

US Census Journey-to-Work Data Brief Description

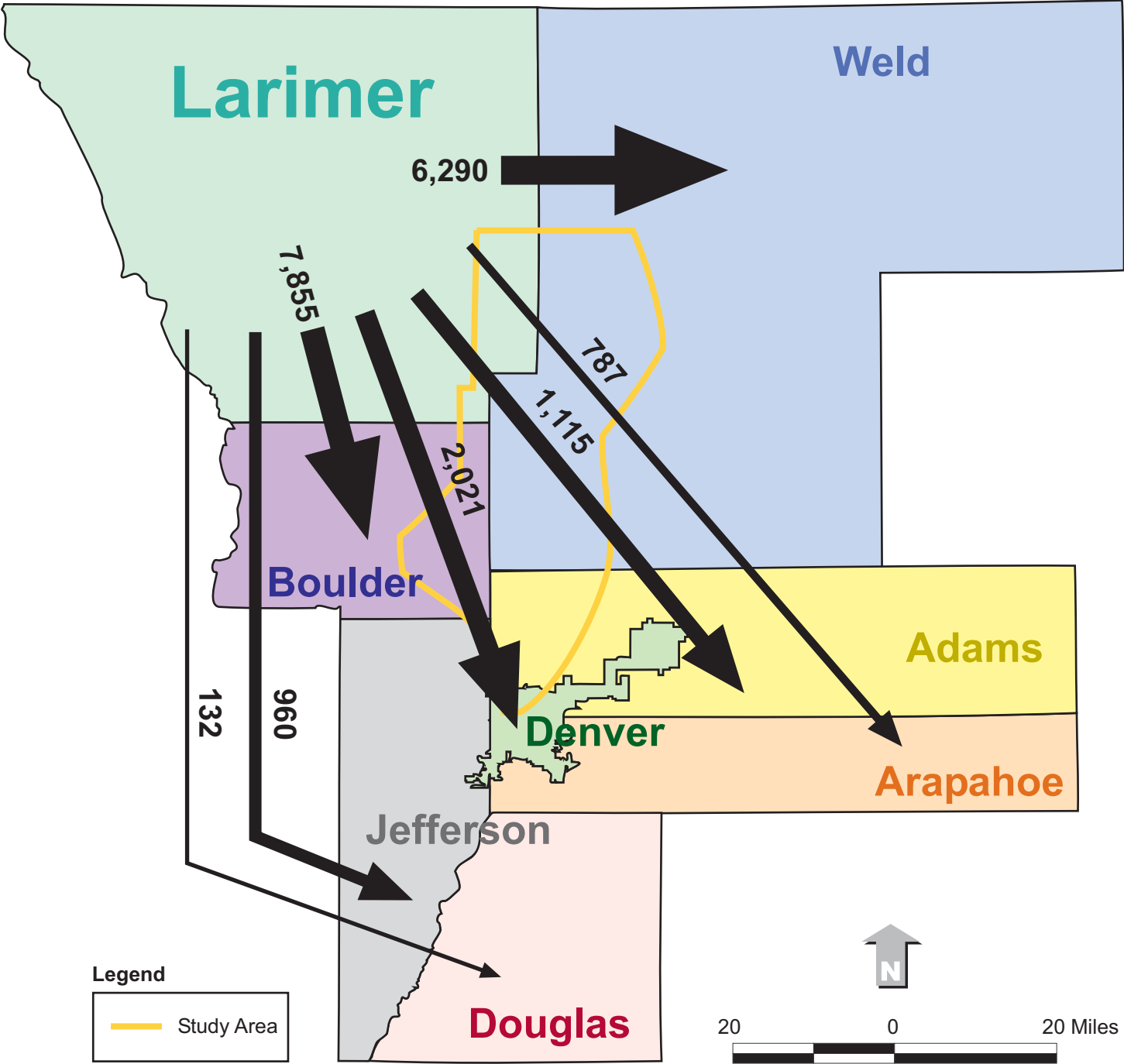
- ▶ Place-of-work data from the long form questionnaire of the US Census.
- ▶ Respondents were workers of households aged 16 years and older.
- ▶ Respondents reported they worked sometime during the survey reference week (the week of April 1, 2000 for the majority of respondents).
- ▶ The journey-to-work data reflects information about only the primary job of the worker.
- ▶ County-of-residence to county-of-work data is currently available.
- ▶ Journey-to-work data at a finer geographic level of detail (cities, towns, and TAZs) should be available sometime later in 2004.

Brief Observations: 2000 Journey-to-Work Data

- ▶ 2.5 percent of work trips **to** Larimer County are from the Denver Metro Area (3,136 trips)
- ▶ 9.0 percent of work trips **to** Weld County are from the Denver Metro Area (6,331 trips)
- ▶ 9.7 percent of work trips **from** Larimer County are traveling to the Denver Metro Area (12,870)
- ▶ 22.0 percent of work trips **from** Weld County are traveling to the Denver Metro Area (18,725)

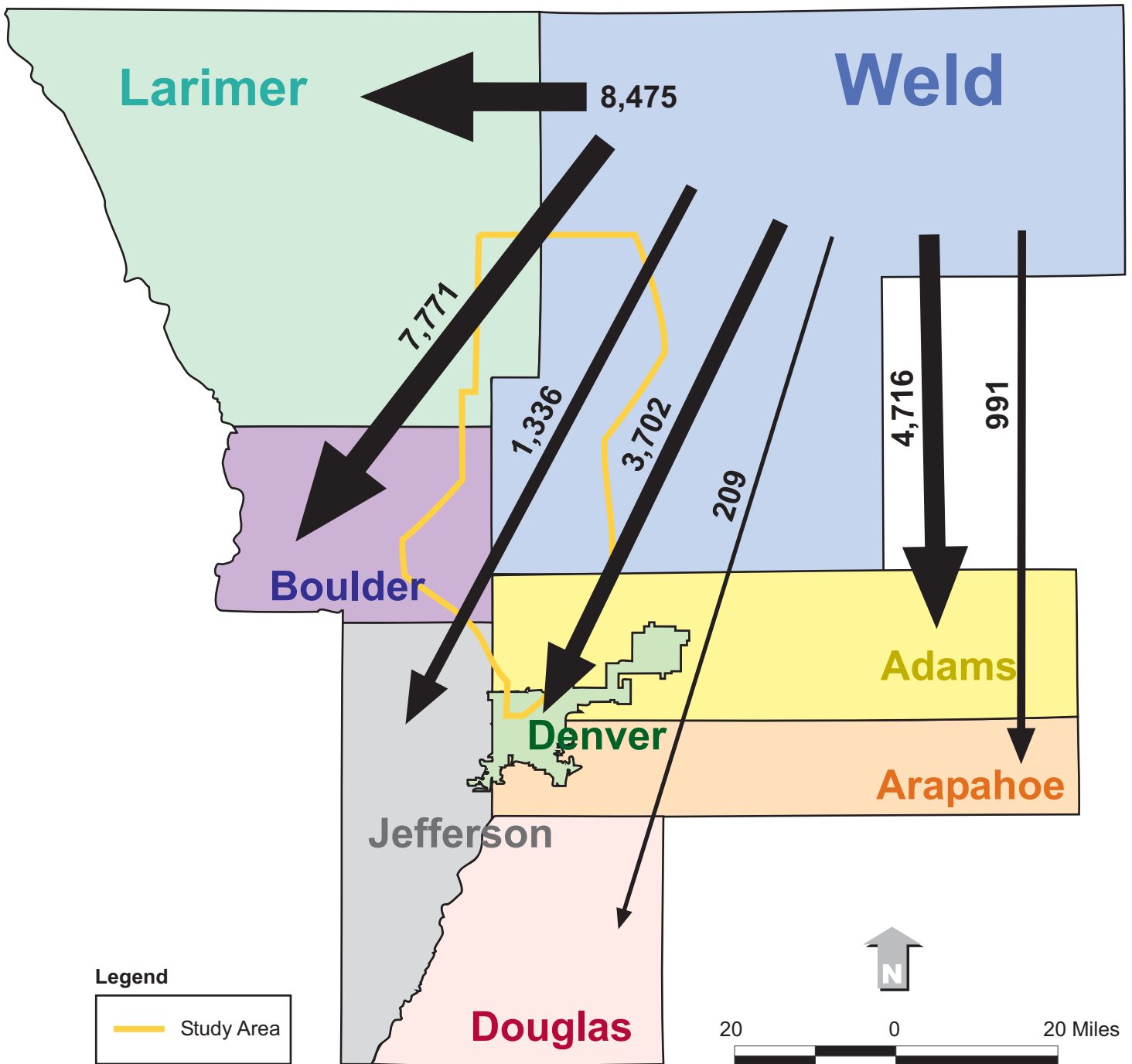
Work Trips from Larimer County

US Census, 2000



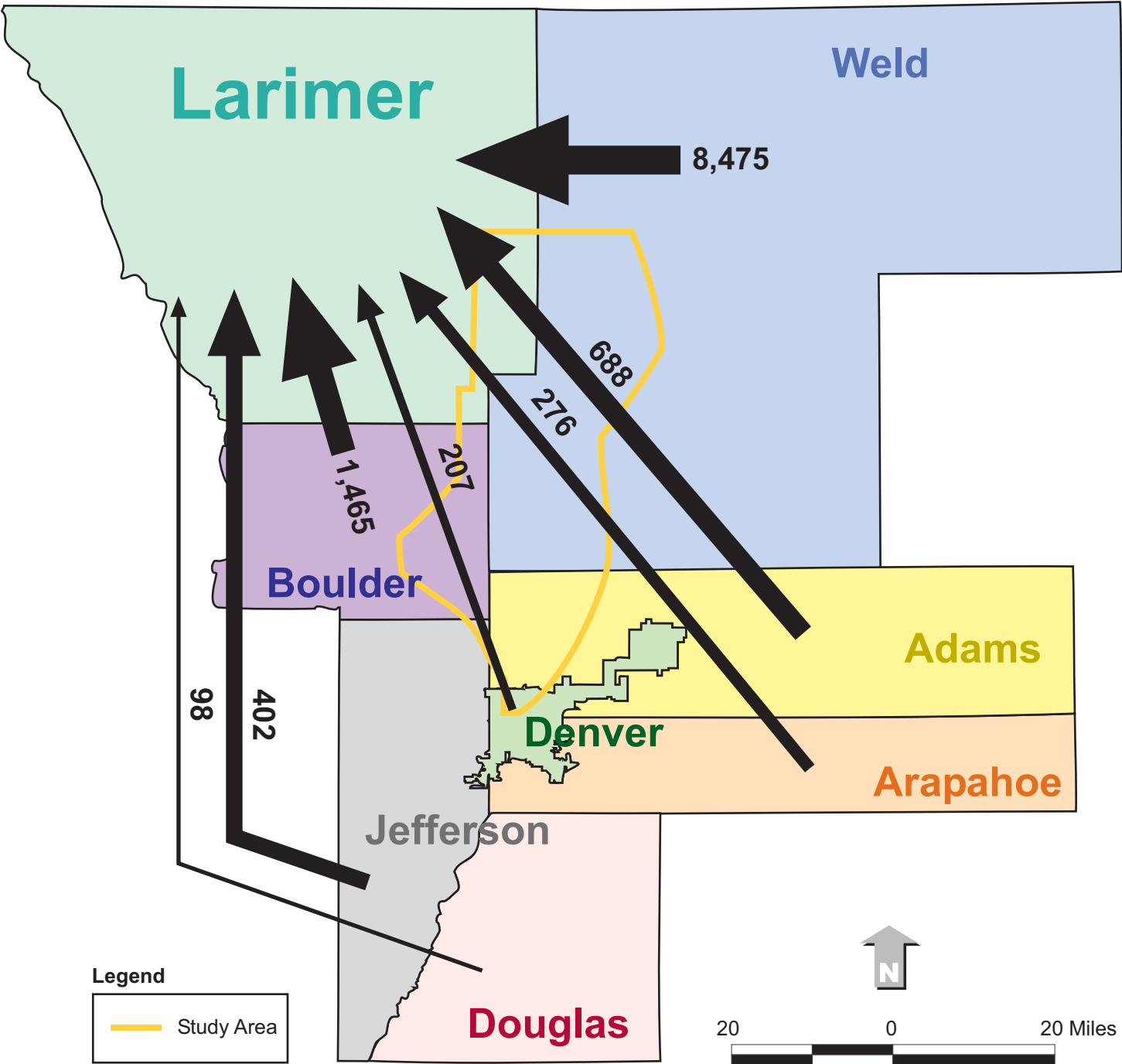
Work Trips from Weld County

US Census, 2000



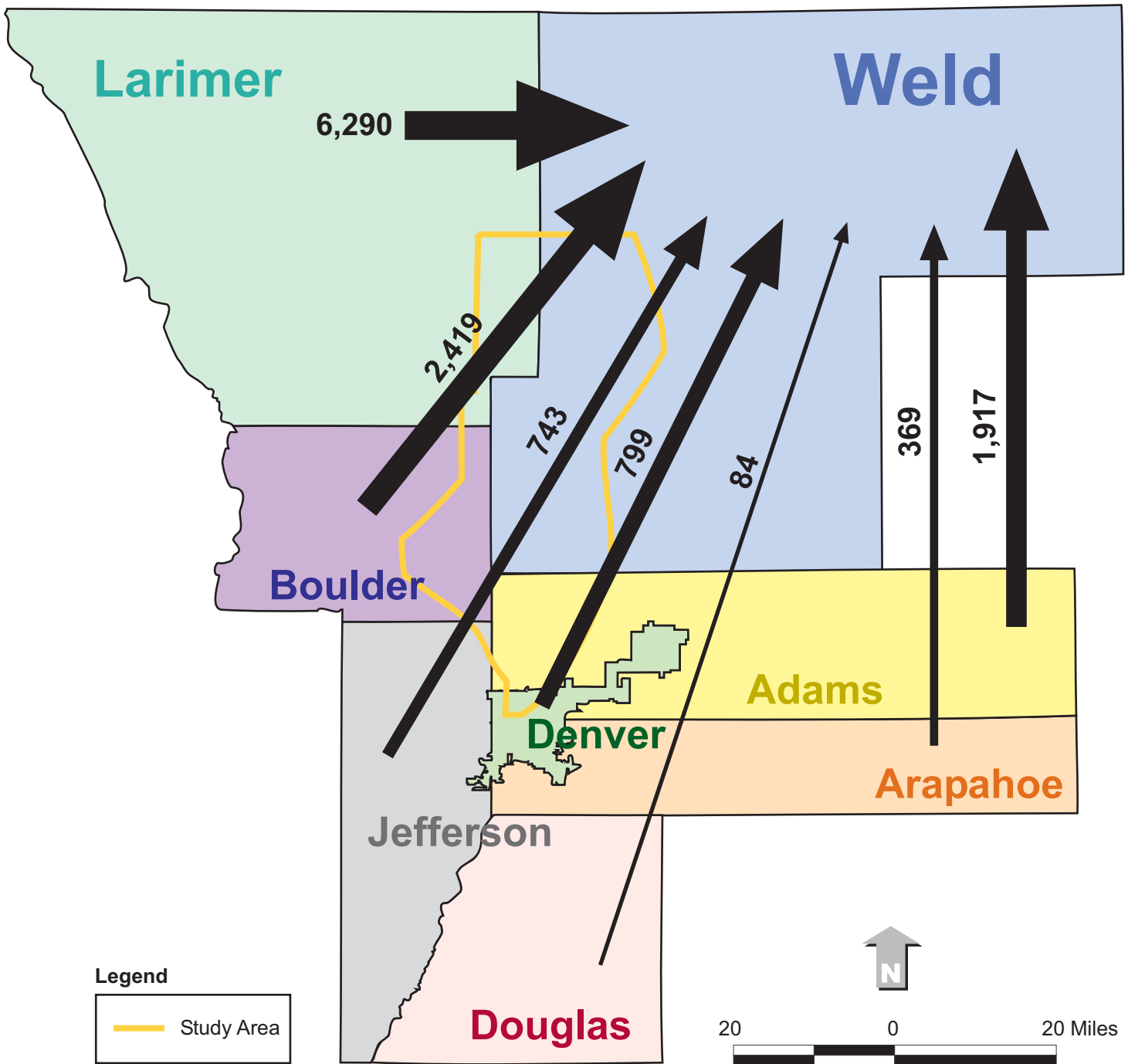
Work Trips to Larimer County

US Census, 2000



Work Trips to Weld County

US Census, 2000



Census Journey-to-Work County-to-County Summary

Journey-to-Work Trips TO Larimer and Weld Counties (1990 and 2000)

Residence	Workplace	1990 Workers	% of all Workers	2000 Workers	% of all Workers	% Change 1990- 2000
Adams County	Larimer County	318	0.4%	688	0.5%	116.4%
Arapahoe County	Larimer County	276	0.3%	276	0.2%	0.0%
Boulder County	Larimer County	1,096	1.3%	1,465	1.2%	33.7%
Denver County	Larimer County	230	0.3%	207	0.2%	-10.0%
Douglas County	Larimer County	18	0.0%	98	0.1%	444.4%
Jefferson County	Larimer County	241	0.3%	402	0.3%	66.8%
Larimer County	Larimer County	80,195	93.0%	113,409	89.7%	41.4%
Weld County	Larimer County	2,996	3.5%	8,475	6.7%	182.9%
Metro Subtotal		2,179	2.5%	3,136	2.5%	43.9%
Elsewhere		828	1.0%	1,417	1.1%	71.1%
Total		86,198	100.0%	126,437	100.0%	46.7%
Adams County	Weld County	1,159	2.1%	1,917	2.7%	65.4%
Arapahoe County	Weld County	208	0.4%	369	0.5%	77.4%
Boulder County	Weld County	1,149	2.1%	2,419	3.4%	110.5%
Denver County	Weld County	327	0.6%	799	1.1%	144.3%
Douglas County	Weld County	15	0.0%	84	0.1%	460.0%
Jefferson County	Weld County	404	0.7%	743	1.0%	83.9%
Larimer County	Weld County	4,215	7.5%	6,290	8.8%	49.2%
Weld County	Weld County	47,671	85.2%	57,777	80.7%	21.2%
Metro Subtotal		3,262	5.8%	6,331	8.8%	94.1%
Elsewhere		777	1.4%	1,214	1.7%	56.2%
Total		55,925	100.0%	71,612	100.0%	28.1%

1990 Summary	2000 Summary
Work Trips TO Larimer County From within Larimer County = 93.0% From outside Larimer County = 7.0% From the Metro Area = 2.5%	Work Trips TO Larimer County From within Larimer County = 89.7% From outside Larimer County = 10.3% From the Metro Area = 2.5%
Work Trips TO Weld County From within Weld County = 85.2% From outside Weld County = 14.8% From the Metro Area = 5.8%	Work Trips TO Weld County From within Weld County = 80.7% From outside Weld County = 19.3% From the Metro Area = 8.8%

Journey-to-Work Trips FROM Larimer and Weld Counties (1990 and 2000)

Residence	Workplace	1990 Workers	% of all Workers	2000 Workers	% of all Workers	% Change 1990- 2000
Larimer County	Adams County	554	0.6%	1,115	0.8%	101.3%
Larimer County	Arapahoe County	379	0.4%	787	0.6%	107.7%
Larimer County	Boulder County	3,981	4.3%	7,855	5.8%	97.3%
Larimer County	Denver County	1,402	1.5%	2,021	1.5%	44.2%
Larimer County	Douglas County	25	0.0%	132	0.1%	428.0%
Larimer County	Jefferson County	592	0.6%	960	0.7%	62.2%
Larimer County	Larimer County	80,195	86.4%	113,409	84.2%	41.4%
Larimer County	Weld County	4,215	4.5%	6,290	4.7%	49.2%
Metro Subtotal		6,933	7.5%	12,870	9.6%	85.6%
Elsewhere		1,466	1.6%	2,046	1.5%	39.6%
Total		92,809	100.0%	134,615	100.0%	45.0%
Weld County	Adams County	3,000	4.8%	4,716	5.5%	57.2%
Weld County	Arapahoe County	573	0.9%	991	1.1%	72.9%
Weld County	Boulder County	3,432	5.5%	7,771	9.0%	126.4%
Weld County	Denver County	2,269	3.7%	3,702	4.3%	63.2%
Weld County	Douglas County	71	0.1%	209	0.2%	194.4%
Weld County	Jefferson County	898	1.4%	1,336	1.5%	48.8%
Weld County	Larimer County	2,996	4.8%	8,475	9.8%	182.9%
Weld County	Weld County	47,671	77.0%	57,777	67.0%	21.2%
Metro Subtotal		10,243	16.5%	18,725	21.7%	82.8%
Elsewhere		1,025	1.7%	1,233	1.4%	20.3%
Total		61,935	100.0%	86,210	100.0%	39.2%

1990 Summary	2000 Summary
Work Trips FROM Larimer County To Larimer County = 86.4% Outside Larimer County = 13.6% To the Metro Area = 7.5%	Work Trips FROM Larimer County To Larimer County = 84.2% Outside Larimer County = 15.8% To the Metro Area = 9.6%
Work Trips FROM Weld County To Weld County = 77.0% Outside Weld County = 23.0% To the Metro Area = 16.5%	Work Trips FROM Weld County To Weld County = 67.0% Outside Weld County = 33.0% To the Metro Area = 21.7%

To: Chris Primus 11/31

**Transportation Planner's Handbook on Conversion
Factors for the Use of Census Data**

3.5 CALCULATION OF A COMPOSITE ADJUSTMENT FACTOR

Individual adjustment factors calculated in Steps 1-4 can be combined to reflect one adjustment factor for each of the Census journey-to-work files. Table 3.5 shows the combined calculation of composite factors for each of the area types.

Table 3.5

APPLICATION OF CENSUS ADJUSTMENT FACTORS Census "Workers" to Daily Home-Based Work Trips						
		Adjustment Factors				Total Adjustment
Metro Area Size		Absenteeism × by	Mode Shift × by	Multiple Trips × by	Chaining × by	
50-200K	Auto	0.82	1.00	1.04	1.58	1.35
	Transit	0.70	0.93	1.00	1.82	1.18
	Motorcycle/Bicycle	0.76	0.98	1.00	1.71	1.27
	Walk	0.61	1.21	1.05	1.61	1.25
200-500K	Auto	0.81	1.00	1.06	1.58	1.36
	Transit	0.95	0.77	1.00	1.82	1.33
	Motorcycle/Bicycle	0.80	0.98	1.00	1.71	1.34
	Walk	0.66	1.17	1.08	1.67	1.39
500-1000K	Auto	0.82	1.00	1.03	1.59	1.34
	Transit	0.90	0.87	1.00	1.89	1.48
	Motorcycle/Bicycle	0.80	0.98	1.00	1.71	1.34
	Walk	0.71	1.05	1.06	1.80	1.42
1 MIL + w/o Subway	Auto	0.85	1.00	1.03	1.60	1.40
	Transit	0.76	0.81	1.02	1.86	1.17
	Motorcycle/Bicycle	0.84	0.98 ¹	1.18	1.91	1.36
	Walk	0.67	1.13	1.08	1.70	1.39
1 MIL + with Subway	Auto	0.84	1.01	1.03	1.61	1.41
	Transit	0.82	0.85	1.01	1.81	1.27
	Motorcycle/Bicycle	0.84	0.98	1.23	1.71	1.73
	Walk	0.84	1.45	1.04	1.59	2.01
Not Urbanized	Auto	0.83	1.00	1.06	1.59	1.40
	Transit	0.81	0.81	1.07	1.89	1.33
	Motorcycle/Bicycle	0.78	0.78	1.00	1.71	1.04
	Walk	0.55	0.99	1.06	1.80	1.04
All Areas	Auto	0.84	1.00	1.04	1.59	1.39
	Transit	0.82	0.84	1.01	1.82	1.27
	Motorcycle/Bicycle	0.80	0.98	1.07	1.71	1.43
	Walk	0.66	1.17	1.05	1.67	1.35

1. Adjusted to All Area average for lack of sufficient data

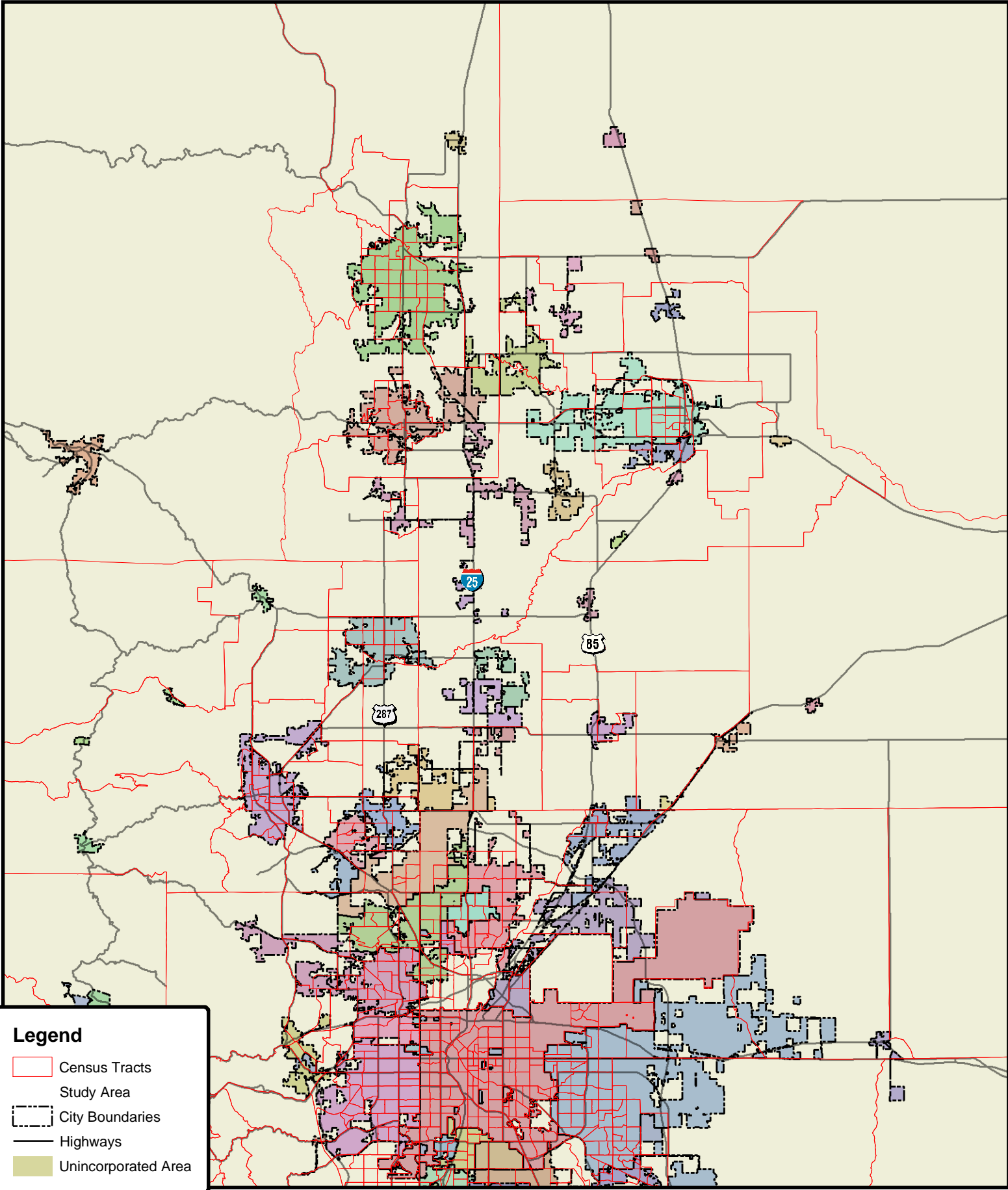
CHAPTER 3

DEVELOPMENT OF CENSUS ADJUSTMENT FACTORS FROM NPTS

The process used for adjusting Census journey-to-work files includes four steps as depicted in Figure 3.0. Each adjustment is discussed separately and consists of a set of national averages derived from the 1990 Nationwide Personal Transportation Survey (NPTS). Subsequently, these NPTS derived factors are compared to locally derived data in Chapter 4. This comparison serves to enable a better understanding of issues related to use of the conversion factors.

The NPTS proves to be a particularly useful database for deriving Census conversion factors since the sample size was large enough to permit stratification of some factors by metropolitan area size and normal travel mode. Normal mode is defined as the mode which the survey respondent indicated was their customary mode of travel to work. More important is the fact that the NPTS mode of travel was asked both in terms of an individual's normal mode-to-work during the past week, and in terms of a more conventional travel diary for all household members on a random day of the week. Thus the NPTS files contain all of the data necessary to generate conversion factors directly. Further, the definition of worker in the NPTS includes anyone who was working at all during the past week. This is consistent with the worker definition used by the Census.

This chapter discusses how to generate home-based work production/attraction trip tables starting with the mode specific data sets available from the Census journey-to-work files, either at the metropolitan area level of detail or from the statewide files. Either data set provides information on the normal mode of travel for all working individuals, whether employed full or part time, who responded that they worked at some time during the week preceding the Census. The metropolitan files normally provide the home-origin and work-destination locations at the zonal level and the state files provide this information at minor civil division or urban place level. Data tables in this chapter provide the conversion factors necessary to sequentially convert these "trip tables", extracted by mode, into the tables normally developed for use in urban travel demand modeling. Some modes were combined during the development of these factors. Appendix B provides tables stratified for all modes. The final conversion factors can be applied to Census journey-to-work files to compare the results to data obtained from a local home interview survey or transit on-board survey. In the absence of such locally derived information, adjusted Census trip tables can be used directly.

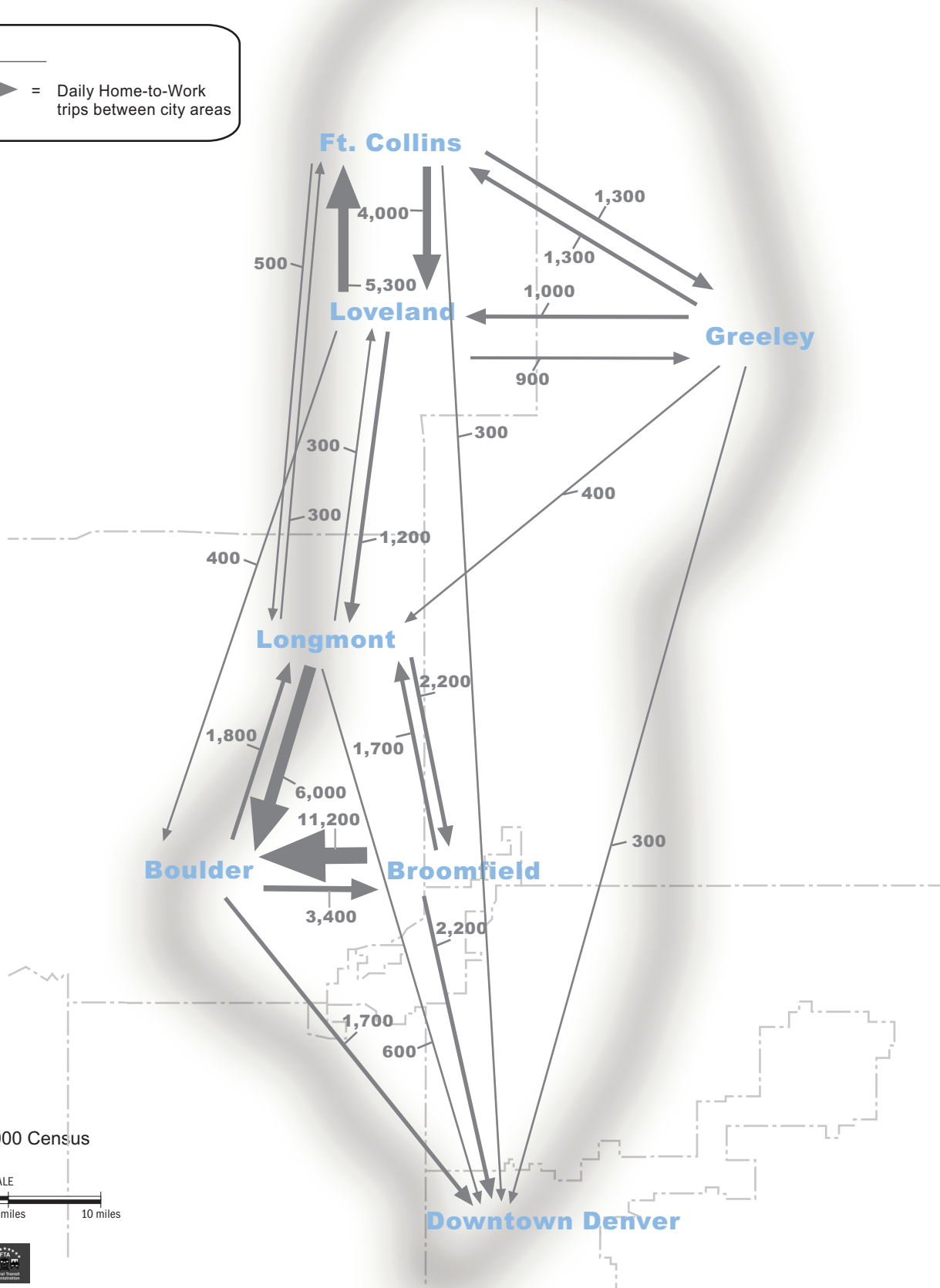


Legend

- Census Tracts
- Study Area
- City Boundaries
- Highways
- Unincorporated Area



City to City Home-to-Work Trips



Source: 2000 Census

APPROXIMATE SCALE
0 5 miles 10 miles



TRAVEL DEMAND MODEL DEVELOPMENT AND VALIDATION

CARTER-BURGESS

PRACO
Section 11 - Page 10

August 2004



Graphics Development -- Reference

	Fort Collins	Loveland	Greeley	Longmont	Boulder	Broomfield Area	Downtown Denver	Other North Area (Non-City)	Other South Area (Non-City)	Remaining Denver Metro Area	ALL TRIPS (SUM)
From Fort Collins to	55458	3943	1278	499	248	129	289	4979	690	1422	68935
From Loveland to	5345	11236	932	1222	403	56	197	3273	292	732	23688
From Greeley to	1298	965	28968	412	153	54	280	5636	1554	1415	40735
From Longmont to	293	297	242	18353	5944	2228	617	705	6755	2091	37525
From Boulder to	72	42	44	1792	33380	3423	1656	102	5933	4371	50815
From Broomfield Area to	116	34	56	1697	11207	13543	2238	88	7358	8876	45213
Total other north to	14840	5551	6737	3224	1088	88	323	15283	3396	2481	53011
Total other south to	525	346	1154	3838	12316	10138	12165	1144	63965	72012	177603
From Downtown Denver to	0	0	10	18	113	15	3649	0	290	3902	7997
From Denver Metro Area to	633	191	653	1928	9365	8255	102893	512	30909	756732	912071

RSA Assignments

Fort Collins = 3,4

Loveland = 5

Greeley = 10,11

Longmont = 103, 104

Boulder = 107, 108

Lafayette = 105, 106, 704

Downtown Denver = 412

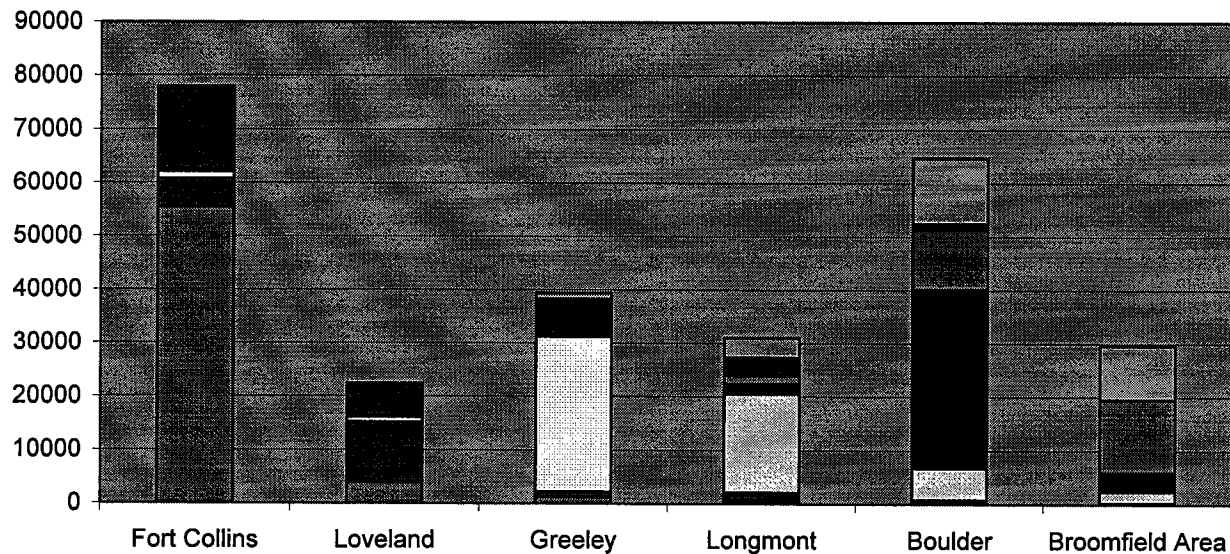
Denver Metropolitan Area = 101, 201-214, 304, 305, 311-313, 401-411, 413, 501-515, 601-607

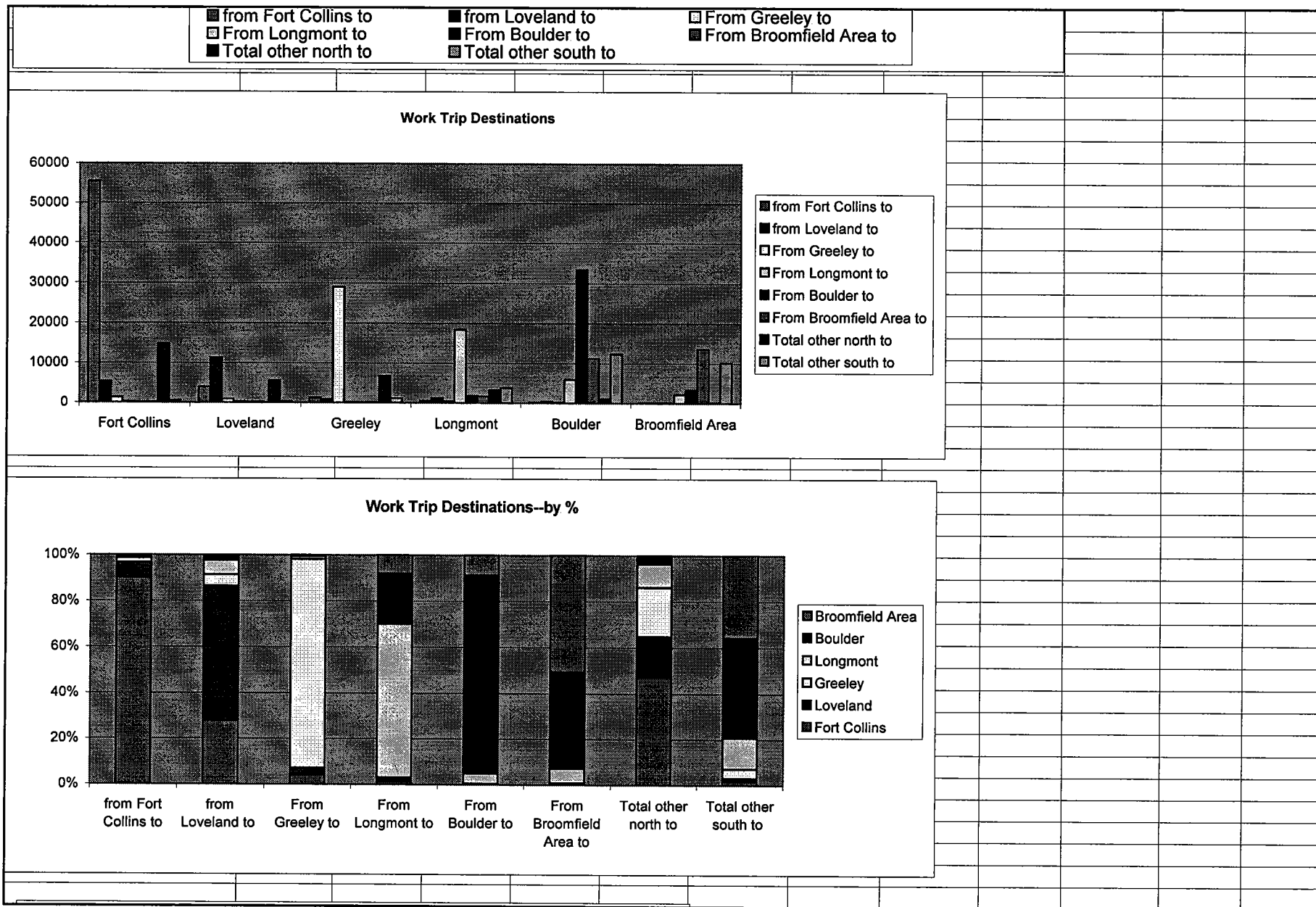
Other North = 1,2,6,7,8,9,12,13,14

Other South = 102, 301, 302, 303, 306, 307, 308, 309, 310, 705, 706, 802, 803

	Fort Collins	Loveland	Greeley	Longmont	Boulder	Broomfield Area	Downtown Denver	Other North Area (Non-City)	Other South Area (Non-City)	Remaining Denver Metro Area	All trips	ALL TRIPS (SUM)
from Fort Collins to	55458	3943	1278	499	248	129	289	4979	690	1422	69031	68935
from Loveland to	5345	11236	932	1222	403	56	197	3273	292	732	24303	23688
From Greeley to	1298	965	28968	412	153	54	280	5636	1554	1415	40902	40735
From Longmont to	293	297	242	18353	5944	2228	617	705	6755	2091	37945	37525
From Boulder to	72	42	44	1792	33380	3423	1656	102	5933	4371	50829	50815
From Broomfield Area to	116	34	56	1697	11207	13543	2238	88	7358	8876	45012	45213
Total other north to	14840	5551	6737	3224	1088	88	323	15283	3396	2481	53320	53011
Total other south to	525	346	1154	3838	12316	10138	12165	1144	63965	72012	178704	177603
From Downtown Denver to	0	0	10	18	113	15	3649	0	290	3902	7987	7997
From Denver Metro Area to	633	191	653	1928	9365	8255	102893	512	30909	756732	916483	912071

North I-25 Corridor Travel Patterns







Journey-to-Work Data Processing

Travel data from the US Census of 2000 was processed for the study area. The census survey (the long form, received by about every 7th household) records information about the journey-to-work (JTW) trip, including travel time, start time, means (mode), workplace location, etc.

The Census Bureau summarizes the JTW data at different geographies, including county level and census tract level.

JTW Definition

- ❑ For journey-to-work workplace information, the US census long form inquires where the survey respondent worked most during the prior week, for their primary job. The survey question is "At what location did this person work last week? If this person worked at more than one location, print where he or she worked most last week."
- ❑ The JTW definition of a work trip differs from the Home-based Work (HBW) definition used in travel models. A HBW trip, recorded by a household survey for a given weekday, is a trip made between home and work, with no regard to directionality.

Conversion of JTW worker flows to 2-way work trips

- ❑ JTW trips can be converted to HBW trips. The conversion factor takes into account the return trip from work to home, the effect of multiple jobs, absenteeism (vacation and sick days), etc. The factor ranges from 1.35 to 1.41, depending on the population size of the area¹. For the North I-25 Study Area, a conversion factor of 1.35 is appropriate.

County-to-County Journey-to-Work Data

¹ Transportation Planner's Handbook on Conversion Factors for the Use of Census Data, USDOT Federal Highway Administration, May 1996.

Journey-to-Work Trips To/From Larimer and Weld Counties

Residence County	Workplace County	Workers	% of all Trips	Residence County	Workplace County	Workers	% of all Trips	Residence County	Workplace County	Workers	% of all Trips	Residence County	Workplace County	Workers	% of all Trips
Adams	Larimer	688	0.5%	Adams	Weld	1,917	2.7%	Larimer	Adams	1,115	0.8%	Weld	Adams	4,716	5.5%
Arapahoe	Larimer	276	0.2%	Arapahoe	Weld	369	0.5%	Larimer	Arapahoe	787	0.6%	Weld	Arapahoe	991	1.1%
Boulder	Larimer	1,465	1.2%	Boulder	Weld	2,419	3.4%	Larimer	Boulder	7,855	5.8%	Weld	Boulder	7,771	9.0%
Denver	Larimer	207	0.2%	Denver	Weld	799	1.1%	Larimer	Denver	2,021	1.5%	Weld	Denver	3,702	4.3%
Douglas	Larimer	98	0.1%	Douglas	Weld	84	0.1%	Larimer	Douglas	132	0.1%	Weld	Douglas	209	0.2%
Jefferson	Larimer	402	0.3%	Jefferson	Weld	743	1.0%	Larimer	Jefferson	960	0.7%	Weld	Jefferson	1,336	1.5%
Larimer	Larimer	113,409	89.7%	Larimer	Weld	6,290	8.8%	Larimer	Larimer	113,409	84.2%	Weld	Larimer	8,475	9.8%
Weld	Larimer	8,475	6.7%	Weld	Weld	57,777	80.7%	Larimer	Weld	6,290	4.7%	Weld	Weld	57,777	67.0%
Elsewhere	Larimer	1,417	1.1%	Elsewhere	Weld	1,214	1.7%	Larimer	Elsewhere	2,046	1.5%	Weld	Elsewhere	1,233	1.4%
Total	Larimer	126,437	100%	Total	Weld	71,612	100%	Larimer	Total	134,615	100%	Weld	Total	86,210	100%

Journey-to-Work Trips Between Denver Metro* and Larimer/Weld Counties

Denver Metro*	Larimer	3,136
Denver Metro*	Weld	6,331
Larimer	Denver Metro*	12,870
Weld	Denver Metro*	18,725
Total		41,062

* Denver Metro consists of Adams, Arapahoe, Boulder, Denver, Douglas, and Jefferson Counties.

County-to-County Summary

- ❑ The county-to-county JTW data indicates about 41 thousand workers commute between Larimer/Weld counties and the six Denver metropolitan counties. This equates to about 55 thousand daily HBW trips (using the conversion factor of 1.35 to convert JTW to HBW trips).

Census Tract Journey-to-Work Data

- ❑ JTW data between census tracts was summarized to the Regional Statistical Area (RSA) geographic level (see map attached) for analysis purposes.
- ❑ The RSA geographic level of analysis allowed the summarization of data for the study area boundary, and to focus on the interregional trips between the north area and the Denver metropolitan area. (Most notably, southwestern Weld County is included in the Denver metropolitan area).
- ❑ The North Study area approximately corresponds to the NFRMPO model area.
- ❑ The RSA set 1-14 form the North Study Area (see attached graphic).

JTW Flow From and To the North Study Area

Origin	Destination	JTW Worker Flow
North Study Area	North Study Area	165,750
	South Study Area	16,260
	Other Denver Metro	5,580
	Denver CBD	1,090
	Elsewhere	3,760
	TOTAL	192,440
North Study Area	North Study Area	165,750
South Study Area		5,440
Other Denver Metro		2,100
Denver CBD		10
Elsewhere		5,590
TOTAL		178,890

JTW Flow Between North Study Area and Denver Metro

Origin	Destination	JTW Worker Flow
North Study Area	Denver Metro	22,890
Denver Metro	North Study Area	7,540
2-way Total		30,430

Census Tract Summary

- ❑ The census tract JTW data indicates about 30 thousand workers commute between the north study area and the Denver metropolitan area. This equates to about 40 thousand HBW trips.

Other

- ❑ The US Census suggests that total employment should be about 7 to 9% greater than workers reported by the JTW. This is due to JTW restricting the respondents to workers who worked during the reference week (as opposed to those on vacation or on sick leave), multiple jobs, and seasonal employment fluctuations.

North Study Area Employment and Workers

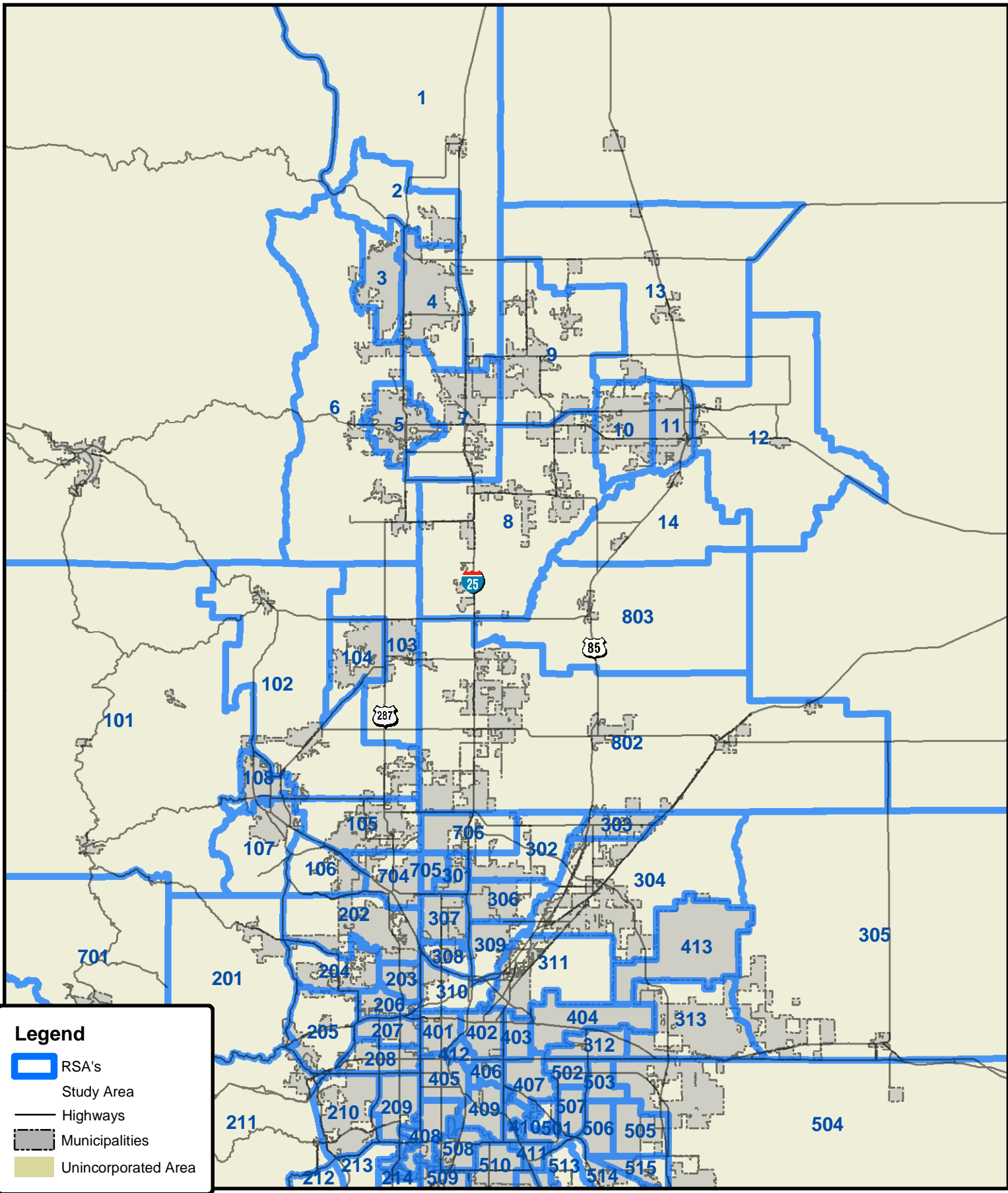
Employment	Workers	Percent Difference
196,100	179,630	9%

Observation

- ❑ The total JTW worker flow is within the range expected, compared to total employment.

J:_Transportation\071609.400\model\JTW Trip Processing.doc

Regional Statistical Areas



Legend

- RSA's
- Study Area
- Highways
- Municipalities
- Unincorporated Area



**NORTH I-25
EIS**

information. cooperation. transportation.

Work Locations of North Study Area Residents		
Work Location	Number	%
North Study Area	165,800	86%
South Study Area	16,300	8%
Denver CBD	1,100	1%
Other Denver Metro	5,600	3%
Elsewhere	3,800	2%
Total	192,600	100%

Legend:

- Burlington Northern Santa Fe
- Great Western Railroad
- Union Pacific Railroad
- Abandoned Railroad ROW
- US or Interstate Highway
- State Highway

Work Locations of North Study Area Residents

	Number	%
North Study Area	165,800	86%
South Study Area	16,300	8%
Denver CBD	1,100	1%
Remaining Denver Metro Area	5,600	3%
	3,800	2%
Total	192,600	100%

Map Labels: Wellington, Ault, Ft. Collins, Timnath, Severance, Eaton, Lucerne, Loveland, Greeley, Garden City, Evans, La Salle, Campion, Johnstown, Miliken, Berthoud, Mead, Platteville, Firestone, Frederick, Niwot, Erie, Arapahoe Rd., Baseline Rd., Lafayette, Louisville, Superior, Westminister, Thornton, Commerce City, Northglenn, Denver Union Station, 6th Ave.

Study Area Labels: North Study Area, South Study Area

County Labels: WELD, BOULDER, ADAMS, GROOMFIELD, JEFFERSON

Highway Labels: 1, 14, 25, 287, 68, 257, 392, 34, 60, 56, 52, 76, 70, 225, 40, 6, 7, 36, 119, 93, 121, 279, E470

Callouts:

- 86% of North Study Area residents work in the North Study Area
- 8% of North Study Area residents work in the South Study Area
- 3% of North Study Area residents work in the remaining Denver Metro area
- 1% of North Study Area residents work in the Denver CBD

Scale: 0 to 10 miles