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Review of the Regional Adjustment Within the Essential Programs and Services Cost Allocation Model

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With passage of the Essential Programs and Services (EPS) Funding Act in 2005, Maine replaced an adequacy-based funding system for the minimum guaranteed foundation. Under the minimum guaranteed foundation program, general purpose aid was distributed to School administrative Units (SAUs) in two stages. First, money for program costs—special education, transportation, career technical education, and debt service—was distributed. The program cost subsidy to each SAU was determined by the SAU's prior expenditures and its ability to pay. Next, remaining available general purpose aid funds were distributed for operating costs. A fixed amount of money called the per-pupil guarantee was allocated to each SAU for each of its pupils. Each SAUs total allocation was then split between the state share and the local share using an ability to pay index. The state share was the operating cost subsidy.

As an adequacy-based school funding system, the Essential Programs and Services Funding Act was intended to ensure that schools have funding sufficient for the resources they need to give all students the opportunity to meet the Maine learning results (MRS Title 20-A, Chapter 606-B, § 15671). The calculation of the state subsidy for each School Administrative Unit (SAU) is carried out in two phases. First, a total cost of education is calculated according to the cost model outlined in the statute. After full implementation of EPS, originally scheduled for the 2009-10 school funding year, this cost of education will be an SAU's total allocation. During the ramping up period, the total allocation is an annually increasing percentage of the total cost of education. Second, the total allocation is divided between the state and local shares according to the funding formula. The local share is an amount determined by each SAUs equalized property valuation (i.e., its property tax base) and a statewide expected property tax rate called the mill rate expectation. The state share that results from subtracting the local share from the total allocation is the state subsidy.

According to the statute, school funding must be "available in all schools on an *equitable* basis," and "*adequate* to fully provide for all of the staffing and other material resource needs of the essential programs and services identified by the Legislature." (MRS Title 20-A, Chapter 606-B, § 15671, emphasis added) Two venerable principles of justice are often applied in judging the equitable or inequitable distribution of funding: the principle that like cases should

be treated alike, called horizontal equity, and the principle that unlike cases should be treated unalike, called vertical equity. In terms of the Essential Programs and Services (EPS) cost model, the total allocation should be adequate for meeting the Maine Learning Results. If every SAU were the same, then the same per-pupil dollar amount would be needed in each. One size would fit all. But every SAU is unique. Therefore, the dollar amount needed by each SAU to achieve the Learning Results may be different. The dollar amount needed may differ in two key ways, as recognized within the EPS cost model. The ***quantity*** of resources needed may vary, and the ***price*** of those resources may also vary. Rural schools and higher poverty schools, for example, need a greater *quantity* of some types of resources. Higher poverty schools may need more school staff than lower poverty schools to provide a high quality education, because the students may be starting from a lower average achievement level and may have more barriers to achieving a high learning rate. EPS provides additional funding for students from low income families (MRS Title 20-A, Chapter 606-B, § 15675).

Rural schools need greater quantities of some resources due to geographic factors. Schools in rural areas typically need more buses, more fuel, and more bus driver time per pupil than schools in urban or suburban areas, because pupils have farther to travel to get from home to school and back. The transportation component of EPS, which is based on pupil densities and the miles buses travel, provides a greater per-pupil cost allocation to sparsely populated rural SAUs than to the more densely populated urban and suburban SAUs (MRS Title 20-A, Chapter 606-B, § 15681-A).

In geographically isolated areas, including some islands, SAUs may need to operate very small schools that require more favorable teacher-pupil ratios. They are too small to take advantage of the economies of scale available in midsized schools. While distance education technologies may mitigate some of the additional cost as well as increasing educational opportunities for students, EPS provides for a geographically isolated small school adjustment (MRS Title 20-A, Chapter 606-B, § 15683).

In addition to recognizing the different *quantities* of resources needed by different SAUs, EPS also recognizes the different *prices* SAUs have to pay for certain resources. The number one resource in schools, in terms of both cost and consequence, is labor. The EPS model provides two cost adjustments based on labor prices: the *salary matrix*, which is based on differences in the education and experience levels of teachers and other staff (MRS Title 20-A,

Chapter 606-B, § 15677); and the *regional adjustment*, which is based on differences in teacher salaries across different labor market areas in the state (MRS Title 20-A, Chapter 606-B, § 15682). The salary matrix recognizes the additional cost associated with having more experienced and educated personnel.

The regional adjustment recognizes the differences in cost associated with operating in areas with different labor costs. Wages and salaries for similar positions vary throughout the state. Teacher salaries, for example, are generally higher in urban areas than rural areas. Thus, while rural schools may need a greater *quantity* of resources than urban and suburban schools, the urban and suburban schools may have a disadvantage regarding the unit *price* of resources, especially labor.

This brief addresses four questions related to geographic cost differences in education:

1. Are there differences in the cost of educating students in different parts of the state?
2. In what ways may a school funding formula account for geographic differences in resource costs?
3. How does the Labor Market Area regional adjustment within EPS reflect differences in labor costs?
4. What is the updated Labor Market Area regional adjustment for Maine?

The first question is addressed by examining examples of cost differences across the state, specifically, differences in the cost of living, housing and energy prices, and teacher salaries. Next, several options for a regional adjustment are presented. Third, the regional adjustment currently used in Maine is discussed. It is based on regional differences in teacher salaries, adjusted for teacher education and experience. And finally, an updated adjustment based on the most recent available salary data is also provided.

1. Cost Differences in Maine

Cost of Living in Portland and Bangor Metropolitan Areas

It generally costs more to live in the Portland area than the Bangor area. A number of price differences between the Portland and Bangor Metropolitan Statistical Areas are evident in the Cost of Living Index (COLI), which is published quarterly by ACCRA (formerly known as the American Chamber of Commerce Researchers Association). Table 1 shows the component

indexes for the Portland and Bangor areas for 4th quarter 2006. The national average index is set to equal 1.00. Overall, according to the composite index, the cost of living Portland is 16.4% higher than the national average and in Bangor is 3.4% higher, which makes Portland 13% more expensive than Bangor. Looking at the component indexes, in fact, costs are higher in the Portland area for all components except transportation and healthcare, where the costs in Bangor are approximately one percent higher. The greatest cost difference was in housing, which in Portland was 46% more costly than in Bangor.

Table 1: Cost of Living in the Portland and Bangor Metropolitan Areas

Metropolitan Statistical Area	Composite Index	Component Indexes					
		Grocery Items	Housing	Utilities	Transportation	Health Care	Miscellaneous Goods and Services
	100%	13%	28%	10%	10%	4%	32%
Portland – South Portland – Biddeford, ME Metro	116.4	103.4	133.9	134.0	99.1	105.9	108.2
Bangor, ME Metro	103.4	98.2	91.8	129.3	100.3	106.7	107.8
% Difference	13%	5%	46%	4%	-1%	-1%	0.4%

(4th Quarter 2006)

What about the cost of living in other areas of Maine? The only areas that participate in the ACCRA COLI are the Portland, Bangor, and sometimes Lewiston-Auburn metropolitan areas. Rural areas are not eligible to participate. The qualitative difference between urban and rural lifestyles makes it impossible to price out the cost of living an equivalent lifestyle in urban and rural areas. However, it is possible to take a closer look at variation across the state in the prices of some of the component items, such as housing and fuel.

Housing and Energy

Two areas in which price vary across the state are housing and energy. Table 2 shows the variation from county to county in the price of homes, apartment rent, heating oil, and gasoline. Regional variation is found in both housing and energy prices. The amount of variation, however, is much higher in home prices and rent than in heating oil or gasoline. Median home prices varied from a low of $76,175 in Aroostook County to a high of $238,250 in Cumberland

County, a variation of 213% from lowest to highest. Average heating oil prices, in contrast, varied by only 2% from lowest to highest.

Table 2: Maine Housing and Fuel Prices by County

County	Median Home Price (2006)	Median 2-BR Rent	Average Oil Prices (March 2008)	Lowest Gasoline Prices (March 2008)
Androscoggin	$155,000	$730	$3.523	$3.16
Aroostook	$76,175	$557	$3.533	$3.39
Cumberland	$238,250	$1,018	$3.522	$3.18
Franklin	$124,750	$676	$3.523	$3.33
Hancock	$195,000	$863	$3.592	$3.31
Kennebec	$139,000	$697	$3.547	$3.22
Knox	$200,000	$819	$3.548	$3.31
Lincoln	$202,233	$875	$3.548	$3.29
Oxford	$135,000	$651	n.a.	n.a.
Penobscot	$134,000	$795	$3.606	$3.23
Piscataquis	$108,667	$660	$3.606	n.a.
Sagadahoc	$189,900	$826	$3.548	$3.21
Somerset	$97,500	$645	n.a.	n.a.
Waldo	$145,000	$753	$3.548	n.a.
Washington	$120,000	$785	$3.592	$3.39
York	$225,000	$886	$3.572	$3.19
Average	**$185,000**	**$844**	**$3.558**	**$3.27**
Low	$76,175	$557	$3.522	$3.16
High	$238,250	$1,018	$3.606	$3.39
% Difference	213%	83%	2%	7%

Sources: Home prices and rent are from Maine State Housing Authority. Oil prices are from MaineOil.com and reflect prices dating from March 7 through March 13. Some averages include more than one county and are listed here with each county included in the average. Gasoline prices are from MaineGasPrices.com and reflect the lowest prices listed in selected areas of each county on or around March 13. State average oil and gasoline price calculations by MEPRI.

Overall, U.S. consumers spend more on housing than on energy, as may be seen in Table 3, although the data source, *Consumer Expenditures in 2005*, does not separate heating costs from other utilities. In rural areas, the difference is less pronounced. Similar dollar amounts are spent on utilities in rural and urban areas, but approximately $400 more is spent on gasoline by rural households, whereas around $4,000 more is spent on shelter in urban areas. The end result is that, while different components of the cost of living vary by different amounts and in different directions, the cost of shelter—home prices and rent—is the greatest factor in the regional variation in the cost of living.

Table 3: Average Annual Expenditures on Selected Items, Urban and Rural Consumers

Selected Items	All Consumers		Urban		Rural	
Average Annual Expenditures	$46,409	100.0%	$47,177	100.0%	$38,486	100.0%
Housing: Shelter	$8,805	19.0%	$9,155	19.4%	$5,147	13.4%
Housing: Utilities, fuels, and public services	$3,183	6.9%	$3,183	6.7%	$3,191	8.3%
Transportation: Gasoline and motor oil	$2,013	4.3%	$1,979	4.2%	$2,372	6.2%

Data source: Consumer Expenditures in 2005, *U.S. Bureau of Labor Statistics. Calculations: MEPRI*

Teacher Salary

The cost of education is different from, though related to, the cost of living, because the resources purchased for schools are different from the items purchased by households. The largest difference is that schools purchase much more labor than households. The largest portion of school labor costs are teacher salaries. There are wide variations in average teacher salaries across Maine, as can be seen in Figure 1. The highest average salaries, over $45,000 were concentrated in southern and mid-coast Maine, with Bangor, Brewer, Madawaska, and Greenville also falling into that category. The lowest average salaries, those below $35,000, occurred outside of the southernmost portion of the state, especially in Washington and Hancock Counties, but also in parts of central, western, and northern Maine.

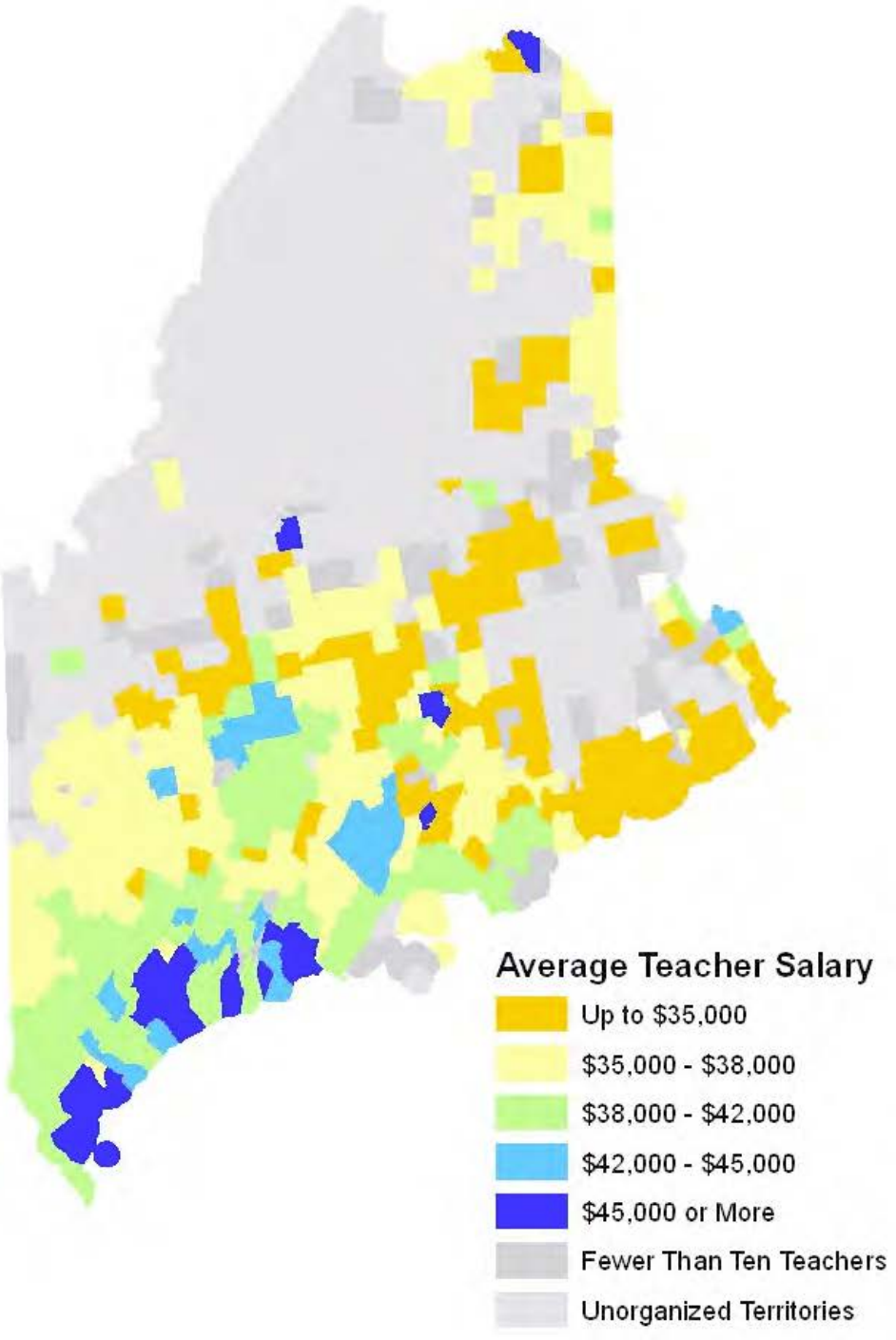

Figure1: Average Teacher Salaries in Maine School Administrative Units (2004-05)

2. Regional Adjustments for School Funding

Thus, there is regional variation in the cost of education across the state of Maine, just as there is variation in the cost of living. In what ways may a state school funding formula account for this variation? There is no general agreement on a single type of regional resource cost adjustment that is best for all state school funding systems. Rather, there are a number of different approaches, each with its own advantages and disadvantages. Regional resource cost adjustments may be calculated in terms of: (1) cost of living, (2) cost of housing, (3) the cost of school staff, (4) hedonic indexes, (5) the Comparable Wage Index, or (6) no regional adjustment.

It is possible to base a regional cost of education adjustment on variation in the *cost of living*. Several state economic analysis units, but not Maine, maintain regional cost of living indexes within their own state. Florida and Wyoming, for example, use their state cost of living index in their school funding formulas. Aside from the expense of maintaining a state cost of living index, there is a question whether any single basket of goods can be truly said represent the same lifestyle in both urban and rural areas. But perhaps the greatest drawback of any regional adjustment based on the cost of living is that they do not adequately address the difference between the cost of living and the cost of educating students. Living and educating students are different activities that require different resources. However, states may use cost of living indexes to determine the cost of education, if they are willing to rely on the idea that employees pass higher living costs on to their employer by way of higher salary demands. To the extent that they do not do pass on higher living costs, or that other factors influence teacher salaries, a cost of living index will not be reflective of the true cost of educating students.

It is also possible to base a regional adjustment on the largest, most variable, component of the cost of living, namely, *housing*. In fact, the possibility of such a regional adjustment was studied in depth before the decision was made to base the EPS regional adjustment on teacher salaries. Such an approach would be less costly and perhaps more accurate than maintaining a multiple component cost of living index. Accurate data on home sales in different areas of the state are already collected as a matter of course. Price data on other items, such as clothing and household products, are not. In terms of distinguishing between the cost of living and the cost of education, this approach is no better than other regional adjustments based on the cost of living.

A regional adjustment may be based on the largest component of the cost of education: *school staff*. In this type of adjustment, the cost allocation for teachers and other school staff is

derived from the school staff salaries in nearby districts. Maine's EPS cost model includes this type of regional adjustment, which is described in more detail in the Section 3 of this report.

Among the most complicated methods of calculating a regional adjustment are *hedonic indexes*. A hedonic index utilizes a statistical technique known as regression analysis to estimate the expected prices of teacher salaries and other education resources in each school district using a variety of factors. Some of the factors, such as teacher-to-student ratios, are within the control of the district. Others, such as crime statistics, weather, and distance from the central city of a metropolitan area, are beyond the control of the district. The teacher salary used in the regional adjustment is the salary that would be expected, if all the factors that are within the control of the district were equal to the state average. The advantage of this approach is that each school district is given a unique adjustment based solely on the characteristics of the district that are beyond its control. However, these analyses are difficult to understand and interpret, except by experts. And the results may differ depending on which cost factors are included in the analysis. Also, the accuracy of the analysis is affected by the quantity of data, making such an approach less useful in smaller states.

In 2006, the National Center for Education Statistics released the *Comparable Wage Index* (CWI). The CWI measures the salaries of workers who are not teachers, but whose occupations are similar to teachers in terms of education required and other factors. The idea behind it is that the same market forces that affect the salaries of teachers are behind the salaries of people in similar occupations. Therefore, the CWI may be used to determine what the different market prices of teacher salaries should be in different regions. The CWI may be very useful in state to state comparisons in the cost of education as well as within some larger, more densely populated states. However, because the Public Use Microdata Sample (PUMS) of the U.S. Census was used in creating the CWI, each region must have at least a 100,000 population. Maine, therefore, contains only 10 areas, which were not determined by labor markets, but rather by population. One area, containing Lincoln, Sagadahoc, and part of Cumberland County, is not even contiguous. It may or may not be possible to generate a similar index within a small state such as Maine using state wage data within labor markets.

Finally, it is possible to have *no regional adjustment*. If this is done, then schools in areas with higher labor costs will be able to afford fewer teachers with their total cost allocation than recommended in the cost model, and fewer than similar schools in lower cost areas. They

would be left with few options: try to hire and retain teachers at below-market salaries, try to meet state learning standards with fewer teachers than recommended in the cost model, or raise more local dollars than the amount the funding formula recognizes as their ability to pay.

3. The EPS Regional Adjustment

The EPS regional adjustment is based on actual teacher salaries. However, the adjustment for each SAU is not equal to its own average salaries. If it were, then each SAU could write its own adjustment by raising its teacher salaries above the market price. Rather, for purposes of calculating the EPS regional adjustment, SAUs are combined into 35 Labor Market Areas (LMAs) throughout Maine. A Labor Market Area means an area where people can both live and work within a reasonable commuting distance.[1] A single regional adjustment is calculated for each LMA, and that regional adjustment is applied to all SAUs in the LMA. Specifically, the calculated salary and benefits costs of EPS recommended school personnel of each SAU in the LMA are multiplied by the regional adjustment.

The regional adjustment for each LMA is calculated in three steps. First, an average teacher salary is calculated for each LMA. Some of the differences in average teacher salaries may be due to differing years of experience and education level rather than true regional differences in the labor market. Therefore, next, the average teacher salary in each LMA is adjusted for the level of education and experience of the teachers. This minor adjustment utilizes a widely-used statistical technique known as regression analysis to estimate what the average salary would be if the experience and education levels in the LMA were equal to the state average but the salary scales were the same as in the actual LMA. Finally, the adjusted average salary for the LMA is divided by the state average teacher salary to get the LMA regional adjustment.

The EPS regional adjustment has several advantages. It is relatively simple and easy to understand. It is based directly on one of the major determinants of the cost of education, teacher salaries. There are also some limitations to this approach. First, if teacher salaries in an

[1] The LMAs used in the EPS model were defined by the Maine Department of Labor on the basis of commuting patterns evident in the 1990 U.S. Census data. The definition of LMAs was updated by the federal government in 2005, resulting in 31 Maine LMAs. However, the 35 former LMAs continued to be used in the EPS regional adjustment, because the new definition combined whole Metropolitan Statistical Areas (such as Greater Portland and Greater Bangor) into very large LMAs which had very large variation in teacher salaries within them. In addition, three of the 31 LMAs were partly in Maine and partly in New Hampshire.

LMA are determined by factors other than teacher education and experience and labor market prices (such as one LMA having consistently more effective teachers than another LMA or one LMA having consistently better working conditions than another LMA) then the regional adjustment may not be perfectly accurate. However, no evidence is available that such systematic differences exist between LMAs. Second, because it is based on regions, there may be a jump in the regional adjustment from the SAUs on one side of an LMA boundary to the SAUs on the other side.

4. An Updated EPS Regional Adjustment

An updated regional adjustment for the 35 LMAs was recalculated using 2008-09 staff data. The results, which are summarized in Table 4, are based on salaries of full-time teachers as of December 1, 2008, adjusted for differences in education and experience. For example, the 1.06 regional adjustment in the Kittery-York LMA means that average teacher salaries in the LMA, adjusted for the education and experience levels of teachers in the LMA, are 6% higher than the state average. The calculated adjustment ranged from a low of 0.83 to a high of 1.09, compared to a range from 0.84 to 1.09 in 2004-05. The Greater Portland LMA joined the Biddeford LMA as the highest salary cost LMAs with a 1.09 adjustment. The Jonesport-Millbridge and Machias-Eastport LMAs again had the lowest salary costs with calculated regional adjustments dropping from 0.84 to 0.83. An increase in the calculated regional adjustment was seen in six LMAs, while a decrease was seen in 23. Most of the increases were in LMAs with an adjustment above 1.00 in 2004-05, while most of the decreases were in LMAs with an adjustment below 1.00 in 2004-05. Only four LMAs had changes in the opposite direction.

Conclusions

Because the price of teacher labor varies significantly across the state, a regional adjustment is necessary within EPS to ensure that all students have the resources they need in their schools to meet the Maine Learning Results. The EPS regional adjustment, based on teacher salaries, is appropriate and compares favorably to other possible approaches, especially for states with smaller populations such as Maine. As Maine SAUs continue to merge under the regionalization act, there will be fewer SAUs in each LMA. At some point, it may be necessary to reduce the number of regions from 35 or reexamine the approach to the EPS regional adjustment.

Table 4: Calculated Regional Adjustment Change 2004-05 to 2008-09

Labor Market Area (LMA)	Regional Adjustment		
	2004-05 Data	2008-09 Data	4-Year Change
1. Kittery - York	1.06	1.06	n.c.
2. Sanford	1.03	1.02	-.01
3. Biddeford	1.09	1.09	n.c.
4. Greater Portland	1.08	1.09	+.01
5. Bath - Brunswick	1.02	1.03	+.01
6. Boothbay Harbor	1.03	1.05	+.02
7. Sebago Lake	0.94	0.93	-.01
8. Lewiston - Auburn	0.98	0.96	-.02
9. Rockland	1.00	1.00	n.c.
10. Norway - Paris	0.94	0.93	-.01
11. Stonington	0.95	0.94	-.01
12. Augusta	0.95	0.94	-.01
13. Waterville	0.97	0.96	-.01
14. Belfast	1.01	0.99	-.02
15. Bucksport	0.94	0.90	-.04
16. Jonesport - Milbridge	0.84	0.83	-.01
17. Bangor	1.02	1.02	n.c.
18. Machias - Eastport	0.84	0.83	-.01
19. Dexter - Pittsfield	0.94	0.96	+.02
20. Ellsworth - Bar Harbor	0.93	0.91	-.02
21. Outer Bangor	0.89	0.89	n.c.
22. Rumford	0.93	0.92	-.01
23. Lincoln - Howland	0.86	0.84	-.02
24. Farmington	0.96	0.96	n.c.
25. Calais	0.96	0.98	+.02
26. Patten - Island Falls	0.88	0.87	-.01
27. Millinocket - East Millinocket	0.88	0.87	-.01
28. Houlton	0.88	0.87	-.01
29. Skowhegan	1.03	1.05	+.02
30. Greenville	0.95	0.94	-.01
31. Dover - Foxcroft	0.95	0.94	-.01
32. Presque Isle - Caribou	0.90	0.89	-.01
33. Van Buren	0.99	0.98	-.01
34. Fort Kent	0.99	0.98	-.01
35. Madawaska	0.99	0.98	-.01
Maine	1.00	1.00	n.c.