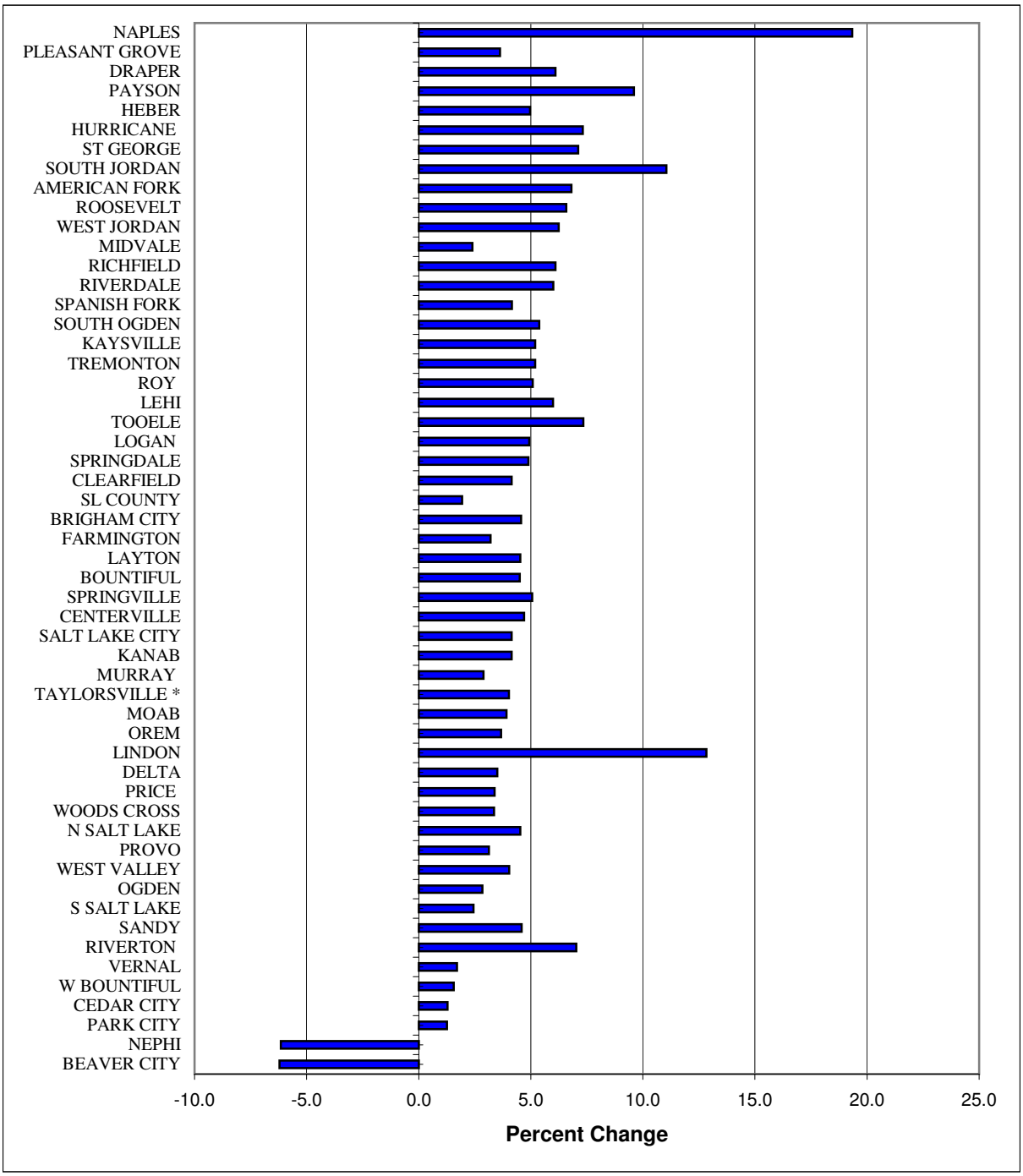
MAJOR CITY SALES TAX DISTRIBUTION FORECAST FY2005



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MAJOR CITY SALES TAX FORECASTS FY 2005

I. SUMMARY

The Utah State Tax Commission's Economic and Statistical Unit has prepared fiscal year 2004-2005 (FY2005) local sales tax forecasts for 54 major Utah cities. These forecasts are just that -- forecasts of future consumer behavior: there is no guarantee these amounts will be distributed by the Utah State Tax Commission. The numbers are only our "best guess," based on weighted estimates from (a) an averaged trend model, (b) an actual distribution model and (c) a statewide model (see Table 3 – Utah Major Cities Forecast and Appendix 1 – Full Distribution Forecast Model for detailed figures for each city). They illustrate how much money these cities could expect if:

1) each city's direct sales trend-line growth remains relatively constant through FY2005, and
2) local development factors are relatively insignificant.

Average Trend Model. The first forecast approach was to estimate each city's direct sales level, seasonal patterns and trends to make a forecast for FY2005. The researches used *Exponential Smoothing* including *Winters' smoothing* to project future sales revenue based on past trends in the data. This technique treats each city independently over time and weights recent activity more heavily. Direct sales were forecasted for each city by recognizing trends in the historical data and taking into account local event considerations. Since the trend model weights recent events more heavily, recent shocks or one-time events had a great influence on the forecast results, which could reduce their accuracy. The trend model also used a *ceteris paribus* assumption, or in other words, forecasts in each city were made while holding events in all other cities constant. This means that the trend model did not take into consideration events beyond the local level, such as events affecting the entire state or all the events in nearby cities, both of which could influence the forecast to some degree. This approach was given a 25 percent weight for all cities that were not affected by the Hold Harmless Provision (see Appendix 1 – Full Distribution Forecast Model for estimated number of hold harmless months).

Actual Distribution Model. The second approach was the actual distribution model that examined the actual distribution numbers for FY 2003 and FY 2004.

Specifically, this model produced a relative growth rate by calculating the change from FY 2003 to FY 2004. This growth rate was given a 25 percent weight to the final forecast.

Statewide Model. For most cities, which are influenced by the 50 percent population/50 percent point-of-sale formula, half of their sales tax change depends on the statewide growth rate. This is so because the population side of the formula is determined by statewide growth. Thus, for most cities, the final distribution forecast is a combination of 50 percent from the statewide growth (as determined by our econometric model), 25 percent from each city's seasonally smoothed trend model and 25 percent from the actual distribution model.

II. ECONOMIC OUTLOOK – FY2005

Utah's economic recovery, from two flat or slightly negative growth years of FY2002 and FY2003, appears to be here at hand. During the first four months of CY2004, taxable sales have increased 10 percent. Yes, this has been on the backs of very soft sales during the preparation for and the culmination of the Iraq war, but it still reflects improved employment, consumer confidence and business spending. Barring substantial terrorist successes this recovery should move forward. While it is true that certain international economic indicators have turned down in the past month, the basic foundation of the recovery seems to be on a sure footing.

Job growth has moved up from declines in the fall of 2003 to positive 1.3 percent during the first half of 2004. The Utah Council of Economic Advisors (UCEA), which met on June 23, 2004, estimated that 2.0 percent employment growth is probable for the entire calendar year (Table 1). This means that they expect second half growth to outpace the first half by 1 percent to about 2.5 percent.

Table 1. Council of Economic Advisors Forecast Growth Rates for 2004 and 2005

	CY 2004	CY 2005
Current $GDP	6.1 %	5.6 %
U.S. Real Fixed Investment	9.1 %	4.0 %
Utah Wages	4.6 %	5.5 %
Utah Employment	2.0 %	2.7 %
Utah Average Pay	2.5 %	2.7 %
Utah Residential Construction	11.6 %	-2.9 %

In addition, residential construction continues to outpace forecasts. Even with interest rates inching up this year, and possibly due to increased interest rate expectations, single-family permits were up 5 percent in the first four months of the year, while multifamily starts were up 3 percent. Residential permit values were up even more, up 18 percent, suggesting builders are constructing higher-value homes and condominiums than in 2003 (sales tax is applied to construction materials). During the

second half of 2004, residential construction permit values will calm down as mortgage rates and construction loan rates increase. For CY2004 UCEA now expects that permit values will increase 11.6 percent, in contrast to the 1.5 percent decline predicted in February 2004 (Table 1).

The Council also pushed up expected job growth in 2004 from 1.5 percent in February to 2 percent in June's meeting. In fact, the outlook for most of the indicators improved either slightly or markedly in the June meeting. Current dollar Gross Domestic Product (GDP) growth was lowered slightly in CY2004, but the CY2005 GDP forecast was raised from 5.2 percent to 5.6 percent in June's meeting. The outlook for 2004 Real Fixed U.S. investment improved to 9.1 percent from 8.1 percent between February and June. The Council lowered its sights for 2005 U.S. Fixed Investment from 4.4 percent in February to 4 percent in the June meeting.

Based on these key economic assumptions we derive the following forecasts for taxable sales (plus or minus adjustments for exemption amounts and new base additions):

Table 2. Tax Commission Taxable Sales Forecast, by Major Sector, FY2004 and FY2005

	FY 2004	FY 2005
Retail Nondurables	4.5 %	3.2 %
Retail Durables	8.4 %	5.9 %
Business Investment	9.0 %	9.2 %
Transportation, Communication and Public Utilities	9.4 %	3.4 %
Services	2.3 %	7.1 %
Total	5.9 %	5.1 %

For FY2005, based on the Council of Economic Advisors' Revenue Assumption Committee's latest economic assumptions, our five-sector econometric model is predicting a growth rate of 5.1 percent for taxable sales (Table 2). This includes a deduction of 2.5 percent for nontaxable, but competitive Internet sales and a 1 percent decline for the FY2005 base decrease for satellite and cable TV services. It includes a near 6 percent gain in Business Investment and relatively strong retail trade growth rates of 4.2 percent. Taxable services are also expected to increase by 7.1 percent in FY2005. This would be a marked improvement for a sector, which was red hot in the 90s, but since has cooled off.

We are 65% certain that the assumptions in Table 1 will prevail. Higher interest rates and oil prices or major terrorist successes could derail this forecast, but these events seem unlikely (but possible) at this point. In conclusion, expect statewide sales taxes to grow only about 5.1 percent in FY2005. This follows 5.9 percent taxable sales growth in FY2004 and a 0.7 percent decline in FY2003.

The 5.1 percent growth rate is important for those cities <u>not</u> in "Hold Harmless" because half of their local sales tax growth is based on this rate. In other words, half of their growth rate will equal the above 5.1 percent divided by 2 or 2.55 percent; the other half will be based on their own "Point-of-Sale" growth rate.

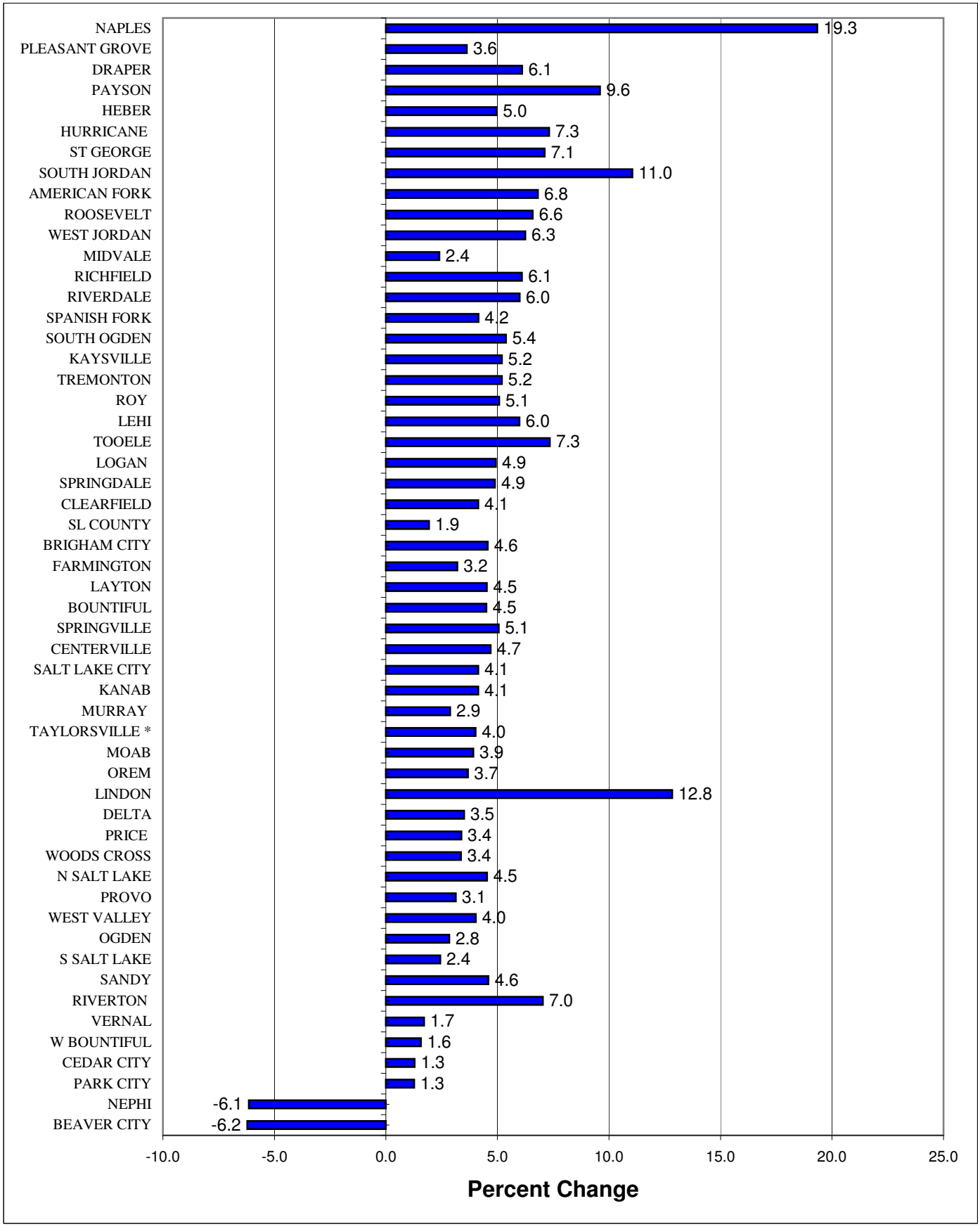
TABLE 3:UTAH MAJOR CITIES FORECAST, FY2005

	1	2	3	4	5	6
	FY 2003 Sales Tax Distribution	FY 2004 Sales Tax Distribution	Percent change from FY03	FY 2004 EFFECT-IVE TAX RATE	FY2005 TOTAL DISTRIBUTION FORECAST	Percent Change from FY2004
BEAR RIVER						
LOGAN	6,000,673	6,309,441	5.1%	0.98%	**6,620,572**	**4.9%**
BRIGHAM CITY	2,003,540	2,227,153	11.2%	1.15%	**2,328,907**	**4.6%**
TREMONTON	816,756	875,609	7.2%	1.07%	**921,117**	**5.2%**
WEBER						
OGDEN	11,286,072	11,396,651	1.0%	1.03%	**11,720,115**	**2.8%**
RIVERDALE	4,169,848	4,440,112	6.5%	0.76%	**4,706,535**	**6.0%**
ROY	3,083,025	3,282,534	6.5%	1.73%	**3,449,337**	**5.1%**
SOUTH OGDEN	1,686,870	1,727,062	2.4%	1.23%	**1,819,991**	**5.4%**
DAVIS						
LAYTON	9,213,276	9,459,415	2.7%	0.93%	**9,887,599**	**4.5%**
BOUNTIFUL	4,722,805	4,802,997	1.7%	1.26%	**5,019,343**	**4.5%**
CLEARFIELD	2,469,302	2,534,700	2.6%	1.70%	**2,639,783**	**4.1%**
CENTERVILLE	2,160,833	2,214,650	2.5%	1.05%	**2,318,712**	**4.7%**
KAYSVILLE	2,078,652	2,180,856	4.9%	1.45%	**2,294,236**	**5.2%**
WOODS CROSS	1,591,981	1,602,601	0.7%	0.79%	**1,656,507**	**3.4%**
N SALT LAKE	1,423,707	1,456,410	2.3%	0.96%	**1,522,473**	**4.5%**
FARMINGTON	1,187,903	1,261,958	6.2%	1.63%	**1,302,326**	**3.2%**
W BOUNTIFUL	735,303	705,884	-4.0%	1.01%	**716,926**	**1.6%**
SALT LAKE NORTH						
SALT LAKE CITY	34,274,192	35,657,054	4.0%	0.85%	**37,134,005**	**4.1%**
WEST VALLEY	14,471,758	15,081,775	4.2%	1.14%	**15,690,171**	**4.0%**
MURRAY	11,014,841	11,855,714	7.6%	0.80%	**12,197,686**	**2.9%**
S SALT LAKE	9,834,748	9,788,900	-0.5%	0.81%	**10,027,695**	**2.4%**
TAYLORSVILLE *	6,230,916	6,278,198	0.8%	1.40%	**6,530,631**	**4.0%**
SALT LAKE SOUTH						
SL COUNTY	21,240,574	21,478,597	1.1%	1.40%	**21,894,619**	**1.9%**
SANDY	14,623,447	15,018,633	2.7%	0.94%	**15,708,204**	**4.6%**
WEST JORDAN	10,502,386	11,088,162	5.6%	1.00%	**11,781,175**	**6.3%**
MIDVALE	4,662,769	4,600,796	-1.3%	0.94%	**4,710,916**	**2.4%**
DRAPER	3,595,705	3,863,654	7.5%	1.11%	**4,099,516**	**6.1%**
SOUTH JORDAN	2,767,735	3,194,899	15.4%	1.55%	**3,547,845**	**11.0%**
RIVERTON	2,143,397	2,414,727	12.7%	2.24%	**2,584,603**	**7.0%**
Just Off WASATCH Front						
PARK CITY	3,213,567	3,400,610	5.8%	0.79%	**3,443,601**	**1.3%**
TOOELE	2,849,268	3,221,448	13.1%	1.23%	**3,458,054**	**7.3%**
HEBER	1,137,430	1,182,662	4.0%	1.07%	**1,241,375**	**5.0%**

TABLE 3 (cont):UTAH MAJOR CITIES FORECAST, FY2005

	1	2	3	4	5	6
	FY 2003 Sales Tax Distribution	**FY 2004 Sales Tax Distribution**	**Percent change from FY03**	**FY 2004 EFFECT-IVE TAX RATE**	**FY2005 TOTAL DISTRIBUTION FORECAST**	**Percent Change from FY2004**
UTAH COUNTY						
OREM	13,736,441	13,897,477	1.2%	0.94%	**14,408,379**	**3.7%**
PROVO	12,477,560	12,434,374	-0.3%	1.24%	**12,823,916**	**3.1%**
AMERICAN FORK	3,354,306	3,659,898	9.1%	0.92%	**3,909,277**	**6.8%**
SPRINGVILLE	2,623,790	2,815,542	7.3%	1.10%	**2,957,948**	**5.1%**
SPANISH FORK	2,520,231	2,707,153	7.4%	1.24%	**2,819,617**	**4.2%**
LEHI	2,184,803	2,342,409	7.2%	1.31%	**2,482,616**	**6.0%**
PLEASANT GROV	2,192,781	2,241,093	2.2%	1.74%	**2,322,402**	**3.6%**
LINDON	1,562,005	1,635,728	4.7%	0.83%	**1,845,628**	**12.8%**
PAYSON	1,341,632	1,495,234	11.4%	1.47%	**1,638,746**	**9.6%**
CENTRAL						
RICHFIELD	1,243,244	1,306,008	5.0%	0.84%	**1,385,609**	**6.1%**
NEPHI	999,132	611,426	-38.8%	1.31%	**573,827**	**-6.1%**
DELTA	526,805	527,923	0.2%	1.14%	**546,457**	**3.5%**
SOUTHWEST						
ST GEORGE	9,087,838	10,158,952	11.8%	0.82%	**10,881,642**	**7.1%**
CEDAR CITY	3,565,679	3,413,302	-4.3%	0.92%	**3,457,281**	**1.3%**
HURRICANE	943,215	1,051,266	11.5%	1.27%	**1,128,206**	**7.3%**
KANAB	458,089	484,188	5.7%	1.10%	**504,231**	**4.1%**
BEAVER CITY	558,366	339,696	-39.2%	1.20%	**318,588**	**-6.2%**
SPRINGDALE	191,048	216,098	13.1%	0.77%	**226,667**	**4.9%**
UINTAH BASIN						
VERNAL	2,298,499	2,514,853	9.4%	0.93%	**2,557,873**	**1.7%**
ROOSEVELT	742,885	805,947	8.5%	1.04%	**858,983**	**6.6%**
NAPLES	500,585	790,340	57.9%	1.04%	**943,171**	**19.3%**
SOUTHEAST						
PRICE	1,720,800	1,784,174	3.7%	0.89%	**1,844,543**	**3.4%**
MOAB	944,440	985,990	4.4%	0.87%	**1,024,604**	**3.9%**
54 City Total	**262,967,451**	**272,822,933**	**3.7%**	**1.01%**	**284,434,791**	**4.3%**
					4.3%	

FIGURE 1: LOCAL SALES TAX DISTRIBUTION GROWTH FORECAST



III. TREND MODEL METHODOLOGY

A wide variety of statistical forecasting techniques are available in the literature, some simple and some very sophisticated. Exponential smoothing was the technique focused upon this year to attain the trend model forecast that represents 25% of the total distribution forecast (see Section 5 – Full Distribution Forecast Methodology for overall methodology). Specifically, the trend model used three types of exponential smoothing: general exponential smoothing, Winters Multiplicative Smoothing, and Winters Additive Smoothing. These smoothing formulas were used in conjunction with *Forecast Pro forecasting software* using quarterly time-series data to forecast future distribution based upon past trends (see Appendix 2 – Seasonally Adjusted Gross Taxable Sales History & Forecast Graphs for time-series data for each city).

The following will be a brief explanation of how exponential smoothing formulas forecast past trends into future predictions.

It is sometimes useful to think of a model generating the observed value (X_t) of a time series as a function of trend (T_t), seasonality (S_t), and irregularity (I_t) components. The Additive Winters Smoothing formula looks like this:

$$X_t = T_t + S_t + I_t$$

The Multiplicative Winters Smoothing formula looks like this:

$$X_t = T_t * S_t * I_t$$

General exponential smoothing finds no trend component and is thus written as:

$$X_t = S_t + I_t \quad \text{or } X_t = S_t * I_t$$

Forecast Pro calculates each of these and other forecasting formulas using the time-series data for each city and then selects the formula, through statistical analysis, that out performs the others (see Table 4 – Summary Statistics for a list of which formula was used for each city).

The *trend* in a time series is the long-term change in the level of the data. This component is sometimes called *cyclical trend* or *trend-cycle*. In most cases city sales tax distribution is trending upwards over time.

However, for most practical purposes, when dealing with business and economic data series, this view of trend is far too narrow to be useful. The more modern approach is to contemplate *local trend models*, where growth rates are not assumed to be constant for all time, but instead might evolve smoothly over time.

A *seasonal* pattern occurs in a time series when there is a regular variation in the level of the data that repeats itself at the same time each year. In other words, seasonal variation refers to systematic though not necessarily regular intra-year movements in the time series. Seasonal movements are assumed to be caused by exogenous forces, are deemed uncontrollable, and hence are removed or controlled for before forecasting. For example, retail sales for many products peak in November and December due to holiday sales and then drop off after the first of the year. These seasonal trend need to be controlled for to generate accurate sales forecasts.

The *irregular* component of the time series seeks to capture the fluctuations that are not part of a trend or seasonal variation. These are often called *random* fluctuations and are difficult to predict. As such they are the most difficult to capture in a forecast model. When an irregular event in the data appears to be skewing the forecast, the irregular component is intended to correct for that error. For example, a city may receive a large prior-period payment from a retailer that might cause the model to forecast higher than actual future revenues. Inserting an event or irregular variable controls for these types of fluctuations. It should also be noted that the forecasts presented in this publication may not have accounted for all irregularities in past trends or future events that may have happened or may happen in an individual city such as the introduction of a large discount store or the closing of a large plant.

IV. FORECAST EVALUATION

Various measures for assessing forecasting (or modeling) accuracy exist in the literature; however, none are generally accepted as *the* best. Forecast accuracy refers to the measure of suitability of a particular forecasting method for a given data set. In most forecasting situations, accuracy is treated as the overriding criterion for selecting a forecasting method. In many instances, the word 'accuracy' refers to 'goodness of fit,' which in turn refers to how well the forecasting model is able to reproduce the data that are already known. To the consumer of forecasts, it is the accuracy of the *future* forecast that is most important.

Although *Forecast Pro* produces a number of measures for assessing forecast errors, this report relies upon only two measures: the mean absolute percentage error (MAPE) and the adjusted R-squared (R^2). (see Table 4 – Summary Statistics for each individual city's measures of accuracy.)

MAPE measures the forecast errors as the absolute value of the difference between forecasted and observed values relative to the observed values. It is based on the assumption that the severity of error is linearly related to its size. Forecasters generally prefer lower values for MAPE as an acceptable criterion for forecast accuracy. The adjusted R^2 is a measurement of the fraction of variance that can be explained by the model adjusted for the number of parameters.

The MAPE values range from a low of 2.6 percent for Logan to a high of 13.44 percent for Farmington (which has fewer data points than most cities). The average MAPE for all the cities is 5.92 percent. Thus, the forecasting procedure yielded predictions whose errors have magnitudes that are on average 5.95 percent of the direct sales for each city. The adjusted R^2 values fall between 59.5 percent for West Bountiful to 99.33% for Sandy. On average the forecasts had an R^2 of 93.01 percent meaning that on average the model accounts for 93.01 percent of the variability in the forecasts.

TABLE 4: SUMMARY STATISTICS-54 CITY DIRECT SALES FORECAST FY 2005

CITY	MODEL TYPE	NO TREND	SAMPLE SIZE	MAPE[B]	ADJUSTED R-SQUARE
American Fork	Multiplicative Winters		64	3.95%	98.76%
Beaver City	Multiplicative Winters		64	5.18%	95.91%
Bountiful	Additive Winters		64	3.08%	94.30%
Brigham City	Exponential Smoothing	No Trend	64	4.80%	92.31%
Cedar City	Additive Winters		64	4.62%	97.38%
Centerville	Additive Winters		64	6.63%	95.75%
Clearfield	Multiplicative Winters		64	8.50%	92.37%
Delta	Multiplicative Winters		64	6.03%	91.93%
Draper City	Additive Winters		33	4.87%	95.09%
Farmington	Exponential Smoothing	No Trend	36	13.44%	79.71%
Heber City	Additive Winters		64	6.95%	96.29%
Holladay[*A]	Additive Winters		12	3.54%	92.16%
Hurricane	Additive Winters		27	3.90%	88.02%
Kanab	Exponential Smoothing	No Trend	64	7.30%	91.40%
Kaysville	Multiplicative Winters		64	8.03%	97.48%
Layton	Additive Winters		64	4.60%	97.96%
Lehi	Multiplicative Winters		36	7.97%	92.42%
Lindon	Additive Winters		36	7.59%	97.48%
Logan City	Additive Winters		64	2.60%	98.53%
Midvale City	Exponential Smoothing	No Trend	64	5.99%	95.36%
Moab	Multiplicative Winters		64	8.62%	93.18%
Murray City	Multiplicative Winters		64	3.72%	96.54%
Naples[*A]	Additive Winters		21	12.53%	70.34%
Nephi	Additive Winters		64	6.41%	93.48%
North Salt Lake	Multiplicative Winters		64	8.31%	86.89%
Ogden City	Exponential Smoothing	No Trend	64	3.30%	95.22%
Orem City	Additive Winters		64	4.65%	97.91%
Park City	Multiplicative Winters		64	6.27%	98.12%
Payson	Multiplicative Winters		64	7.07%	91.51%
Pleasant Grove	Exponential Smoothing	No Trend	64	10.64%	91.16%
Price	Exponential Smoothing	No Trend	64	5.63%	89.22%
Provo	Additive Winters		64	4.09%	96.04%
Richfield	Additive Winters		64	3.50%	98.00%
Riverdale	Multiplicative Winters		64	6.96%	96.86%
Riverton	Multiplicative Winters		56	4.94%	97.53%
Roosevelt	Multiplicative Winters		64	6.07%	90.89%
Roy	Multiplicative Winters		64	5.09%	93.63%
Salt Lake City	Additive Winters		64	3.13%	96.40%
Salt Lake County	Exponential Smoothing	No Trend	64	6.58%	80.21%
Sandy City	Multiplicative Winters		64	3.34%	99.33%
South Jordan	Multiplicative Winters		36	9.41%	93.02%
South Ogden	Multiplicative Winters		64	6.08%	94.86%
South Salt Lake	Exponential Smoothing	No Trend	64	5.01%	95.11%
Spanish Fork	Exponential Smoothing	No Trend	64	4.86%	97.64%
Springdale	Multiplicative Winters		36	7.18%	95.00%
Springville	Additive Winters		64	8.37%	95.80%
St. George	Multiplicative Winters		64	3.42%	98.90%
Taylorsville[*A]	Exponential Smoothing	No Trend	24	3.63%	76.51%
Tooele	Multiplicative Winters		64	4.33%	98.58%
Tremonton	Multiplicative Winters		64	5.00%	93.50%
Vernal	Exponential Smoothing	No Trend	64	5.08%	96.87%
West Bountiful	Exponential Smoothing	No Trend	36	7.57%	59.50%
West Jordan	Multiplicative Winters		64	4.95%	97.86%
West Valley City	Multiplicative Winters		64	3.72%	96.54%
Woods Cross	Additive Winters		64	6.70%	92.70%
AVERAGE				**5.92%**	**93.01%**

A. Naples, Taylorsville, and Holladay are included in the list for the pupose of completeness, but because the number of observations used for the forecast is small, we have less confidence in the forecast.

B. Mean absoute percent error: is average of the absolute values of the ratios of the forecast errors to the actuals.

TABLE 5: EVALUATION OF FY2004 SALES TAX FORECAST

CITY	FY2004 DISTRIBUTION FORECAST	FY2004 ACTUAL DISTRIBUTION	ERROR	Change FY2003 - FY2004	DESCRIPTIVE NOTES	STATISTICS	
NEPHI	$ 982,806	609,121	***-38.0%***	***-38.8%***	Natural Gas Pipeline boosted FY2003	Min. Value	-38.0%
BEAVER CITY	507,338	343,634	***-32.3%***	***-39.2%***	Natural Gas Pipeline boosted FY2003	1st Quartile	0.3%
W BOUNTIFUL	734,981	706,662	***-3.9%***	***-4.0%***		Median	3.2%
CEDAR CITY	3,537,611	3,411,130	***-3.6%***	***-4.3%***		3rd Quartile	8.0%
S SALT LAKE	10,086,105	9,749,158	***-3.3%***	***-0.5%***		Max. Value	63.9%
MIDVALE	4,740,056	4,588,981	***-3.2%***	***-1.3%***	Lost Cost-Co	Std. Deviation	12.2%
RIVERDALE	4,500,686	4,435,809	***-1.4%***	6.5%			
WOODS CROSS	1,632,928	1,613,605	***-1.2%***	0.7%		2 of 54 (4%) < -4%	
PLEASANT GROVE	2,257,579	2,233,290	***-1.1%***	2.2%		29 of 54 (54%) = + - 4%	
PROVO	12,491,635	12,404,582	***-0.7%***	***-0.3%***		23 of 54 (43%) > 4%	
OREM	13,834,230	13,832,660	***0.0%***	1.2%		8 of 54 (15%) > 10%	
CENTERVILLE	2,193,379	2,195,017	0.1%	2.5%			
WEST JORDAN	10,994,216	11,010,776	0.2%	5.6%			
LINDON	1,611,756	1,616,015	0.3%	4.7%			
SANDY	14,905,113	14,960,438	0.4%	2.7%			
LAYTON	9,372,964	9,429,810	0.6%	2.7%			
BOUNTIFUL	4,727,088	4,761,069	0.7%	1.7%			
DELTA	523,132	528,264	1.0%	0.2%			
CLEARFIELD	2,496,088	2,528,925	1.3%	2.6%			
SALT LAKE COUNTY	21,138,650	21,462,014	1.5%	1.1%			
N SALT LAKE	1,428,208	1,450,775	1.6%	2.3%			
HEBER	1,167,067	1,186,809	1.7%	4.0%			
OGDEN	11,160,681	11,354,570	1.7%	1.0%			
MOAB	956,821	976,844	2.1%	4.4%			
TOOELE	3,119,348	3,198,954	2.6%	13.1%			
KAYSVILLE	2,115,250	2,171,093	2.6%	4.9%			
SOUTH OGDEN	1,666,922	1,716,152	3.0%	2.4%			
RICHFIELD	1,253,671	1,296,551	3.4%	5.0%	New Walmart		
LOGAN	6,058,944	6,293,803	3.9%	5.1%			
DRAPER	3,665,364	3,816,538	4.1%	7.5%			
WEST VALLEY	14,346,676	15,006,272	4.6%	4.2%			
TAYLORSVILLE	5,967,042	6,258,581	4.9%	0.8%			
KANAB	459,168	484,423	5.5%	5.7%			
ROY	3,084,138	3,257,495	5.6%	6.5%			
PRICE	1,653,947	1,750,586	5.8%	3.7%			
SALT LAKE CITY	33,424,713	35,554,498	6.4%	4.0%	Recovering economy		
SPRINGVILLE	2,641,615	2,812,491	6.5%	7.3%			
LEHI	2,243,282	2,404,443	7.2%	7.2%			
VERNAL	2,331,922	2,506,577	7.5%	9.4%	Oil Prices Rose		
AMERICAN FORK	3,369,914	3,628,373	7.7%	9.1%			
ROOSEVELT	735,768	795,189	8.1%	8.5%	Oil Prices Rose		
PAYSON	1,363,983	1,475,929	8.2%	**11.4%**			
SPRINGDALE	206,493	223,585	8.3%	13.1%	Southwest Region Strength		
SPANISH FORK	2,481,392	2,694,028	8.6%	7.4%			
TREMONTON	802,522	873,959	8.9%	7.2%			
ST GEORGE	9,203,729	10,087,530	9.6%	**11.8%**	Southwest Region Strength		
HURRICANE	945,570	1,040,796	**10.1%**	**11.5%**	Southwest Region Strength		
FARMINGTON	1,150,197	1,267,522	**10.2%**	6.2%			
MURRAY	10,608,389	11,812,312	**11.3%**	7.6%	Gained Cost-Co		
RIVERTON	2,157,101	2,402,776	**11.4%**	**12.7%**			
PARK CITY	3,103,756	3,478,328	**12.1%**	5.8%	Recovering economy, Good Ski Season		
SOUTH JORDAN	2,807,365	3,178,776	**13.2%**	**15.4%**	Jordan Landing		
BRIGHAM CITY	1,889,279	2,249,481	**19.1%**	**11.2%**	**Recovering economy**		
NAPLES	472,721	774,775	**63.9%**	**57.9%**	New Plant		
		Average	**3.86%**	**4.47%**			
54 City Total	**$ 263,311,302**	**$ 271,901,773**	**3.26%**				

V. FULL DISTRIBUTION FORECAST METHODOLOGY

The full distribution forecast for FY2005 is made of three components each with a different weight:

(a) Averaged Trend Model (25% weight),
(b) Actual Distribution Model (25% weight), and
(c) Statewide Econometric Model (50% weight).

This can be formalized into a distribution forecast equation as follows:

$$Y = X * [1 + (\alpha * 0.25) + (\beta * 0.25) + (\delta * 0.5)]$$

where

Y = Forecasted sales tax distribution for FY2005
X = FY2004 actual sales tax distribution
α = Percent change in distribution from FY2003 to FY2004 (see 5.2 below)
β = Percent change in distribution forecast from FY2004 to FY2005 (see 5.1)
δ = State-wide growth rate (see 5.3)

Specific data for each city can be found in Table 3 – Utah Major Cities Forecast and Appendix 1 – Full Distribution Forecast Model. In addition see Table 5 – Evaluation of FY2004 Sales Tax Forecast for the evaluation of FY2004 forecast compared to the actual distribution.

5.1 Average Trend Model (25% weight)

The Average Trend Model is made of the average of two components: (a) the estimated distribution percentage change from FY2004 to FY2005 and (b) the percent change in the direct sales trend forecast from FY2004 to FY2005.

The first component, *estimated distribution percentage change*, was calculated by multiplying the direct sales forecast (trend model forecast) for FY2005 by the 'effective tax rate' for each city. The 'effective tax rate' was calculated as the percentage of the direct sales in each city during FY2004 that was actually distributed to that city.

The second component, *direct sales trend percentage change*, was derived by finding the percent change in the direct sales forecast (trend model forecast) from FY2004 to FY2005. These two components were average and given 25 percent weight in the overall distribution model.

Note: Some caution should be exercised in evaluating the trend forecasts modeled by the exponential smoothing method. While the forecasts are generally robust and consistent given the historical values, they cannot accurately predict events or shocks, which may cause significant variations in future forecasts. Similarly, this model does not reflect well events outside the forecasted city, such as statewide influences. Generally, this model reflects the trend in growth (or decline) with higher weights apportioned to recent data. Thus, if recent data reflects a temporary downturn (upturn), which is not expected to continue, the forecast may be lower (higher) then would otherwise be expected. In cases where such events or shocks have altered the forecasts noticeably, efforts were made to reduce those effects through event indexes (dummy variables). While such alterations can be added to account for past shocks and events, it is nearly impossible to predict such events with reliable accuracy in the future.

5.2 Actual Distribution Model (25% weight)

This model is simply the percent change in sales tax distribution from FY2003 to FY2004, for each city.

5.3 Statewide Econometric Model (50% Weight)

The Tax Commission's Sales Tax Econometric Model is used to estimate taxable sales by sector to forecast the state's 4.75 percent sales tax collections. This quarterly, five-sector model has proved fairly reliable. The five-sector model has replaced the more time-consuming and less-accurate 10-sector model utilized between FY1981 and FY1992. The five sectors are:

1) *Retail nondurable goods* sales -- including food, eating and drinking, general merchandise, apparel, and miscellaneous shopping store sales.

2) *Retail durable goods* sales -- including motor vehicle, building and garden, and furniture and home furnishing store sales.

3) *Business investment* -- including taxable final sales and purchases by Utah's mining, construction, manufacturing, and wholesale trade sectors.

4) *Taxable services* -- including hotel, personal, auto and other repairs, computer leases and sales, amusement and recreation sales, and purchases by education and professional service companies.

5) *Transportation, Communications and Public Utility* taxable purchases and sales. This sector includes sales by municipal utilities as well.

Utah nonfarm wages and salaries, a statistic produced by Utah's Department of Employment Security, is the key model driver in four out of five sector equations. Consensus estimates of this important statistic and others are formulated by the Tax Commission's Economic and Statistical Unit and the Governor's Office of Planning and Budget about three times a year. The following variables are significant drivers in estimating each of the five sector equations.

1) *Retail nondurable goods* sales: nonfarm wages and salaries, and a dummy variable for the Micron plant construction and Y2K, a moving average of retail durable goods spending and a trend variable.

2) *Retail durable goods* sales: nonfarm wages and salaries, lagged Utah residential construction values, and a dummy variable for the Micron plant.

3) *Business investment*: Utah residential construction lagged values, lagged U.S. investment in plant and equipment, and real interest rates.

4) *Taxable services*: nonfarm wages and salaries, Salt Lake International airport passengers, the Utah Misery index, and a dummy variable for the 1994 base expansion in 1994.

5) *Transportation, communications and public utility* taxable purchases and sales: nonfarm wages and salaries, Salt Lake City heated degree days, and dummy variables for utility rate changes, and a dummy varioable for construction of the Kern River pipeline.

APPENDIX 1

FULL DISTRIBUTION FORECAST MODEL

FY2005

APPENDIX 1: FULL DISTRIBUTION FORECAST MODEL

	1	2	3	4	5	6	7	8	9	10	11	12
	FY 2003 Sales Tax Distribution	FY 2004 Sales Tax Distribution	Percent change from FY03	New FY 2004 Trend Model Direct Sales Forecast	FY 2005 Trend Model Direct Sales Forecast	FY 2004 Sales Tax Distribution	FY 2004 EFFECT-IVE TAX RATE col. 6/4	FY 2005 Trend Model Distribution Forecast col. 7*5	Percent Change from FY2004	Average Growth Average col. 3 & 9	FY2005 TOTAL DISTRIBUTION FORECAST [1/2col. 10, 1/2 state %]	Percent Change from FY2004 col. 11/6
BEAR RIVER											except col. 12	
LOGAN	6,000,673	6,309,441	5.1%	640,873,760	668,939,024	6,309,441	0.98%	$ 6,585,745	4.4%	4.8%	**6,620,572**	**4.9%**
BRIGHAM CITY	2,003,540	2,227,153	11.2%	192,990,580	193,601,056	2,227,153	1.15%	$ 2,234,198	0.3%	5.7%	**2,328,907**	**4.6%**
TREMONTON	816,756	875,609	7.2%	81,582,280	84,342,758	875,609	1.07%	$ 905,237	3.4%	5.3%	**921,117**	**5.2%**
				915,446,620	946,882,838							
WEBER												
OGDEN	11,286,072	11,396,651	1.0%	1,104,721,808	1,106,634,736	11,396,651	1.03%	$ 11,416,385	0.2%	0.6%	**11,720,115**	**2.8%**
RIVERDALE	4,169,848	4,440,112	6.5%	581,900,824	616,816,992	4,440,112	0.76%	$ 4,706,535	6.0%	6.2%	**4,706,535**	**6.0%**
ROY	3,083,025	3,282,534	6.5%	190,265,344	197,219,332	3,282,534	1.73%	$ 3,402,507	3.7%	5.1%	**3,449,337**	**5.1%**
SOUTH OGDEN	1,686,870	1,727,062	2.4%	140,591,274	153,160,776	1,727,062	1.23%	$ 1,881,469	8.9%	5.7%	**1,819,991**	**5.4%**
				2,017,479,250	2,073,831,836							
DAVIS												
LAYTON	9,213,276	9,459,415	2.7%	1,012,436,352	1,065,433,232	9,459,415	0.93%	$ 9,954,576	5.2%	4.0%	**9,887,599**	**4.5%**
BOUNTIFUL	4,722,805	4,802,997	1.7%	380,742,860	404,042,918	4,802,997	1.26%	$ 5,096,923	6.1%	3.9%	**5,019,343**	**4.5%**
CLEARFIELD	2,469,302	2,534,700	2.6%	148,719,896	154,274,028	2,534,700	1.70%	$ 2,629,362	3.7%	3.2%	**2,639,783**	**4.1%**
CENTERVILLE	2,160,833	2,214,650	2.5%	211,219,124	224,113,224	2,214,650	1.05%	$ 2,349,846	6.1%	4.3%	**2,318,712**	**4.7%**
KAYSVILLE	2,078,652	2,180,856	4.9%	150,256,796	158,789,472	2,180,856	1.45%	$ 2,304,701	5.7%	5.3%	**2,294,236**	**5.2%**
WOODS CROSS	1,591,981	1,602,601	0.7%	201,762,136	208,428,236	1,602,601	0.79%	$ 1,655,550	3.3%	2.0%	**1,656,507**	**3.4%**
N SALT LAKE	1,423,707	1,456,410	2.3%	151,176,488	159,713,600	1,456,410	0.96%	$ 1,538,655	5.6%	4.0%	**1,522,473**	**4.5%**
FARMINGTON	1,187,903	1,261,958	6.2%	77,529,768	74,708,609	1,261,958	1.63%	$ 1,216,038	-3.6%	1.3%	**1,302,326**	**3.2%**
W BOUNTIFUL	735,303	705,884	-4.0%	69,577,190	69,617,684	705,884	1.01%	$ 706,295	0.1%	-2.0%	**716,926**	**1.6%**
				2,403,420,610	2,519,121,003							
SALT LAKE NORTH												
SALT LAKE CITY	34,274,192	35,657,054	4.0%	4,216,352,640	4,314,749,696	35,657,054	0.85%	$ 36,489,183	2.3%	3.2%	**37,134,005**	**4.1%**
WEST VALLEY	14,471,758	15,081,775	4.2%	1,323,392,448	1,346,164,032	15,081,775	1.14%	$ 15,341,287	1.7%	3.0%	**15,690,171**	**4.0%**
MURRAY	11,014,841	11,855,714	7.6%	1,481,771,200	1,521,489,152	11,855,714	0.80%	$ 12,173,499	2.7%	5.2%	**12,197,686**	**2.9%**
S SALT LAKE	9,834,748	9,788,900	-0.5%	1,213,428,864	1,242,378,432	9,788,900	0.81%	$ 10,022,440	2.4%	1.0%	**10,027,695**	**2.4%**
TAYLORSVILLE *	6,230,916	6,278,198	0.8%	447,382,160	470,307,560	6,278,198	1.40%	$ 6,599,914	5.1%	2.9%	**6,530,631**	**4.0%**
				8,682,327,312	8,895,088,872							
SALT LAKE SOUTH												
SL COUNTY	21,240,574	21,478,597	1.1%	1,534,933,632	1,480,091,360	21,478,597	1.40%	$ 20,711,179	-3.6%	-1.2%	**21,894,619**	**1.9%**
SANDY	14,623,447	15,018,633	2.7%	1,598,591,808	1,685,928,320	15,018,633	0.94%	$ 15,839,152	5.5%	4.1%	**15,708,204**	**4.6%**
WEST JORDAN	10,502,386	11,088,162	5.6%	1,107,360,928	1,209,487,776	11,088,162	1.00%	$ 12,110,773	9.2%	7.4%	**11,781,175**	**6.3%**
MIDVALE	4,662,769	4,600,796	-1.3%	491,681,480	495,138,424	4,600,796	0.94%	$ 4,633,144	0.7%	-0.3%	**4,710,916**	**2.4%**
DRAPER	3,595,705	3,863,654	7.5%	347,104,904	370,591,960	3,863,654	1.11%	$ 4,125,090	6.8%	7.1%	**4,099,516**	**6.1%**
SOUTH JORDAN	2,767,735	3,194,899	15.4%	206,282,092	244,557,828	3,194,899	1.55%	$ 3,787,714	18.6%	17.0%	**3,547,845**	**11.0%**
RIVERTON	2,143,397	2,414,727	12.7%	107,920,636	113,620,064	2,414,727	2.24%	$ 2,542,252	5.3%	9.0%	**2,584,603**	**7.0%**
				5,393,875,480	5,599,415,732							
Just Off WASATCH Front												
PARK CITY	3,213,567	3,400,610	5.8%	428,322,672	432,573,744	3,400,610	0.79%	$ 3,434,361	1.0%	3.4%	**3,443,601**	**1.3%**
TOOELE	2,849,268	3,221,448	13.1%	262,006,468	278,032,308	3,221,448	1.23%	$ 3,418,491	6.1%	9.6%	**3,458,054**	**7.3%**
HEBER	1,137,430	1,182,662	4.0%	110,669,008	116,956,308	1,182,662	1.07%	$ 1,249,851	5.7%	4.8%	**1,241,375**	**5.0%**
				800,998,148	827,562,360							

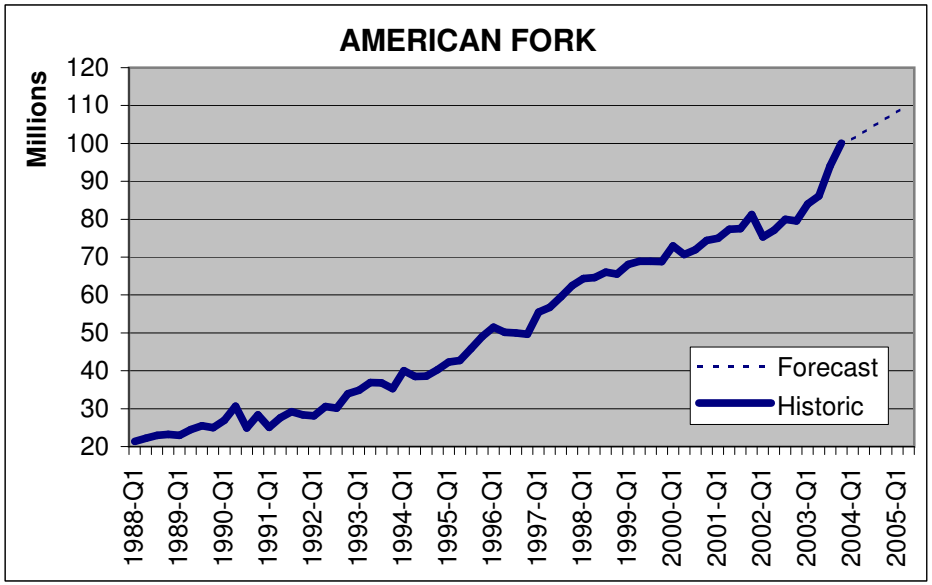
APPENDIX 1(cont): FULL DISTRIBUTION FORECAST MODEL

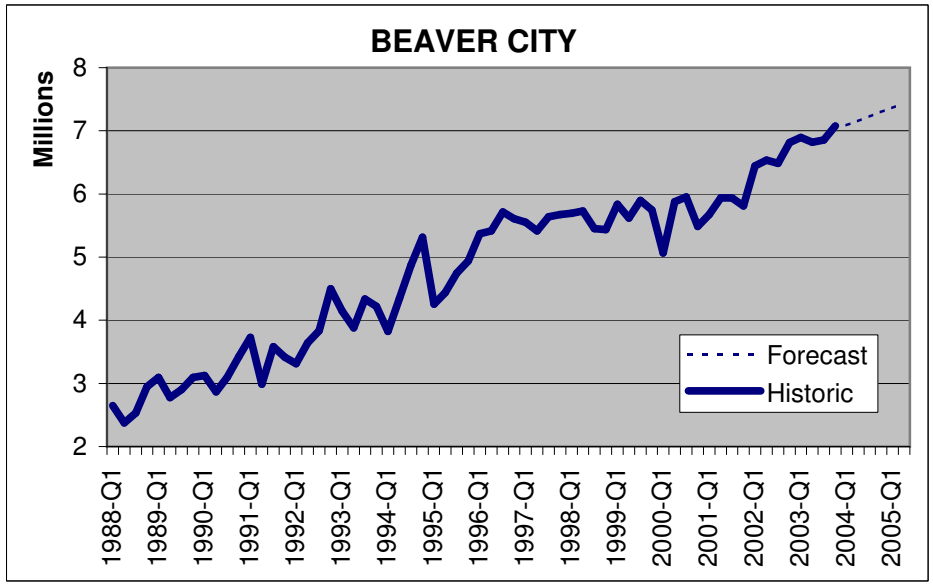
	1	2	3	4	5	6	7	8	9	10	11	12
	FY 2003 Sales Tax Distribution	FY 2004 Sales Tax Distribution	Percent change from FY03	New FY 2004 Trend Model Direct Sales Forecast	FY 2005 Trend Model Direct Sales Forecast	FY 2004 Sales Tax Distribution	FY 2004 EFFECT-IVE TAX RATE col. 6/4	FY 2005 Trend Model Distribution Forecast col. 7*5	Percent Change from FY2004	Average Growth Average col. 3 & 9	FY2005 TOTAL DISTRIBUTION FORECAST [1/2col. 10, 1/2 state %]	Percent Change from FY2004 col. 11/6
UTAH COUNTY												
OREM	13,736,441	13,897,477	1.2%	1,471,007,424	1,520,029,696	13,897,477	0.94%	$ 14,360,619	3.3%	2.3%	**14,408,379**	**3.7%**
PROVO	12,477,560	12,434,374	-0.3%	999,352,880	1,026,108,160	12,434,374	1.24%	$ 12,767,275	2.7%	1.2%	**12,823,916**	**3.1%**
AMERICAN FORK	3,354,306	3,659,898	9.1%	398,622,720	430,292,760	3,659,898	0.92%	$ 3,950,672	7.9%	8.5%	**3,909,277**	**6.8%**
SPRINGVILLE	2,623,790	2,815,542	7.3%	255,347,148	262,300,784	2,815,542	1.10%	$ 2,892,215	2.7%	5.0%	**2,957,948**	**5.1%**
SPANISH FORK	2,520,231	2,707,153	7.4%	218,986,832	216,798,072	2,707,153	1.24%	$ 2,680,095	-1.0%	3.2%	**2,819,617**	**4.2%**
LEHI	2,184,803	2,342,409	7.2%	178,417,640	190,065,916	2,342,409	1.31%	$ 2,495,337	6.5%	6.9%	**2,482,616**	**6.0%**
PLEASANT GROV	2,192,781	2,241,093	2.2%	128,621,754	131,334,576	2,241,093	1.74%	$ 2,288,361	2.1%	2.2%	**2,322,402**	**3.6%**
LINDON	1,562,005	1,635,728	4.7%	196,470,692	268,003,652	1,635,728	0.83%	$ 2,231,280	36.4%	20.6%	**1,845,628**	**12.8%**
PAYSON	1,341,632	1,495,234	11.4%	101,660,074	118,681,110	1,495,234	1.47%	$ 1,745,582	16.7%	14.1%	**1,638,746**	**9.6%**
				3,948,487,164	4,163,614,726							
CENTRAL												
RICHFIELD	1,243,244	1,306,008	5.0%	155,663,968	169,878,736	1,306,008	0.84%	$ 1,425,269	9.1%	7.1%	**1,385,609**	**6.1%**
NEPHI	999,132	611,426	-38.8%	46,762,633	48,636,317	611,426	1.31%	$ 635,925	4.0%	-17.4%	**573,827**	**-6.1%**
DELTA	526,805	527,923	0.2%	46,204,779	47,882,369	527,923	1.14%	$ 547,091	3.6%	1.9%	**546,457**	**3.5%**
				248,631,380	266,397,422							
SOUTHWEST												
ST GEORGE	9,087,838	10,158,952	11.8%	1,237,007,392	1,317,029,888	10,158,952	0.82%	$ 10,816,139	6.5%	9.1%	**10,881,642**	**7.1%**
CEDAR CITY	3,565,679	3,413,302	-4.3%	372,748,496	369,868,048	3,413,302	0.92%	$ 3,386,925	-0.8%	-2.5%	**3,457,281**	**1.3%**
HURRICANE	943,215	1,051,266	11.5%	82,470,250	88,754,040	1,051,266	1.27%	$ 1,131,367	7.6%	9.5%	**1,128,206**	**7.3%**
KANAB	458,089	484,188	5.7%	44,018,928	44,309,906	484,188	1.10%	$ 487,389	0.7%	3.2%	**504,231**	**4.1%**
BEAVER CITY	558,366	339,696	-39.2%	28,400,356	29,566,975	339,696	1.20%	$ 353,650	4.1%	-17.5%	**318,588**	**-6.2%**
SPRINGDALE	191,048	216,098	13.1%	27,969,433	29,068,970	216,098	0.77%	$ 224,593	3.9%	8.5%	**226,667**	**4.9%**
				1,792,614,855	1,878,597,827							
UINTAH BASIN												
VERNAL	2,298,499	2,514,853	9.4%	271,399,536	276,042,248	2,514,853	0.93%	$ 2,557,873	1.7%	5.6%	**2,557,873**	**1.7%**
ROOSEVELT	742,885	805,947	8.5%	77,260,442	83,157,992	805,947	1.04%	$ 867,468	7.6%	8.1%	**858,983**	**6.6%**
NAPLES	500,585	790,340	57.9%	75,912,777	82,947,010	790,340	1.04%	$ 863,575	9.3%	33.6%	**943,171**	**19.3%**
				424,572,755	442,147,250							
SOUTHEAST												
PRICE	1,720,800	1,784,174	3.7%	200,683,896	199,984,604	1,784,174	0.89%	$ 1,777,957	-0.3%	1.7%	**1,844,543**	**3.4%**
MOAB	944,440	985,990	4.4%	113,662,298	116,724,956	985,990	0.87%	$ 1,012,558	2.7%	3.5%	**1,024,604**	**3.9%**
				314,346,194	316,709,560							
54 City Total	**262,967,451**	**272,822,933**	**3.7%**	**26,942,199,768**	**27,929,369,426**	**272,822,933**	**1.01%**	**$ 282,561,564**	**3.6%**	**3.7%**	**284,434,791**	**4.3%**
											4.3%	
					STATE MODEL FORECAST FY 2005 =					**5.1%**		

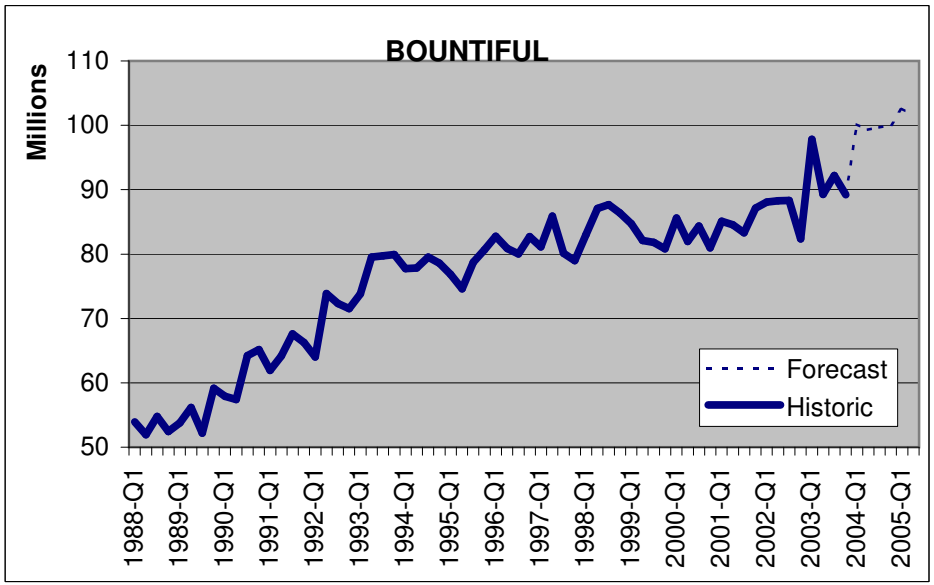
APPENDIX 2

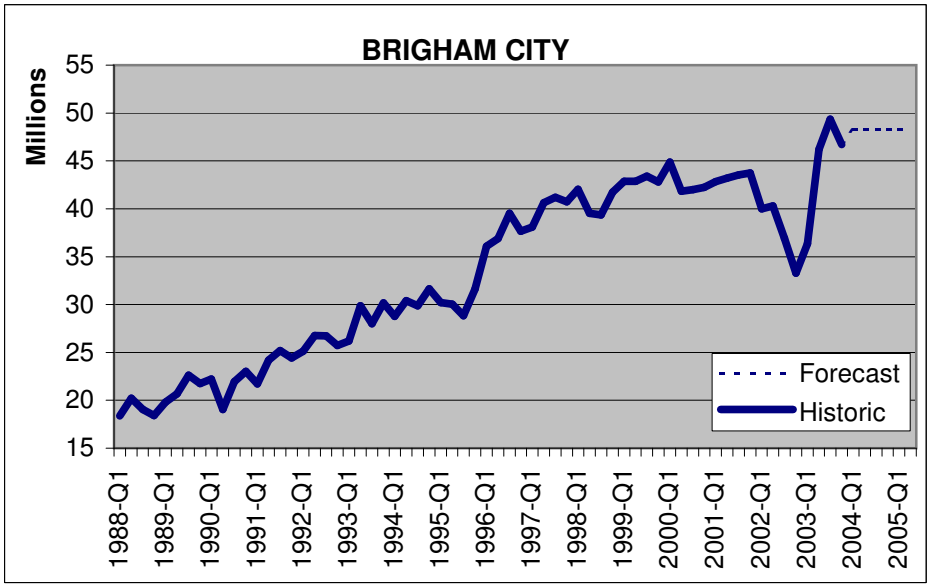
SEASONALLY ADJUSTED GROSS TAXABLE SALES HISTORY & FORECAST GRAPHS

APPENDIX 2: SEASONALLY ADJUSTED SALES GRAPHS

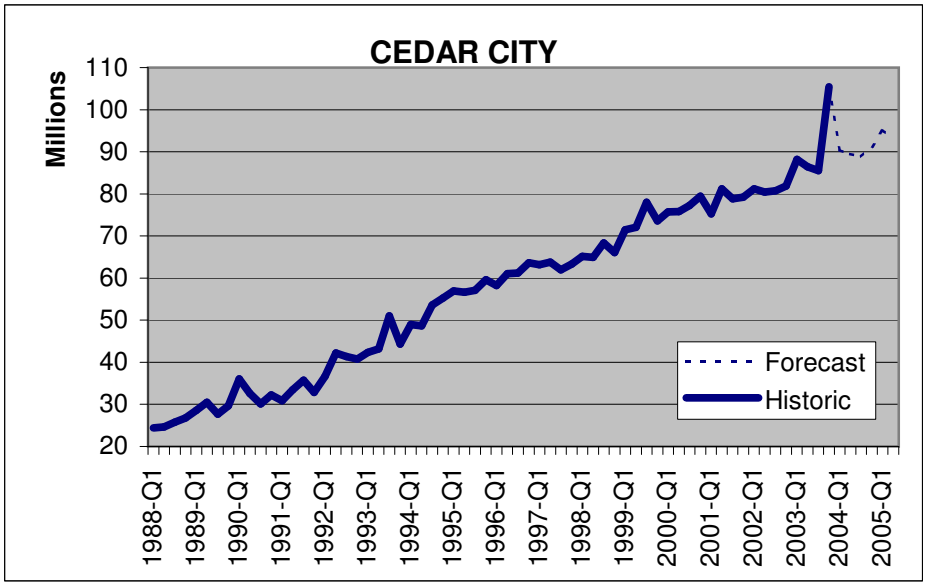


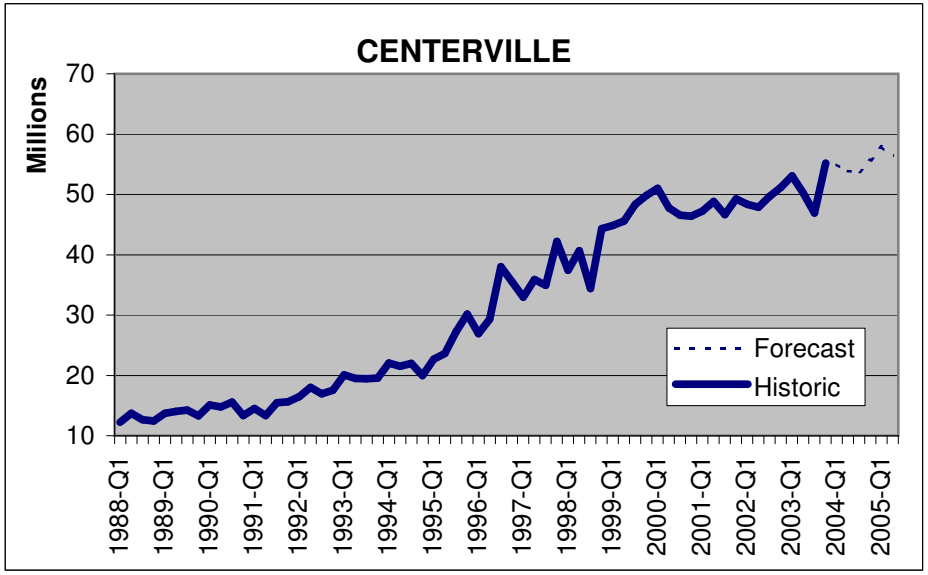


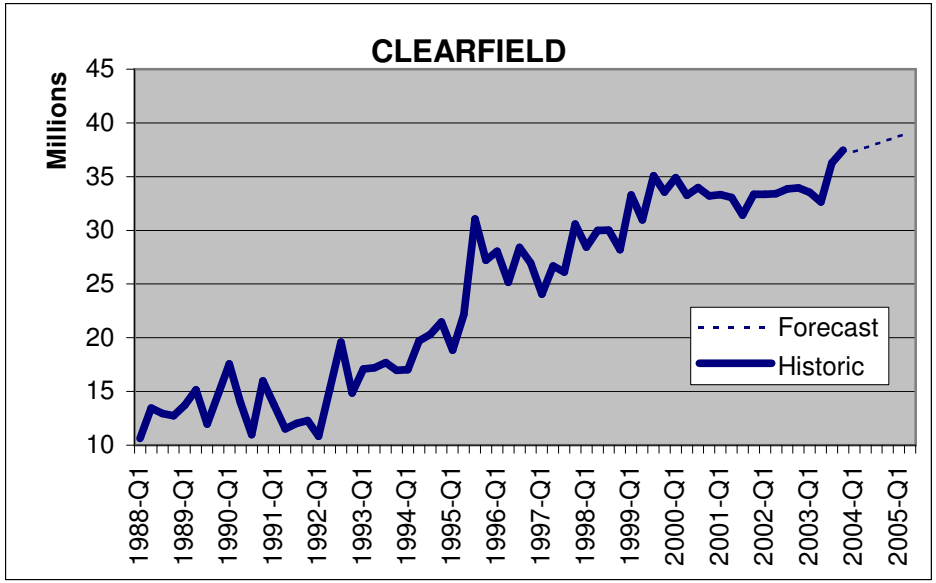


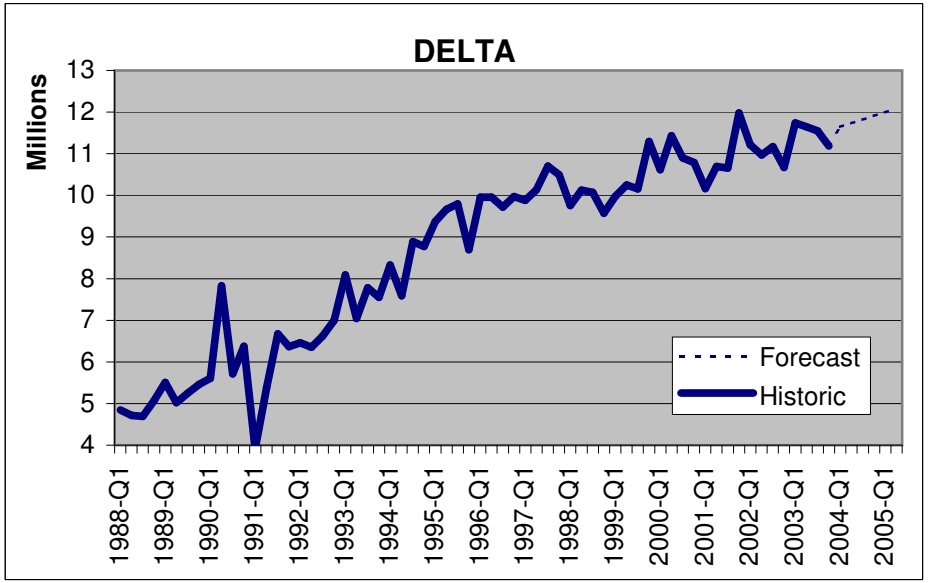


APPENDIX 2(cont) : SEASONALLY ADJUSTED SALES GRAPHS

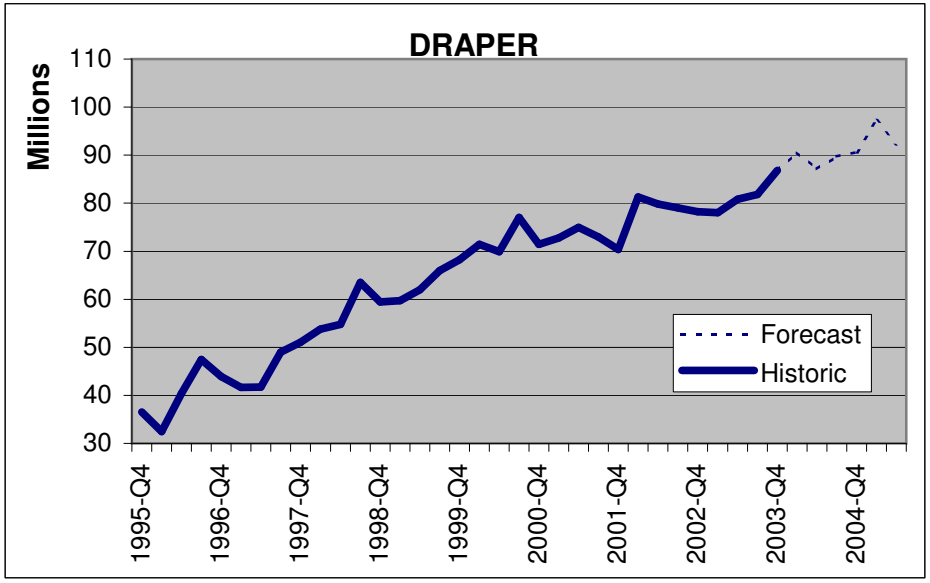


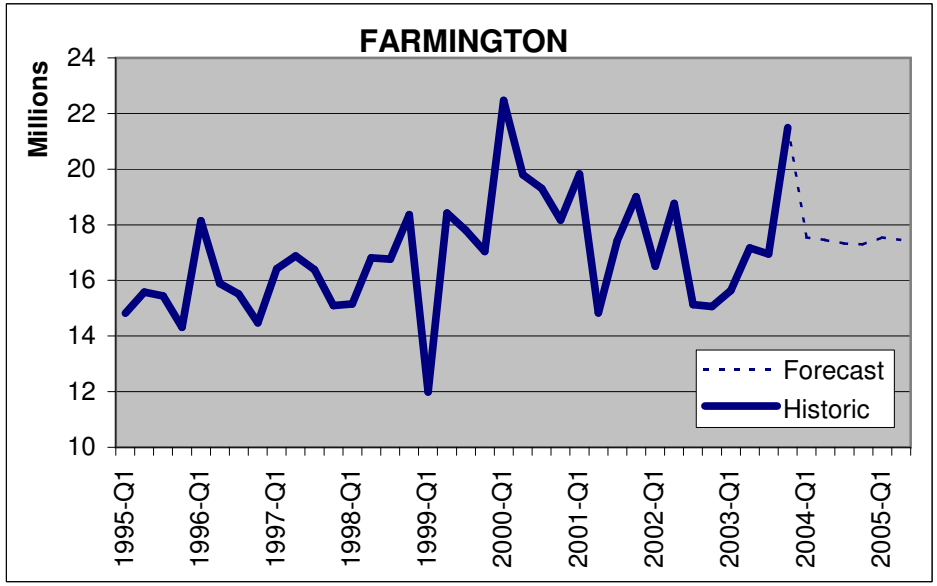


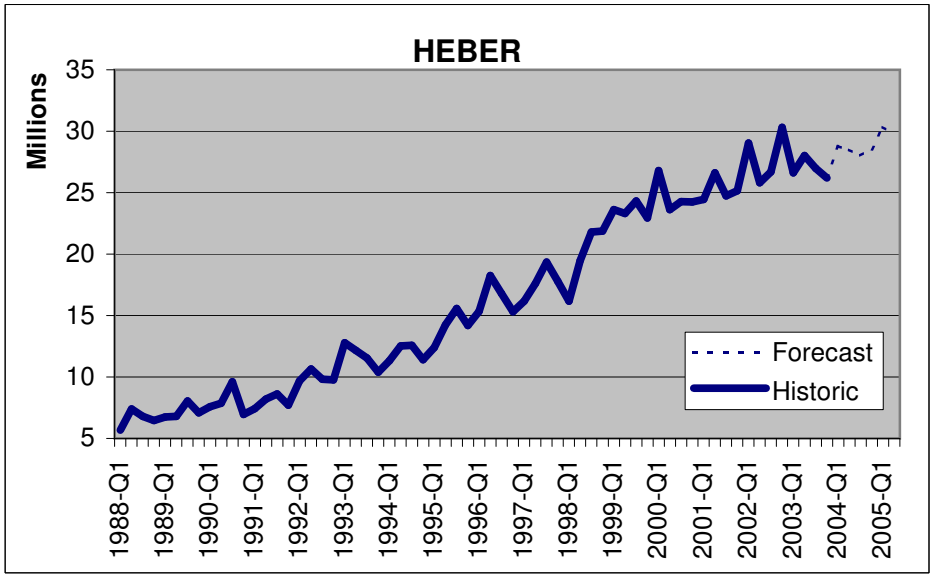


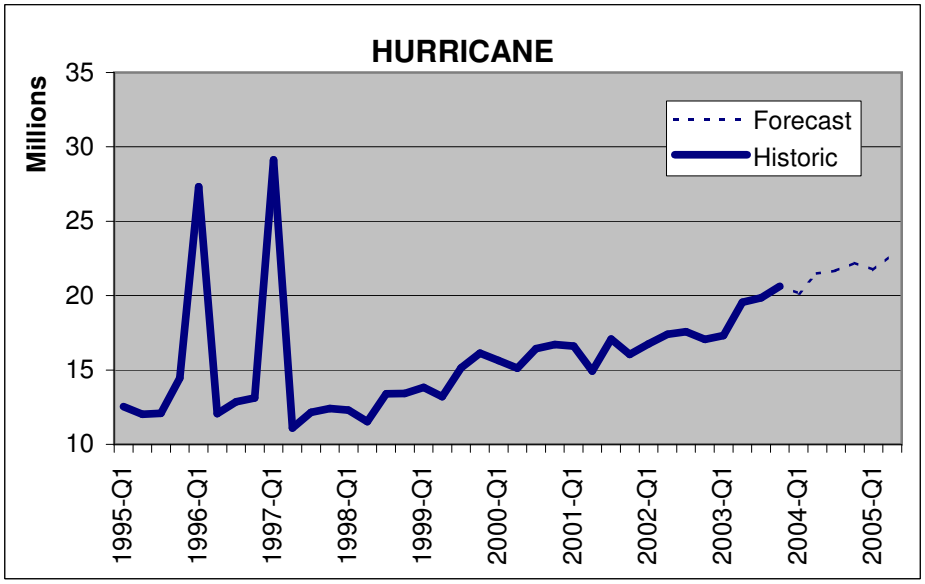


APPENDIX 2(cont) : SEASONALLY ADJUSTED SALES GRAPHS

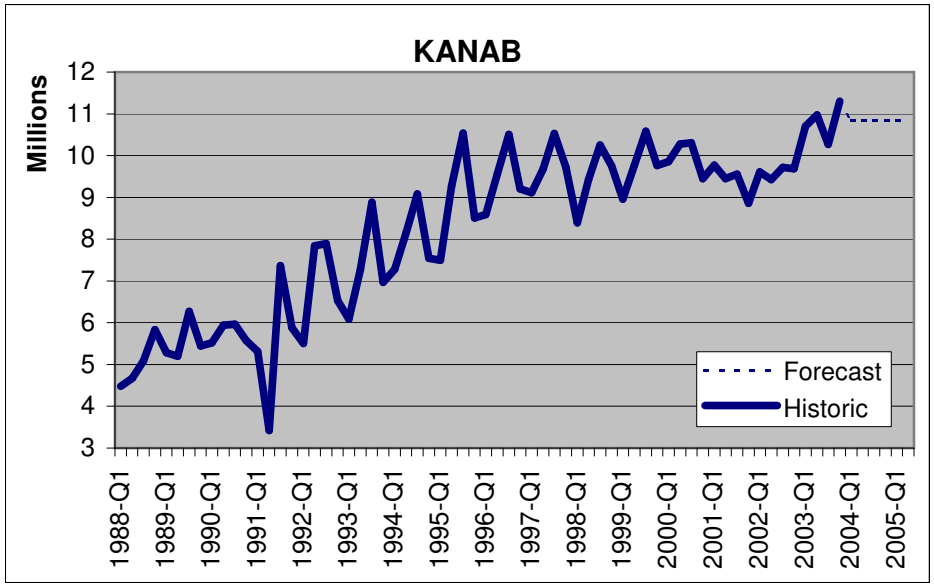


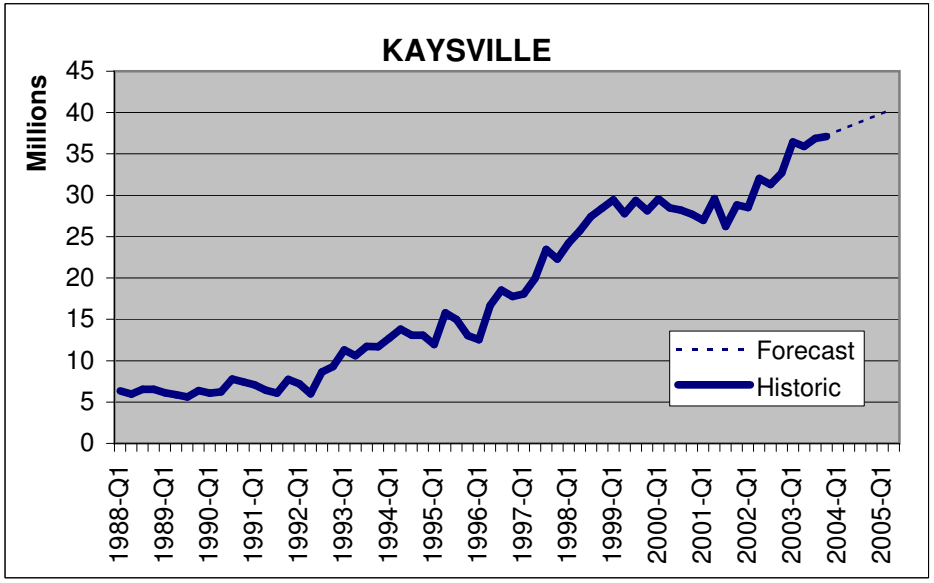


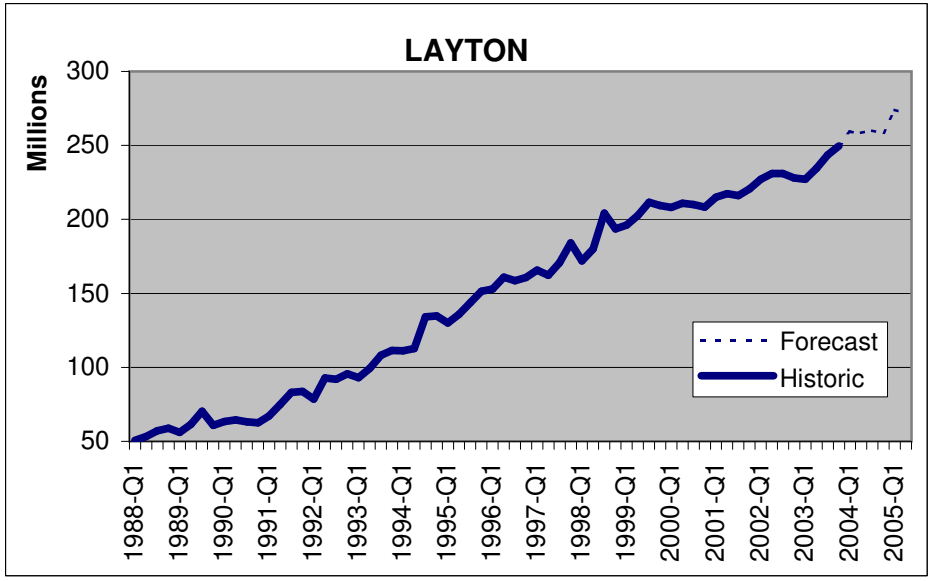


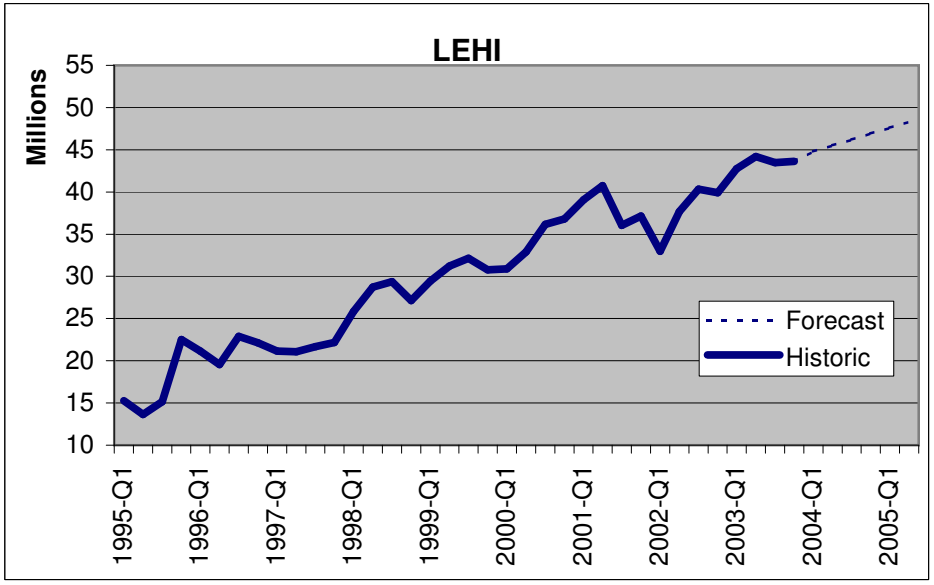


APPENDIX 2(cont) : SEASONALLY ADJUSTED SALES GRAPHS

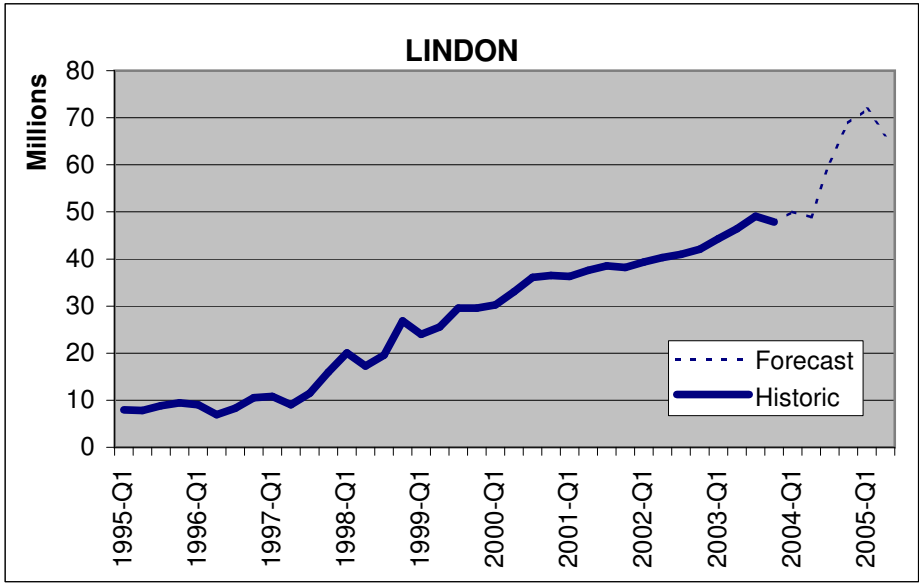


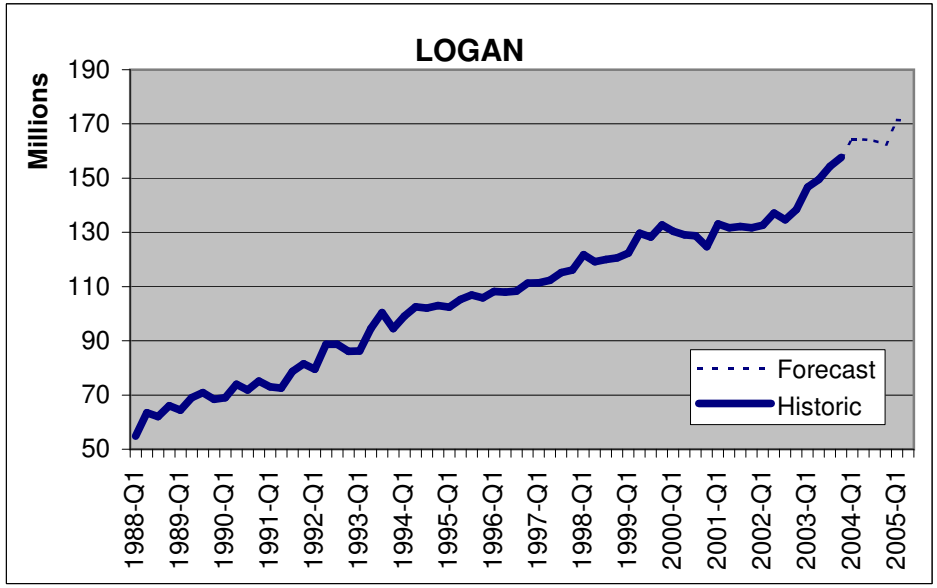


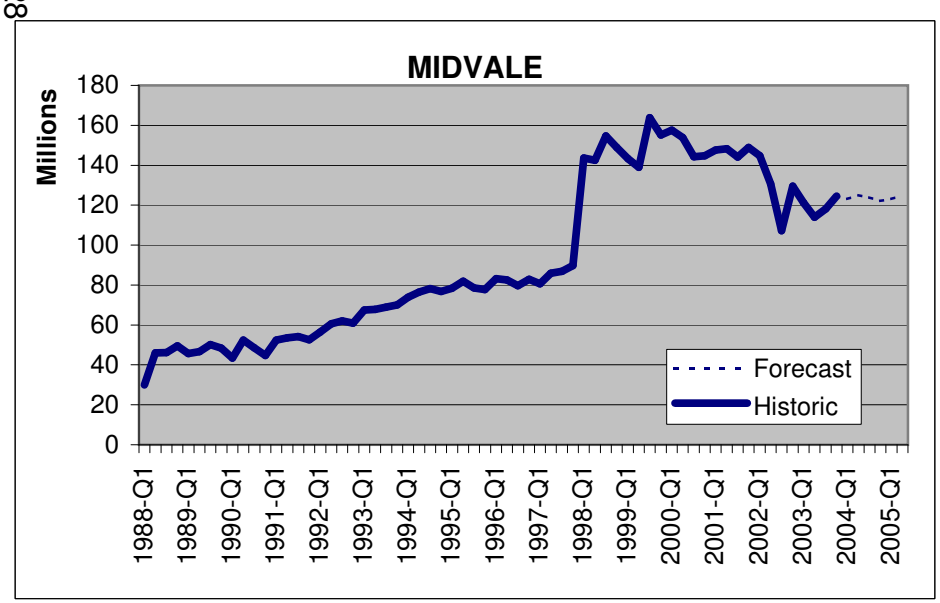


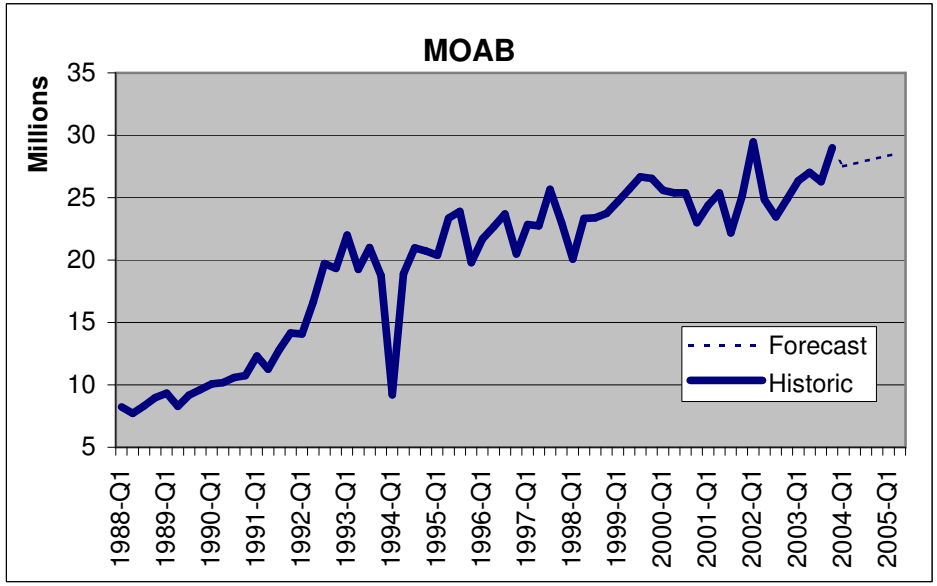


APPENDIX 2(cont) : SEASONALLY ADJUSTED SALES GRAPHS

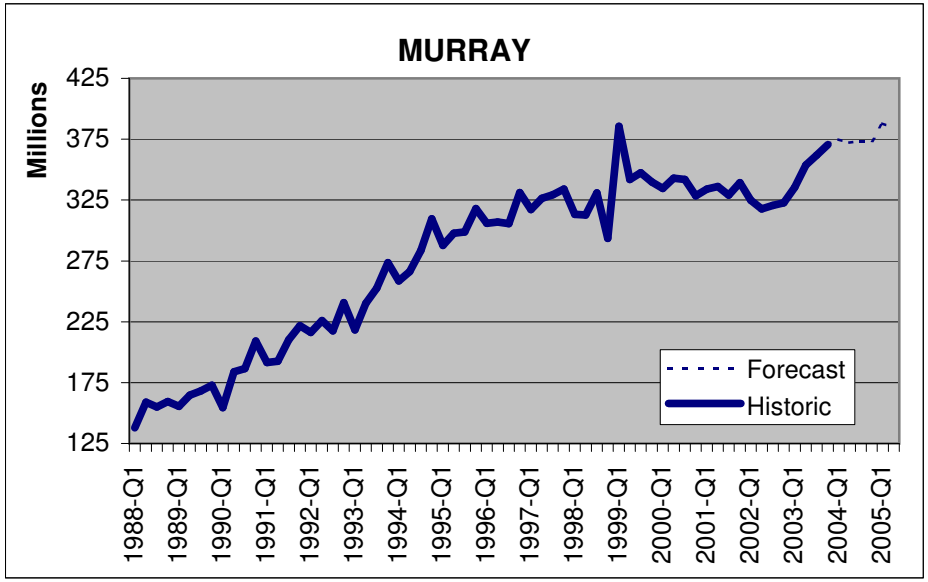


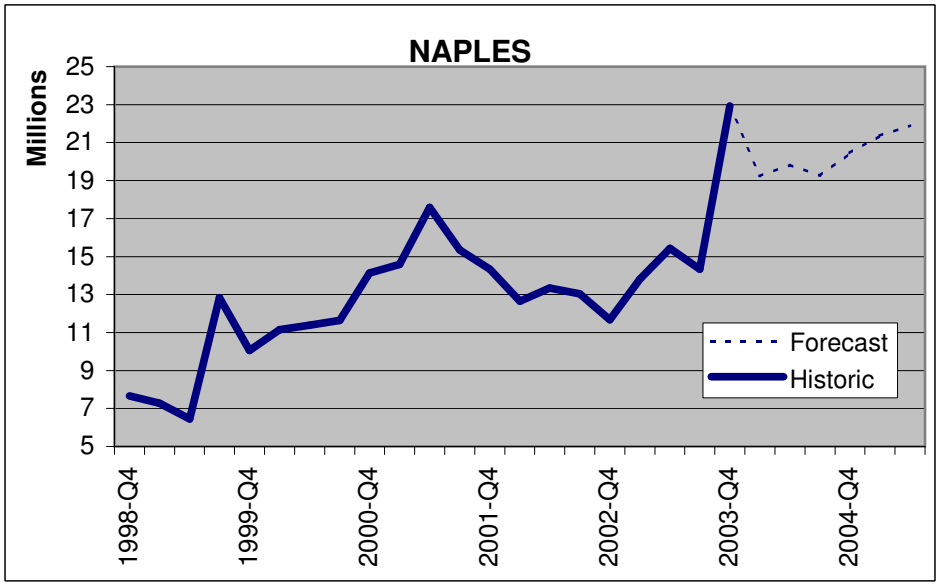


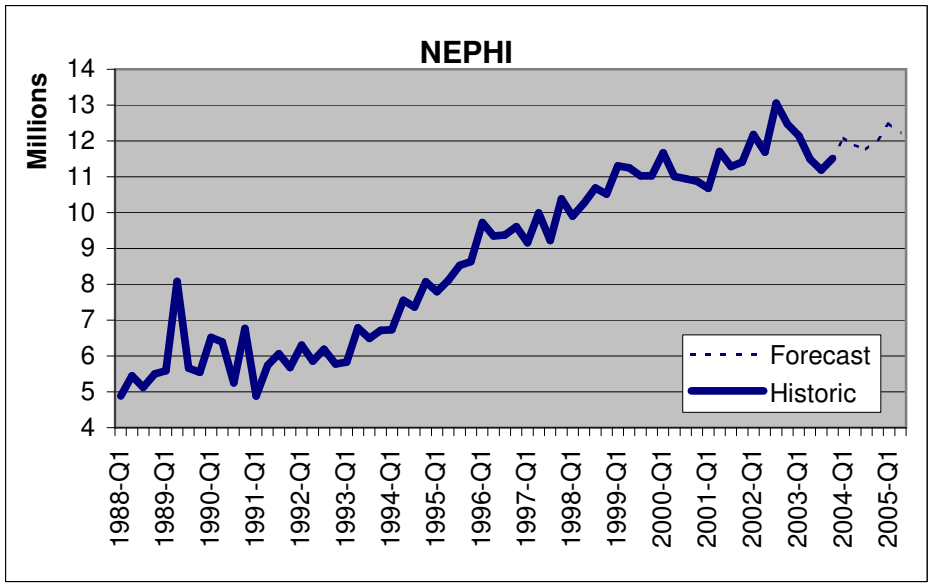


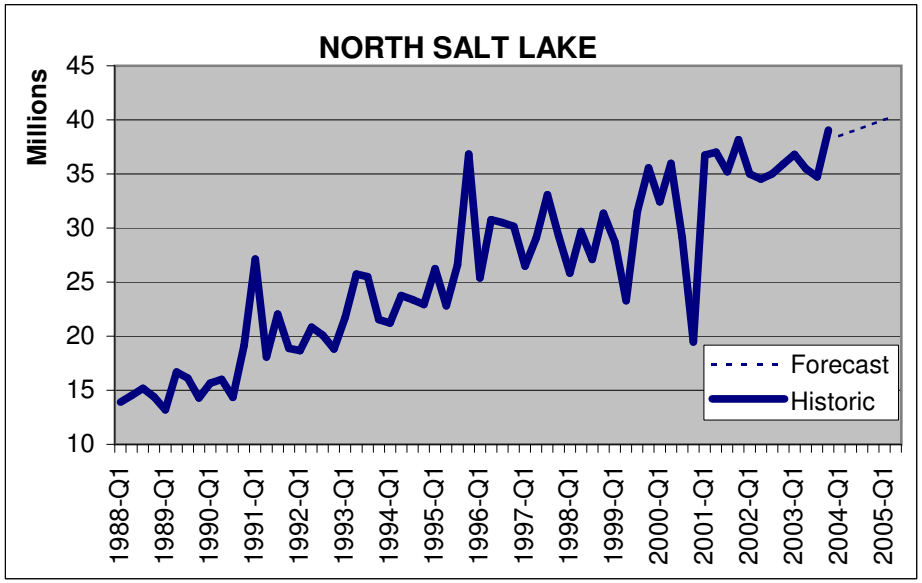


APPENDIX 2(cont) : SEASONALLY ADJUSTED SALES GRAPHS

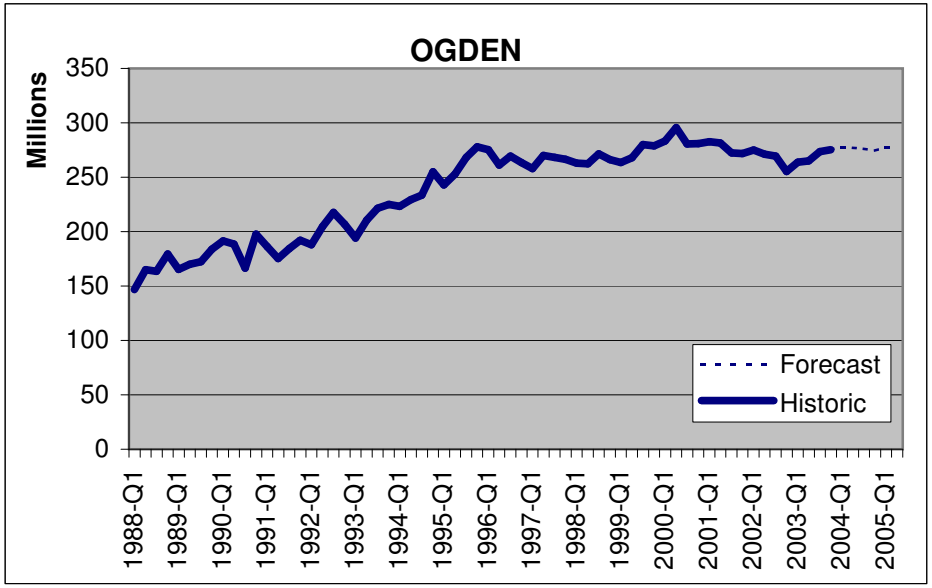


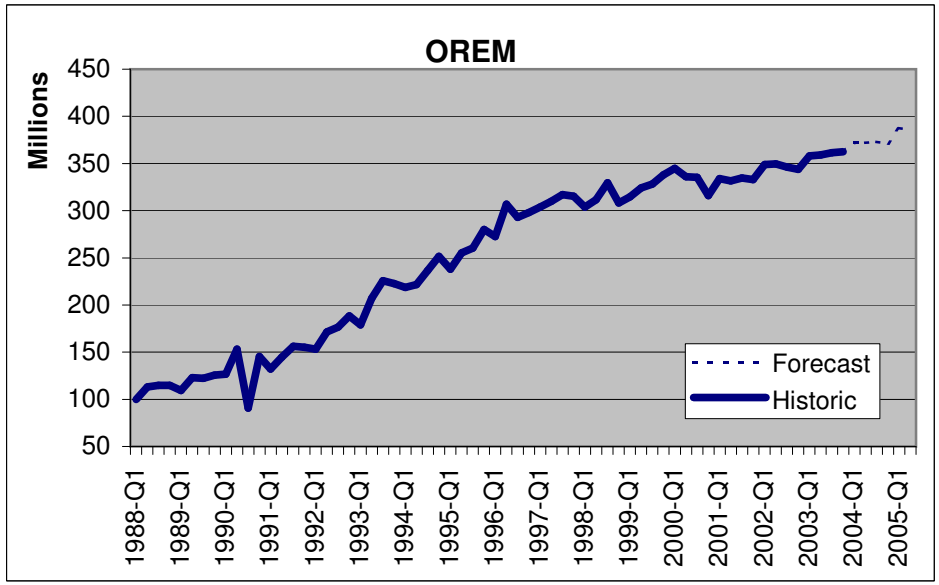


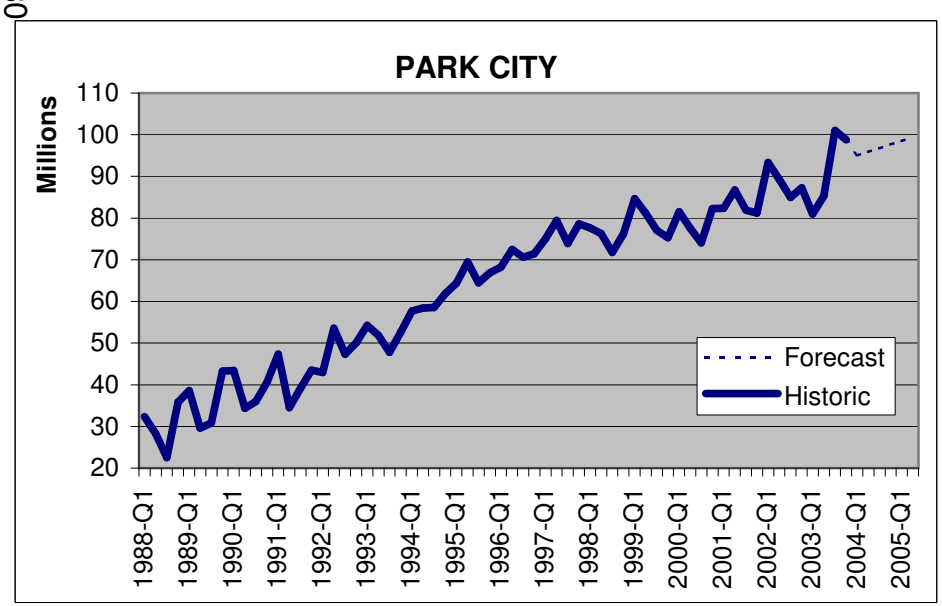


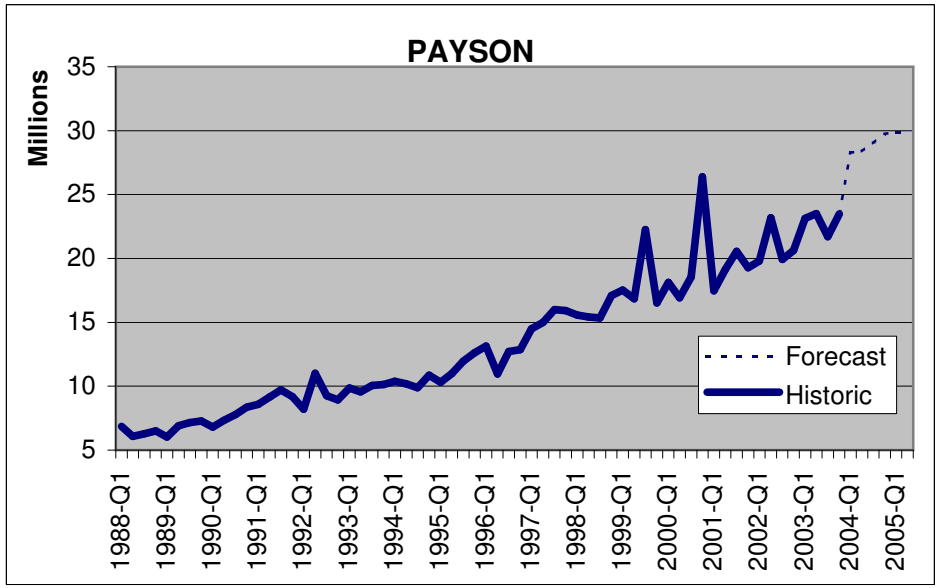


APPENDIX 2(cont) : SEASONALLY ADJUSTED SALES GRAPHS

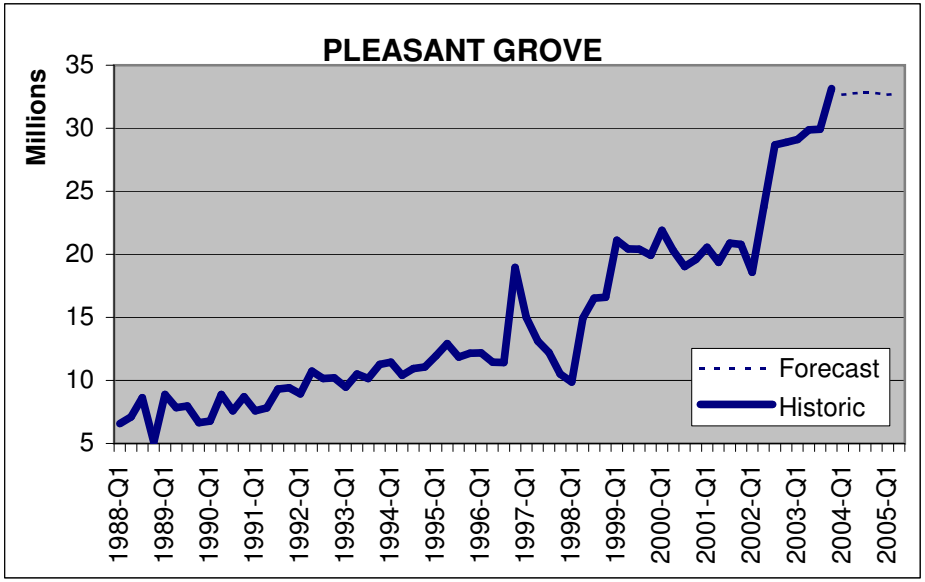


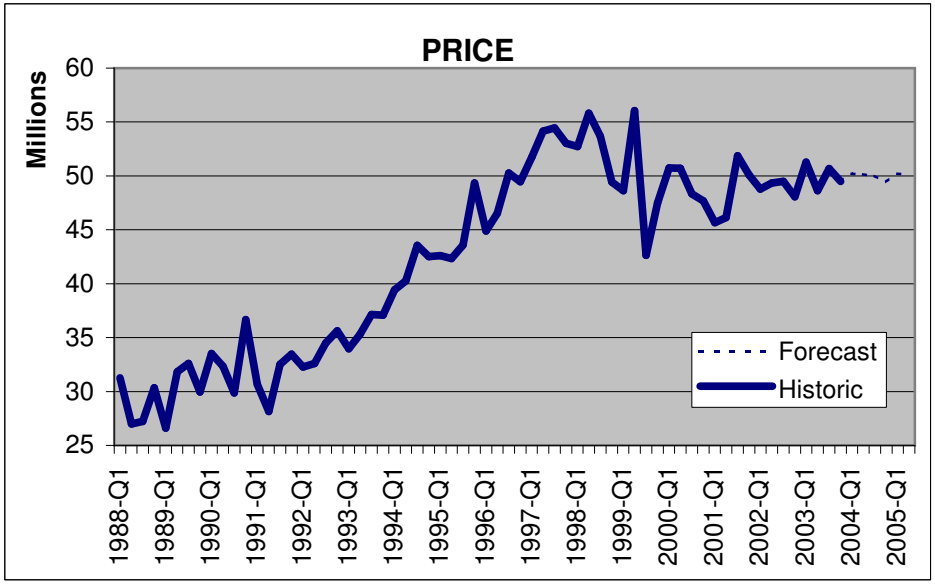


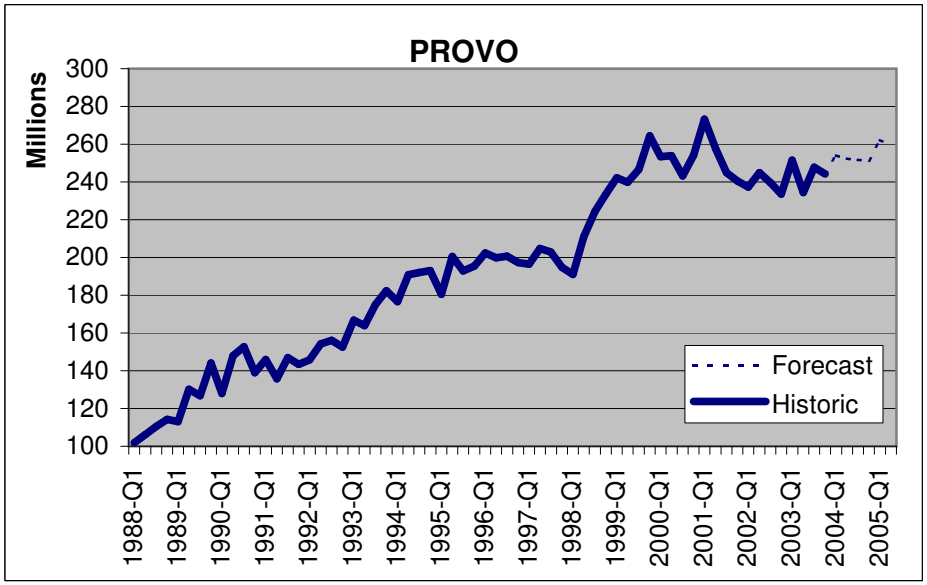


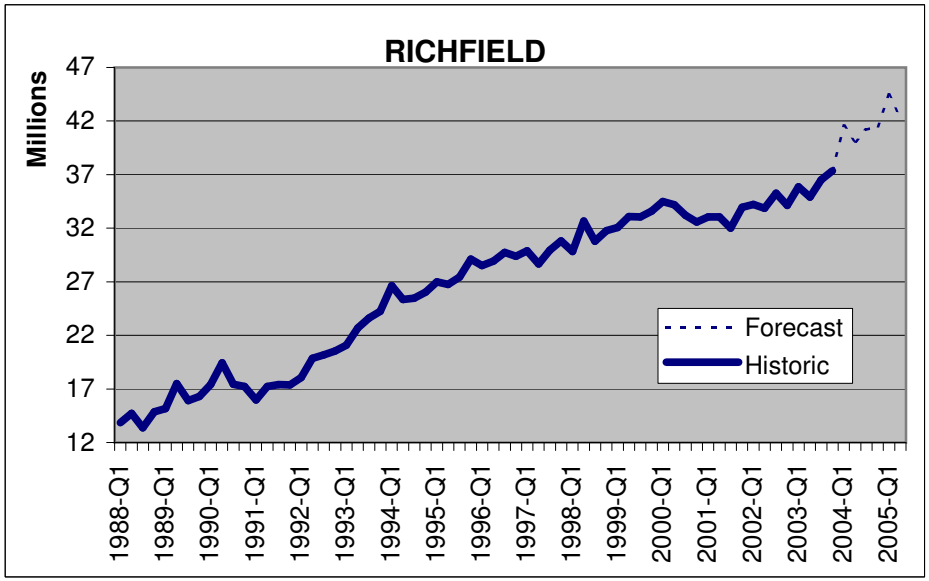


APPENDIX 2(cont) : SEASONALLY ADJUSTED SALES GRAPHS

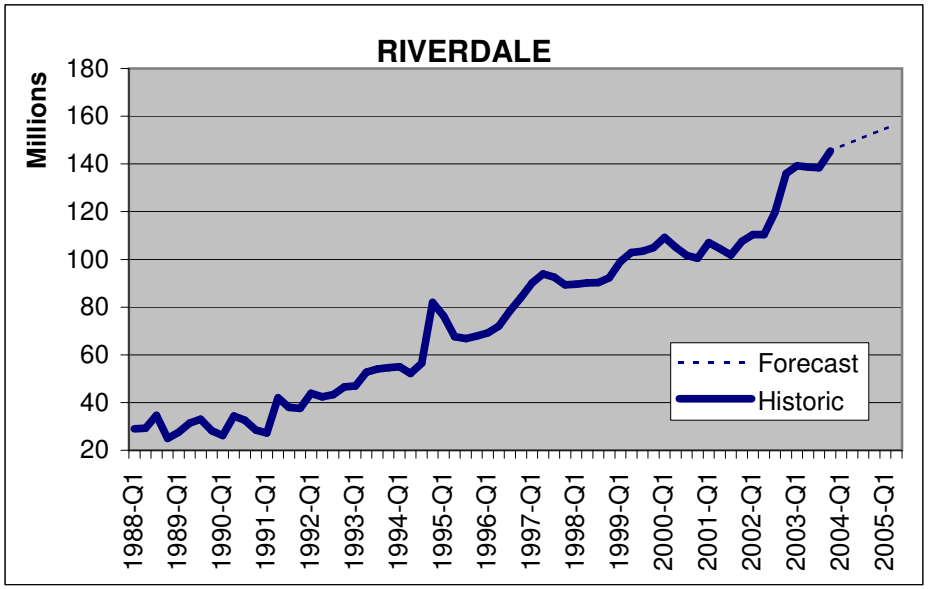


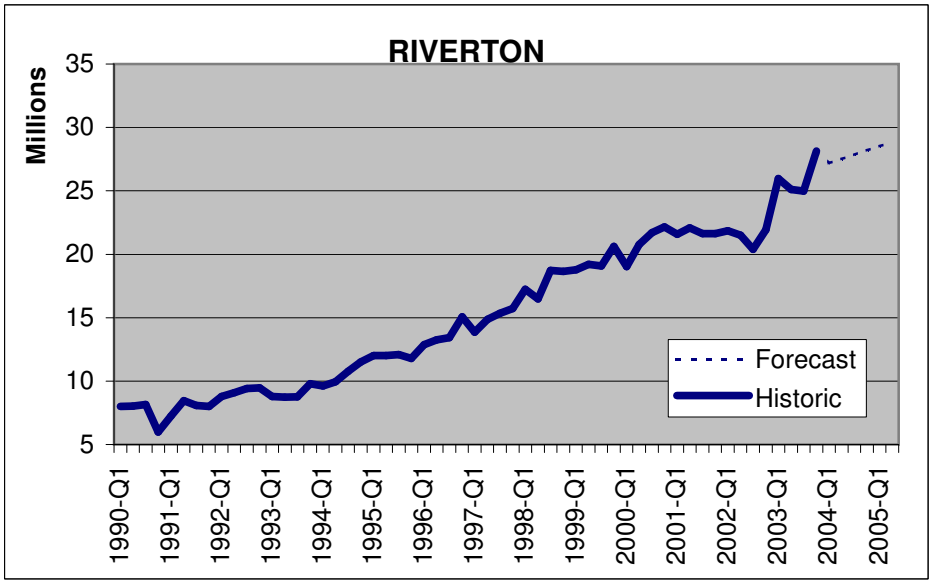


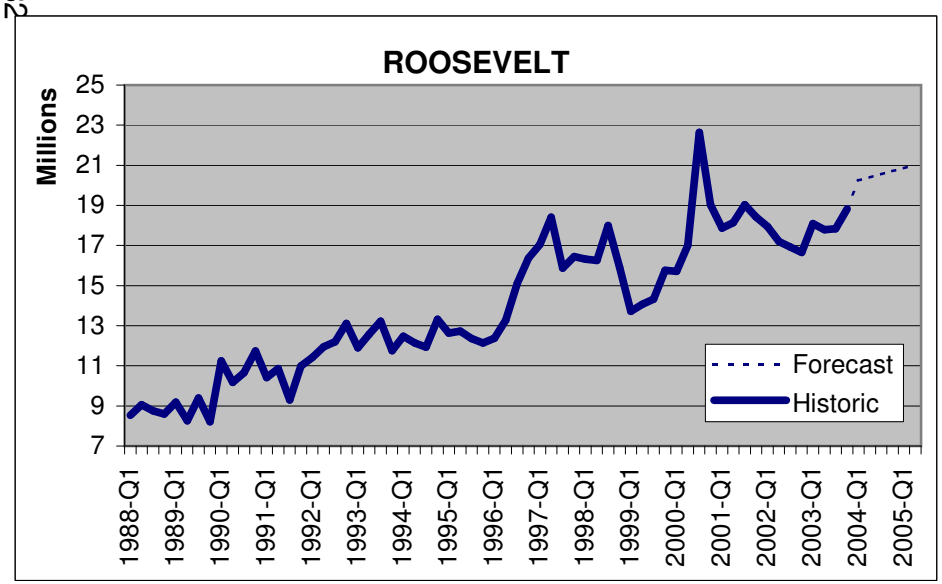


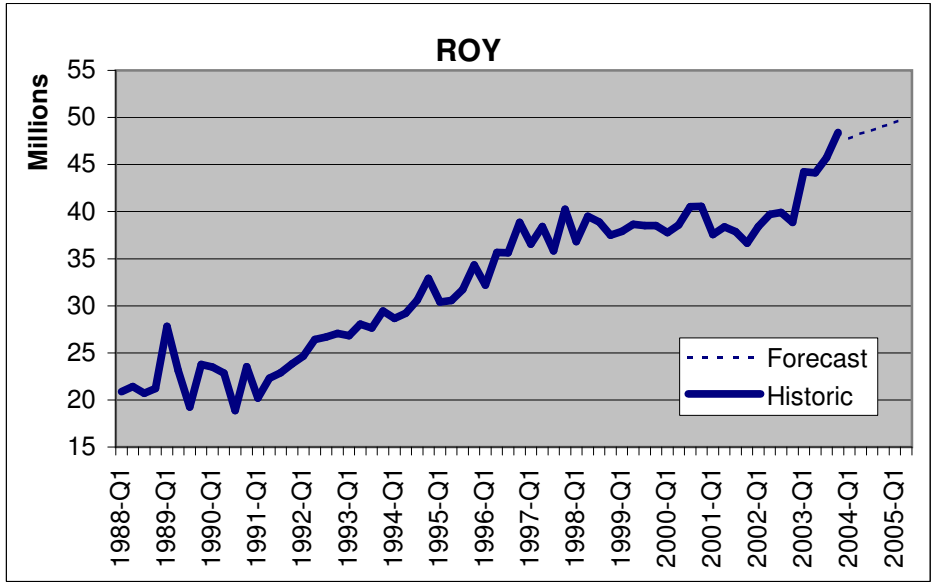


APPENDIX 2(cont) : SEASONALLY ADJUSTED SALES GRAPHS

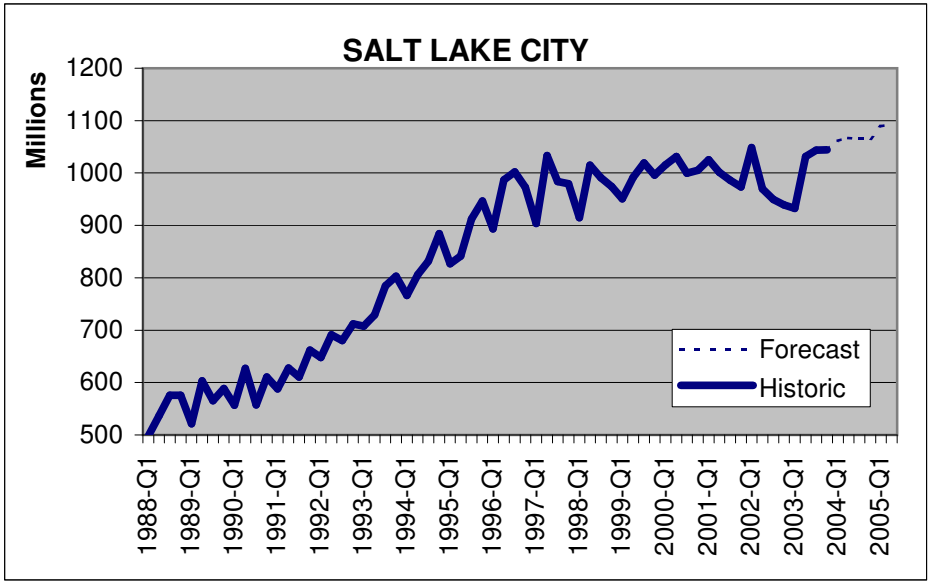


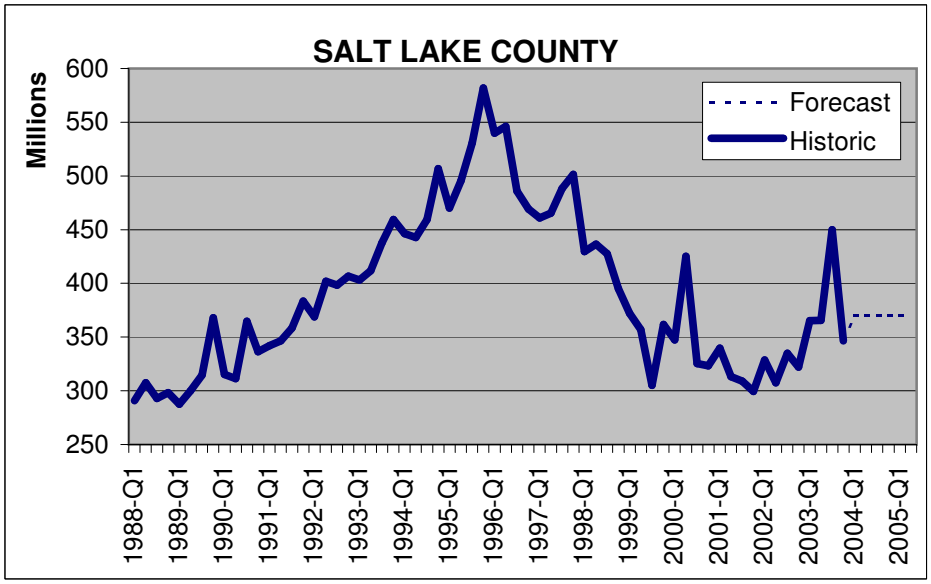


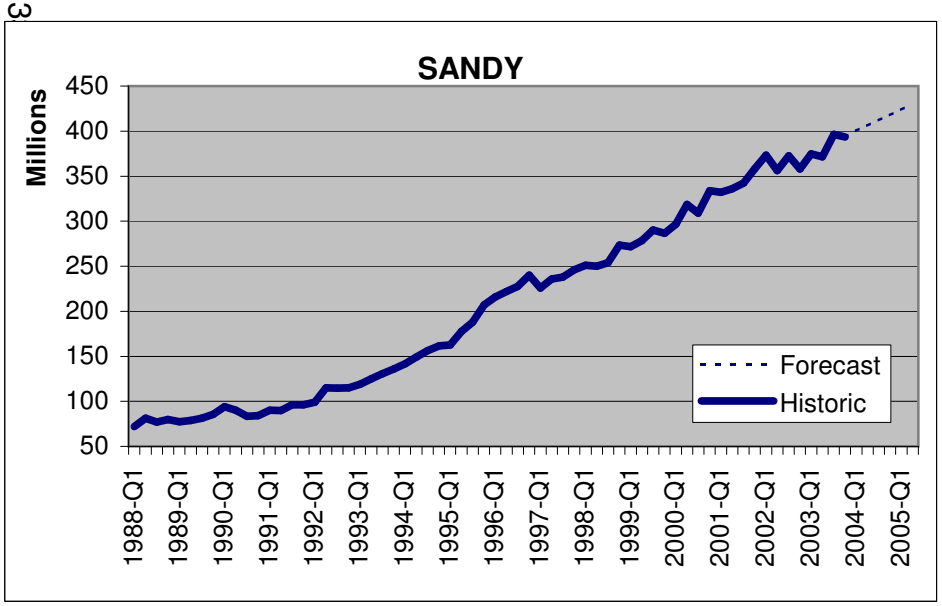


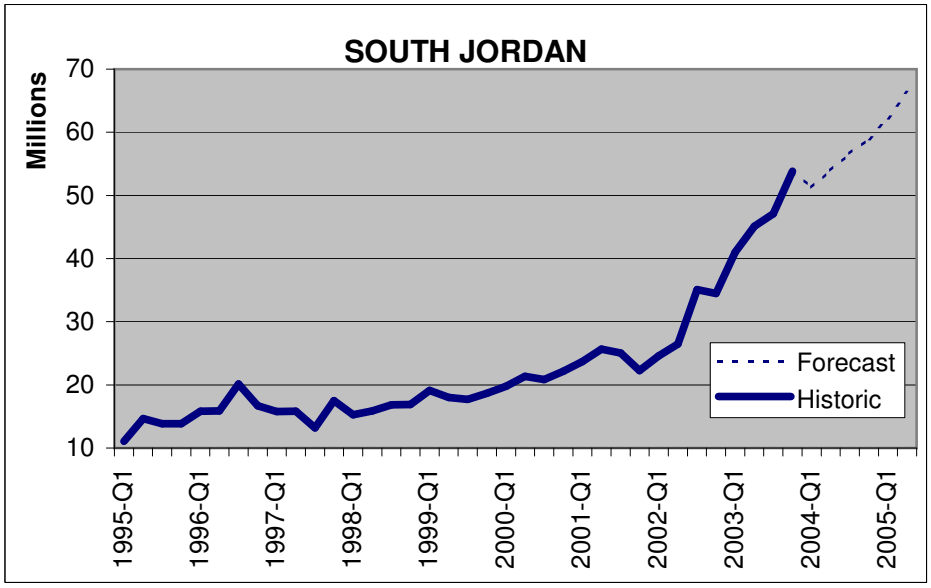


APPENDIX 2(cont) : SEASONALLY ADJUSTED SALES GRAPHS

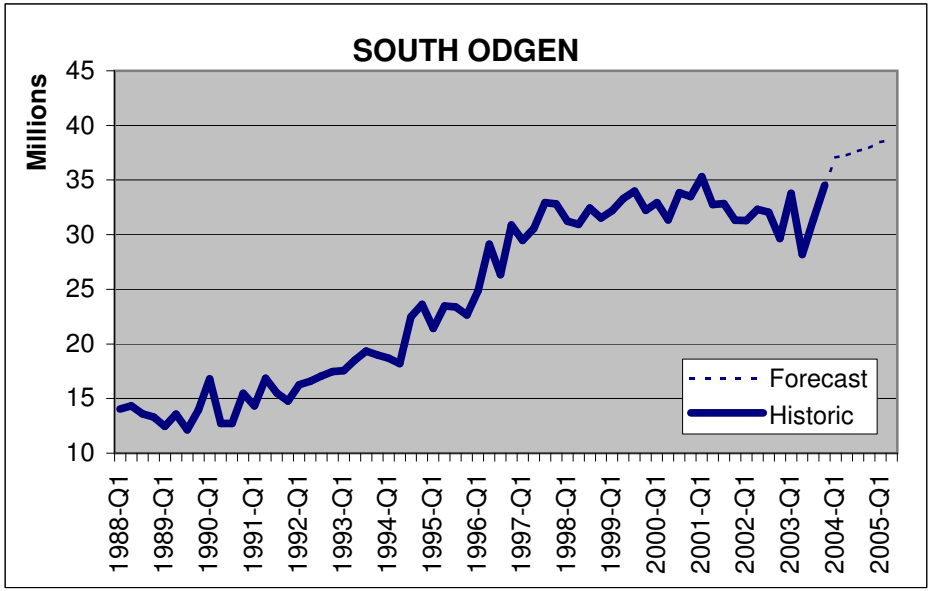


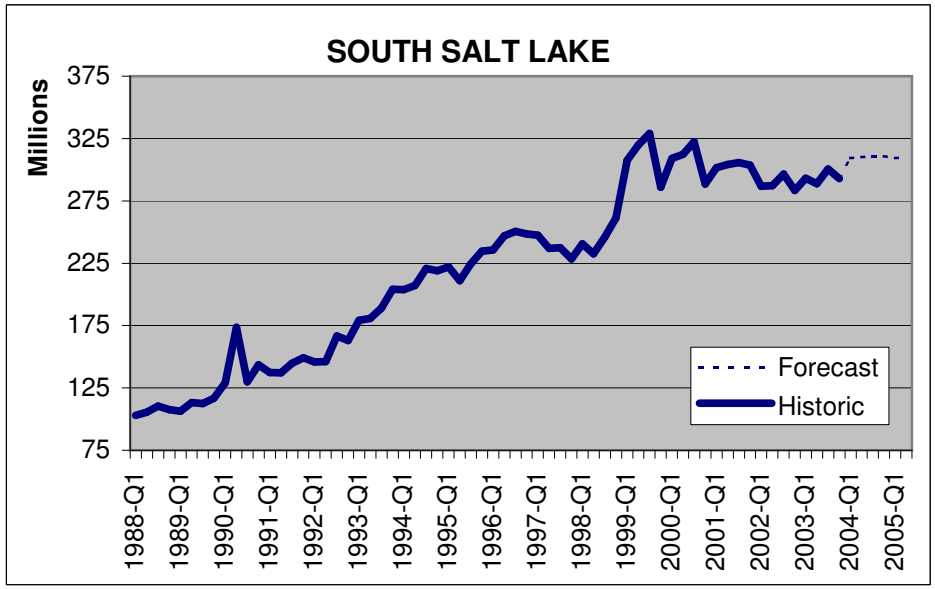


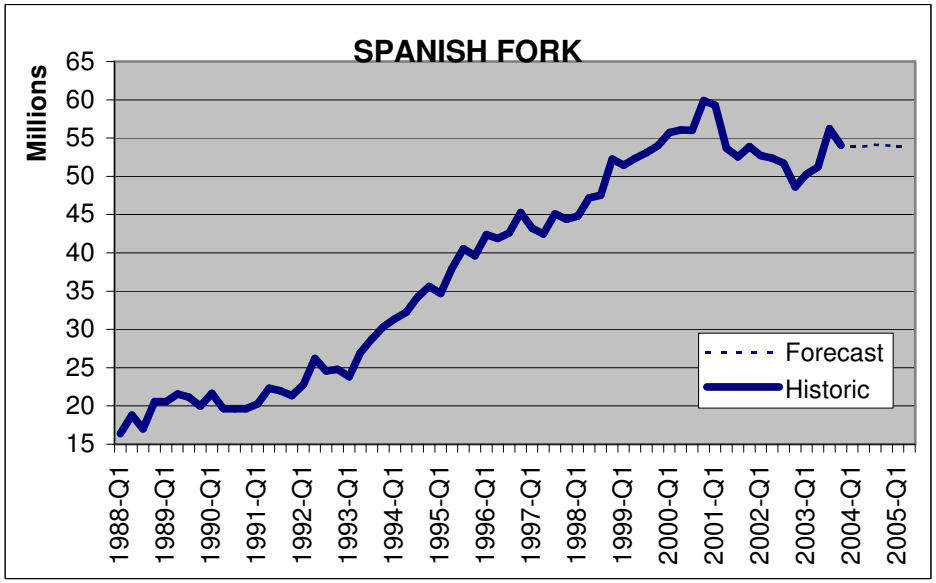


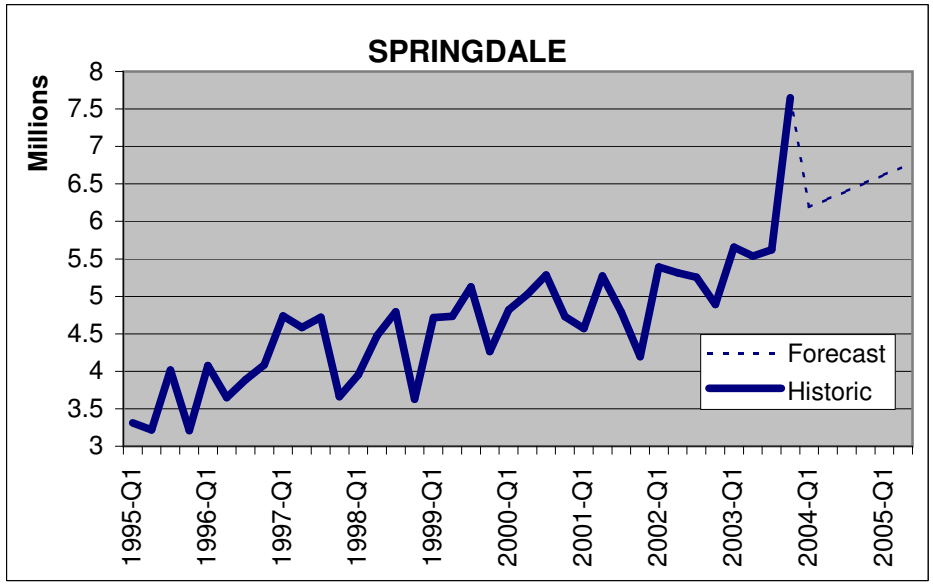


APPENDIX 2(cont) : SEASONALLY ADJUSTED SALES GRAPHS

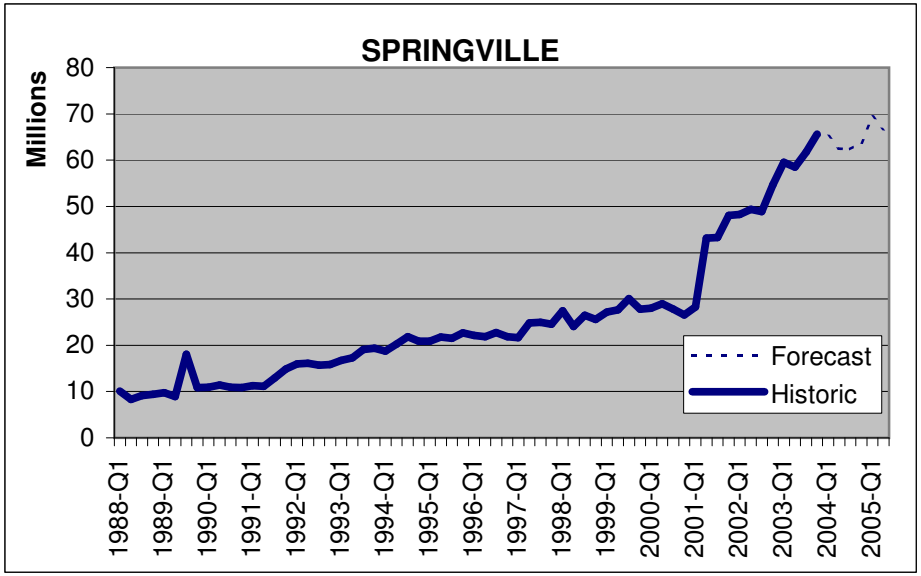


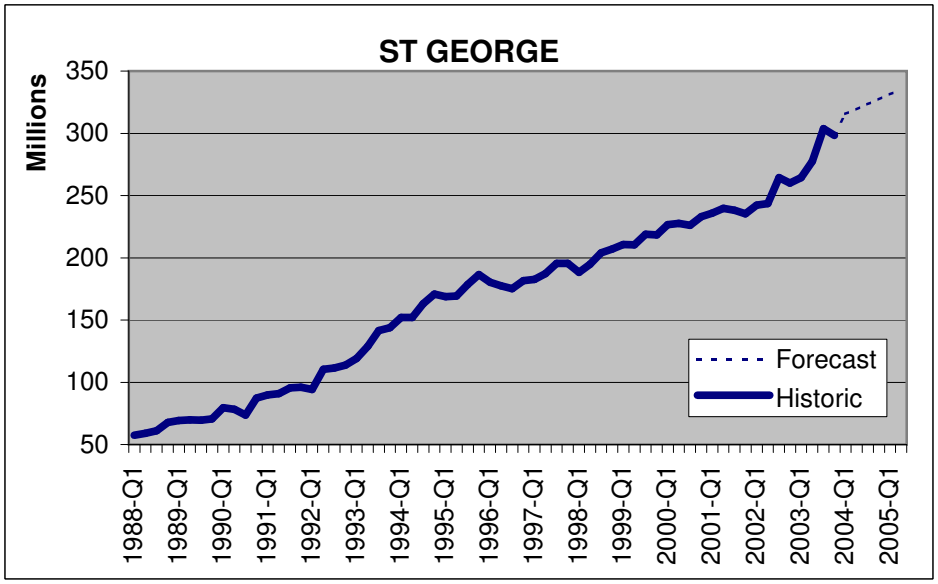


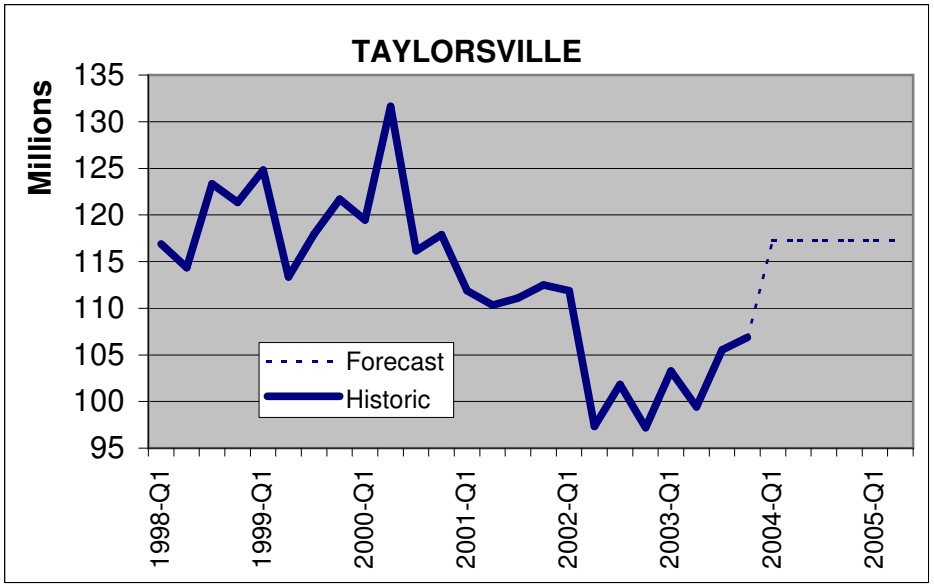


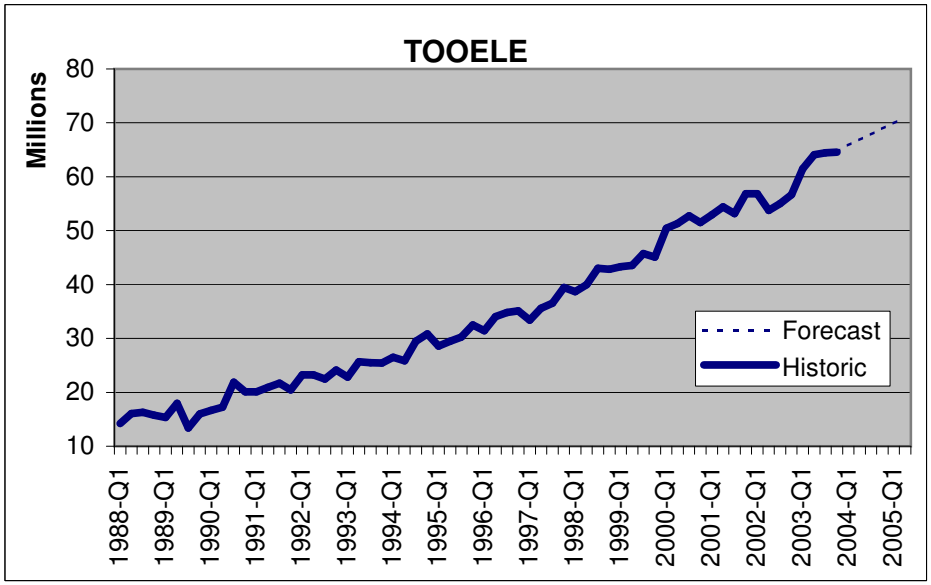


APPENDIX 2(cont) : SEASONALLY ADJUSTED SALES GRAPHS

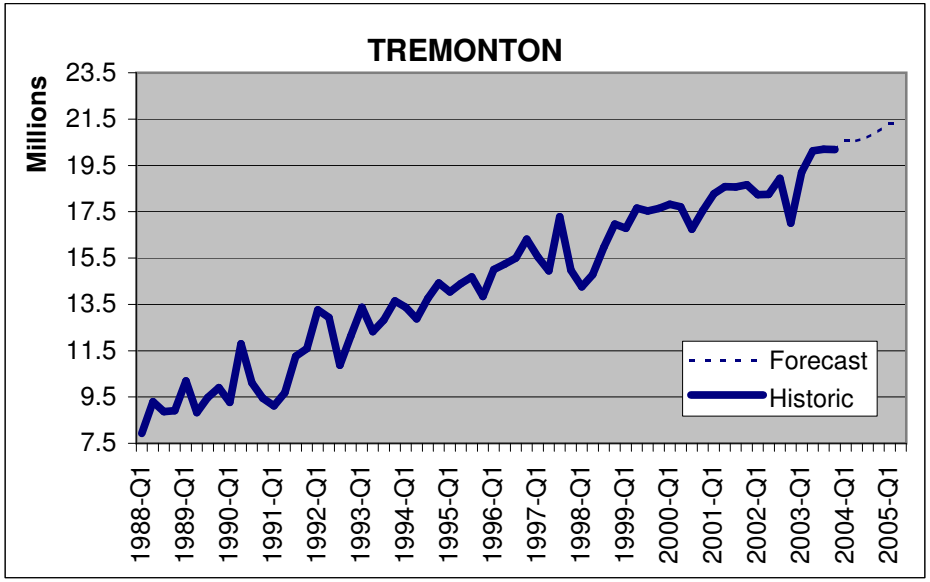


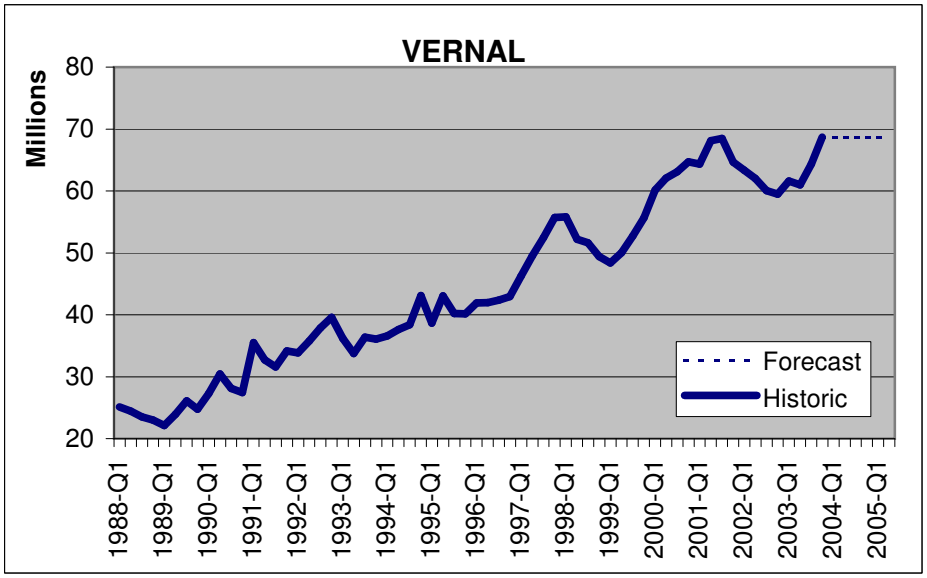


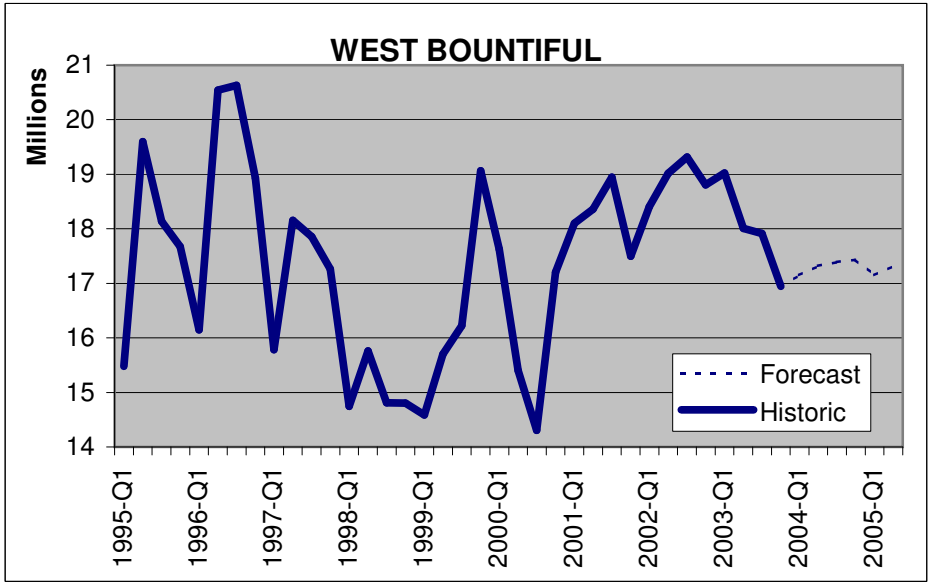


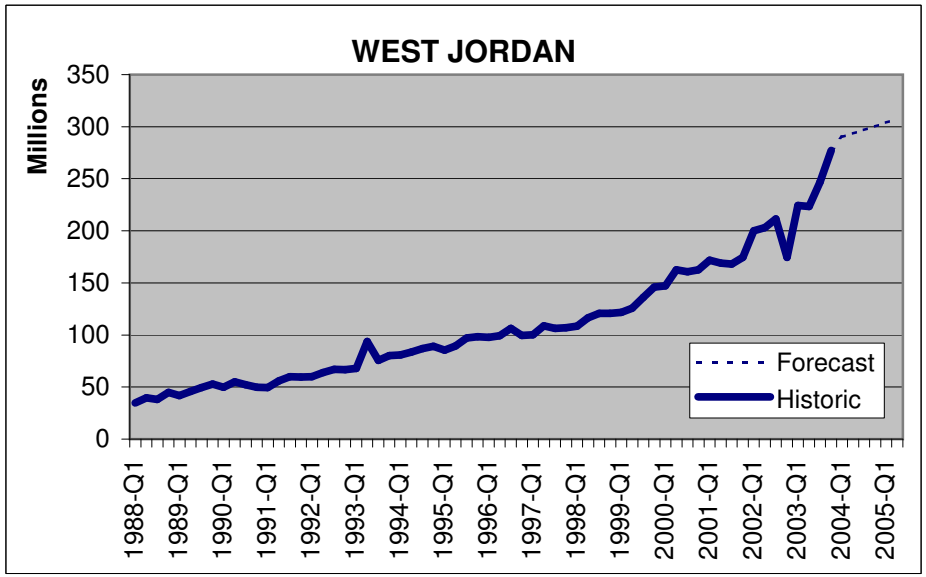
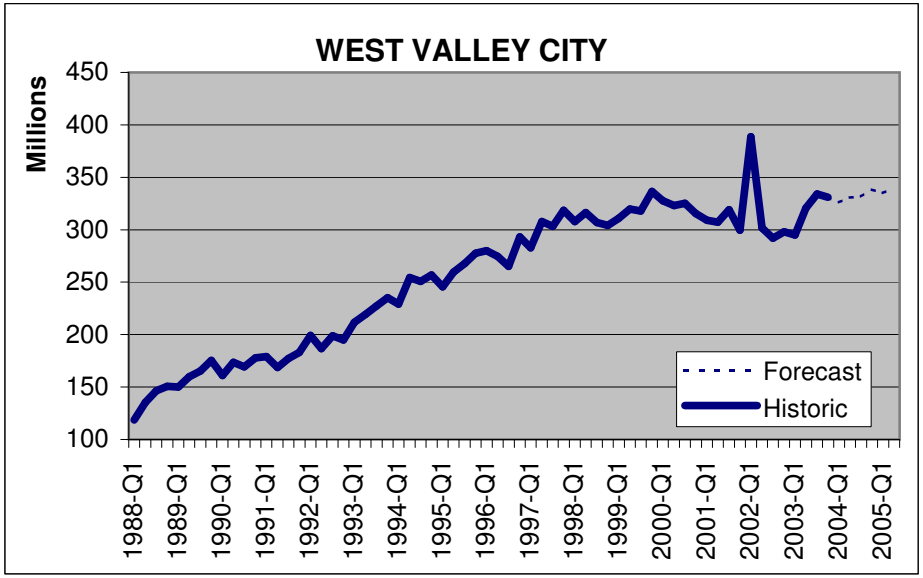
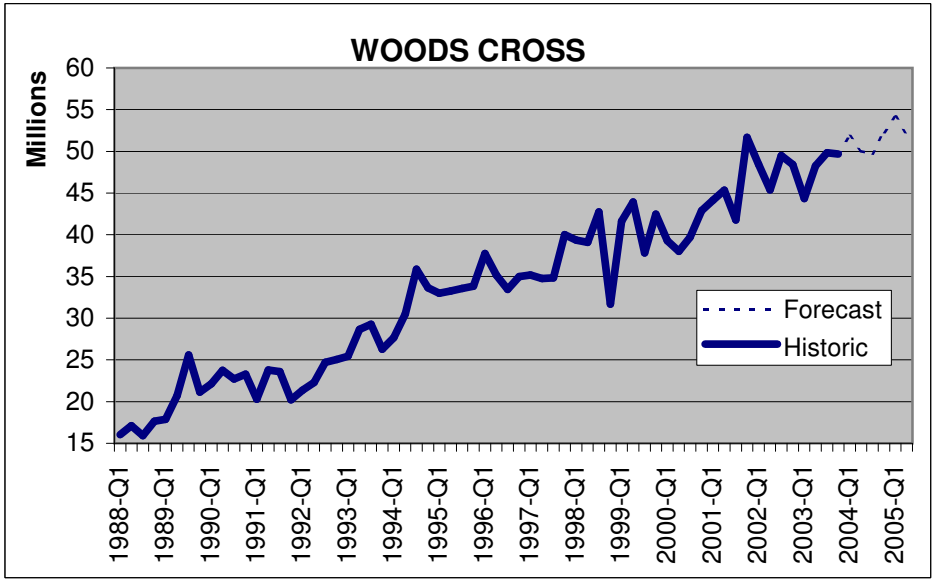


APPENDIX 2(cont) : SEASONALLY ADJUSTED SALES GRAPHS









APPENDIX 2(cont) : SEASONALLY ADJUSTED SALES GRAPHS