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Penobscot Valley Prudent Investment Linking Our Towns A Report on Education, Housing, and Capital Planning Opportunities

Thomas Allen

Kathleen Bell

Philip A. Trostel
University of Maine, philip.trostel@maine.edu

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Penobscot Valley
Prudent Investments Linking Our Towns

A Report on
Education, Housing, and Capital Planning Opportunities

PVpilot Communities

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I. INTRODUCTION

A. Executive Summary

This report brings together three studies focusing on regional planning and public investment opportunities in the Greater Bangor area. These documents were completed as part of the Penobscot Valley Prudent Investments Linking Our Towns (PVPILOT) research project sponsored by the Eastern Maine Development Corporation and by the TCSP Pilot Program of the Federal Highway Administration. Our goal is to help advance the discussion of regional cooperative strategies in education, housing, and the provision of public services.

Education

The first study is an initial examination of economies of scale in public education in Maine, with specific emphasis on the Greater Bangor area. An important issue concerns the possible duplication of educational resources. Is there too much or too little duplication of educational infrastructure and personnel? The evidence suggests that there is too much duplication of public educational services. That is, on average, our school districts and schools are too small. Close examination of the data reveals that, on average, cost per student falls significantly as the number of students rises. The average number of students per school district is about 750 in Maine, and about 1,100 in the Greater Bangor region. Moreover, the data also show that academic performance and school quality (to the very imperfect extent that they can be measured) in Maine are positively affected by school size. Having schools and school districts that are too small is costing us both in terms of taxes and in terms of the quality education that we provide our young.

Summary Points

- Cost per student in Maine's public schools is about 10 percent higher than in the country.
- Part of the reason for the relatively high cost of public education in Maine appears to be that there is too much duplication of education services. That is, there are potential economies of scale that are not being realized.
- On average, school districts in Maine are less one quarter as large as districts in the rest of the country.

- Forecasted demographic changes indicate that our schools and school districts will become even smaller without greater consolidation of educational resources.

- Unrealized economies of scale in our public education also appear to affect adversely the educational opportunities for our young.

- Larger school districts can offer a wider range of course offerings. Larger districts are also able to hire staff with higher qualifications on average.

- There is a positive relationship between average test scores and the number of students in a school. A larger school is not the same thing as a larger class size.

- An initial statistical analysis indicates that, on average, cost per student declines until school districts in Maine reach about 3,400 students. Only nine of the State's school districts are this large.

- The estimated potential cost savings from increasing the number of students in a school district from about 2,250 to about 3,400 is roughly $207 per student (which is a little over 3 percent of the current average operating cost per student).

- The estimated potential cost savings from a proposed consolidation of educational resources within the Greater Bangor region is roughly $647 per student (which is about 10 percent of the cost currently). This translates into about $110 of potential taxpayer savings per year per $100,000 of property tax valuation.

Housing

This study presents a preliminary analysis of housing in the Greater Bangor Region, summarizing basic information related to the housing stock and housing policies of the communities in this region. Data are presented to advance the discussion of three housing policy issues: incentives for private development of rental housing, availability of affordable housing, and multi-community planning. While of particular interest to the communities of the Greater Bangor Region, these issues are germane to communities throughout Maine. In recent years, there has been limited new construction of multi-unit residential buildings statewide. Low expected returns from such projects and restrictive land use and building design requirements are likely explanations of this trend in the Greater Bangor Region and elsewhere. If multi-unit buildings are expected to serve future rental housing needs, emphasis should be given to the lack of incentives for private development of such housing. Rental housing and housing affordability

are closely related housing issues. Changes in the affordability of owner- and renter-occupied homes indicate varying trends in affordability within the Greater Bangor Region. Common policy objectives of providing affordable housing for elderly and low-income populations suggest that this issue is likely to be a prominent one in the future. Furthermore, such common policy objectives may serve as the basis for future regional cooperation. However, at this time, few communities currently recognize the role of multi-community strategies to solve housing problems. In the future, regional planning strategies may be devised to provide affordable and perhaps rental housing to populations such as the elderly and low-income.

Summary Points

- Higher rates of growth in housing stock are occurring in smaller, rural towns relative to established service centers such as Bangor and Brewer.
- Few multi-unit residential buildings have been constructed in the Greater Bangor Region in recent years. This trend is consistent with development trends throughout Maine. The implications of this trend on the availability of rental housing are of growing interest.
- Overall, housing is affordable in the Greater Bangor Region relative to other portions of the state. However, there is considerable variation in the percentage of residents who devote upwards of 30 percent of their income to housing across the communities
- Few towns and cities are currently solving housing problems using regional approaches, but there is a growing interest in such strategies, especially in terms of providing housing for the elderly and lower-income.

CAPITAL PLANNING and PUBLIC SERVICES

Regionalization of local public services is a concept that has been promoted in Maine for many years to improve the cost efficiency of service delivery. With some exceptions, inter-local cooperation occur in the PV PILOT region more in response to state regulations, or on an ad hoc basis as opportunities arise, than as the result of an explicit strategy. One example is the mandated closure of open waste dumps resulted in the creation of the regional Penobscot Energy Recovery Corporation municipal waste incinerator. Nevertheless, most town managers in PV PILOT towns are predisposed to enter into joint-purchasing or service arrangements when there

is a clear gain in efficiency or effectiveness of service. For example, the joint-purchasing program provided by PVCOG was cited by most town managers as a positive example of joint activity. There is some indication that this service could be expanded to include the letting of contracts for road paving. Joint provision of public works activities is not occurring in the PV PILOT region, partly because many smaller towns have no public works departments and contract maintenance activities with the private sector. Also for this reason, inter-local cooperation among smaller towns for road plowing and other maintenance activities is another area with potential for regionalization.

Summary Points

- Despite the common perception that Maine communities are staunchly independent, most town managers in the PV PILOT region recognize the benefits of regionalizing selected public services.

- Inter-local cooperation agreements occur in towns and cities throughout Maine. A person or agency designated as a regional information clearinghouse is needed to help officials in PV PILOT towns to identify places in Maine where successful inter-local agreements have been established.

- Growing interest in capital investment planning, especially among smaller towns, presents an opportunity for an organized effort to promote regionalization as part of an overall program to assist communities in developing their capital investment plans.

B. Structure of Report

This report focuses on regional planning and investment opportunities in the Penobscot Valley. In what follows, data and analysis are presented to assist with the development of the Penobscot Valley Prudent Investments Linking Our Towns (PV PILOT) research project. Our goal is to help advance the project's discussion of regional cooperative strategies for achieving education, housing, and public service provision objectives. Section II of this report examines potential cost savings from school consolidation. Existing data sources are employed to quantify the dispersion of school resources across the Penobscot Valley and explore the benefits of school consolidation. Section III of this report explores the availability of rental and affordable housing in the Penobscot Valley and discusses the role of regional planning in attaining regional housing policy goals. Existing data resources are employed to describe the housing stock in these different communities and initiate a discussion of regional housing strategies. Finally, Section IV examines potential gains from cooperative capital investments. This section presents the results of a series of interviews conducted with town managers in the participating communities conducted during August and September of 2002.

C. Background

The cities and towns participating in PV PILOT represent are a diverse group in several respects. They range in population from 584 members of the Penobscot Nation on Indian Island to over 31,000 people residing in Bangor. Ten of the fifteen member towns have fewer than 5,000 residents (Figure 1). Between 1990 and 2000, the five largest communities lost an average of 3.1 percent of their population, while the ten smaller communities had an average gain of 7 percent.

The 2000 property tax rates in the PV PILOT municipalities, as reported to Maine Revenue Services, range from $12.60 per $1,000 in Kenduskeag to $24.00 per $1,000 in Orono (Table 1). State property valuations in 2002 also vary considerably, even when adjusted for population. The town of Veazie, with a property valuation of $67,700 per capita has more than twice the population-adjusted tax base of both Glenburn ($32,700 per capita) and Kenduskeag ($31,400 per capita) and Orono[1] ($24,670 per capita).

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[1] (Orono's measure of $24,700 per capita may be unusually low due to the large presence of university students included in the 2000 Census count of population.)

Median household income also ranges widely, from less than $25,000 in the Penobscot Nation to more than $60,000 in both Hampden and Holden. From 1990 to 2000, median household income increased by at least 80 percent in Hampden, Holden, Orono and Veazie. Conversely, median household incomes grew less than 50 percent in Bradley, Glenburn, Kenduskeag, and Orrington.

Recent demographic and socio-economic changes in these communities are relevant to PV PILOT's discussion of regional cooperation, as they convey information about the diversity of this group of communities and foreshadow future distinctions across the group. Table 2 summarizes a handful of such changes between 1990 and 2000. The number of housing units, renter-occupied units, persons under age 20, persons over age 65, and jobs in 2000 are displayed by community along with the percentage of persons over 25 with a college degree and workers over 16 who commute by car alone. In addition, the percentage change in these values from 1990 to 2000 is also shown in Table 2. Although this table explores only a subset of changes, it does an effective job of pointing out some interesting trends. First, as mentioned previously, the PV PILOT communities range in size from urban centers to rural communities. Second, a mismatch between job growth and population growth is evident, as several of the larger communities recently lost population but gained jobs over this time period. Finally, higher rates of increase in population and housing units are occurring in smaller, rural communities such as Glenburn, Hermon, and Bradley. The benefits and costs of regional cooperation will depend on factors such as the indicators and changes presented in Tables 1 and 2. The diversity of this group of communities implies that different municipalities will seek different rewards from regional cooperation. In turn, the costs of such cooperation will also vary across municipalities. In the sections that follow, we explore regional strategies to achieve education, housing, and public service provision objectives.

Figure 1. 2000 Population in PV PILOT towns.
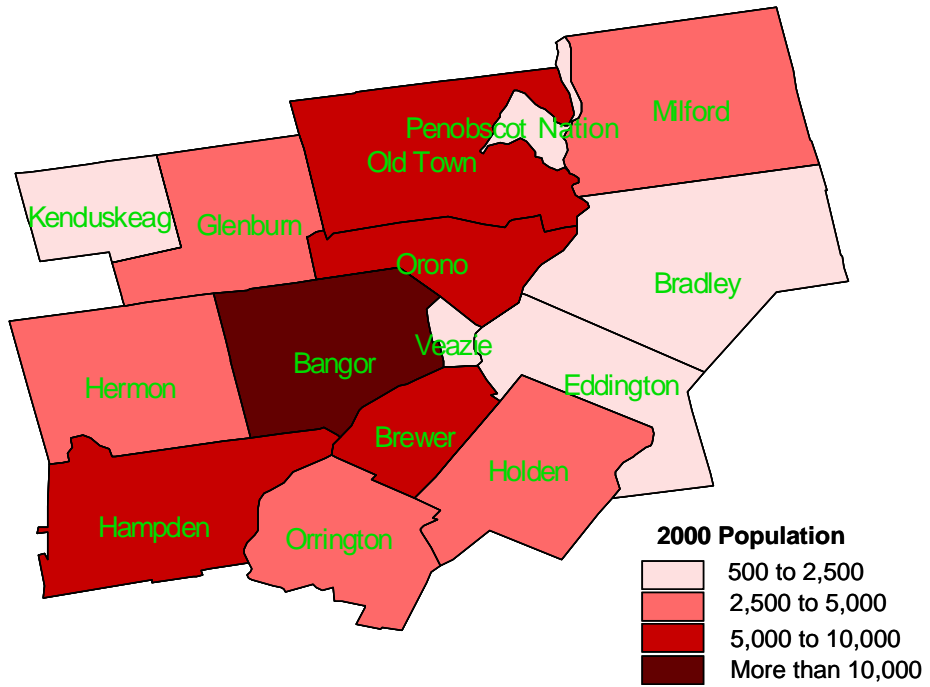
Source:

Table 1: Population and Economic Indicators

	Population 2000[1]	1990 – 2000 Pop. Change	2002 State Valuation[2]	2000 Valuation Per capita	2000 Property Tax Rate[2]	2000 Median Household Income[3]
Bangor	31,473	-5%	$1,606,250,000	$51,036	23.45	42,047
Bradley	1,242	8%	$49,550,000	$39,895	14.10	41,417
Brewer	8,987	0%	$477,950,000	$53,182	24.23	46,632
Eddington	2,052	5%	$84,850,000	$41,350	12.60	45,966
Glenburn	3,964	24%	$129,500,000	$32,669	15.40	44,335
Hampden	6,327	8%	$298,800,000	$47,226	20.00	61,321
Hermon	4,437	17%	$243,200,000	$54,812	13.70	50,500
Holden	2,827	-4%	$143,750,000	$50,849	16.80	62,208
Kenduskeag	1,171	-5%	$36,750,000	$31,383	15.00	36,779
Milford	2,950	1%	$112,900,000	$38,271	17.90	46,542
Old Town	8,130	-1%	$402,100,000	$49,459	21.00	40,589
Orono	9,112	-14%	$224,800,000	$24,671	24.00	52,714
Orrington	3,526	3%	$218,550,000	$61,982	15.20	47,803
Indian Island	584	26%				24,375
Veazie	1,744	7%	$118,050,000	$67,689	18.40	54,583

Sources: [1]*U.S. Department of Commerce. U.S. Census Bureau. Census of Population and Housing. 2000.*
[2]*2000 Municipal Valuation Return Statistical Summary, Maine Revenue Services, Augusta, Maine. Property tax rate is dollars per $1,000 of property value.*
3Maine State Planning Office, Augusta, Maine, and Claritas, Inc.

Table 2: Demographic and Socio-Economic Changes
(2000 Values and Percentage Change from 1990 to 2000)

	Housing Units (2000)	Change	Renter-Occupied Units (2000)	Change	Persons Under Age 20 (2000)	Change	Persons Over Age 65 (2000)	Change	Jobs (2000)	Change	Persons over 25 with a College Degree	Change	Workers over 16 Who Commute Alone by Car	Change
Bangor	14,587	2%	7,205	4%	7,822	-8%	4,431	-2%	35,219	19%	27%	8%	77%	1%
Bradley	614	21%	97	9%	298	3%	178	38%	68	-22%	13%	60%	84%	-1%
Brewer	4,064	8%	1,447	11%	2,197	-5%	1,498	14%	4,762	-9%	25%	17%	85%	3%
Eddington	920	9%	159	25%	508	-3%	267	38%	332	48%	20%	32%	81%	2%
Glenburn	1,683	30%	164	67%	1,156	14%	312	14%	273	194%	13%	11%	85%	14%
Hampden	2,545	11%	517	28%	1,862	2%	678	27%	2,114	32%	35%	22%	84%	1%
Hermon	1,748	23%	267	21%	1,299	23%	440	4%	1,409	124%	19%	32%	87%	10%
Holden	1,320	-1%	143	-9%	726	-9%	311	-7%	438	42%	28%	43%	85%	4%
Kenduskeag	509	12%	58	2%	296	-24%	118	5%	159	24%	10%	32%	86%	7%
Milford	1,248	6%	235	17%	767	-17%	320	75%	540	40%	18%	54%	85%	-3%
Old Town	3,686	6%	1,373	9%	1,960	-4%	1,127	-7%	3,618	4%	23%	1%	78%	-3%
Orono	2,899	8%	1,406	16%	2,758	-22%	847	11%	5,335	4%	48%	-5%	60%	15%
Orrington	1,489	8%	189	7%	912	1%	426	23%	384	-4%	20%	8%	87%	4%
Indian Island	364	101%	85	4%	201	33%	55	53%	158		11%	-35%	70%	0%
Veazie	767	11%	153	1%	464	16%	254	21%	330	45%	38%	23%	87%	10%

Source: *U.S. Department of Commerce. U.S. Census Bureau. . Census of Population and Housing. . 1990 and 2000.*

Regional Cooperation in the Greater Bangor Region: Education

October 2002

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II. EDUCATION

A. Introduction - Economies of Scale in Education

Economies of scale is a fundamental economic principle. Cost per unit decreases as more units are produced when there are net economies of scale. To some extent there are economies of scale in just about every economic activity. Whether we are talking about building airplanes or baking cookies, it is almost always cost effective to produce more than one unit. Economies of scale are also usually limited, however. At some point diseconomies of scale are encountered. At some level of output, production bottlenecks and supervisory problems become increasingly severe and cost per unit begins to rise. Thus, cost-effectiveness is a tricky balancing act. To borrow from Goldilocks, some beds can be too large and some can be too small.

In the case of public provision of education (and other public services) in the Penobscot Valley (and to an even greater extent in the rest of the state), it appears that some of our beds, i.e., our school districts and schools, are too small. Certainly there are important benefits of small schools. Teachers and children generally get to know each other better, thus raising children's sense of belonging and security. Children's relationships and social experiences generally can be expected to improve with smaller school size. Being able to walk to school is a big plus, in addition to saving on transportation costs. In an ideal world all our children would be a two-minute walk from their school. Moreover, competition between schools can be a healthy incentive for providing quality services.

Small schools, however, come with a high price. We are paying a high cost for too much duplication of education services. Moreover, it is not just that we have to pay more (i.e., higher taxes) to educate our children, some of our children are also missing out on some educational opportunities. That is, having small schools and small school districts is costing us both in terms of taxes and in terms of quality. High-cost schooling might be an acceptable choice – if we were getting high-quality schools in return. Similarly, just-okay schools might be acceptable choice – if only the cost were okay. The data, however, indicate that the choice to have relatively small schools and school districts, on average, is causing us to have just-okay public education and at a relatively high cost.[1]

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[1] This evaluation may seem rather harsh to some readers familiar with assessments such as Maine having "the highest performing K-12 education system" (National Education Goals Panel, 1999) and the "biggest bang for its

It is important at the outset to stress three points. First, this report is not meant to condemn the effort and motivation of local school teachers and administrators. They are not the cause of the high-cost/average-quality problem. The problem is in our use of limited resources. That is, the issue is about using our resources more efficiently. Second, school size and school-district size are not the same as class size. We are not necessarily proposing decreases in the number of classes (i.e., we are not arguing for larger class sizes per se). We are proposing decreases in the number of schools, and especially, in the number of school districts. Third, the trend of rapidly rising costs of education is going to continue. Thus, unless we use our resources more efficiently, the problem of rising mill rates is going to continue.[2] Furthermore, if we do not use our resources more efficiently, the quality of education that many of our young receive will lag further and further behind that in the rest of the country.

B. School Size

Schools and school districts in the PV PILOT communities,[3] as well as schools and school districts in Maine generally, are much smaller than in the rest of country on average. This is shown in Figures 1 and 2. Figure 1 shows that Bangor is the only PV PILOT school district with more students than the national average, and S.A.D. 22 is the only other district with even half the national average. The other 12 school districts are more like the rest of the state. The average number of students in PV PILOT school districts is 1,097, which is only a little over a third of the national average, but well over the state average. Figure 2 indicates that most of the public schools in the PV PILOT area and in the state as a whole are considerably smaller than in the rest of the country. The average number of students is only about 5/9[ths] of the national average. Moreover, this occurs despite the fact that Bangor High School is the largest school in the state (1,447 students in 2000-01).

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education buck" (*Forbes Magazine*, 1997). These studies (as well the widely-publicized high average scores of Maine students on national standardized exams), however, fail to account for Maine being the least ethnically diverse state in the country. After accounting for this fact, the performance of Maine schools is only average. For further discussion on this issue see Philip A. Trostel, "Workforce Development in Maine: Held Back by the Lack of Higher Education", Margaret Chase Smith Center for Public Policy Technical Report, forthcoming 2002.

[2] Moreover, this problem is compounded by Maine's current budget shortfall and already high level of state and local taxes.

[3] The PV PILOT towns are Bangor, Bradley, Brewer, Eddington, Glenburn, Hampden, Hermon, Holden, Kenduskeag, Milford, Old Town, Orono, Orrington, Veazie, and the Penobscot Indian Nation on Indian Island. Hampden is in S.A.D. 22 (with Newburgh and Winterport), Eddington and Holden are in S.A.D. 63 (with Clifton), and Kenduskeag is in S.A.D. 64 (with Bradford, Corinth, Hudson, and Stetson).

Moreover, future demographic changes forecasted recently by the Maine State Planning Office indicate that our schools and school districts will become even smaller unless there is consolidation of educational resources. As revealed in Figure 3, a rapid contraction of the school-aged population (ages 5 through 17) is expected in Maine and in most PV PILOT communities. The school-aged population in Maine is forecasted to shrink by almost 8 percent from 2000 to 2005, and by almost 13 percent over the 2000-10 decade. The reduction is expected to be even stronger in the combined PV PILOT area. The forecasted school-aged population in the PV PILOT towns is over 9 percent lower in 2005 than in 2000, almost 15 percent lower in 2010 compared to 2000. These forecasts indicate that, unless there is significant consolidation, the fixed costs of providing education services (i.e., the costs of facilities operation, administration, etc.) will have to be spread over even fewer students in the near future.

C. Cost per Student

Education in the PV PILOT communities, as well as education in Maine generally, costs more than in the rest of country on average. Figure 4 shows operating cost per student in the school districts in the PV PILOT area. The average operating cost per student in the PV PILOT area ($6,248) is practically the same as the state average ($6,233). Cost per student in Maine, however, is about 10 percent higher than for the country as a whole according to the latest data available from the U.S. Department of Education. This is shown in Figure 5.[4]

Figure 6 illustrates the rising cost of providing K-12 education. The cost of education rose significantly faster than the rate of inflation during the last decade. Even after removing the effect of inflation, per-student cost in Maine rose by an average of 2 percent per year over the nine academic years from 1992-93 to 2000-01. Moreover, public education costs rose particularly rapidly during the last three years of that period. In the latter three years per-student cost in Maine rose by an average of 4 percentage points per year more than the rate of inflation. Bradley was the only PV PILOT district that did not experience rising real cost per student over the nine-year period.

The primary reason for the rising costs is that education is labor intensive, and average wages rose faster than inflation, particularly at the end of the last decade. That is, the 'problem'

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[4] Costs shown in Figures 3 and 4 are not directly comparable because of differences in the way that the Maine and U.S. Departments of Education calculate costs per student. The U.S. Department of Education figure includes all State spending on public education, not just that which can be attributed to individual school districts.

of rising education costs is mainly a consequence of increasing economic prosperity. In a labor-intensive area like education, as opposed to a capital-intensive area such as microchip manufacturing, technological advances do not offset rising wage rates. The implication of this is that we should expect that education costs will continue to rise - unless significant cost savings are found. A close examination of the costs of providing public education in Maine and in the Greater Bangor region reveals that there are indeed significant potential cost savings.

D. A First Look at School Size and Cost per Student

Net economies of scale exist when cost per student declines as the number of students increases. Net economies of scale are expected to occur at low numbers of students because the spreading of fixed cost over a larger number of students more than offsets the additional cost from a larger number of students. Net diseconomies of scale exist when cost per student rises as the number of students rises. This is expected to occur at high numbers of students because the additional cost of more students outweighs the spreading the fixed cost over more students. In other words, going from very low levels of students (imagine the cost per student of having a school for each student) to very high levels of students (imagine the cost per student of having only one school in the state); we can expect a U-shaped relationship between cost per student and the number of students. This expected relationship between school size and per-student cost is shown in Figure 7. It is not immediately clear, however, where our schools and school districts are in this relationship. Ideally our schools would be on the flat middle region of this relationship where cost per student is minimized (for some level of education quality). The data, however, suggests that our schools are on the declining portion of the relationship.

Figure 8 plots average cost per student in each state in 1998-99 against its average number of students per school district (comparable cost figures are only available for school districts rather than for schools).[5] Although there is a considerable amount of variation in average per-student cost, Figure 8 suggests a U-shaped relationship. Moreover, Maine appears to be on the declining portion. The data shown in this figure are highly aggregated, though. It would be better to look at data from individual school districts to infer economies of scale and potential cost reductions from consolidation of school resources. Data of this sort are shown in Figure 9.

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[5] Hawaii with a single school district of 185,860 students is omitted from Figure 8 to avoid distorting its scale.

Figure 9 also suggests a U-shaped relationship between cost per student and the number of students in Maine, although there again is considerable variation in cost per student across the districts.[6] All of the 25 highest-cost districts (above $7,800 per student) are relatively small (all but one have less than 300 students). But there are also many small districts (so small that they appear very near the zero vertical axis) that have low per-student costs, which appears to contradict the hypothesis that there are significant increasing returns to scale in K-12 education. Closer inspection of the data, however, reveals that these data points do not contradict the hypothesis. Indeed, these cases provide further support for the hypothesis of increasing returns at low numbers of students.

All of the 7 lowest-cost districts (below $4,850 per student), and 20 out of the 23 lowest cost districts (below $5,225 per student) pay other districts to educate at least some of their students. That is, by sending all or some (i.e., just the high schoolers) of their students to other districts, many of the very small districts are able to benefit from the economies of scale found in the larger school districts. One might initially think that tuitioning students to other districts would be relatively costly for these school districts. On average, however, this is not the case. For the small districts, tuitioning their students is not only cheaper than educating their students themselves, it is even cheaper than the average cost per student in the state. The average cost per student in Maine in 2000-01 was $6,233. The weighted average cost per student in school districts that tuition all of their students to other districts was only $5,889 – 5.5 percent less than the state average.

Why do these tuitioning districts get such a good deal? Are the receiving school districts being benevolent to the smaller districts? Perhaps, but probably not. The larger districts have their own children and taxpayers to consider. More likely, the larger districts benefit by accepting students from other districts at a tuition rate below their average cost per student. How is this possible? Economies of scale. The cost of the *additional* students is less than their overall average cost per student. These districts benefit from having more students share their costly infrastructure. In other words, both the sending and receiving districts can share in the cost

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[6] Data for the whole state is emphasized rather than for just the PV PILOT communities because the PV PILOT school districts are too few (14) from which to draw reliable inferences.

savings from moving from points on the downward-sloping part of the curve shown in Figure 7 to a point on or nearer the flat part of the curve.[7]

Figure 10 clearly shows the benefit from tuitioning students out of the smallest districts.[8] The complete-tuitioning districts generally lie below and to the left of the K-8 districts, which generally lie below and to the left of the K-12 districts. Tuitioning students out of very small districts, i.e., consolidating educational resources, reduces the cost per student. The State thus already benefits from some consolidation of school resources. Indeed, consolidation of school resources has been occurring in the state for decades. There does, however, appear to be room for more consolidation. Moreover, one cannot help but wonder if there is any reasonable justification for having the extra bureaucracy from 56 school districts that do not operate any schools and tuition all of their students (with an average of 38 students in each).

Figures 11 and 12, unlike Figure 9, compare like with like. That is, they show how cost per student varies with school district size for K-8 districts only and K-12 districts only. The economies of scale are clearly visible in these charts. Moreover, many of Maine's schools appear to be on the downward-sloping part of the relationship between cost per student and school district size. That is, there appears to be significant cost savings from greater consolidation of educational resources.

E. Transportation Cost per Student

It is reasonable to suspect that there is much more to the cost story than simply reducing the number of schools and school districts to achieve significant cost savings (indeed, Figures 11 and 12 reveal considerable variation in per-student cost that is not due to variation in school district size). For example, the suggested cost savings could be severely constrained by geography and transportation costs. Certainly transportation costs would become prohibitive at some level of consolidation. At the current level of consolidation (or lack of it), though, transportation costs do not appear to be an important constraint on economies of scale.

In fact, the Maine Department of Education believes that transportation costs could be significantly reduced by further consolidation of school districts. After recently exploring transportation costs in some detail, they have come to the conclusion that there is an inefficient

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[7] There are also legal caps on the tuition rates that school districts can charge other school districts. It seems highly unlikely, however, that the receiving districts would tolerate a situation where they are heavily subsidizing the sending districts.

level of duplication in school bus transportation in the state. This conclusion is based on the finding that transportation cost per student per mile is smaller the larger the number of students. Greater consolidation of school transportation resources is expected to reduce overall bus costs through more efficient routing of buses, through less duplication of transportation infrastructure, maintenance, and overhead costs, and through volume-discount purchasing.

F. School Quality

It is possible, although perhaps not likely, that the cost savings from larger schools and schools districts come from a reduction in quality. It seems more reasonable to expect that at least part of the cost savings will be put into the quality of instruction. For instance, casual observation indicates that students in larger schools have more educational choices. Small schools cannot feasibly offer a full range of curricular and extracurricular options. Although the quality of educational services cannot be quantified with any degree of precision, it is worth examining some crude measures. The readily-available crude measures are for individual schools (as opposed to school districts as examined earlier).

Figure 13 plots the percentage of the school staff with graduate degrees against school size. Staff with greater credentials can presumably provide better services on average. Although there is a great deal of variation in the ratio across schools, there is also a clear positive correlation between the percentage of graduate staff and the number of students (the correlation coefficient is 0.25). Of the 82 schools with less than 80 students (and without missing data), 36 do not have any staff with graduate degrees (i.e., there is an overlap of many data points near the origin on the horizontal axis). Evidently larger schools do indeed use some their cost savings from economies of scale to hire relatively more staff with higher qualifications.

Figures 14, 15, and 16 plot average scores from the Maine Education Assessment against the number of students in the school.[9] Again there is a lot of variation in average tests across schools, but there is also a positive correlation between the 4th, 8th, and 11th grade average test scores and the number of students (the correlation coefficients are 0.16, 0.11, and 0.23).[10] Again,

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[8] The largest school district (Portland) is omitted to make this chart easier to read by substantially reducing its scale.
[9] To streamline the discussion these test scores are the average of the average scores on the reading, writing, and mathematics tests.
[10] The positive correlation between the 8th grade average test score and the number of students is not quite statistically significant, however. This correlation is different from zero with only 87 percent statistical confidence. The correlations shown in Figures 13, 14, and 16 are different from zero with at least 98 percent statistical confidence.

the evidence suggests that economies of scale enable the larger schools to provide higher quality instruction (as well as at a lower cost).

Figure 17 plots the percentage of graduating seniors that intend to further their education against school size. Perhaps surprisingly, there is essentially no correlation between these variables (the correlation coefficient is 0.03, but is not statistically different from zero).

Thus, the evidence, albeit crude, does not indicate that cost reductions from larger schools come at the expense of education quality. Indeed, the evidence suggests that larger schools are able to use some of their cost savings to provide better instruction. An important implication of this is that expenditures per student are not the whole story for judging the fairness of educational opportunities. Equality of spending per student does not necessarily imply equality of education quality and opportunity when there are significant differences in economies of scale across school districts. The evidence suggests that, even if spending per student were the same across every school district, students in smaller school districts essentially have less educational resources and opportunities.

Naturally it is possible that larger schools have lower levels of some unmeasured, yet important, aspects of education quality. To the extent that this is the case, then the loss of these benefits from smaller schools needs to be weighed against the estimated cost savings presented below.

G. Statistical Analysis

The previous charts showing correlations suggest significant potential cost savings from greater consolidation of educational resources. It would be more useful, however, to have a more specific idea of the extent of these cost savings. Rough estimates of the potential cost savings can be calculated using regression analysis. That is, an equation that best fits the data shown in Figure 10 can be estimated.

The data and the theory discussed earlier indicate that the relationship between cost per student (abbreviated as C) and the number of students (abbreviated as S) is nonlinear:

$C_i = \alpha + \beta S_i + \gamma S_i^2$.

The subscript i denotes the individual school districts (i.e., the values of C and S are different in different districts), and α, β, γ are parameters to be estimated. The data and theory also indicate that K-8 school districts benefit from the economies of scale in the districts where they send their

high school students. Thus, a dummy variable for the K-8 districts (abbreviated as D, where $D = 1$ for K-8 districts and $D = 0$ otherwise) is added to the equation to be estimated:

$$C_i = \alpha + \beta S_i + \gamma S_i^2 + \delta D_i.$$

δ is another parameter to be estimated. There is also clearly a large amount of unexplained variation (abbreviate as ε) in cost per student (due to differences in efficiencies, quality of instruction, etc.). Thus, the regression equation is

$$C_i = \alpha + \beta S_i + \gamma S_i^2 + \delta D_i + \varepsilon_i.$$

As discussed earlier, the number of students in school districts that tuition all their students gives a misleading indication of the school sizes where their students attend. Thus, the regression equation is estimated using data from the school districts where teaching occurs (i.e., for the K-8 and K-12 districts only).

The equation that that best matches the (K-8 and K-12) data shown in Figure 10 is

$$\hat{C}_i = 7{,}505.53 - 1.07457S_i + 0.000159S_i^2 - 408.56D_i.$$

The coefficient estimates on S and S^2 indicate that the relationship between cost per student and size of school district is indeed U-shaped.[11] The coefficient estimate on D indicates that cost per student in K-8 school districts is \$409 lower on average than the K-12 districts after controlling for S and S^2 (although their per-student cost is \$242 higher than for K-12 schools when not controlling for district size). The estimated equation (for both K-8 and K-12 districts) is shown in Figure 18 along with the data points.[12] Clearly there is a considerable amount of unexplained variation across districts in cost per student. But 12.7 percent of all the variation in cost per student is explained by only three variables: the number of students, its square, and the tuitioning of 9-12 students. School district size clearly affects per-student cost. This suggests significant cost savings from moving to more cost-effective sizes.

The estimated school district size that achieves minimum cost per student (denoted as S^*) is 3,378 students ($S^* = \hat{\beta}/2\hat{\gamma}$). Only nine of the State's school districts are this large. Thus, there appears to be substantial potential cost savings from greater consolidation of educational resources in Maine.

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[11] The other pertinent technical details of this regression are: $N = 205$, $R^2 = 0.127$, $t_\alpha = 31.58$, $t_\beta = 5.06$, $t_\gamma = 4.04$, and $t_\delta = 1.74$.

[12] The Portland school district is again omitted to make the chart easier to read.

H. Some Illustrative Estimates of Cost Savings

The estimated per-student cost curve shown in Figure 18 is nonlinear. Therefore the implied potential cost savings from consolidation depend on levels of consolidation. The likely cost savings are clearly greater when going from, say, 500 to 1500 students per school district, than from, say, 2000 to 3000 students per district. The cost curve is relatively steep at low numbers of students, but relatively flat near S^*. Thus, a few illustrative examples of cost savings from reducing duplication of educational services are shown below.[13]

Four points are worth making before turning to these illustrative cases. First, the estimated regression equation indicates the *average* potential cost savings. We cannot expect the same cost savings in every case (even if the level of consolidation were the same). The actual cost savings would probably be smaller in some circumstances, but larger in others. Second, there are at least some physical limits to the potential cost savings. To take an extreme example, according to the estimates Augusta and Orono could merge to form a school district with 3,358 students, which is very close to the cost-minimizing size. The 85 mile distance between the towns, though, obviously makes such a merger absurd. To the extent that there are severe physical limits, the estimated cost savings shown below overstate the likely actual cost savings. Third, the estimated cost savings are implicitly *long-run* cost savings. Clearly there would be some adjustment costs from school and school-district realignment. The estimates below do not account for these costs; hence there is another reason why the estimated cost savings overstate likely actual cost savings to some extent. Fourth, the estimates do not take differences in educational quality into account. If some the cost savings from economies of scale are used to increase school quality, as suggested by the evidence on teacher qualifications and average test scores, then the estimates below understate the true cost savings from consolidation.

2,238 Students to S^*

The weighted-average school district size in Maine in 2000-01 is 2,238 students. The average school district size is 754 (1,018 when excluding the districts that tuition all their students), but most of the students in Maine are in the larger districts. Thus, the average school size for Maine's public school students is the weighted average. The estimated long-run annual cost saving from moving of a school district of this size to cost-minimizing size is

$$\hat{C}_{2238} - \hat{C}_{3378} = 7{,}505.53 - 1.07457(2{,}238) + 0.000159(2{,}238)^2$$

$$- 7{,}505.53 + 1.07457(3{,}378) - 0.000159(3{,}378)^2$$
$$= \$206.74.$$

The estimated cost saving of \$207 per student represents 3.5 percent of the estimated cost per student at S = 2,238 (3.3 percent of the actual average operating cost per student in the State). Moreover, because the cost-size relationship is nonlinear, this understates the potential cost savings of moving all of Maine's school districts to the cost-minimizing size (subject to the caveats above). This estimate would be the potential cost savings for the State if all school districts in Maine had 2,238 students. Obviously some districts have more, and many have less, but, because of the nonlinearity, the greater cost savings from the smaller schools more than offsets the lower cost savings from the larger schools.

1,018 Students to S*

As noted above, the average teaching school district in Maine has 1,018 students. The estimated cost saving of moving the average teaching school district to the cost-minimizing size is

$$\hat{C}_{1018} - \hat{C}_{3378} = 7{,}505.53 - 1.07457(1{,}018) + 0.000159(1{,}018)^2$$
$$- 7{,}505.53 + 1.07457(3{,}378) - 0.000159(3{,}378)^2$$
$$= \$885.92.$$

The estimated cost saving of \$886 per student is 13.5 percent of the estimated cost per student at S = 1,018 (and 14.2 percent of the actual average operating cost per student in Maine).

Merger of Brewer, Dedham, Orrington, & S.A.D. 63

Brewer, Dedham, Orrington, and the communities in S.A.D. 63 (Clifton, Eddington, and Holden) recently considered, but apparently rejected, merging into a single school district which would have had 3,347 students (remarkably close to S*) in 2000-01. The estimated long-run cost of that decision is

$$(1{,}414\hat{C}_{1414} + 276\hat{C}_{276}^{\,K\text{-}8} + 641\hat{C}_{641}^{\,K\text{-}8} + 1016\hat{C}_{1016}^{\,K\text{-}8})/3347 - \hat{C}_{3347} =$$
$$1{,}414(7{,}505.53 - 1.07457(1{,}414) + 0.000159(1{,}414)^2)/3347$$
$$+ 276(7{,}505.53 - 1.07457(276) + 0.000159(276)^2 - 408.56)/3347$$
$$+ 641(7{,}505.53 - 1.07457(641) + 0.000159(641)^2 - 408.56)/3347$$
$$+ 1{,}016(7{,}505.53 - 1.07457(1{,}016) + 0.000159(1{,}016)^2 - 408.56)/3347$$
$$- 7{,}505.53 + 1.07457(2{,}430) - 0.000159(2{,}430)^2$$

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[13] Other examples can be computed by request to philip.trostel@maine.edu.

= $646.88.

The estimated cost saving of $647 per student per year is 10.2 percent of the estimated weighted-average cost per student in these school districts (and 10.2 percent of the actual weighted-average cost per student in these districts). Evidently the decision not to consolidate these districts is very costly.

I. Conclusion

The rough estimates just presented are just that, rough estimates. They should not be interpreted as any more than that. This initial examination of the data cries out for more in-depth analysis. The primary reason why further study is warranted is that this initial study suggests that the stakes are very high.

For example, the estimated potential long-run cost savings from one possible consolidation of educational resources within the PV PILOT area is about 10 percent. In 2000-01, 72.8 percent of local property taxes in Maine were used for K-12 education (and this ratio has been rising). The (unweighted) average was 72.5 percent in 1999 in the six towns affected by the proposed consolidation. Thus, if education costs can be reduced by 10 percent, then property tax rates can potentially be reduced by about 7 percent. That is, potentially the (unweighted) average mill rate in the six towns could be reduced from 15.4 percent (in 1999) to 14.3 percent. This means about $110 of potential taxpayer savings per year per $100,000 of property tax valuation.

These *potential* tax savings, however, are probably significantly less than the actual tax savings that these towns would see. Much of the cost savings would probably be passed on the State rather than kept within the district. The State's school funding formula appears to subsidize the small districts, and hence unintentionally subsidies sprawl. That is, the data show that, despite the fact that small school districts generally have significantly higher per-student costs, small districts also generally have significantly lower property tax rates for education. This unintentional subsidy to sprawl from the school funding formula is an issue that merits further research.

Although costs have received the lion's share of the emphasis in the study (for the simple reason that they are quantifiable), it is important to keep in mind that costs are only half of the story. The quality of the instruction that our children receive is also at issue here.

Reducing unnecessary duplication of infrastructure is also important because it can help provide more opportunities for our kids. Larger schools and school districts can facilitate more opportunities for taking advanced placement courses, vocational courses, as well as recreational courses.

A final implication of this study is that the data on K-12 education are probably indicative of all local public service provision. That is, it is unlikely that our provision of education is dramatically different from our provision of public services generally. It is reasonable to expect that similar cost savings and quality improvements can be found throughout local service provision.

FIGURES

Figure 1
Students per School Administrative Unit in 2000-01
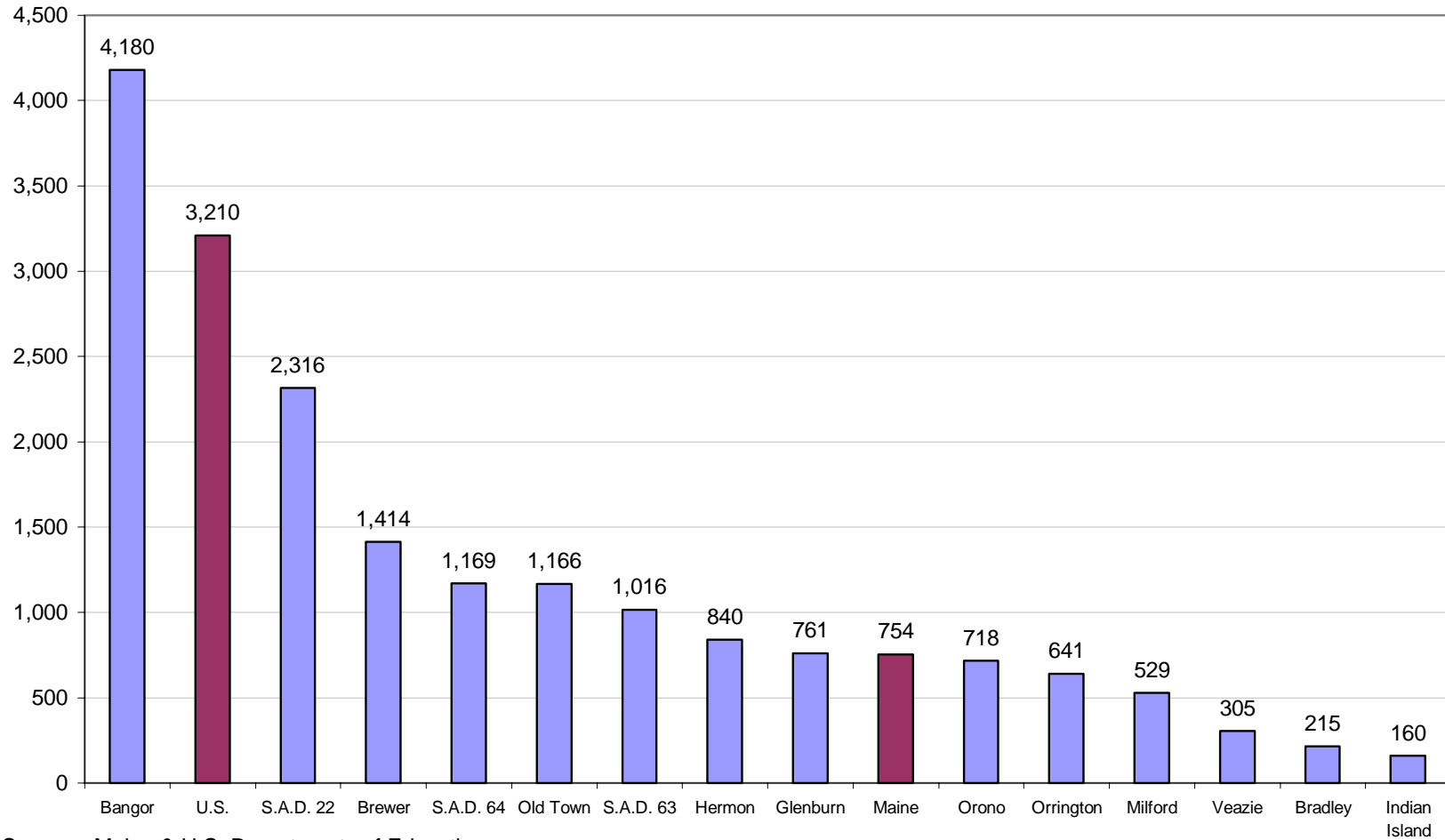
Sources: Maine & U.S. Departments of Education

Figure 2
Average Number of Students per School in 2000-01
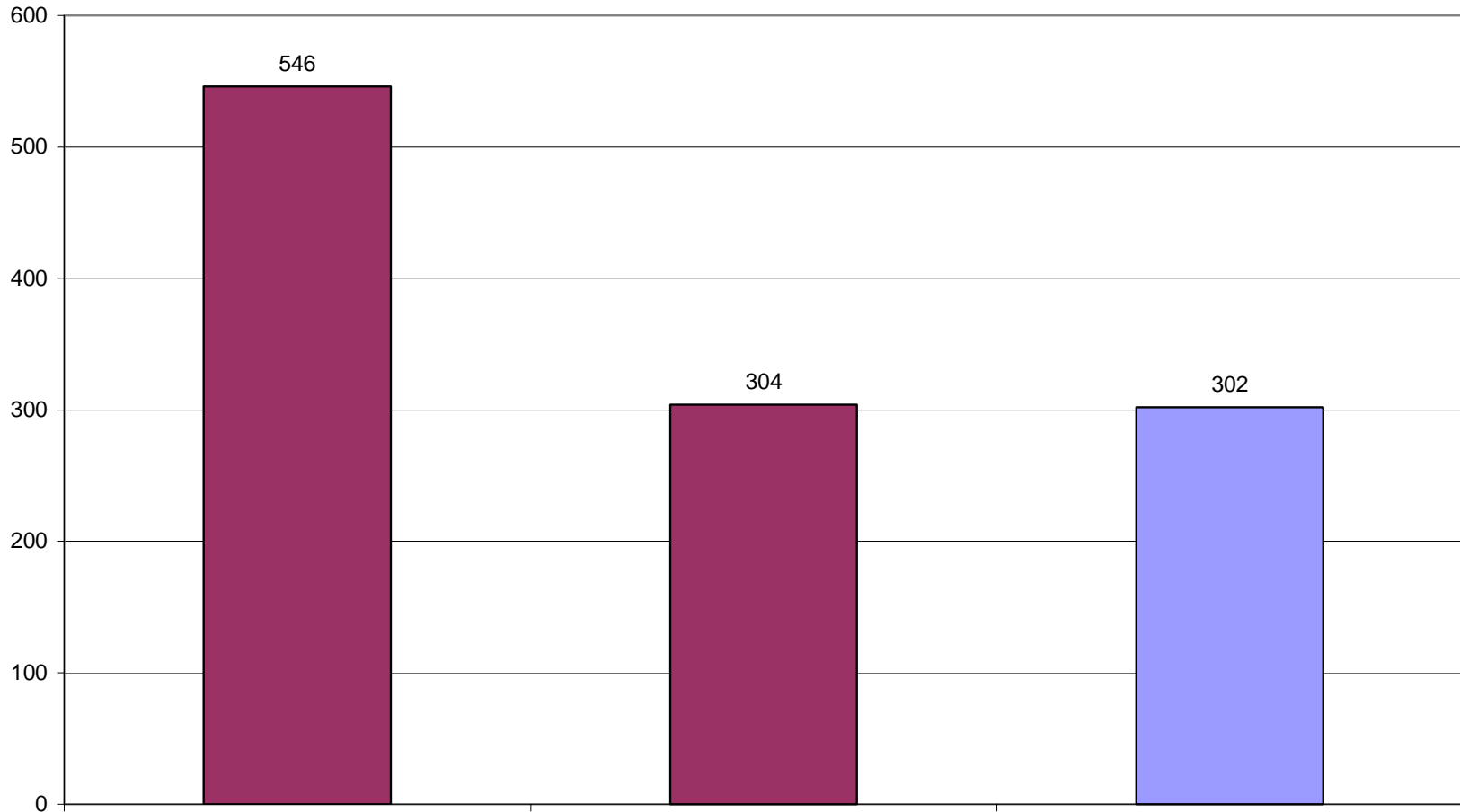
Sources: Maine & U.S. Departments of Education

Figure 3
Projected Growth of School-Aged Population from 2000 to 2005, 2010, and 2015

Margaret Chase Smith Center
FOR PUBLIC POLICY
Proudly Serving Maine
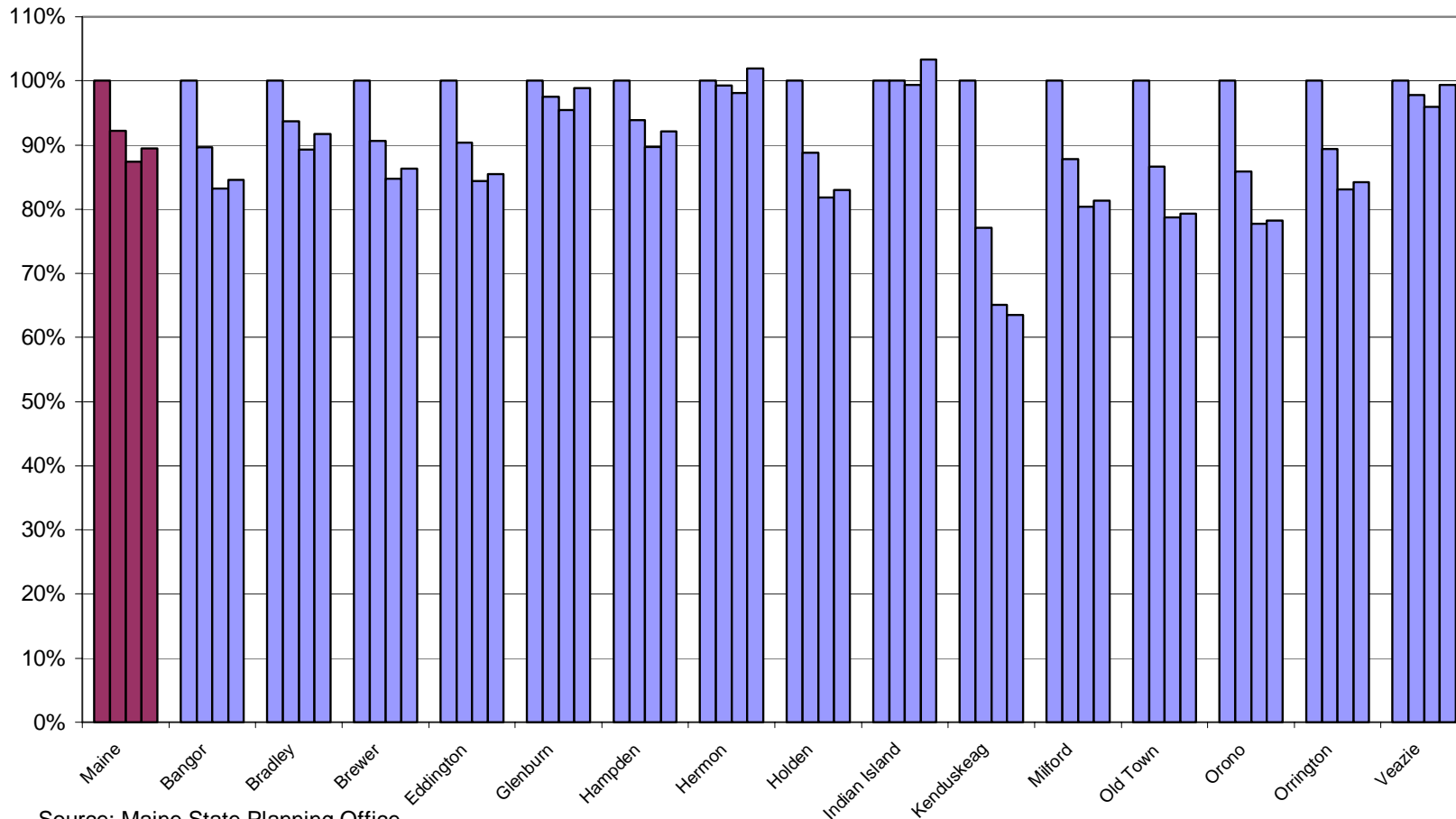
Source: Maine State Planning Office

Figure 4
Operating Cost per Student in 2000-01

Bar chart showing operating cost per student in 2000-01 by district:
- Indian Island: $9,109
- Brewer: $7,008
- Orono: $6,811
- Milford: $6,637
- Bangor: $6,438
- S.A.D. 22: $6,314
- Maine: $6,233
- Veazie: $6,188
- Old Town: $6,069
- Hermon: $6,054
- S.A.D. 63: $5,885
- Orrington: $5,728
- Glenburn: $5,671
- Bradley: $5,198
- S.A.D. 64: $5,108
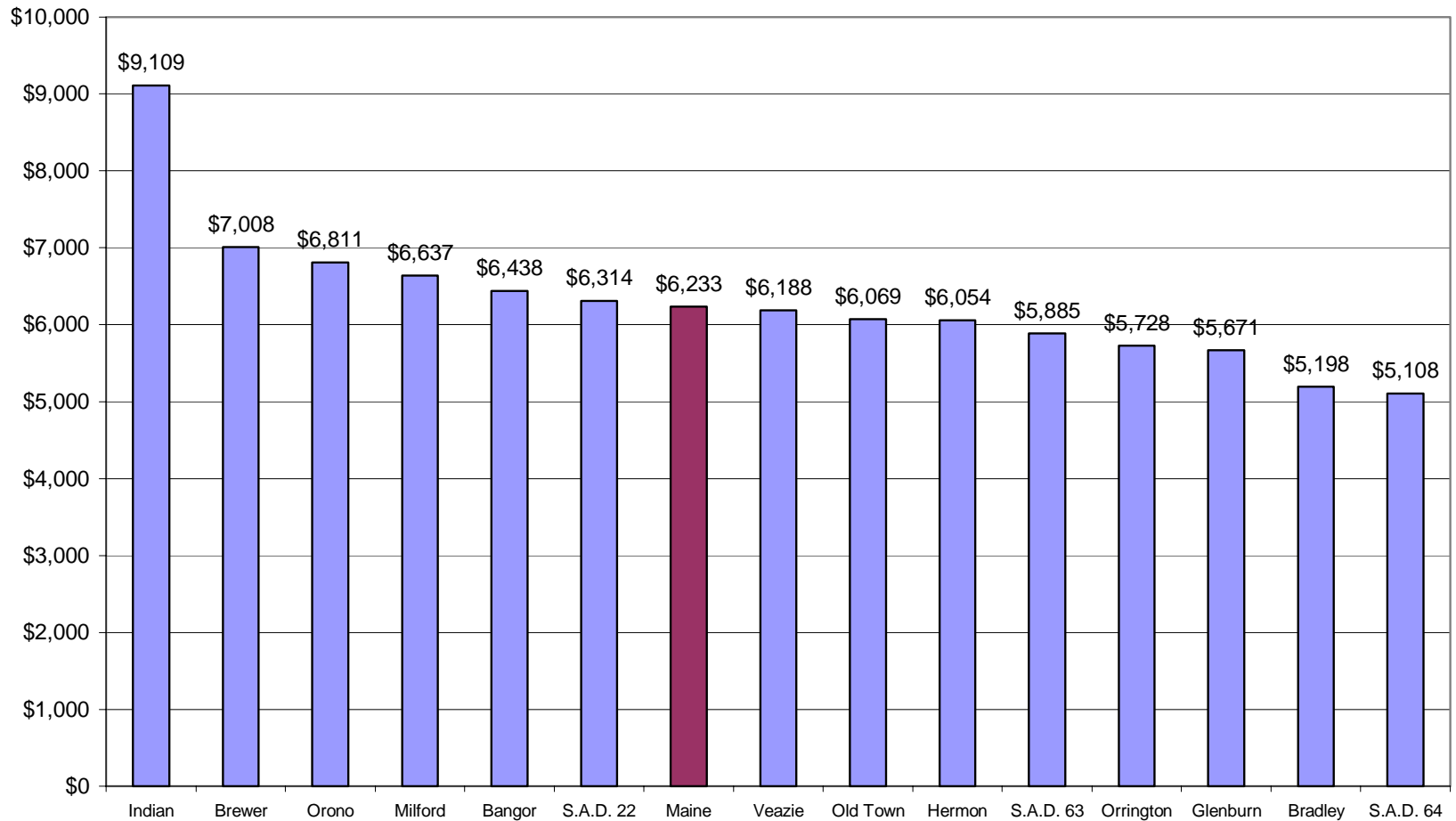
Source: Maine Department of Education

Figure 5
Current Cost per Student in 1998-99

Margaret Chase Smith Center
F O R   P U B L I C   P O L I C Y
Proudly Serving Maine

Source: U.S. Department of Education
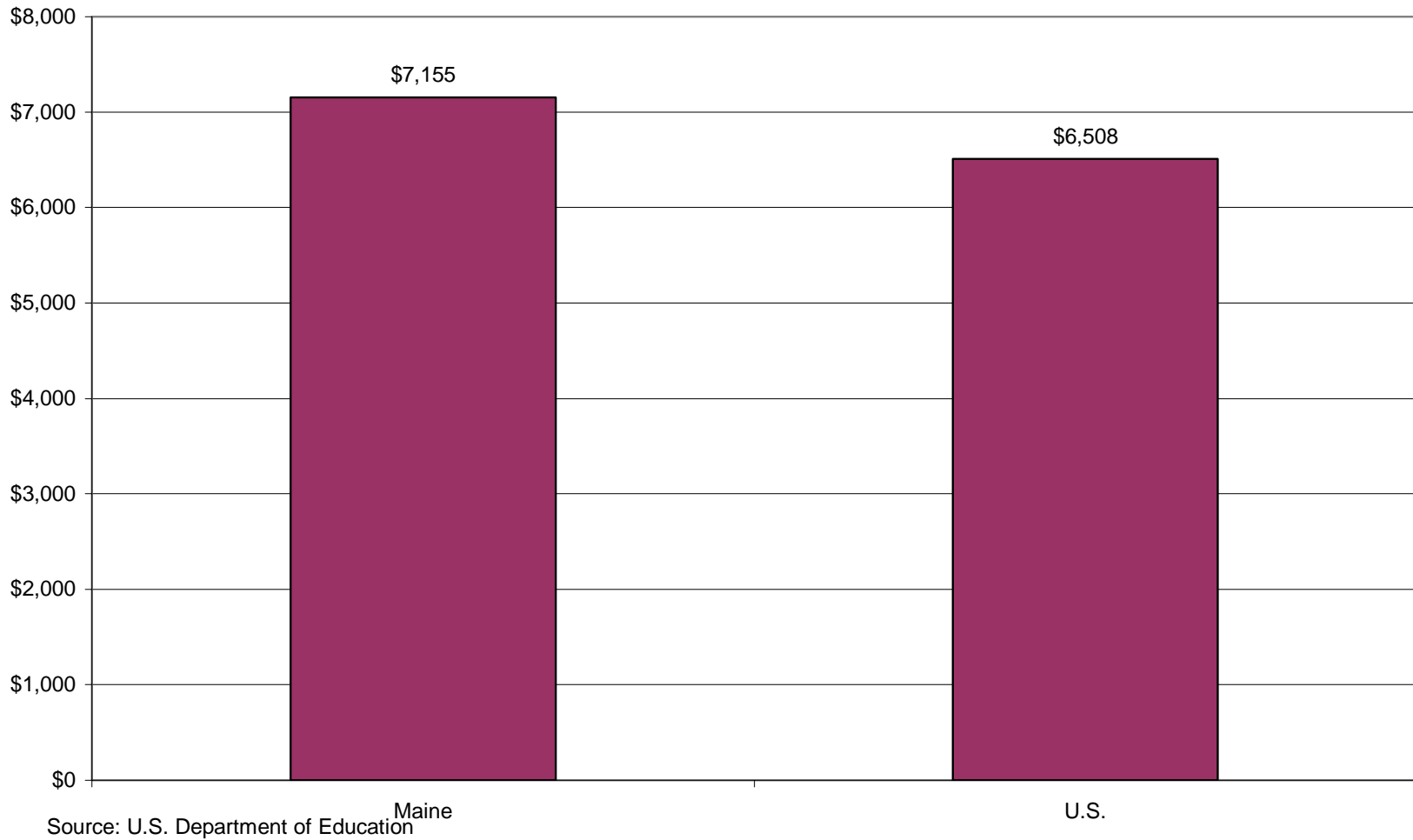
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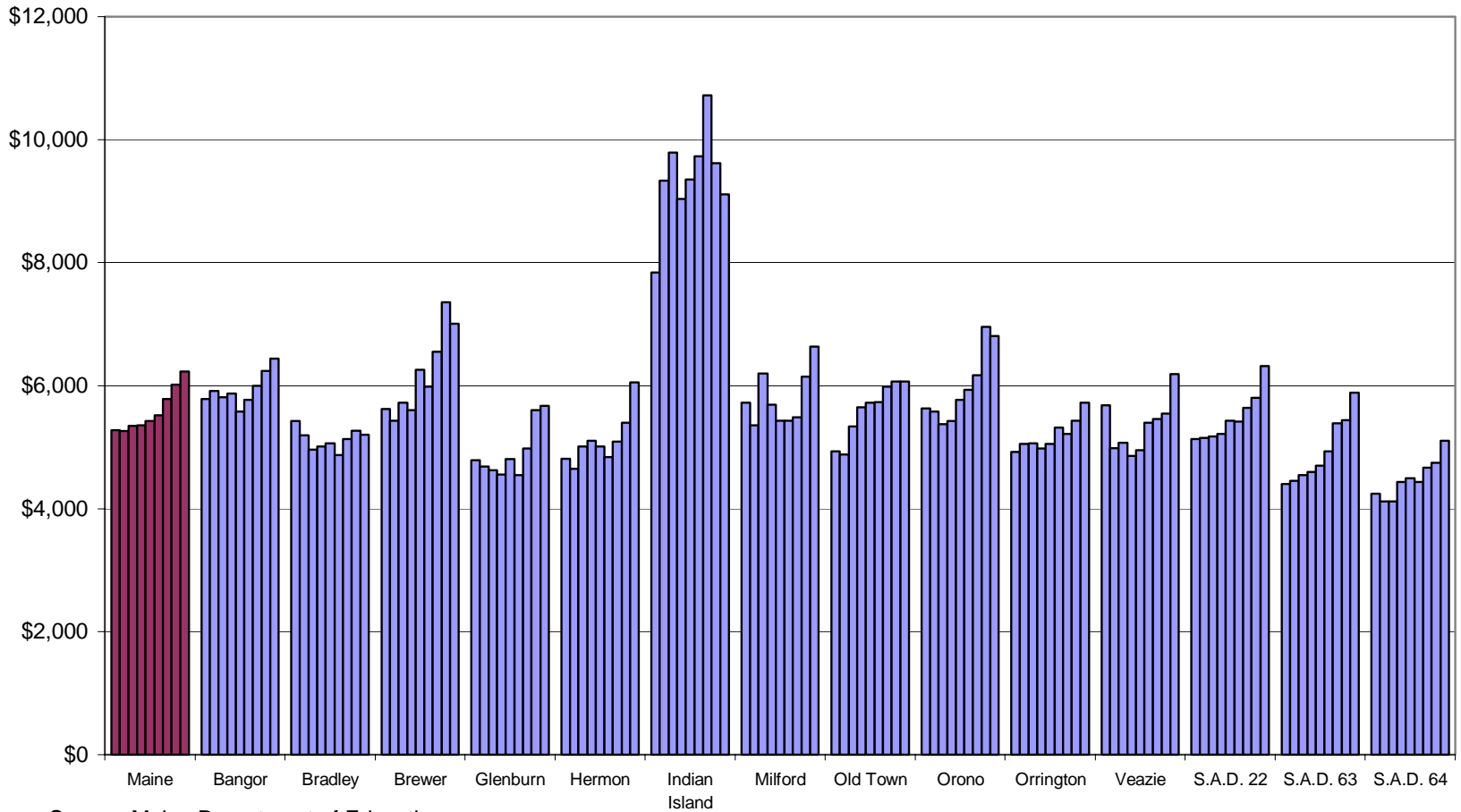
Source: Maine Department of Education

Figure 7
Expected Relationship between Cost per Student
and School Size

Cost per Student
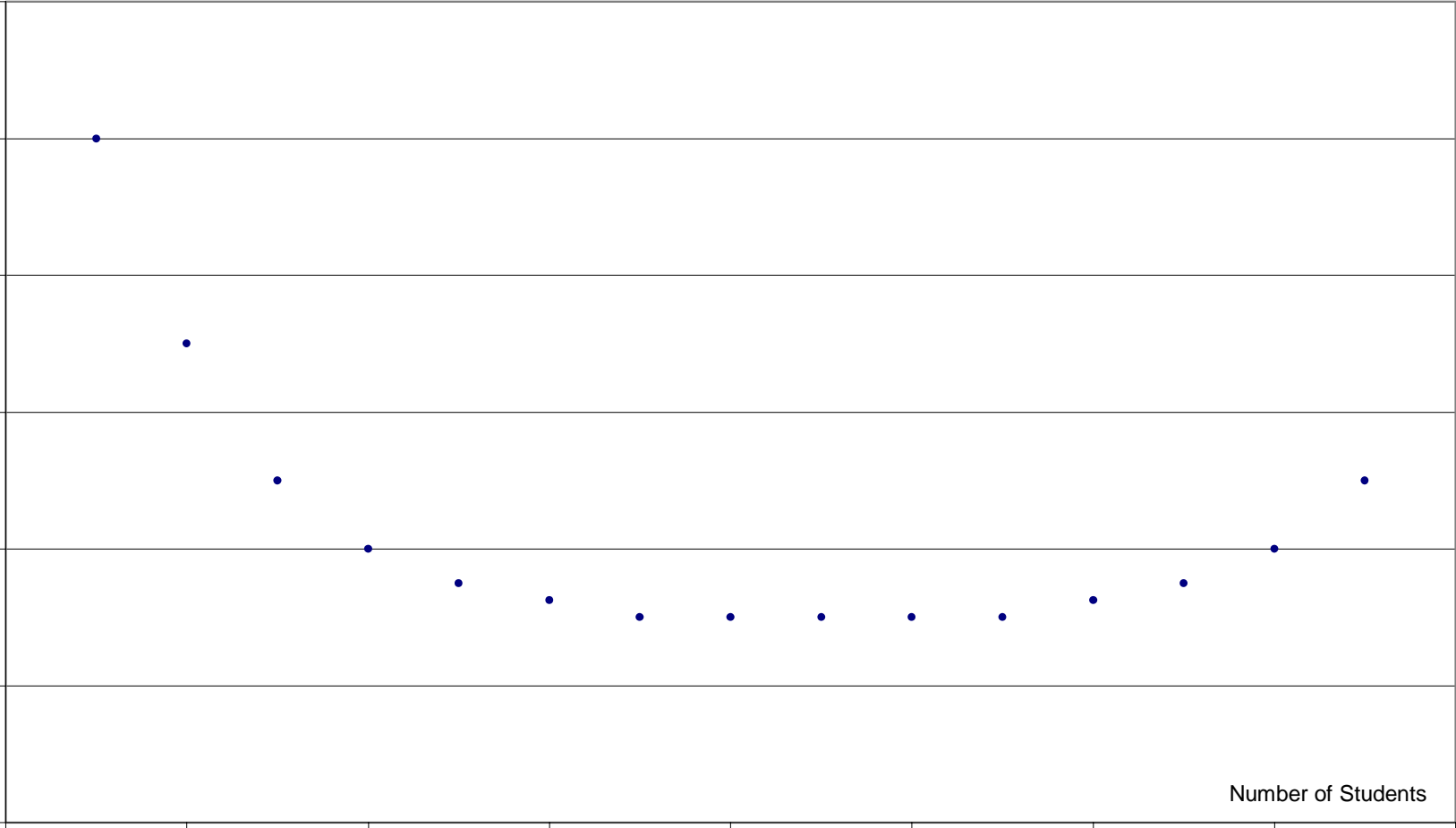
Number of Students

Figure 8
Cost per Student and Average School District Size
in each State in 1998-99

Source: U.S. Department of Education
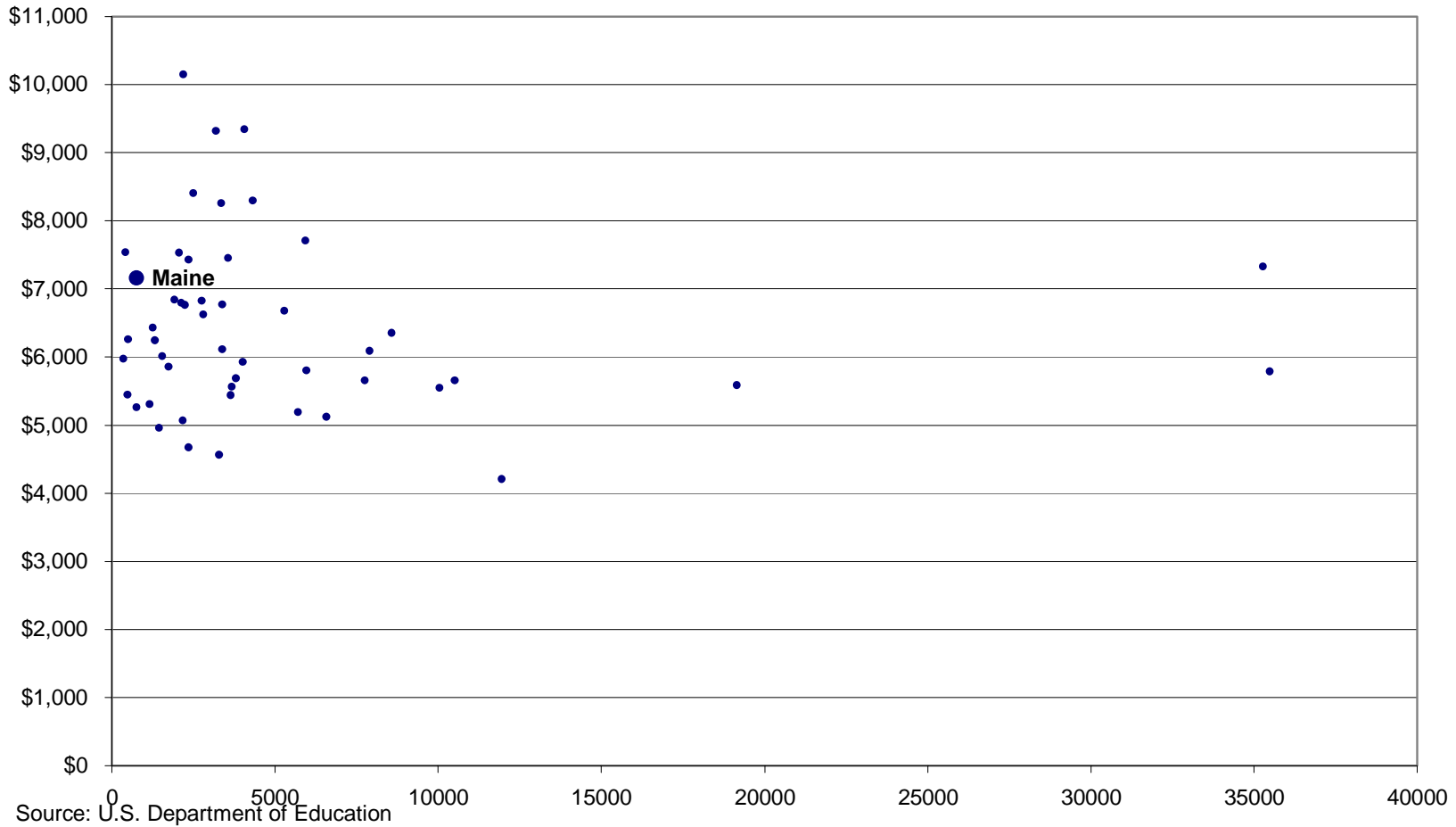
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Source: Maine Department of Education
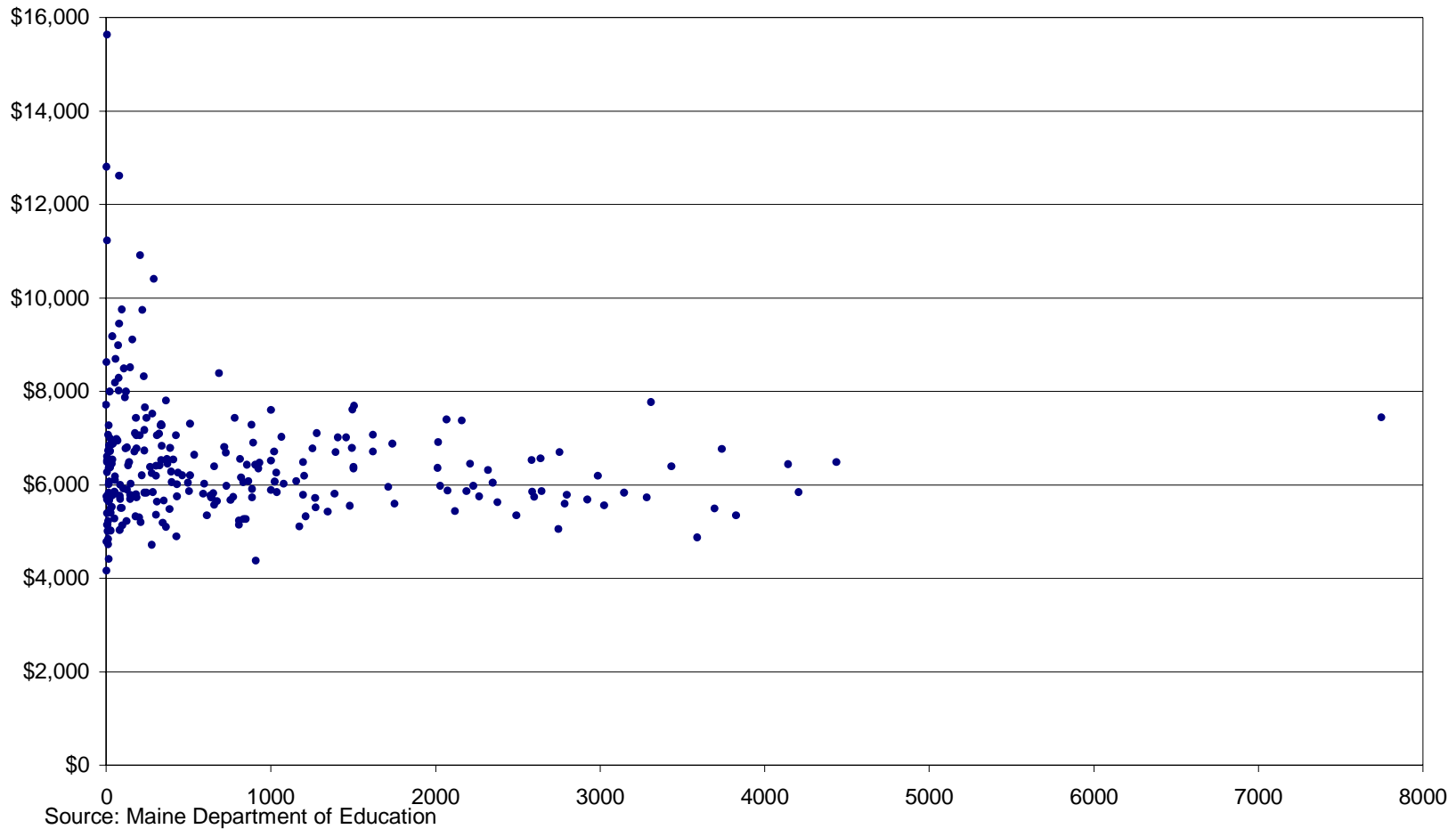
**Figure 10
Cost per Student and Number of Students in
Maine's School Administrative Units**

Source: Maine Department of Education   ▲ Tuitioned ■ K-8 ◆ K-12
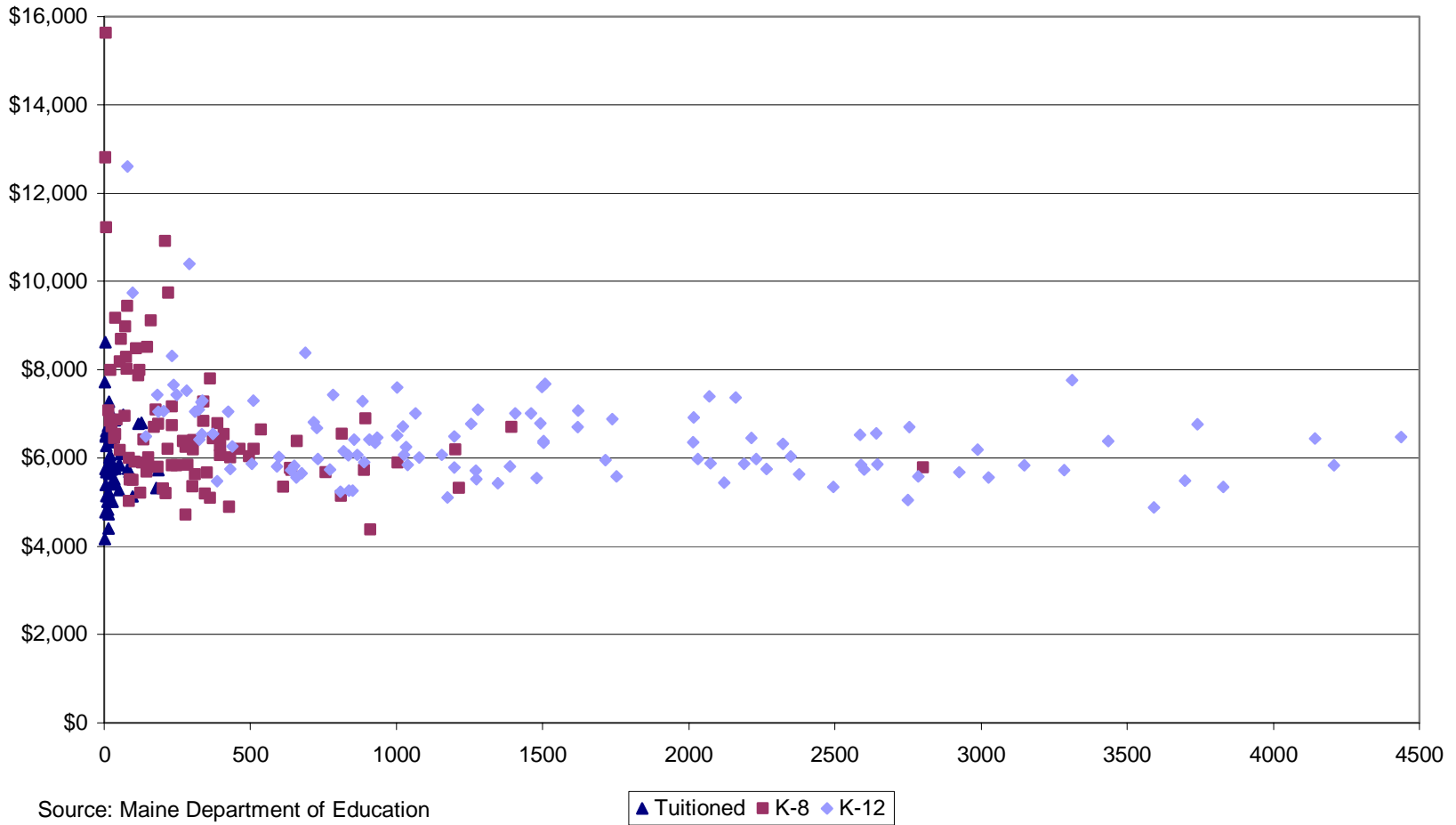
Figure 11
Cost per Student and Number of Students in
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Source: Maine Department of Education
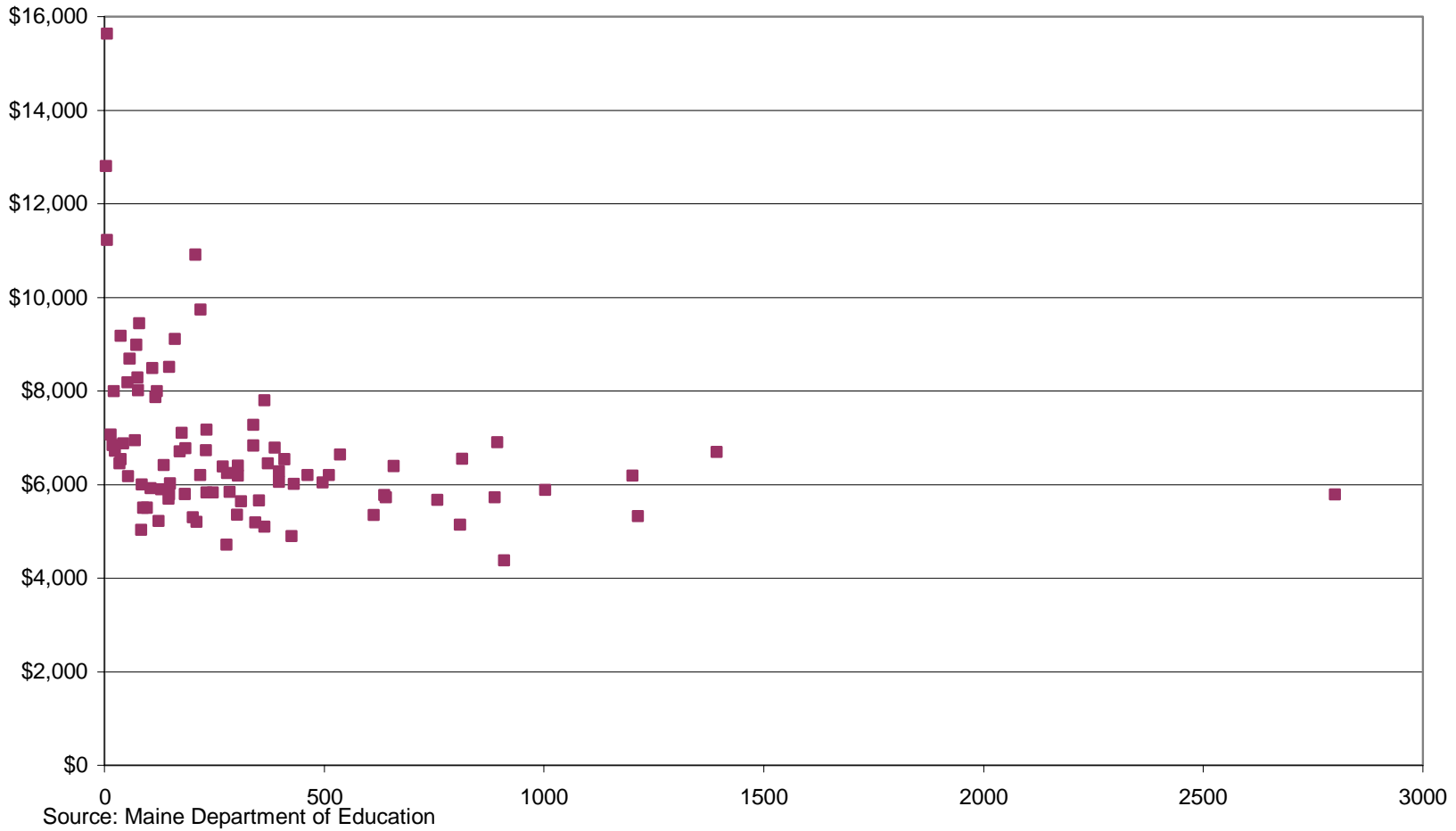
Figure 12
Cost per Student and Number of Students in
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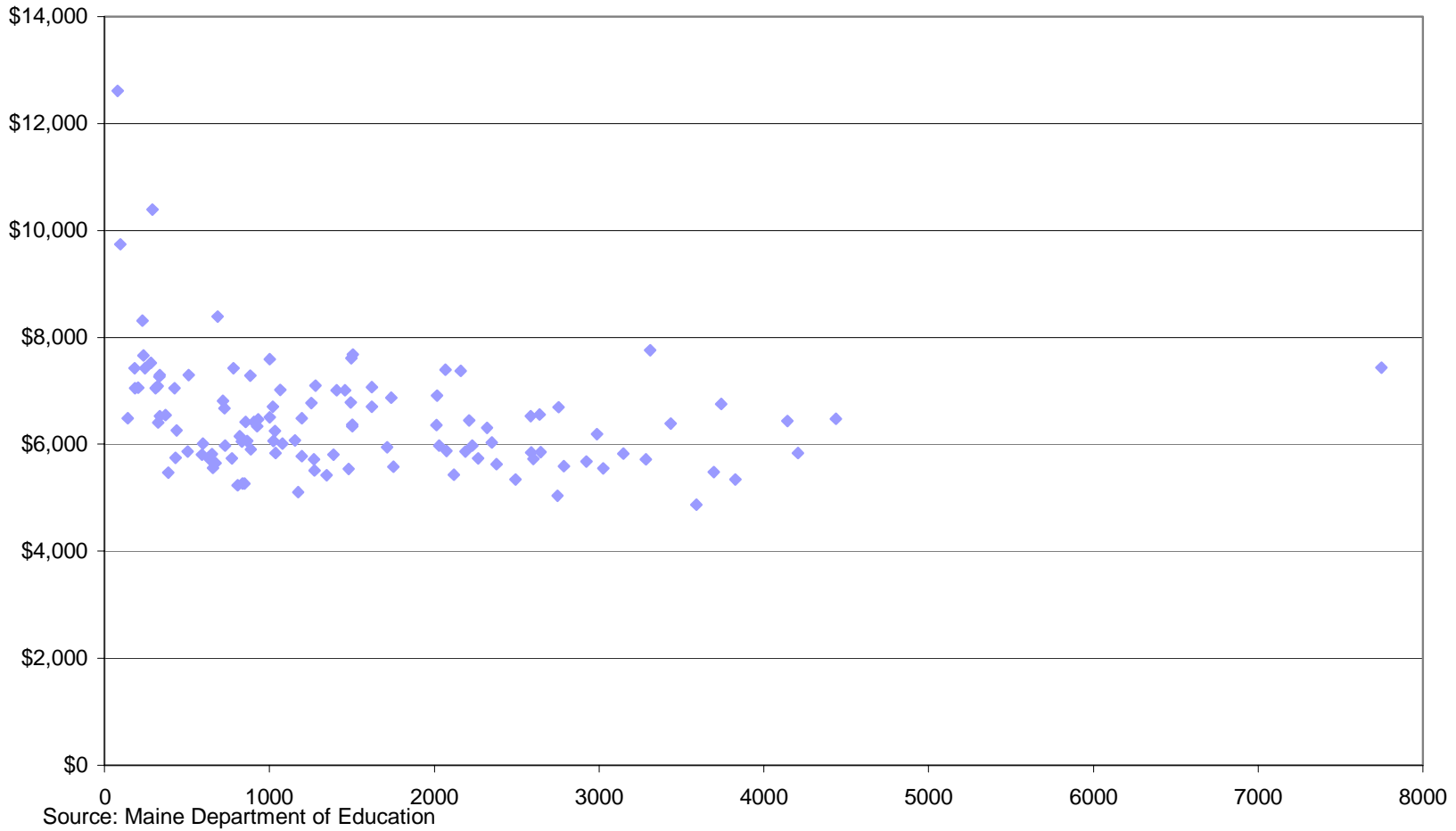
Source: Maine Department of Education

Figure 13
Percentage of Staff with Graduate Degrees and
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Source: Maine Education Policy Research Institute
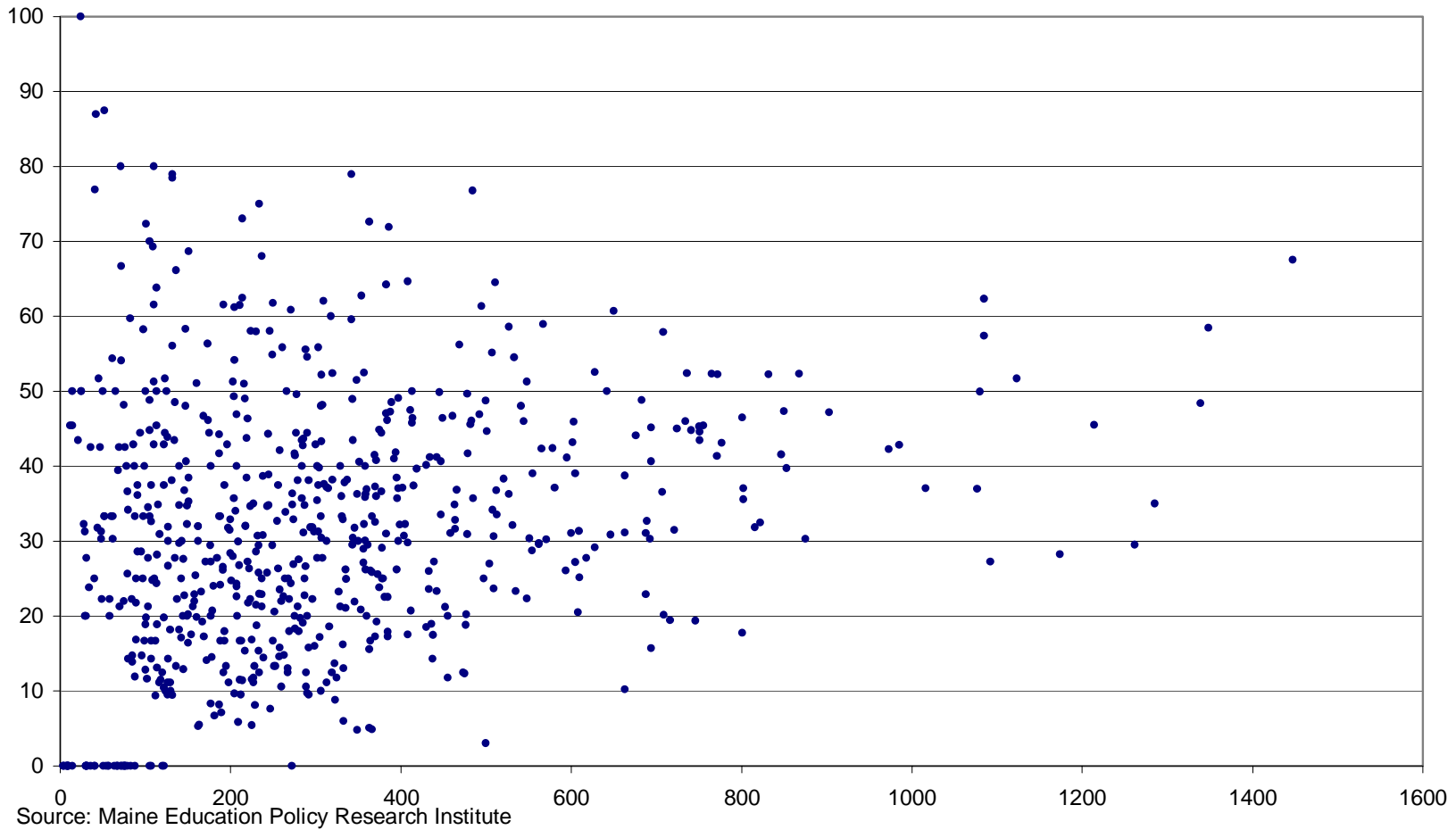
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Average 4th Grade Test Scores and Number of Students

Source: Maine Education Policy Research Institute
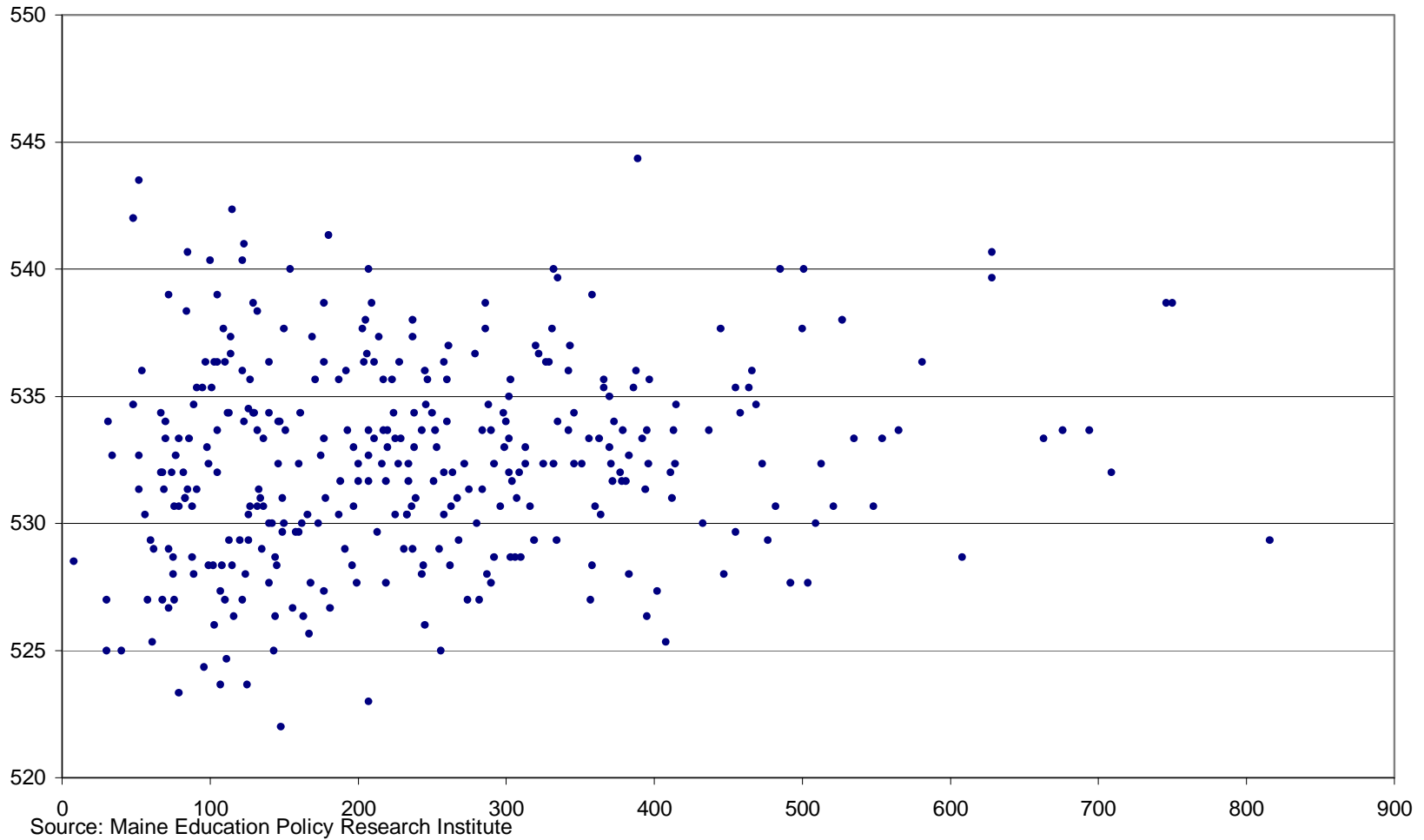
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Average 8th Grade Test Scores and Number of Students

Source: Maine Education Policy Research Institute
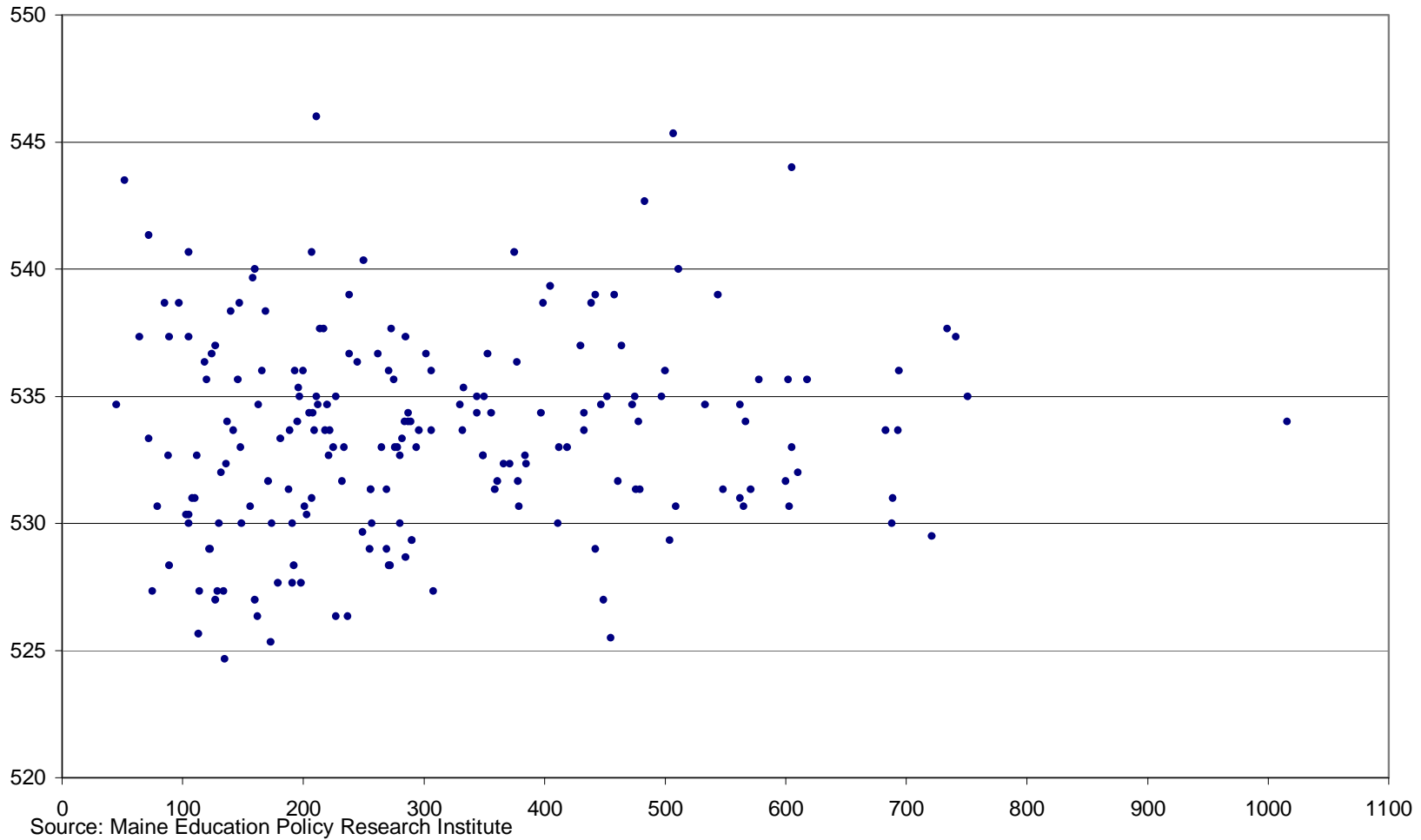
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Average 11th Grade Test Scores and Number of Students
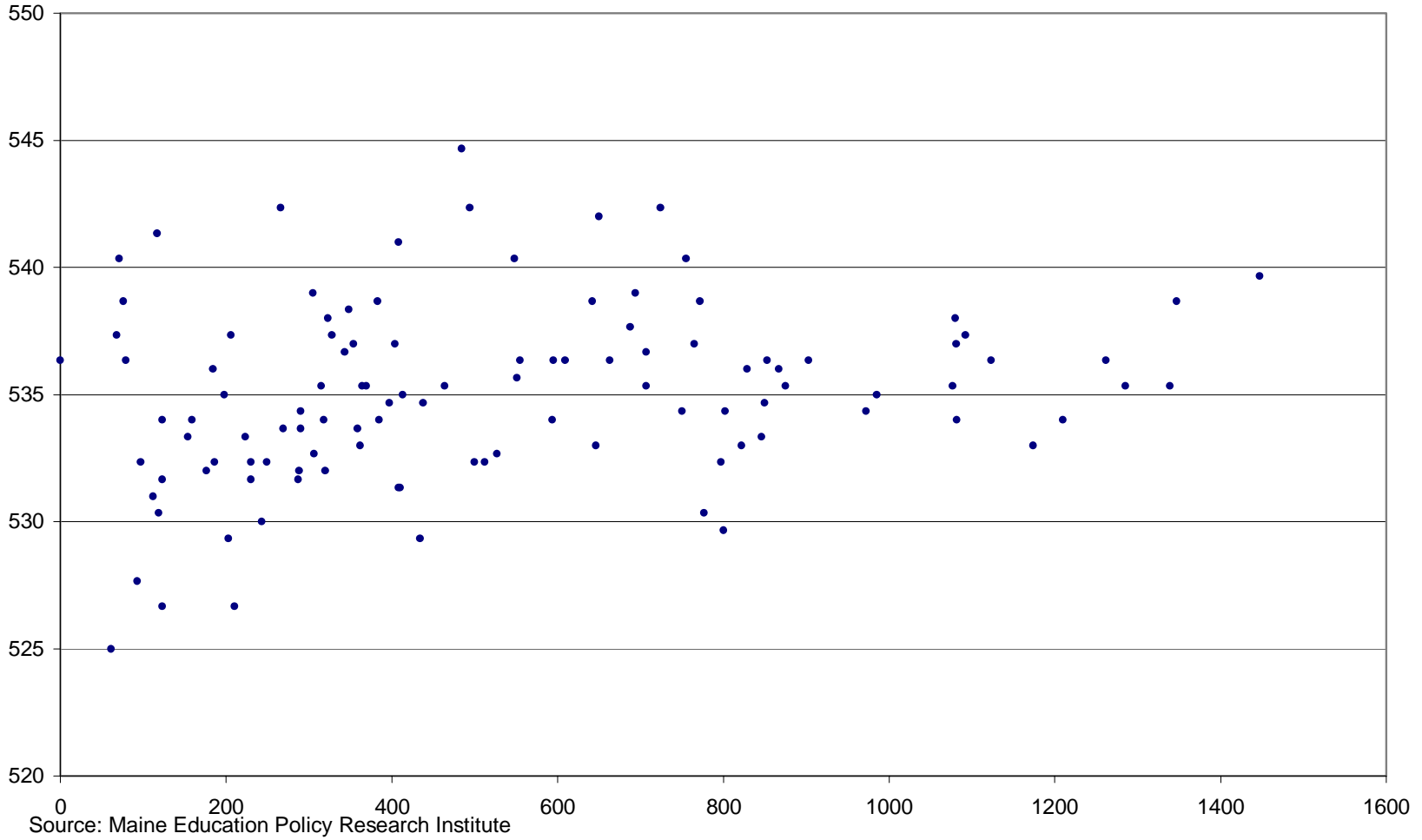
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Source: Maine Education Policy Research Institute
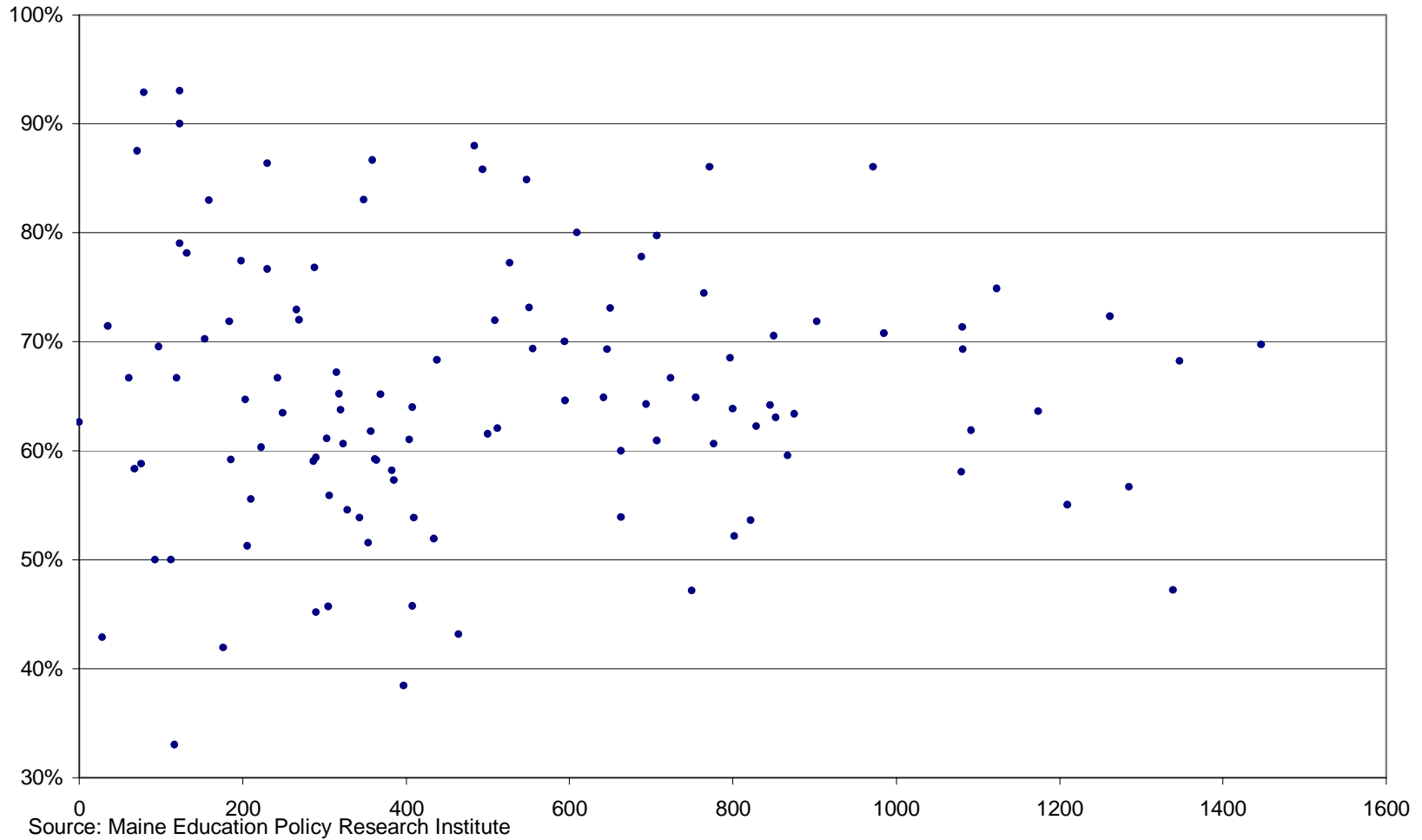
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Estimated Relationship between Cost per Student and School District Size in Maine

Regional Cooperation in the Greater Bangor Region: Housing

October 2002

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III. HOUSING

A. Introduction

In contrast to the policy area of education, where a regional perspective is encouraged by regional entities such as school administrative districts, there is less evidence of regional activity on housing policies. In Maine, this tendency may be explained by a lack of housing problems. Historically, Maine has consistently ranked highly in terms of home ownership and housing affordability relative to other states in the United States.   In recent years, however, rapid population growth and escalating property values have spurred unprecedented housing problems in some regions of Maine (Rooks 2002). In response to decreased availability of affordable housing and rental housing, discussions regarding regional solutions to housing problems have emerged. Examples of such activities include the Southern Maine Affordable Rental Housing Coalition, the Knox County Housing Coalition, the Workforce Housing Coalition, and the MDI Tomorrow project (Bouchard 2002; Chapman 2002).

In what follows, data and ideas are presented to inform the discussion of regional housing issues in the Penobscot Valley[1].   Specifically, the report serves as a supplement to discussions initiated by the Penobscot Valley Council of Governments (PVCOG), Bangor Area Comprehensive Transportation System (BACTS), and the Eastern Maine Development Corporation (EMDC). In the Penobscot Valley Prudent Investments Linking Our Towns (PV PILOT) Draft Regional Plan (BACTS 2002), housing is discussed in the context of three regional business and economic development strategies[2]. Three specific housing policy issues were identified in this regional plan:

- the lack of incentives for private development of rental housing;
- the shortage of affordable housing; and
- the need for a multi-community planning program.

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[1] The PV PILOT study area includes the following communities: Bangor, Bradley, Brewer, Eddington, Glenburn, Hampden, Hermon, Holden, Kenduskeag, Milford, Old Town, Orono, Orrington, Veazie, and Penobscot Indian Island Reservation. Throughout this section, the study area is referred to as the Penobscot Valley.
[2] These three strategies include: provide regional financial and political support for investments in the service centers that will benefit the entire region, such as the Bangor Convention Center and Bangor-Brewer waterfronts (Strategy 1); explore the possibility of developing a multi-revenue sharing business park in the region (Strategy 2); and examine and implement measures to address the housing shortage (costs and supply) in the region and encourage investment in affordable housing in downtown areas (Strategy 3). While housing is inextricably linked to all three of these regional economic development strategies, the connection is strongest between regional housing issues and the pursuit of Investment Strategy 3.

The remainder of Section III is organized around these three issues. While much of the discussion focuses on recent trends in the provision of housing, emphasis is also given to the rationale for addressing such issues on a regional basis. Different levels of existing rental housing and rates of new development of multi-family housing units are observed across the communities in the Penobscot Valley. In this report, trends in the provision of rental housing are examined using readily available data. The second housing policy issue addressed in this report is the supply of affordable housing in Penobscot Valley. There is a perceived shortage of affordable housing in the Penobscot Valley, particularly of starter homes ranging in value from $35,000 to $50,000 (BACTS 2002). Two suggested implications of this shortage are a tighter than usual rental market due to a delay in home ownership and occupancy of sub-standard homes available in rural markets. In this report, trends in affordable housing are examined using readily available data. The utility of a multi-community or regional planning program is the final housing policy issue addressed in this report. A cursory review of the comprehensive plans of the communities in Penobscot Valley confirms their acknowledgement of the benefits of regional provision of services such as education, water, fire, police, public transit, and waste disposal. In addition, there appears to be widespread acknowledgement of the regional aspects of land use issues such as the maintenance of natural resource areas and bike trails. However, few communities address the regional aspects of housing policy issues, aside from acknowledging the variation in burden of providing affordable housing units or the potential for regional solutions to elderly housing problems. In this report, a brief discussion of regional cooperation on housing issues is presented based on the future intentions of Penobscot Valley communities and recent efforts of housing coalitions in Maine and other regions of the United States.

B. Maine Housing Policy Issues

Before addressing the three specific policy issues raised in the draft PV PILOT Regional Plan, it is helpful to consider the housing policy issues that have been identified at the state-level. The age of Maine's housing stock and the high home ownership rate both have significant effects on housing policy. In 1999, Maine had the 7th oldest housing stock in the United States (MSHA 1999). Based on the US Census 2000 data, Maine had 651,901 housing units in 2000 and 29 percent of these units were built prior to 1939. From 1990 to 2000, the state experienced a modest increase in housing units of 64,856 (11 percent). The age distribution of housing varies throughout the state. The older age of Maine's housing complicates housing policy, making

rehabilitation programs a logical part of any comprehensive housing policy strategy. Maine ranks highly in terms of home ownership rate. In 2000, 72 percent of the state's housing units were owner occupied. While this is encouraging, it complicates the provision of rental and multi-family units, as low home ownership costs restrict the payments that can be gleaned in the rental market.

The Maine State Housing Authority (2002) draws attention to the following six housing policy issues: affordable housing in high growth areas; housing for the frail elderly; homelessness; housing in downtowns; preserving existing federal subsidized housing; and increasing the capacity of nonprofit organizations to meet the challenges of providing housing to populations with various needs (p.11). Discussions of these issues center on common themes related to the inter-relatedness of demographic, regional economic, and housing trends.

Demographic trends influence housing policy issues in a variety of ways. Notably, different demographic groups have fundamentally different housing needs. As household formation and lifestyle trends change, housing demands are also expected to change. For example, the demand for different types of housing units is expected to vary with age and income. Smaller starter homes, apartments, and mobile homes are often more desirable to younger residents. Whereas, larger homes and renovations are often demanded by middle-aged residents. In contrast, older residents may begin to demand housing that is tied with services such as medical, transportation, and meals. Thus, one can expect changes in housing demands as the characteristics of Maine's population changes. Looking into the future, several agencies anticipate changes in housing demands due to an increase in elderly populations (MSHA, 1999; MSHA 2002; EDCM 2002; MECD and MSHA 2002).   Similarly, strategies aimed at maintaining younger populations are likely to hinge on the provision of smaller starter homes and apartments (MSHA, 1999; MSHA 2002; EDCM 2002; MECD and MSHA 2002). Communities throughout Maine are likely to experience dramatic shifts in housing preferences if they continue to lose younger populations and gain elderly populations.

A second relationship between demographics and housing policy issues involves affordability. When housing costs increase at a greater rate than income, affordability will tend to decrease. Demographic characteristics such as educational attainment are often strongly correlated with income and in turn home ownership. Policy makers recognize that future changes in educational attainment and income can be expected to affect ownership trends and the

demand for housing assistance (MECD and MSHA 2002; EDCM 2002). This relationship further accentuates the importance of education to maintaining healthy and prosperous communities statewide.

Housing policy issues are also closely tied to employment and economic trends. The demand for housing is a function of employment opportunities. Furthermore, regional economic development strategies often depend on available housing when encouraging new job creation and business startups. The Workforce Housing Coalition and MDI Now Project are examining respectively the detrimental impacts of limited affordable housing on employers in Southern Maine and Mount Desert Island (Bouchard 2002; Chapman 2002). Lastly, housing values are significant to the communities of Maine because of the prominence of property taxes as a revenue source. For an excellent discussion of the connections between Maine's jobs, housing, and people, refer to O'Hara (2001)[3]. Future policies aimed at solving Maine's housing problems may benefit from the consideration of relevant employment and economic trends and vice versa.

The provision of affordable housing and rental housing is of concern to communities throughout Maine. Housing assistance needs are difficult to quantify. MECD and MSHA (1999) emphasize the fundamental importance of understanding what populations are in need of housing assistance. One way of describing "in need" is to consider families and seniors, making 50 percent or less than the metropolitan statistical area (MSA) median income and spending more than 30 percent of income on housing. MECD and MSHA (1999) identified 64,000 households in need of rental housing assistance statewide. Of these households, 45 percent (28,590) were seniors. While subsidized housing units were expected to help many of these households, approximately 39 percent of these households (24,819) were not expected to be serviced by the existing subsidized rental housing units in their area of residence. The Bangor labor/housing market area had the third highest unmet need of renters (2,182) in absolute terms, after Portland (6,620) and Augusta (2,564).

---

[3] O'Hara (2001) identifies the following strategies for maintaining the future health of Maine: identifying the following strategies for the future health of Maine: (1) create apartments to make Maine attractive to Young people; (2) employ neighborhood stabilization and improvement as a property tax strategy; (3) employ retirement housing as an economic development strategy; (4) build up the construction industry; and (5) build neighborhoods and communities instead of units.

Affordable housing for young people and retirees is anticipated to be a major policy issue in Maine in the years to come (MSHA 2002). Recent data suggest that the Bucksport and Outer Bangor housing/labor market areas along with Somerset County have the most low income elderly in need of housing statewide (MSHA 2002). Building permit data indicate sparse new development of multi-unit buildings statewide. During the mid 1980s (1984 to 1988), permits for buildings with greater than 5 units averaged 172 per year. Only 27 such permits for buildings with greater than 5 units were issued state-wide in 2001, ranking Maine last in the nation in production of multifamily housing units. The concurrent decline in federal subsidies to provide affordable housing is also of concern, especially as the renewal period for many past projects nears. Voter approval of the affordable housing bond initiative in 2001 ($10 million dedicated to the affordable housing crisis in Maine) suggests that citizens support programs that encourage affordable housing. Unfortunately, it is expected that citizens support the concept of affordable housing but are not necessarily supportive when such housing is proposed in their neighborhood.

The Maine State Housing Authority (MSHA) characterizes housing affordability of rental and owned housing using an affordability index. "The index measures the ability of a family at the median income to purchase a median price home in their labor market (MSHA 1999, p.4)." Values less than 1 indicate lack of affordability; values greater than 1 indicate affordability. Maps 1 and 2 display affordability trends based on this index. Map 1 presents the estimated indices for 2001 at the town level. Kennebunkport (0.39), Brooklin (0.45), Belfast (0.47), Rangeley (0.49), and Southwest Harbor (0.50) were the least affordable towns in 2001. Map 2 presents these same data at the labor market area level for 1997, 2000, and 2001. These data suggest that affordability problems are greatest in the coastal and western regions of Maine.

C. Penobscot Valley Housing Issues

The PV PILOT study area, referred to here as the Penobscot Valley, includes the following municipalities: Bangor, Bradley, Brewer, Eddington, Glenburn, Hampden, Hermon, Holden, Kenduskeag, Milford, Old Town, Orono, Orrington, Penobscot Indian Island, and Veazie. The housing policies in these different communities reflect consistent goals of maintaining and repairing the existing housing stock; maintaining the vitality of neighborhoods, especially those in downtown or village centers; and encouraging the provision of affordable housing.

Background information on the housing stock of these communities serves as a useful foundation for the consideration of housing policy issues. A cursory examination of the housing stock in these communities draws attention to the variation of housing opportunities within the communities of Penobscot Valley. Table 1 presents the total number of housing units in 1990 and 2000 and the associated percentage change in the total number of housing units over this time period by community. As the largest community and most prominent employment and retail center, Bangor (14,587) stands out in absolute terms, with the highest number of housing units, followed thereafter by Brewer (4,064), Old Town (3,686), and Orono (2,899). A review of the percentage changes in housing units distinguishes a different set of communities. In relative terms, the smaller communities of Indian Island (100%), Glenburn (30%), Hermon (25%), and Bradley (21%) are currently experiencing more rapid growth in the total number of housing units. Notably, Holden (-1%) was the only community to experience a loss in housing units over this time period.

Tables 2 and 3 display the number of housing units falling into four different housing types: single-family homes, multi-family homes, mobile homes and other housing units such as recreational vehicles or boats. Single-family homes included attached and detached 1 unit homes; whereas, multi-family homes refer to structures with more than 1 unit and include buildings ranging in size from 2 units to 20 or more units. Boats, RVs, and vans are included in the category labeled other.

Table 2 summarizes the absolute number of units classified as these different types; Table 3 displays the percentage of total housing units by housing type. Table 4 recasts the information presented in Tables 2 and 3 in terms of changes between 1990 and 2000. In 2000, greater than seventy percent of the housing stock in Hampden (79%), Indian Island (78%), Hermon (73%), Holden (73%), and Eddington (73%) is compromised of single-family homes. In 2000, the highest percentage of multi-family units occurred in the communities of Bangor (37%), Brewer (33%), Orono (35%), and Old Town (27%). In 2000, mobile homes account for greater than twenty percent of the housing stock in Kenduskeag (38%), Milford (30%), Glenburn (29%), and Holden (21%). It is interesting to note the variation in changes of housing types across

communities. While increases in single-family units are observed across all communities in the Penobscot Valley, gains and losses in units of other types are observed in these different areas[4].

Table 5 displays estimates of the percentage of occupied and vacant housing units for 1990 and 2000 by community. Housing units are classified as occupied or vacant. Within these major categories, units are further distinguished according to tenure. Table 5 shows the total number of occupied housing units as well as the number of units that are owner and renter occupied. In 2000, with the exception of Bradley, Glenburn, Holden, and Indian Island, over ninety percent of the housing units are occupied in the communities of Penobscot Valley. Bangor (53%), Orono (52%), Old Town (40%), Brewer (38%), and Indian Island (38%) had the highest percentage of rental-occupied housing units. In contrast, over eighty percent of occupied units are owner-occupied in Glenburn (89%), Holden (88%), Kenduskeag (85%), Orrington (86%), Hermon (86%), Bradley (84%), Eddington (81%), and Milford (80%).

Table 6 summarizes the age distribution of the housing stock in these various communities, displaying the percentage of housing units constructed prior to or during 1939, from 1940 to 1969, from 1970 to 1989, and from 1990 to 2000. Thirty-five percent or more of the housing units were built during or prior to 1939 in Bangor (45%), Old Town (38%), and Brewer (35%), implying that housing rehabilitation may be of particular concern in these communities. More than 50 percent of the housing stock in the communities of Holden, Glenburn, and Kenduskeag was constructed from 1970 to 1989. Approximately nineteen percent or more of the housing units in Hermon, Glenburn, Eddington, Milford, and Indian Island were constructed between 1990 and 2000, indicating recent development in these communities.

Table 7 displays the percentage of owner-occupied housing units falling into different valuation categories in 2000. Most communities offer a mix of housing in terms of valuation. Bradley (13%) and Indian Island (28%) have the highest percentage of housing units valued below $50,000; Holden (25%), Veazie (27%), and Orono (22%) have the highest percentage of housing units valued above $200,000. Table 8 presents a similar classification of rental housing units, summarizing the percentage of renter-occupied housing units falling into different categories in 2000. Again, most communities offer a mix of rental housing in terms of cost. In 2000, over 50 percent of rental-housing units had a gross rent below $500 in Indian Island

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[4] It is likely that some of the changes have been artificially induced by the use of different classifications in the 1990 and 2000 Census of Population and Housing. Such errors are more likely for the mobile home and other categories.

(86%), Old Town (62%), Brewer (57%), Bradley (57%), Holden (57%), Bangor (56%) Milford (52%), and Orono (53%).

These basic data offer a useful description of the housing stock of the different communities. In the next sections, additional data are presented to further the discussions of rental and affordable housing opportunities.

D. Incentives for Private Development of Rental Housing

Incentives for private development of rental housing are closely linked with developers' expectations of the net returns from such projects. When private developers make decisions about the type and location of housing to be constructed within a region, they examine the benefits and costs of various projects. Ultimately, development decisions hinge on which types of housing units and locations offer the highest expected net return. Because of differences in factors such as demographics, accessibility, land use and zoning ordinances, and permitting and design requirements, expected net returns vary within and across communities. Differences in access to and availability of state and federal programs which act as subsidies to private developers and encourage the construction of rental housing also account for differences in incentives. With respect to multi-family units, land use ordinances and permitting requirements will also influence tremendously the feasibility and expected returns of development projects. Throughout this section, rental housing will often be discussed in the context of multi-family housing. Readily available data on building permits do not distinguish rental and owner occupied housing.

Difficult questions arise when considering how to assess normatively the current distribution of rental housing units. Determining the appropriate levels and rates of new construction of specific types of housing units is a challenging exercise. One approach suggests relying entirely on market forces. If there is excess demand for rental housing, the market should respond (e.g., higher rents) and in turn provide privately increased rental housing. Another approach calls for relying on a mixture of market forces and public actions to determine rental housing opportunities. Under this strategy, market forces are recognized and tinkered with using incentive programs such as subsidies or tax breaks. The second or mixed approach is a logical one for rental housing because of the highly regulated nature of the land market in numerous municipalities. Note that developers often have the option to build single-family or multi-family units. If regulations preclude or restrict greatly the number of units allowed (e.g., density),

single-family projects are likely to be chosen over multi-family projects. Currently, there is a perception that developers do not consider private provision of rental housing to be a profitable exercise in the Penobscot Valley. Specifically, it is generally assumed that rental housing is too costly to provide given the expected return.   The limited number of new multi-family housing units in the region tends to support this hypothesis. A notable challenge in Maine is that the affordability of non-rental units effectively caps the rents permitted in the rental market.

The subsequent discussion focuses on the incentives for private new and re-development of rental housing, recognizing the perception that developers do not consider rental housing to be a profitable exercise in the Penobscot Valley. Readily available data on housing markets are employed to study the following research hypotheses. First, if the private market is not encouraging the development of rental housing, the number of new rental units constructed is expected to be limited. Second, if there is persistent excess demand for rental housing, contract rents are expected to increase over time. The different levels of existing rental housing as well as different rates of new development of rental housing units across the communities in the Penobscot Valley may reflect to some extent the variation in expected returns and the incentives provided to developers. If there is considerable variation in local incentives provided to private developers, spatial variation in rental housing units is expected across communities, *with other factors being equal*. Communities with higher expected net returns may have higher rates of rental housing.

Referring back to Table 5, the communities of Bangor, Orono, Indian Island, Old Town, and Brewer have the highest percentage of renter-occupied housing units, with more than 35 percent of their housing stock devoted to this use. From 1990 to 2000, the largest absolute increases in renter-occupied housing units occurred in these same communities. Table 9 displays the number of renter-occupied housing units in 1990 and 2000 and the percentage of occupied housing units that are occupied by renters as opposed to home-owners. Glenburn, Hampden, Eddington, and Hermon experienced more dramatic increases in the percentage of housing stock occupied by renters. These figures do not distinguish new units and owner-occupied units or vacant units that have been converted to renter-occupied units so they cannot be used as a measure of new construction or development. Holden is the only community in which the number of renter-occupied housing units dropped during this time period.

Referring back to Table 5, the percentage of vacant housing stock varies considerably across communities in the Penobscot Valley. In 2000, higher rates of vacancy occur in Indian Island (39%), Bradley (16%), Glenburn (12%), Eddington (10%), and Holden (13%). Aggregating block-group level census data for 2000, we can examine the number and percentage of vacant units that are rental units. In absolute terms, the highest numbers of vacant rental units are found in Bangor, Brewer, Old Town, and Orono. In relative terms, vacant units for rent accounted for more than 25 percent of total vacant units in Bangor, Milford, Old Town, Orono, and Veazie. Anecdotal evidence suggests that the recent increase in students at University of Maine has resulted in extremely low vacancy rates among rental units in the Penobscot Valley.

Building permit data for non-single family homes provide one means to assess the private construction of rental housing. Figure 1 displays the number of building permits issued annually for residential buildings with more than 1 unit in a subset of the Penobscot Valley Communities from 1980 to 2001. Several observations can be made based on this figure. The late 1980s marked a high point in terms of such new construction but little new multi-family housing development has occurred in the region in recent years. Secondly, over this time period, the majority of permits were issued in the larger communities of Bangor (179 permits), Old Town (52 permits), Brewer (47 permits), Hampden (37), and Orono (36). In contrast, over this same time period, zero such permits were issued in Bradley, Eddington, and Kenduskeag and three or less were issued in Holden, Glenburn, Milford, and Veazie.

Annual information on contract rents that is consistently organized across communities is difficult to find. Table 10 displays the median value of owner-occupied homes and the median rent of renter-occupied homes by community for 1990 and 2000. The nominal percentage changes in median value and median rent are also shown in the far right column. In 2000, Hermon, Veazie, Orono, and Holden had median housing values in excess of $100,000. In contrast, the median housing value was below $80,000 in Bradley, Old Town, and Indian Island. In 2000, the median rent exceeded $500.00 in Glenburn, Orrington, Hermon, Hampden, Veazie, and Kenduskeag. Median housing values increased nominally by more than 20 percent in Kenduskeag, Holden, Hermon, Veazie, and Bradley. Median rents increased nominally by more than 20 percent in Glenburn, Kenduskeag, Orrington, Milford, Hampden, and Hermon. Median values are one measure of central tendency and alone do not describe fully the distribution of rents within a community.

What do these data suggest in terms of the research questions that were stated in the outset of this section? From 1980 to 2001, limited building permits were issued to private developers for the construction of residential buildings ranging from 2 units to 5 or more units in the Penobscot Valley. In recent years, this holds especially true. From 1991 to 2001, the number of such permits were as follows: Bangor (8), Bradley (0); Brewer (6); Eddington (0); Glenburn (1); Hampden (8); Hermon (2); Holden (0); Kenduskeag (0); Milford (2); Old Town (3); Orono (1); Orrington (1); and Veazie (0). These data suggest that developers see little expected returns from such projects. Yet, the lack of incentives is difficult to gauge without more micro-level data. In some areas, such construction may be precluded by land use and building codes.

Table 11 documents the housing policy issues raised in a subset of the Penobscot Valley communities' comprehensive plans. While affordability is a common theme across towns, few towns explicitly focus on rental housing opportunities. Two types of policy initiatives related to rental housing are mentioned. The policies of certain communities emphasize development and provision of new and affordable rental housing (e.g., Bangor, Hampden, Hermon, Milford, Old Town). A second policy emphasis of many towns (e.g., Eddington, Kenduskeag) is the maintenance of the safety and health of existing multi-family units. In cases where the latter is the dominant policy strategy, there appears to be little concern regarding the adequacy of the existing stock to meet the demands of renters. Finally, many communities recognize the connections between their land use and subdivision ordinances as well as design requirements and the incentives to build multi-family units. Throughout the Penobscot Valley, it is encouraging to note the willingness to consider novel planning tools such as cluster development, mixed-use zoning, transferable development rights, and contract zoning to provide the incentives for truly mixed housing stocks. Perhaps this shared appreciation for these tools may serve as the foundation for a regional strategy to provide and maintain rental housing. Hampden, Veazie, and Eddington specifically mention reaching out to a regional entity or propose a regional solution to housing policy issues related to rental housing.

Numerous research questions arise in considering the issue of rental housing. For example, how do specific land use and zoning ordinance policies affect the incentives provided to developers? Will increasing rents affect the renewal of subsidized rental housing agreements and/or provide a market-based incentive for future private development of rental housing. Is

there a stronger incentive to provide rental housing for specific populations? If so, who is being served (e.g., elderly) and who is not (e.g., poor)? Given limited development of new rental units, how can communities encourage rehabilitation of existing units? If there is an established need for rental units, can their location be coordinated with efforts to revitalize downtown centers? A comprehensive treatment of such questions is beyond the scope of this report.

E. Affordable Housing

The second housing policy issue addressed in this report is the supply of affordable housing in Penobscot Valley.   There is a perceived shortage of affordable housing in the Penobscot Valley, particularly of starter homes ranging in value from $35,000 to $50,000 (BACTS 2002).   Two suggested implications of this shortage are a tighter than usual rental market due to a delay in home ownership and occupancy of sub-standard homes available in rural markets. A variety of factors may influence the supply of affordable housing units. As noted above in the discussion of rental housing, private provision of new affordable housing units depends on the expected returns. Variation in expected net returns from affordable housing development is closely related to variation in state and federal programs that act as subsidies to private developers. Note that if a developer has the opportunity to build a higher valued home that will result in a higher expected return, it is logical for the developer to opt not build affordable housing. It is logical to observe different levels of affordable housing as well as different rates of new development of affordable housing across the communities in the Penobscot Valley.   More difficult and interesting questions arise when considering how to assess normatively the current distribution of affordable housing units. In this report, trends in affordable housing are reported on using readily available data for the Penobscot Valley. In addition, information from the comprehensive plans of the various PV PILOT communities is used to assess the extent of concern regarding affordable housing in different communities. Shared and consistent concerns related to affordable housing may suggest that affordable housing is a regional policy issue.

Readily available data on affordable housing are used to examine the current distribution of affordable housing and to explore whether or not we observe a backing up of the rental market or occupancy of sub-standard homes available in rural markets. The data shown in Tables 12 and 13 relate to housing affordability because they describe the percentage of income being devoted to home ownership costs and rental costs. Table 12 summarizes the percentage of

owner-occupied housing units falling into different classifications of ownership costs as a percentage of income. Similar data are summarized in Table 13 for rental housing units. Affordability concerns arise when households are spending more than 30 percent of their income on housing. Based on these data, Kenduskeag and Indian Island stand out with higher percentages of income being devoted to home ownership costs on average. Glenburn, Orono, Old Town, and Bangor similarly have a higher percentage of rental households devoting upwards of 30 percent of their income to rent.

Housing researchers typically consider a housing unit to be unaffordable to a family when residency requires expenditure of more than 30 percent of their income. Comparing the distributions for 1990 and 2000 yields interesting results. Figures 2 and 3 display the percentage of households devoting upwards of 30 percent of their income to home ownership or rental costs in 1990 and 2000. If this percentage rises over time, affordability of housing is expected to have decreased. Figure 2 shows with few exceptions (Holden and Hermon) that this percentage has risen with respect to owner-occupied homes. The greatest increases occur in Glenburn, Kenduskeag, Milford, and Old Town. A more mixed trend is observed in Figure 3 which summarizes rental costs, as numerous communities recorded a drop in the number of renters devoting in excess of 30 percent of their income to rental costs (Bradley, Hampden, Kenduskeag, Milford, Orrington, Indian Island, and Veazie). The highest increases in rental costs occurred in Glenburn, Holden, Eddington, and Bangor.

These data offer some support for a growing concern about housing affordability. It is important to note that affordability is both a function of incomes and housing values. If incomes rise at a lower rate than housing values, affordability decreases, *with other factors being equal*. The data shown in Figures 2 and 3 represent the range of housing values and rents as well as income classes. Therefore, they do not necessarily target low and moderate income households. Recall the Maine State Housing Authority (MSHA) affordability index which "measures the ability of a family at the median income to purchase a median price home in their labor market (MSHA 1999, p.4)." Values less than 1 indicate lack of affordability; values greater than 1 indicate affordability. In 2001, the Maine State Housing affordability indices for the Penobscot Valley towns were: Bangor (0.93); Bradley (1.23); Brewer (1.03); Eddington (1.42); Glenburn (1.26); Hampden (1.05); Hermon (1.31); Holden (0.93); Kenduskeag (1.22); Milford (1.24); Old Town (1.00), Orono (0.90); Orrington (1.28); Indian Island (1.00); and Veazie (0.94). Based on

this measure of affordability, Bangor, Orono, and Veazie are considered to be unaffordable. Comparing, 1997, 2000, and 2001, the same affordability indices measured at the regional scale (e.g., the Bangor Labor and Housing Market area) were 1.13 (1997), 1.15 (2000), and 1.09 (2001). While the index has dropped since 1997, the region still is considered affordable especially relative to other regions of Maine experiencing rapid population growth and escalating property values (refer to Maps 1 and 2).

Do we observe a back up of the rental market because starter homes are unavailable? Do we observe occupancy of substandard homes in rural areas? These questions are difficult to address using readily available data but some clues are evident in the US Census Bureau data. Notably, we do see an increase in the number of mobile homes in 1990 and 2000 across the different communities. Increases in these homes are recorded in Bradley, Brewer, Eddington, Glenburn, Hermon, Milford, Orrington, and Indian Island. In contrast, decreases in mobile homes are observed in Hampden, Holden, Orono, Bangor, and Veazie. These changes may suggest that mobile homes are increasingly serving as starter homes. However, it is difficult to assess whether or not this trend is related to a lack of other types of housing opportunities. Assessing the condition of housing units is possible using a proxy for substandard condition of lacking adequate plumbing facilities. Table 14 presents the percent of occupied housing units lacking adequate plumbing facilities in 1990 and 2000 by community. Based on this index, the occupancy of substandard homes is uncommon and decreasing in the communities of the Penobscot Valley. However, it should be noted that this proxy may not adequately describe the conditions of housing units in these communities. Detailed housing assessments completed in these communities suggest that rehabilitation is very much needed in some areas.

Returning to Table 11 which summarizes the housing policy issues documented in a subset of the Penobscot Valley communities' comprehensive plans, affordable housing is clearly a common theme across all of these communities, except perhaps Bradley. The emphasis given to affordable housing may simply be an artifact of the Growth Management Act requirements for preparing a comprehensive plan. Section G of the Implementation Strategy calls for the following:

"Ensure that its land use policies and ordinances encourage the siting and construction of affordable housing within the community and comply with requirements of section 4358

pertaining to individual mobile home and mobile home park siting and design requirements. The municipality shall seek to achieve a level of 10% of new residential development, based on a 5-year historical average of residential development in the municipality, meeting the definition of affordable housing. Municipalities are encouraged to seek creative approaches to assist in the development of affordable housing, including, but not limited to, cluster zoning, reducing minimum lot and frontage sizes, increasing densities and use of municipally owned land."

However, numerous communities express urgent concerns regarding the provision of affordable housing to elderly, homeless, and low-income populations. As noted in the prior discussion of rental housing, several communities express a willingness to consider the novel land use planning tools listed above. Such open-ness may prove invaluable in encouraging regional solutions to affordable housing problems.

Several communities stand out in terms of proposing regional solutions or perspectives. For example, Eddington specifically mentions developing a housing complex for the elderly with Bradley and Clifton. In addition, Veazie expresses interest in participating in a regional affordable housing program, if the costs and benefits if such programs are shared fairly by the communities in the region. Lastly, Hampden specifically notes expanding its relationship with a regional housing authority or non-profit as a policy objective.

Many related research questions arise in considering the issue of affordable housing. For example, how do land use and zoning ordinance policies affect the supply of affordable housing? Will increasing rents affect the renewal of subsidized rental housing agreements? Are specific populations being more adversely affected than others in searching for affordable housing? If so, who is being served (e.g., elderly) and who is not (e.g., poor)? What strategies may encourage the provision of affordable housing in accordance with the GMA goal of 10 percent of new residential units? Are certain sites more appropriate than others for affordable housing (accessible to employment, service, public transportation and cultural centers)? While many of these questions are beyond the scope of this report, some are addressed in the subsequent section which focuses on multi-community planning.

F. Multi-Community Planning

The final housing policy issue discussed here is multi-community planning. Specifically, there is a growing interest in understanding both the benefits and costs of regional cooperation in planning and servicing the needs of residents of the Penobscot Valley (BACTS 2002). A range of planning activities (capital, land use, natural resource) could be addressed in a cooperative manner, as noted in this report's discussion of education and capital planning. While housing is affected by a diverse set of planning activities, land use planning has a fundamental and powerful influence on the attainment of housing policy objectives such as the provision of rental and affordable housing.

In terms of housing, a regional perspective begins with the coordination of housing priorities and policies. Orfield (2002) views regional housing planning as a means "to provide balance in housing choices within every community of a region" (p.121). Much of the research to date on regionalism and consolidation has focused on metropolitan areas with large urban cores and extensive suburban networks (Orfield 1997; Orfield 2002; Katz 2000). In these settings, balance implies having a range of low- to high-income housing in all parts of the metropolitan area, with dual objectives of maintaining high-income households in urban centers and expanding low- and moderate-income housing opportunities in the suburbs. The Penobscot Valley is fundamentally different from many of the metropolitan areas that have been studied by these researchers. As a result, regional housing goals are likely to be different. None-the-less, many of their findings are relevant to the discussions of rental and affordable housing emerging throughout Maine.

Orfield (2002) notes three complementary policies for encouraging affordable and rental housing opportunities: reduced legislative barriers; fair-share requirements; and financial assistance for low-income housing (p.123). These three policies are germane to the fulfillment of the individual and regional objectives of the Penobscot Valley communities. Reducing barriers to the construction of multi-family housing or conversion of single-family housing to multi-family housing appears to be a common goal of many of the communities. The elimination of many barriers would follow from the revision of land use and zoning policies and building design requirements. Land use policies, design requirements, and permitting processes can significantly affect the costs of a private development and therefore can account for considerable variation in the expected return of a specific project in different communities.

Differences in such policies across the region are likely to affect the spatial distribution of new rental and affordable housing units. Fair share requirements ensure that affordable and rental housing are available throughout the region. However, effective fair share requirements recognize differences across communities (population; job availability; past efforts to provide such housing) and account for such differences in setting the specific requirements for each community. The Growth Management Act's goal of 10 percent is one type of fair share requirement. However, there is much potential to design a more innovative system. The final suggested policy of a regional housing fund is relevant here as well. While the private market is likely to broaden the choices of housing if barriers can be removed, there is still likely to be little encouragement of very low-income housing. For this reason, regional funds are an important part of regional housing planning.

Table 15 summarizes the Regional Cooperation Policy Objectives noted in a subset of the Penobscot Valley communities' comprehensive plans. It is encouraging to note that some communities note housing policies in their discussion of regional cooperation objectives. For example, Eddington, Clifton, and Bradley are exploring a regional elderly complex. Glenburn notes working with neighboring communities to set similar goals and priorities in providing affordable and low-income housing. Veazie specifically notes the regional aspects of affordable housing. A common item raised in many of the comprehensive plans involves the siting and regulation of new multi-family housing. Emphasis is given to locating such housing in downtown, village, or growth areas, paralleling the Maine State Housing Authority's (2002) focus on housing in downtowns.

Identification of the "best" location for different kinds of housing is a complex process. Increasingly throughout the United States, attention is being given to policies that encourage "smart" growth. From an economics perspective, smart growth is sensible because it is based on the attainment of efficiency. In short, policy-makers acknowledge that different types of housing and developing patterns impose different costs to communities in terms of public services and environmental stress. Smart growth in its most basic realization involves channeling new growth and new housing in existing growth centers, with existing infrastructure and creating incentives to prevent new housing development in outlying and rural communities. To work well, smart growth must be implemented on a regional basis. Without regional support, the incentives to locate in service centers or downtowns and to protect outlying and rural areas may be too weak

to support the strategy. The Maine State Planning Office has done an outstanding job in conveying the relevancy of smart growth to Maine and initiating discussions with municipalities about the costs of servicing different types of development patterns (Maine State Planning Office 1997). Policies and tools advanced as part of smart growth efforts in other parts of the country may prove helpful in determining what locations are most appropriate for specific types of housing. The provision of affordable and rental housing, especially for select groups such as the elderly, is a policy issue that warrants consideration in future discussions of smart growth in Maine.

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Map 1: Maine State Housing Authority Affordability Index by Town (2001)
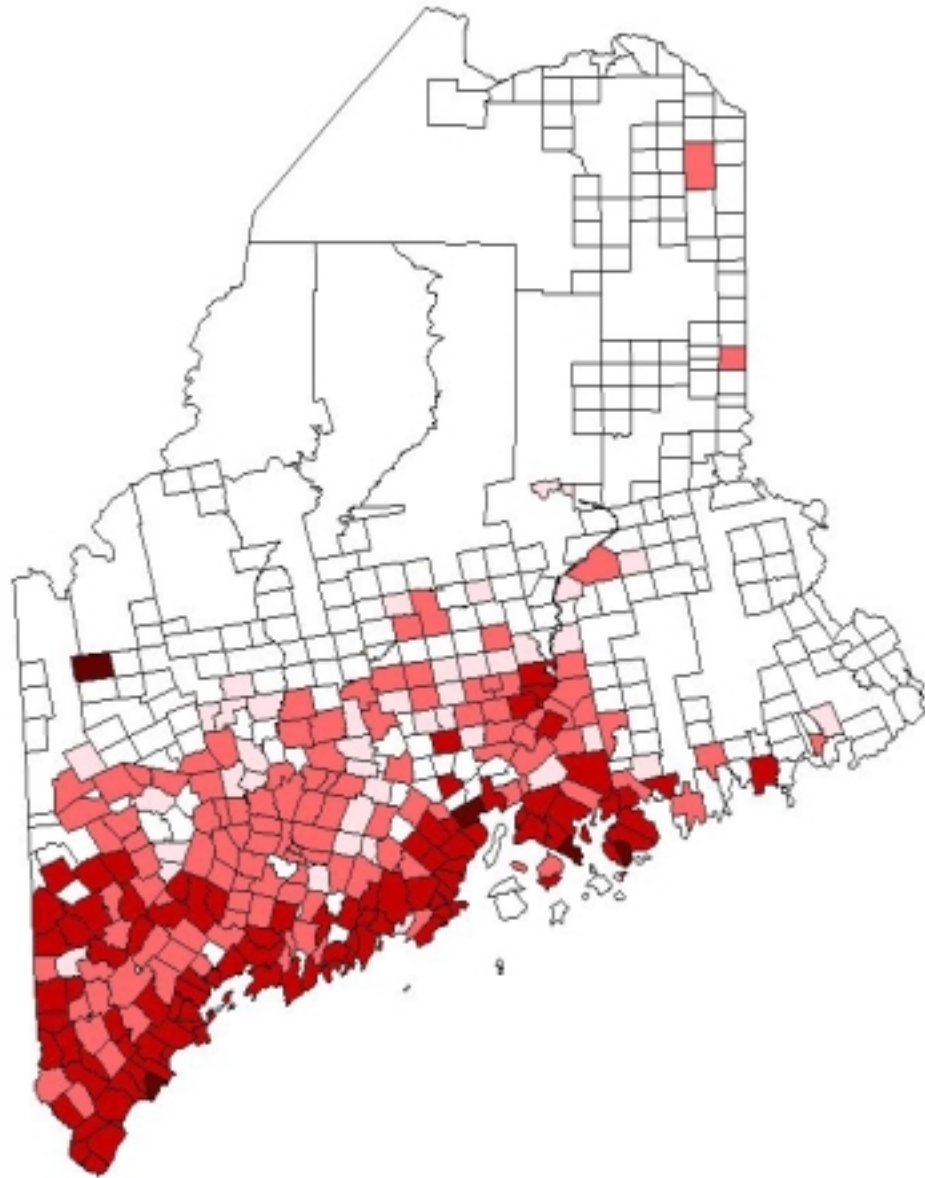
Source: MSHA Affordability Index (2001).
Values less than 1 indicate lack of affordability.

No Data
0 - 0.5
0.5 - 1
1 - 1.5
1.5 - 4
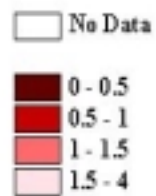
Map 2: Maine State Housing Authority Affordability Index by Labor Market Area (1997-2001)

1997

2000

2001

No Data

0 - 0.5
0.5 - 1
1 - 1.5
1.5 - 4
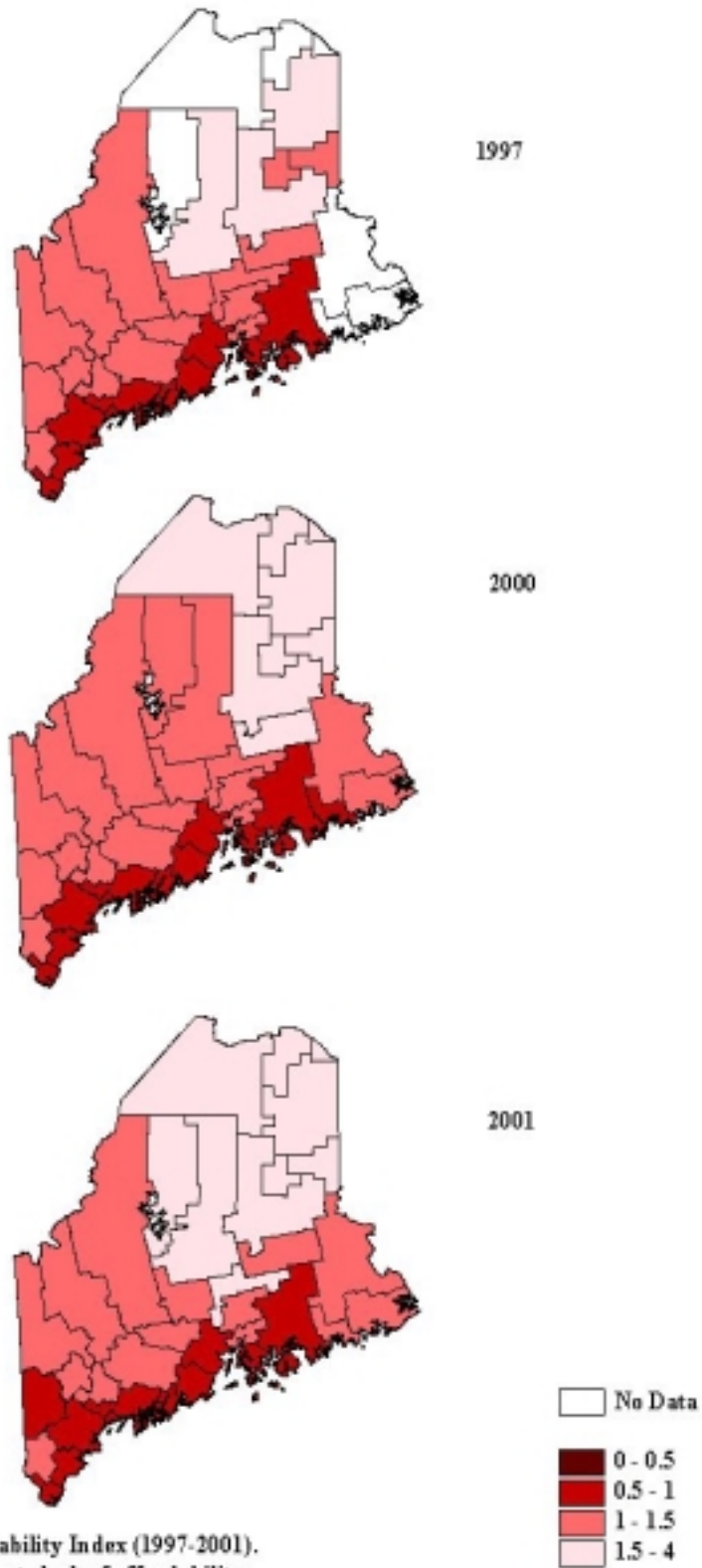
Source: MSHA Affordability Index (1997-2001).
Values less than 1 indicate lack of affordability.

Table 1: Housing Units

	1990	2000	Percentage Change
Bangor	14,366	14,587	2%
Bradley	506	614	21%
Brewer	3,780	4,064	8%
Eddington	843	920	9%
Glenburn	1,298	1,683	30%
Hampden	2,288	2,545	11%
Hermon	1,421	1,748	23%
Holden	1,333	1,320	-1%
Kenduskeag	454	509	12%
Milford	1,178	1,248	6%
Old Town	3,483	3,686	6%
Orono	2,685	2,899	8%
Orrington	1,376	1,489	8%
Indian Island	181	364	100%
Veazie	694	767	11%
Penobscot County	61,346	66,847	9%
Maine	587,045	651,901	11%
Source: US Department of Commerce. Census of Population and Housing. 1990 and 2000. 2000 Data are based on Demographic Profiles: 100 Percent and Sample Data Files.			

Table 2: Housing Units by Type of Unit

	1990				2000			
	Single	Multi	Mobile	Other	Single	Multi	Mobile	Other
Bangor	5,991	7,230	1,018	127	6,340	7,231	1,011	5
Bradley	287	78	91	50	391	95	126	2
Brewer	2,243	1,426	79	32	2,398	1,529	132	0
Eddington	581	91	165	6	662	72	177	0
Glenburn	795	36	303	164	1,114	82	487	0
Hampden	1,885	261	120	22	2,017	436	92	0
Hermon	993	110	296	22	1,274	143	331	0
Holden	883	81	326	43	962	74	280	4
Kenduskeag	252	25	177	0	300	12	195	2
Milford	663	189	301	25	719	148	375	5
Old Town	1,771	1,320	296	96	2,103	1,222	355	0
Orono	1,240	1,220	119	106	1,501	1,281	117	0
Orrington	1,155	110	111	0	1,316	94	85	0
Indian Island	143	12	26	0	287	39	42	1
Veazie	442	138	111	3	510	155	102	0
Source: US Department of Commerce. Census of Population and Housing. 1990 and 2000. 2000 Data are based on Demographic Profiles: 100 Percent and Sample Data Files.								

Table 3: Percentage of Housing Units by Type of Housing Unit

	1990				2000			
	Single	Multi	Mobile	Other	Single	Multi	Mobile	Other
Bangor	42%	50%	7%	1%	43%	50%	7%	0%
Bradley	57%	15%	18%	10%	64%	15%	21%	0%
Brewer	59%	38%	2%	1%	59%	38%	3%	0%
Eddington	69%	11%	20%	1%	73%	8%	19%	0%
Glenburn	61%	3%	23%	13%	66%	5%	29%	0%
Hampden	82%	11%	5%	1%	79%	17%	4%	0%
Hermon	70%	8%	21%	2%	73%	8%	19%	0%
Holden	66%	6%	24%	3%	73%	6%	21%	0%
Kenduskeag	56%	6%	39%	0%	59%	2%	38%	0%
Milford	56%	16%	26%	2%	58%	12%	30%	0%
Old Town	51%	38%	9%	3%	57%	33%	10%	0%
Orono	46%	45%	4%	4%	52%	44%	4%	0%
Orrington	84%	8%	8%	0%	88%	6%	6%	0%
Indian Island	79%	7%	14%	0%	78%	11%	11%	0%
Veazie	64%	20%	16%	0%	66%	20%	13%	0%
Source: US Department of Commerce. Census of Population and Housing. 1990 and 2000. 2000 Data are based on Demographic Profiles: 100 Percent and Sample Data Files.								

Table 4: Change in Type of Housing Units (1990 to 2000)

	Absolute Change				Percentage Change			
	Single	Multi	Mobile	Other	Single	Multi	Mobile	Other
Bangor	349	1	-7	-122	6%	0%	-1%	-96%
Bradley	104	17	35	-48	36%	22%	38%	-96%
Brewer	155	103	53	-32	7%	7%	67%	-100%
Eddington	81	-19	12	-6	14%	-21%	7%	-100%
Glenburn	319	46	184	-164	40%	128%	61%	-100%
Hampden	132	175	-28	-22	7%	67%	-23%	-100%
Hermon	281	33	35	-22	28%	30%	12%	-100%
Holden	79	-7	-46	-39	9%	-9%	-14%	-91%
Kenduskeag	48	-13	18	2	19%	-52%	10%	0%
Milford	56	-41	74	-20	8%	-22%	25%	-80%
Old Town	332	-98	59	-96	19%	-7%	20%	-100%
Orono	261	61	-2	-106	21%	5%	-2%	-100%
Orrington	161	-16	-26	0	14%	-15%	-23%	0%
Indian Island	144	27	16	1	101%	225%	62%	0%
Veazie	68	17	-9	-3	15%	12%	-8%	0%
Source: US Department of Commerce. Census of Population and Housing. 1990 and 2000. 2000 Data are based on Demographic Profiles: 100 Percent and Sample Data Files.								

Table 5: Occupancy and Vacancy Rates

	1990				2000			
	Occupied Units			Vacant Units	Occupied Units			Vacant Units
	Total	Owner	Renter	Total	Total	Owner	Renter	Total
Bangor	93%	48%	52%	7%	94%	47%	53%	6%
Bradley	87%	80%	20%	13%	84%	81%	19%	16%
Brewer	96%	64%	36%	4%	95%	62%	38%	5%
Eddington	88%	83%	17%	12%	90%	81%	19%	10%
Glenburn	85%	91%	9%	15%	88%	89%	11%	12%
Hampden	94%	81%	19%	6%	96%	79%	21%	4%
Hermon	96%	84%	16%	4%	95%	84%	16%	5%
Holden	85%	86%	14%	15%	87%	88%	12%	13%
Kenduskeag	96%	87%	13%	4%	92%	88%	12%	8%
Milford	95%	82%	18%	5%	95%	80%	20%	5%
Old Town	92%	61%	39%	8%	93%	60%	40%	7%
Orono	91%	51%	49%	9%	93%	48%	52%	7%
Orrington	92%	86%	14%	8%	94%	86%	14%	6%
Indian Island	97%	53%	47%	3%	61%	62%	38%	39%
Veazie	95%	77%	23%	5%	94%	79%	21%	6%
Source: US Department of Commerce. Census of Population and Housing. 1990 and 2000. 2000 Data are based on Demographic Profiles: 100 Percent and Sample Data Files.								

Table 6: Percentage of Housing Units by Year Built

	1939 or Prior	1940 to 1969	1970 to 1989	1990 to 2000
Bangor	45%	26%	23%	6%
Bradley	23%	21%	42%	13%
Brewer	35%	34%	20%	11%
Eddington	20%	20%	40%	19%
Glenburn	4%	20%	52%	22%
Hampden	21%	37%	28%	12%
Hermon	15%	15%	43%	25%
Holden	10%	17%	55%	14%
Kenduskeag	15%	14%	52%	17%
Milford	17%	18%	42%	19%
Old Town	38%	30%	22%	9%
Orono	29%	35%	31%	4%
Orrington	21%	29%	34%	14%
Indian Island	16%	16%	45%	20%
Veazie	18%	34%	32%	14%
Penobscot County	28%	26%	32%	13%
Maine	29%	24%	32%	13%
Source: US Department of Commerce. Census of Population and Housing. 2000. Demographic Profiles: 100 Percent and Sample Data Files.				

Table 7: Percentage of Owner-Occupied Homes by Housing Value (2000)

	Less than $50,000	$50,000 to $99,999	$100,000 to $149,999	$150,000 to $199,999	$200,000 to $299,999	$300,000 to $499,999	$500,000 to $999,00	$1,000,000 or More
Bangor	5.53%	59.29%	23.36%	6.74%	4.23%	0.86%	0.00%	0.00%
Bradley	13.23%	59.92%	23.74%	3.11%	0.00%	0.00%	0.00%	0.00%
Brewer	3.05%	62.21%	25.43%	4.70%	3.20%	1.40%	0.00%	0.00%
Eddington	6.87%	61.14%	26.54%	4.03%	1.42%	0.00%	0.00%	0.00%
Glenburn	6.87%	48.08%	33.79%	8.10%	3.16%	0.00%	0.00%	0.00%
Hampden	2.07%	50.91%	28.08%	11.69%	5.91%	0.91%	0.43%	0.00%
Hermon	6.04%	38.49%	45.04%	6.35%	2.56%	1.54%	0.00%	0.00%
Holden	3.18%	38.16%	31.32%	14.94%	10.17%	2.23%	0.00%	0.00%
Kenduskeag	8.63%	76.65%	13.71%	1.02%	0.00%	0.00%	0.00%	0.00%
Milford	8.64%	64.77%	25.04%	1.55%	0.00%	0.00%	0.00%	0.00%
Old Town	11.56%	65.31%	19.12%	2.30%	1.18%	0.53%	0.00%	0.00%
Orono	2.65%	39.41%	35.49%	14.41%	6.57%	1.47%	0.00%	0.00%
Orrington	5.97%	48.68%	33.60%	7.19%	3.74%	0.81%	0.00%	0.00%
Indian Island	27.72%	54.46%	15.84%	0.00%	0.00%	0.00%	1.98%	0.00%
Veazie	2.61%	42.04%	30.64%	11.16%	11.40%	1.66%	0.00%	0.48%
Penobscot County	13.45%	56.44%	21.26%	5.31%	2.81%	0.61%	0.10%	0.03%
Maine	8.62%	42.66%	27.29%	10.76%	6.80%	2.78%	0.88%	0.21%

Source: US Department of Commerce. Census of Population and Housing. 2000. Demographic Profiles: 100 Percent and Sample Data Files.

**Table 8: Percentage of Renter-Occupied Homes by Rent (2000)**

	Less than $200	$200 to $299	$300 to $499	$500 to $749	$750 to $999	$1,000 to $1,499	$1,500 or more
Bangor	10.04%	9.32%	36.69%	38.85%	4.31%	0.60%	0.20%
Bradley	3.49%	12.79%	40.70%	43.02%	0.00%	0.00%	0.00%
Brewer	11.98%	8.27%	37.07%	36.65%	4.13%	1.89%	0.00%
Eddington	5.93%	3.70%	30.37%	43.70%	11.85%	4.44%	0.00%
Glenburn	10.97%	0.00%	27.10%	16.77%	45.16%	0.00%	0.00%
Hampden	7.77%	2.52%	28.99%	49.16%	9.24%	2.31%	0.00%
Hermon	6.06%	3.03%	32.90%	36.36%	21.65%	0.00%	0.00%
Holden	11.38%	13.01%	32.52%	21.14%	17.07%	4.88%	0.00%
Kenduskeag	4.88%	0.00%	36.59%	39.02%	19.51%	0.00%	0.00%
Milford	2.06%	5.15%	44.33%	38.66%	9.79%	0.00%	0.00%
Old Town	13.50%	15.33%	33.03%	30.36%	6.71%	1.07%	0.00%
Orono	13.42%	6.05%	32.31%	35.74%	11.09%	1.39%	0.00%
Orrington	10.88%	8.16%	10.88%	55.10%	10.88%	4.08%	0.00%
Indian Island	32.10%	23.46%	30.86%	9.88%	3.70%	0.00%	0.00%
Veazie	4.26%	3.55%	31.91%	53.90%	4.26%	2.13%	0.00%
Penobscot County	11.20%	9.80%	36.74%	35.26%	6.05%	0.86%	0.09%
Maine	9.60%	7.88%	33.04%	35.08%	10.82%	2.82%	0.75%
Source: US Department of Commerce. Census of Population and Housing. 2000. Demographic Profiles: 100 Percent and Sample Data Files.							

Table 9: Renter-Occupied Units

	1990		2000	
	Renter-Occupied Units	Percentage of Occupied Units	Renter-Occupied Units	Percentage of Occupied Units
Bangor	6,901	52%	7,205	53%
Bradley	89	20%	97	19%
Brewer	1,301	36%	1,447	38%
Eddington	127	17%	159	19%
Glenburn	98	9%	164	11%
Hampden	404	19%	517	21%
Hermon	221	16%	267	16%
Holden	157	14%	143	12%
Kenduskeag	57	13%	58	12%
Milford	201	18%	235	20%
Old Town	1,265	39%	1,373	40%
Orono	1,210	49%	1,406	52%
Orrington	176	14%	189	14%
Indian Island	82	47%	85	38%
Veazie	151	23%	153	21%
Source: US Department of Commerce. Census of Population and Housing. 1990 and 2000. 2000 Data are based on Demographic Profiles: 100 Percent and Sample Data Files.				

Figure 1

Multi-Unit Building Permits Issued by Community
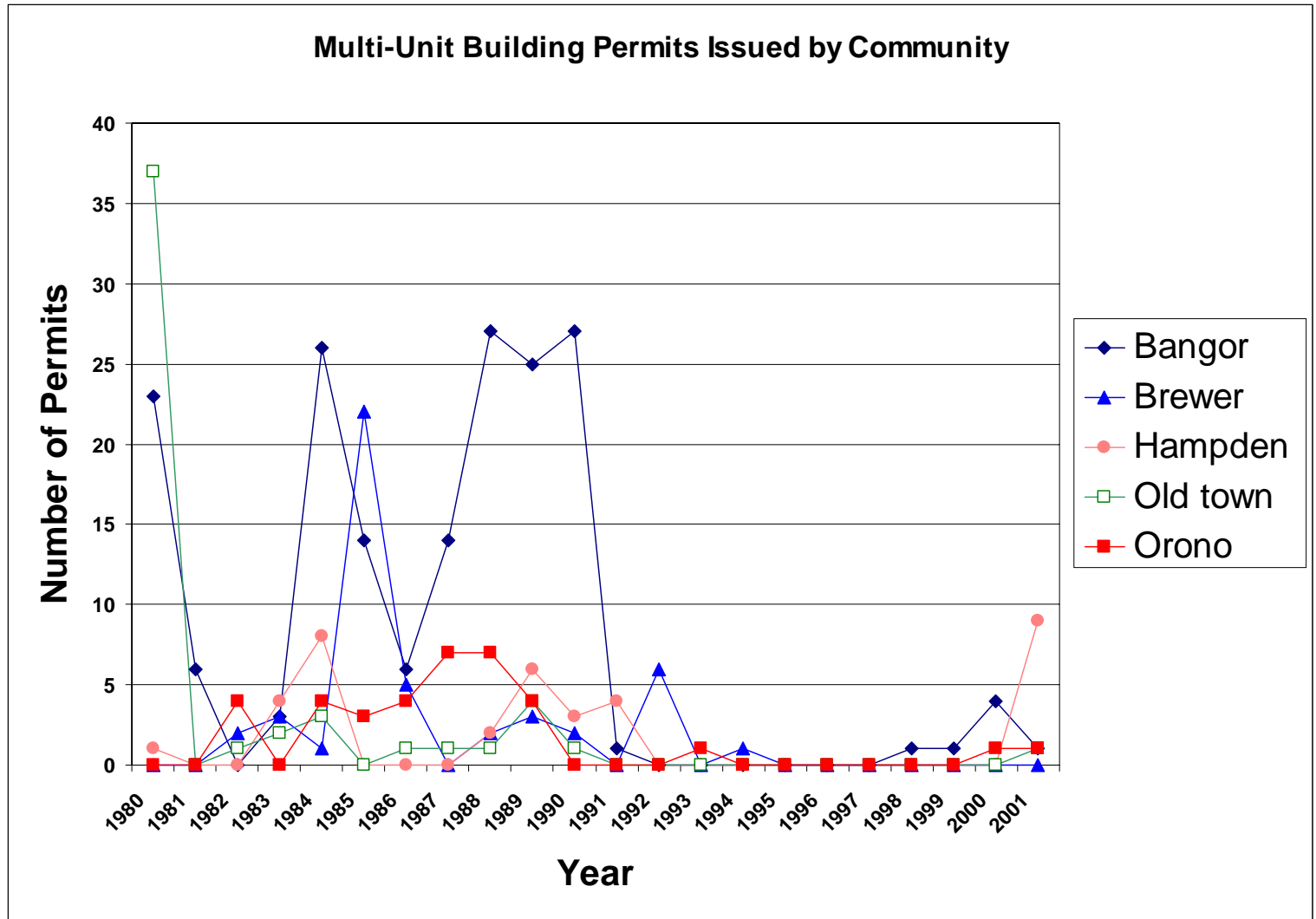
Source: US Department of Commerce. Residential Building Permits Data. Annual Data by Place. U.S. Census Bureau, Manufacturing and Construction Division, Washington, DC.

Table 10: Median Housing Value and Rent

	1990	2000	1990	2000	Nominal Percentage Change	
	Value		Rent		Value	Rent
Bangor	76,900	87,300	411	475	14%	16%
Bradley	63,900	78,100	401	475	22%	18%
Brewer	81,900	89,300	416	466	9%	12%
Eddington	72,600	86,400	437	565	19%	29%
Glenburn	82,400	97,400	370	630	18%	70%
Hampden	92,500	97,400	452	550	5%	22%
Hermon	84,200	104,700	455	552	24%	21%
Holden	90,900	112,600	456	485	24%	6%
Kenduskeag	62,100	82,600	375	535	33%	43%
Milford	73,100	84,100	404	495	15%	23%
Old Town	67,600	77,100	376	439	14%	17%
Orono	92,300	108,300	434	495	17%	14%
Orrington	84,900	95,100	429	595	12%	39%
Indian Island		66,800	303	272		-10%
Veazie	85,400	105,700	481	545	24%	13%
Penobscot County		82,400		468		
Maine		98,700		497		
Source: US Department of Commerce. Census of Population and Housing. 1990 and 2000. 2000 Data are based on Demographic Profiles: 100 Percent and Sample Data Files.						

Table 11: Housing Goals Based on Comprehensive Plans

Community	Year	Goals
Bangor	1989	1. Promote Administrative Coordination A. Ensure consistent public interaction and efficient processing of permits (combine community development, planning, and code enforcement under a single administrator; establish an integrated one-step permitting process; develop a more effective housing inspection staff) B. Establish effective two-way communication between the city and the public regarding housing needs and policies (Establish a housing advisory committee; Provide and maintain accurate housing; Improve management of housing information by instituting computer software which would bring together relevant data for all properties) C. Develop a self-supporting permitting and project review process (Collect permit and review fees) 2. Take an active role in promoting the development of safe, affordable housing opportunities A. Discourage the elimination of sound, low and moderate income housing (Expand CBDG block grant; Develop policy that creates incentives for developers to replace lower income affordable housing units that are lost to demolition and reconstruction) B. Encourage federally and state funded, scattered site, and low-income housing (Encourage low subsidized housing with private ownership; deconcentrate subsidized housing) C. Develop various means by which lower income persons may become home-owners (lease select properties with an option to buy; provide federal and state housing funds to assist first time homeowners acquire modular and manufactured housing units; support a lease with option to purchase program on select public housing units; initiate a policy that allows low-income owners to make monthly tax payments in lieu of semiannual payments; and in lieu of property taxes, accept transfer of ownership interest from low-income residential property owners to the city and grant occupants life tenancy. 3. Encourage developers of large-scale, multi-family rental housing projects to make some units available at a rent affordable to low-income persons (encourage developers of housing projects containing more than 25 units to make available no less than 10 percent of units at HUD fair market rents (financial incentives; development bonuses)) 4. Institute design controls in specific areas where design implications are considered critical A. Adopt a set of residential and non-residential design standards B. Allow the development of mixed use projects (mixed use campus residential-professional zoning; mixed use planned development zoning) C. Amend land use policy and zoning to encourage a variety of housing types and support flexibility (review and revise zoning criteria; permit smaller lot sizes, zero lot line, and clustered siting of homes in some residential zoning categories) D. Carefully review and permit conversion from single-family to multi-family use E. Provide basic infrastructure that will permit housing development opportunities at a variety of appropriate housing locations (designate service areas; extend infrastructure considering impact on low and moderate income housing) 5. Encourage conservation of existing housing stock A. Reduce the number of substandard units (establish a maintenance lien system; support residential code enforcement; and expand resources to CD rehabilitation loan program) 6. Recognize the special needs of the local population A. Actively provide facilities and programs which serve the homeless (permit shelters in accessible locations) B. Facilitate the development of group homes for mentally and physically handicapped persons (amend zoning requirements to permit such homes) C. Encourage accessible housing opportunities for the elderly and handicapped within the City of Bangor
Bradley	1996	1. Consider Site Plan Review. No town zoning except State Shoreland Ordinance. 2. Consider repeal of Archaic mobile home ordinance 3. Provide services for elderly.

Table 11: Housing Goals Based on Comprehensive Plans (continued)		
Community	Year	Goals
Brewer	1995	1. Maintain the existing housing stock in good repair A. Code enforcement on health and safety items B. Seek further federal subsidies for existing apartments C. Pursue federal and state grants to encourage rehabilitation of older properties 2. Continue to provide a diversity of housing opportunities for people of different incomes, family types, and lifestyles A. Ensure that ordinance continues to allow a variety of housing for families at different income levels B. Utilize MSHA programs for first-time home buyers C. Investigate "point system" that rewards developers for locating mobile home parks close to built-up areas, near services, and public transit 3. Minimize impact of housing development on municipal facilities and services
Eddington	2002 (draft)	1. Encourage and promote affordable, decent housing opportunities for all Eddington citizens. A. Enforce and implement applicable laws, codes, guidelines, and ordinances B. Encourage mixed uses and mixed income housing within appropriate residential areas – encourage senior citizen housing opportunities and provide residential areas that allow single and multi-family dwellings as well as manufactured housing C. Pursue grants for housing rehabilitation programs and educate residents about the available resources D. Revise zoning guidelines, minimum lot sizes, and frontage requirements to support the intent of the growth and rural areas identified by the Land Use Plan – permitting in-law apartments and single family conversions in growth areas and in the rural area after review; allowing mobile home parks in growth area E. Research the quality of affordable housing units, especially for the elderly – Planning board will work with the towns of Clifton and Bradley to cooperate in exploring financing and supporting a housing complex dedicated to the elderly F. Ensure the safety and health of multi-family dwellings and rental units G. Provide residents with information on housing rights and energy efficient programs
Glenburn	1998	1. Encourage affordable housing A. Consider density bonus and cluster development incentives for affordable housing in the proposed Rural District B. Consider reductions in minimum lot size and/or frontage requirements in return for providing affordable housing C. Consider requirements for developments over a certain size to provide a given percent of its housing at affordable prices D. Consider developing contribution requirements for commercial and industrial businesses to fund affordable housing (incorporating the number of employees it expects to hire at moderate or low income wages) E. Consider involving land trusts in the provision of affordable housing F. Consider use of Town sales to encourage affordable housing G. Modification of infrastructure requirements

Table 11: Housing Goals Based on Comprehensive Plans (continued)		
Community	Year	Goals
Hampden	2001	1. Protect existing neighborhoods from incompatible development 2. Encourage cluster development as a means to preserve open space and reduce development costs, particularly road construction and maintenance, and thus promote housing affordability 3. Promote innovation in design 4. Encourage and provide for a variety of housing types 5. Provide incentives for the development of affordable housing, especially subsidized housing and housing for the elderly 6. Encourage the development of specialized housing such as assisted living, congregate care, community living arrangements, and nursing home units 7. Establish a relationship with a regional housing organization or nonprofit housing group to promote and encourage development of subsidized rental housing opportunities in Hampden A. Develop an annual reserve account for the sole purpose to assist in the provision of affordable housing and other housing goals (lending money; acquiring land; improving infrastructure) B. Develop a subdivision fee waiver provision if the proposed development can insure affordable units will result C. Review local land use regulations that require a double review of multi-family housing projects D. Review local road frontage requirements for housing developments E. Review the existing built-in density bonus for multi-unit buildings in the rural district. Consider a density base standard. F. Revise existing cap of 10 units per building in Residential B district G. Establish a relationship with The Housing Foundation or another subsidized housing organization
Hermon	1995	1. Preserve the rural character and atmosphere of the community 2. Plan for balanced development A. Suggest that the Town of Hermon needs 15% more affordable housing units available by 2002 than were available in 1990 (create a Hermon Housing Authority) B. Recommend identifying soils which would permit higher density development on on-site waste water disposal systems C. Encourage multi-family dwellings; mobile home parks; and other forms of housing to meet the needs of low-income residents (identify specific areas where future mobile home parks are permitted) D. Recommend an area where sewer could be brought in to permit higher density housing E. Recommend that the town provide opportunities for affordable housing (handicapped accessible and low income) F. Recommend that new subdivision developments provide subsidized opportunities such that 10% of all new housing is affordable
Holden	1995	1. Maintain housing policy to encourage safe, decent, and affordable housing - "Continue not to discriminate against manufactured housing, mobile home parks, elderly housing, or low income housing projects within its jurisdiction." A. Continue to work with the Holden Housing authority B. Develop standards to encourage the appropriate conversion of seasonal to year-round housing units

Table 11: Housing Goals Based on Comprehensive Plans (continued)		
Community	Year	Goals
Kenduskeag	1991	1. Allow for a range of housing opportunities for the additional 90 households anticipated by 2001 A. Designate areas where new residences would most appropriately be located - growth areas 2. Encourage and promote rehabilitation of housing to provide adequate, affordable rental and owner occupied housing A. 1. Allow for a range of housing opportunities for the additional 90 households anticipated by 2001; designate areas where new residences would most appropriately be located 3. Encourage and promote rehabilitation of housing to provide adequate, affordable rental and owner occupied housing A. Consider housing design standards B. Permit multi-family housing as an affordable option C. Permit accessory apartments and single-family conversions in some cases D. Permit elder cottages 4. Allow for the construction of adequate, affordable housing by permitting a variety of housing types and ensuring that ordinance standards are not too restrictive and preventing affordable housing A. Review minimum lot size requirements B. Review road frontage and setback requirements C. Review street width and paving standards D. Review other design standards E. Consider use of density bonuses (affordable housing) 5. Permit the use of cluster housing, where appropriate, to encourage the preservation of open space and provision of affordable housing A. Consider use of density bonus (cluster) 6. Establish and enforce a building code to prevent inadequate, substandard housing A. Consider housing design standards B. Designate certain areas as eligible for rehabilitation assistance and public infrastructure improvement
Milford	1995	1. Encourage safe, decent, and affordable housing through the town's land use ordinance by allowing a mixture of housing types A. Allow multi-family housing (up to 4 units) in the Village-Commercial and Mixed Residential Districts; Permit multi-family housing in the Shoreland District subject to the town's and state's Shoreland Zoning Ordinance. B. Permit in-law apartments and single-family conversions throughout the town of Milford C. Allow mobile-home parks within the Mixed Residential District of Milford D. Ensure safe and responsible development of homes and mobile home parks through performance standards E. Pursue CDBG funds to fund rehabilitation F. Pursue grants to establish senior citizen housing G. Consider amending development standards – allow for cluster development in rural areas; adjust minimum lot size, frontage, and access requirements - minimum lot size (rural district (5 acre); river residential (2 acre); mixed residential (1 acre up to 4 units per building); village (1 acre per unit (1-2 units) or 20,000 square feet per dwelling unit contained within a multi-family building)

Table 11: Housing Goals Based on Comprehensive Plans (continued)		
Community	Year	Goals
Old Town	1995	1. Ensure Mobile Home Safety A. Prohibit mobile manufactured homes prior to June 15, 1976; Amend City Ordinance to include safety standards for mobile homes 2. Provide for comprehensive review of mobile home parks A. Amend the mobile home park standards to conform to statutory requirements and to provide for a more comprehensive review of new park proposals and park expansions 3. Continue to allow multi-family dwellings but tighten up density and parking requirements, except for elderly housing – No off-street parking space shall be located within a required front yard; Prohibit densities greater than 12 dwellings units per acre 4. Provide for closer City review of large multi-family developments – Amend the Zoning Ordinance to require that multi-family units (3 or more units) in R-2 zones be subject to Special Exception Review 5. Address substandard housing conditions – Apply for CDBG funds to be used for rehabilitation 6. Take steps to ensure housing remains affordable – Continue to allow subsidized housing units and a wide range of housing types 7. Provide for future needs of elderly – Develop congregate housing and other types of housing serving elderly needs. Set aside land for such housing. 8. Ensure that seasonal developments do not impose a burden on City services and that they provide safe access for emergency vehicles – adopt road standards for seasonal housing.
Orono	1998	1. Continue to allow a wide variety of housing types within Orono A. Zoning Ordinance allows for a wide variety of housing types B. Revise Zoning Ordinance to consider architectural integrity of historically significant buildings when there is a change from residential to non-residential requiring planning board review 2. Continue to encourage a compact, village-oriented residential growth pattern, while discouraging urban sprawl. A. Continue the practice of allowing higher densities in the village and somewhat surrounding areas and lower density in the rural areas. Continue the practice of varying lot size according to availability of off-lot sewer and water. B. Maintain the forest and agricultural district; regulate mobile home parks C. Continue to protect areas not suitable for development 3. Continue current efforts to provide affordable housing opportunities A. Continue existing subsidized housing for qualified, low-income people (The Housing Foundation) 4. Revised the Zoning Ordinance to regulate better the required number of parking spaces for rental housing 5. Manufactured Housing and Mobile Home Parks A. Prohibit mobile homes manufactured prior to June 15, 1976 B. Limit the location if mobile homes and single-wide modular homes to the forest and agricultural district west of I-95; require manufactured housing be placed on permanent foundations C. Allow for expansion of existing mobile home parks if soils are suitable and traffic/access requirements are met, along with other provisions of the land use ordinance 6. Establish general performance standards for new multi-family residential developments A. Consider upgrading existing standards for new multi-family residential developments, using DECD's mobile home park standards as a guide
Veazie	2002	1. Continue to encourage affordable housing through Contract Zoning, Open Space Cluster Subdivisions, and Mobile Home Park Provisions in the Land Use Ordinance A. Developing an Affordable Housing Program to encourage appropriate rate of growth in the stock of affordable housing; Consider additional incentives such as using the Contract Zoning and Open Space B. Implement affordable housing impact fees (fee assessed on all new housing that does not meet the state's criteria for affordability) 2. Strive to make five percent of all new residential development within the range of affordability for low-income households and ten percent within the range of affordability for low to moderate-income households as defined by the state A. Re-examine Land Use Ordinance to see if some form of accessory apartment additions could be allowed in certain zones 3. Continue efforts to develop additional affordable housing for Veazie's senior citizens A. Senior Housing Complex being developed with assistance from Penquis CAP (20 affordable units) 4. Participate in regional affordable housing programs if the costs and benefits of such programs are shared fairly by the communities in the region

Table 12: Ownership Costs as a Percentage of Income (2000)

	Less than 15 percent	15.0 to 19.9 Percent	20.0 to 24.9 Percent	25.0 to 29.9 Percent	30.0 to 34.9 Percent	35 Percent or More
Bangor	35%	22%	17%	8%	5%	13%
Bradley	40%	21%	9%	11%	5%	14%
Brewer	37%	17%	15%	10%	6%	13%
Eddington	35%	23%	13%	13%	6%	11%
Glenburn	33%	22%	14%	10%	6%	15%
Hampden	35%	22%	19%	11%	4%	10%
Hermon	36%	21%	20%	11%	2%	11%
Holden	36%	24%	16%	8%	5%	9%
Kenduskeag	36%	18%	13%	6%	10%	18%
Milford	40%	15%	16%	7%	4%	18%
Old Town	43%	13%	16%	8%	4%	16%
Orono	35%	18%	15%	10%	7%	12%
Orrington	35%	21%	14%	9%	2%	17%
Indian Island	32%	10%	20%	4%	18%	17%
Veazie	39%	23%	14%	12%	5%	8%
Penobscot County	38%	20%	15%	9%	5%	13%
Maine	36%	19%	15%	10%	6%	15%
Source: US Department of Commerce. Census of Population and Housing. 2000 Data are based on Demographic Profiles: 100 Percent and Sample Data Files.						

Table 13: Rent as a Percentage of Income (2000)

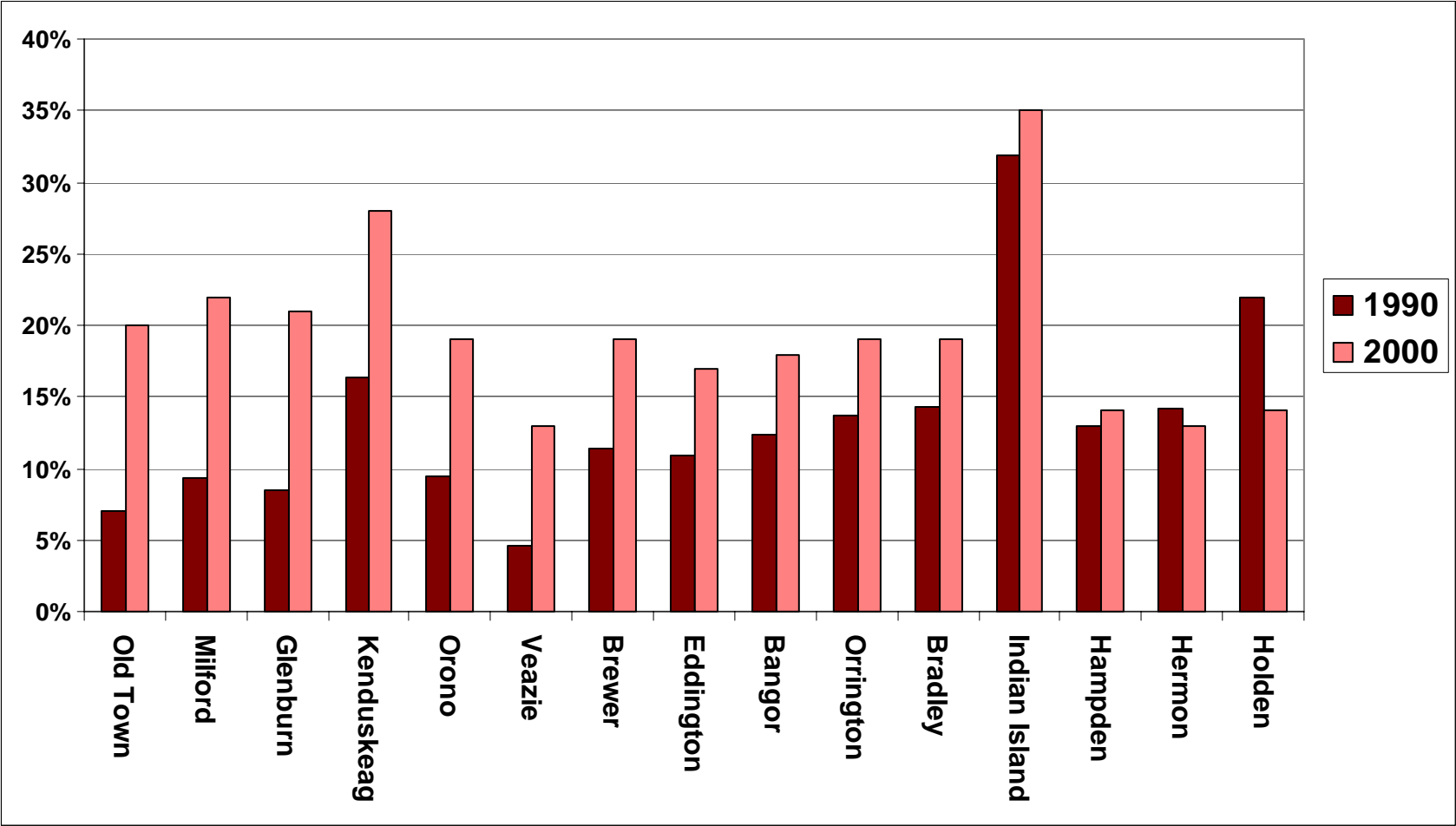|	Less than 15 percent	15.0 to 19.9 Percent	20.0 to 24.9 Percent	25.0 to 29.9 Percent	30.0 to 34.9 Percent	35 Percent or More
Bangor	17%	13%	15%	12%	6%	34%
Bradley	17%	17%	4%	17%	8%	25%
Brewer	20%	16%	17%	11%	8%	24%
Eddington	20%	16%	11%	7%	9%	28%
Glenburn	24%	14%	5%	0%	17%	32%
Hampden	20%	23%	19%	11%	4%	18%
Hermon	18%	20%	2%	13%	12%	21%
Holden	7%	15%	17%	15%	4%	31%
Kenduskeag	21%	7%	16%	5%	0%	23%
Milford	28%	12%	10%	6%	7%	26%
Old Town	19%	12%	11%	11%	8%	33%
Orono	14%	9%	11%	13%	10%	38%
Orrington	17%	5%	21%	20%	16%	18%
Indian Island	22%	20%	17%	7%	7%	16%
Veazie	29%	11%	12%	2%	4%	31%
Penobscot County	17%	13%	13%	11%	7%	31%
Maine	17%	15%	13%	12%	7%	27%
Source: US Department of Commerce. Census of Population and Housing. 2000 Data are based on Demographic Profiles: 100 Percent and Sample Data Files.						

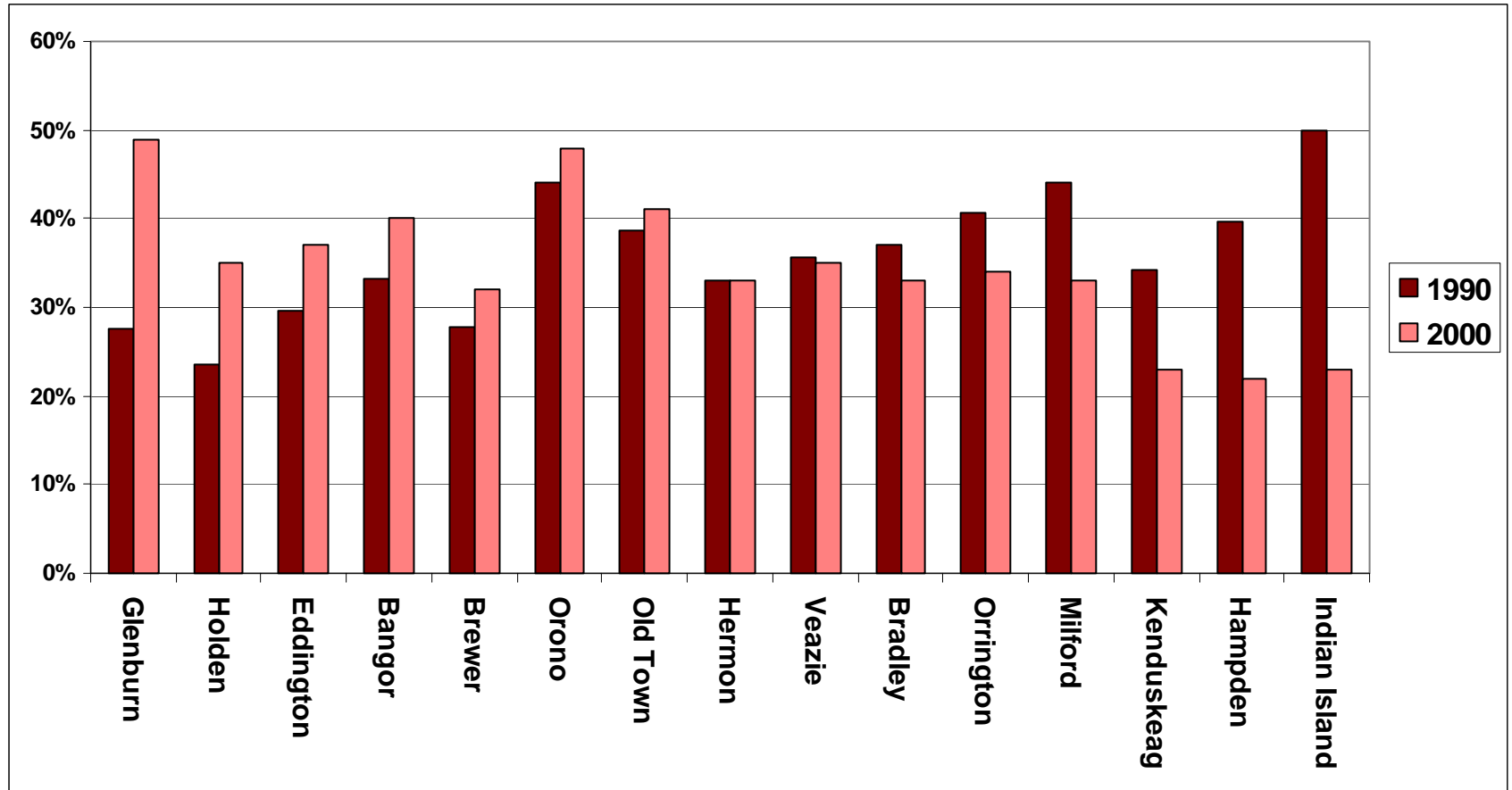**Figure 2: Percentage of Owner-Occupied Housing Units Devoting 30 Percent of Income or Greater to Home Ownership Costs**

Figure 3: Percentage of Renter-Occupied Housing Units Devoting 30 Percent of Income or Greater to Rental Costs

Source: US Department of Commerce. Census of Population and Housing. 1990 and 2000. 2000 data are based on Demographic Profiles: 100 Percent and Sample Data Files.

Table 14: Percent of Occupied Housing Units Without Adequate Plumbing Facilities

	1990	2000	Change
Bangor	1%	0%	0%
Bradley	1%	0%	-1%
Brewer	0%	1%	0%
Eddington	5%	0%	-5%
Glenburn	2%	0%	-2%
Hampden	1%	0%	-1%
Hermon	1%	1%	-1%
Holden	1%	1%	0%
Kenduskeag	3%	2%	-1%
Milford	3%	0%	-3%
Old Town	0%	1%	0%
Orono	1%	0%	-1%
Orrington	1%	1%	0%
Indian Island	3%	1%	-3%
Veazie	0%	1%	1%
Source: US Department of Commerce. Census of Population and Housing. 1990 and 2000. 2000 Data are based on Demographic Profiles: 100 Percent and Sample Data Files.			

Table 15: Regional Cooperation Goals Based on Comprehensive Plans

Community	Year	Goals
Bangor	1989	1. Coordinate developments on municipal boundaries 2. Look to Promote Regionalism in Implementing Economic Development Goals 3. Examine potential for multi-community sharing of urban services (transit (the Bus); solid waste disposal; regional transportation planning) 4. Recognize regional basis of environmental and natural resource issues (groundwater supplies; watershed management of surface water; environmentally sensitive lands; and wildlife habitat) 5. Encourage state to amend policies so that municipalities can pursue regional projects (sort out scope and relevance of area-wide activities and examine appropriateness of quasi-governmental entities)
Brewer	1995	Coordinate with other communities on the following projects: 1. Regionalization of public safety and governmental services 2. Creation of a land trust 3. Establishment of park and ride facilities on US 1A 4. Enhancements to "The Bus" service 5. Protection of Hatcase Pond water supply 6. Establishment of a toxic/household chemical disposal system 7. Coordination with Bangor Water District
Glenburn	1998	1. Work with regional organization to efficiently address regional economic issues (EMDC, Greater Bangor Region Chamber of Commerce, Annual Overall Economic Development Plan) 2. Work with surrounding communities in developing regional plans 3. Work with neighboring communities to set similar goals and priorities for providing affordable and low income housing to assure that no one community bears disproportionate shares of obligation 4. Continue to participate in regional water quality and natural resource protection initiatives and programs (provide neighboring towns with copies of land use ordinance; shoreland zoning ordinance etc) 5. Continue to participate in regional recreational initiatives and programs (programs with adjacent towns) 6. Continue to participate in regional transportation initiatives and programs including the RTAC process (shared maintenance agreements with surrounding towns; attend RTAC meetings; and continue to support Penquis CAP transportation services) 7. Encourage compatible land uses with neighboring communities

Community	Year	Goals
Hampden	2001	1. Maintain relationship with Municipal Review Committee and Penobscot Refuse Disposal District 2. Review multi-use concept for Marina 3. Coordinate sewer plans with City of Bangor 4. Coordinate water plans with Hampden Water District and Bangor Water District 5. Maintain contacts/representation with BACTS
Hermon	1995	Recognize regional natural resources (lakes and ponds; wetlands; aquifers); public services and facilities (schools, police, fire, ambulance, solid waste, health care); transportation (railroad, roadways; airport); and economic development strategies (business parks and employment centers). 1. Continue to participate in regional efforts to reduce pollution inflow from point and non-point sources to the Soudabscook Stream/Hermon Pond 2. Explore regional solid waste solutions and regional recycling facilities 3. Work with neighboring towns and Maine DOT to determine necessary improvements to state maintained roads and shared local roads 4. Continue and possibly expand mutual aid (fire) agreements 5. Explore regional dispatching solutions 6. Explore increased regional police protection efforts 7. Coordinate with neighboring communities on land use regulations 8. Coordinate expansion of sewer and water 9. Coordinate land use zoning within the high decibel zone of the airport.
Holden	1995	"It is the policy of the Town of Holden to cooperate and communicate with other communities in order to address efficiently issues of interlocal significance." 1. Consider regional issues related to economic development, transportation, solid waste management, recreational opportunities, and environmental protection
Kenduskeag	1991	1. Continue to investigate the possibility of working with nearby towns to establish a regional recycling program and facility 2. Protect regional water quality resources; work with appropriate communities to develop and implement the "Kenduskeag Stream Watershed Plan" 3. Examine benefits of regional cooperation with ambulance and rescue services 4. Plan for the optimum use, construction, maintenance, and repair of roads; Work with Maine DOT to study regional roadway improvement strategies 5. Work with other communities to develop uniform development standards long shared borders 6. Work with neighboring communities to determine the needs and benefits of extending the Eastern Transportation service areas
Milford	1995	1. Monitor industrial and commercial development within the region to consider the impact on the demand for housing in Milford

Community	Year	Goals
		2. Establish communication with neighboring planning boards to share regulations protecting natural resources
Old Town	1995	1. Share comprehensive plan with surrounding communities and EMDC and incorporate their feedback 2. Public facilities (Monitor efforts in Milford to remove infiltration so that it does not adversely impact Old Town's option to service new growth; work with surrounding communities on issues of regional concern to ensure a continued delivery of services in a cost effective manner; continue to work with surrounding communities on mutual aid fire agreements; explore regional watershed protection plan (monitoring water quality at Pushaw lake)) 3. Transportation (Continue to work with and support BACTS; continue to work with Maine DOT on implementation of the Aviation Systems Plan; Implement improvements to pedestrian and bicycle facilities in accordance with BACTS planning efforts)
Orono	1998	1. Continue regional coordination activities - employment and cultural center; police (mutual aid agreements) and fire protection (hazardous materials); transportation (BACTS; BUS); solid waste (Penobscot Energy Recovery Program (PERC)); water; and recreation opportunities. 2. Continue participation in regional organizations (Penobscot Valley Regional Planning Commission; Eastern Maine Development District; BATS; and Bangor Area Municipal Review Committee) 3. Amend Zoning Ordinance to require that proposed zoning changes in close proximity to an adjacent town's border be forwarded to the appropriate municipality prior to public hearing
Veazie	2002	1. Work cooperatively with other municipalities in the surrounding region to ensure wise and sustainable use of the region's resources. Issues - regional economy; water and air resources, critical natural resource corridors; agricultural and forest lands; housing; and transportation resources. 2. With assistance from Penquis CAP, Veazie is in the process of redeveloping the old John R. Graham School into a Senior Housing Complex (20 affordable units) 3. Developing an Affordable Housing Program to encourage appropriate rate of growth in the stock of affordable housing; Consider additional incentives such as using the Contract Zoning and Open Space Cluster Subdivision ordinances to develop affordable housing

Regional Cooperation in the Greater Bangor Region: Capital Planning

October 2002

![Margaret Chase Smith Center logo — F O R   P U B L I C   P O L I C Y — Proudly Serving Maine]

Table of Contents

IV. CAPITAL PLANNING

A. Introduction

This report is one of several prepared as a follow-up to the PV PILOT Regional Plan prepared by the Bangor Area Comprehensive Transportation System and Eastern Maine Development Corporation. Formal capital planning is undertaken in many, but not all towns in the PV PILOT region. Moreover, annual financial reports of the towns treat capital outlays inconsistently, thereby limiting the usefulness of a quantitative analysis of capital expenditures across all of the towns. In its place, this report presents the results of a series of interviews conducted with municipal officials in the participating communities conducted during August and September of 2002. While the study focuses on public works, capital investments and other expenditures for public infrastructure, the objective of the interviews was to identify specific examples of inter-local cooperation that already are in place, regardless of whether they were the result of formal agreements or ad hoc decision. In addition, the discussions attempted to identify additional avenues for regionalism from the perspective of the municipal officials.

It is not the intent of this report to provide an exhaustive inventory of inter-local agreements among the communities that comprise PV PILOT. Nor does it seek to prescribe specific activities to be pursued by particular towns, or groups of towns. Rather, the goal of the study is to present examples of successful inter-local cooperation and, on the basis of comments presented by the municipal officials, to suggest possible strategies for encouraging greater regionalism.

B. Regionalism

Regionalism of public services is not a new concept in Maine. More than ten years ago, an article in the *Maine Townsman* examined the "new" regionalism that was emerging as a result of solid waste regulations from the Maine Department of Environmental Protection (Josephson 1991), while another article provided an in-depth look at the various types of formal inter-local agreements and the differences between them (Herman 1991). In 1975, the Maine Municipal Association published the *Handbook for Interlocal Cooperation Agreements in Maine* to provide guidance for municipal officials on the procedural and substantive issues involved in the creation of formal multi-municipal relationships (Maine Municipal Association 1975). The handbook was updated in 2001.

Various efforts have been made over the years to promote greater cooperation among

neighboring towns, and several reasons have been put forth to explain the lack of progress on regionalizing some municipal services. Part of the reason is structural. Public governance and provision of public services in New England historically has been the responsibility of the local municipality. Planning, zoning, education, social welfare, and commercial development traditionally have been the dominion of the local town or city. Likewise, local government is primarily responsible for securing the funds to pay for public services. It is no wonder that, in the face of growing demands for greater efficiency in the provision of services, local leaders recognize the opportunities afforded by regional solutions, but typically have been hesitant to surrender local control over what many view as a local responsibility. A survey of its members in 2001 by the Mid-Maine Chamber of Commerce lists a wide range of obstacles that they felt prevented municipalities from further consolidating public services. Among the wide range of responses were political considerations, bureaucratic complexities, loss of local control, and potential losses of tax revenues (Mid-Maine Chamber of Commerce 2001).

While views such as these may exist, the municipal officials interviewed for this study generally expressed a desire to engage in cooperative activities where clear gains in efficiency were expected. This was particularly true in those communities that clearly would benefit from cooperation. For example, a town with no solid waste management facilities within its own borders (landfill or transfer station) benefits from an agreement that allows its citizens to drop off materials at the facilities in a neighboring town. In such cases, the desire for absolute local control takes a second priority when there is a realization that some services could be provided more effectively, and more efficiently through inter-local cooperation.

On the other hand, particularly in communities with greater than average fiscal capacity, there appears to be less pressure to engage in cooperative agreements if sharing of resources or services results in inconvenience in the administration of services or for its citizens. As an example, three towns in the region had jointly purchased a piece of composting equipment several years ago. However, due to the inconvenience of transporting the equipment, one town opted later to buy its own equipment separately.

Inter-local cooperation generally occurs in one of two forms. In the simplest cases, cooperative agreements are forged, formally or informally, to share resources or responsibilities for specified public services. Shared resources may include personnel (for example, a code enforcement official that serves two neighboring towns), or equipment. Public works equipment

that requires only occasional use is suitable for such cooperation (e.g., compost turner, street sweeper). In the most complex cases, multiple towns enter into agreements that result in the creation of a new legal entity. The Penobscot Energy Recovery Corporation (PERC) located in Orrington was cited by several municipal officials as a very successful joint undertaking of this type. PERC is the region's waste to energy incinerator that serves as the ultimate destination of municipal solid waste for approximately 130 towns.

C. Cooperative capital planning in the PV PILOT region

The discussions with area municipal officials focused on: public services, capital investment and public infrastructure; housing issues including growth and affordability; and local education. This portion of the study reports only on the findings pertinent to the issues of water supplies, septic waste and sewage treatment, solid waste management, roads and highway maintenance, and public works activities. A summary of these services in the PV PILOT communities is presented in Table 1.

Water: Public water systems generally are designed to serve locations with at least moderate density levels of residential, commercial or industrial development. As a fairly expensive capital investment, such systems are cost effective where large numbers of connections can be made per linear unit of installed pipeline. In addition, an adequate base of total users is necessary to avoid prohibitive unit costs associated with the fixed and operating costs of the pumping, storage and treatment facilities.

Since residential development often occurs without regard to its proximity to political boundaries, it can make sense for a public water system to serve households and businesses in adjacent towns if they are within an economically viable service area as a method of increasing the user base. This kind of activity occurs throughout the PV PILOT region. There are five community water systems in the region (Orono and Veazie share a single system) that serve residents in 13 of the fifteen area communities. In most cases, a neighboring community is only partially served by a water system that originates in another town (Figure 1).

In one case, two towns have joined to form a single water district that serves residents of both towns (Orono and Veazie). In addition, portions of Veazie are served by the Bangor Water District. In many cases, residents are served and billed directly for water service provided from a neighboring town (for example, some Milford and Bradley residents receive water service from

the Old Town Water District). In the case of Hampden, the town has its own water utility to install and maintain water lines and pumping stations, however, it receives its water supply from the Bangor Water District.

Sewage and Wastewater Treatment: Similar to public water systems, municipal waste treatment relies on adequate numbers of users to support the large capital investment for plant and equipment and pipeline. There are five treatment plants in the PV PILOT region that serve users in nine communities.

Among the smaller towns in the PV PILOT region, there appears to be no urgent need for sewer expansion. Hampden has a fairly extensive sewer system that is connected to the City of Bangor's Wastewater Treatment Facility. This agreement appears to provide adequate capacity for Hampden for the foreseeable future. Hermon's industrial development, in particular, has benefited from the extension of the Bangor sewer system. The availability of sewer connections to lines already serving an established industrial park in Bangor enabled Hermon to develop an industrial park in an adjacent location.

The Town of Milford, which is served by Old Town Waste Treatment Facility, is presently being forced to relocate its main sewer connection to the Old Town facility due to impending bridge reconstruction. Among the alternatives being explored is an extension of the sewer to cross the Penobscot River at a point near the boundary line that borders the Town of Bradley. Since Bradley currently has no treatment facilities, this option may open the possibility of connection to Old Town's treatment plant at some future date. For now, it appears that there is no immediate need for a sewer system in Bradley.

Solid Waste Management: The closure of open dumps and the expense of operating landfill facilities have caused many smaller communities to forego the option of local waste disposal within their municipal borders in favor of contracting with private sector waste companies. In fact, almost all of the town in PV PILOT contract for curbside trash pickup, even among some of the towns that have their own public works departments.

As a service for their residents, four municipalities have established a transfer station where residents may drop off trash (and sometimes recyclables) for transfer to a landfill elsewhere. However, only the City of Brewer has agreements with neighboring towns

(Eddington, Holden and Orrington) that allows residents of those towns to utilize the Brewer landfill and transfer station. A similar inter-local agreement between two other communities in the region was terminated, apparently due to concerns of waste volume.

Public Works and Road Maintenance: Several of the issues that were examined within this category of municipal services include possible sharing of public works equipment, joint provision of public works services such as road plowing and sanding, and coordination of road construction and paving. Just as many of the municipalities in the region opt to contract out their solid waste disposal services, so too do many of the municipalities choose to contract out various public works services. Indeed, six of the municipalities in the PV PILOT region have no public works department. These municipalities contract with the private sector for all of their maintenance needs such as plowing and sanding of roads, mowing, ditching, culvert replacement/installation, etc.

When asked, several of these municipalities responded favorably to the suggestion that such services might be provided jointly among two or more municipalities. One of the smaller towns with its own public works department had considered previously, if somewhat informally, the possibility of providing plowing and sanding services for neighboring municipalities. However, to do so it would become necessary to acquire additional equipment, and the additional equipment would entail the construction of additional garage and storage facilities. Eventually, the added costs were seen as making the joint services infeasible.

At the outset of this study, it had been suggested that coordination of road maintenance and paving presented an opportunity for inter-local cooperation that would result in reduced costs and improved service to the traveling public. However, when approached with this topic, most municipal officials seemed skeptical. Generally it was felt that coordination would not produce cost savings significantly beyond the contract costs that result from the current public bidding process. One person, however, with experience in multi-town coordinated paving contracts, indicated that savings are likely. Ten years ago, joint purchasing programs in southern and eastern Maine produced savings of $6 to $14 per ton for asphalt in place. The Southern Maine program was operated by the Greater Portland Council of Governments while the Eastern Maine program was coordinated by a private consultant (Josephson 1992).

In addition to the potential savings, coordinated road maintenance could provide

perceived benefits to motorists by eliminating situations where road conditions change noticeably at town boundaries. This typically occurs when one town has resurfaced a section of the road while the neighboring town may not resurface it for several more years. Similarly, winter driving conditions often change due to differences in snowplowing and sanding schedules or practices. While the municipal officials in PV PILOT towns acknowledged these potential benefits, most indicated that there are, in fact, few opportunities for coordination because there are relatively few local roads that cross municipal boundaries. This appears to be particularly true among the smaller, more rural towns (Figure 4).

A survey of Maine municipalities conducted in 1990 found that 32 percent of municipalities in the state engaged in some form of cooperative activity regarding road maintenance (Deller and Halstead 1991). The most frequent agreements pertained to snow removal and sanding, while the purchase and spreading of asphalt were among the least common cooperative ventures. The cost analysis conducted as part of that study found the average cost for road maintenance per mile of road was lowest for municipalities with approximately 80 miles of road. Municipalities with fewer (or more) miles of road to maintain typically have higher average costs per mile (a municipality with 40 miles of road to maintain spends almost as much as municipalities with 80 miles of road). Since more than one-half of Maine municipalities maintain less than 30 miles of road, the study concluded that cooperative agreements can take advantage of economies of scale to produce savings for many smaller towns. In the PV PILOT region, only Bangor and Hampden have at least 80 miles of roads while Brewer, Hermon and Old Town have between 60 and 80 miles of roads. However, the Maine Department of Transportation provides maintenance for some roads in these municipalities s.

While pubic transportation is not a capital planning issue that receives significant attention in many smaller towns, it nonetheless is a topic that deserves attention, particularly as population growth increasingly occurs in outlying communities. Figure 5 shows the mean travel time to work in the PV PILOT region, according to U.S. Census Bureau, and suggests that most people in the region probably travel to the larger communities of Bangor, Brewer, Orono and Old Town to work. Average travel time to work (which is a function of the change in total numbers of commuting workers in a town and the distance between where they live and where they work) is growing fastest in the outlying communities (Table 2). Part of the problem may result from sprawl (people choosing to live in outlying communities and working elsewhere),

however, in some communities the increased travel time may be the result of jobs lost in the local and regional communities. For example, the populations of Kenduskeag and Milford increased little or declined, yet the increase in aggregate travel time to work for those residents were among some of the largest in the region. Conversely, the large increases in travel time to work for residents of Glenburn and Holden appear to result at least partially from the large increases in population including new residents who work elsewhere.

D. Concluding Observations

Capital Investment: An analysis of capital investment based on secondary information, whether past investments or those planned for the future, is precluded by the lack of consistency with which expenditures are defined and reported. Even audited municipal financial statements lack uniformity with regard to their treatment of capital expenditures. Some municipalities may regard purchase of a public safety vehicle or public works equipment as a capital expense, while some may view the same expenditure as an operating cost. While most town financial statements include a separate category for capital outlays, some ignore this category completely.

Water and Sewerage Utilities: Owing to the capital intensive nature of public utilities, many municipalities are served by quasi-public entities that are chartered to serve customers across municipal boundaries. All of the municipal officials in communities that presently do not have a local wastewater treatment plant or municipal water system indicated a willingness and a desire to work cooperatively with neighboring municipalities where necessary to provide these services. It was quite clear that most smaller towns lack the population base and fiscal capacity to establish these utilities on their own. In some cases where continued population growth and denser development may necessitate the provision of these services, most municipal officials in that situation indicated a desire to work with a neighboring communities for possible expansion of existing utility services. As an example, Hermon, which presently is partially served by the Bangor Water District, has already established future water resources that it would deed to the Bangor Water District as part of an agreement to expand service to Hermon residents at some future time.

Except for local zoning ordinances, planning for installation of water and sewer utilities is perhaps one of the most effective tools that a local community has to control the direction and extent of growth. Given the broad acceptance of inter-local activity in the provision of these

services, there maybe an opportunity to engage multiple municipalities in using the development of sewer and water services as the vehicle for region-wide growth planning.

Solid Waste Disposal: Approximately one-half of the municipalities in the PV PILOT region have foregone the development of a licensed landfill or a transfer station in favor of contracting with private waste management companies for disposal of household trash. These contracts typically include provisions for once- or twice-yearly cleanup weeks for residents to dispose of white goods, yard wastes, and other non-household wastes. In four of the communities, agreements have been established to provide drop-off services for their residents at a neighboring landfill or transfer station. However, it remains an issue that is problematic in some communities. While a local landfill provides convenience for residents and insurance against escalating tipping fees at licensed landfills, it is regarded by many as an expensive service. Some municipalities with landfills or transfer stations are reluctant to open those facilities to non-residents, citing concerns of capacity and operating resources. Some with limited own-source activity are more open to allowing non-resident usage.

While there is nearly universal agreement that the PERC incinerator in Orrington is a good example of successful regionalization, there appears to be an opportunity for greater cooperation in solid waste management on a smaller scale.

Road Paving and Maintenance: While some of the municipalities in the PV PILOT region have a well developed maintenance schedule for road paving and reconstruction, others are less well developed or nonexistent. However, even among those municipalities that presently have a reactionary approach to road maintenance, there is a clear sense of need to establish a regular maintenance plan, and nearly every town without a plan is moving in that direction. That several municipalities in the region have not yet established a maintenance program but have expressed a need for one suggests an opportunity for PVCOG to provide technical assistance within the framework of better coordinating regional road maintenance, paving and construction activities.

Creative approaches to joint road maintenance that have been tried elsewhere within the state have proven the potential for cost savings. The solutions have ranged from simple joint purchasing programs to the creation of a joint highway department. This study was focused

solely on municipalities in the PV PILOT region and examined in general terms the existence and possibilities for cooperative agreements. Although there is little cooperative activity with respect to road maintenance in PV PILOT municipalities, additional efforts should be made to identify joint programs that have succeeded elsewhere in Maine and assess specifically their potential application in the PV PILOT region.

Other comments and observations:

- The joint purchasing program administered by PVCOG was widely praised as a successful cooperative program. Several managers pointed to the voluntary option of the program as a key reason for its success, at least from their point of view. It was suggested that this program could be the vehicle for coordinating the bidding for joint paving contracts.

- It was suggested that there is a significant need for a resource person who tracks inter-local cooperation among communities in Maine and who could provide assistance on regionalizing activities in the PV PILOT region. Housed within PVCOG, this person would serve as an ombudsman for communities looking for regional partners, or as a contact point for communities looking for examples of particular types of service regionalization that have succeeded elsewhere.

- Greater attention needs to be focused on inter-local agreements for public works activities. Most small towns do not have their own public works departments and bid out those activities to the private sector. Most of those municipalities also indicate a willingness to cooperate with neighboring municipalities regarding public works. In addition to potential cost savings, a key benefit cited by some small towns would be the convenience of having those services available, while eliminating the need to go through the bidding process for every small project that arises unexpectedly.

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Table 1: Summary of selected public services and facilities in PV PILOT towns.

	Public Water System	Sewage Treatment	LandFill*	Landfill yrs Remaining	Transfer Station	Road Miles
Bangor	Yes	Yes	No		No	178
Bradley	Old Town	No	No		No	14
Brewer	Yes	Yes	Yes	5	Yes	62
Eddington	Bangor, Brewer	No	Brewer		No	28
Glenburn	No	No	Yes		No	39
Hampden	Yes, (Bangor)	Bangor	Yes	20	Yes	81
Hermon	Bangor	Bangor	No		Yes	61
Holden	Bangor, Brewer	No	Brewer		No	41
Kenduskeag	No	No	No		No	23
Milford	Old Town	Old Town	No		Yes	30
Old Town	Yes	Yes	Yes	15	Yes	75
Orono	Yes, w/ Veazie	Yes	Yes	30	No	49
Orrington	Bangor, Brewer	Brewer	No		PERC	50
Veazie	Yes w/ Orono; Bangor	Yes	No		No	13
Penobscot Nation	Old Town	Old Town	No		No	5

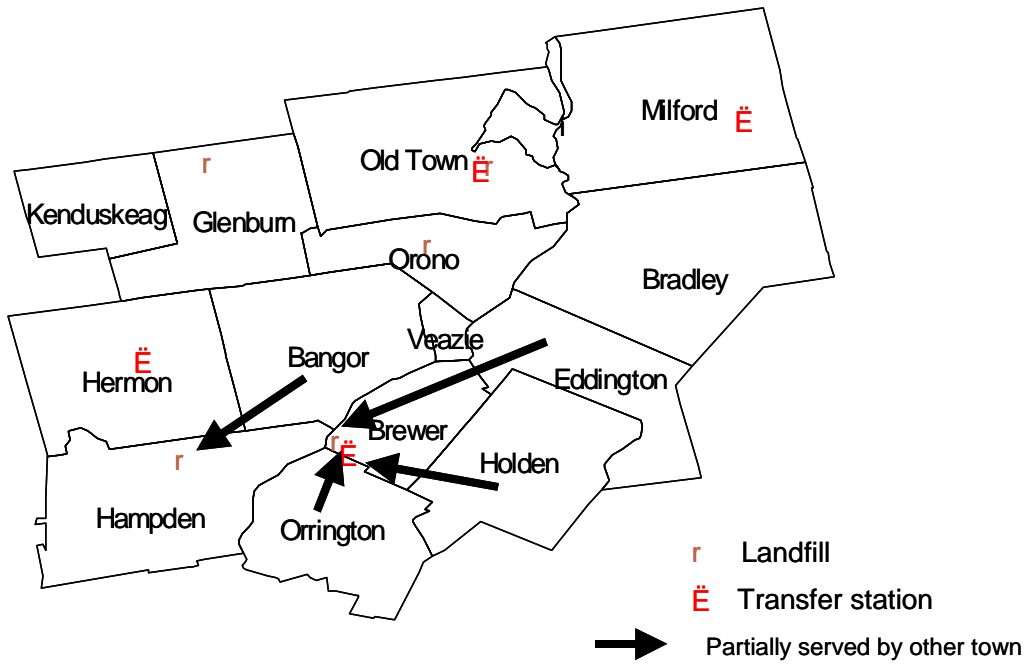*Typically designated for construction and demolition debris.
Information is from various sources including interviews, town annual reports, town comprehensive plans, and Maine State Planning Office.
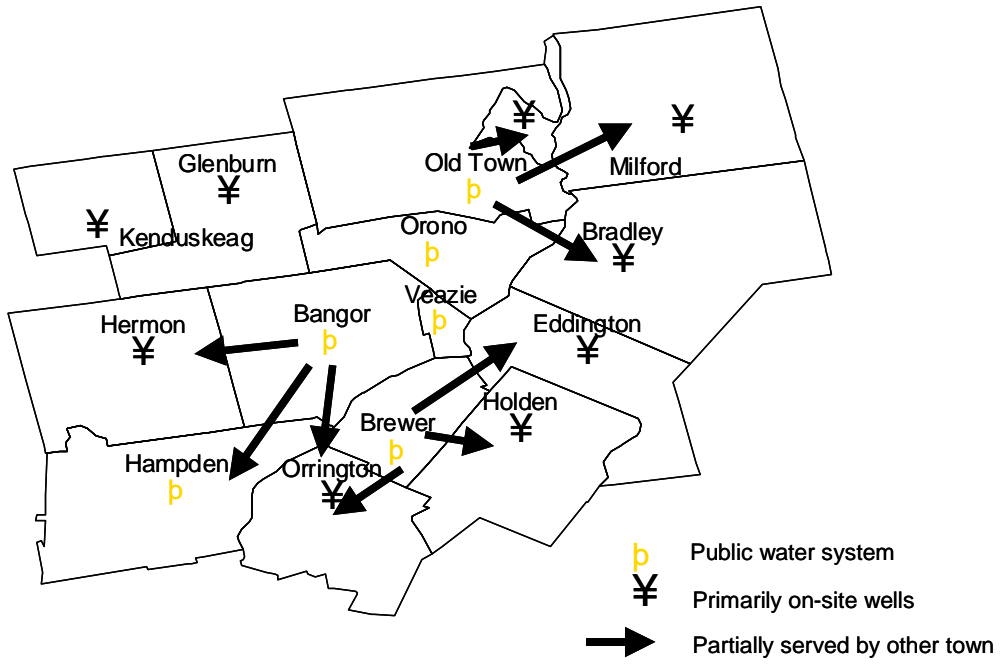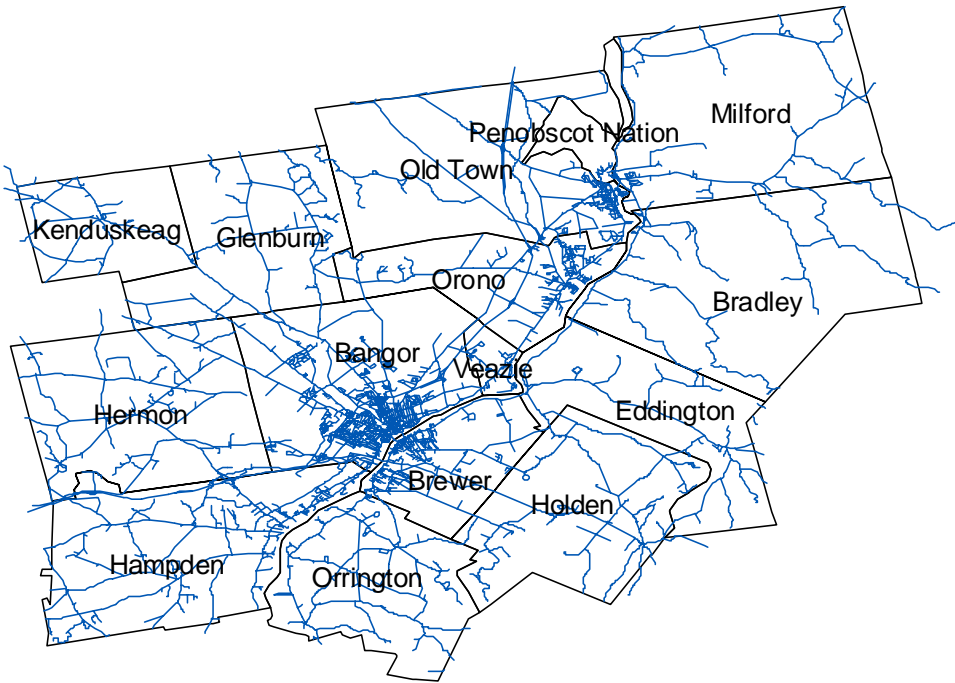
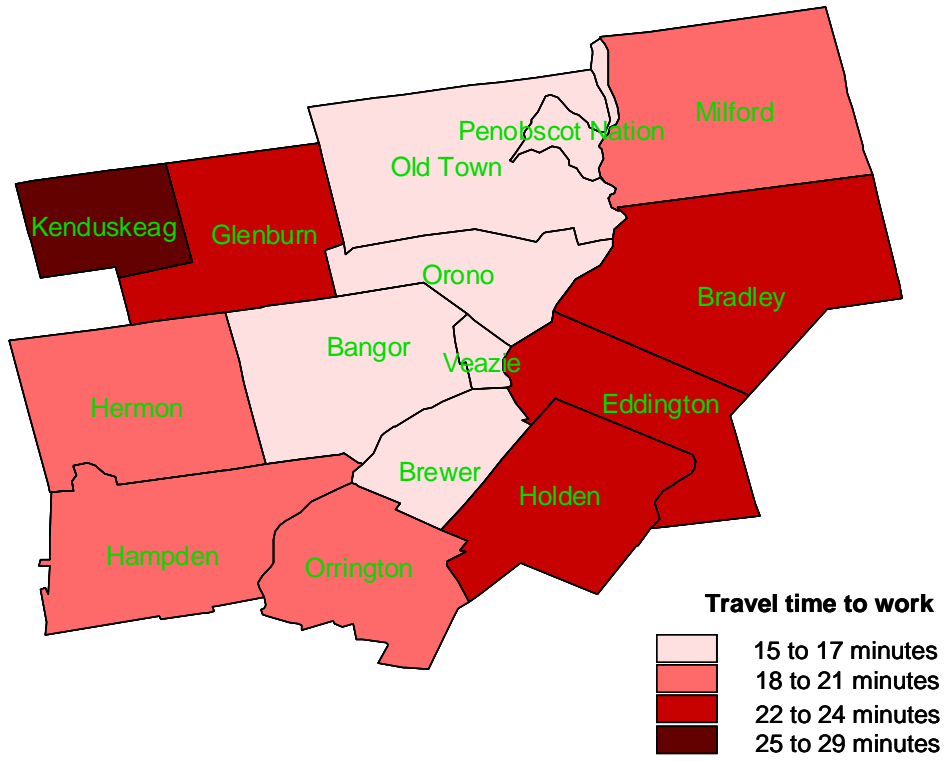**Figure 1: Municipal water service and inter-local cooperation in PV PILOT towns.**
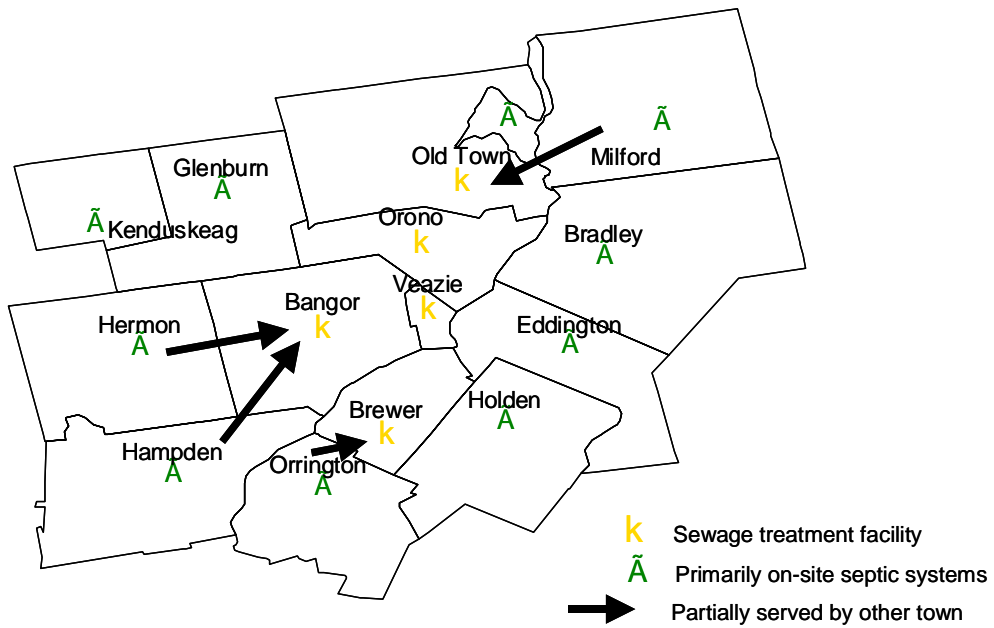
Figure 2: Wastewater management and inter-local cooperation in PV PILOT towns.

Figure 3: Solid waste management and interlocal cooperation among PV PILOT towns.

Figure 4: Road systems in PV PILOT towns.

Figure 5: Mean travel time to work for residents of PV PILOT communities.

Table 2: Population change and travel time to work in PV PILOT communities.

	1990 Population	1990 Aggregate travel time (minutes)	2000 Population	2000 Aggregate travel time (minutes)	Population change	Travel time change
Bangor city	33,181	218,115	31,473	220,575	-5.1%	1.1%
Bradley town	1,151	10,618	1,242	14,570	7.9%	37.2%
Brewer city	9,021	64,307	8,951	69,485	-0.8%	8.1%
Eddington town	1,947	20,091	2,030	24,085	4.3%	19.9%
Glenburn town	3,198	34,116	3,964	47,705	24.0%	39.8%
Hampden town	5,843	47,479	6,327	63,930	8.3%	34.6%
Hermon town	3,790	38,825	4,437	49,525	17.1%	27.6%
Holden town	2,951	25,449	2,827	29,340	-4.2%	15.3%
Kenduskeag town	1,234	13,059	1,171	16,700	-5.1%	27.9%
Milford town	2,931	22,093	2,952	30,695	0.7%	38.9%
Old Town city	8,252	68,337	8,133	64,470	-1.4%	-5.7%
Orono town	10,570	50,877	9,112	65,665	-13.8%	29.1%
Orrington town	3,440	34,593	3,560	36,975	3.5%	6.9%
Penobscot Nation	464	2,260	559	3,445	20.5%	52.4%
Veazie town	1,636	12,793	1,744	13,735	6.6%	7.4%

Source: US Census Bureau

For additional copies contact:

Eastern Maine Development Corporation
One Cumberland Place Suite 300
Bangor, ME 04401
P: (207)942-6389
F: (207)942-3548

www.emdc.org