

**2040 Economic and Demographic Forecast  
North Front Range Metropolitan Planning Organization  
(NFRMPO)  
2012-2013**

**Steven Fisher, Ph.D.  
Phyllis Resnick, Ph.D.**

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# 2040 Economic and Demographic Forecast North Front Range Metropolitan Planning Organization (NFRMPO) 2012-2013

## Overview

The NFRMPO contracted with Steven B. Fisher, Ph.D., Phyllis Resnick, Ph.D., and Logan Simpson Design to complete a long term economic and demographic forecast for the NFRMPO modeling area including the 8-hour ozone nonattainment northern area. The modeling area includes large portions of Larimer and Weld Counties. The forecast horizon is 2040. This represents a five year increase from the last long term forecast (the 2035 forecast) prepared in 2006, before the Great Recession that began in late 2007 and ended in mid 2009. Data for the project was assembled in 2012. As with previous forecast efforts, work is subject to review by a regional task force. Task force members are shown below.

### Task Force Members

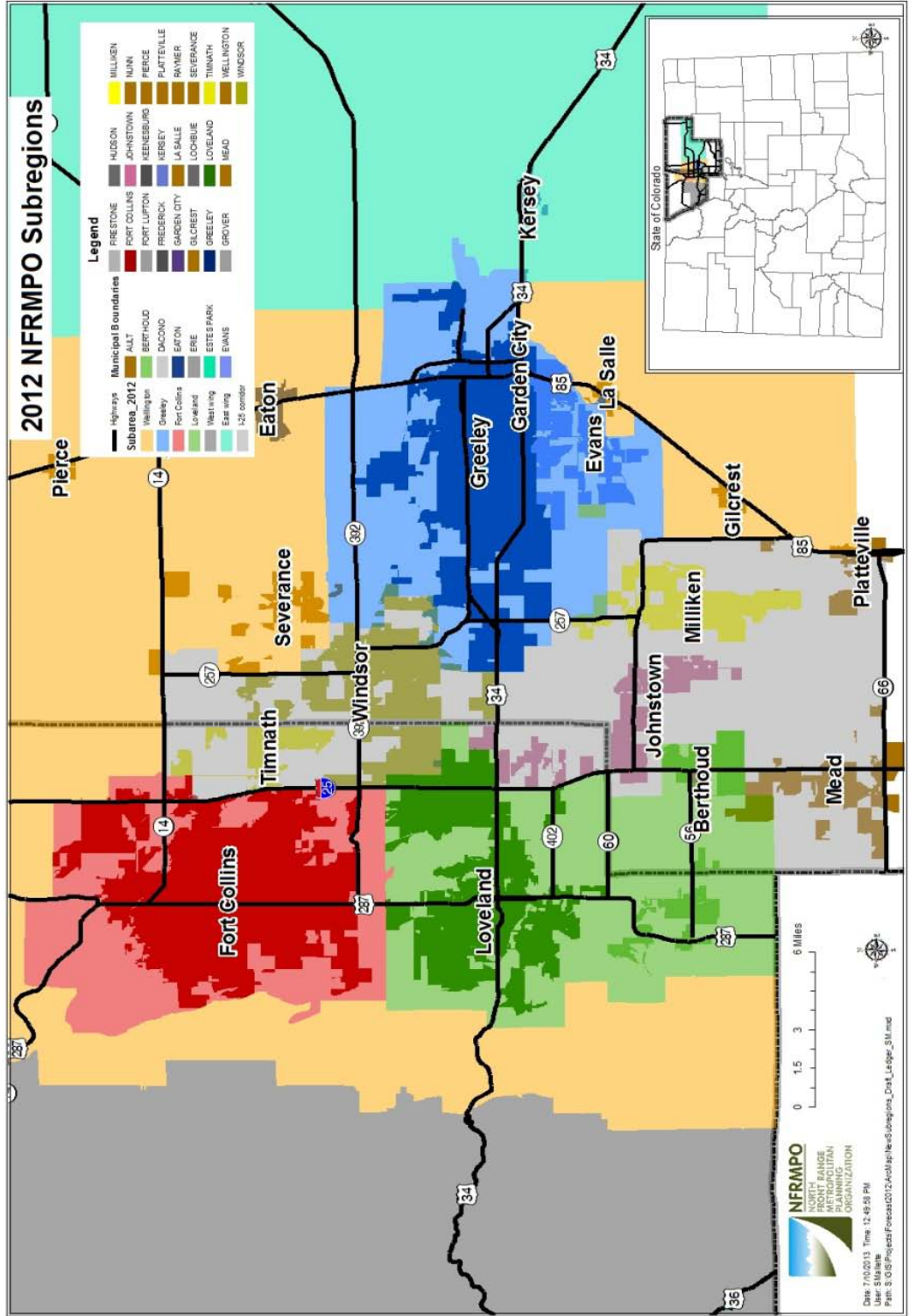
Schools	Thompson Valley	Brian Erickson
	Poudre Valley	Ed Holder
	Weld County	Wayne Eads
Governments	Fort Collins	Tim Wilder
	Loveland	Karl Barton
		Dave Klockeman
		Alan Krmarik
		Justin Stone
	Greeley	Brad Mueller
		Brandon Gossard
	Larimer County	Matt Lafferty
		Russell Legg
		Janet Carter
Hospitals	Weld County	John Lefebvre
	Weld County Treasurer	Scott McPherson
	Banner Health	Kevin Unger
Local Economist	Poudre Valleu	Martin Shields
	CSU	David Thomas
State Demographer	UNC	Elizabeth Garner
		Grant Nulle
Realtor NCBR CDOT		Sean Dougherty
		Molly Armbrister
		Cathy Cole
Economic Development		Jeff Sudmeier
	Larimer County NCEDC	Walt Elish
Other	Weld County- Upstate Colorado	Eric Berglund
	Embrace Northern Colorado	John Daggett

## **The NFRMPO**

The NFRMPO is an association of fifteen governments. NFRMPO is created by federal legislation to improve regional transportation, mobility, and air quality. NFRMPO supports this goal with short and long-range planning. As the MPO, it is responsible for allocation of federal transportation dollars for the region. Current NFRMPO members are Berthoud, Garden City, La Salle, Timnath, Eaton, Greeley, Loveland, Evans, Johnstown, Milliken, Windsor, Fort Collins, Severance, Weld County and Larimer County.

This forecast covers the NFRMPO modeling area as well as the ozone nonattainment northern area as depicted on the map below. For planning purposes, the region is divided into seven subregions as shown below. The subregions are:

1. The central area (shaped like the letter “n”) containing Wellington, Pierce, Eaton, Severance, and other towns.
2. The Greeley region.
3. The Fort Collins region.
4. The Loveland region.
5. The “West Wing” containing Estes Park
6. The “East Wing” containing rural Weld County
7. The I-25 corridor



## **Key Findings of the Forecast**

- For most of the post World War II period, the region enjoyed robust growth. Gains in population, jobs, and income exceeded those of the nation for most of the past 60 years. The region will continue to enjoy growth in excess of the nation, but the gap in growth rates decreases in the out years.
- In 2000 the economy was hit hard by sharp downturns in the technology, telecommunications and travel industries. A modest recovery began in mid-2003, but starting in late 2008, the Great Recession brought significant losses in all areas of the economy.
- Consistent with the nation and the state, the region will age over the forecast horizon. By 2030, 26% of all of the region's households will be headed by an adult 65 years old and over.

## **The Regional and Subregion Control Totals**

The primary goal is to provide forecasts of population, households, and jobs in five-year increments from 2010 to 2040. The regional forecasts are used as “control totals.” The regional forecasts are then subdivided into the seven subregions. The regional control totals and subregion totals are used by NFRMPO staff in transportation and air quality planning.

Population and housing forecasts are strong, consistent with the historical pattern of growth in the North Front Range. Growth rates taper-off somewhat in future years. This tapering-off is also consistent with the national forecast and the State Demographer's forecasts.

The ratio of population to households is expected to decrease slightly as the population ages. The results of the regional forecast are shown below.

## Regional Control Totals: Population, Group Quarters, and Households

	Population	Percent Change	Group Quarters	Percent Change	Households	Percent Change
2010	488,513		12,889		186,459	
2015	537,273	10%	13,375	4%	207,951	12%
2020	603,776	12%	14,537	9%	234,379	13%
2025	679,202	12%	15,412	6%	264,421	13%
2030	753,200	11%	15,927	3%	293,892	11%
2035	825,174	10%	16,123	1%	323,034	10%
2040	896,191	9%	16,300	1%	351,176	9%

Source: Economic Forecast Model, Steven Fisher, PhD and Phyllis Resnick, PhD.

Job growth rates match or slightly exceed population projections. Moody's analytics projects a short term growth burst as the economy recovers from the Great Recession. The regional forecast reflects this.

## Regional Control Totals: Employment

	Wage and Salary Employment	Percent Change	Proprietor Employment	Percent Change	Total Employment	Percent Change
2010	195,270		42,345		237,615	
2015	223,060	14%	57,147	35%	280,207	18%
2020	248,081	11%	66,746	17%	314,827	12%
2025	267,439	8%	75,379	13%	342,818	9%
2030	285,294	7%	83,748	11%	369,042	8%
2035	305,788	7%	93,208	11%	398,996	8%
2040	323,957	6%	104,642	12%	428,599	7%

Source: Economic Forecast Model, Steven Fisher, PhD and Phyllis Resnick, PhD.

## **The Forecast Process**

Drs. Fisher and Resnick developed a regional economic model similar to the one used in the 2035 NFRMPO forecast. The model consists of thirty-six econometric equations described in more detail below.

The regional economic model develops regional controls and subarea population and employment totals. The socioeconomic forecast data sets are inputs into The NFRMPO travel demand model. The travel demand model in turn develops projections of vehicle trips.

In May of 2012, an initial meeting was held with NFRMPO staff. The contract team then commenced assembling data for the forecast.

An initial task force meeting was called in August of 2012 to review historical trends and get feedback to guide the forecast effort. A second meeting was held to review initial results. Minor adjustments to the forecast were made based on feedback from this second meeting. A third task force meeting was held to review the final forecast and the subarea allocations. Results were then presented to the Technical Advisory Committee of the NFRMPO and the NFRMPO Council for review and adoption.

### **Forecast Methodology**

The economic forecast was generated by a model originally developed by Wilson Kendall of the Center for Business and Economic Forecasting (CBEF). For this 2040 analysis, that model was updated and modified by Drs Fisher and Resnick to fit the NFRMPO modeling area and to better match current economic circumstances. The model relies on the fact that the region closely follows the national economy. The model is tailored to the region by using forecasts from the Colorado State Demography Office (SDO). SDO provides detailed projections for population and jobs at the county level. The model tailors SDO demographic variables to the region and separately forecasts employment variables for the region. The model also forecasts key macroeconomic indicators for the region including personal income, housing and household data, inflation, the unemployment rate and other labor force characteristics.

The forecast model data sources

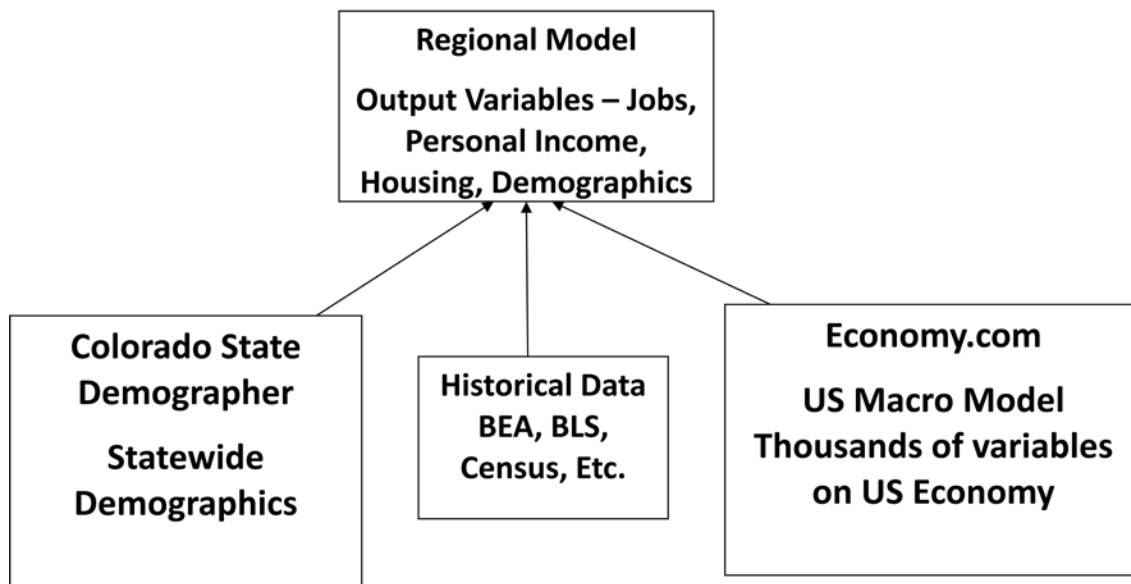
1. The Colorado State Demography Office (SDO) provides detailed demographic history and forecasts to the year 2040 for the state and each of its counties. The data had to be scaled to fit the NFRMPO region, which does not cover Larimer and Weld Counties in



their entirety. The scaling was done using Geographic Information System mapping, U.S. Census data, and Bureau of Labor Statistics data to determine the percentage of population and employment within the NFRMPO region.

2. Moody's Analytics (Economy.com) is the source of national economic history and forecast (to 2040) data on a host of variables including employment, industrial production, inflation, personal income, etc.
3. Federal government data sources (Bureau of Labor Statistics, Bureau of Economic Analysis, and Census Bureau) provide regional historical data.

The three input data sources to the model are diagrammed below.



Econometric equations were established linking the national forecast from economy.com and state demographic forecast to the local variables using the proprietary econometric software Eviews. These equations were examined for statistical significance, adequacy of fit, and common sense. Using these equations, forecasts were made out to 2040. Various diagnostic tests were applied to ensure historical consistency reasonableness. The methodology used by the SDO is described in Appendix 8.

Moody's Analytics uses a proprietary methodology that links thousands of variables and thousands of equations in order to forecast the US economy. These equations link US demographics, assumptions about technology and geo-politics, and assumptions about US monetary policy, fiscal policy, the US dollar and energy prices to develop a most probable trend forecast. A summary of the significant assumptions is discussed below.

## Key US Economy Assumptions

### *Moody's Analytics Methodology*

Moody's describes their overall methodology as follows:

“In the broadest sense, aggregate economic activity is determined by the intersection of the economy's aggregate demand and supply functions. In the short run, fluctuations in economic activity are primarily determined by shifts in aggregate demand. The level of resources and technology available for production is taken as given. Prices and wages adjust slowly to equate aggregate demand and supply. In the longer term, changes in aggregate supply determine the economy's growth potential. The rate of expansion of the resource and technology base of the economy is the principal determinant of economic growth. The U.S. macro model is specified to reflect the interaction between aggregate demand and supply. The model contains more than 1,700 variables, including unpublished intermediate variables, and is designed to produce forecasts that run 30 years. “

More specific short term assumptions are described below.

### *Monetary policy*

The Federal Reserve continues to pursue an extraordinarily aggressive easy monetary policy in response to an economy that is operating well below its potential. Inflation and inflation expectations remain near the Fed's 2% target and are stable. Short-term interest rates remain near zero in the near term. A third round of quantitative easing, involving open-ended purchases of mortgage securities, will continue until the job market has significantly improved. The unemployment rate will likely need to fall below 7% before the program ends, which is not expected to happen before mid-2013. The Fed's extraordinary actions have significantly reduced long-term interest rates, which the Fed expects will take some financial pressure off debtors and prompt investors and creditors to take more risk, thus supporting stock prices and more lending. Highly stimulative monetary policy is expected to taper off starting mid-2013, and by late 2013, the Fed may start raising short-term interest rates. However, monetary policy will not be normalized before early 2016.

### *Fiscal policy*

The federal budget deficit was \$1.1 trillion in the fiscal year 2012, about 7% of GDP. This is down from the \$1.3 trillion deficits in fiscal 2011 and fiscal 2010 and the record \$1.4 trillion in fiscal 2009. These unprecedented deficits reflect the Great Recession and the costs of the government's multifaceted response to it. Policymakers will need to agree to additional long-

term deficit reduction after the 2016 election. Assuming income tax rates rise on upper-income families and \$1 trillion in 10-year spending cuts are implemented as agreed to in last year's Treasury debt-ceiling deal, then \$2.5 trillion more in 10-year spending cuts or tax revenue increases will be needed to achieve long-term fiscal sustainability. Most of this is assumed to come from changes to the Medicare and Medicaid program. Some modest tax reform is also expected. There are clearly many risks to this outlook, but the key assumption is that policymakers are able to come sufficiently to terms to achieve fiscal sustainability by the end of the decade.

### ***U.S. dollar***

The U.S. dollar is holding its own given the turmoil in Europe and weaker growth in the emerging world. Despite the fiscal problems of the U.S., with no obvious alternative safe currency, investors are largely staying put. From a long-run perspective, the U.S. dollar is appropriately valued against the euro, modestly undervalued against the Canadian dollar and Japanese yen, and a bit overvalued against the British pound. The dollar will right itself against these currencies slowly over the next several years. The dollar also remains overvalued against the Chinese yuan and is expected to depreciate by 2% to 3% per annum over the next four to five years. Across all countries, on a broad trade-weighted basis, the dollar will depreciate modestly over the long run.

### ***Energy prices.***

Oil prices have weakened considerably as concerns over the Iranian oil embargo have faded and global growth and demand for oil have remained tepid. West Texas Intermediate will stay below \$100 per barrel through the rest of the year, assuming that tensions with Iran do not boil over into an overt conflict and Saudi Arabia increases its oil production to fill the void. Longer run, oil and gasoline prices are expected to trend higher, just above the overall rate of inflation as global oil production struggles to keep pace with increasing demand from faster-growing, less energy-efficient emerging economies. New technologies used to extract oil and natural gas from shale will promote domestic production and temper growth in prices. A glut of natural gas will persist, keeping natural gas prices low during the next several years.

### ***Absence of Major Shocks to Economy.***

The Economy.com forecast does not attempt to forecast future shocks to the economy or business cycles as defined by the National Bureau of Economic Research. For example, a significant deviation from the forecast's assumptions concerning geopolitical events could result in far different outcomes than those currently projected. The forecast does not incorporate any global disruptions that would significantly affect the performance of the economy. Such disruptions would include major wars, an acceleration of terrorist activities, significant shifts in international trade, or drastic climate change.

The Moody's Economy.com forecast shows long term low inflation and low interest rates. There is steady growth in all the major indicators. There is no explosion of energy prices.

### **Key U.S. Variables from Economy.com.**

<b>US Variable</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
CPI: Urban Consumer - All Items, (Index 1982-84=100)	218.08	247.51	276.54	308.44	341.57	374.47	408.91
Average Annual Pct Change		2.6%	2.2%	2.2%	2.1%	1.9%	1.8%
Retail Gasoline Prices	2.84	4.12	4.47	4.86	5.29	5.78	6.32
Employment: Manufacturing (Million)	11.53	12.10	11.68	10.94	10.25	9.64	8.99
Employment: Total Nonagricultural (Million)	129.86	141.56	149.23	153.52	157.60	162.97	167.32
Housing Starts: Total (Million)	0.59	2.02	1.65	1.67	1.67	1.67	1.67
US Unemployment Rate	9.63	6.35	5.47	5.77	5.97	6.02	6.13
US Population: Total	309.59	324.23	340.00	355.98	371.95	387.89	403.94
Interest Rates: 10-Year	3.21	4.59	4.69	4.67	4.62	4.54	4.37
Retail Sales (\$ Billion)	4,306	5,540	6,624	7,867	9,252	10,836	12,698
US Personal Income (\$ Billion)	12,322	15,948	19,916	24,160	29,088	35,114	41,801
US Existing Single-Family Home Price: Avg, (\$Thou)	220.15	266.90	307.47	366.85	434.26	513.04	605.33

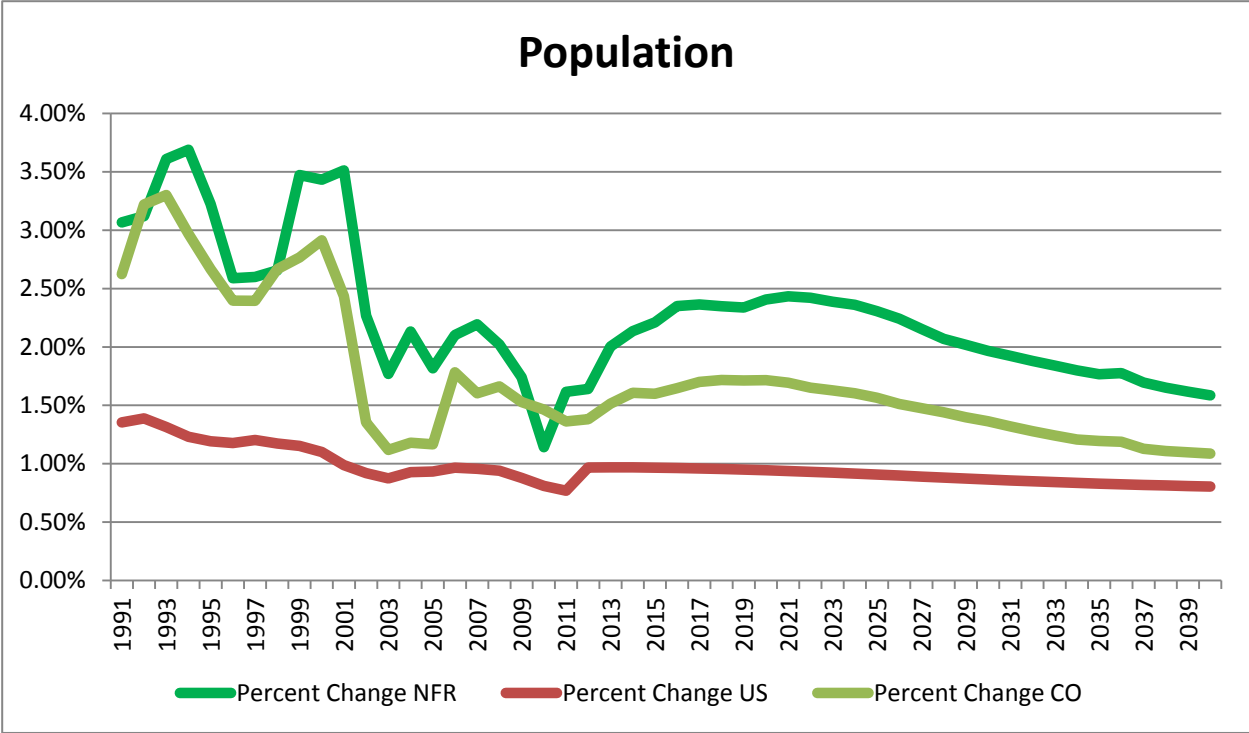
## **Summary of Regional Forecast Results**

### ***Population***

The NFRMPO region is expected to grow steadily during the next three decades, surpassing both the US and Colorado economies. In particular, both population and employment are expected to grow faster than the US as a whole. The NFRMPO region has ample room to grow and has positive attitudes toward economic growth. Surveys of local planning staffs indicate that these projections are far below the estimated buildout capacities of the jurisdictions. Task force members expressed an optimistic outlook on economic growth.

Population growth is stimulated by natural increase (births less deaths) and strong in-migration. (See appendix 2.) Population growth fuels economic growth and vice-versa.

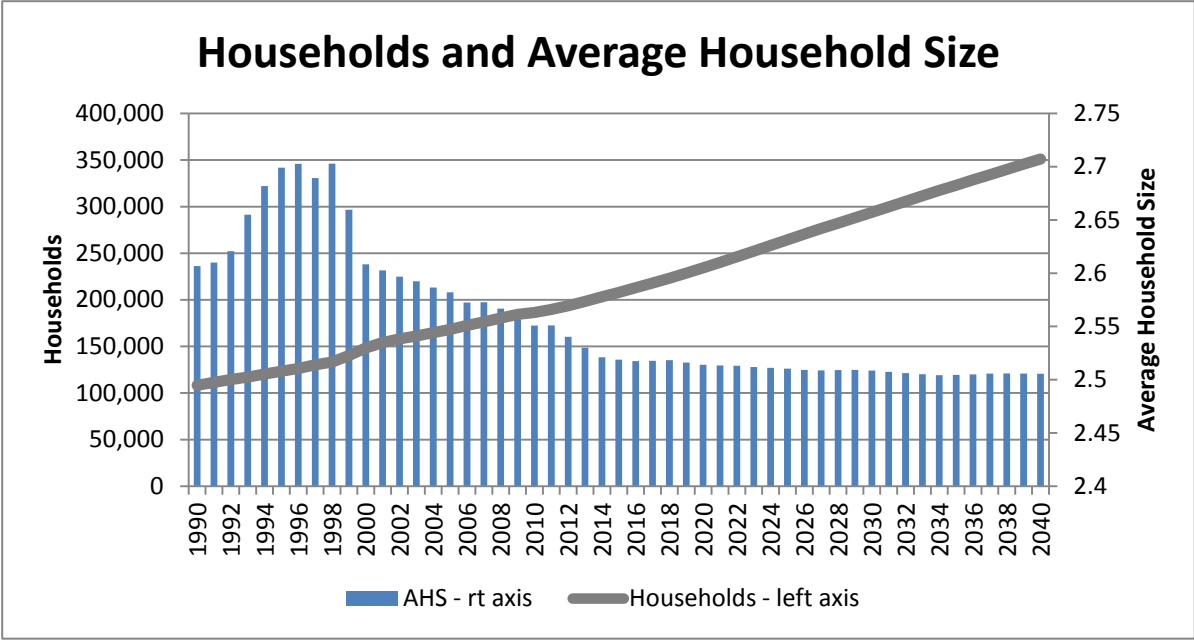
One way to look at the growth of the region is to compare growth in NFRMPO population with growth in Colorado and the US. The NFRMPO region significantly outgrew both the US and Colorado in population during the 1990's, and 2000's and is projected to continue this trend.



Source: Economic Forecast Model, Steven Fisher, PhD and Phyllis Resnick, PhD.

***Households and Household Size***

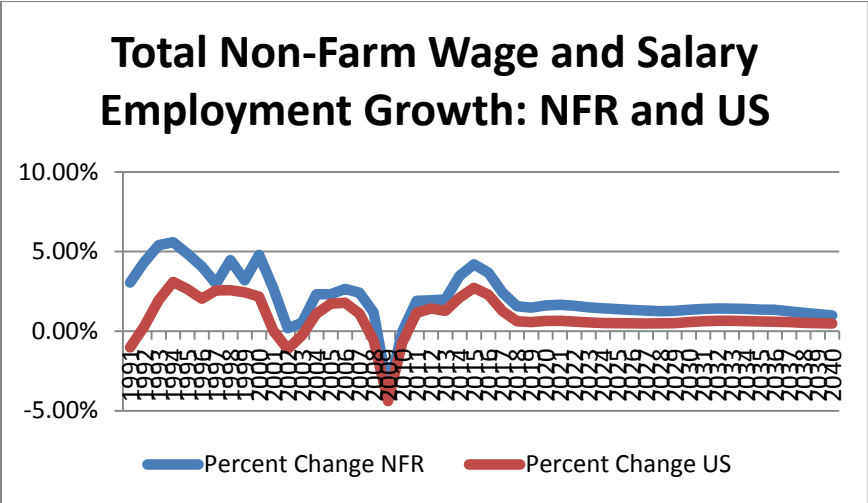
Household numbers continue to grow. The chart below shows the region’s extraordinary growth in household size during the 1990’s. The 1990’s were a boom era in all of the North Front Range. The increase in household size occurred because home builders could not keep pace with people moving into Colorado looking for jobs. The boom of the 1990’s ended abruptly with the high tech crash. Household size declined rapidly. It is expected to decline through 2014 and then stabilize as the job market stabilizes and home building reaches equilibrium with population. Household size remains low over the forecast period as the population ages. Older people generally have smaller household sizes.



Source: Economic Forecast Model, Steven Fisher, PhD and Phyllis Resnick, PhD.

**Employment**

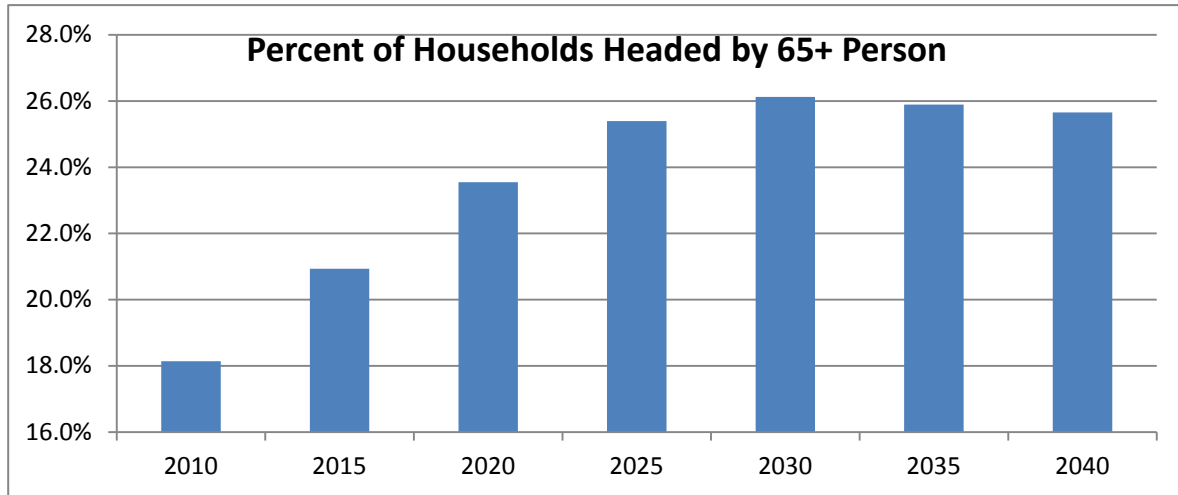
Population drives employment and vice-versa. Just as the NFRMPO outgrows the state in population, so does it outgrow the state in employment. This relationship is projected to remain throughout the forecast future. The chart below compares the growth of NFRMPO nonfarm wage and salary employment with that of the US. Nonfarm wage and salary employment is the most widely publicized measure of jobs. The data comes from the Bureau of Labor Statistics monthly survey of employers (Current Employment Survey.)



Source: Economic Forecast Model, Steven Fisher, PhD and Phyllis Resnick, PhD.

### ***Aging of the Population***

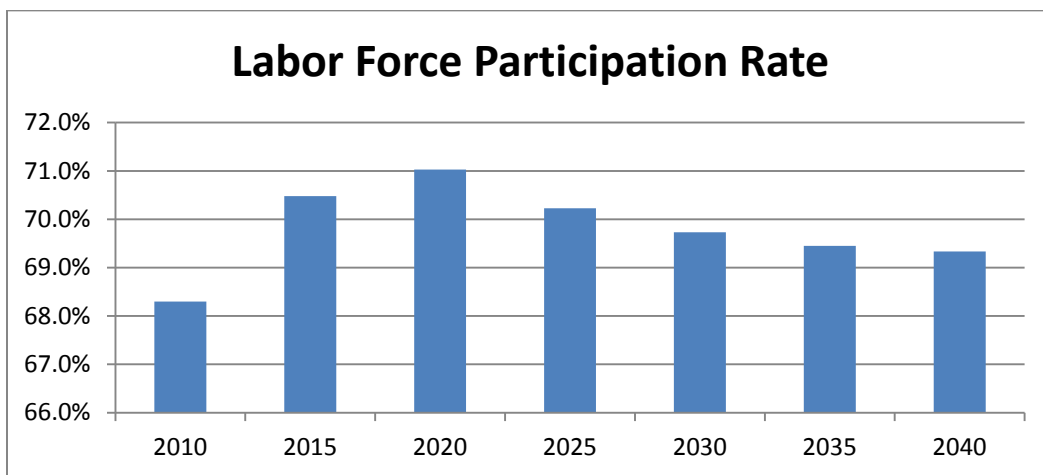
By 2030, 26% of households will be headed by a person 65 or over. After 2030, this percentage decreases slightly. This phenomenon is the aging and dying of the post war baby boom population. These estimates originate with the State Demography Office and are scaled to fit the NFRMPO. This phenomenon has an effect on the labor force participation rate.



Source: Economic Forecast Model, Steven Fisher, PhD and Phyllis Resnick, PhD.

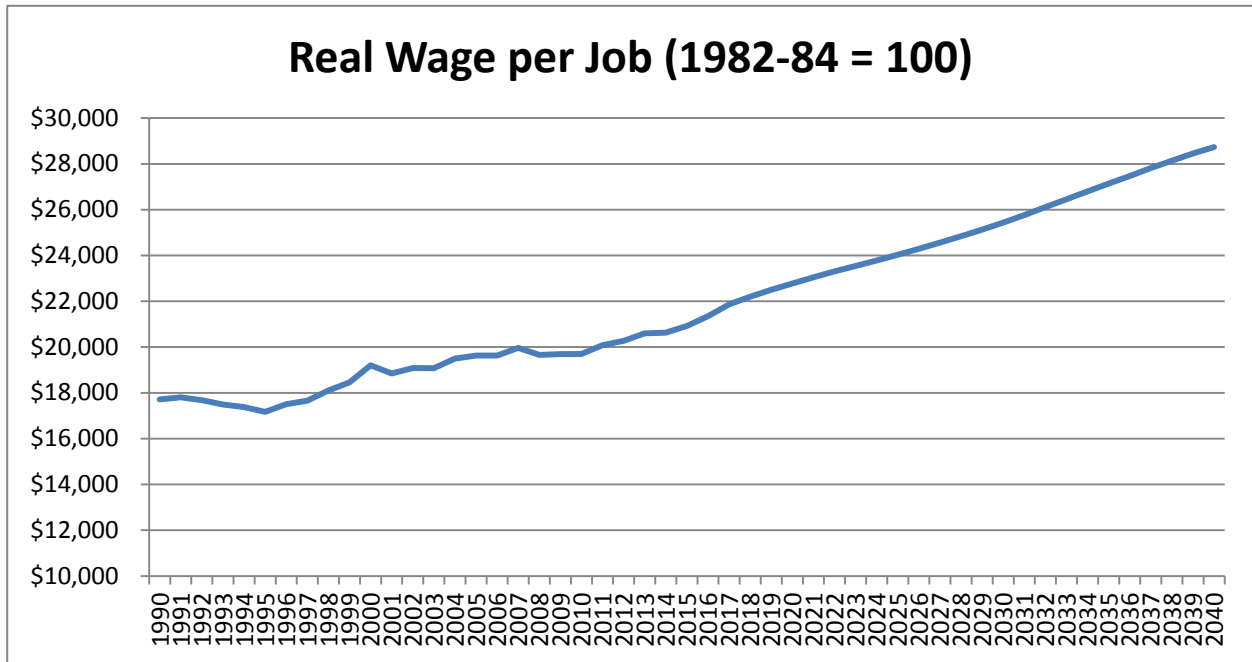
### ***Labor Force Participation Rate, Wages, and Job to Population Ratio***

The Labor Force Participation Rate is defined as the percent of the civilian non-institutional population aged 16 and over that is working or looking for work. In the NFRMPO the Labor Force Participation rate grows then declines due to the aging of the population.



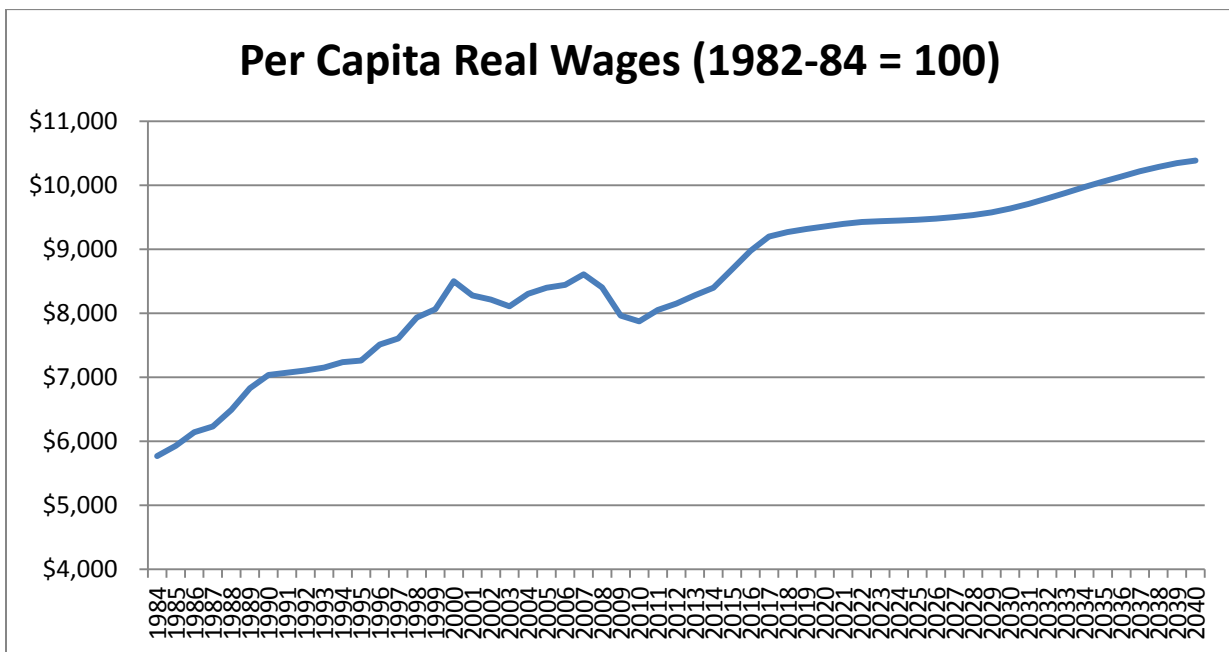
Source: Economic Forecast Model, Steven Fisher, PhD and Phyllis Resnick, PhD.

Because of falling labor force participation rates, real wages per worker are expected to grow steadily. Those workers remaining in the labor force do better financially as time goes on. The vertical axis is constant dollars based on the 1982-1984 period.



Source: Economic Forecast Model, Steven Fisher, PhD and Phyllis Resnick, PhD.

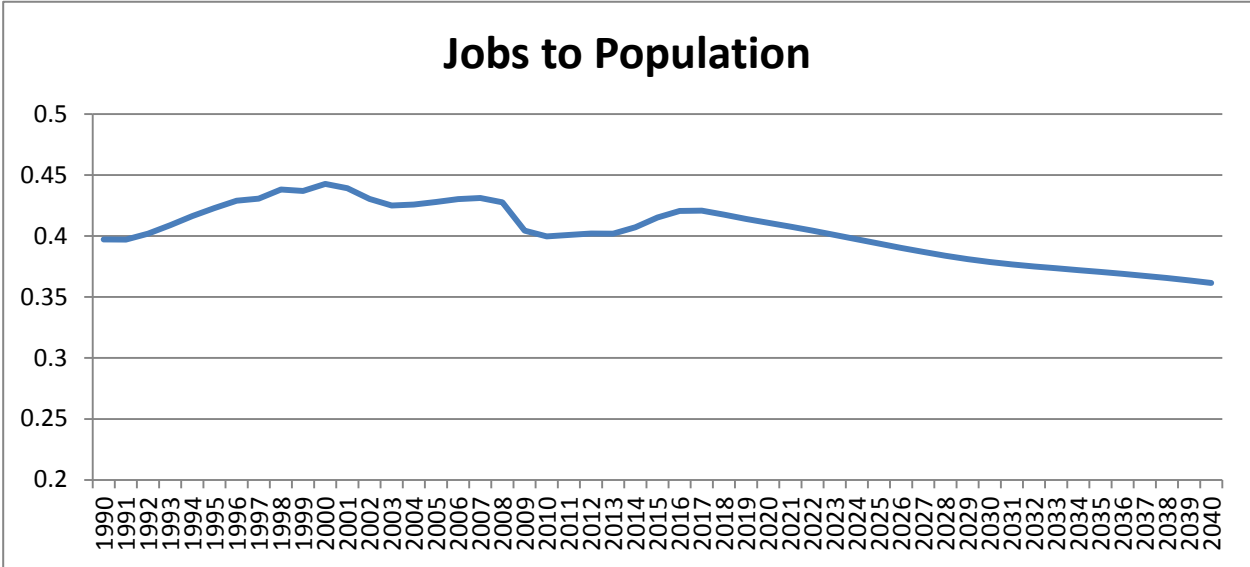
On a per capita, basis, though, real wages grow more slowly than in the 1980's and 1990's. This is because non-workers are included in the per-capita measure.



Source: Economic Forecast Model, Steven Fisher, PhD and Phyllis Resnick, PhD.



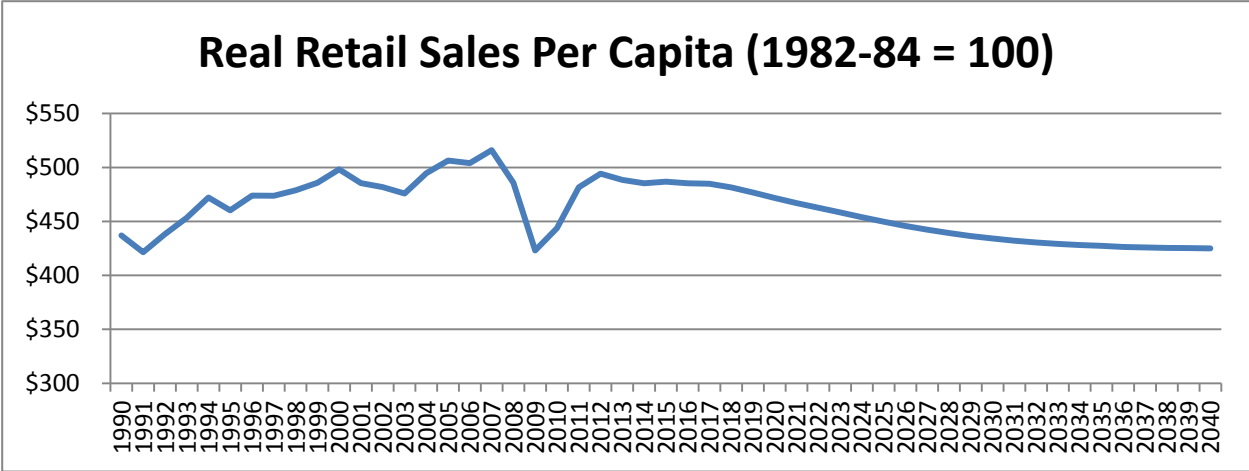
The lower participation rate affects the jobs to population ratio, but not by much. The job to population ratio is important as a diagnostic. The job to population ratio should be fairly stable, because population grows steadily. Notice that the ratio was highest during the boom years of the 1990's and 2000's, then dropped during the Great Recession. It rises during the recovery from the Great Recession, then declines slowly as the aging population drops out of the labor force.



Source: Economic Forecast Model, Steven Fisher, PhD and Phyllis Resnick, PhD.

***Retail Trade Sales***

Retail trade sales are defined as sales at brick and mortar retail trade establishments. On a per-capita basis, these sales took a big hit during the Great Recession, then rebounded, but not to their previous peak. Inflation adjusted sales are expected to decline over the forecast period as internet sales grow, and as the aging population spends more on services, especially medical services.



Source: Economic Forecast Model, Steven Fisher, PhD and Phyllis Resnick, PhD.

### Key Regional Forecast Variables

Key regional forecast variables are shown below. The low long term inflation rates are consistent with Moody’s Analytics forecast.

Item	2010	2015	2020	2025	2030	2035	2040
CPI (1982-84=100)	212.4	249.8	279.3	313.7	348.5	383.2	419.5
CPI Avg Annual Pct Chg		3.5%	2.4%	2.5%	2.2%	2.0%	1.9%
Housing Permits	1,791	7,559	7,010	7,524	7,559	7,647	7,725
Labor Force	268,233	291,128	331,041	371,108	411,440	451,488	492,553
Employment: Mfg (Thousand)	19.2	22.2	23.2	24.1	25.0	26.2	27.0
Population	488,513	537,273	603,776	679,202	753,200	825,174	896,191
Unemployment Rate	8.3	5.8	5.3	5.6	5.8	5.8	5.9
Retail Trade Sales (\$Million)	515,838	727,611	890,847	1,076,341	1,283,765	1,527,868	1,811,646
Wage and Salary Employment (Thousand)	195.3	223.1	248.1	267.4	285.3	305.8	324.0
Wage and Salary Income (\$Million)	8,172,875	11,657,590	15,776,058	20,160,033	25,293,007	31,802,245	39,046,118
Personal Income (\$Million)	17,002,355	22,946,970	30,117,268	37,947,983	47,023,085	58,347,955	71,190,843

Source: Economic Forecast Model, Steven Fisher, PhD and Phyllis Resnick, PhD.

## **Risk Factors to the Forecast**

During task force discussions several risks to the forecast were discussed. Any violation of the assumptions described in the methodology section above could affect the forecast. Some of the most prominent are outlined below.

### ***Water***

The most frequently discussed risk was water. Water supply is scarce and uncertain. The forecast assumes implicitly that water will not constrain economic growth. Should water shortages affect the region, growth of all kinds will be constrained.

### ***Transportation Infrastructure***

In order to handle the considerable economic and demographic growth of the region, transportation infrastructure must expand. This expansion might take the form of increased roadway, mass transit, or alternate modes of transportation such as bicycle and pedestrian. Without mobility, the growth of the region will slow.

### ***Geopolitical Conflict***

The forecast implicitly assumes that no major geopolitical events constrain National, and therefore regional economic growth. Slower national growth implies slower regional growth.

## **Subregion Allocation**

The 2040 economic and demographic control totals were allocated to the seven subregions of the NFRMPO. Subregion control totals assist in the calibration and validation process used in land use allocation modeling that distributes the subregion data to the Traffic Analysis Zone (TAZ) level. They also allow local government staff the ability to review information at a more localized level. As stated in the overview, the subregions are:

1. Wellington
2. Greeley/Evans
3. Ft. Collins
4. Loveland
5. Larimer County
6. Weld County
7. The I-25 corridor

### **Subregion Allocation Process**

In 2004, the planning firm AECOM assisted the NFRMPO in developing the Land Use Allocation Model (LUAM). The LUAM is a parcel/land use-based growth model built in a Geographic Information System (GIS) platform in conjunction with CommunityViz modeling software. This model draws on land use classifications and densities to accurately distribute household and employment projections. The gravity model distributed households and employment to the TAZ level across the region based on the land use classification and attractiveness factors. The purpose of the LUAM is to provide regional planning organizations a tool that projects future population and employment to support decisions regarding growth, transportation and economic development.

#### **Step 1. Base Data, Households and Population**

The allocation to the subregions began with data from the *Land Use Allocation Model Update* (September 2011) published by NFRMPO. Base household data was taken from the 2011 Update (Table 5) table that shows subregion household totals used for the LUAM. At that time, NFRMPO consisted of six regions. Data was provided for 2009 and projected for 2015, 2025, and 2035. The table below depicts the LUAM Update 2011 subregion distribution of households.

Households		2009	2015	2025	2035
Exurban	1	37,914	45,842	60,005	72,088
Greeley/Evans	2	45,440	51,980	65,727	77,092
Ft. Collins	3	67,187	71,763	80,910	87,725
Loveland	4	31,893	37,263	45,670	52,425
Larimer	5	8,557	9,551	11,473	13,781
Weld	6	3,158	3,525	4,234	5,086
	Total	194,149	219,924	268,019	308,197

Source: Land Use Allocation Model Update, September 2011

## Step 2. Break out Subregion Seven

Subregion 7 (the I-25 Corridor) was extracted from subregions 1, 2 & 4 using ArcGis. The TAZ's within subregion seven were summarized to develop the total number of households and employment within the subregion. The *total* number of households remains unchanged during this process. The regions were relabeled to better reflect their locations.

Households		2009	2015	2025	2035
Wellington	1	20,721	23,811	27,582	31,355
Greeley/Evans	2	45,433	51,295	64,751	76,071
Ft. Collins	3	67,187	71,763	80,910	87,725
Loveland	4	31,824	37,194	45,503	52,175
Larimer	5	8,557	9,551	11,473	13,781
Weld	6	3,158	3,522	4,234	5,086
I-25	7	17,269	22,785	33,564	42,003
	Total	194,149	219,921	268,017	308,196

## Step 3. Determine Percentage Shares

From the table in Step 2, percentage shares were computed.

Households		2009	2015	2025	2035
Wellington	1	10.7%	10.8%	10.3%	10.2%
Greeley/Evans	2	23.4%	23.3%	24.2%	24.7%
Ft. Collins	3	34.6%	32.6%	30.2%	28.5%
Loveland	4	16.4%	16.9%	17.0%	16.9%
Larimer	5	4.4%	4.3%	4.3%	4.5%
Weld	6	1.6%	1.6%	1.6%	1.7%
I-25	7	8.9%	10.4%	12.5%	13.6%
	Total	100.0%	100.0%	100.0%	100.0%

#### Step 4. Expand Percentages to Accommodate Five Year Increments

Projections for this forecast report are given in five year increments, so column 2015 in Step 3 is duplicated for 2020, 2025 is duplicated for 2030, and 2035 is duplicated for 2040.

Households		2009	2015	2020	2025	2030	2035	2040
Wellington	1	10.7%	10.8%	10.8%	10.3%	10.3%	10.2%	10.2%
Greeley/Evans	2	23.4%	23.3%	23.3%	24.2%	24.2%	24.7%	24.7%
Ft. Collins	3	34.6%	32.6%	32.6%	30.2%	30.2%	28.5%	28.5%
Loveland	4	16.4%	16.9%	16.9%	17.0%	17.0%	16.9%	16.9%
Larimer	5	4.4%	4.3%	4.3%	4.3%	4.3%	4.5%	4.5%
Weld	6	1.6%	1.6%	1.6%	1.6%	1.6%	1.7%	1.7%
I-25	7	8.9%	10.4%	10.4%	12.5%	12.5%	13.6%	13.6%
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

#### Step 5. Allocate Regional Control Totals to Get Preliminary Subregion Control Totals

The NFRMPO regional control totals (repeated in the table below) are multiplied by the respective percentages from step 4 to get preliminary subregion allocations. The overall control totals are consistent with the forecast for the region as a whole.

Regional Totals		186,459	207,951	234,379	264,421	293,892	323,034	351,176
Households		2010	2015	2020	2025	2030	2035	2040
Wellington	1	19,900	22,515	25,376	27,212	30,245	32,865	35,728
Greeley/Evans	2	43,633	48,503	54,667	63,882	71,002	79,733	86,680
Ft. Collins	3	64,526	67,857	76,481	79,824	88,721	91,948	99,959
Loveland	4	30,563	35,170	39,639	44,892	49,896	54,687	59,451
Larimer	5	8,218	9,031	10,179	11,319	12,581	14,444	15,703
Weld	6	3,033	3,330	3,754	4,177	4,643	5,331	5,795
I-25	7	16,585	21,545	24,283	33,114	36,804	44,025	47,861
	Total	186,459	207,951	234,379	264,421	293,892	323,034	351,176

#### Step 6. Present the Preliminary Subregion Allocation to the Task Force Along With Buildout Capacities

Buildout capacities were derived from the LUAM and from discussions with local planning departments. It is clear that no subregion is close to its buildout capacity. The total buildout capacity for the region is 857,686 with the projected households for 2040 at 351,176.

Households		Buildout Capacity	2040 Variance vs. Buildout Capacity
Wellington	1	140,826	294%
Greeley/Evans	2	197,690	128%
Ft. Collins	3	153,184	53%
Loveland	4	103,633	74%
Larimer	5	40,265	156%
Weld	6	24,067	315%
I-25	7	198,021	314%
	Total	857,686	144%

### Step 7. Adjustments Based On 2012 Assessor Data. Add Households to Ft. Collins and Take Households from Other Subregions for 2015

Recent Assessor data for 2012 showed that the 2015 projection for the Ft. Collins subregion was too low. That is, the original 2015 projection for Ft. Collins showed a decrease from the 2012 Assessor data. A small manual adjustment was made to correct this. In order to offset the increase to Ft. Collins, a decrease was made to the Wellington, Estes Park, and I-25 subregions. The specific adjustments are shown in the table below. Adjustments were made only to 2015.

Households		2015
Wellington	1	(1,272)
Greeley/Evans	2	(0)
Ft. Collins	3	3,000
Loveland	4	0
Estes	5	(510)
Weld	6	(0)
I-25	7	(1,217)
	Total	-

### Step 8. Adjusted Household Numbers

The table below shows the households from Step 5 with the adjustments noted in Step 7.

Households		2010	2015	2020	2025	2030	2035	2040
Wellington	1	19,900	21,243	25,376	27,212	30,245	32,865	35,728
Greeley/Evans	2	43,633	48,503	54,667	63,882	71,002	79,733	86,680
Ft. Collins	3	64,526	70,857	76,481	79,824	88,721	91,948	99,959
Loveland	4	30,563	35,170	39,639	44,892	49,896	54,687	59,451
Estes	5	8,218	8,521	10,179	11,319	12,581	14,444	15,703
Weld	6	3,033	3,330	3,754	4,177	4,643	5,331	5,795
I-25	7	16,585	20,328	24,283	33,114	36,804	44,025	47,861
	Total	186,459	207,951	234,379	264,421	293,892	323,034	351,176

## Step 9. Multiply Household Numbers by Average Household Size to Get Population in Households

Household population and group quarters population are two separate concepts. Household population is total population minus group quarters population. To get subregion population in households, household numbers were multiplied by region-wide average household size (derived from the region wide control totals) to get subregion household population. Minor adjustments were made for rounding errors.

Household Size		2.55	2.52	2.51	2.51	2.51	2.50	2.51
Household Population		2010	2015	2020	2025	2030	2035	2040
Wellington	1	50,762	53,518	63,796	68,312	75,874	82,312	89,518
Greeley/Evans	2	111,301	122,195	137,435	160,366	178,119	199,694	217,182
Ft.Collins	3	164,594	178,509	192,277	200,389	222,570	230,290	250,450
Loveland	4	77,962	88,605	99,654	112,695	125,172	136,966	148,958
Estes	5	20,963	21,467	25,590	28,415	31,561	36,176	39,345
Weld	6	7,736	8,389	9,438	10,486	11,648	13,352	14,520
I-25	7	42,305	51,213	61,049	83,128	92,328	110,262	119,918
	Total	475,624	523,898	589,239	663,790	737,273	809,051	879,891

## Step 10. Allocate Group Quarters (GQ) Population to Subregions

### Step 10a. Obtain 2010 Group Quarters Population from State Demography Office

Group quarters population data from the State Demography Office was obtained for 2010.

GQ Population		2010	Percent
Wellington	1	105	1%
Greeley/Evans	2	4,673	36%
Ft.Collins	3	6,823	53%
Loveland	4	771	6%
Estes	5	410	3%
Weld	6	10	0%
I-25	7	99	1%
	Total	12,889	100%

### Step 10b. Apply 2010 Percent Share to Group Quarters Control Totals

The 2010 percent share of group quarters by subregion was applied to control totals to allocate group quarters population.



<b>GQ Population</b>		<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Wellington	1	105	109	118	125	130	131	133
Greeley/Evans	2	4,673	4,849	5,270	5,588	5,774	5,845	5,909
Ft.Collins	3	6,823	7,080	7,695	8,158	8,431	8,534	8,628
Loveland	4	771	800	869	921	952	964	974
Estes	5	410	426	463	490	507	513	519
Weld	6	10	10	11	11	12	12	12
I-25	7	99	102	111	118	122	123	125
	Total	12,889	13,375	14,537	15,412	15,927	16,123	16,300

### Step 10c. Add Group Quarters Population to Household Population to Obtain Total Population

<b>Total Population</b>		<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Wellington	1	50,867	53,627	63,915	68,437	76,004	82,443	89,651
Greeley/Evans	2	115,974	127,044	142,705	165,954	183,894	205,540	223,091
Ft.Collins	3	171,417	185,589	199,971	208,548	231,001	238,825	259,078
Loveland	4	78,733	89,405	100,523	113,616	126,124	137,930	149,932
Estes	5	21,373	21,893	26,053	28,905	32,068	36,689	39,863
Weld	6	7,746	8,399	9,449	10,497	11,660	13,364	14,532
I-25	7	42,404	51,315	61,160	83,246	92,450	110,386	120,043
	Total	488,513	537,273	603,776	679,202	753,200	825,174	896,191

### Step 11. Base Data, Employment

The process for allocating employment is parallel to the process for allocating households. The allocation to the subregions began with data from the *Land Use Allocation Model Update* (September 2011) published by NFRMPO. Base data from the 2011 LUAM model documentation (Table 7) show employment by subregion. The table below shows the employment distribution by subregion.

<b>Employment</b>		<b>2009</b>	<b>2015</b>	<b>2025</b>	<b>2035</b>
Exurban	1	28,401	33,176	55,440	77,289
Greeley/Evans	2	61,725	77,210	95,174	110,364
Ft. Collins	3	103,947	110,090	118,441	126,334
Loveland	4	42,310	51,666	64,345	73,461
Larimer	5	5,545	6,190	7,438	8,931
Weld	6	2,232	2,492	2,995	3,600
	Total	244,160	280,824	343,833	399,979

Source: Land Use Allocation Model Update, September 2011

### Step 12. Break out Subregion Seven

Subregion 7 (the I-25 Corridor) was extracted from subregions 1, 2 & 4 using ArcGis. The TAZ's within subregion seven were summarized to develop the total number of households and

employment within the subregion. The *total* number of employment remains unchanged during this process. The regions were relabeled to better reflect their locations.

Employment		2009	2015	2025	2035
Wellington	1	11,599	12,269	18,384	29,033
Greeley/Evans	2	59,870	75,030	92,233	107,374
Ft. Collins	3	103,948	110,091	118,442	126,315
Loveland	4	41,887	51,245	63,923	73,040
Larimer	5	5,546	6,192	7,441	8,933
Weld	6	2,233	2,493	2,998	3,602
I-25	7	19,086	23,516	40,426	51,676
	Total	244,169	280,836	343,847	399,973

### Step 13. Determine Percentage Shares

From the table in Step 12 above, percentage shares were computed.

Employment		2009	2015	2025	2035
Wellington	1	4.8%	4.4%	5.3%	7.3%
Greeley/Evans	2	24.5%	26.7%	26.8%	26.8%
Ft Collins	3	42.6%	39.2%	34.4%	31.6%
Loveland	4	17.2%	18.2%	18.6%	18.3%
Larimer	5	2.3%	2.2%	2.2%	2.2%
Weld	6	0.9%	0.9%	0.9%	0.9%
I-25	7	7.8%	8.4%	11.8%	12.9%
	Total	100.0%	100.0%	100.0%	100.0%

### Step 14. Expand Percentages to Accommodate Five Year Increments

Projections for this forecast report are given in five year increments, so data for 2015 was used for 2025, data for 2025 was used for 2030, and data for 2035 was used for 2040.

Employment		2009	2015	2020	2025	2030	2035	2040
Wellington	1	4.8%	4.4%	4.4%	5.3%	5.3%	7.3%	7.3%
Greeley/Evans	2	24.5%	26.7%	26.7%	26.8%	26.8%	26.8%	26.8%
Ft. Collins	3	42.6%	39.2%	39.2%	34.4%	34.4%	31.6%	31.6%
Loveland	4	17.2%	18.2%	18.2%	18.6%	18.6%	18.3%	18.3%
Larimer	5	2.3%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%
Weld	6	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
I-25	7	7.8%	8.4%	8.4%	11.8%	11.8%	12.9%	12.9%
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

**Step 15. Allocate Regional Control Totals to Get Preliminary Subregion Totals**

The regional employment control totals are multiplied by the respective percentages from step 13 above to get preliminary subarea allocations. The overall control totals are consistent with the forecast for the region as a whole.

<b>Regional Totals</b>		<b>237,615</b>	<b>280,207</b>	<b>314,827</b>	<b>342,818</b>	<b>369,042</b>	<b>398,996</b>	<b>428,599</b>
<b>Employment</b>		<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Wellington	1	11,288	12,242	13,754	18,329	19,731	28,962	31,111
Greeley/Evans	2	58,263	74,862	84,111	91,957	98,991	107,112	115,059
Ft. Collins	3	101,158	109,844	123,416	118,088	127,121	126,006	135,355
Loveland	4	40,763	51,130	57,447	63,732	68,607	72,862	78,267
Larimer	5	5,397	6,178	6,941	7,419	7,986	8,911	9,572
Weld	6	2,173	2,487	2,795	2,989	3,218	3,593	3,860
I-25	7	18,574	23,463	26,362	40,305	43,388	51,550	55,374
	<b>Total</b>	<b>237,615</b>	<b>280,207</b>	<b>314,827</b>	<b>342,818</b>	<b>369,042</b>	<b>398,996</b>	<b>428,599</b>

**Step 16. Present the Preliminary Subregion Allocation to the Task Force Along With Buildout Capacities**

Buildout capacities were derived from the LUAM and from discussions with local planning departments. No subregion exceeds its buildout capacity. However, review of growth rates, job/household ratios, and recent growth trends suggested that some employment needed to be reallocated amongst the subregions. The total buildout capacity for the region is 1,180,161 employees with the projected growth for 2040 at 428,599.

<b>Employment</b>		<b>Buildout Capacity</b>
Wellington	1	133,730
Greeley/Evans	2	372,421
Ft. Collins	3	255,235
Loveland	4	193,894
Larimer	5	9,230
Weld	6	39,072
I-25	7	176,579
	<b>Total</b>	<b>1,180,161</b>

### Step 17. Revise the Employment Allocation

Based on data from the LUAM and discussions with local planning staff, employment was reallocated. A manual adjustment was made to correct the subregion allocation predominately between Wellington and Ft. Collins. Local planning staff from the affected communities were involved in the adjustment and approved of the changes prior to implementation. The table below shows the adjustments. No adjustments were made to 2010 data.

Employment		2015	2020	2025	2030	2035	2040
Wellington	1	367	457	(3,090)	(2,794)	(10,558)	(11,103)
Greeley/Evans	2	-	-	-	-	-	-
Ft. Collins	3	(4,050)	(7,314)	3,090	2,794	10,558	11,103
Loveland	4	-	-	-	-	-	-
Larimer	5	-	-	-	-	-	-
Weld	6	-	-	-	-	-	-
I-25	7	3,683	6,857	-	-	-	-
	Total	0	0	0	0	0	0

### Step 18. Revised Employment Allocation

The table below shows the employment from Step 14 with the adjustments noted in Step 16.

Employment		2010	2015	2020	2025	2030	2035	2040
Wellington	1	11,288	12,608	14,211	15,239	16,937	18,404	20,007
Greeley/Evans	2	58,263	74,862	84,111	91,957	98,991	107,112	115,059
Ft. Collins	3	101,158	105,794	116,102	121,177	129,915	136,565	146,459
Loveland	4	40,763	51,130	57,447	63,732	68,607	72,862	78,267
Larimer	5	5,397	6,178	6,941	7,419	7,986	8,911	9,572
Weld	6	2,173	2,487	2,795	2,989	3,218	3,593	3,860
I-25	7	18,574	27,147	33,219	40,305	43,388	51,550	55,374
	Total	237,615	280,207	314,827	342,818	369,042	398,996	428,599

### Summary

The region-wide control totals for households, population, and employment were allocated to the seven subregions of the NFRMPO. The subregion control totals will be used during a land use modeling process allocating to the Traffic Analysis Zone (TAZ) level. The subregion data allow local government staff the ability to review information at a more localized level.

The NFRMPO can expect strong steady growth in all areas. Growth will be strongest in the Greeley/Evans, Loveland, and I-25 subregions. Estimates of buildout capacity suggest that the region has ample room for further growth.

## **Conclusion**

The North Front Range region will continue its pattern of strong economic growth. There is ample room for growth. Regional communities have positive attitudes toward growth, and a labor force and location conducive to long term growth. Potential constraints to growth include water supply, transportation infrastructure, geopolitical conflict, and climate change.

## **Appendices**

**Appendix 1. Labor Force Supply and Demand.**

**Appendix 2. Population and Components of Change.**

**Appendix 3. Components of Employment**

**Appendix 4. Households by Type.**

**Appendix 5. Number of Workers by Household Type.**

**Appendix 6. Income Distribution.**

**Appendix 7. North American Industrial Classification System Wage and Salary Employment.**

**Appendix 8. State Demographer's Methodology**

**Appendix 9. Resolution 2013-17 Adopting the Forecast**

## Appendix 1. Labor Force Supply and Demand.

The State Demography Office annually estimates labor supply and demand based on “basic” jobs that is those jobs that bring money in from outside the region. This report takes the SDO analysis from Region 2 (Larimer-Weld) and scales it down to the NFRMPO based on GIS mapping, U.S. Census data, and data from the Bureau of Labor Statistics. Labor demand is driven by the needs of employers. “Total jobs” are jobs by place of work. (This is the same as our total jobs forecast above.)

Labor supply is determined by resident population, working age population, labor force participation rate, multiple job holding rate and unemployment rate. Supply and demand are balanced by commuting.

	2010	2015	2020	2025	2030	2035	2040
<b><u>DIRECT BASIC JOBS</u></b>							
TRADITIONAL INDUSTRIAL BASIC JOBS	44,600	52,319	54,257	55,605	57,166	59,802	62,114
REGIONAL & NATIONAL SERVICES	34,628	41,765	45,843	49,008	52,506	57,387	61,999
TOURISM	11,182	13,984	15,703	16,667	17,640	19,098	20,454
COMMUTING JOBS	8,648	8,835	8,658	8,493	8,402	8,462	8,517
RETIREE GENERATED JOBS	15,906	20,368	25,498	30,032	33,920	37,218	40,172
PUBLIC ASST. GENERATED JOBS	6,863	7,500	7,606	7,981	8,440	9,221	9,831
INVESTMENT INCOME & WEALTH	7,695	8,511	10,065	11,063	12,151	13,487	14,807
<b>TOTAL DIRECT BASIC JOBS</b>	<b>129,520</b>	<b>153,283</b>	<b>167,629</b>	<b>178,849</b>	<b>190,226</b>	<b>204,676</b>	<b>217,895</b>
NON-BASIC RESIDENT SV. JOBS	108,095	126,924	147,198	163,969	178,816	194,320	210,704
<b>TOTAL JOBS (Demand)</b>	<b>237,615</b>	<b>280,207</b>	<b>314,827</b>	<b>342,818</b>	<b>369,042</b>	<b>398,996</b>	<b>428,599</b>
CIVILIAN JOBS HELD (SUPPLY)	230,812	272,184	305,813	333,003	358,476	387,572	416,328
COMMUTING (+ = IN)	6,803	8,023	9,014	9,815	10,566	11,424	12,271
JOBS HELD BY RESIDENTS	254,274	297,921	340,556	379,411	417,279	456,187	495,223
Plus:Jobs Multiply Held	17,953	20,564	23,622	26,417	29,138	31,936	34,760
Multiple Job Holding Rate	7.6%	7.4%	7.5%	7.5%	7.5%	7.5%	7.5%
Employed Persons (Residents)	236,321	277,357	316,934	352,994	388,141	424,252	460,463
Unemployment Rate	8.5%	5.8%	5.2%	5.0%	5.2%	5.2%	5.3%
Unemployed Persons	22,012	17,039	17,216	18,771	21,225	23,427	25,960
<b>LABOR FORCE (RESIDENTS)</b>	<b>258,333</b>	<b>294,396</b>	<b>334,151</b>	<b>371,765</b>	<b>409,366</b>	<b>447,678</b>	<b>486,423</b>
Labor Force Participation Rate	68.3%	70.5%	71.0%	70.2%	69.7%	69.4%	69.3%
Civilian NonInst. Population 16+	378,245	417,718	470,451	529,384	587,066	644,621	701,566
Civilian NI Pop 16+ / Total Pop	77.4%	77.7%	77.9%	77.9%	77.9%	78.1%	78.3%
<b>POPULATION NFRMPO</b>	<b>488,513</b>	<b>537,273</b>	<b>603,776</b>	<b>679,202</b>	<b>753,200</b>	<b>825,174</b>	<b>896,191</b>

## Appendix 2. Population and Components of Change.

The State Demography Office estimates births, deaths, and net migration by county. The following table scales the Larimer and Weld County combined analysis to the NFRMPO area.

Change = Births – Deaths + Net Migration

Example: 2015 Population Estimate = 2010 Population + 2015 Change

$$537,273 = 488,513 + 33020 - 15,999 + 31,739$$

<b>Population</b>	<b>Estimate</b>	<b>Change</b>	<b>Births</b>	<b>Deaths</b>	<b>NetMigration</b>
<b>2010</b>	488,513				
<b>2015</b>	537,273	48,760	33,020	15,999	31,739
<b>2020</b>	603,776	66,503	37,115	18,268	47,655
<b>2025</b>	679,202	75,426	41,816	21,015	54,626
<b>2030</b>	753,200	73,998	46,326	24,369	52,041
<b>2035</b>	825,174	71,974	50,278	29,041	50,737
<b>2040</b>	896,191	71,017	54,214	34,428	54,937



### Appendix 3. Components of Employment

Wage and salary and proprietor employment were forecast by North American Industrial Classification System (NAICS) detail. The NAICS detail was summarized into five categories as required by the NFRMPO travel model.

The relation between NAICS and the summary categories is shown below.

<b>Summary Category</b>	<b>NAICS Category</b>
Education	Education and Health
Government	Federal Government
	Local Government
	State Government
Production	Manufacturing
	Mining, Logging, and Construction
	Transportation and Utilities
	Wholesale Trade
Retail	Retail Trade
Service	Financial Activities
	Information
	Leisure and Hospitality
	Other Service
	Professional and Business Services

### Appendix 3. Continued

	<b>Employment by Category - In Thousands</b>						
<b>Wage and Salary</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Education	23.69	28.15	33.05	37.93	42.63	47.24	51.32
Government	42.84	45.89	48.86	50.41	51.83	53.49	55.05
Production	45.38	52.95	57.45	60.42	63.01	67.05	70.92
Retail	22.13	24.17	25.93	27.41	28.96	31.16	33.21
Service	61.23	71.90	82.79	91.26	98.86	106.84	113.45
<b>Subtotal</b>	<b>195.27</b>	<b>223.06</b>	<b>248.08</b>	<b>267.44</b>	<b>285.29</b>	<b>305.79</b>	<b>323.96</b>
<b>Proprietor</b>							
Education	1.07	1.45	1.69	1.91	2.13	2.37	2.65
Government	-	-	-	-	-	-	-
Production	7.88	10.64	12.43	14.04	15.59	17.35	19.43
Retail	3.98	5.37	6.27	7.08	7.86	8.75	9.80
Service	29.41	39.69	46.36	52.35	58.16	64.73	72.47
<b>Subtotal</b>	<b>42.34</b>	<b>57.15</b>	<b>66.75</b>	<b>75.38</b>	<b>83.75</b>	<b>93.21</b>	<b>104.34</b>
<b>Total</b>							
Education	24.76	29.60	34.74	39.84	44.76	49.61	53.97
Government	42.84	45.89	48.86	50.41	51.83	53.49	55.05
Production	53.26	63.59	69.88	74.46	78.60	84.40	90.35
Retail	26.10	29.54	32.20	34.49	36.83	39.92	43.01
Service	90.64	111.59	129.15	143.62	157.02	171.57	185.92
<b>Grand Total</b>	<b>237.61</b>	<b>280.21</b>	<b>314.83</b>	<b>342.82</b>	<b>369.04</b>	<b>399.00</b>	<b>428.30</b>

### Appendix 3, Continued. Components of Total Employment by Subregion

<b>Jobs by Type for Subregion 1 (Wellington)</b>						
	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Education	1,332	1,568	1,771	2,054	2,288	2,521
Government	2,065	2,205	2,241	2,379	2,467	2,572
Production	2,861	3,154	3,310	3,608	3,893	4,220
Retail	1,329	1,453	1,533	1,690	1,841	2,009
Service	5,021	5,830	6,384	7,206	7,914	8,685
<b>Grand Total</b>	<b>12,608</b>	<b>14,211</b>	<b>15,239</b>	<b>16,937</b>	<b>18,404</b>	<b>20,007</b>

<b>Jobs by Type for Subregion 2 (Greeley)</b>						
	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Education	7,908	9,281	10,687	12,006	13,318	14,499
Government	12,261	13,054	13,522	13,902	14,361	14,790
Production	16,989	18,669	19,973	21,085	22,658	24,271
Retail	7,891	8,602	9,251	9,879	10,716	11,554
Service	29,813	34,505	38,523	42,119	46,060	49,946
<b>Grand Total</b>	<b>74,862</b>	<b>84,111</b>	<b>91,957</b>	<b>98,991</b>	<b>107,112</b>	<b>115,059</b>

<b>Jobs by Type for Subregion 3 (Ft. Collins)</b>						
	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Education	11,176	12,812	14,084	15,757	16,980	18,455
Government	17,328	18,019	17,819	18,245	18,309	18,826
Production	24,008	25,770	26,320	27,671	28,888	30,894
Retail	11,151	11,874	12,191	12,965	13,662	14,707
Service	42,131	47,628	50,765	55,277	58,725	63,576
<b>Grand Total</b>	<b>105,794</b>	<b>116,102</b>	<b>121,177</b>	<b>129,915</b>	<b>136,565</b>	<b>146,459</b>

<b>Jobs by Type for Subregion 4 (Loveland)</b>						
	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Education	5,401	6,339	7,407	8,321	9,059	9,863
Government	8,374	8,916	9,371	9,635	9,769	10,061
Production	11,603	12,751	13,843	14,613	15,413	16,510
Retail	5,389	5,875	6,412	6,847	7,289	7,860
Service	20,362	23,567	26,699	29,191	31,332	33,975
<b>Grand Total</b>	<b>51,130</b>	<b>57,447</b>	<b>63,732</b>	<b>68,607</b>	<b>72,862</b>	<b>78,267</b>

<b>Jobs by Type for Subregion 5 (Estes Park)</b>						
	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Education	653	766	862	969	1,108	1,206
Government	1,012	1,077	1,091	1,122	1,195	1,230
Production	1,402	1,541	1,611	1,701	1,885	2,019
Retail	651	710	746	797	892	961
Service	2,460	2,848	3,108	3,398	3,832	4,155
<b>Grand Total</b>	<b>6,178</b>	<b>6,941</b>	<b>7,419</b>	<b>7,986</b>	<b>8,911</b>	<b>9,572</b>

<b>Jobs by Type for Subregion 6 (Rural Weld)</b>						
	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Education	263	308	347	390	447	486
Government	407	434	440	452	482	496
Production	564	620	649	685	760	814
Retail	262	286	301	321	359	388
Service	991	1,146	1,252	1,369	1,545	1,675
<b>Grand Total</b>	<b>2,487</b>	<b>2,795</b>	<b>2,989</b>	<b>3,218</b>	<b>3,593</b>	<b>3,860</b>

<b>Jobs by Type for Subregion 7 (I25 Corridor)</b>						
	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Education	2,868	3,666	4,684	5,262	6,409	6,978
Government	4,446	5,156	5,927	6,093	6,911	7,118
Production	6,160	7,373	8,754	9,241	10,905	11,681
Retail	2,861	3,397	4,055	4,330	5,157	5,561
Service	10,811	13,628	16,885	18,461	22,167	24,037
<b>Grand Total</b>	<b>27,147</b>	<b>33,219</b>	<b>40,305</b>	<b>43,388</b>	<b>51,550</b>	<b>55,374</b>

## Appendix 4. Households by Type.

The State Demographer projects households by age of head of household and type. The “Age” column represents the lower limit of the age of head of household. For example “18” designates “18-24.” This analysis takes the Larimer and Weld totals and scales them to the NFRMPO region using the method described above. The specific categories are those used by the U.S. Census Department.

Households by Type	Age	2010	2015	2020	2025	2030	2035	2040
One adult no kids	18	3,422	3,365	3,772	4,204	4,445	4,903	5,309
One adult no kids	25	10,913	12,364	13,958	15,757	17,281	18,367	19,778
One adult no kids	45	17,722	18,531	19,359	20,670	23,042	26,430	29,244
One adult no kids	65	14,199	18,277	23,170	28,193	32,233	35,120	37,829
One adult with kids	18	820	806	904	1,007	1,065	1,175	1,272
One adult with kids	25	5,528	6,263	7,070	7,982	8,754	9,304	10,019
One adult with kids	45	2,614	2,734	2,856	3,049	3,399	3,899	4,314
One adult with kids	65	17	21	27	33	38	41	44
More than one adult no kids	18	9,062	8,910	9,988	11,133	11,771	12,983	14,059
More than one adult no kids	25	15,436	17,488	19,742	22,288	24,443	25,979	27,975
More than one adult no kids	45	35,008	36,607	38,242	40,831	45,517	52,209	57,769
More than one adult no kids	65	18,771	24,163	30,632	37,273	42,614	46,430	50,012
More than one adult with kids	18	1,853	1,822	2,043	2,277	2,407	2,655	2,875
More than one adult with kids	25	34,049	38,575	43,547	49,162	53,914	57,303	61,706
More than one adult with kids	45	16,213	16,953	17,710	18,909	21,080	24,179	26,753
More than one adult with kids	65	832	1,071	1,358	1,653	1,889	2,059	2,217
<b>Totals</b>		<b>186,459</b>	<b>207,951</b>	<b>234,379</b>	<b>264,421</b>	<b>293,892</b>	<b>323,034</b>	<b>351,176</b>

## Appendix 5. Number of Workers by Household Type.

The State Demographer projects households by age of head of household and type. The 2010 American Community Survey (ACS), U.S. Census Bureau, provides data on the distribution of the number of workers by type of household. This analysis assumes that the distribution of number of workers in a household type remains the same throughout the forecast period. This distribution is then scaled up to the number of households in each forecast period as provided by SDO.

The “Age” column represents the lower limit of the age of head. For example “18” designates “18-24.”

<b>2010</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3+</b>	<b>Total</b>
18 One adult with kids	-	744	76	-	<b>820</b>
18 One adult without kids	162	3,260	-	-	<b>3,422</b>
18 Two adults with kids	-	223	1,430	201	<b>1,853</b>
18 Two adults without kids	156	180	6,239	2,487	<b>9,062</b>
25 One adult with kids	170	4,949	410	-	<b>5,528</b>
25 One adult without kids	449	10,464	-	-	<b>10,913</b>
25 Two adults with kids	77	4,722	24,918	4,332	<b>34,049</b>
25 Two adults without kids	96	538	13,003	1,799	<b>15,436</b>
45 One adult with kids	148	1,981	472	14	<b>2,614</b>
45 One adult without kids	2,024	15,698	-	-	<b>17,722</b>
45 Two adults with kids	103	2,024	8,192	5,893	<b>16,213</b>
45 Two adults without kids	640	5,104	23,538	5,725	<b>35,008</b>
65 One adult with kids	8	9	-	-	<b>17</b>
65 One adult without kids	10,451	3,747	-	-	<b>14,199</b>
65 Two adults with kids	40	230	318	244	<b>832</b>
65 Two adults without kids	7,005	6,103	5,170	494	<b>18,771</b>
<b>Total</b>	<b>21,529</b>	<b>59,975</b>	<b>83,767</b>	<b>21,188</b>	<b>186,459</b>

<b>2015</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3+</b>	<b>Total</b>
18 One adult with kids	-	731	75	-	<b>806</b>
18 One adult without kids	159	3,206	-	-	<b>3,365</b>
18 Two adults with kids	-	219	1,406	197	<b>1,822</b>
18 Two adults without kids	153	177	6,135	2,445	<b>8,910</b>
25 One adult with kids	192	5,607	464	-	<b>6,263</b>
25 One adult without kids	509	11,855	-	-	<b>12,364</b>
25 Two adults with kids	87	5,349	28,231	4,908	<b>38,575</b>
25 Two adults without kids	109	610	14,732	2,038	<b>17,488</b>
45 One adult with kids	154	2,072	493	14	<b>2,734</b>
45 One adult without kids	2,117	16,415	-	-	<b>18,531</b>
45 Two adults with kids	107	2,117	8,567	6,162	<b>16,953</b>
45 Two adults without kids	670	5,337	24,613	5,987	<b>36,607</b>
65 One adult with kids	10	11	-	-	<b>21</b>
65 One adult without kids	13,453	4,823	-	-	<b>18,277</b>
65 Two adults with kids	52	297	409	313	<b>1,071</b>
65 Two adults without kids	9,017	7,855	6,655	636	<b>24,163</b>
<b>Total</b>	<b>26,790</b>	<b>66,681</b>	<b>91,779</b>	<b>22,701</b>	<b>207,951</b>

<b>2020</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3+</b>	<b>Total</b>
18 One adult with kids	-	820	84	-	<b>904</b>
18 One adult without kids	178	3,594	-	-	<b>3,772</b>
18 Two adults with kids	-	245	1,576	221	<b>2,043</b>
18 Two adults without kids	172	198	6,877	2,741	<b>9,988</b>
25 One adult with kids	217	6,329	524	-	<b>7,070</b>
25 One adult without kids	575	13,383	-	-	<b>13,958</b>
25 Two adults with kids	98	6,039	31,870	5,541	<b>43,547</b>
25 Two adults without kids	123	688	16,631	2,300	<b>19,742</b>
45 One adult with kids	161	2,164	515	15	<b>2,856</b>
45 One adult without kids	2,211	17,148	-	-	<b>19,359</b>
45 Two adults with kids	112	2,211	8,949	6,438	<b>17,710</b>
45 Two adults without kids	700	5,576	25,713	6,254	<b>38,242</b>
65 One adult with kids	13	14	-	-	<b>27</b>
65 One adult without kids	17,055	6,115	-	-	<b>23,170</b>
65 Two adults with kids	66	376	519	397	<b>1,358</b>
65 Two adults without kids	11,432	9,959	8,436	806	<b>30,632</b>
<b>Total</b>	<b>33,113</b>	<b>74,859</b>	<b>101,694</b>	<b>24,713</b>	<b>234,379</b>

<b>2025</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3+</b>	<b>Total</b>
18 One adult with kids	-	914	94	-	<b>1,007</b>
18 One adult without kids	198	4,006	-	-	<b>4,204</b>
18 Two adults with kids	-	274	1,757	247	<b>2,277</b>
18 Two adults without kids	191	221	7,665	3,056	<b>11,133</b>
25 One adult with kids	245	7,146	592	-	<b>7,982</b>
25 One adult without kids	649	15,109	-	-	<b>15,757</b>
25 Two adults with kids	111	6,817	35,979	6,255	<b>49,162</b>
25 Two adults without kids	139	777	18,775	2,597	<b>22,288</b>
45 One adult with kids	172	2,311	550	16	<b>3,049</b>
45 One adult without kids	2,361	18,309	-	-	<b>20,670</b>
45 Two adults with kids	120	2,361	9,555	6,873	<b>18,909</b>
45 Two adults without kids	747	5,953	27,453	6,677	<b>40,831</b>
65 One adult with kids	16	17	-	-	<b>33</b>
65 One adult without kids	20,753	7,440	-	-	<b>28,193</b>
65 Two adults with kids	80	458	631	484	<b>1,653</b>
65 Two adults without kids	13,910	12,117	10,265	981	<b>37,273</b>
<b>Total</b>	<b>39,691</b>	<b>84,229</b>	<b>113,316</b>	<b>27,185</b>	<b>264,421</b>

<b>2030</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3+</b>	<b>Total</b>
18 One adult with kids	-	966	99	-	<b>1,065</b>
18 One adult without kids	210	4,235	-	-	<b>4,445</b>
18 Two adults with kids	-	289	1,857	261	<b>2,407</b>
18 Two adults without kids	202	233	8,104	3,231	<b>11,771</b>
25 One adult with kids	269	7,836	649	-	<b>8,754</b>
25 One adult without kids	711	16,569	-	-	<b>17,281</b>
25 Two adults with kids	121	7,476	39,457	6,860	<b>53,914</b>
25 Two adults without kids	152	852	20,590	2,848	<b>24,443</b>
45 One adult with kids	192	2,576	614	18	<b>3,399</b>
45 One adult without kids	2,632	20,410	-	-	<b>23,042</b>
45 Two adults with kids	134	2,632	10,652	7,662	<b>21,080</b>
45 Two adults without kids	833	6,637	30,604	7,444	<b>45,517</b>
65 One adult with kids	18	20	-	-	<b>38</b>
65 One adult without kids	23,727	8,507	-	-	<b>32,233</b>
65 Two adults with kids	91	523	722	553	<b>1,889</b>
65 Two adults without kids	15,903	13,854	11,736	1,121	<b>42,614</b>
<b>Total</b>	<b>45,195</b>	<b>93,616</b>	<b>125,084</b>	<b>29,997</b>	<b>293,892</b>



<b>2035</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3+</b>	<b>Total</b>
18 One adult with kids	-	1,065	109	-	<b>1,175</b>
18 One adult without kids	231	4,671	-	-	<b>4,903</b>
18 Two adults with kids	-	319	2,048	288	<b>2,655</b>
18 Two adults without kids	223	257	8,939	3,563	<b>12,983</b>
25 One adult with kids	286	8,329	689	-	<b>9,304</b>
25 One adult without kids	756	17,611	-	-	<b>18,367</b>
25 Two adults with kids	129	7,946	41,937	7,291	<b>57,303</b>
25 Two adults without kids	162	906	21,884	3,027	<b>25,979</b>
45 One adult with kids	220	2,955	704	20	<b>3,899</b>
45 One adult without kids	3,019	23,411	-	-	<b>26,430</b>
45 Two adults with kids	153	3,019	12,218	8,789	<b>24,179</b>
45 Two adults without kids	955	7,612	35,104	8,538	<b>52,209</b>
65 One adult with kids	20	22	-	-	<b>41</b>
65 One adult without kids	25,851	9,268	-	-	<b>35,120</b>
65 Two adults with kids	100	570	787	602	<b>2,059</b>
65 Two adults without kids	17,327	15,094	12,787	1,221	<b>46,430</b>
<b>Total</b>	<b>49,433</b>	<b>103,056</b>	<b>137,206</b>	<b>33,340</b>	<b>323,034</b>

<b>2040</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3+</b>	<b>Total</b>
18 One adult with kids	-	1,154	118	-	<b>1,272</b>
18 One adult without kids	251	5,059	-	-	<b>5,309</b>
18 Two adults with kids	-	346	2,218	312	<b>2,875</b>
18 Two adults without kids	242	279	9,680	3,859	<b>14,059</b>
25 One adult with kids	308	8,969	742	-	<b>10,019</b>
25 One adult without kids	814	18,964	-	-	<b>19,778</b>
25 Two adults with kids	139	8,557	45,159	7,851	<b>61,706</b>
25 Two adults without kids	174	975	23,565	3,260	<b>27,975</b>
45 One adult with kids	243	3,269	779	23	<b>4,314</b>
45 One adult without kids	3,340	25,904	-	-	<b>29,244</b>
45 Two adults with kids	170	3,340	13,519	9,725	<b>26,753</b>
45 Two adults without kids	1,057	8,423	38,842	9,447	<b>57,769</b>
65 One adult with kids	21	23	-	-	<b>44</b>
65 One adult without kids	27,846	9,983	-	-	<b>37,829</b>
65 Two adults with kids	107	614	847	649	<b>2,217</b>
65 Two adults without kids	18,664	16,259	13,774	1,316	<b>50,012</b>
<b>Total</b>	<b>53,376</b>	<b>112,117</b>	<b>149,244</b>	<b>36,440</b>	<b>351,176</b>

## Appendix 6. Income Distribution.

The State Demographer projects households by age of head of household and type. The 2010 American Community Survey (ACS), U.S. Census Bureau, provides data on the distribution of annual income by type of household. This analysis starts with the distribution of income from the 2010 ACS. Households are then migrated to higher income levels consistent with the growth of aggregate real income. The income categories are labeled with the bottom of the income interval. For example “\$5,000” designates the interval \$5,000 - \$9,999. These are measured in 2010 dollars.

<b>\$2010</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
-	5,365	4,954	5,546	6,081	6,546	7,237	7,744
<b>5,000</b>	7,786	7,581	8,676	9,776	10,740	11,834	12,752
<b>10,000</b>	10,129	10,510	12,288	14,055	15,566	17,095	18,369
<b>15,000</b>	10,086	10,524	12,235	13,886	15,268	16,735	17,937
<b>20,000</b>	10,026	10,485	12,059	13,596	14,934	16,377	17,580
<b>25,000</b>	9,105	9,743	11,138	12,512	13,736	15,084	16,193
<b>30,000</b>	9,985	10,846	12,423	13,994	15,410	16,908	18,178
<b>35,000</b>	9,402	10,361	11,811	13,337	14,757	16,199	17,519
<b>40,000</b>	9,007	10,077	11,409	12,885	14,299	15,706	17,066
<b>45,000</b>	7,577	8,610	9,766	11,120	12,436	13,633	14,870
<b>50,000</b>	16,040	18,028	20,270	22,933	25,600	28,083	30,671
<b>60,000</b>	20,234	23,301	26,166	29,700	33,194	36,313	39,699
<b>75,000</b>	25,261	29,340	32,628	36,791	41,196	45,201	49,453
<b>100,000</b>	15,590	18,185	20,032	22,457	25,154	27,759	30,532
<b>125,000</b>	7,915	9,365	10,310	11,558	12,962	14,310	15,716
<b>150,000</b>	6,731	8,269	9,041	10,092	11,335	12,600	13,891
<b>200,000</b>	6,220	7,770	8,579	9,649	10,760	11,958	12,975
<b>Total</b>	186,459	207,950	234,378	264,421	293,892	323,034	351,145

## Appendix 7. North American Industrial Classification System Wage and Salary Employment.

Wage and Salary employment was forecast at the most detailed NAICS level available from the Bureau of Labor Statistics Current Employment Survey.

<b>Employment in Thousands</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
<b>Education &amp; Health</b>	23.69	28.15	33.05	37.93	42.63	47.24	51.32
<b>Federal Government</b>	3.12	2.94	3.28	3.62	3.89	4.12	4.31
<b>Local Govt. Education</b>	12.30	12.96	13.71	14.02	14.23	14.45	14.54
<b>Other Local Government</b>	10.03	10.32	11.02	11.32	11.68	12.19	12.74
<b>State Government</b>	17.38	19.68	20.85	21.45	22.04	22.74	23.46
<b>Manufacturing</b>	19.25	22.21	23.18	24.11	25.01	26.15	27.02
<b>Mining, Logging Construction</b>	15.67	19.49	21.90	23.03	23.87	25.83	28.16
<b>Transportation &amp; Utilities</b>	4.61	4.79	5.34	5.84	6.25	6.59	6.77
<b>Wholesale Trade</b>	5.85	6.45	7.03	7.45	7.88	8.47	8.98
<b>Retail Trade</b>	22.13	24.17	25.93	27.41	28.96	31.16	33.21
<b>Financial Activities</b>	9.02	9.70	11.23	12.98	14.91	17.19	19.23
<b>Information</b>	3.15	3.19	3.66	4.09	4.46	4.87	5.21
<b>Leisure &amp; Hospitality</b>	21.01	25.09	28.84	31.37	33.45	35.63	37.39
<b>Other Services</b>	7.09	7.98	9.11	10.15	10.97	11.67	12.16
<b>Professional &amp; Business Service</b>	20.97	25.94	29.96	32.67	35.06	37.48	39.45
<b>Total Wage &amp; Salary Employment</b>	<b>195.27</b>	<b>223.06</b>	<b>248.08</b>	<b>267.44</b>	<b>285.29</b>	<b>305.79</b>	<b>323.96</b>

## **Appendix 8: State Demographer's Methodology**

The following is the State Demography Office's description of its forecast methodology.

The overall set of population projections is produced in a series of stages which are carried out at the state, and then region and county levels. They are as follows:

### **Creating the State Forecast**

1. First, a draft state level economic forecast is prepared using the CBEF model. The model, as constructed, provides a forecast of employment (by industrial division at the state level only), employed persons, unemployed persons, (and thus,) persons in the labor force (demanded by the economy), and personal income. The model also forecasts approximate levels of net migration and population which are used internally to forecast activities in the construction and consumer service sectors of the economy.

2. In step #2, the levels of net migration forecasted by the economic model are used in the demographic model to create a first draft population forecast. We then derive forecasts of the civilian non-institutional population by multiplying the population forecast by age-sex specific ratios of the civilian non-institutional population and the total population derived from data provided by the 2000 Census. Then, the forecast populations of non-institutional population by age and sex are multiplied by projected age-and sex-specific labor force participation rates to produce an initial forecast of the labor force (supply).

3. In step #3, this demographically-produced labor force supply is compared with the labor force (demand) generated by the economic model and an attempt is made to reconcile the differences that result from the running of the two models. Initially it is assumed that the demographic model correctly forecasts the labor supply for various levels of net migration and thus population. Thus, the relationships related to net migration and/or labor force demand in the economic model are adjusted slightly in the direction that would bring the labor force demand closer to the labor supply projected by the demographic model. If these adjustments do not bring the labor force demand in line with the projected supply then consideration is given to changing certain assumptions in the demographic model. The two assumptions most likely to be considered are the labor force participation rates and the age-sex distribution of migrants. The adjustments, however, large or small, are based on what seem to be the most reasonable assumptions given what is known about the economy and the natures of the two models. Generally, the results of the models can be brought into an alignment -- where labor force supply projected by the demographic model equals the labor force demand projected by the economic model without having to make unreasonable assumptions.

### **Creating the Region and County Forecasts**

4. In step #4, the region and county economic forecasts are prepared:

4A. In step #4A, economic forecasts of jobs are prepared for each of the state's planning and management regions (by CBEF), and then for the counties within them. In general, these forecasts are based on the region's share historically of the state total, and then the county's share of the region total. However, where more detailed economic analysis exists, the job forecasts are developed in two stages: In the first, the region's or county's share of the state total is determined for each of the area's basic industries. Then, its non-basic industries are projected on the basis of historical levels of these industries in relation to the base industries for these areas.

4B. In step #4B, the number of employed persons by region and by county are forecasted on the basis of the forecasted number of jobs. First, because the number of jobs is by place of work and the number of employed persons is by place of residence, the forecast (of employed persons) needs to account for existing and expected patterns of commuting between counties. In addition, these forecasts need to account for the number of multiple job holders. One employed person can hold more than one job. The number of multiple job holders was determined using the 1990 Census Public Use Microdata Samples data by sub-state region and the Current Population Survey was used to indicate change since 1990 (2000 Census data was not a reliable indicator of change from 1990 because of specific errors in regions with group quarter populations and the subsequent determination of employment).

4C. In step #4C, the labor force (demand) forecast is prepared on the basis of the jobs-employed persons. This is achieved by forecasting an unemployment rate and thus the number of unemployed persons, and by adding together the forecasts of employed persons and unemployed persons.

5. In step #5, the region and county population forecasts are prepared:

5A. In step #5A, the initial region and county population forecasts are prepared on the basis of historic, current, and anticipated levels of net migration. Adjustments are made in the region's and state's assumed age-sex distribution of migration. As was explained previously in the section regarding our "middle-up, middle-down" approach, there is a need to fine tune these assumed age-sex distributions of migrants so that the sum of the regions for each age group approximates the size of the age-sex groups that result from a state-level projection. It is at this point that this work is done. A committee of state agencies has been formed to assist staff in the reviewing and evaluating the age-sex population forecasts. These agencies, as part of their service responsibilities, monitor the existence of age-sex specific conditions or activities which are often reflective of the amounts of populations in certain age-sex groups.

5B. In step #5B, initial labor force (supply) forecasts are prepared at the region and then county levels based on the initial population forecasts and forecasts of regional age-sex-specific labor force participation rates.

6. In Step #6, the initial forecast of the demand for labor is compared to the initial forecast of the supply of labor at first the region and then county levels. Adjustments are then made in the economic and/or demographic forecasts and/or the projected labor force participation rates so that the forecasts of labor force demand equals that of labor force supply. At this point, staff-

produced preliminary economic and population forecasts have been completed.

7. In step #7, the preliminary economic and demographic forecasts are reviewed at the region (and county) levels. While potentially all assumptions contained in either model are subject to review, the primary focus will be on the forecast for several key variables; namely: jobs, employed persons, labor force (demand), net migration, and labor force participation and the resulting labor force supply. It is not expected that initially these numbers will all fit together. The review will most likely lead to revisions in some of the assumptions and in the forecasts of some of the key variables.

#### Detailed Descriptions of Assumptions and Data Sources Used in the Preparation of the Demographic Model

The Demographic Section has made a number of estimates and assumptions in applying this model to Colorado and its counties. These are described briefly below:

**Survival Rates.** The number of deaths in each projection year is calculated by applying a survival rate to each single year age-sex group. Base year survival rates are derived by calculating annual average age-sex specific death rates. Resident deaths for one-half of 1999 and all of 2000 constitute the numerator and the 2000 (April 1) Census population the denominator for each age-sex group. Survival rates are assumed to improve slightly over time, maintaining their current ratio to rates projected by the Census Bureau for the U. S. Expectation of life at birth for Colorado males is assumed to increase from 73.6 years in 1990 to 76.4 years in 2020. Comparable figures for females are 79.7 years in 1990 and 82.4 in 2020. A single set of survival rates is used for all counties in the state.

**Fertility Rates.** The number of births in each projection year is calculated by applying age-specific fertility rates (by five year age groups) to the resident female population 15 - 49. Fertility rates are derived by calculating the annual average fertility rate using resident births for one-half of 1999 and all of 2000 as the numerator and the 2000 (April 1) Census female population in each age group as the denominator. The total fertility rate for the State is 1995 births per 1000 women 15 - 49 and, consistent with national projections of fertility rates, is expected to remain constant throughout the projection period. Because there is much greater regional variation in fertility rates than survival rates different fertility rates are used for different regions in the state. Thus, region-specific fertility rates were calculated and used in the model. The fertility rates for each region and the region's constituent counties are shown in the table on the next page. The rates are shown for both when the special population women are excluded and when they are included. The former rates (which excluded the special population women, primarily college students) are the rates used in the model since the special population women are not included in the female population that generates the births in the projection model.

**Migration.** As described above, the current application of the model sets future net migration levels for each geographic unit -- except counties in the Denver metropolitan area (CMSA) -- such that the supply of labor is equal to the demand for labor forecast by the econometric model. The levels are set at each five-year interval, and then interpolated for the intervening

years, such that the average of the annual differences between the demand and supply of labor over the period approximates zero. The assumed age-sex distribution of migrants is estimated on the basis of prototype patterns by age and by a "residual analysis" of population change. In the latter analysis, the age-sex distribution of migrants is estimated by surviving forward from the 1990 Census population (adjusted for estimated undercount), subtracting actual deaths (by age and sex), and adding actual births (by sex, and by year of birth) to create an expected 2000 population by age and sex. The difference between the expected (survived plus born) population and the population enumerated in the 2000 Census is assumed to represent net migration by age and sex for the decade. This distribution is scaled to the projected annual net migration total to achieve the projection year age-sex specific migration pattern.

#### Treatment of Denver-Metro Area Counties.

Net migration and population for the six counties within the Denver metropolitan area -- Adams, Arapahoe, Boulder, Denver, Douglas, and Jefferson -- are calculated differently. First, assumed future levels of net migration for the metropolitan area as a whole are calculated in the same manner as described above. Then, the future populations of the region are distributed to the respective counties in a manner consistent with the distributions developed by the Denver Regional Council of Governments in their 2000 projections update, with the 2000 Census counts, and their 2005 short-term (2002) projected distributions. Accordingly, net migration for the counties within the region is adjusted to achieve these projected population totals. For the Denver metropolitan area, the age-sex migration pattern is determined first for the area as a whole in the manner described in the paragraph before last. From this set of net migrants a certain number of net migrants by age and sex are assigned to Denver County in a manner consistent with that county's age-sex specific migration pattern and with the total required by the DRCOG projection. The remaining net migrants for each age-sex group are then distributed to the other five counties in proportion to each county's share of total net migration.

Base Year Population. The projections by age and sex are initially based on a July 1, 2000 extrapolation of the total population counted in the April 1, 2000 Census of the Population. The distribution of the population by age and sex for July 1, 2000 is the same as counted in the Census, i.e., the population of each age-sex group is scaled up or down from the April 1 count so that their total equals the July 1 total. The total population is forecast from a 2001 base determined by the Division's multivariate estimate model mentioned before.

The Treatment of "Special" Populations. In thirty counties, the model recognizes the existence of "special" populations whose demographic behaviors differ than that assumed for the general population. These special populations include college students, state prison inmates, ski resort employees, and military personnel. The size and age-sex composition of special populations is projected separately based on their special characteristics derived from census and other sources. They are not subject to the mortality and fertility schedules of the cohort-component model nor the migration assumptions projected by the econometric model.

Treatment of Elderly Populations. For each estimate year (2001-current) the population 65 and over is adjusted to be consistent with data on Medicare enrollments. The basis of this adjustment is the ratio of the population 65 and over to Medicare enrollment at the time of the

2000 Census. For these years the total population 65 and over is calculated by multiplying the 2000 ratio times the number of that year's Medicare enrollers. The population 65 and over that is projected by the model is adjusted to be consistent with this total.

### The Accuracy of the Projections

Actual population change is likely to differ from projected change because it is unlikely that any statistical model can completely anticipate the future. The principal source of forecast error is the discrepancy between assumptions incorporated in these projections about the components of population change, and, in particular, that regarding migration, and the actual values of these components. (For example, the projected number of new births may exceed actual births if fertility rates fall below those assumed in these projections.) Other potential sources of forecast error are the historical data and current estimates used to calibrate the model. (For example, a projection may be too low if there was a significant underenumeration of an area.) Generally, projections for longer time periods and for areas with more volatile population trends will prove to be poorer forecasts than those for the near future and for larger areas with more stable population trends. Below is a series of comments on the reasonableness of likely accuracy of each component of the model used in preparing these projections.

**Survival Rates.** Data on current mortality levels and projections of future trends are probably the most accurate part of the cohort-component projections. Current levels are estimates from records of resident deaths by age and sex provided by the Colorado Department of Health. There is relatively little variation in mortality levels by region or over time. Changes in mortality are likely to follow the slight improvement assumed in these projections.

**Fertility.** While current estimates of fertility have a high degree of accuracy, there is substantial variation in fertility rates among different regions of the state and there has been substantial variation in fertility levels in past decades. If actual fertility diverges from the levels assumed in these projections, this divergence will have a significant impact on the projections for the young age groups but a relatively small impact on the projection of total population in the near future.

**Migration.** In this projection system, migration is determined by projected changes in employment. Thus, the process begins with a projection of employment. Then, projected changes in employment are used to project changes in the demand for labor. Finally, changes in the demand for labor are balanced by changes in supply which, after accounting for projected changes in labor force participation of the resident population, is achieved by migration in or out of the region. As can be appreciated, there is the potential for error in the assumptions used at each step in this process:

Nobody knows with any certainty or precision the future course of our international and national economies and the exact role Colorado and each of its counties will play within such prospective developments. However, the State forecast ultimately chosen by the Center for Business and Economic Forecasting and the Colorado Division of Local Government has been prepared within the context of national projections prepared by the U. S. Bureau of Economic Analysis and Fair Associates, a national economic forecasting firm, plus information from a



variety of other national and local sources. The regional and county projections were prepared on the basis of studies by BEA and CBEF and the evaluation of many experts including those of the Labor Market Information section of the Colorado Department of Labor and Employment. Thus, the employment forecasts used here, are consistent with the views of a wide range of experts regarding future growth in Colorado counties given past trends and current developments. The accuracy of the projections of the labor force supply of a county are determined by the accuracy of the estimates and forecasts of the population, and in particular by age and sex, and that of the labor force participation rates that are projected for each age-sex group. Further, an undercount of the population can lead to an underestimate of the labor supply and given a demand for labor can overstate the need for new migrants. Data on labor force participation have been prepared for considerable age-sex detail and are tied to national trends for each group. However, they are based on 2000 data. The migration forecasts produced by this economic-demographic approach are reviewed by professionals in each of the regions throughout the State. The numbers are evaluated against recent trends regarding migration in each county and in the context of expected future economic and residential developments.



**RESOLUTION NO. 2013-17  
OF THE NORTH FRONT RANGE TRANSPORTATION  
AND AIR QUALITY PLANNING COUNCIL  
TO ADOPT THE 2040 REGIONAL FORECAST**

**WHEREAS**, the North Front Range Transportation & Air Quality Planning Council (NFRMPO) is designated as the Metropolitan Planning Organization (MPO) in cooperation with local elected officials; authorized to carry out the continuing, cooperative, and comprehensive transportation planning process resulting in plans and programs that consider all transportation modes and supports community development, the local economy, and social goals; and

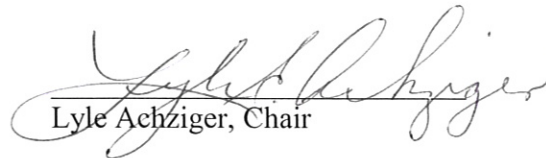
**WHEREAS**, the MPO has been designated by the U.S. Department of Transportation and the Colorado Department of Transportation (CDOT) to direct, coordinate, and administer programs mandated by the Congress in Titles 23 and 49 U.S.C.; and

**WHEREAS**, the Council, through a formal bid process, contracted with Steve Fischer and Phyllis Resnick, PhD. to develop a 2040 Forecast for population, employment and households, in 5-year increments; and

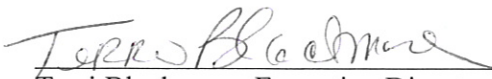
**WHEREAS**, Steve Fischer and Phyllis Resnick, PhD. have presented the draft forecast to Council, the Technical Advisory Committee (TAC), and other local experts for review and acceptance;

**NOW, THEREFORE, BE IT RESOLVED**, The North Front Range Transportation & Air Quality Planning Council (NFRMPO) hereby adopts the 2040 Regional Forecast.

Passed and adopted at the regular meeting of the North Front Range Transportation and Air Quality Planning Council held this 6th day of June, 2013.

  
Lyle Achziger, Chair

ATTEST:

  
Terri Blackmore, Executive Director