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COMMITTEE REPORT  
SENATE

FURTHER: FINANCE

2/23/84

Date: 3/23/84

Mr. President:

The Committee on JUDICIARY has had SS SS 926  
constitutional spending limit; 951.

under consideration and (a majority of the committee) (the committee) reports it back with the following recommendations:

- do pass  do not pass
- do pass with attached amendments(s)
- replace with CS for SS 951  same title  
 new title
- and recommends \_\_\_\_\_
- AND attaches a "Letter of Intent"  New Fiscal Note
- reports it back without recommendation
- referred to the \_\_\_\_\_ Committee

MEMBERS SIGNING  
DO PASS

MEMBERS HAVING  
OTHER RECOMMENDATIONS:

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CHAIRMAN

# MEMORANDUM


# State of Alaska

TO: John Shively, Chief of Staff  
Office of the Governor

DATE: January 4, 1984

FILE NO: 84B-1

TELEPHONE NO: 465-3568

FROM: Gordon S. Harrison   
Associate Director  
Office of Management and Budget

SUBJECT: Appropriation Limit

This memorandum discusses the complexities of interpreting the State's constitutional limit on appropriations (Article IX, Section 16). It recommends an explicit method of calculating the limit. This method would be used to calculate the limit for fiscal year 1985 and subsequent years as well, provided legislation is not enacted which specifies a different method. Dr. Tom Chester of this office has provided much of the background information in this memo, and he has made the actual mathematical computations.

The constitutional language that creates a problem of interpretation is "appropriations . . . shall not exceed \$2,500,000,000 by more than the cumulative change, derived from federal indices as prescribed by law, in population and inflation since July 1, 1981." The Legislature has not passed a law prescribing which Federal indices are to be used and how. Several major ambiguities, complications and issues stand in the way of an easy, straightforward interpretation of this language. These are discussed below, and a recommended approach to each of them is suggested.

### Period of Adjustment to Base

The law states that the limit of \$2.5 billion is to be adjusted for the cumulative change in population and inflation since July 1, 1981. Does this mean that \$2.5 billion is the limit for fiscal year 1982 (July 1, 1981 - June 30, 1982) or that it is the base for calculating the limit for FY 82? In other words, should the adjustment for population and inflation be made to the beginning of the fiscal year to which it applies, or through the end of it? The longer the period of time for which adjustments are made, the higher the allowable appropriations will be in future years.

The intent of the limit is to permit per capita spending levels to remain constant over time. In my opinion the adjustment should include the year in which the spending is to take place, so the population growth and inflation that occurs during that year does not result in an actual decrease of government services in per capita terms. The only contrary argument I see is simply that making the adjustment through the end of the

fiscal year may give the appearance to some that the Governor and Legislature are manipulating the law to give them a higher, less restrictive limit. To avoid the appearance of any trickery in this sensitive matter, I suggest that the adjustment for population and inflation be made only to the beginning of the fiscal year.

### Indices

The most complex question in interpreting the appropriation limitation language is which index of the many available should be used for making adjustments to the \$2.5 billion base for population and inflationary changes.

### Population

Table 1 presents population information for Alaska. This information suggests three plausible measures of population growth that could be used for purposes of interpreting the spending limit: (1) the average annual population growth that occurred during the decade 1970-1980; (2) population change based on current estimates by the Alaska Department of Labor (ADOL); (3) population change based on current estimates by the U.S. Census Bureau (published by the Bureau of Economic Analysis [BEA]).

TABLE 1

#### Various Population Measures for Alaska

<u>Year</u>	<u>Population Census</u>	<u>Population Estimate</u>	
		<u>Alaska DOL (% change)</u>	<u>U.S. Census Bureau (% change)</u>
1970	308,500.0		
1980	419,700.0		
1981		435,000.0	416,000.0
1982		461,000.0 (5.98)	443,000.0 (6.49)
1983		N/A	N/A

The advantage of using the 1970-1980 annual rate of change<sup>1</sup> is that the numbers are based on the Federal decennial census and are not now subject to significant revision. Also, derivation of the number is simple and easy for people to understand. The disadvantage of this number, on the other hand, is that it may

not reflect actual population changes that are occurring in the 1980s. As a result, it may overstate or understate current growth.

The Alaska Department of Labor, Research and Analysis Section, makes population estimates of Alaska for purposes of Federal programs. The estimates are derived from methods approved by the U.S. Census Bureau, which certifies the State numbers. Because of this link with U.S. standards and estimating methodology, I believe the State estimates of population change could satisfy the constitutional requirement that the adjustment factors be "derived from federal indices." However, recent departmental changes have undermined the ability of the State to make timely and accurate population estimates. The professional demographer employed by the Department of Labor recently resigned, and no replacement has been hired at this time. Also, a reorganization within the Department of Health and Social Services has reduced the ability of the Department to make vital statistics available in a timely fashion to the Department of Labor. These statistics are necessary for estimating the natural increase component of population growth. As a result of this situation, and because we would need to stretch somewhat the phrase "federal indices" to use the State population estimates, I suggest that Federally-published estimates of population change be used.

Federal population estimates for 1981 and 1982 are shown in Table 1. While the Federal estimates are lower than the State estimates, and presumably less accurate, the Federal rate of change between 1981 and 1982 is somewhat higher. For purposes of calculating an appropriation limit, changes between July 1 and July 1 of each year should be used.

#### Inflation

Several different indices of inflation could plausibly be used for calculating the constitutional limit for a particular fiscal year. Most commonly discussed are the Federal consumer price indices. Currently the Bureau of Labor Statistics (BLS), U.S. Department of Labor, produces two basic consumer price indices: the All Urban Consumers (CPI-U) and the Urban Wage Earners and Clerical Workers (CPI-W). CPI-U is a more inclusive definition. CPI-W primarily measures changes in prices of goods typically purchased by urban workers while CPI-U measures changes in price of items typically bought by all urban dwellers irrespective of their attachment to the labor force. CPI-U covers approximately twice as many persons and in general produces an inflation rate higher than that for CPI-W.

BLS produces an Anchorage CPI-U and CPI-W. While the cost of living in Anchorage is higher than the U.S. average, the CPI

indices are higher than the national CPI indices. However, the rate of change in cost of living (inflation) is lower in Anchorage than in the U.S. because economies of scale are being realized in the transportation and distribution of goods. It is not known to what extent the Anchorage CPI indices reflect statewide changes. Inflationary change may be slower in Anchorage than the U.S. average, but that may not be so in Juneau or the bush where many government services are provided.

One serious drawback to using the consumer price indices is a change made by the BLS in measuring the shelter component of these indices.<sup>2</sup> This change creates an inconsistency in the series from July 1, 1981 to the present, with the result that the published inflation rate takes a significant dip in 1983. The effect of this change is especially dramatic in the Anchorage consumer price indices because of a related change made in measuring housing costs.<sup>3</sup>

The major problem with the CPI series for our purposes, however, is that it measures changes in the cost of a market basket of goods purchased by consumers, not of goods and services purchased by the State government.

There is a Federally-computed inflation index for the cost of services provided by state and local governments. The government purchase index is published monthly by the Bureau of Economic Analysis in a publication titled Current Business Trends. Even though this is a measure of price changes at the national level, the government purchase index seems to be the most logical for our purposes. I recommend that we adopt this index, using the annual point-to-point percentage change between July 1 and July 1 of each year.

Table 2 presents rates of change measured by the various indices. The low rates shown for the Anchorage CPI series in 1983 reflect the problem of definitional change discussed above.

TABLE 2Various Rates of Inflation

<u>Rate of Change</u>	<u>Fiscal Year</u>			
	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
U.S.A.				
CPI-U	13.20	10.73	7.7	2.43
CPI-W	13.47	10.25	6.29	2.19
Government Purchase Index	9.77	5.70	6.81	6.34
Anchorage				
CPI-U	10.10	7.75	7.11	.83*
CPI-W	8.91	7.52	7.2	-.62

\* Due to change in definition of shelter component.

Estimating in the Absence of Data

Calculation of the appropriation limit requires a value for population and inflationary change that is not available at the time it is needed. Note in Table 1 that population estimates are not yet available for 1983. We actually need an estimate of population change for 6 months in the future (to July 1, 1984) to calculate an FY 85 limit. While the publication of inflation indices does not lag as much as the publication of population figures, the problem still exists. There are several options for obtaining the missing data; among them are the purchase of an estimate from a national economic forecasting firm, and the production of an estimate in-house by OMB with an econometric model. Our recommendation, however, is to simply use for the missing number the trend since July 1, 1981. That is, the average of the annual point-to-point changes since July 1, 1981 becomes the missing value. This approach has the advantage of not being subject to manipulation. To avoid the erosion of public credibility, it is important that the Governor and Legislature use a method which is easily understood and reproducible by everyone.

Revised Indices

Federal indices of population and inflation are subject to revision by the agency that issues them. This is because the figures they release are typically based on survey data, and

additional information invariably becomes available, or new benchmarks are used, or errors are discovered, etc. For purposes of computing the spending limit, the most current published estimate available should be used, and a mid-year adjustment in the spending limit should not be made even if revised indices are issued.

#### FY 84 Precedent

When the Sheffield Administration took office in December, 1982, former Governor Hammond's administration had prepared an executive budget for FY 84. This executive budget contained a spending limit calculation of \$2.98 billion. The only written explanation of this number is a footnote on page 3 of the Executive Budget Book that states "...according to the spending limit, the FY 84 budget ceiling could exceed the FY 82 figure of \$2.5 billion by the estimated rate of inflation and population growth. For FY 83 our estimate is 10%, hence the FY 83 base is \$2,750.0. The \$2.98 billion limit for FY 84 is estimated to be 8.4% over the FY 83 base level." Since there is no explanation of the assumptions or method used, I do not see why this Administration is bound by whatever those may have been, nor bound to \$2.98 billion as a base for calculating the FY 85 limit. It seems to me that Governor Sheffield and the Legislature may adopt a method that best comports with the intent of the law and with logic, even if the method produces a different number from that used in FY 1984.

#### Appropriation Limit Options

From the foregoing discussion it should be clear that there are theoretically a large number of possible limit calculations. This section presents several options that suggest the range of possible outcomes. It also includes the recommended calculation, which is Option 4. In accord with our earlier recommendation regarding the period of adjustment to the base, all of the options shown here assume that the adjustment for population and inflation are made for three years rather than four. A fourth year of adjustments would add approximately \$250 million to the numbers shown. The options are:

- Option 1 = ADOL Population and Alaska CPI-U
- Option 2 = ADOL Population and Government Services
- Option 3 = BLS Population and Alaska CPI-U
- Option 4 = BLS Population and Government Services
- Option 5 = Census\* Population and Alaska CPI-U
- Option 6 = Census\* Population and Government Services

\* 1970-1980 compound average

The appropriation limits that result from these options are:

<u>FY</u>	<u>Option 1</u>	<u>Option 2</u>	<u>Option 3</u>	<u>Option 4</u>	<u>Option 5</u>	<u>Option 6</u>
84	3.041	3.199	3.062	3.220	2.871	3.020
85	3.356	3.618	3.390	3.654	3.079	3.319
86	3.704	4.092	3.753	4.147	<u>3.301</u>	3.648
87	4.087	4.630	4.156	4.707	3.539	4.010
88	4.509	5.238	4.602	5.343	3.795	4.406

We have analyzed these spending limits in terms of maximum allowable appropriations and available revenue, and the results of that analysis are available. However, the focus of this memo has been the methodological issues surrounding the calculation of a limit.

GSH/mm

FOOTNOTES

1. This change can be expressed, and calculated, in three ways: as one-tenth the decennial change; as the continuous annual change; and as the compound annual change. The latter (3.126%) is the best measure for the purposes at hand.

$$\text{One-tenth the decennial change: } \frac{(419,700 - 308,500)}{10} = 3.6045$$

$$\text{Continuous annual change: } P_{1980} = P_{1970} E^{rt} = 3.0782$$

$$\text{Annual compound change: } P_{1980} = (1+r)^t P_{1970} = 3.1260$$

2. The change involved a measure of shelter from the cost of mortgages and the selling price of homes to the cost of rental units.
3. In Anchorage, the BLS began for the first time in 1983 to measure Anchorage costs. Prior to this, they simply used the costs of housing in west coast cities of a size similar to Anchorage. In describing the effect of the new measure, the Alaska Department of Labor has written:

From January to July of this year the Anchorage Consumer Price Index registered increases below historical levels. During the last five months, the index's over-the-year change did not exceed 1% and, in fact, fell in May. This decline in inflation is misleading because of methodology changes causing inconsistency between 1983 and 1982 data. Because of this the BLS has recommended that in the short term, users of the CPI use either 1) a 12 month annual average, or 2) the U.S. rate; or 3) compare 1983 data only. Looking at the Anchorage CPI this way the index has risen 3.2% from January through July. If the CPI continues this same trend it will increase between 5.0% and 6.0% for the 1983 average.

(Alaska Economic Trends, Alaska Department of Labor, November, 1983, p. 13.)

Why was the change made? The Commissioner of the U.S. Department of Labor provides the following reasons. First, the former method combined investment and consumption effects upon price. The new approach is an attempt to measure only the changing cost of consumption. Second, the old method was based upon the assumption of a fixed rate mortgage. Recently, a variety of alternatives to a fixed rate mortgage have become

available. The former method did not take them into account. Third, the appearance of seller financing distorted the measure since there is no accurate way to detect it. Finally, the Federal Government will be using the index, starting in 1985, to index tax brackets. Thus, the most accurate index possible is desired.

TABLE 2

OPERATING BUDGET COMPARISON FY 85-89

<u>SSSB 326</u>	<u>OMB Plan*</u>	<u>Difference</u>
FY 85 \$2,100.9	FY 85 \$2,192.9	FY 85 \$ 92.0
FY 86 2,248.0	FY 86 2,379.3	FY 86 131.3
FY 87 2,405.3	FY 87 2,581.5	FY 87 176.2
FY 88 2,573.7	FY 88 2,800.9	FY 88 227.2
FY 89 2,753.9	FY 89 3,039.0	FY 89 <u>285.1</u>
		\$ 911.8

SSSB 326 would save \$911.8 million

\* Based on FY 85 proposed operating budget and 8.5% annual growth rate as stated in OMB Memo on Appropriation Limit dated January 4, 1984

SSSB 326TABLE 1

Spending Limit SSSB 326 vs. OMB Plan

<u>SSSB 326 Limit</u>	<u>Revenue Projections</u>			<u>OMB Plan</u>	<u>Revenue Projections</u>		
	30th%	40th%	50%		30th%	40th%	50th%
FY 85 \$3151.4	x	x	x	FY 85 3,654.0*			
FY 86 3372.0	x	x	x	FY 86 4,147.0			
FY 87 3608.0	x	x	x	FY 87 4,707.0			
FY 88 3860.6	x	x	x	FY 88 5,343.0			
FY 89 4130.8	x	x	x				

"x" denotes spending limit is under available appropriations

\* OMB Memo on Appropriation Limit dated January 4, 1984

Note: Under SSSB 326, the inflation adjustment for FY 86 through FY 89 is the average of the two preceding annual rates of change in the Anchorage CPI-U.



# Alaska State Legislature

## Senate

Official Business

Pouch V  
State Capitol  
Juneau, Alaska 99811

To: Senator Bill Ray  
Chairman of Judiciary Committee

From: Senator Frank R. Ferguson *FRF*

Date: January 19, 1984

Subject: Proposed Letter of Intent

### LETTER OF INTENT SSSB 326

It is the intent of the Legislature that for the purposes of calculating the spending limit in Sponsor Substitute for Senate Bill 326 the following equation be used:

$$\text{Base} \times 1 + (\text{rate of growth in population} + \text{inflation adjustment}) = \text{Limit}$$

The base is \$2,500,000,000 for fiscal year 1982. For each succeeding fiscal year the base shall be adjusted by the rate of change in population and the Anchorage Consumer Price Index-Urban (CPI-U)

The rate of change in population shall be calculated as the continuously compounded annual rate of change between 1970 and 1980 (April 1) estimates of population established by the U.S. Census Bureau in their decennial censuses. For example, the rate of change for the 1980's is computed as follows:

$$\text{Population}_{1980} = \text{Population}_{1970} \cdot e^{rt} \text{ or}$$

$$\text{Rate of Change} = r = \frac{\ln(\text{population } 1980 / \text{population } 1970)}{t} \text{ or}$$

$$\text{Rate of Change} = .0284 = \frac{\ln(401851/302583)}{10}$$

The rate of change in the Anchorage (CPI-U) computed as the July to July change in the index as published by the U.S. Department of Labor, Bureau of Labor Statistics.

LUV  
AUDIT DIVISION  
POUCH W — ALASKA OFFICE BUILDING

FINANCE DIVISION  
POUCH WF — STATE CAPITOL

**THE LEGISLATURE**

BUDGET AND AUDIT COMMITTEE      JUNEAU 99801

M E M O R A N D U M

DATE: October 27, 1983  
TO: Senator Frank Ferguson  
attn: Mike Scott  
FROM: Mike Greany, Director *MGreany*  
Legislative Finance Division  
SUBJ: The Spending Limit

You asked what the FY 1985 spending limit may be.

We have prepared a paper on the spending limit including examples of possible appropriation limit calculations -- the point being that the method of calculation and the source of the variables are not specified in the constitutional amendment or in statute. You will note that the amendment also does not specify who is responsible for either selecting the method or making the calculation.

cc: Rep. Adams, Chairman, House Finance Committee  
Sen. Sackett, Co-Chair, Senate Finance Committee  
Sen. Bennett, Co-Chair, Senate Finance Committee  
Rep. Bettisworth, Chairman, Budget & Audit Committee

enclosure

MG:ro

## THE SPENDING LIMIT

The Alaska constitutional appropriation limit (commonly referred to as the spending limit) went into effect at the beginning of the 1984 fiscal year. The law does not specify what variables should be used in the calculation of the limit, nor what agency is responsible for making the calculation.

This paper discusses the various factors involved in calculating the limit and provides various examples of different methods of calculation.

### Reaching the limit

Three factors are involved in determining the limit: (1) revenues available for appropriation; (2) the calculated limit; and (3) the categorization of appropriations.

The amount of revenues available for appropriation is important because of an attorney general's opinion which states that if the available revenues are less than the calculated appropriation limit, the provisions of the limit do not have to be followed. Aside from the issue of what revenue estimate is to be used and what constitutes unrestricted revenue, a major problem is the timing of the revenue estimate. For example, if the March revenue estimate for FY 84 was less than the appropriation limit, but the actual revenue for FY 84 is more than the limit, what would that fact mean in terms of the legal requirement to abide by the provisions of the amendment? None of these issues have been settled.

Calculating the appropriation limit allows considerable latitude for interpretation. The amendment calls for a base of \$2,500.0 to be adjusted by the "cumulative federal indices as prescribed by law, in population and inflation since July 1, 1981." Which federal indices or the methods to adjust them are not identified. Several sources of population estimates could be used as variables: the average yearly population growth from the 1970-1980 U.S. Census, the State Department of Labor forecasts, the population estimates developed by the local communities for state entitlement programs, and population estimates used by the federal government for federal entitlement programs.

The most common inflation factor used by various agencies in calculating the limit is the All Urban Consumer Anchorage Consumer Price Index (CPI). Other inflation factors which could be used include specific portions of the Anchorage CPI, U.S. national inflation factors, or a state government inflation factor.

The number of years of adjustment made to the base number is also subject to interpretation. The law calls for adjustments since July 1, 1981. In calculating the FY 84 limit, that provision can be interpreted as either two years of adjustments (from July 1, 1981 to July 1, 1983) or as three years of adjustments (from July 1, 1981 to June 30, 1984). The two year adjustment provides adjustments to the beginning of the 1984 fiscal year. The three year adjustment covers the entire 1984 fiscal year.

The categorization of appropriations is important in determining if the provision that "at least one third shall be reserved for capital projects and loan appropriations" has been met. Such a categorization requires a determination of what is a capital project. Also whether or not program receipts should be included as unrestricted revenue and whether lawsuit settlements are included under the limit, and if they are whether they are operating or capital.

EXAMPLES OF POSSIBLE APPROPRIATION LIMIT CALCULATIONS

Method A: The FY 84 Executive Budget Book (EBB) I: Historical population trends plus the yearly Average Anchorage Consumer Price Index.

Base x (average historical population + Anchorage CPI) =  
Limit

$$\text{FY 83 } 2500.0 \times (1.0 + (.029 + .071)) = 2750.0$$

$$\text{FY 84 } 2750.0 \times (1.0 + (.029 + .055)) = 2981.0$$

$$\text{FY 85 } 2981.0 \times (1.0 + (.029 + .039)) = 3183.7$$

Method B: FY 84 Executive Budget Book I Modified: A mathematical error occurred during the calculation of the Average Historical Population as published in EBB I. Method B uses the same variables as Method A, but with the correct numbers.

$$\text{FY 83 } 2500.0 \times (1.0 + (.032 + .071)) = 2757.5$$

$$\text{FY 84 } 2757.5 \times (1.0 + (.032 + .055)) = 2997.4$$

$$\text{FY 85 } 2997.4 \times (1.0 + (.032 + .039)) = 3210.2$$

Method C: FY 84 EBB I modified with FY 84 Actual CPI: The original spending limit in EBB I was calculated with an estimate of the Anchorage CPI because the actual CPI for FY 84 was not known.

Base X (average historical population + actual Anchorage CPI)  
= Limit

$$\text{FY 83 } 2500.0 \times (1.0 + (.032 + .071)) = 2757.5$$

$$\text{FY 84 } 2757.5 \times (1.0 + (.032 + .008)) = 2867.8$$

$$\text{FY 85 } 2867.8 \times (1.0 + (.032 + .039)) = 3071.4$$

Method D: Alaska Population Forecasts: Population increases based on the State Department of Labor population forecasts.

Base x (Alaska population forecasts x actual anchorage CPI) =  
Limit.

$$\text{FY 83 } 2500.0 \times (1.0 + (.025 + .071)) = 2740.0$$

$$\text{FY 84 } 2740.0 \times (1.0 + (.034 + .008)) = 2855.1$$

$$\text{FY 85 } 2855.1 \times (1.0 + (.035 + .039)) = 3066.4$$

Method E: Alaska Population Estimates: Population increases based on the population totals reported by the communities.

Base x (Alaska Population estimates x actual Anchorage CPI) =  
Limit

$$\text{FY 83 } 2500.0 \times (1.0 + (.059 + .071)) = 2825.0$$

$$\text{FY 84 } 2825.0 \times (1.0 + (.100 + .008)) = 3130.1$$

FY 85 Unknown

Method F: State Government: Federal government estimate of inflation for state and local governments nationwide.

Base x (average Historical Population + Statewide Inflation)  
= Limit

$$\text{FY 83 } 2500.0 \times (1.0 + (.032 + .071)) = 2757.5$$

$$\text{FY 84 } 2757.5 \times (1.0 + (.032 + .094)) = 3104.9$$

$$\text{FY 85 } 3104.9 \times (1.0 + (.032 + .094)) = 3476.2$$

Method G: Three years adjustment: Adjustments to the FY 82 base to inflation proof the base.

Base x (Average Historical Population + Actual Anchorage CPI)

$$\text{Base } 2500.0 \times (1.0 + (.032 + .071)) = 2757.5$$

$$\text{FY 83 } 2757.5 \times (1.0 + (.032 + .008)) = 2867.8$$

$$\text{FY 84 } 2867.8 \times (1.0 + (.032 + .039)) = 3071.4$$

$$\text{FY 85 } 3071.4 \times (1.0 + (.032 + .039)) = 3289.5$$

Method H: High number for each variable: The community population estimates plus the federal inflation index for State and Local governments with three years of adjustment.

Adjusted Base x (community population estimate + state government inflation) = limit.

Base Adjusted 2500.0 x (1.0 + (.037 + .071)) = 2770.0

FY 83 2770.0 x (1.0 + (.059 + .094)) = 3193.8

FY 84 3193.3 x (1.0 + (.100 + .094)) = 3813.4

FY 85 Unknown

# SB 326 (Sponsor Substitute) Appropriations Limit

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Limit  
(\$ Million)

Population Rate of Change    Anch. CPI-U Rate of Change

FY 82      2500.0

FY 83      2764.7 = 2500.0 x [ 1 + ( 0.0284 + 0.0775 ) ]

FY 84      3039.8 = 2764.7 x [ 1 + ( 0.0284 + 0.0771 ) ]

FY 85      3151.4 = 3039.8 x [ 1 + ( 0.0284 + 0.0083 ) ]

Note 1.

The population adjustment used above is the continuously compounded annual rate of change between the 1970 and 1980 Decennial Censuses. It is computed as follows:

$$\text{Population}_{1980} = \text{Population}_{1970} \cdot e^{rt}$$

$$\text{or Rate of Change} = r = \frac{\ln(\text{Population}_{1980} / \text{Population}_{1970})}{t}$$

$$\text{or Rate of Change} = 0.0284 = \frac{\ln(401851 / 302583)}{10}$$

Note 2.

The rate of change in the Anchorage CPI-U is computed as the July to July change in the index as published by the US Department of Labor, Bureau of Labor Statistics.