



# TEACHER SUPPLY AND DEMAND IN THE STATE OF COLORADO

*Prepared for*  
Colorado Department of Education  
Denver, CO

Institute of Education Sciences  
U.S. Department of Education  
Washington, DC 20208

*Prepared by*  
Robert Reichardt  
*with assistance from*  
Becky Van Buhler  
Motoko Akiba

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Mid-continent Research for Education  
and Learning  
2550 South Parker Road, Suite 500  
Aurora, CO 80014  
Phone: 303-337-0990  
Fax: 303-337-3005  
[www.mcrel.org](http://www.mcrel.org)



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## EXECUTIVE SUMMARY

This report describes the Colorado teacher workforce from 1999 through 2001. It also contains detailed information on the special education teacher workforce in Appendix H and on school level leadership in Appendix I. Teacher and leader characteristics are described in terms of where they work (i.e. region of the state and school locale), subject they teach, and the schools they work in. Schools are characterized as large or small, high or low poverty, and high or low minority.

The report begins by describing trends in student population. Statewide student enrollment grew by between 2.3 and 2.4 percent annually between 1999 and 2001. Growth rates differed by region. There was faster growth in the Metropolitan and Pikes Peak Regions, while enrollment declined in the Northeast, Southeast and Southwest. The school-age population is forecasted to continue growing through 2012, but at a slower rate than in 1999–2001.

The number of Colorado teachers has grown faster than the student population, from 41,908 in 1999 to 45,408 in 2001. During that time, the proportion of minority teachers increased while the proportion of male teachers decreased. A significant number of teachers were approaching retirement. About 18 percent of the workforce will be eligible to retire within five years of 2001. While the number of teachers who retire in the next 10 years is expected to increase, the overall teacher attrition rate is not expected to increase by more than two percentage points from the current rate of 10 percent.

There were few clear and consistent patterns when examining teacher qualifications by geographic area or subject area. When looking at qualifications by student characteristics, however, clear patterns emerged. Teacher qualification levels in small schools and in schools with high concentrations of minority or poor students were lower than in other schools.

Average teacher salaries increased by two percent between 1999 and 2000 and four percent between 2000 and 2001. Teacher salaries were generally higher in the Metropolitan Region and in suburban schools, while those in the Northeast or Southeast and in towns received the lowest salaries. Colorado teachers generally had lower salaries than teachers in those states that were a source of many new Colorado teachers.

Just over one out of every five teachers left the schools they were teaching in 2000. About 11 percent of teachers in 2000 did not return to teaching in 2001. Another four percent of teachers changed districts, and seven percent changed schools within the same district. A high proportion of teachers in high-poverty and high-minority schools transferred to other schools within the same district. It was noted earlier that the high poverty and high minority schools generally had teachers with lower qualification levels. This high transfer rate may drain well-qualified teachers away from these schools.

Colorado hired just under seven thousand teachers in 2001. Less than half of these hires, 44 percent, were new teachers who had no teaching experience. About half of these new teachers were trained inside Colorado, and the other half were trained outside Colorado. Of those who

had prior experience teaching, about 800 worked in Colorado public education in 1999. These people had simply taken a year off from working in Colorado public schools.

There were about 4,100 special education teachers working in Colorado in 2001. This workforce was largely white (93 percent) and female (85 percent). Special education teachers had qualification levels similar to the general teacher workforce, except that a higher proportion of special education teachers have master's degrees or higher. Special education teachers who specialize in preschooler disabilities and those who work with students who have significant emotional disabilities generally had lower qualifications. Special education teachers in the Northeast and in urban schools generally had lower qualifications, while those in the Southwest and towns had higher qualification levels.

The school-level education leader workforce is made up of principals and assistant principals. Those leaders who worked in elementary schools were, on average, better educated and were more often female and minority. The average proportion of leaders who stopped working within the state after 2000 was eight percent, which is lower than the teacher attrition rate. However, leader transfer rates between districts and between schools were slightly higher than the teacher transfer rates. The end result was, on average, a quarter of school leaders left their schools between 2000 and 2001.

Taken together, this information does not reveal any crises. However, a few issues are worth noting. Just under one out of five teachers will be eligible to retire in the next five years. While the aging of the workforce is expected to increase attrition, it is not expected to raise the attrition rate more than two percentage points above the current 10 percent.

The foreign language teacher workforce may deserve some special attention. This workforce has high proportions of teachers who were eligible to retire and relatively low qualification levels. The vocational education teacher workforce is also expected to face a high number of retirements and may need attention.

Schools with high proportions of poor or minority students are of special concern. Teacher qualifications in these schools were generally lower. This was despite the fact that teachers in these schools generally receive higher salaries. These schools also have high attrition rates. Almost one out of three teachers in these schools changed schools in 2001. Most of this attrition was due to teachers moving to other schools within the same district.

Within special education, those teachers who work with students with significant emotional disabilities may deserve attention. These teachers have higher attrition rates, lower starting salaries, and lower qualifications than other special education teachers.

Finally, Colorado benefits greatly from teachers who move to Colorado from other states. This was despite the fact that average Colorado teaching salaries were lower than the average teaching salaries in the states that have sent the largest number of teachers to Colorado. That said, Colorado institutions appear to train about half of all the new teachers hired in the state.



## INTRODUCTION

The purpose of this report is to inform Colorado policymakers about the state's current teacher workforce and projected future teacher demand. This report describes the overall teacher workforce in terms of number of teachers, their ages, subject areas, years to retirement, and geographic location. The report also contains two special appendices, one with additional information about the special education teacher workforce, and another with information about the school building leadership workforce. District level data are not reported; instead, teachers are grouped by demographic type, subject taught, and student characteristics. The report looks at the following attributes of the workforce: teacher qualifications, attrition, and salary level. A rough forecast is made of future teacher demand through 2012. The report begins with background information about the student population.

## TRENDS IN STUDENT POPULATION

Teacher demand is a product of student population and policy decisions about staffing and class size. This section describes changes in the student population. Table 1 shows the student population in 1999, 2000, and 2001 by Colorado Department of Education (CDE) region<sup>1</sup>. (See Appendix A for a map of the regions.) Overall, Colorado's K–12 student population increased, but not all regions of the state had the same rate of growth. The statewide student population increased by 2.3 percent between 1999 and 2000, and by 2.4 percent between 2000 and 2001, with the largest growth occurring in the Metropolitan and Pikes Peak Regions. The Metropolitan Region added the most students, while the Pikes Peak Region grew at a higher rate. Three regions, the Northeast, Southeast, and Southwest, experienced declines in population. The largest population decline was in the Southwest.

**Table 1. Colorado student Population by Geographic Area**

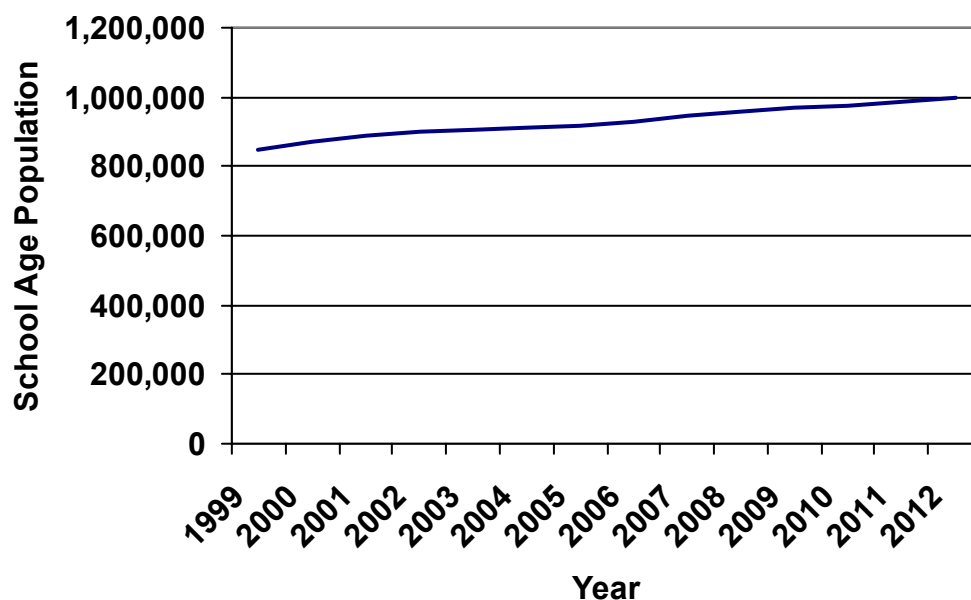
CDE Region	Student Population 1999	Student Population 2000	1999–2000 Rate of Increase	Student Population 2001	2000–2001 Rate of Increase
North Central	73,921	75,998	2.8%	77,605	2.1%
Northwest	30,218	30,643	1.4%	31,000	1.2%
Northeast	11,172	11,038	-1.2%	10,957	-0.7%
Metropolitan	397,018	405,700	2.2%	418,281	3.1%
Pikes Peak	125,272	129,781	3.6%	132,744	2.3%
West Central	33,677	34,189	1.5%	34,951	2.2%
Southwest	22,648	22,819	0.8%	22,252	-2.5%
Southeast	13,510	13,282	-1.7%	13,067	-1.6%
Total	707,436	723,450	2.3%	740,857	2.4%

Source: CDE Student Enrollment Data Files

<sup>1</sup> For the purposes of this report, the years noted refer to the beginning of the school year. Thus, 1999 indicates the 1999–2000 school year, 2000 indicates the 2000–2001 school year, and 2001 indicates the 2001–2002 school years.

The regions vary in size considerably. In 2001, the largest region, the Metropolitan Region, contained more than half of the students in the state, while the smallest region, Northeast, contained less than two percent of the students in the state. To place these differences in context, the Metropolitan Region added 12,600 students between 2000 and 2001 — more than the number of students who resided in the Northeast Region and almost as many students as resided in the Southeast Region.

In July 2001 the Colorado Department of Local Affairs, Colorado Demography Section projected the state's student age population through 2012 using information from the 2000 Census. Growth of the statewide student-age population is expected to slow after 2000 to about one percent a year and remain at that level through 2012. However, the actual rate of growth in 2001 was higher than the Department's projected rate.



**Figure 1: Colorado school age (5–18 years old) population forecast**

Source: Department Local Affairs, Colorado Demography Section

The projection forecasts high growth rates the Northwest Region, about three percent a year, while the Northeast Region is expected to have no growth in school-age population over the next ten years. Detailed information by region is contained in Appendix B.

In summary, statewide student enrollment grew by between 2.3 and 2.4 percent annually between 1999 and 2001. Growth rates differed by region within the state. There was faster growth in the Metropolitan and Pikes Peak Regions, while enrollment declined in the Northeast, Southeast and Southwest. The school-age population is forecasted to continue growing through 2012, but at a slower rate than in 1999–2001.

## THE TEACHER WORKFORCE

To conduct this analysis, the CDE provided McREL with two data sets, the human resources (HR) and licensure data sets. The HR data set contains individual level information on all of the education professionals working in Colorado public schools from 1999 through 2001. Data for these three years, 1999, 2000, and 2001, were used in this analysis since they were collected using a similar method (through the World Wide Web) and thus are expected to be comparable and suitable for analyzing together. Information in the HR data set includes the job classification (for example, teacher, paraprofessional or student support services provider), locations, subject area assignments (for example English, history or speech pathology), age, experience (beginning in 2000), and highest education level. The licensure data set contains information on education professionals' certification levels and endorsement areas.

This report focuses on individual teachers both part and full-time, (full-time-equivalents (FTE) were not used since teachers are hired as individuals). This also allows the description of individual characteristics (age, race, salary level). Using the information in the HR data set, individuals with more than one job classification or subject area were placed in the job and subject area in which each person spent the most time.

In order to provide contextual information about the schools and districts where teachers work, information from the HR data set was merged with CDE data on school-level student characteristics (race and free and reduced lunch eligibility) as well as U.S. Department of Education information on schools from the Common Core of Data (CCD) data set. This combined data set is referred to in the report as CDE HR.

Table 2 shows the number of teachers by subject area for 1999 through 2001. Over these three years, the total number of teachers grew by 3,500, from 41,908 to 45,408. The number of teachers grew at a faster rate than the student population — 4.9 percent between 2000 and 2001, as compared to a student growth rate of 2.4 percent during that time frame. The subject area with the most teachers was general elementary, with about 38 percent of the total teacher workforce. The next largest area was English language arts, followed by special education. The subject areas with the fewest teachers were music and art.

**Table 2. Colorado Teachers by Subject Area**

	1999	2000	2001
General Elementary	15,984	16,659	17,018
Special Education	3,530	3,633	4,043
English Language Arts	3,151	3,914	4,370
General Middle/Junior High	3,128	1,460	1,389
Career, Vocational & Consumer Science	2,416	2,541	2,516
Math	2,302	2,639	2,907
Social Science	2,146	2,601	2,639
Natural Science	2,094	2,455	2,607
Physical Education	1,675	1,908	1,964
Music	1,257	1,412	1,559
Foreign Languages	1,126	1,219	1,311
Other	1,111	553	535
Art	923	1,092	1,173
Unknown	1,065	1,205	1,377
Statewide Total	41,908	43,291	45,408

Source: CDE HR Data Set

Table 3 shows the breakdown of teachers by race/ethnicity and gender for 2001 and the change in this distribution since 1999. Since 1999, there were increases in the proportion of Native American, Asian and Hispanic teachers and a decline in the proportion of white teachers. The increase in the number of Native American teachers was a relatively dramatic 65 percent. The proportion of male teachers declined.

**Table 3. Teachers' Race/Ethnicity and Gender**

	2001	Percentage Point Change since 1999
Native American	0.9%	0.3
Asian	0.8%	0.1
Black	1.7%	0.0
Hispanic	6.5%	0.3
White	90.1%	-0.7
Female	74.3%	0.5
Male	25.7%	-0.5

Source: CDE HR Data Set

When teachers are grouped by grade level served by their school, approximately 50 percent of teachers taught elementary grades (pre-kindergarten through six), 22 percent taught in

middle/junior high school grades (six through nine) and 28 percent taught in senior high (grades nine through twelve)<sup>2</sup>.

Table 4 shows the geographic distribution of teachers in 2001 and the percentage point change since 1999. This analysis describes the geographic distribution of teachers in two ways: locale and region. For locale, schools were assigned to one of four locales (urban, suburban, town and rural) based on information contained in the CCD. As noted earlier, the regions are those used by the CDE. The large majority (82 percent) of teachers worked in the Metropolitan, Pikes Peak or North Central Regions. Most teachers worked in suburban or urban schools. As with student population, the largest growth in the number of teachers was in the Metropolitan Region, while the number of teachers who worked in the Northwest, Southwest and Southeast Regions declined. It appears that the number of teachers working in the West Central Region also declined, despite the fact that the student population in this region increased slightly.

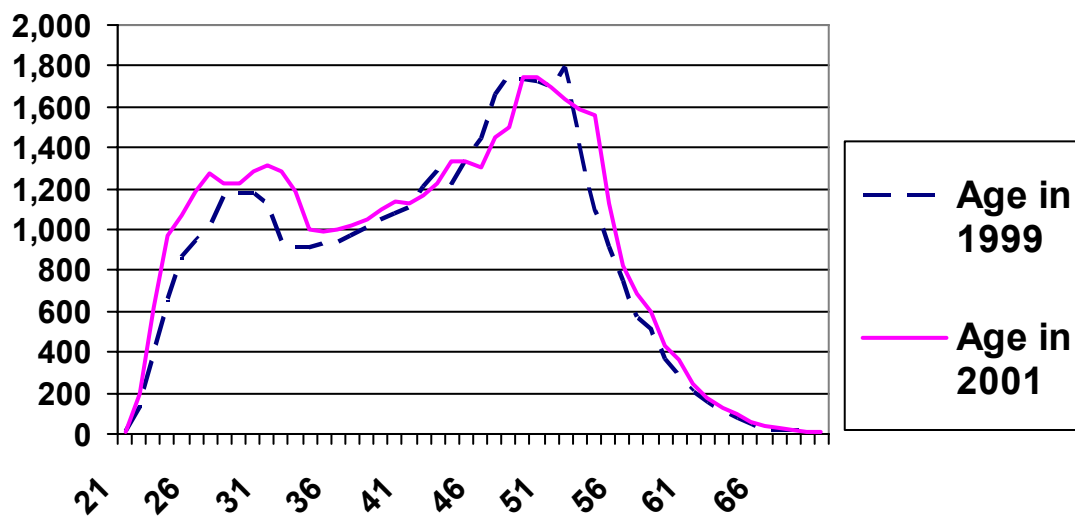
**Table 4. Geographic Distribution of Colorado Teachers**

	2001	Percentage Point Change since 1999
North Central	13.4%	0.6
Northwest	4.9%	-0.1
Northeast	2.4%	0.3
Metro	50.6%	0.2
Pikes Peak	18.1%	0.3
West Central	4.8%	-0.2
Southwest	3.5%	-0.4
Southeast	2.3%	-0.2
Urban	31.7%	0.7
Suburban	39.5%	-0.5
Town	7.9%	-0.4
Rural	21.0%	0.2

Source: CDE HR Data Set

Figure 2 shows the age distribution of the Colorado teacher workforce. The workforce had two large age cohorts. The largest cohort was those teachers born between 1947 and 1957, ages 44 through 54 in 2001. That group of teachers was approaching retirement, which is indicated by the sharp decline in the number of teachers over the age of 55. Based on this age distribution, Colorado policymakers should expect the retirement rate of teachers to remain at the same level or increase for the next six to ten years as this cohort moves into retirement. The second large cohort of teachers was those born between 1966 and 1976, ages 25 through 35. This cohort of teachers grew from 10,300 to 12,000 between 1999 and 2001.

<sup>2</sup> Grade levels were based on the grades served by the schools where teacher's work.



**Figure 2: Colorado teacher age distribution**

Source: CDE HR Data Set

In order to provide more information on future retirements and the potential demand implications for teacher supply, teachers' years to retirement eligibility were calculated. This calculation was made using retirement eligibility rules from the Colorado Public Employees Retirement Association and the Denver Public Schools Retirement System. Retirement eligibility is a function of age and experience working in Colorado public schools. Information on experience in Colorado public schools and age is contained in the HR data set. The retirement calculation is reported only for 2001 because experience information was first collected in 2000, and data managers indicated data collected during the first year was not accurate.

Table 5 shows the proportion of teachers who were eligible to retire in five years or less in 2001 by geographic area. Statewide, 18 percent of teachers were eligible to retire in the next five years. The Southeast Region had the highest proportion of teachers within five years of retirement at 24 percent or almost one out of four teachers. Relatively lower proportions of teachers within five years of retirement were in Southwest, Northwest, and Metropolitan Regions. Rural locales had the smallest proportion of teachers within five years of retirement, while towns had the highest proportion of teachers within five years of retirement.

**Table 5. Proportion of Teachers Eligible to Retire in Five Years or Less by Geographic Area (2001)**

	Percent Eligible to Retire in 5 years or less
North Central	19%
Northwest	17%
Northeast	20%
Metro	17%
Pikes Peak	18%
West Central	21%
Southwest	16%
Southeast	24%
Urban	19%
Suburban	18%
Town	21%
Rural	16%
Statewide Average	18%

Source: CDE HR data set

Table 6 shows retirement eligibility by subject area. The subject areas with the highest proportion of teachers within five years of retirement were foreign language and career, vocational & consumer science. The subject areas with the fewest teachers within five years of retirement were math and natural science.

**Table 6. Proportion of Teachers Eligible to Retire in Five Years or Less by Subject Area (2001)**

	Percent Eligible to Retire in 5 years or less
Career, Vocational & Consumer Science	21%
Foreign Languages	21%
Physical Curriculum	20%
English Language Arts	19%
Art	18%
General Elementary	18%
Music	18%
Social Science	18%
General Middle/Junior High	17%
Special Education	17%
Other	17%
Math	16%
Natural Science	16%
Unknown	9%

Source: CDE HR data set

In summary, the number of Colorado teachers had grown faster than the student population, from 41,908 in 1999 to 45,408 in 2001. During that time, the proportion of minority teachers increased while the proportion of male teachers decreased. A significant number of teachers were approaching retirement. About 18 percent of the workforce will be eligible to retire within five years of 2001. The Southeast and West Central Regions had higher concentrations of teachers near retirement while the Southwest, Metropolitan and Northwest Regions had lower concentrations of teachers near retirement. A higher proportion of career and vocational education teachers as well as foreign language teachers were near retirement, while the proportion of math and natural science teachers that were near retirement was below the state average.

## **TEACHER QUALIFICATIONS**

The links between teacher quality, defined as improved student performance, and the teacher qualification measures contained in this report are mixed (Reichardt, 2001). The clearest links have been found between teacher experience and student achievement. As teachers go through their first several years of teaching, student achievement tends to increase and then plateau (Hanushek, Kain, & Rivkin, 1998).

There are four types of information on teacher qualifications contained in the combined CDE HR and licensure data sets: certification, endorsement, experience and education. This information was used to derive the proportion of teachers who had higher qualification levels, that is, teachers who were completely certified, had a master's degree or higher, had more than



three years of experience, and senior high teachers who were endorsed in the subject area they teach. Note that certification is a measure of whether the state believes a teacher is qualified to teach while endorsement is a measure of whether the state believes a teacher is qualified in his or her subject area.

Each of these qualification measures is defined below, but in general, the higher the proportion of teachers that fall into each category, the better qualified the teacher workforce.

There is some research that shows that high school students perform better in certain subjects when they have teachers with more advanced education in those subjects (Goldhaber & Brewer, 1997). The CDE HR data set contains information on teachers' highest level of education, but not the subject area of that education. This information has been used to categorize teachers as either having a bachelors degree only, or as having a masters degree or higher.

To analyze the distribution of teacher experience, teachers were classified as either novice, that is, those with less than three years of teaching experience, or veteran, those with more than three years of teaching experience. Data on teacher experience levels were gathered by CDE for the first time in 2000. As discussed earlier, that first year of data collection was not considered accurate and only 2001 data are reported here.

When analyzed in the aggregate, teacher certification can represent the level of teacher qualifications in the state, or can be an indicator of teacher shortages. To use teacher certification as an indicator of teacher shortages, one must assume that districts will hire a completely certified applicant before hiring an uncertified or in-completely certified teacher. If this assumption is true, then areas with high proportions of uncertified teachers are experiencing shortages of certified applicants.

The nine different certification levels within Colorado were consolidated into four different certification levels: not fully certified, conditionally certified, completely certified and master teacher. Not fully certified includes teachers with emergency or temporary certification. Conditionally certified teachers must meet a condition, such as a year working in an alternative teaching program, to become completely certified. Completely certified teachers include both provisional and professional certification. The master certification level includes those teachers with certification from the National Board for Professional Teaching Standards (NBPTS). Appendix C contains additional information on the link between the nine different certification types and the levels used in this analysis. These four categories were further consolidated into two groupings:

- 1) incompletely certified: those who are not fully certified and conditionally certified teachers, and
- 2) completely certified: those who are completely certified and those with master certification.

The proportion of teachers who are completely certified is reported in this analysis.

The link between certification and student achievement is hotly debated. One reason it is difficult to find a link between certification and student achievement is the huge variation in the skills and knowledge teachers gather as part of the certification or re-certification process. This is due to changes over time in certification requirements and the great variety in the coursework taken by teachers to receive and maintain their certification.

There are approximately 202 subject area endorsements contained in the licensure data set. These were consolidated to approximate the subject areas used in the HR data set. Teacher endorsement levels were analyzed for core subject teachers in senior high schools. Senior high schools are those that serve any combination of ninth through twelfth grades, but do not serve any other grades. Core subjects used in this analysis were English language arts, foreign language, mathematics, natural science, and social sciences. These were drawn from the core subjects identified in the final regulations for the federal No Child Left Behind Act (NCLB). Since this qualification measure is reported for only senior high teachers, this information was reported separately from the other three measures.

The determination of whether a teacher was endorsed in a given subject area was based on a comparison of the consolidated CDE endorsement areas and subject area assignments. Final responsibility for ensuring that a teacher is qualified to teach a specific subject lies with districts. Thus, the State Board of Education has not created rules or regulations that indicate which endorsements are appropriate for which subjects. This means that the figures reported here should only be interpreted as *approximations* of the proportion of teachers who were endorsed in the subjects they were teaching.

Table 7 shows teacher qualifications in 2001 by geographic area. There was no one region with the lowest levels for all three qualification measures. For example, the Northwest Region had the lowest proportion of completely certified teachers, but one of the highest proportions of teachers with a master's degree or higher. The Northeast and Southeast Regions had the lowest proportions of teachers with master's degrees or higher. Lower education levels may reflect issues around access to higher education. The West Central and Southwest Regions had the highest qualifications in terms of teacher certification and teacher experience and were near the top in terms of teacher education levels.

**Table 7. Teacher Qualification Levels in 2001 by Geographic Area**

	Completely Certified	Master's Degree or Higher	More than Three Years of Experience	Number of Teachers in This Group
North Central	95%	42%	75%	6,171
Northwest	90%	42%	79%	2,267
Northeast	92%	25%	80%	1,091
Metro	93%	47%	76%	23,335
Pikes Peak	93%	34%	77%	8,330
West Central	96%	47%	84%	2,203
Southwest	97%	43%	84%	1,611
Southeast	93%	31%	83%	1,066
Urban	92%	38%	75%	14,375
Suburban	94%	47%	77%	17,915
Town	94%	44%	83%	3,579
Rural	93%	41%	78%	9,538
Statewide Average/Total	93%	43%	77%	45,407

Source: CDE HR, Licensure Data Sets & U.S. Department of Education CCD

The overall proportion of completely certified teachers was 93 percent. Teachers in urban schools had slightly lower qualification levels than teachers in the other three locales. Towns had the highest proportion of teachers with more than three years experience, and were tied with suburban schools for the highest number of completely certified teachers. The suburban schools also had the highest proportions of teachers with master's degrees or higher.

As was discussed earlier, a teacher's subject area was determined based on where he/she spends the majority of his/her time working. The large majority of these teachers, between 85 and 95 percent depending on subject area, spent all of their time teaching their subject area. Table 8 shows the approximate proportion of endorsed core subject senior high teachers by geographic area. These ranged from 82 to 90 percent with an average of 89 percent. The Metropolitan and Pikes Peak Regions had the highest proportion of endorsed teachers. The Southeast Region had the lowest proportion of endorsed senior high school teachers. A higher proportion of teachers in rural and suburban schools were endorsed than teachers in schools in towns or urban areas.

**Table 8. Approximate Proportion of Endorsed Senior High Core Subject Teachers by Geographic Area (2001)**

Region	Endorsed Core Subject Senior High Teachers	Number of Teachers in This Group
North Central	88%	788
Northwest	85%	314
Northeast	86%	92
Metro	90%	3,444
Pikes Peak	90%	1,302
West Central	84%	344
Southwest	87%	241
Southeast	82%	111
<b>Locale</b>		
Urban	87%	2,114
Suburban	90%	2,483
Town	88%	573
Rural	90%	1,466
Statewide Average/Total	89%	6,636

Source: CDE HR, Licensure Data Sets & U.S. Department of Education CCD

Table 9 shows qualification levels by subject. Foreign language teachers generally had lower qualifications, particularly when looking at certification and education levels. Physical curriculum and special education teachers generally had higher qualifications. Physical curriculum teachers rated particularly high in certification and experience levels, while special education teachers rated particularly high in education levels. General elementary teachers, the largest group of teachers, had mixed qualification levels. There were more completely certified general elementary teachers, but fewer with master's degrees and more than three years of experience. Appendix E contains information on the relative ranking of the different qualification measures. These rankings help identify which subject areas generally had higher and lower qualification levels.

**Table 9. Teacher Qualification Levels in 2001 by Subject Area**

	Completely Certified	Master's or Higher	More Than 3 Years Experience	Number of Teachers in This Group
General Elementary	94%	38%	76%	16,399
English Language Arts	93%	46%	76%	4,176
Special Education	91%	65%	79%	3,949
Math	92%	42%	77%	2,771
Social Science	94%	42%	77%	2,530
Natural Science	92%	46%	76%	2,482
Physical Curriculum	96%	37%	82%	1,901
Music	93%	40%	78%	1,473
General Middle/Junior High	94%	36%	77%	1,310
Foreign Languages	88%	42%	76%	1,227
Art	93%	35%	77%	1,123
Career, Vocational & Consumer Science	91%	43%	81%	2,392
Other	90%	44%	74%	450
Unknown	90%	51%	79%	1,332
Statewide Average/Total	93%	42%	76%	43,515

Source: CDE HR & Licensure Data Sets

Table 10 shows endorsement levels by subject for senior high teachers in five core subjects. On average, 89 percent of these teachers were endorsed in the subject they teach. The subject with the lowest proportion of endorsed teachers was math (85 percent); the highest proportion was of natural science teachers (92 percent).

**Table 10. Approximate Proportion of Endorsed Senior High Core Subject Teachers by Subject (2001)**

	Endorsed Senior High Teachers	Number of Teachers in This Group
English Language Arts	89%	1,852
Foreign Languages	88%	787
Math	85%	1,352
Natural Science	92%	1,269
Social Science	90%	1,376
Statewide Average/Total	89%	6,636

Source: CDE HR & Licensure Data Sets

An equity issue facing many districts and states is the uneven distribution of highly qualified (well-educated and experienced) teachers. Schools with many minority (black or Hispanic) or poor children, very large or very small schools, or rural schools, often have fewer highly qualified teachers (Henke, Choy, Chen, Geis, & Alt, 1997). To analyze this issue, schools in Colorado were classified by three different measures of school characteristics: school size, proportion of students who were eligible for free and reduced lunch, and proportion of minority (black or Hispanic) students. For school size, schools were classified by quartile. Each quartile contains about 400 schools. For the proportion of free and reduced lunch eligibility and the proportion of minority students schools were classified as under 25 percent, 26 to 50 percent, 51 to 75 percent, and above 75 percent.

It is important to note that many fewer teachers worked in the schools with the highest proportions of free and reduced lunch eligible, or minority (black or Hispanic) students. For example, 52 percent of teachers worked in schools with fewer than 25 percent free and reduced lunch eligible students while just 6 percent worked in schools with over 75 percent free and reduced lunch eligible students. More information about the groupings used for the qualification analysis is contained in Appendix D.

Table 11 shows teacher qualification measures by school size. There is a clear pattern in which teacher qualification levels generally declined as school size declined. The lowest qualification levels were seen in the smallest schools. These schools employ 3,416 teachers, or about 7.5 percent of the teachers in the state.

**Table 11. Teacher Qualifications in 2001 by School Size**

	Completely Certified	Master's Degree or Higher	More Than Three Years Experience	Number of Teachers in This Group
Quartile 4, Largest Schools	93%	46%	77%	21,526
Quartile 3	94%	42%	77%	12,002
Quartile 2	93%	39%	77%	8,250
Quartile 1, Smallest Schools	91%	33%	74%	3,416
Statewide Average/Total	93%	43%	77%	45,194

Source: CDE HR, Licensure & Enrollment Data Sets

Table 12 shows teacher qualifications by student eligibility for free and reduced lunch. As with school size, a clear pattern emerges. Here the 2,833 teachers (six percent) who worked in the schools with the highest proportion of free and reduced lunch eligible students (FRL) had the lowest qualifications on all three measures. The largest differences were seen with teacher education, where 46 percent of teachers had master's degrees in schools with the fewest free and reduced lunch eligible students, as compared to 34 percent in schools with the most free and reduced lunch eligible students.

**Table 12. Teacher Qualifications in 2001 by Student Poverty**

	Completely Certified	Master's Degree or Higher	More than Three Years Experience	Number of Teachers in This Group
Less Than 26% FRL	95%	46%	78%	23,572
Between 26% and 50% FRL	93%	39%	78%	11,634
Between 51% and 75% FRL	91%	38%	74%	7,155
Greater Than 75% FRL	87%	34%	69%	2,833
Statewide Average/Total	93%	43%	77%	45,194

Source: CDE HR, Licensure & Enrollment Data Sets

Teacher qualifications by proportion of minority (black or Hispanic) students are shown in Table 13. The schools with the highest proportion of minority students had the teachers with the lowest qualification levels. The 4,046 teachers (nine percent) who worked in schools with more than 75 percent minority students had the lowest qualification levels.

**Table 13. Teacher Qualifications in 2001 by Student Proportion of Minority Students**

	Completely Certified	Master's Degree or Higher	More than Three Years Experience	Number of Teachers in This Group
Less than 26% Minority	95%	45%	79%	25,192
Between 26% and 50% Minority	93%	40%	77%	9,830
Between 51% and 75% Minority	90%	40%	73%	6,125
Greater than 75% Minority	87%	37%	70%	4,046
Statewide Average/Total	93%	43%	77%	45,408

Source: CDE HR, Licensure & Enrollment Data Sets

The patterns shown above for qualifications by school size, student poverty, and proportion of minority students were also found when looking at senior high school teacher endorsements. See Appendix E for further details.

In summary, there were few clear and consistent patterns for teacher qualifications by geographic area. Teachers in urban schools tended to have lower qualifications. Foreign language teachers generally had lower qualification levels, except when looking at senior high school teachers. In that case, a lower proportion of math teachers were endorsed in the subject they taught. When looking at qualifications by student characteristics, however, clear patterns emerged. Teacher qualification levels in small schools and in schools with high concentrations of minority and poor students were lower than in other schools.

## **WORKFORCE ATTRIBUTES**

### **TEACHER SALARIES**

Salaries are one tool that can be used to increase teacher supply by making teaching more attractive than other work (or leisure). While there is growing agreement among researchers about the importance of teachers to student achievement, it has been very difficult for researchers to find statistical relationships between teacher salaries and student achievement (Hanushek, Kain, & Rivkin, 1999). Higher salaries have been shown to retain experienced teachers and theoretically should increase the applicant pool of new teachers (Ballou & Podgursky, 1997). A larger applicant pool should allow districts to select higher quality new teachers.

Average teacher salaries and rate of increase are reported in Table 14. The average salaries reported are total salaries (i.e., salary that includes pay for additional activities). Average teacher salaries increased 2% between 1999 and 2000, and 4% between 2000 and 2001.



**Table 14. Average Teacher Salary by Year**

	Average Salary	Rate of Increase
1999	\$37,108	
2000	\$38,009	2%
2001	\$39,601	4%

Source: CDE HR Data Set

Each district in Colorado sets its own salary level. Salaries traditionally increase as teachers gain experience and education. Teacher starting salaries and increases due to education and experience vary by district. Several districts have innovative alternative pay structures that reward teachers for things other than experience and education (Reichardt & Van Buhler, 2002). This means that increases in teacher salaries reflect an overall increase in pay for teachers, increased experience within the teacher workforce, increased education levels, or some combination of factors. To isolate changes in overall pay, additional analysis of teacher salaries focuses on salaries paid to teachers with similar amounts of education and experience. In this case the analysis will focus on teachers with no experience and only a bachelor's degree (new teachers), and those with 15 years experience and at least a master's degree (experienced teachers). Since the experience data is most accurate for 2001, the analysis focuses on that year.

Table 15 shows average teacher salaries by geographic region for all teachers, new teachers, and experienced teachers. It also shows the highest and lowest salary by region and locale under rank. A clear pattern emerges. Teachers in the Metropolitan Region and those in suburban schools had the highest salaries, while those in the Northeast or Southeast and in towns received the lowest salaries.

**Table 15. 2001 Average Teacher Salaries by Geographic Area**

Region	All teachers	Rank	15 Years Experience and at Least a Master's	Rank	No Experience and No Master's	Rank
North Central	\$38,595		\$46,169		\$27,142	
Northwest	\$36,570		\$42,489		\$25,622	
Northeast	\$30,850	Low	\$35,352	Low	\$23,158	
Metro	\$42,305	High	\$51,883	High	\$29,239	High
Pikes Peak	\$37,413		\$42,703		\$26,385	
West Central	\$37,701		\$44,043		\$26,380	
Southwest	\$34,114		\$40,507		\$23,996	
Southeast	\$30,980		\$36,055		\$22,591	Low
Locale						
Urban	\$39,731		\$47,998		\$29,149	High
Suburban	\$41,733	High	\$50,521	High	\$27,927	
Town	\$35,409	Low	\$39,904	Low	\$25,018	Low
Rural	\$36,810		\$44,341		\$26,341	
Statewide Total	\$39,600		\$ 47,678		\$27,996	

Source: CDE HR Data Set

The one exception to the pattern was new teachers in urban areas, who received higher salaries than their suburban counterparts. It is important to note that urban areas generally had teachers with the lowest qualifications (see Tables 7 and 8), despite the fact that new teacher salaries were higher in urban schools. Salaries are often used as a tool to attract high-quality teachers (Reichardt & Van Buhler, 2002). This data suggests that either the higher salaries paid in the urban schools were not adequate to attract well-qualified new teachers, or as Ingersoll (1999) has argued, retaining qualified urban teachers is the central issue for raising the qualifications of urban teachers.

Table 16 shows teacher salaries for schools categorized by student poverty. Note that Table 12 showed that teacher qualifications decreased as student poverty increased. Table 16 shows that salaries for new and experienced teachers increase as student poverty increases. This suggests that these higher salaries were not adequate for attracting and retaining the most qualified teachers to these schools, or that factors other than salary play an important role in attracting and retaining highly qualified teachers to schools with many poor students. Similar patterns are seen with schools categorized by minority enrollment. See Appendix E for further information.

**Table 16. 2001 Average Teacher Salaries by Student Poverty**

	All Teachers	15 Years Experience and at least a Master's	No Experience and No Master's
Less than or equal to 25% FRL	\$40,582	\$48,050	\$27,178
Between 26% and 50% FRL	\$38,609	\$45,650	\$27,375
Between 51% and 75% FRL	\$38,028	\$48,724	\$27,656
Greater than 75% FRL	\$38,537	\$51,345	\$28,287

Source: CDE HR Data Set

Salary information by subject area is provided in Table 17. There were some differences in salary levels for the various subject areas. Special education teachers received the highest average salaries while teachers in the “other” category received the lowest. The largest difference for experienced teachers was between natural science teachers, who were paid \$51,402, compared to special education and general middle/junior high teachers, whose average pay was around \$45,700. The highest salaries for new teachers went to English language arts teachers at \$29,626, and the lowest went to “other” teachers, who were paid \$22,466.

**Table 17. 2001 Average Teacher Salaries by Subject Area**

	All Teachers	Rank	New Teachers — No Experience and No Master's	Rank	Experienced Teachers — 15 Years Experience and At Least a Master's	Rank
General Elementary	\$38,883		\$28,118		\$47,252	
English Language Arts	\$39,453		\$29,626	High	\$46,304	
Special Education	\$41,359		\$28,130		\$45,761	
Math	\$39,892		\$27,350		\$47,081	
Social Science	\$40,244		\$28,556		\$46,549	
Natural Science	\$40,285		\$28,525		\$51,402	High
Physical Curriculum	\$40,772		\$28,603		\$48,109	
Music	\$38,947		\$28,342		\$50,588	
General Middle/Junior High	\$39,312		\$26,272		\$45,600	
Foreign Languages	\$39,504		\$29,286		\$50,623	
Art	\$38,249		\$24,811	Low	\$47,842	
Career, Vocational & Consumer Science	\$41,541	High	\$27,220		\$49,825	
Other	\$34,202	Low	\$22,466		n/a	
Unknown	\$39,791		\$26,231		\$45,338	Low

Source: CDE HR Data Set

As will be discussed later, a significant source of new teachers in Colorado was teachers from other states. In order to better understand the link between salaries and sources of teachers, Colorado teacher salaries are compared with teacher salaries in the states that were the largest sources of new teachers in 2001. The information used for this analysis was provided by the American Federation of Teachers (AFT) (Nelson, Drown, & Gould, 2002). It allows comparisons of average teacher salaries between states for salaries in 2000.

Table 18 provides salary information in 2000 for teachers from Colorado and the five states that provide the most new teachers to Colorado. The reader is advised to keep in mind that average salaries do not provide good information about the experiences of individual teachers. The AFT provides multiple comparisons of teacher salaries. Table 18 shows four comparisons — average salary, average salary adjusted to cost of living, average beginning teacher salary, and the ratio of average salary to annual earnings in the private sector. The ratio of average salaries to private sector earnings serves as a gross measure of teacher salaries relative to other opportunities within the state. The lower the ratio, the lower teacher salaries are in comparison with other jobs. This comparison is important given the fact that many college graduates can choose either to enter teaching or work in another occupation.

**Table 18. 2000 Average Teacher Salaries by Subject Area**

	Average Salary	Adjusted by AFT Cost of Living Index	Average New Teacher Salary	Ratio to Private Sector Earnings
U.S. Average	\$43,250	\$43,250	\$28,986	1.23
Colorado	\$39,184	\$36,241	\$26,479	1.04
California	\$52,480	\$43,061	\$33,121	1.27
Texas	\$38,359	\$42,444	\$29,823	1.07
Illinois	\$47,865	\$48,275	\$31,222	1.25
New York	\$51,020	\$47,681	\$32,772	1.12
Iowa	\$36,479	\$39,591	\$26,058	1.33

Source: Nelson, Drown & Gould, 2002

Generally, Colorado teacher salaries were lower than the salaries paid in states that were significant sources of new teachers. The fact that Colorado teacher salaries were relatively low suggests that factors other than salary, such as lifestyle, were important to the people who move to Colorado and teach.

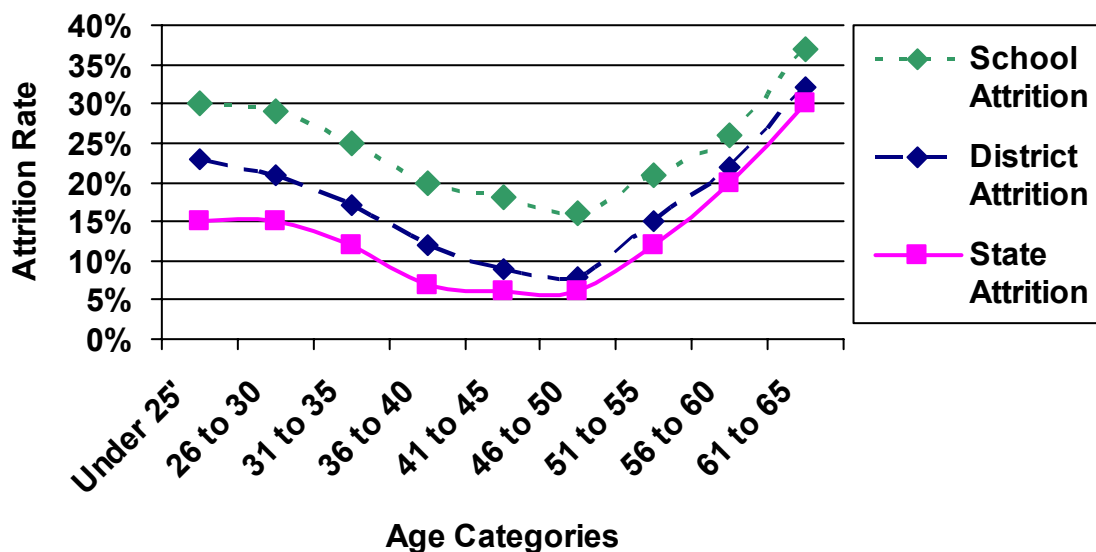
In summary, average teacher salaries increased by two percent between 1999 and 2000 and four percent between 2000 and 2001. Teacher salaries were generally higher in the Metropolitan Region and in suburban schools, while those in the Northeast or Southeast and in towns received the lowest salaries. There was some variation in salaries by subject area. Colorado teachers generally had lower salaries than teachers in those states that were a source of many new Colorado teachers.

## TEACHER ATTRITION

Teacher attrition plays an important role in teacher supply and demand. High levels of attrition can lead to increased demand. Low levels of attrition can lead to increased teacher supply.

Figure 3 shows teacher attrition by age. It illustrates the three different types of attrition: attrition from the state workforce, from a district, and from a school. State attrition occurs when a teacher was working within the state in 2000, but not working in public education within the state in 2001. District attrition occurs when a teacher works in a district in 2000, but not in that district in 2001. The source of district attrition can either be state attrition or a between-district transfer. In other words, the district attrition rate is the sum of the state attrition and the between-district attrition rates. A transfer from one district to another is a loss as far as the originating district is concerned, but that teacher is not a loss from the state teacher workforce. The fact that the largest differences between the district and state attrition rates were for younger teachers indicates that most between-district transfers involve younger teachers. Finally, school attrition can include state or district attrition, or when a teacher transfers from one school to another within the same district (within-district transfers). In other words, the school attrition rate is the

sum of the district attrition rate and the within-district transfer rate. School attrition creates a vacancy at a school. Note that these attrition rates do not include teachers who change jobs within public education. For further information please see Appendix G.



**Figure 3: 2000 to 2001 Attrition rates by age**

Source: CDE HR data set

There was a clear link between teacher age or experience, and attrition rates. The “U” shaped relationship shown in Figure 3 is very similar to findings from other researchers (Kirby, Grissmer, & Hudson, 1991). The figure shows relatively high rates of attrition for younger teachers and for teachers as they near retirement age and low levels of attrition for middle-aged teachers.

Table 19 shows the three attrition rates by geographic area. Subtracting the state attrition rate from the district attrition rate provides the between-district transfer rate. Similarly, subtracting the district attrition rate from the school attrition rate provides the within-district transfer rate. For example, schools in the Northwest had the highest attrition rates. Part of this was due to the fact that they have the highest state attrition rate, and part was due to the fact that they had one of the highest within-district transfer rates of eight percent. Schools in the West Central Region had one of the lowest between-district transfer rates, at two percent, but one of the higher within-district transfer rates.

Rural and urban schools have similar school attrition rates, 24 and 23 percent respectively. However, the source of school attrition was very different. A large source of rural school attrition was due to the relatively high between-district transfer rate of six percent, compared to the between-district transfer rate in urban schools of three percent. At the same time, the within-district transfer rate was higher for urban schools, at nine percent, compared to eight percent for rural schools.

**Table 19. 2000–2001 Attrition Rates by Geographic Area**

Region	State Attrition Rate	Between District Transfer Rate	District Attrition Rate	Within District Transfer Rate	School Attrition Rate
North Central	10%	5%	15%	6%	21%
Northwest	13%	5%	18%	8%	26%
Northeast	9%	8%	17%	6%	23%
Metro	11%	4%	15%	7%	22%
Pikes Peak	10%	4%	14%	8%	22%
West Central	9%	2%	11%	8%	19%
Southwest	9%	4%	13%	6%	19%
Southeast	8%	6%	14%	5%	19%
Locale					
Urban	11%	3%	14%	9%	23%
Suburban	10%	5%	15%	6%	21%
Town	10%	4%	14%	5%	19%
Rural	10%	6%	16%	8%	24%
Statewide Average	11%	4%	15%	7%	22%

Source: CDE HR data set

Attrition rates based on the proportion of poor students in a school show an interesting pattern, as is indicated in Table 20. The state and district attrition rates do not vary much by school poverty. However, the school attrition rate increased with student poverty. The higher school attrition rates for schools with more poor students were entirely due to higher rates of within-district transfers. The within-district transfer rate for teachers in schools with many poor students was 14 percent (29-15) compared to the six percent for schools with the fewest poor students. Similar patterns were also seen when examining attrition by minority enrollment. Additional information is contained in Appendix F.

**Table 20. 2000–2001Attrition Rates by Student Poverty**

	State Attrition Rate	Between District Transfer Rate	District Attrition Rate	Within District Transfer Rate	School Attrition Rate
Less than 26% FRL	11%	3%	14%	6%	20%
Between 26% and 50% FRL	10%	5%	15%	8%	23%
Between 51% and 75% FRL	11%	5%	16%	8%	24%
Greater than 75% FRL	12%	3%	15%	14%	29%
Statewide average	11%	4%	15%	7%	22%

Source: CDE HR data set

Table 21 contains attrition rates by subject. Physical curriculum teachers had the lowest state and district attrition rates. Art teachers had high state attrition rates. Special education teachers had relatively low state attrition rates (nine percent) but the highest transfer rates, resulting in one of the higher school attrition rates. This may partially be an artifact of the data. The school attrition rates may be artificially elevated for subjects where teachers work in multiple schools, i.e. itinerant teachers. It is likely that some teachers who work in multiple schools were counted as school attrition when in actuality their schedules simply changed. To the extent that special education teachers were itinerant, this problem may apply to them.

**Table 21. 2000–2001 Attrition Rates by Subject Area**

	State Attrition Rate	Between District Transfer Rate	District Attrition Rate	Within District Transfer Rate	School Attrition Rate
General Elementary	10%	4%	14%	7%	21%
English Language Arts	12%	5%	17%	6%	23%
Special Education	9%	6%	15%	12%	27%
Math	12%	5%	17%	5%	22%
Social Science	10%	4%	14%	5%	19%
Natural Science	11%	4%	15%	5%	20%
Physical Curriculum	8%	4%	12%	5%	17%
General Middle/Junior High	12%	5%	17%	8%	25%
Music	11%	5%	16%	8%	24%
Foreign Languages	12%	5%	17%	6%	23%
Art	14%	2%	16%	8%	24%
Career, Vocational & Consumer Science	11%	3%	14%	8%	22%
Other	16%	4%	20%	10%	30%
Unknown	10%	4%	14%	12%	26%

Source: CDE HR data set



In summary, 11 percent of teachers who taught in 2000 did not return to Colorado public schools in 2001, while another four percent changed districts and seven percent changed schools within the same district. The end result was that just over one out of every five teachers left the schools they were teaching in 2000. There were higher attrition rates in the Northwest, and in rural and urban schools. A high proportion of teachers in high-poverty and high-minority schools transferred to other schools within the same district. It was noted earlier that the high poverty and high minority schools generally had teachers with lower qualification levels. This high transfer rate may drain well-qualified teachers away from these schools.

## NEW HIRES

The number of teachers hired by districts is a product of teacher attrition and district goals (stated or unstated) for student-teacher ratios and class size. A teacher hire for a given year is a teacher who did not work in public education during the prior school year. Teacher hires can be individuals who were new to the profession, teachers who returned to work after taking time off from the profession, or transfers from outside the state. In 2000, Colorado had 6,241 teacher hires; in 2001 there were 6,854 teacher hires.

Not all new hires were young, recent college graduates. Table 22 shows the age distribution of new hires in 2001. Less than a quarter of all new hires in 2001 were under the age of 25, while over a quarter of new hires were over the age of 40. Of the new hires in 2001, 835 (12 percent) worked in Colorado public education in 1999. That means about 10 percent of new hires appear to have been teachers who have taken a year off from working in Colorado public schools. Less than half of all new hires, 3,045 or 44 percent, were new teachers, that is, new to the profession without teaching experience.

**Table 22. 2001 New Hires by Age**

	Number of New Hires	Proportion of New Hires
Under 25	1,567	23%
26 to 30	1,541	22%
31 to 35	996	15%
36 to 40	767	11%
41 to 45	632	9%
46 to 50	625	9%
51 to 55	446	7%
Over 55	280	4%
Statewide Total	6,854	100%

Source: CDE HR data set

There are two sources of information on where new hires were trained. The HR data set contains information on where each education professional received his/her highest level of

education. Within the licensure data set, there is information on the college where each education professional received his/her endorsements. The information on the highest education level in the HR data set is more complete in that there are fewer missing data points, and thus this data is reported here. The measure of where a teacher received his/her highest education level may not be where a teacher received his/her teacher training. The data that will be presented should therefore be interpreted as an approximation of how many teachers were produced by each teacher training program.

The education data named the Colorado institutions that provided each teacher with his/her education, but only provided the name of the state for those who received their education from outside of the Colorado. Table 23 shows whether teachers hired in 2001 received their highest level of education inside Colorado or from outside the state. A slight majority, 52 percent of new teachers (those who did not have any teaching experience) received their highest degree from a Colorado based college or university. A slight minority of experienced teachers hired in 2001 received their highest degree from institutions outside of Colorado. In other words, of the new hires in 2001, the majority who were new teachers went to college in Colorado, while the majority who were experienced teachers went to college outside of Colorado.

**Table 23. Sources of Highest Degree for Teachers Hired in 2001**

	Highest Education Outside Colorado	Highest Education Inside Colorado	Total
New Teachers, No Teaching Experience	48%	52%	3,045
New Hires, with Teaching Experience	54%	46%	3,809

Source: CDE HR data set

Table 24 provides additional details on the colleges and universities attended by teachers who received their highest degree in Colorado. It shows the top 15 Colorado colleges and universities in terms of those that provided teachers with their highest level of education. University of Northern Colorado trained the largest proportion of new hires in 2001. The University of Colorado–Boulder, Colorado State University and Metropolitan State University each trained just over 10 percent of new teachers. The largest producer of new teachers on the Western Slope was Mesa State College, followed closely by Western State College.

**Table 24. Top Colorado Providers of Higher Education to Colorado New Hires in 2001**

	New Teachers, No Teaching Experience	New Hires, with Teaching Experience
University of Northern Colorado	27%	24%
University of Colorado–Boulder	12%	14%
Colorado State University	11%	11%
Adams State College	4%	6%
Metropolitan State College	11%	8%
University of Colorado–Denver	4%	7%
University of Southern Colorado	7%	5%
Western State College of Colorado	2%	3%
University of Colorado–Colorado Springs	3%	4%
University of Denver	2%	2%
Regis College	4%	3%
Fort Lewis College	3%	2%
Colorado College	2%	1%
Lesley College	0%	1%
Mesa State College	2%	3%
Total-all Colorado Institutions	1,583	1,752

Source: CDE HR data set

Because about half of Colorado teachers were trained in other states, a key issue is identifying the states these teachers came from<sup>3</sup>. Table 25 shows the top ten states that supplied teachers who received their highest level of education outside of Colorado. The four largest sources of teachers, California, Texas, Illinois and New York, were all within the five largest states in the nation. The fourth largest state in the nation, Florida, was not a large source of Colorado teachers, ranking 19<sup>th</sup> in terms of supplying new teachers to the state. Note that all of these states supply more new hires that have experience, than new teachers who do not have experience. It was not clear if these teachers gained this experience within Colorado or outside the state.

<sup>3</sup> These states will be described as supplying new teachers, but technically these states are known to have provided new teachers with the highest level of education.

**Table 25. Top States that Provide Higher Education to New Colorado Teachers in 2001**

	New Teachers, No Teaching Experience	New Hires, With Teaching Experience
California	8%	8%
Texas	4%	8%
Illinois	5%	7%
New York	6%	4%
Iowa	5%	4%
Ohio	4%	4%
Arizona	4%	4%
Nebraska	5%	3%
Kansas	3%	4%
Wyoming	4%	4%
Minnesota	4%	3%
Statewide Total	1,462	2,057

Source: CDE HR data set

Wyoming, Nebraska and Kansas were within the top ten suppliers of new hires even though they do not have large population bases. Table 26 shows the providers of education to new Colorado hires per 100,000 in population. This measures the number new teacher from each state given the number of people who live in that state. Using this measure, Wyoming was the top supplier of teachers to Colorado. Since Wyoming's sole institution of higher education is very close to the Colorado border, it is possible that many of the new teachers that were educated in Wyoming were Colorado residents before or while they went to college.

**Table 26. Largest Providers of Higher Education to Colorado Teachers in 2001 on a Per Capita Basis**

	New Colorado Teachers per 100,000 in Population
Wyoming	25.3
South Dakota	8.5
Nebraska	7.8
North Dakota	6.3
Montana	6.1
Iowa	5.0
New Mexico	4.8
Kansas	4.7
Vermont	4.1
Utah	3.3

Source: CDE HR data set

In summary, Colorado hired just under than seven thousand teachers in 2001. Less than half of these hires, 44 percent, were new teachers who had no teaching experience. About half of these new teachers were trained inside Colorado, and the other half were trained outside Colorado. The majority of those from inside Colorado received their highest degree from the University of Northern Colorado, the University of Colorado–Boulder, Colorado State University or Metropolitan State College. Of those who had prior experience teaching, about 800 worked in Colorado public education in 1999. These people had simply taken a year off from working in Colorado public schools.

About half of the new hires were trained outside of Colorado. Most of these teachers came from states with large populations, such as California, Texas, Illinois and New York. Many of the smaller neighboring states to Colorado, Kansas, Nebraska and Wyoming, were also sources of new teachers. Given Wyoming’s relatively small base population, the number of teachers that come from that state was very high.

## **TEACHER SUPPLY AND DEMAND**

Rough estimates of teacher demand and supply from the existing workforce can be made using information on population forecasts, teacher counts, teacher attrition and new teacher characteristics.

The demand forecast was made using the ratio of school-age-population-to-teachers by county<sup>4</sup>. This allowed the forecast to capture differences in teacher attrition rates by age and

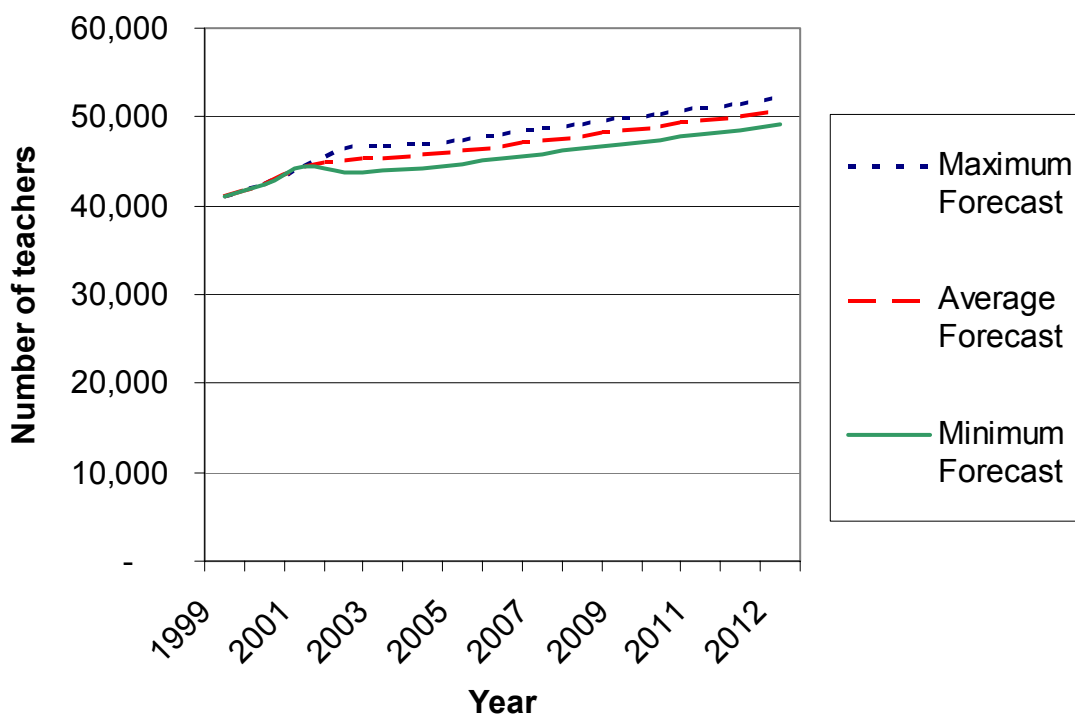
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<sup>4</sup> This ratio is similar to a pupil-teacher ratio, but uses school age population instead of enrollment.

differences in population growth rates by county. These forecasts of total teacher demand were made based on the total number of teachers working in 1999, 2000, and 2001.

These forecasts should be interpreted as rough estimates, not exact predictions. The base assumptions behind the forecasts were that the student-teacher ratios from past years will be maintained and that the population forecasts are correct. The forecast estimates that after growing three percent in 1999 and two percent in 2000 the growth rate of the school age population will level off at one percent a year through 2012. The student-teacher ratios used to make these forecasts may not reflect future student-teacher ratios. The key issue is the policy response to changing enrollments. If enrollment increases and schools and districts do not increase the number of teachers at the same rate, then these forecasts were too high. If districts increase the number of teachers faster than the rate of population increase, then the forecasts may have been too low.

Figure 4 shows three teacher demand forecasts. The forecasts predict a steady increase in teacher demand through 2012 based on population increases.



**Figure 4. Forecast of Colorado teacher demand through 2012**

Source: CDE HR data set & Colorado Department of Local Affairs, Colorado Demography Section

An estimate of the number of teachers who will quit and the number of teachers who need to be hired can be made using this demand forecast, teacher attrition rates, and the age distributions of new teachers and the existing workforce. These estimates are shown in Table 27. Teacher attrition was estimated to grow slowly from the current amount of just under five thousand a year to just under six thousand a year in 2012. A significant factor in this increased

attrition is the aging of the teacher workforce. However, despite this aging workforce, the attrition rates are expected to increase no more than 1.8 percentage points above the current rate of 10.2 percent. In other words, the aging of the teacher workforce is expected to cause teacher attrition rates to increase, but not drastically.

**Table 27. Estimated Total Demand, Teachers Who Will Leave Teaching and New Hires Needed**

	Total Demand	Attrition	New hires
1999	43,066	4,601	
2000	44,335	4,650	6,239
2001	46,301	5,070	6,854
2002	43,760 to 46,461	4,952 to 5,288	5,182 to 5,529
2003	43,984 to 46,696	5,048 to 5,379	5,314 to 5,657
2004	44,243 to 46,966	5,128 to 5,454	5,577 to 5,926
2005	44,683 to 47,427	5,211 to 5,535	5,784 to 6,136
2006	45,243 to 48,014	5,295 to 5,618	5,924 to 6,277
2007	45,856 to 48,656	5,374 to 5,697	5,944 to 6,294
2008	46,407 to 49,234	5,437 to 5,760	5,964 to 6,312
2009	46,913 to 49,763	5,490 to 5,814	6,017 to 6,366
2010	47,416 to 50,291	5,540 to 5,864	6,113 to 6,467
2011	47,964 to 50,868	5,593 to 5,920	6,229 to 6,590
2012	48,574 to 51,510	5,654 to 5,985	6,355 to 6,724

Source: CDE HR data set & Colorado Department of Local Affairs, Colorado Demography Section

The number of new hires is expected to drop in the near term from about 6,800 to about 5,400 in the next few years, as student population growth is expected to slow. Over the long run the number of new teacher hires is expected to grow to about 6,500 per year. Since teacher demand is expected to grow, the number of new hires is higher than the number of teachers lost to attrition. As was seen in the analysis of new hires above, most of the new hires in the future will not necessarily be new college graduates. As with the new hires in 2001, many may be experienced teachers who have prior experience within the state or outside of the state.

## CONCLUSIONS AND DISCUSSION

This report describes Colorado's overall teacher workforces. Appendix H is a separate but parallel report on the special education teacher workforce. While in general, no crises in teacher supply and demand were identified; a few issues are worth noting. Just under one out of five teachers will be eligible to retire in the next five years. While the aging of the workforce is expected to increase attrition, it is not expected to raise the attrition rate more than 1.8 percentage points above the current 10.2 percent.

The foreign language teacher workforce may deserve some special attention. This workforce has high proportions of teachers who were eligible to retire and relatively low qualification levels. The vocational education teacher workforce is also expected to face a high number of retirements and may need attention.

Schools with high proportions of poor or minority students are of special concern. Teacher qualifications in these schools were generally lower. This was despite the fact that teachers in these schools generally receive higher salaries. These schools also had high attrition rates. Almost one out of three teachers in these schools changed schools in 2001. Most of this attrition was due to teachers moving to other schools within the same district.

Finally, Colorado benefits greatly from teachers who move to Colorado from other states. This was despite the fact that average Colorado teaching salaries were lower than the average teaching salaries in the states that have sent the largest number of teachers to Colorado. That said, Colorado institutions appear to train about half of all the new teachers hired in the state.

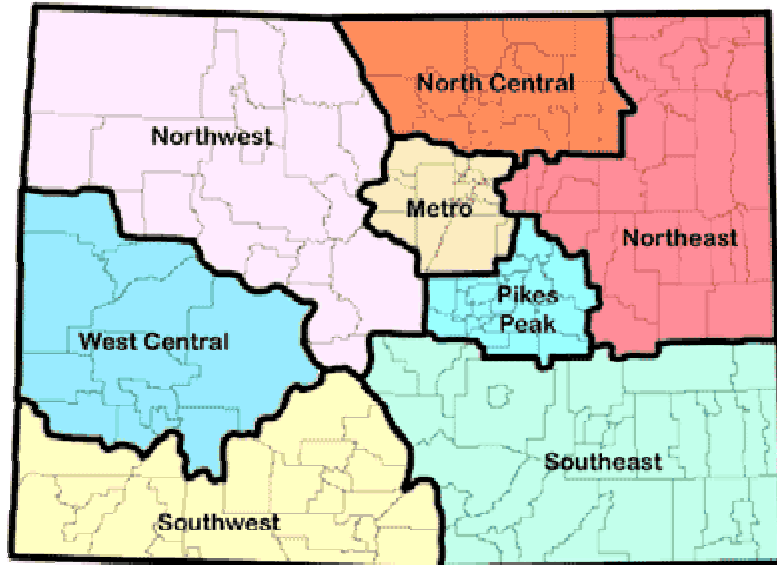


## REFERENCES

- Ballou, D., & Podgursky, M. (1997). *Teacher pay and teacher quality*. Kalamazoo, MI: W. E. Upjohn Institute for Employment Research.
- Goldhaber, D. D., & Brewer, D. J. (1997). Evaluating the effect of teacher degree level on educational performance. In W. Fowler (Ed.), *Developments in School Finance, 1996* (pp. 197–210). Washington, DC: NCES.
- Hanushek, E. A., Kain, J. F., & Rivkin, S. G. (1998, August). *Teachers, schools, and academic achievement* (NBER Working Paper No. 6691). Cambridge, MA: National Bureau of Economic Research.
- Hanushek, E. A., Kain, J. F., & Rivkin, S. G. (1999, January). *Do higher salaries buy better teachers?* Paper presented at the Annual Meeting of the American Economic Association, New York, NY. (ERIC Document Reproduction Service No. ED 437 710)
- Henke, R. R., Choy, S. P., Chen, X., Geis, S., & Alt, M. N. (1997). *America's teachers: Profile of a profession, 1993–94*. Washington, DC: U.S. Department of Education, National Center for Education Statistics. (NCES 97-460)
- Ingersoll, R. M. (1999). *Teacher turnover, teacher shortages and the organization of schools*. Seattle, WA: Center for the Study of Teaching and Policy.
- Kirby, S. N., Grissmer, D. W., & Hudson, L. (1991). *New and returning teachers in Indiana: Sources of supply* (R-4049-LE). Santa Monica, CA: RAND.
- Nelson, F. H., Drown, R., & Gould, J. C. (2002). *Survey & analysis of teacher salary trends 2001*. Washington, DC: American Federation of Teachers.
- Reichardt, R. (2001, November). *Toward a comprehensive approach to teacher quality* (Policy Brief). Aurora, CO: Mid-continent Research for Education and Learning.
- Reichardt, R., & Van Buhler, R. (2002). *Recruiting and retaining teachers with alternative pay*. Aurora, CO: Mid-continent Research for Education and Learning.

## APPENDIX A: COLORADO DEPARTMENT OF EDUCATION REGIONS

This map shows the CDE regions that were used in the analysis. Districts were assigned to regions based on the county in which the district is located. If a region split a county, the county was assigned to the region that served the most students in that county.



**Figure A-1. CDE Regions**

Source: CDE-Downloaded from <http://www.cde.state.co.us/cdeedserv/rgmapage.htm> on January 26, 2003

## APPENDIX B: STUDENT-AGE POPULATION PROJECTIONS

This section details the population forecast made by the Department of Local Affairs, Colorado Demography Section.

**Table B-1. School-age (5–18 years old) Population Forecast by CDE Region**

	North Central	North- west	North- east	Metro	Pikes Peak	West Central	South- west	South- east	Total
1999	93,769	35,590	12,499	472,494	150,423	39,692	26,666	15,619	846,752
2000	96,619	36,625	12,575	487,186	154,110	40,413	27,122	15,628	870,278
2001	100,237	37,383	12,414	498,395	157,416	41,400	27,301	15,044	889,590
2002	101,715	38,365	12,304	504,852	158,798	42,105	27,387	14,875	900,401
2003	102,580	38,991	12,150	508,375	158,987	42,284	27,255	14,676	905,298
2004	103,580	39,703	12,056	512,315	158,943	42,488	27,173	14,586	910,844
2005	104,892	40,804	12,029	518,412	159,102	42,886	27,279	14,622	920,026
2006	106,426	42,149	12,014	526,119	159,414	43,376	27,477	14,706	931,681
2007	108,080	43,596	12,025	534,623	159,664	43,945	27,680	14,826	944,439
2008	109,619	44,997	12,030	542,271	159,671	44,512	27,870	14,957	955,927
2009	111,174	46,343	12,061	549,035	159,556	45,102	28,101	15,073	966,445
2010	112,840	47,688	12,102	555,419	159,560	45,735	28,358	15,184	976,886
2011	114,719	49,072	12,161	561,835	159,997	46,474	28,643	15,305	988,206
2012	116,822	50,464	12,232	568,598	160,969	47,304	28,981	15,423	1,000,793

Source: Colorado Department of Local Affairs, Colorado Demography Section

## **APPENDIX C: CERTIFICATION TYPES AND CERTIFICATION CATEGORIES USED IN THIS ANALYSIS**

There are nine different categories of certification contained in the licensure data set. These nine categories were combined into four groups: unqualified, conditionally certified, fully certified and master certification. For the analysis in this report, teachers who were in the unqualified and conditionally certified groups were counted as incompletely certified, while those who were in the fully certified and master certification were counted as completely certified.

### **Unqualified**

- Emergency
- One-year substitute
- Three-year substitute

### **Conditionally certified (e.g. teachers must meet a condition to become fully certified)**

- Alternative
- Temporary
- Five-year substitute

### **Fully certified**

- Provisional
- Professional

### **Master certification**

- Master

## APPENDIX D: ANALYSIS CATEGORIES

This appendix provides additional detail on the analysis categories used to describe the teacher workforce.

**Table D-1. School size quartile cut points in 2001**

	Minimum Enrollment	Maximum Enrollment
Quartile 1	3	204
Quartile 2	205	389
Quartile 3	390	576
Quartile 4	577	3,520

**Table D-2. Proportion of teachers working in each of the student poverty and minority classifications in 2001**

	Free lunch eligible	Black or Hispanic
Less than or equal to 25%	52%	56%
Between 26% and 50%	26%	22%
Between 51% and 75%	16%	13%
Greater than 75%	6%	9%

## APPENDIX E: TEACHER QUALIFICATIONS

This appendix provides additional detail on teacher qualifications.

Table E-1 shows the relative rankings for three of the different qualification measures. A ranking of one indicated the teachers in that subject, on average, had higher qualifications for that measure than teachers in the other subjects.

**Table E-1. Relative Ranking of Teacher Qualifications by Subject Area in 2001**

	Completely Certified	Master's or Higher	More Than 3 Years Experience
General Elementary	2	11	10
English Language Arts	5	3	10
Special Education	10	1	3
Math	8	7	6
Social Science	2	7	6
Natural Science	8	3	10
Physical Curriculum	1	12	1
Music	5	10	5
General Middle/Junior High	2	13	6
Foreign Languages	14	7	10
Art	5	14	6
Career, Vocational & Consumer Science	10	6	2
Other	12	5	14
Unknown	12	2	3

Source: CDE HR Data Set

Tables E-2 and E-3 show the proportion of senior high core subject teachers who were endorsed.

**Table E-2. Approximate Proportion of Endorsed Core Subject, Senior High Teachers in 2001 by Student Poverty**

	Endorsed Core Subject Senior High Teachers	Number of Teachers in This Group
Less Than 26% FRL	90%	4,833
Between 26% and 50% FRL	86%	1,329
Greater Than 50% FRL	79%	452
Statewide Average	89%	6,614

Source: CDE HR Data Set

**Table E-3. Approximate Proportion of Endorsed Core Subject, Senior High Teachers in 2001 by Minority Enrollment**

	Endorsed Core Subject Senior High Teachers	Number of Teachers in This Group
Less than or equal to 26% minority	90%	4,317
Between 26% and 50% minority	89%	1,450
Greater than 50% minority	81%	847
Statewide Average	89%	6,614

Source: CDE HR Data Set

## APPENDIX F: ADDITIONAL TEACHER SALARY DATA

This appendix provides additional detail on teacher salaries.

**Table F-1. Teacher Salary by Minority Enrollment**

	All Teachers	15 Years Experience and At Least a Master's	No Experience and No Master's
Less than or equal to 25% minority	\$39,789	\$46,851	\$27,116
Between 26% and 50% minority	\$39,218	\$46,863	\$27,236
Between 51% and 75% minority	\$38,839	\$48,620	\$28,895
Greater than 75% minority	\$39,851	\$54,000	\$30,688

Source: CDE HR Data Set

**Table F-2. Teacher Salary by School Size**

	All Teachers	15 Years Experience and At Least a Master's	No Experience and No Master's
Quartile 1, Smallest Schools	\$32,589	\$38,343	\$24,794
2	\$37,328	\$44,702	\$27,215
3	\$39,771	\$47,951	\$28,133
Quartile 4, Largest Schools	\$41,366	\$49,402	\$28,829

Source: CDE HR Data Set



## APPENDIX G: ATTRITION INFORMATION

This appendix provides additional detail on teacher attrition.

**Table G-1. 2000-2001 Attrition by Age**

	Total Teachers	State Attrition	Between District Transfers	New Job	Within District Transfers
Under 25'	2,442	368	199	16	163
26 to 30	5,711	837	390	97	443
31 to 35	5,194	618	270	91	398
36 to 40	5,092	362	232	112	405
41 to 45	6,107	356	196	164	565
46 to 50	7,987	444	195	150	626
51 to 55	7,289	904	169	128	472
56 to 60	2,689	531	53	29	115
61 to 65	669	202	14	6	30
Over 65	108	28	2	2	5

Source: CDE HR Data Set

**Table G-2. 2000-2001 Attrition by Minority Enrollment**

	State Attrition Rate	District Attrition Rate	School Attrition Rate
Less than or equal to 25% minority	10%	14%	20%
Between 26% and 50% minority	11%	16%	23%
Between 51% and 75% minority	12%	17%	25%
Greater than 75% minority	13%	16%	29%
Statewide Average	11%	15%	22%

Source: CDE HR Data Set & Enrollment Data Set

## APPENDIX H: SPECIAL EDUCATION

This special education appendix briefly describes the special education student population and then describes the special education teacher workforce.

### SPECIAL EDUCATION STUDENTS<sup>5</sup>

Special education students were those reported in the October student count as receiving special education services and having an individualized education plan. In 2000 there were 70,992 special education students in the state; that number rose to 73,623 in 2001, an annual growth rate of four percent.

Table H-1 shows the proportion of special education students to total enrollment by region. Special education students made up approximately 10 percent of the student population, with little variation by county. The Northeast reported the highest average proportion of 12 percent and the Southwest reported the lowest average of nine percent. The lowest proportion of special education students to total enrollment was five percent, while the highest was 16 percent.

**Table H-1. 2001 Proportion Special Education Students to Total Number of Students**

Region	Minimum Maximum			
	Average	by County	by County	Range
Metropolitan	10%	9%	13%	4%
North Central	11%	10%	12%	1%
Northeast	12%	9%	16%	7%
Northwest	10%	5%	15%	9%
Pikes Peak	10%	6%	12%	6%
Southeast	11%	7%	14%	6%
Southwest	9%	7%	12%	6%
West Central	10%	6%	13%	7%
Statewide				
Average	10%	5%	16%	11%

Source: CDE Enrollment data sets

Table H-2 shows the proportion of special education students to total number of students by county level student population. When the counties were divided into quartiles based on student population, the average proportion of special education students to total enrollment was 10% for all quartiles. But counties with enrollment under the state median (2,205) had a larger range. The highest proportion of special education to student population was in the smallest quartile, and the lowest proportion was in quartile 2.

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<sup>5</sup> The enrollment data for special education students was analyzed by county since district and school counts of special education students were often small and un-stable.

**Table H-2. 2001 Proportion of Special Education Students to Total Number of Students by County Level Student Population**

Quartiles of Student Population	Average	Minimum	Maximum	Range
Quartile 1: County Enrollment was between 74 and 935	10%	6%	16%	10%
Quartile 2 County Enrollment was between 959 and 1,961	10%	5%	15%	9%
Quartile 3 County Enrollment was between 2,205 and 5,002	10%	7%	15%	7%
Quartile 4 County Enrollment was between 5,734 and 99,332	10%	7%	13%	6%
Statewide Average	10%	5%	16%	11%

Source: CDE Enrollment data sets

The special education enrollment, along with the student age population projections data, can be used to create a rough estimate of future special education student enrollment. This forecast was made with a similar methodology as the teacher demand projection. It assumes that the current ratio of special education students to population will continue in the future, and that the population forecasts were correct. Table H-3 shows the projected special education population through 2012.

**Table H-3. Colorado Special Education Student Forecast**

	Year	Special Education Enrollment
Actual	2000	70,992
Actual	2001	73,623
Estimate	2002	73,879
Estimate	2003	74,226
Estimate	2004	74,635
Estimate	2005	75,341
Estimate	2006	76,256
Estimate	2007	77,266
Estimate	2008	78,173
Estimate	2009	78,999
Estimate	2010	79,820
Estimate	2011	80,713
Estimate	2012	81,707

Source: CDE Enrollment Data Set & Colorado Department of Local Affairs, Colorado Demography Section

This forecast assumes that the growth in the special education student population will follow the expected growth in student age population. The growth in student age population is expected to slow from three percent to one percent after 2001. Under these assumptions, the number of special education students is expected to grow from about 73,000 in 2001 to 81,000 in 2012.

## SPECIAL EDUCATION TEACHERS

This section uses the data reported in the 1999, 2000 and 2001 Colorado Department of Education (CDE) Human Resources and licensure data sets. The HR data set is based on information reported by districts, while the licensure data set is based on information reported by individual teachers. Special education teachers were defined as teachers who were reported in the HR data set as spending most of their time working in the special education subject area. This makes the focus of this analysis individuals, not full time equivalents (FTE). This methodology was used because districts hire individuals, not FTEs and because it clarifies the description of individual characteristics (age, race, salary level).

There were some reporting discrepancies in the number of special education teachers who worked in several counties<sup>6</sup>. A statewide estimate of special education teachers was made for 2000 and 2001 by extrapolating the number of special education teachers for those counties. Table H-4 shows the reported and estimated number of special education teachers in the state. The number of teachers grew at an annual rate of seven percent over the course of these three years. This growth rate was three percentage points faster than the growth of the special education student population, and five percentage points larger than the overall growth in student population.

**Table H-4. Colorado Special Education Teacher Forecast**

	Reported Teachers	Estimated Teachers
1999	3,388	n/a
2000	3,628	3,816
2001	3,886	4,084

Source: CDE Enrollment and HR Data Sets

The remaining sections in the special education portion of this report describe the individuals who were reported as special education teachers. Table H-5 shows the racial/ethnic and gender breakdown for special education teachers. The workforce was 93 percent white and 85 percent female. This can be compared to the overall teacher workforce, which was 90 percent white and 74 percent female.

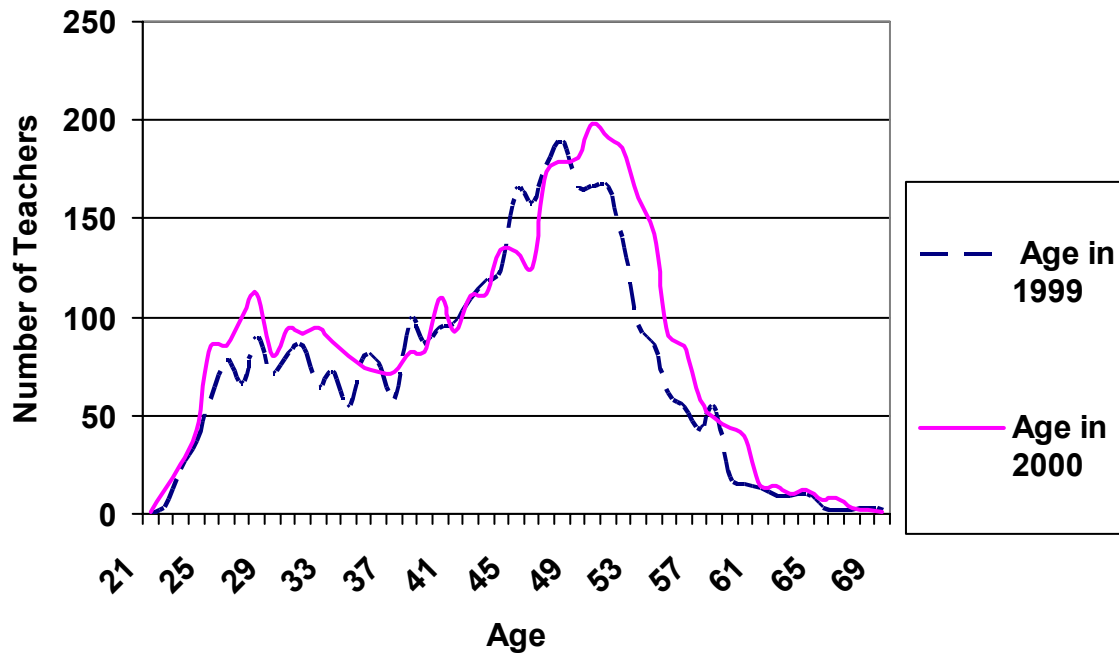
<sup>6</sup> The counties with inconsistent data on the number of special education teachers were Delta, Douglas, Gilpin, Huerfano, Prowers, Rio Blanco, Summit and Yuma. The estimated teacher total assumes that the missing teacher data would have the same characteristics as the available teacher data.

**Table H-5. Colorado Special Education Teacher Demographics**

	1999	2000	2001
Native American	0.3%	0.4%	0.5%
Asian	1.0%	0.9%	0.8%
Black	1.3%	1.5%	1.6%
Hispanic	3.7%	3.7%	3.7%
White	93.6%	93.5%	93.4%
Female	84.8%	84.1%	84.6%
Male	15.2%	15.9%	15.4%

Source: CDE HR Data Sets

Figure H-1 shows the age distribution for special education teachers in 2001. It was very similar to the age distribution for the overall teacher workforce. There were two large cohorts. The largest cohort included those teachers between the ages of 42 and 54 in 2001, i.e. those born between 1945 and 1957. That group of teachers was approaching retirement, which is indicated by the sharp decline in the number of teachers over the age of 55. The second large cohort of special education teachers included those between the ages of 25 and 33 in 2001, i.e. those born between 1968 and 1976. This cohort grew. In 1999 there were about 590 special education teachers who were born between 1968 and 1976; in 2001 this cohort contained about 910 special education teachers.



**Figure H-1: Colorado special education teacher age distribution**

Source: CDE HR Data Set

The special education workforce has been slowly aging. From 1999 through 2001, the average age has risen from 42.9 to 43.3. The average age for the 2001 workforce, along with the proportion of teachers who can retire in five years or fewer, is shown in H-6. Because the experience data from 1999 and 2000 were not reliable, 2001 was the first year that a retirement eligibility estimation could be made. In 2001, 17 percent of special education teachers, compared to 18 percent of all teachers, were within five years of being eligible to retire.

**Table H-6. Age and Retirement Eligibility of Colorado Special Education Teachers**

	Average Age	Proportion That Can Retire in Five Years or Fewer
1999	42.9	n/a
2000	43.2	n/a
2001	43.3	17%

Source: CDE HR Data Sets

The regional distribution of special education teachers is shown in Table H-7. This distribution was very similar to the distribution of all teachers. The largest group, 50 percent, worked in the Metropolitan Region, followed by 19 percent who worked in the Pikes Peak

Region. When looking at the distribution by locale there were some differences between the distribution of special education teachers and the total teacher workforce. There were a smaller proportion of special education teachers in rural schools, 15 percent, as compared to 21 percent of the overall teacher population (see Table 4 in the main report). At the same time, there was a slightly higher proportion of special education teachers in urban schools, 36 percent compared to 32. There was little variation in the proportion that was eligible to retire in five years or fewer. For almost all geographic regions this proportion was about 17 percent. The major exception was the West Central Region, where 25 percent of the special education teachers were eligible to retire in five or fewer years. There was more variation in retirement eligibility for the overall teacher workforce than for the special education teacher workforce.

**Table H-7. Distribution and Retirement Eligibility of Colorado Special Education Teachers by Geographic Area in 2001**

Region	Proportion of Teachers	Proportion of Eligible to Retire in Five Years or Fewer
North Central	14%	16%
Northwest	4%	15%
Northeast	2%	17%
Metro	50%	17%
Pikes Peak	19%	17%
West Central	6%	25%
Southwest	3%	14%
Southeast	2%	18%
Locale		
Urban	36%	18%
Suburban	41%	17%
Town	8%	17%
Rural	15%	17%

Source: CDE HR Data Sets

The distribution of special education teachers by specialty is shown in Table H-8. Special education teachers were reported as working in 10 different types of disability specializations. For this analysis, teachers were assigned to one specialization area based on the area in which they spent the most time working. The large majority of special education teachers were generalists. About eight percent worked with children who have perceptual or communicative disabilities, and less than five percent worked in all other areas.

**Table H-8. Colorado Special Education Specializations**

	1999	2000	2001
General Special Education	81%	79%	78%
Perceptual or Communicative Disability	7%	8%	8%
Significant Limit Intellectual Capacity	2%	4%	4%
Significant Identifiable Emotional Disability	2%	3%	3%
Preschooler Disability	1%	1%	2%
Visual Disability	1%	1%	1%
Hearing Disability	1%	1%	1%
Multiple Disability	1%	2%	1%
Other Disability	1%	1%	1%
Speech-Language Disability	1%	1%	0%

Source: CDE HR Data Sets

In summary, there were about 4,100 special education teachers working in Colorado in 2001. This workforce was largely white (93 percent) and female (85 percent). About 17 percent of these teachers will be able to retire within five years of 2001, with a higher concentration of teachers near retirement eligibility in the West Central Region of the state. The large majority of teachers (78 percent) reported working as generalists.

## **SPECIAL EDUCATION TEACHER QUALIFICATIONS**

There are four types of information on teacher qualifications contained in the combined CDE HR and licensure data sets: certification, endorsement, experience and education. This information was used to report on the proportion of teachers who had higher qualification levels, that is, teachers who were completely certified, had a master's degree or higher, had more than three years of experience, and senior high teachers who were endorsed in the subject they teach. Each of these qualification measures is defined below, but in general the higher the proportion of teachers that fall into each category, the better qualified the teacher workforce.

To analyze the distribution of teacher experience, teachers were classified as either novice, that is, those with less than three years of teaching experience, or veterans, those with more than three years of teaching experience. Data on teacher experience levels were gathered by CDE for the first time in 2000. That first year of data collection was not considered accurate and only 2001 will be reported here.

The CDE HR data set contains information on the teachers' highest level of education. This information has been used to categorize teachers as having a bachelor's degree only or as having a master's degree or higher.

The proportion of teachers who were not completely certified is reported here. The nine different certification levels within Colorado were consolidated into four different certification



levels: not completely certified, conditionally certified, completely certified and master teacher. Not fully certified includes teachers with emergency or temporary certification. Conditionally certified teachers must meet a condition, such as a year working in an alternative teaching program, to become completely certified. Completely certified teachers include both provisional and professional certification. The master certification level includes those teachers with certification from the National Board for Professional Teaching Standards (NBPTS). (Appendix C contains a matrix that shows the link between the nine different certification types and these four levels.) These four categories were further consolidated into two groupings: incompletely certified, which includes teachers who were not fully certified as well as conditionally certified teachers, and completely certified, which includes those who were completely certified and those with master certification. The proportion of teachers who were completely certified is reported in this analysis.

There were approximately 203 endorsement areas in the licensure data set. These endorsement areas were consolidated to approximate the subject areas used in the HR data set. It must be noted that there is no official CDE crosswalk between endorsements and subject areas, and this consolidation was based on analysis of the endorsement areas.

Table H-9 shows the qualifications by specialization area. Compared to the overall workforce, special education teachers were not much different in terms of certification and experience. However, special education teachers were much more likely to have a master's degree, 63 percent as compared to 43 percent of the overall workforce. Comparing endorsement levels, the special education workforce was very similar to the core subject teachers in senior high school.

There were a few patterns in the variation in qualifications by specialization. Hearing disability teachers were generally more qualified than the average special education teacher, while preschooler disability and significant identifiable emotional disability teachers were generally less qualified.

**Table H-9. Colorado Special Education Teacher Qualifications by Specialization (2001)**

	Completely Certified	Master's Degree or Higher	More than Three Years Experience	Endorsed
General Special Education	91%	70%	82%	89%
Perceptual or Communicative Disability	93%	65%	65%	85%
Significant Limit Intellectual Capacity	93%	66%	76%	82%
Significant Identifiable Emotional Disability	87%	63%	64%	85%
Preschooler Disability	87%	62%	61%	72%
Other Disability	91%	67%	72%	96%
Multiple Disability	93%	100%	87%	86%
Hearing Disability	96%	91%	80%	98%
Visual Disability	96%	74%	74%	83%
Speech-Language Disability	88%	89%	50%	82%
Statewide Average	91%	63%	79%	88%

Source: CDE HR Data Sets

Table H-10 shows special education teacher qualifications in 2001 by geographic area. Teachers in the Northeast generally had lower qualifications, followed by teachers in the Metropolitan and Pikes Peak Regions. Teachers in the Southwest and West Central Regions generally had higher qualifications. When looking at locale, special education teachers in urban schools had lower qualification levels for each of these three measures than teachers in the other three locales. Teachers in towns generally had higher qualifications than those in the other locales.

**Table H-10. Colorado Special Education Teacher Qualifications by Geographic Area (2001)**

	Completely Certified	Master's Degree Or Higher	More Than Three Years Experience	Endorsed
North Central	93%	70%	75%	89%
Northwest	93%	70%	83%	89%
Northeast	87%	55%	73%	81%
Metro	90%	68%	77%	89%
Pikes Peak	90%	49%	82%	87%
West Central	97%	74%	86%	82%
Southwest	98%	76%	92%	86%
Southeast	95%	69%	87%	77%
Locale				
Urban	89%	56%	77%	89%
Suburban	92%	70%	79%	89%
Town	95%	72%	87%	86%
Rural	91%	68%	78%	85%
Statewide Average	91%	65%	79%	88%

Source: CDE HR Data Sets

In summary, special education teachers had qualification levels similar to the general teacher workforce, except that a higher proportion of special education teachers had master's degrees or higher. Teachers who work with hearing disabilities generally had higher qualifications. Special education teachers who specialize in preschooler disabilities and those who work with students who have significant emotional disabilities generally had lower qualifications. Special education teachers in the Northeast and in urban schools generally had lower qualifications, while those in the Southwest and towns had higher qualification levels.

## **SPECIAL EDUCATION TEACHER SALARIES**

Table H-11 shows special education teacher salaries by geographic region. Teacher pay is traditionally based on experience and education. Differences in teacher salaries may reflect an overall higher pay, increased higher experience levels, higher education levels, or some combination of these factors. To isolate differences in pay levels, this analysis includes salaries paid to teachers with similar amounts of education and experience. Three different salary measures are shown: average for all teachers, average for teachers with no experience and without a masters' degree, and average for teachers with 15 years of experience and a master's degree.

Average special education teacher salaries were lower in the Northeast and Southeast. They were highest in the Metropolitan Region. When looking at salaries by locale, they were lowest in towns and highest in suburban schools. The relationship between salary and qualification levels was not completely straightforward. As would be expected, the Northeast Region had both lower salaries and lower qualifications. However, despite the higher salaries in the Metropolitan Region, special education teachers in this region generally had lower qualifications. At the same time, despite the lower salary levels in the towns, special education teachers in towns generally had higher qualifications.

**Table H-11. Colorado Special Education Teacher Salaries by Geographic Area in 2001**

	All Teachers	No Experience and No Master's	15 Years Experience and At Least a Master's
North Central	\$39,734	\$28,605	\$48,075
Northwest	\$36,336	n/a	n/a
Northeast	\$31,143	n/a	n/a
Metro	\$44,163	\$30,419	\$50,157
Pikes Peak	\$39,602	\$29,058	n/a
West Central	\$39,132	\$27,533	n/a
Southwest	\$35,303	n/a	n/a
Southeast	\$32,663	n/a	n/a
Locale			
Urban	\$41,459	\$42,665	\$41,410
Suburban	\$43,426	\$44,522	\$43,294
Town	\$35,750	\$36,268	n/a
Rural	\$38,291	\$39,030	\$38,280
Statewide Average	\$41,354*	\$46,304*	\$29,626*

Source: CDE HR Data Sets

\* The total average salaries are slightly different than those reported for special education teachers when analyzing the entire teacher workforce. This is due to the inclusion in this analysis of some teachers who spend equal amounts of time teaching special education and a different subject.

Note that cells with fewer than 10 teachers are not reported

Table H-12 shows special education teacher salaries by specialization. There was some variation in average salary, with the lowest average salaries for multiple disability teachers and higher average salaries for hearing disability teachers. When looking at salaries for teachers with no experience and without a master's degree, significant limited intellectual capacity teachers had higher salaries. At the same time significant emotional disability teachers generally had lower salaries.

**Table H-12. Colorado Special Education Teacher Salaries by Specialization (2001)**

	All Teachers	New Teachers – No Experience and No Master’s	Experienced Teachers – 15 Years Experience and At Least a Master’s
General Special Education	\$41,767	\$29,557	\$46,269
Perceptual or Communicative Disability	\$40,684	\$30,482	
Significant Limit Intellectual Capacity	\$40,620	\$32,102	
Significant Identifiable Emotional Disability	\$40,935	\$28,187	
Preschooler Disability	\$37,281	\$28,680	
Multiple Disability	\$35,646		
Other Disability	\$37,565		
Hearing Disability	\$43,673		
Visual Disability	\$40,673		
Speech-Language Disability	\$36,743		

Source: CDE HR Data Sets

Note that cells with fewer than 10 teachers are not reported

Average special education teacher salaries, and new special education teacher salaries were about \$1,000 higher than salaries of the total teacher workforce, while experienced special education salaries were lower. Lower salaries were somewhat correlated with lower qualification levels. The Northeast Region had both lower salaries and lower qualifications. However, despite the higher salaries in the Metropolitan Region, special education teachers in this region generally had lower qualifications. Teachers who worked with students with significant emotional disabilities generally had lower qualifications and lower salaries, but the differences in salary level were small.

## ATTRITION OF SPECIAL EDUCATION TEACHERS

The attrition analysis will focus on two different types of attrition: attrition within the district, and from the state workforce. State attrition occurs when a teacher was working within the state in 2000, but not working in public education within the state in 2001. District attrition occurs when a teacher works in a district in 2000, but not in that district in 2001. The source of district attrition can either be state attrition or a between-district transfer. A transfer from one district to another is a loss as far as the originating district is concerned, but that teacher is not a loss from the state teacher workforce. This attrition rate does not count teachers who change from special education to a different subject area such as English or elementary education.

Table H-13 shows attrition rates by geographic region. The statewide attrition rate for special education teachers was nine percent at the state level and 15 percent at the district level. The special education teacher state attrition rate was lower than the state attrition rate for the

overall teacher workforce, which was 11 percent over the same time period. The district attrition rate was equal to the statewide district attrition rate. There were large differences in attrition rates between regions. The West Central and Pikes Peak Regions have relatively low attrition rates. The Northwest had a high state attrition rate, while the Northeast had a high district attrition rate. The high district attrition rate in the Northeast means a relatively high number of teachers were transferring between districts in and out of the Northeast.

**Table H-13. Colorado Special Education Teacher 2000-2001 Attrition Rates by Geographic Area**

	State Attrition	District Attrition
North Central	7%	14%
Northwest	15%	21%
Northeast	8%	25%
Metro	10%	15%
Pikes Peak	7%	12%
West Central	7%	10%
Southwest	10%	21%
Southeast	10%	15%
Locale		
Urban	8%	12%
Suburban	9%	15%
Town	9%	14%
Rural	9%	18%
Statewide Average	9%	15%

Source: CDE HR Data Sets

Table H-14 shows the attrition rates for the five largest specializations within the special education workforce. The attrition rates for teachers working in the area of significant identifiable emotional disabilities were higher than the rates for the other major specializations. New teachers in this specialization generally had lower starting salaries, and all teachers in this specialization on average had lower qualifications.

**Table H-14. Colorado Special Education Teacher 2000–2001 Attrition Rates by Specialization**

	State Attrition	District Attrition
General Special Education	9%	15%
Perceptual or Communicative Disability	9%	15%
Significant Limit Intellectual Capacity	10%	14%
Significant Identifiable Emotional Disability	14%	23%
Multiple Disability	10%	18%
Statewide Average	9%	15%

Source: CDE HR Data Sets

Special education attrition rates were similar to attrition rates for the overall teacher workforce. There were higher attrition rates in the Northwest and Northeast. Teachers who work with children who have significant emotional disabilities had higher attrition rates.

## **SPECIAL EDUCATION TEACHER NEW HIRES**

Of the approximately 4,000 special education teachers working in 2001, 15 percent, or 615, were new hires. New hires are teachers who did not work in Colorado public education during the previous year. Table H-15 shows the proportion of special education hires by age. The age distribution of special education new hires was older than the overall teacher workforce new hires. In the overall teacher workforce, the largest proportion of new hires was under 25 years old and 45 percent of new hires were under 30. In the special education workforce, the largest proportion of new hires was between 26 and 30 years old and only 35 percent of all new hires were under 30.

**Table H-15. 2001 New Special Education Hires by Age**

	Proportion of New Hires
Under 25	14%
26 to 30	21%
31 to 35	14%
36 to 40	12%
41 to 45	14%
46 to 50	11%
51 to 55	10%
Over 55	4%
Total	615

Source: CDE HR data set

A minority of the 2001 new hires were new to teaching. Approximately 65 percent, or 395, of these new special education hires had previous experience in education either inside or outside of the state. In fact many, about 14 percent or 87, of the new hires had worked in Colorado public education in 1999.

Using information on where teachers received their highest degree it is possible to estimate which institutions provided higher education to Colorado's special education teacher workforce. About 44 percent, or 272 of the new hires, received their highest level of education from within Colorado.

Of the 272 new hires, about 116 were new teachers, i.e. they did not have any teaching experience. Table H-16 shows the 15 largest providers of higher education to new hires who were educated within Colorado. To a greater extent than in the entire teacher workforce, the University of Northern Colorado was the largest education provider to special education teachers. Note that Colorado State and Metropolitan State educated a higher proportion of new teachers than new hires with experience. This suggests that these programs have grown in their provision of higher education to special education teachers.



**Table H-16. Top Colorado Providers of Higher Education to Colorado Teachers (2001)**

	New Teachers, No Teaching Experience	New Hires, with Teaching Experience
University of Northern Colorado	38%	40%
Adams State College	4%	7%
University of Colorado - Boulder	6%	7%
University of Colorado - Colorado Springs	4%	3%
University of Colorado - Denver	2%	5%
University of Denver	3%	3%
Colorado State University	13%	8%
Metropolitan State College	10%	8%
Regis College	5%	4%
Western State College of Colorado	2%	2%
University of Southern Colorado	3%	4%
Mesa State College	3%	2%
Fort Lewis College	2%	2%
Colorado Christian University	3%	1%
Colorado College	1%	0%
Total, all Colorado Institutions	116	156

Source: CDE HR Data Set

About 56 percent, or 343, of Colorado's new special education hires received their higher education in other states. Table H-17 shows the top ten states for providing higher education to new special education hires. As with the entire teacher workforce, four of the largest states in the nation were top providers of education to new Colorado's special education hires. Following those larger states, several of Colorado's neighboring states, Nebraska, Kansas, and New Mexico, were also top education providers to new hires. A difference from the overall teacher workforce was that Wyoming was not a top education provider to new special education teachers.

**Table H-17. Top States Sources of Higher Education to Colorado Teachers (2001)**

	New Teachers, No Teaching Experience	New Hires, with Teaching Experience
Illinois	6%	7%
Texas	4%	6%
California	7%	6%
New York	7%	6%
Nebraska	5%	5%
Arizona	4%	4%
Kansas	3%	4%
New Mexico	4%	3%
Michigan	2%	2%
Ohio	7%	5%
Total From All Out of State Institutions	112	231

Source: CDE HR Data Set

About 15 percent of the special education teacher workforce was new hires, i.e. they did not work in Colorado public education in the prior year. The majority of the new hires (65 percent) had teaching experience, and most (56 percent) were educated outside of Colorado. The University of Northern Colorado was the main in-state provider of higher education to special education teachers. Most of the new hires that were trained outside of Colorado came from large states (Illinois, Texas, California, New York, and Ohio) or neighboring states such as Nebraska, Kansas and New Mexico.

## **SPECIAL EDUCATION TEACHER DEMAND FORECAST**

Using the special education student enrollment forecast and a count of special education teachers by county, a rough estimate of the total demand for special education teachers can be made. By definition, overall demand forecast for teachers matches the estimated growth in student population, increasing at a rate of about one percent a year, from 4,115 in 2002, to 4,576 in 2012.

The teacher demand forecast can be combined with information about teacher attrition and age distributions to construct a rough estimate of future teacher attrition. Table H-18 shows the estimated total demand, attrition and new hires of special education teachers through 2012. Taken together, this information can be used to formulate a rough estimate of the number of new hires that are needed each year. Attrition will increase at a faster rate than total demand due to the aging of the special education workforce. The number of new hires is also expected to grow over the next decade, but not at a constant rate. The number of new hires is expected to increase quickly in 2003 through 2005, and then slowly through the rest of the decade.

**Table H-18. Forecast of Special Education Teacher Demand, Attrition and New Hires**

	Total Demand	Attrition	New Hires
2000	3,816		
2001	4,084	400	431
2002	4,115	409	430
2003	4,136	419	444
2004	4,160	429	470
2005	4,202	441	494
2006	4,255	453	513
2007	4,315	465	519
2008	4,368	476	525
2009	4,417	485	533
2010	4,466	493	545
2011	4,518	501	559
2012	4,576		

Source: CDE HR data set & Colorado Department of Local Affairs, Colorado Demography Section

## **OTHER JOBS IN THE SPECIAL EDUCATION WORKFORCE**

Teachers are not the only education professionals who work with special education students in the state of Colorado. The largest two groups other than teachers were student services providers and paraprofessionals.

Table H-19 shows the number of people reported to have worked as special education paraprofessionals and student services providers. The two groups had fairly similar average ages, around 42, and proportion of females, around 92 percent. There were about 4,086 special education paraprofessionals in 2001, which was about the same as the number of teachers. The information on paraprofessional education levels was not available. Paraprofessional salaries were much lower than teacher salaries, averaging \$11,960.

There were about 416 student services providers in 2001. A large proportion of student services providers had a master's degree or higher (84 percent) compared to the special education teacher workforce (65 percent) or the overall teacher workforce (43 percent). Average special education student services provider salaries were similar to average teacher salaries and slightly lower than average special education teacher salaries.

**Table H-19. Information on Colorado Special Education Student Services Providers and Paraprofessionals (2001)**

	Number	Average Age	Proportion Female	Masters Degree or Higher	Average Salary
Student Services	416	42.3	92%	84%	\$40,044
Para-professionals	4,086	41.3	93%	n/a	\$11,690

Source: CDE HR Data Set

As with teachers, most special education student services providers and paraprofessionals report a generalist specialization. Table H-20 shows the top areas of specialization for special education student services providers and paraprofessionals. A much higher proportion of student services providers worked with speech and/or language issues than special education teachers, 29 percent compared to about one percent. Almost all paraprofessionals were generalists.

**Table H-20. Special Education Student Services and Para-Professional Specializations (2001)**

	Student Services	Para-Professional
General Special Education	53%	89%
Speech Pathology	20%	1%
Speech-Language Disability	9%	0%
Perceptual or Communicative Disability	5%	3%
Significant Identifiable Emotional Disability	4%	1%
Physical Disability	3%	0%
Other Disability	1%	2%
Significant Limit Intellectual Capacity	1%	2%
Multiple Disability	0%	1%
All Others	1%	1%

Source: CDE HR Data Set

## CONCLUSIONS AND DISCUSSION

The special education teacher workforce is very similar to the overall teacher workforce, except that the special education workforce appears to be growing faster than the overall teacher work force, and slightly better educated. The special education teacher workforce has a significant number of teachers who are nearing retirement. About 17 percent will be able to retire within five years of 2001. However, overall attrition rates are not expected to greatly increase. The attrition rate in 2000 was nine percent, and the attrition rate is expected to peak at 11 percent in 2011.

As with the general workforce, this analysis did not reveal any burning issues. However, a few issues may warrant further attention. First, there is relatively large variation in the number of special education students in smaller counties. At the same time, rural schools have fewer special education teachers. A concern is that these numbers reflect a lack of capacity in some smaller counties and rural schools to identify and serve all of the students who need special education students.

A second, and potentially related issue, involves the Northeast Region where about two percent of special education teachers work. Special education teachers in this region generally have lower qualifications. These lower qualifications may be a product of the high attrition rates for teachers in this region, which in turn may be driven by the lower average special education salaries in this region.

Finally, the small proportion of teachers, about three percent, who work with students with significant emotional disabilities may deserve some attention. These teachers generally have lower qualifications. As with teachers in the Northeast Region, teachers who work with students with emotional disabilities have higher attrition and lower salaries.

## APPENDIX I: CHARACTERISTICS AND ATTRITION RATES OF PRINCIPALS AND ASSISTANT PRINCIPALS

This appendix presents the demographic and professional characteristics of principals and assistant principals by school levels<sup>7</sup>, and attrition rates of principals and assistant principals by individual demographic and school characteristics.

Table I-1 illustrates average age, percentage of female and minority, percentage of M.A. or specialist degree holders and Ph.D. holders, and the median annual salary of principals and assistant principals in elementary, middle/junior high, senior high schools and other schools in 2001. There were no distinct differences in mean age and M.A./specialist and Ph.D. holders among different levels of schools. Mean age ranged from 46 to 48 years old. About 80 to 86 percent of leaders hold M.A. or specialist degrees; less than 10 percent hold a doctorate. Annual salary varied from \$62,790 to \$70,582, with the highest salaries observed in elementary school leaders, followed by senior high and middle/junior high school leaders. The median salary of the leaders in the other types of schools was the lowest. A clear difference was observed in the percentage of female and minority leaders. While 64 percent of elementary school leaders were female, in senior high schools, middle/junior high schools and the other types of schools, 33 percent, 50 percent and 48 percent of leaders were female respectively. Elementary schools had the highest percentage of minority leaders, 19 percent, followed by middle/junior high schools, which had 18 percent. In senior high schools and the other types of schools, 14 percent and 9 percent were minority leaders respectively.

**Table I-1. Characteristics of Principals and Assistant Principals by School Level (2001)**

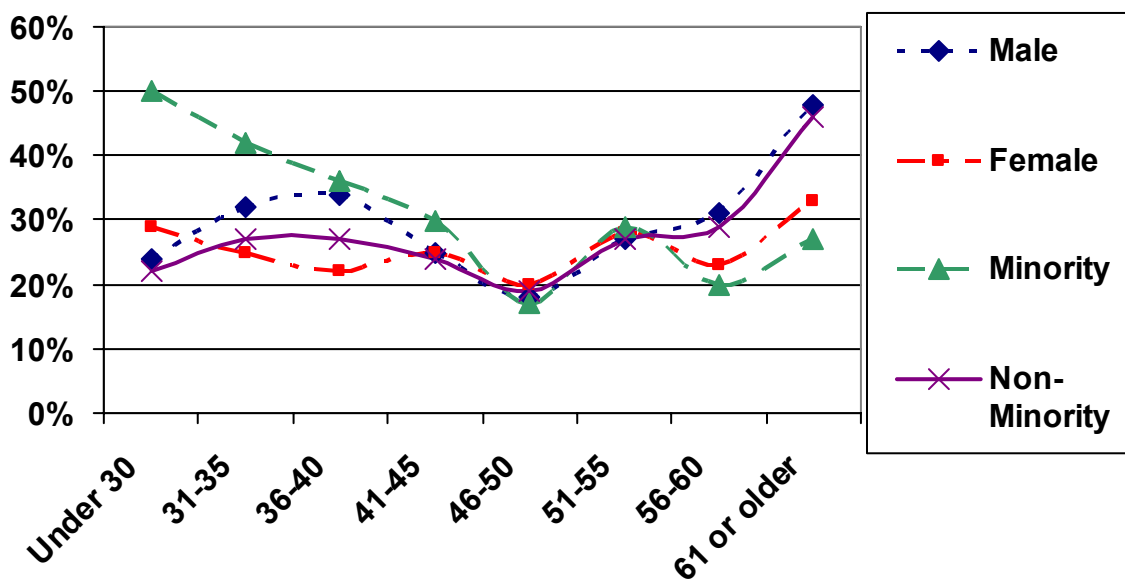
	Elementary	Middle/ Junior High	Senior High	Other
Number of Leaders	862	483	605	337
Average Age	48	46	47	48
Proportion Female	64%	50%	33%	48%
Proportion Non-White	19%	18%	14%	9%
M.A./Specialist Degree holders	85%	86%	84%	81%
Doctorate holder	7%	4%	6%	7%
Median Salary	\$70,582	\$66, 560	\$69,098	\$62,790

Source: CDE HR Data Set

<sup>7</sup> K-5 and K-6 schools were categorized as elementary schools, and 9-11 and 9-12 schools were categorized as senior high schools. The schools categorized as middle or junior high schools are 5-8, 5-9, 6-8, 6-9, 7-8, and 7-9 schools. The schools that did not fall into any of the three categories were labeled as “other” types of schools.

Figure I-1 shows the percentage, by age category, of principals and assistant principals who left their schools (school attrition rate) between 2000 and 2001. The four lines indicate the separate attrition rates of female, male, minority, and non-minority leaders. We can see gender differences and minority-status differences in the attrition rates plotted by age groups. The attrition rates were generally lower among female leaders than male leaders except for the age cohort of 30 or younger. This is probably associated with the fact that younger females were more likely to leave their positions due to childrearing.

The graph also indicates distinct differences between minority leaders and non-minority leaders. A significantly higher percentage of minority leaders left their schools at age 45 or younger compared to non-minority leaders. When looking leaders who are 56 and older, more non-minority leaders left their schools than minority leaders did. Minority leaders were more likely to leave their schools at a younger age rather than at an older age, and non-minority leaders were more likely to leave at an older age rather than at a younger age. It is not clear why this pattern emerges between minority and non-minority leaders. Future studies that explain such differences are needed.



**Figure I-1. Attrition rates of principals and assistant principals by gender and minority status (2000-2001)**

Source: CDE HR Data Set

Table I-2 illustrates the percentage of school leaders who left their schools between 2000 and 2001 by school location: city, suburban and rural areas. Three kinds of attrition rates are presented here: 1) state attrition rates, 2) district attrition rates, and 3) school attrition rates. State attrition rates indicate the percentage of leaders who left education-related jobs or left the state, district attrition rates indicate the percentage of leaders who left their district, and school attrition rates indicate the percentage of leaders who left their schools. The statewide average attrition rate was eight percent, the average district transfer rate was 14 percent, and the school attrition rate was 25 percent.

Table I-2 indicates that there was no distinct difference in school attrition rates among city, suburban, town and rural schools: the rates varied from 24 to 28 percent. However, when we look at state and district attrition rates, we can see that town and rural areas had relatively higher district attrition rates compared to suburban and city areas. This means that the majority of the leaders who left their schools in towns and rural areas moved to another district or state, or left education-related positions, compared to suburban and city areas where only about half of the school leaders who left their school moved to another district or state, or left education-related positions.

**Table I-2. Attrition Rates of Principals and Assistant Principals by School Locale (2000-2001)**

	Number of leaders	State Attrition	Between District Transfers	District Attrition	Within District Transfers	School Attrition
Urban	662	8%	4%	12%	12%	24%
Suburban	852	8%	5%	13%	11%	24%
Town	183	8%	8%	16%	10%	26%
Rural	471	9%	8%	17%	11%	28%
Statewide Total/ Average	2,168	8%	5%	14%	11%	25%

Source: CDE HR Data Set

How do the attrition rates differ among different regions in the state? The percentage of school leaders who left their schools by Colorado Department of Education (CDE) regions is presented in Table I-3. The number of school leaders within a region varied from 41 to 1,114. The school attrition rates varied from 20 percent to 34 percent. The highest rate was in the West Central Region and the lowest rate was in the Pikes Peak Region. We can also see a variation between these regions in state and district attrition rates. For example, in Southwest Region, more than half of those who left their schools left education-related jobs or left the state, whereas in West Central Regions, the majority of those who left their schools moved to another school in the same district.



**Table I-3. Attrition Rates of Principals and Assistant Principals by Region (2000-2001)**

Region	Number of leaders	State Attrition	Between District Transfers	District Attrition	Within District Transfers	School Attrition
North Central	271	10%	5%	15%	10%	25%
Northwest	117	9%	10%	19%	7%	26%
Northeast	41	10%	5%	15%	7%	22%
Metro	1,114	9%	5%	14%	12%	26%
Pikes Peak	405	5%	6%	11%	9%	20%
West Central	107	4%	3%	7%	27%	34%
Southwest	84	14%	3%	17%	9%	26%
Southeast	60	7%	8%	15%	7%	22%
Statewide Total/Average	2,199	8%	5%	14%	12%	25%

Source: CDE HR Data Set

Table I-4 shows the attrition rates of school leaders by school size quartiles. The school attrition rates varied from 19 percent to 28 percent. The largest attrition rates were observed in larger mid-sized schools and smallest schools and the smallest attrition rates were observed in smaller mid-sized schools. There were no distinct differences in the rates of state and district attrition rates among the schools with different sizes.

**Table I-4. Attrition Rates of Principals and Assistant Principals by School Size<sup>8</sup> (2000-2001)**

	Number of Leaders	State Attrition	Between District Transfers	District Attrition	Within District Transfers	School Attrition
Quartile 4						
Largest schools	947	7%	6%	13%	11%	24%
Quartile 3	459	11%	4%	15%	12%	27%
Quartile 2	388	8%	5%	13%	6%	19%
Quartile 1						
Smallest Schools	361	10%	7%	17%	11%	28%
Statewide Total/Average	2,155	8%	5%	14%	11%	25%

Source: CDE HR Data Set

Do we see different attrition rates of school leaders by school level? The percentage of school leaders who left their schools, districts, and state by school level is presented in Table I-5. The school attrition rates were the highest in the other types of schools (34 percent) compared to the rates of elementary, middle/junior high, and senior high schools (23 percent, 28 percent, and 21 percent respectively). There were no distinct differences in the rates of district attrition, which varied from 13 to 16 percent. The other types of schools had the highest rates of state attrition

<sup>8</sup> The schools in Quartile 1 category have less than 369 students and the schools in Quartile 4 have more than 871 students.

(10 percent) followed by elementary school (9 percent), middle/junior high schools (7 percent), and senior high schools (6 percent).

**Table I-5. Attrition Rates of Principals and Assistant Principals by School Level (2000-2001)**

	Number of Leaders	State Attrition	Between District Transfers	District Attrition	Within District Transfers	School Attrition
Elementary	818	9%	4%	13%	10%	23%
Middle/Junior High	470	7%	7%	14%	14%	28%
Senior High	581	6%	7%	13%	8%	21%
Other	340	10%	6%	16%	18%	34%
Statewide Total/ Average	2,209	8%	5%	14%	12%	25%

Source: CDE HR Data Set

In summary, those leaders who worked in elementary schools were, on average, better educated and were more often female and minority. The average proportion of leaders who stopped working within the state after 2000 was eight percent, which is lower than the teacher attrition rate. However, leader transfer rates, between districts and between schools were slightly higher than the teacher transfer rates. The end result was, on average, a quarter of school leaders left their schools between 2000 and 2001. There was some variation in the transfer rates. Leaders in schools located in towns and rural areas had a higher rate of between district transfers. Leaders in schools with non-traditional grade ranges had a higher rate of within district transfers.