA)

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Tables 11-16 are summary tables of the entire data base. The tables are presented alphabetically by state and show the cost data by community and by program areas of wastewater, solid waste, and drinking water. General cost data for each community include number of households and median household income. Program-specific cost data include: current rate (current annual cost), maximum rate (future annual cost; maximum rate projected over 20 years in current dollars), and % MHI. % MHI is based on the maximum rate.

These summary tables contain almost all the basic information used to generate the graphics used in this report.

TABLE 11

	Community	Number of Households (wastewater)	Med. HH Income	WASTEWATER Curr. Rate	WASTEWATER Max. Rate	WASTEWATER % Med. Income	SOLID WASTE Curr. Rate	SOLID WASTE Max. Rate	SOLID WASTE % Med. Income	DRINKING WATER Curr. Rate	DRINKING WATER Max. Rate	DRINKING WATER % Med. Income	TOTAL Total Curr. Rate	TOTAL Total Max. Rate	TOTAL % Med. Income
CONNECTICUT															
3 Media	New Haven	48,986	25,811	230	530	1.73	91	95	0.31	401	418	1.37	722	1043	3.41
	Newtown	6,798	60,830	195	1428	1.98	63	63	0.09	201	201	0.28	459	1692	2.35
	Waterbury	43,164	30,533	63	250	0.69	100	104	0.29	114	118	0.33	277	472	1.31
	Manchester	20,745	40,290	304	328	0.68	149	149	0.26	442	488	1.02	895	963	2.02
	Hartford	51,464	22,140	76	163	0.62	119	119	0.54	134	177	0.67	329	459	1.75
	E. Hartford	20,343	36,584	60	129	0.30	110	110	0.30	106	139	0.32	276	378	0.87
	W. Hartford	23,916	49,642	96	205	0.35	61	61	0.12	169	221	0.38	326	487	0.83
	Windsor(MDC)	9,838	50,228	80	171	0.29	237	237	0.47	140	184	0.31	457	592	1.00
	Bloomfield	7,474	47,853	83	178	0.31	117	117	0.24	146	192	0.34	346	487	0.86
	Rocky Hill	6,577	48,538	65	138	0.29	128	128	0.26	114	149	0.31	307	415	0.72
	Bridgeport	52,326	28,704	259	641	1.89	125	125	0.43	372	448	1.32	756	1214	3.57
	Jewett City	1,385	28,556	197	328	1.15	176	176	0.62	177	305	1.07	550	809	2.39
2media	Wethrsfld(MDC)	10,470	43,888	72	154	0.30				126	166	0.32	198	320	0.62
	Newington	11,223	45,481	87	187	0.35				154	200	0.37	241	387	0.72
1 Media	New Canaan	6,502	91,951				0	42	0.04				0	42	0.04
	Derby	4,974	35,808				130	136	0.32				130	136	0.32
	Groton	14,853	33,967				282	310	0.77				282	310	0.77
	Windham	8,128	29,135				253	263	0.76				253	263	0.76

TABLE 12

MAINE	Community	Number of Households (wastewater)	Med. HH Income	WASTEWATER Curr. Rate	WASTEWATER Max. Rate	WASTEWATER % Med. Income	SOLID WASTE Curr. Rate	SOLID WASTE Max. Rate	SOLID WASTE % Med. Income	DRINKING WATER Curr. Rate	DRINKING WATER Max. Rate	DRINKING WATER % Med. Income	TOTAL Total Curr. Rate	TOTAL Total Max. Rate	TOTAL % Med. Income
3 Media	Augusta	3,938	25,790	267	429	1.41	105	109	0.36	382	385	1.26	754	923	3.02
	Portland	28,230	26,576	256	401	1.28	67	68	0.22	220	272	0.86	543	741	2.36
	Dover – Fox	1,169	23,785	293	326	1.16	27	36	0.10	282	296	1.05	602	658	2.34
	Mars Hill	561	18,234	278	281	1.30	61	64	0.30	236	236	1.09	575	581	2.69
	Rangeley	357	22,850	331	1054	3.90	60	68	0.25	205	551	2.04	596	1673	6.19
2 Media	Bangor	8,448	24,674	356	435	1.49				130	178	0.61	486	613	2.10
	Fort Kent	779	19,832	222	678	2.89				187	196	0.83	409	874	3.72
	Milo	657	23,125	287	287	1.05				144	370	1.35	431	657	2.40
1 Media	Bath	2,460	29,892	278	352	0.99							278	352	0.99
	Bar Harbor	863	26,439	215	405	1.29							215	405	1.29
	Thomaston	698	25,332	444	894	2.98							444	894	2.98

TABLE 13

				WASTEWATER			SOLID WASTE			DRINKING WATER			TOTAL		
MASSACHUSETTS	Community	Number of Households (wastewater)	Med. HH Income	Curr. Rate	Max. Rate	% Med. Income	Curr. Rate	Max. Rate	% Med. Income	Curr. Rate	Max. Rate	% Med. Income	Total Curr. Rate	Total Max. Rate	% Med. Income
3 Media	Greenfield	4,994	26,680	126	268	0.85	98	163	0.51	132	175	0.55	356	606	1.92
	Marshfield	1,500	48,986	322	769	1.33	162	253	0.44	293	312	0.54	777	1334	2.30
	Milton	8,749	53,130	427	431	0.68	80	444	0.71	170	173	0.28	736	1048	1.67
	New Bedford	35,000	22,647	113	459	1.71	92	133	0.50	69	85	0.32	280	677	2.53
	N Brookfield	630	31,868	302	814	2.16	137	137	0.36	274	321	0.85	576	1272	3.37
	Manchester	1,572	52,806	228	480	0.77	188	214	0.34	187	308	0.49	603	1002	1.60
	Scituate	1,827	52,044	319	650	1.06	49	49	0.08	198	198	0.32	566	897	1.46
	Westfield	7,700	33,498	106	140	0.35	88	120	0.30	83	115	0.29	277	375	0.95
	Chicopee	14,000	28,905	186	694	2.03	62	64	0.19	154	167	0.49	402	925	2.70
	Orange	1,138	26,271	193	193	0.62	60	76	0.24	199	199	0.64	452	468	1.51
2 Media	Southampton	674	45,132				41	154	0.29	344	377	0.71	385	531	0.99
	Ashfield	104	33,372	0	1059	2.68				253	361	0.66	253	1420	3.59
	Westboro	3,000	44,044	394	429	0.82	64	76	0.24				458	505	0.97
	Oak Bluffs	200	31,117	0	2819	7.65				186	221	0.60	186	3040	8.25
	Edgartown	3,297	36,285				58	65	0.15	297	321	0.75	355	386	0.90
	Fairhaven	5,689	30,097				2	4	0.01	143	144	0.40	145	148	0.42
1 Media															
	Boston	228,000	29,180	263	500	1.45							263	500	1.45
	Orleans	4,078	29,519							312	312	0.89	312	312	0.89
	Yarmouth	1,500	27,222				37	72	0.22				37	72	0.22
	Tisbury	2,112	28,285							211	375	1.12	211	375	1.12
	Agawam	10,500	37,261							119	121	0.27	119	121	0.27
	Adams	3,000	25,060							313	314	1.06	313	314	1.06
	Rehobeth	1,500	47,748				45	526	0.93				45	526	0.93
	Charlton	170	42,461	262	1607	3.20							262	1607	3.20

TABLE 14

	Community	Number of Households (wastewater)	Med. HH Income	WASTEWATER Curr. Rate	WASTEWATER Max. Rate	WASTEWATER % Med. Income	SOLID WASTE Curr. Rate	SOLID WASTE Max. Rate	SOLID WASTE % Med. Income	DRINKING WATER Curr. Rate	DRINKING WATER Max. Rate	DRINKING WATER % Med. Income	TOTAL Total Curr. Rate	TOTAL Total Max. Rate	TOTAL % Med. Income
NEW HAMPSHIRE															
3 Media	Ashland	266	25,495	308	337	1.12	52	222	0.74	198	393	1.30	558	952	3.15
	Berlin	3,275	25,040	204	320	1.08	83	129	0.44	300	672	2.27	587	1121	3.78
2 Media	Merrimack	7,439	52,798	96	116	0.18	9	156	0.25				105	272	0.44
	Nashua	17,093	40,505	134	302	0.63	23	180	0.51				157	482	1.01
	Lebanon	1,838	32,221	219	294	0.77				309	368	0.97	528	662	1.74
	Manchester	30,000	31,911	148	207	0.55	34	177	0.47				182	384	1.02
	Lisbon	483	25,776	208	412	1.35	111	161	0.53				319	573	1.88
	Keene	4,953	31,235	146	271	0.73				105	226	0.61	251	497	1.34
	Portsmouth	4,815	30,591	284	308	0.85				176	176	0.49	460	484	1.34
	Farmington	1,000	31,112	161	227	0.62	64	309	0.84				225	536	1.46
	Hampton	2,500	40,929	266	324	0.67	92	199	0.41				358	523	1.08
	Jaffrey	677	32,549	273	625	1.62				223	352	0.91	496	977	2.54
	New Hampton	590	33,487				119	313	0.79	86	296	0.75	205	609	1.54
	Freedom	376	30,491				86	309	0.86	111	367	1.02	197	676	1.87
	Littleton	2,347	25,671				50	114	0.38	189	205	0.67	239	319	1.05
	Troy	793	29,511				56	272	0.78	170	200	0.57	226	472	1.35
	Exeter	3,500	36,121				83	162	0.37	121	175	0.41	204	337	0.79
	Goffstown	4759	42160				122	204	0.41	123	195	0.39	245	399	0.80
1 Media	Concord	10400	35000							291	294	0.71	291	294	0.71
	Tamworth	875	25,552				29	232	0.77				29	232	0.77
	Epping	315	36,860	160	209	0.48							160	209	0.48
	New Market	1,190	32,348	209	271	0.71							209	271	0.71
	Rochester	3,500	30,807	370	719	1.97							370	719	1.97
	Durham	812	42,477	218	238	0.47							218	238	0.47
	Marborough	745	31,383				97	196	0.53				97	196	0.53
	Moultonboro	1,164	29,476				239	979	2.81				239	979	2.81
	New Ipswich	1,208	40,325				26	73	0.15				26	73	0.15
	New London	930	46,681							131	248	0.45	131	248	0.45
	Newport	1,365	28,036							166	204	0.62	166	204	0.62
	Wolfeboro	2,162	29,542							203	366	1.05	203	366	1.05
	Salem	5,736	44,210							139	323	0.62	139	323	0.62
	Thornton	575	32,821				139	301	0.78				139	301	0.78
	Shelburne	142	32,411				138	422	1.10				138	422	1.10
	Unity	393	31,458				62	255	0.69				62	255	0.69
	Wakefield	1,172	28,171				50	234	0.70				50	234	0.70
	Walpole	1,323	27,679				49	160	0.49				49	160	0.49
	Whitefield	728	23,670				44	259	0.92				44	259	0.92
	Winchester	1,454	28,196				69	300	0.90				69	300	0.90
	Carroll	309	26000							56	230	0.75	56	230	0.75

(Continued on page 40)

TABLE 14 Continued SUMMARY DATA • NEW HAMPSHIRE (continued)

TABLE 14

			WASTEWATER			SOLID WASTE			DRINKING WATER			TOTAL		
NEW HAMPSHIRE Community	Number of Households (wastewater)	Med. HH Income	Curr. Rate	Max. Rate	% Med. Income	Curr. Rate	Max. Rate	% Med. Income	Curr. Rate	Max. Rate	% Med. Income	Total Curr. Rate	Total Max. Rate	% Med. Income
Rollingsford	391	37,741	446	857	1.92							446	857	1.92
Milford	1,739	36,792	369	552	1.27							369	552	1.27
Bennington	466	34,375				290	389	0.96				290	389	0.96
Colebrook	1,005	24,429				143	242	0.84				143	242	0.84
Bedford	3,997	63,782				50	189	0.25				50	189	0.25
Milton	483	32,888				186	692	1.78				186	692	1.78
Sanbornton	756	33,581				64	166	0.42				64	166	0.42
Alton	1,262	31,033				124	302	0.82				124	302	0.82
Chester	862	46,429				76	254	0.46				76	254	0.46
Deerfield	999	40,960				106	274	0.56				106	274	0.56
Effingham	320	24,853				148	432	1.47				148	432	1.47
Errol	117	22,361				335	811	3.06				335	811	3.06
Groton	116	33,125				194	494	1.26				194	494	1.26
Harrisville	345	35,000				94	287	0.69				94	287	0.69
Hinsdale	1,560	26,753				51	159	0.50				51	159	0.50
Kingston	1,911	46,867				134	372	0.67				134	372	0.67
Tuftonboro	710	30,175				123	335	0.94				123	335	0.94
Andover	125	24,674							74	360	1.23	74	360	1.23
Ossipee	361	25,117							121	389	1.31	121	389	1.31
Contoocook	510	46,610							36	189	0.34	36	189	0.34
Bartlett	250	28,485							181	546	1.62	181	546	1.62
Bethlehem	500	29,048							186	356	1.04	186	356	1.04
Boscawen	900	31,304							174	315	0.85	174	315	0.85
Hancock	190	41,318							24	126	0.26	24	126	0.26
Hanover	1,475	51,899							233	274	0.45	233	274	0.45
Woodsville	604	26,269							247	514	1.65	247	514	1.65
Laconia	5,600	29,116							159	237	0.69	159	237	0.69
Lancaster	1,079	28,611							110	215	0.64	110	215	0.64
Lincoln	2,000	22,000							65	134	0.52	65	134	0.52
Meredith	990	27,057							126	217	0.68	126	217	0.68
Groveton	850	26,250							100	242	0.78	100	242	0.78
Pittsfield	615	29,627							93	195	0.56	93	195	0.56
Somersworth	3,014	32,886							120	183	0.47	120	183	0.47
N. Stratford	119	22,440							81	372	1.40	81	372	1.40
Tilton	925	28,500							152	258	0.76	152	258	0.76
Campton P	180	30,298							214	214	0.60	214	214	0.60
Hillsboro	770	34,167							55	149	0.37	55	149	0.37
Gorham	1,052	35,000							168	168	0.41	168	168	0.41

TABLE 15

				WASTEWATER			SOLID WASTE			DRINKING WATER			TOTAL		
RHODE ISLAND	Community	Number of Households (wastewater)	Med. HH Income	Curr. Rate	Max. Rate	% Med. Income	Curr. Rate	Max. Rate	% Med. Income	Curr. Rate	Max. Rate	% Med. Income	Total Curr. Rate	Total Max. Rate	% Med. Income
3 Media	Charlestown	2,489	36,040	2	71	0.17	34	101	0.24	159	166	0.39	195	338	0.79
	Providence	59,529	22,147	121	314	1.20	110	110	0.42	170	193	0.74	401	617	2.35
	NProvidence	11,885	32,321	121	314	0.84	51	51	0.13	170	193	0.50	342	558	1.46
	West Warwick	12,499	31,637	282	396	1.06	54	54	0.14	166	256	0.68	502	706	1.89
2 Media	JohnstonNBC	5,900	32,596	121	314	0.81	35	35	0.09				156	349	0.90

TABLE 16

				WASTEWATER			SOLID WASTE			DRINKING WATER			TOTAL		
VERMONT	Community	Number of Households (wastewater)	Med. HH Income	Curr. Rate	Max. Rate	% Med. Income	Curr. Rate	Max. Rate	% Med. Income	Curr. Rate	Max. Rate	% Med. Income	Total Curr. Rate	Total Max. Rate	% Med. Income
3 Media	Morrisville	595	19,390	206	349	1.80	241	241	1.05	173	308	1.59	620	898	4.63
	Northfield	520	23,370	269	688	2.94	371	371	1.34	200	272	1.16	840	1331	5.70
	Fair Haven	353	24,149	348	396	1.64	309	309	1.04	289	320	1.27	946	1025	4.24
	Bellows Falls	1,500	21,545	277	289	1.34	227	227	0.89	435	477	2.22	939	993	4.61
	Pittsford	305	31,569	359	489	1.55	119	119	0.32	143	344	1.09	621	952	3.02
	Newport City	1,500	20,174	164	475	2.31	321	321	1.34	155	243	1.20	640	1039	5.15
	Swanton	1,500	22,384	121	476	2.13	345	345	1.31	295	353	1.58	761	1174	5.24
	Hardwick	685	22,148	180	293	1.32	247	247	0.94	220	422	1.91	647	962	4.34
2 Media	W. Rutland	830	28,750	223	320	1.11				175	488	1.70	398	808	2.81
	Barton	450	17,222	291	490	2.81	320	320	1.57				611	810	4.70
	Orleans	500	21,400	203	411	1.92	321	321	1.27				524	732	3.42
	Montpelier	3,100	27,702	155	270	0.98	371	371	1.13				526	641	2.31
	Plainfield	350	28,571				371	371	1.10	159	274	0.96	530	645	2.26
	ColdbrookFD1	300	27,335	598	705	2.58	185	185	0.57				783	890	3.26
	Milton	1,100	31,944				206	206	0.54	283	387	1.21	489	593	1.86
	Hinesburg	225	40,359				206	206	0.43	141	463	1.15	347	869	1.66
	Richmond	310	42,177				206	206	0.41	452	545	1.29	658	751	1.78

(Continued on page 42)

TABLE 16 Continued SUMMARY DATA • VERMONT (continued)

TABLE 16

VERMONT	Community	Number of Households (wastewater)	Med. HH Income	WASTEWATER Curr. Rate	WASTEWATER Max. Rate	WASTEWATER % Med. Income	SOLID WASTE Curr. Rate	SOLID WASTE Max. Rate	SOLID WASTE % Med. Income	DRINKING WATER Curr. Rate	DRINKING WATER Max. Rate	DRINKING WATER % Med. Income	TOTAL Total Curr. Rate	TOTAL Total Max. Rate	TOTAL % Med. Income
1 Media	Bennington	3,500	24,909	139	184	0.74							139	184	0.74
	Chelsea	193	25,573	279	378	1.48							279	378	1.48
	Woodstock	995	26,477	378	480	1.81							378	480	1.81
	Richford	600	19,437	124	398	2.05							124	398	2.05
	Brandon	595	23,148	393	623	2.69							393	623	2.69
	Bridgewater	224	29,666	308	372	1.25							308	372	1.25
	Brighton	196	18,312	261	283	1.55							261	283	1.55
	Vergennes	1,040	24,871	128	188	0.75							128	188	0.75
	Sherburne	785	31,687	220	591	1.87							220	591	1.87
	Enosburg	595	22,564	361	453	2.01							361	453	2.01
	Orwell	75	25,000	247	467	1.87							247	467	1.87
	Castleton	875	30,255	206	279	0.92							206	279	0.92
	Rutland City	4,200	25,434	271	353	1.39							271	353	1.39
	Springfield	1,800	24,665	343	565	2.29							343	565	2.29
	Winooski	850	26,688	195	431	1.60							195	431	1.60
	Randolph	800	26,209	243	476	1.79							243	476	1.82
	Fairfax	120	36,618							212	639	1.74	212	639	1.74
	N.Bennington	800	26,375							284	326	1.24	284	326	1.24
	Proctor	1,100	27,679							110	136	0.49	110	136	0.49
	Wells River	108	18,750							312	805	4.30	312	805	4.30
	Windsor	990	30,375							173	359	1.18	173	359	1.18
	Rutland Town	50	38,818							105	563	1.45	105	563	1.45
	Hyde Park	197	25,250							185	530	2.10	185	530	2.10
	Stowe Village	170	20,833							198	277	1.33	198	277	1.33
	Jeffersonville	157	33,011							395	418	1.26	395	418	1.26
	Putney	147	29,653	395	638	2.15							395	638	2.15
	N. Hero	150	35,313							162	1073	3.04	162	1073	3.04
	Bristol	600	27,077							95	266	1.06	95	266	1.06
	Hartford	2300	35,512							162	251	0.80	162	251	0.80

APPENDIX A

INSTRUCTIONS FOR HOUSEHOLD RATE PROJECTION SPREADSHEET (MODEL)

The following materials provide information on **how this model can be used**.

Contents

- **Instruction on use of the model and verification of data, including information on:**
  - data required
  - model output
  - getting started
  - detailed instructions for data entry
  - checking model input data and results.
- **Attachment A:**
  - Sample data collection sheets (financial information summary sheet).
  - Blank data collection sheet (financial information summary sheet).
- **Attachment B:**
  - Sample spreadsheet.
- **Attachment C:**
  - Equations used in the model to calculate household costs.

APPENDIX A

INSTRUCTIONS FOR HOUSEHOLD RATE PROJECTION SPREADSHEET (MODEL)

The household rate spreadsheet (model) computes annual household costs to pay for the current budget and projected future capital and new O&M expenses over the next twenty years in both future and current dollars.

Data Required

- Municipality Name.
- Current Annual Budget (e.g., '93 total budget (usually the budget for the year before the first year in the rate projection table) - include both operations and any existing or current annual debt service).
- Annual Revenue by source (e.g., user charge, taxes, and other).*
- Number of Households.
- Percent Residential Share of Budget (e.g., 0.45 - 0.95).
- Median Household Income (for 1989 from the 1990 census).
- Current Annual Household User Charge.*
- Base Year (year basis of future capital and O&M estimates, e.g., 1991 if in 1991 dollars).
- Future Capital Expenses (fill in for each year in base year dollars, e.g., 1991 dollars).
- New Annual O&M Costs (fill in for the year starting in base year dollars - do not repeat for the same cost in subsequent years).
- Current Annual Debt Service (this is actually past debt service such as payments on the existing treatment facility loan that is still (currently) being paid, these costs are also part of the current annual budget - repeat for each year until the payments end starting in 1994).
- Future Estimate Source (enter 1 for engineering report, 2 for staff estimate)

* These items are used for checking model input data rather than in the model itself.

Spreadsheet (Model) Output

Based on the above input data the model computes the following for each of the next 20 years:

- New Debt Service (cumulatively).
- Annual Budget (in inflated i.e. future dollars).
- Household Rates in Future Dollars.
- Household Rates in Current (1994) Dollars.
- Percent Median Household Income.

The model also provides:

- Maximum Annual Rate, assuming no inflation and % MHI (a less accurate but often used approximation).
- Maximum Annual Rate with inflation and % MHI (a more accurate estimate).
- Total Capital Expenses.
- Total New O&M Expenses.

Setting Spreadsheet Financial Variables

Near the top of the spreadsheet to the right of the year by year rate projection table are the financial variables which the user can set. These are:

Variable	Abbreviation	Initial Setting
inflation	infl.	0.03
debt interest	int.	0.06
loan term	term	20
MHI inflation	MHI infl.	0.035

The household rate spreadsheet model was produced in Lotus, but will work in other compatible spreadsheet programs. After the spreadsheet is on the screen (see Attachment B), notice the arrows —> next to each item requiring regular entry. All other cells on the worksheet are protected.

Attached to these instructions (Attachment A) are completed (examples) and blank (for your use) Financial Information Summary Sheets. You may want to make copies of the blank form to use for recording the required information. After the form is complete, the data may be entered easily onto the spreadsheet. The spreadsheet already has two examples (City 1 and City 2) filled in to demonstrate where everything goes.

The second attachment (Attachment B) is a print out of the spreadsheet with two samples (City 1 and City 2) filled in which may be helpful to refer to when reviewing the detailed instructions below. The third attachment (Attachment C) is a summary of all the equations used in the rate projection spreadsheet which illustrates how each item is calculated.

APPENDIX A

Detailed Instructions

Municipality Name

Enter municipality name where indicated.

Current Budget

Enter most currently available (e.g., 1993) annual budget for both operations and debt service in thousands where indicated. The spreadsheet assumption is that the budget is for the year before the first year in the rate projection table. A year or two either way, however, does not make a big difference.

Annual Revenue

This item appears on the Financial Information Summary Sheet only, it is not used in the model except to verify input data. It consists of annual revenue by source, user charges, general taxes, or other. This item should generally add up to the current budget item above. Therefore, it is a good check on the budget figure. This information is also useful to help decide if it is necessary to adjust the number of households for a large number of non-user charge budget contributors as described in the last section of these instructions called "checking model input data."

Number of Households

Enter number of households served (i.e., directly or indirectly contributing to the budget). If only a small portion of the community is paying user charges and a substantial portion of the budget is being paid by a larger group of taxpayers, then this item may have to be adjusted or calculated as described below under checking model input data. If this item or the next (% res. share) is difficult to obtain, it may be calculated from current budget and household rates using a simple ratio equation (also discussed in checking model input).

Caution: this number is usually larger than the number of billing accounts. It should include all households in multi-family dwellings even though they are not directly billed for service. Census data on the number of households in the service area are a potential source.

% Residential Share

Enter decimal percent of budget contributed by households (as opposed to industrial, commercial, and government users).

Median Household Income

Enter 1989 MHI from the 1990 census.

Current Annual Household User Charge

This item appears on the Financial Household User Information Summary Sheet only, it is not used in the model except to help verify input data as described below under "checking model input data." This item consists of the current typical household user charge.

Base Year

Enter base year of future capital and O&M estimates (e.g., 1993 if in 1993 dollars).

Capital Expenses

Enter projected capital expenses in thousands (and in constant base year dollars[1]) along the capital expense row in the year column that they are expected to be incurred. Don't worry if the time frames are approximate, +/- 5 years is still much better than assuming all costs in 1994.

New O&M

Enter projected new O&M expenses in thousands (and in constant base year dollars[1]) along the new O&M row in the year column that they are expected to start (do not continue to add this amount to subsequent years because the model will carry this into the annual budget for future years).

Current Debt Service

Enter current debt service, that is, annual debt costs from past (e.g., pre -1994) capital expenses which the municipality is still making annual payments on (e.g., building the existing treatment plant), in thousands, in this row for each year they are anticipated to continue to be paid (e.g., 2,000 per year for the next four years - i.e., until the loan is paid off). Note, entries for this item always start with the first year (1994), can vary from year to year, and continue until debt is retired.

[Note - Use of this item is optional but if this item is left blank the model will assume that all current budget costs are for operational expenses and will inflate and include them for each year of the 20-year model projection which may be inaccurate for communities retiring large debts during the 20-year life of this projection.]

Future Estimate Source

Enter source of future capital and O&M estimates used (e.g., 1 for engineering report, or 2 for staff estimate). This item is used to provide an indicator of the confidence in the future cost estimates.

1 *In the situation where future capital or O&M expenses are projected for several projects and in different base year dollars, pick the most commonly used base year for the model and convert the costs given in different years (e.g. x year) to the base year chosen using the formula below:*

$$\text{Costs}_{(\text{base yr})} = \text{Costs}_{(\text{x year})} \times (1 + \text{inf.})^{(\text{base yr - x year})}$$

model initial value for inf. = 0.03

APPENDIX A

Checking Model Input Data and Results

It is important to check (and sometimes adjust) the basic model input data, using other available data and current user rates, in order to ensure that the input data will produce as accurate projections as possible. Below are procedures for: a) checking the base current annual budget by comparing expenses to income, and b) checking the ratio of % residential share to # of households by comparing it to the ratio of the current user charge to current budget.

• Checking The Current Annual Budget Value

The Current Annual Budget value used in the model is total annual expenses for service including operations and debt payments (but just annual payment for past debt, new debt is picked up by the model automatically as capital expenses are added in the future).

$$BUDGET_{1993} = ANNUAL\ O\&M_{1993} + ANNUAL\ DEBT\ PAYMENTS_{1993}$$

Budget (expenses) should be approximately equal to income (revenue) received from both user charges and taxes.

$$INCOME = USER\ CHARGE\ (UC)\ INCOME + TAX\ INCOME$$
$$= BUDGET\ (EXPENSES) = O\&M + DEBT\ PAYMENTS$$

Suggestion

Use annual budget (expenses) and income (revenue) data to check each other when determining the Current Budget value used on the first line of the model. If you can't get both expense and income data, get the best information possible and use it to develop the budget figure.

• Checking Percent Residential Share And Number of Households Values

Consider the two cases outlined below:

Case 1 (typical situation)

In this case, essentially the same households pay both user charges and, where applicable, taxes for service. This is the case applicable to most fairly developed cities, towns, and districts.

It is very important to check the model input data against the Current User Charge (UC). For Case 1, the equation for doing this is:

$$(1) \qquad UC = \frac{(TOTAL\ BUDGET - TAX\ REVENUE) \times (\%\ RESIDENTIAL)}{\#\ HOUSEHOLDS}$$

Equation (1) can be rearranged and used to calculate the ratio of % Residential to # Households, see equation (2) below.

$$(2) \qquad \frac{UC}{(TOTAL\ BUDGET - TAX\ REVENUE)} = \frac{\%\ RESIDENTIAL}{\#\ HOUSEHOLDS}$$

The model uses the ratio of % Residential to # of Households to calculate the household rate for each future year. See equation (3) below, which the model uses to compute future year household rates from calculated future budgets (taxes are not subtracted out as in equation (1) because we want to calculate a HH rate including all costs whether covered by user charges or taxes). Note that it is the ratio of % Residential to # of Households that is important to calculating future year rates, not the particular values of % Residential or # of Households.

$$(3) \qquad \text{HH RATE}_{(\text{future yr})} = \frac{(\text{BUDGET}_{(\text{future yr})}) \times (\%\ \text{RES.})}{\#\ \text{HOUSEHOLDS}}$$

Suggestion

As long as data for current user charge, current total budget, and tax revenue (if applicable) are available and equation (2) checks for whatever # of households and % residential values you can obtain (or calculate assuming one or the other), the model should give acceptable results. It is not necessary to invest a lot of time trying to obtain exact figures for % residential and # of households if good figures on current budget, annual user charge, and tax revenue are available. Do adjust whatever values used in equation (2) that you are least confident in to make equation (2) check.

Case 2 (substantial non user taxpayer support)

This case applies if only a small portion of the community is using the service and paying user charges, but the whole community provides significant support from taxes. This situation might occur in a rural community with only part of town on sewers and paying user chargers, but the whole town contributing substantial support through taxes. In this case, use equation (4) below (which does not subtract out tax revenue) to calculate a # of households which is higher than just those using the service (e.g. tied into the sewer) to reflect the other taxpayer contributors.

$$(4) \qquad \#\ \text{HOUSEHOLDS} = \frac{(\text{BUDGET}) \times (\%\ \text{RESIDENTIAL})}{\text{UC}}$$

Note this can be rearranged and is similar to equation (2) but without the tax revenue value, see equation (5) below.

$$(5) \qquad \frac{\text{UC}}{(\text{TOTAL BUDGET})} = \frac{\%\ \text{RESIDENTIAL}}{\#\ \text{HOUSEHOLDS}}$$

Suggestion

Again, (see equation 3) the ratio of % residential to # of households is what is important for the model to calculate accurate future household rates, not the actual values. As long as data for current user charge and current total budget are available and equation (5) checks for whatever # of households and % residential values you can obtain (or calculate assuming one or the other), the model should give acceptable results. It is not necessary to invest a lot of time obtaining exact figures for % residential and # of households if good figures on current budget and annual user charge are available. Do adjust whatever values in equation (5) you are least confident in to make equation (5) check.

APPENDIX A

Expanding Spreadsheet Capacity

The spreadsheet has household rate projection tables for 36 municipalities (including the two samples which can be overwritten with actual data if desired). To expand capacity for more municipalities additional copies of the blank spreadsheet file may be copied (or saved) under different names to create multiple spreadsheets. Another option is to expand the spreadsheet by copying blank household rate projection sections of the worksheet below the last existing rate projection section. As the spreadsheet gets larger, however, it will take longer to load and could eventually exceed computer memory capacity.

Spreadsheet Printing

The most important section of the spreadsheet, columns B to Z, with the data entry and rate projection information may be printed on a single landscape, 8.5 X 11 page if the font size and column widths are reduced. A font size of 5 or 6 and the column widths shown below should allow columns B to Z to fit on a single landscape page.

column	width
B	10
C	4
D	3
E	3
F	10
G-Z	4

See Attachments

FINANCIAL INFORMATION SUMMARY SHEET

Completed by: J. SMITH
Date: 4/11/94

Municipality Name: CITY 1 (SAMPLE) Comments: _____

Current Budget: 6,059,000
(O&M and Capital)

Annual Revenue User Charge: 6,059,000 Taxes: 0
Other: 0

# of Households: 8,448

% Residential Share of Budget: 0.49 (as decimal)

Median Household Income (1989): 24,674
(*from 1990 census)

Base Year of Future Capital and O&M Estimates: 1992

Year	Future Capital Exp. (000)	Future * New O&M Exp. (000)	Current Debt Serv. (000)	Fut Est 1 Report 2 Estim.	Comments
1994	1278		3865	1	
1995	2432		5365		
1996	2898	138	3365		
1997	1912	41	3365		
1998	1912		3365		
1999	1912		3365		
2000	762		3365		
2001	1616		3365		
2002	1224		3365		
2003	2101		3365		
2004	1248	44	3365		
2005	1795		3365		
2006	3372		5365		
2007	2124	47	3365		
2008	1577	73	3365		
2009		78	3365		
2010			3365		
2011			0		
2012					
2013					
Total	28163	421	-------		

* Note: enter new O&M costs for the first year they occur only.

FINANCIAL INFORMATION SUMMARY SHEET

Completed by: J. SMITH
Date: 4/11/95

Municipality Name: CITY 2 (SAMPLE) Comments: _____

Current Budget: 7,012,000
(O&M and Capital)

Annual Revenue User Charge: 5,012,000 Taxes: 2,000,000
Other: 0

# of Households: 23,580

% Residential Share of Budget: 0.76 (as decimal)

Median Household Income (1989): 26,734
(from 1990 census)

Base Year of Future Capital and O&M Estimates: 1993

Year	Future Capital Exp. (000)	Future * New O&M Exp. (000)	Current Debt Serv. (000)	Fut Est 1 Report 2 Estim.	Comments
1994	1374		4134	1	
1995	2000	120	4134		
1996	2598	70	4134		
1997	1950		2430		
1998	860		2430		
1999	1517		2430		
2000	2152		1110		
2001			1110		
2002			1110		
2003		50	0		
2004					
2005					
2006					
2007					
2008					
2009					
2010					
2011					
2012					
2013					
Total	14401	240	-------		

* Note: enter new O&M costs for the first year they occur only.

FINANCIAL INFORMATION SUMMARY SHEET

Completed by: _____
Date: _____

Municipality Name: _____ Comments: _____

Current Budget: _____
(O&M and Capital)

Annual Revenue User Charge: _____ Taxes: _____
Other: _____

# of Households: _____

% Residential Share of Budget: _____ (as decimal)

Median Household Income (1989): _____
(from 1990 census)

Base Year of Future Capital and O&M Estimates: _____

Year	Future Capital Exp. (000)	Future * New O&M Exp. (000)	Current Debt Serv. (000)	Fut Est 1 Report 2 Estim.	Comments
1994					
1995					
1996					
1997					
1998					
1999					
2000					
2001					
2002					
2003					
2004					
2005					
2006					
2007					
2008					
2009					
2010					
2011					
2012					
2013					
Total			-------		

* Note: enter new O&M costs for the first year they occur only.

HOUSEHOLD RATE PROJECTIONS

					1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Name ->City 1 (sample)	Cmts.->			City 1 (sample)												
Curr. Budget (000) ->	6,059	MAX RATES		Cap Exp (000) ->	1,278	2,432	2,898	1,912	1,912	1,912	762	1,616	1,224	2,101	1,248	1,795
# of Households ->	8,448	CURR $		New O&M (000) ->			138	41							44	
Res. Shr of Budget ->	0.49	No Infl.	518	Curr Debt Serv (000) ->	3,365	3,365	3,365	3,365	3,365	3,365	3,365	3,365	3,365	3,365	3,365	3,365
89 Median HH Income ->	24,674	% MHI	1.77	New Debt Serv (000)	118	350	634	828	1,027	1,232	1,316	1,500	1,643	1,897	2,052	2,281
Base Year (Fut Est) ->	1992			Budget (000)	6,258	6,573	7,098	7,432	7,728	8,034	8,221	8,511	8,764	9,130	9,464	9,815
Est. Source 1 or 2 ->	1	W/ Infl.	435	Rates - - Future $	363	381	412	431	448	466	477	494	508	530	549	569
Tot. Cap Exp (000)	28,163	% MHI	1.48	Rates- - Curr. $	363	370	388	394	398	402	399	401	401	406	408	411
Tot. New O&M (000)	421			% Median HH Income	1.24	1.26	1.32	1.35	1.36	1.37	1.36	1.37	1.37	1.38	1.39	1.40
				City 2 (sample)												
Name ->City 2 (sample)	Cmts.->															
Curr. Budget (000) ->	7,012	MAX RATES		Cap Exp (000) ->	1,374	2,000	2,598	1,950	1,950	860	1,517	2,152				
# of Households ->	23,580	CURR $		New O&M (000) ->		120	70							50		
Res. Shr of Budget ->	0.76	No Infl.	274	Curr Debt Serv (000) ->	4,134	4,134	4,134	2,430	2,430	2,430	1,110	1,110	1,110			
89 Median HH Income ->	26,734	% MHI	0.86	New Debt Serv (000)	123	308	556	747	944	1,034	1,197	1,434	1,434	1,434	1,434	1,434
Base Year (Fut Est) ->	1993			Budget (000)	7,222	7,623	8,042	6,630	6,931	7,127	6,080	6,431	6,547	5,625	5,750	5,880
Est. Source 1 or 2 ->	1	W/ Infl.	244	Rates- - Future $	233	246	259	214	223	230	196	207	211	181	185	190
Tot. Cap Exp (000)	14,401	% MHI	0.77	Rates- - Curr. $	233	239	244	196	198	198	164	169	167	139	138	137
Tot. New O&M (000)	240			% Median HH Income	0.73	0.75	0.77	0.62	0.63	0.62	0.52	0.53	0.52	0.44	0.43	0.43
				0												
Name ->	Cmts.->															
				Cap Exp (000) ->												
Curr. Budget (000) ->		MAX RATES		New O&M (000) ->												
# of Households ->		CURR $		Curr Debt Serv (000) ->												
Res. Shr of Budget ->		No Infl.	ERR	New Debt Serv (000)	0	0	0	0	0	0	0	0	0	0	0	0
89 Median HH Income ->		% MHI	ERR	Budget (000)	0	0	0	0	0	0	0	0	0	0	0	0
Base Year (Fut Est) ->				Rates - - Future $	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
Est. Source 1 or 2 ->		W/ Infl.	ERR	Rates - - Curr. $	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
Tot. Cap Exp (000)	0	% MHI	ERR	% Median HH Income	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
Tot. New O&M (000)	0															
				0												
Name ->	Cmts.->															
				Cap Exp (000) ->												
Curr. Budget (000) ->		MAX RATES		New O&M (000) ->												
# of Households ->		CURR $		Curr Debt Serv (000) ->												
Res. Shr of Budget ->		No Infl.	ERR	New Debt Serv (000)	0	0	0	0	0	0	0	0	0	0	0	0
89 Median HH Income ->		% MHI	ERR	Budget (000)	0	0	0	0	0	0	0	0	0	0	0	0
Base Year (Fut Est) ->				Rates - - Future $	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
Est. Source 1 or 2 ->		W/ Infl.	ERR	Rates- - Curr. $	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
Tot. Cap Exp (000)	0	% MHI	ERR	% Median HH Income	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
Tot. New O&M (000)	0															

(Continued on page A-13)

2006	2007	2008	2009	2010	2011	2012	2013
3,372	2,124	1,577					
	47	73	78				
3,365	3,365	3,365	3,365	3,365			
2,726	3,015	3,235	3,235	3,235	3,235	3,235	3,235
10,385	10,875	11,348	11,619	11,770	8,560	8,720	8,884
602	631	658	674	683	496	506	515
422	430	435	433	425	300	297	294
1.44	1.47	1.48	1.48	1.45	1.03	1.01	1.00
1,434	1,434	1,434	1,434	1,434	1,434	1,434	1,434
6,013	6,150	6,292	6,438	6,588	6,742	6,902	7,066
194	198	203	207	212	217	222	228
136	135	134	133	132	131	131	130
0.43	0.43	0.42	0.42	0.42	0.41	0.41	0.41
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR

infl.	0.03	
int.	0.06	
term	20	
MHI infl.	0.035	[Annual MHI % increase estimated from change in Northeast CPI from 131.3 (12/89) to 156.3 (12/94)]

RATE MODEL CALCULATIONS

ITEM	FIRST YEAR	SUBSEQUENT YEARS
New Debt Serv	Cap. Exp. $\times$ $(1+\text{inf.})^{(\text{yr - base yr}^*)}$ $\times$ (A/P,int,n)	Prev. Yr New Debt Serv + [Cap. Exp. $\times$ $(1+\text{inf.})^{(\text{yr - base yr})}$ $\times$ (A/P,int,n)]
Budget	(Cur. Bud. - Curr. Debt Serv_{94}) $\times$ (1 + inf.) + Curr. Debt Serv_{94} + New O&M $\times$ $(1+\text{inf.})^{(\text{yr - base yr})}$	(Prev. Yr Bud. - Prev. Yr Curr. Debt Serv - Prev. Yr New Debt Serv) $\times$ (1 + inf.) + New O&M $\times$ $(1+\text{inf.})^{(\text{yr - base yr})}$ + Curr. Debt Serv + New Debt Serv
Rates Future $	$\frac{1000 \times (\text{Bud.}) \times (\text{Res.Share})}{\#\text{ of Households}}$	$\frac{1000 \times (\text{Bud.}) \times (\text{Res.Share})}{\#\text{ of Households}}$
Rates Current $	$\frac{\text{Rates Future \$}}{(1+\text{inf.})^{(\text{year - 1994}^{**})}}$	$\frac{\text{Rates Future \$}}{(1+\text{inf.})^{(\text{year - 1994})}}$

* Base year is the year all projected capital and O&M costs are based on e.g. 1991 if in 1991 dollars.

** 1994 and 94 above actually refer to any first year in the rate projection table on the spreadsheet.

(Continued on page A-15)

CALCULATIONS CONTINUED

MAX RATES CURR $

Maximum Rate With Inflation

@MAX (Rates--Curr. $) [i.e. selects the max from this row in the table]

% Median HH Income With Inflation

$$\frac{\text{@MAX (Rates--Curr. \$) [i.e. selects the max from this row in the table]} \times 100}{\text{(89 MHI from 1990 census)} \times (1 + \text{MHI inf.})^{(1994 - 1989)}}$$

No infl. Max Rate [The no inflation max rate and MHI are included for informational purposes because rates are often approximated this way. These results are not as accurate as projections using the above with inflation equations.]

$$\frac{1000 \times (\text{Cur. Bud.} + \text{Tot. Cap. Exp.} \times (A/P,int,n) + \text{Tot. New O\&M}) \times (\text{Res.Share})}{\text{\# of Households}}$$

No infl. % Median HH Income

$$\frac{\text{Zero infl. Max Rate [from above equation]} \times 100}{\text{(89 MHI from 1990 census)} \times (1 + \text{MHI inf.})^{(1994 - 1989)}}$$

APPENDIX B

FINANCIAL INFORMATION SUMMARY SHEET INSTRUCTIONS

The following materials are intended **for use by people providing data** for the household rate projection model.

Contents

- Instructions on use of the financial information summary sheet, including:
  - data required
  - detailed instructions
- Sample data collection sheets (financial information summary sheet).
- Blank data collection sheet (financial information summary sheet).

FINANCIAL INFORMATION SUMMARY SHEET INSTRUCTIONS

The Financial Information Summary Sheet is used to summarize existing budget and future planned capital and O&M expenses in a format convenient for further analysis.

Data Required

- Municipality Name.
- Current Annual Budget (e.g., 93 total budget - include both operations and any existing or current annual debt service).
- Annual Revenue by source (user charge, taxes, and other).
- Number of Households.
- Percent Residential Share of Budget (e.g., 0.45 - 0.95).
- Median Household Income (for 1989 from the 1990 census).
- Current Annual Household User Charge.
- Base Year (year basis of future capital and O&M estimates, e.g., 1991 if in 1991 dollars).
- Future Capital Expenses (fill in for each year in base year dollars e.g., 1991 dollars and enter total).
- New Annual O&M Costs (fill in for the year starting in base year dollars - do not repeat for the same cost in subsequent years and enter total).
- Current Annual Debt Service (include past debt service such as payments on the existing treatment facility repeat for each year until the payments end starting in 1994).
- Future Estimate Source (enter 1 for engineering report, 2 for staff estimate).

Detailed Instructions

Municipality Name

Enter municipality, district, sewer authority, etc. name where indicated.

Current Budget

Enter most currently available (e.g. 1993) annual budget for both operations and debt service in thousands where indicated.

Annual Revenue

Enter annual revenue by source, user charges, general taxes, or other (please explain). This item should generally add up to the current budget item above.

Number of Households

Enter number of households served (i.e. directly or indirectly contributing to the budget).

Caution: this number is usually larger than the number of billing accounts. It should include all households in multi-family dwellings even-though they are not directly billed for service. Census data on the number of households in the service area are often a good source for this item.

% Residential Share	Enter decimal percent of budget contributed by households (as opposed to industrial, commercial, and government users).
Median Household Income	Enter 1989 MHI from the 1990 census.
Current Annual Household User Charge	Enter current typical household user charge (for wastewater assume 75,000 gal/yr usage).
Base Year	Enter base year for future capital and O&M estimates (e.g. 1991 if in 1991 dollars).
Capital Expenses	Enter projected capital expenses in thousands (and in constant base year dollars[1]) down the capital expense column in the year row that they are expected to be incurred. Don't worry if the time frames are approximate, just do the best you can, even (+/- 5 yrs) is still ok.
New O&M	Enter projected new O&M expenses in thousands (and in constant base year dollars[1]) down the new O&M column in the year row that they are expected to start (do not continue to add this amount to subsequent years).
Current Debt Service	Enter current debt service (i.e., annual debt costs from past or pre 1994 capital expenses which the municipality is still making annual payments on - e.g., building the existing treatment plant, in thousands, in this row for each year they are anticipated to continue to be paid (e.g., 2,000 per year for the next four years - i.e., until the loan is paid off). Note entries for this item always start with the first year (1994), can vary from year to year, and continue until debt is retired. In other words, this item stays constant, decreases over time, and/or finally goes to zero. It does not increase because new debt is included in capital expenses above.

[1] *In the situation where future capital or O&M expenses are projected for several projects and in different base year dollars, pick the most commonly used base year for the summary sheet and convert the costs given in different years (e.g., x year) to the base year chosen using the formula below:*

$$\underset{(\text{base yr})}{\text{Costs}} = \underset{(\text{x year})}{\text{Costs}} \times (1.03)^{(\text{base yr} - \text{x year})}$$

FINANCIAL INFORMATION
SUMMARY SHEET

Completed by: J. Smith
Date: 7/11/94

Municipality Name: EXAMPLE

Subarea: ____
(for multi ~~overlap areas~~)

Current Budget: 2,012,000
(O&M and Capital)

Annual Revenue User Charge: 5,609,600 Taxes: 1,402,400
Other: 0

# of Households: 9,560

% Residential Share of Budget: 0.57 (as decimal)

Median Household Income (1989): 26,734
(from 1990 census)

Current Annual Household User Cost: 335

Base Year of Future Capital and O&M Estimates: 1992

Year	Future Capital Exp. (000)	Future * New O&M Exp. (000)	Current Debt Serv. (000)	Fut Est 1 Report 2 Estim.	Comments
1994	1347		4134	1	Sep. W. Side
1995	2000	120	4134		Sep. + P.S.
1996	2598		4134		Sep.
1997	1950	70	2430		Cons. Conduit
1998	1950		2430		"
1999	1950		2430		"
2000	860		1110		"
2001	1517	52	1110		Elm St Storage
2002	1348		1110		"
2003	2152		1110		South St Storage
2004	1100		0		"
2005	1750				"
2006	3214	29			Cons. Conduit
2007	2113	78			"
2008	1420	69			"
2009					
2010					
2011					
2012					
2013			Y	Y	
Total	27,269	418	-------		

* Note: enter new O&M costs for the first year they occur only.

FINANCIAL INFORMATION SUMMARY SHEET

Completed by: _____
Date: _____

Municipality Name: _____ Subarea: _____ (for multi ~~overlap areas~~)

Current Budget: _____ (O&M and capital)

Annual Revenue User Charge: _____ Taxes: _____ Other: _____

# of Households: _____

% Residential Share of Budget: _____ (as decimal)

Median Household Income (1989): _____ (from 1990 census)

Current Annual Household User Cost: _____

Base Year of Future Capital and O&M Estimates: _____

Year	Future Capital Exp. (000)	Future * New O&M Exp. (000)	Current Debt Serv. (000)	Fut Est 1 Report 2 Estim.	Comments
1994					
1995					
1996					
1997					
1998					
1999					
2000					
2001					
2002					
2003					
2004					
2005					
2006					
2007					
2008					
2009					
2010					
2011					
2012					
2013					
Total			-------		

* Note: enter new O&M costs for the first year they occur only.

APPENDIX C

ENVIRONMENTAL INFRASTRUCTURE STEERING AND TECHNICAL COMMITTEE MEMBERS

The following state and federal staff are members of the Steering Committee and Technical Committee of the State/EPA Environmental Infrastructure project. The Steering Committee provided direction and oversight for the project. The Technical Committee members reviewed the methodology developed by EPA, decided which infrastructure projects were required by federal regulation, decided how to collect the data in their particular state for each program area, and were responsible for data collection. In many cases, staff participated on both committees.

INFRASTRUCTURE STEERING AND TECHNICAL COMMITTEE MEMBERS NOVEMBER 1994 - JANUARY 1995

CONNECTICUT
John Cimochowski - CT DEP, Waste Mgmt.
Mike Harder - CT DEP, Water Mgmt.
Gerald R. Iwan - CT DPH, Water Supply Sect.
Bob Norwood - CT DEP, Water Mgmt.

MASSACHUSETTS
Glenn Gilmore - MA DEP, Bur. of Munic. Facil.
Richard Giorosa - MA DEP, Div. of Solid Waste
Glenn Haas - MA DEP, Bur. of Munic. Facil.
Jack Hamm - MA DEP, Bur. of Munic. Facil.
Stanley Linda - MA DEP, Bur. of Munic. Facil.
Thomas C. McMahon - MA DEP, Munic. Assistance

MAINE
Michael Barden - ME DEP, Bur. of HM
David Breau - ME Dept. of Health Services
Dennis Purington - ME DEP, Bur. of WQ

NEW HAMPSHIRE
Bradford Foster - NH DES, WS & PCC Div.
Bernard Lucey - NH DES, WS & PCC Div.
Parker Morgan - NH DES, Waste Mgmt. Div.
Chris Simmers - NH DES, Commissioner's Office

RHODE ISLAND
Thomas Epstein - RI DEM, Div. Waste Mgmt.
Ronald Gagnon - RI DEM, Div. Waste Mgmt.
Roger Greene - RI DEM, Director's Office
Bob Griffith - RI DEM, Div. of Planning
Ramon Pena - RI DEM, Div. of Water Resources
Elizabeth Scott - RI DEM, Off. Water Supply Mgmt.
June Swallow, P.E. - RI Dept. of Health
Warren Towne - RI DEM, Div. Water Resources
Frederick J. Vincent - RI DEM, Planning & Adm. Serv.

VERMONT
William Brierley - VT DEC
Gary Champy - VT DEC

EPA
David Chin - U.S. EPA - WST
Aaron Gilbert - U.S. EPA - SWGIS
Gerry Levy - U.S. EPA - HAA
Larry MacMillan - U.S. EPA - WMC
Steve Silva - U.S. EPA - WCC

NEIWPCC
Ron Poltak
Jennie Bridge