Policy Paper No. PP86-8-4

Teacher Supply and Demand in California:
Is the Reserve Pool a Realistic
Source of Supply?

Helen H. Cagampang, Walter I. Garms,
Todd J. Greenspan, and James W. Guthrie

August 1986

Helen H. Cagampang is a research associate with PACE.

Walter I. Garms is professor of education and human development, University of
Rochester, Rochester, New York.

Todd J. Greenspan is an administrative analyst, Office of State Governmental Relations,
University of California.

James W. Guthrie is professor of education at the University of California, Berkeley, and
co-director of PACE.

Additional copies of this paper are available by sending $4.00 per copy to:

PACE
School of Education
University of California
Berkeley, California 94720

CHECKS PAYABLE TO THE REGENTS OF THE UNIVERSITY OF CALIFORNIA
*(Residents of Alameda, Contra Costa, and San Francisco counties add 6.5% sales tax. Other California residents add 6%.)*

*Policy Analysis for California Education (PACE)*
*Berkeley, California*
*August 1986*

# *Executive Summary*

An adequate supply of qualified teachers is central to improving education in California. Our supply and demand projections indicate that teacher shortages will be concentrated in specific subject areas and geographical regions. Shortages may undermine recent educational improvements. Moreover, if additional proposed reforms are enacted, such as reducing pupil/teacher ratios, disallowing emergency credentials, and requiring teachers to teach only in their areas of expertise, then teacher shortages will intensify and strong incentives may be necessary to recruit sufficient numbers of highly qualified teachers.

## Projected Demand

*Five year demand.* California will need between 77,000 and 85,000 new teachers by 1989-90 to staff its elementary and secondary schools:

- Between 42,000 and 48,000 teachers will be needed to compensate for attrition in grades K-8.

- Between 14,000 and 16,000 teachers will be needed to compensate for attrition in grades 9-12.

- Twenty-one thousand teachers will be needed due to an enrollment growth of 18.1 percent in grades K-8.

- Fifteen hundred fewer teachers will be needed due to a projected 3.2 percent decrease in enrollment in grades 9-12.

*Ten year demand.* For the period through 1994-95, California will face a total demand for new teachers of between 160,000 and 183,000:

- Between 86,000 and 104,000 teachers will be needed to compensate for attrition in grades K-8.

- Between 29,000 and 35,000 teachers will be needed to compensate for attrition in grades 9-12.

- Thirty-eight thousand teachers will be needed due to elementary enrollment growth.

- Sixty-five hundred teachers will be needed due to a 14.4 percent secondary enrollment growth beginning after 1990.

## Projected Supply

Ten thousand individuals will enter the teaching work force each year from four sources of supply:

- Twenty-three hundred newly credentialed teachers will begin teaching each year.

- Fifteen hundred teachers from out of state will begin teaching in California schools.

- Thirty-two hundred individuals will begin teaching with emergency credentials.

- Three thousand members of the so-called reserve pool will return to teaching.

By a second projection method, using State Teachers' Retirement System data, a larger number, 11,200 teachers per year, can be expected to enter or re-enter the active teacher work force.

## Effect of Educational Improvements on Supply and Demand

Three proposed educational reforms--reducing pupil/teacher ratios to 20 to 1, eliminating emergency credentials, and requiring teachers to instruct only in their fields of expertise--would increase demand:

- Between 58,700 and 59,500 more teachers would be needed beyond increases for enrollment growth and attrition by 1989-90.

- Between 79,400 and 84,000 more teachers would be needed by 1994-95.

- Class size reductions would increase teacher demand by 59.3 to 64.2 percent.

- Annual demand for credentialed teachers would increase by 4.9 to 5.4 percent if emergency credentials are eliminated.

- Between 5.7 and 6.3 percent more licensed individuals would be needed if teachers instruct only in their fields of expertise.

## Projected Shortfall

Between 21,000 and 35,000 more teachers by 1989-90 and between 40,000 and 83,000 more teachers by 1994-95 will be needed than will be available:

- If pupil/teacher ratios remain constant.

- If emergency credentials continue to be issued.

- If teachers continue to teach outside their fields of expertise.

The teacher supply shortfall increases to between 80,000 and 94,000 individuals by 1989-90 and to between 120,000 and 167,000 by 1994-95:

- If the pupil/teacher ratio is reduced to 20 to 1.

- If no emergency credentials are issued.

- If teachers are allowed to instruct only in their fields of expertise.

## Chart 1

### Summary of Supply, Demand, and Shortfall, 1984-85 through 1989-90 and 1994-95

#### Current Practices

| | Demand for enrollment growth | Demand for attrition | Total demand | Total supply | Projected shortfall |
|---|---|---|---|---|---|
| **Best case:** | | | | | |
| 5-year projection | 19,719 | 57,623 | 77,342 | 56,049 | 21,293 |
| 10-year projection | 44,098 | 115,645 | 159,743 | 119,472 | 40,271 |
| **Worst case:** | | | | | |
| 5-year projection | 19,719 | 65,334 | 85,052 | 50,500 | 34,552 |
| 10-year projection | 44,098 | 139,262 | 183,360 | 101,000 | 82,360 |

#### With Educational Reforms

| | Demand for enrollment growth & attrition | Additional demand due to reduced class size | Additional demand due to credential changes* | Total demand | Total supply | Projected shortfall |
|---|---|---|---|---|---|---|
| **Best case:** | | | | | | |
| 5-year projection | 77,342 | 49,658 | 9,083 | 136,083 | 56,049 | 80,034 |
| 10-year projection | 159,743 | 70,280 | 9,083 | 239,106 | 119,472 | 119,634 |
| **Worst case:** | | | | | | |
| 5-year projection | 85,052 | 50,461 | 9,083 | 144,596 | 50,500 | 94,096 |
| 10-year projection | 183,360 | 74,975 | 9,083 | 267,418 | 101,000 | 166,418 |

*Eliminating emergency credentials and eliminating teachers teaching out of field.

# Contents

# List of Charts

# *Policy Analysis for California Education*

Policy Analysis for California Education, PACE, is a university-based research center focusing on issues of state educational policy and practice. PACE is located in the Schools of Education at the University of California, Berkeley and Stanford University. It is funded by the William and Flora Hewlett Foundation and directed jointly by James W. Guthrie and Michael W. Kirst. PACE operates satellite centers in Sacramento and Southern California. These are directed by Gerald C. Hayward (Sacramento) and Allan R. Odden (University of Southern California).

PACE efforts center on five tasks: (1) collecting and distributing objective information about the conditions of education in California, (2) analyzing state educational policy issues and the policy environment, (3) evaluating school reforms and state educational practices, (4) providing technical support to policy makers, and (5) facilitating discussion of educational issues.

The PACE research agenda is developed in consultation with public officials and staff. In this way, PACE endeavors to address policy issues of immediate concern and to fill the short-term needs of decision makers for information and analysis.

PACE publications include Policy Papers, which report research findings; the Policy Forum, which presents views of notable individuals; and Update, an annotated list of all PACE papers completed and in progress.

# Introduction

An adequate supply of qualified teachers is central to improving education in California. Our supply and demand projections indicate that teacher shortages will be concentrated in specific subject areas and geographical regions. These shortages may undermine recent educational improvements. Moreover, if additional proposed reforms are enacted, such as reducing pupil/teacher ratios, disallowing emergency credentials, and requiring teachers to teach only in their areas of expertise, then teacher shortages will intensify and strong incentives may be necessary to recruit enough qualified teachers.

If class sizes and teacher certification requirements remain unchanged, an average annual shortfall of between 4,000 and 7,000 teachers is likely to occur over the next five years. The shortfall will be concentrated in the high demand areas of bilingual education, secondary math and science, and counties where enrollments are increasing rapidly.

In the first section of this report, we project demand for elementary and secondary teachers through 1989-90 and 1994-95. Projections are made for demand due to enrollment growth and attrition (including retirement). The number of teachers needed to meet enrollment growth was projected separately for each county in California, since growth and pupil/teacher ratios vary between counties. We used two methods to project replacements needed for attrition and retirements. The first method uses the average annual rates of attrition from State Teachers' Retirement System (STRS) over the last seven years to project attrition from the teacher work force. The second method is based on a projection of the trend of the averages of these same attrition rates.

In the second section, the supply of teachers is projected for the same periods, through 1989-90 and 1994-95. Two supply projection methods were used. The first method estimates supply from each of four possible sources:

1. newly credentialed teachers

2. teachers from out of state

3. emergency credentials

4. reserve pool (persons with valid credentials not now teaching)

The number of newly credentialed teachers is projected from enrollments in teacher training institutions. The likelihood that newly credentialed teachers will actually teach is calculated from the teaching rates of a random sample of first-credential recipients. The supply of teachers from out of state and from emergency credential holders is projected using Commission on Teacher Credentialing (CTC) data. Reserve pool size and the likelihood that reserve pool members will be available for teaching is estimated. Finally,

1

we estimate the number of teachers who can be expected to re-enter teaching if incentives remain the same as they have been in the seven years for which there is re-entry data from STRS.

In the third section, we evaluate three often discussed educational reforms for their effect on teacher supply and demand, as follows:

1. decreasing pupil/teacher ratios from current levels to 20 to 1

2. eliminating emergency credentials

3. requiring teachers to teach only in their areas of expertise

The last section summarizes expected demand and supply through 1989-90 and 1994-95 for current pupil/teacher ratios and for the educational quality assumptions discussed in section three.

# Demand Projections

Keeping pupil/teacher ratios constant, we first calculated demand due to increased enrollment, based on State Department of Finance (DOF) enrollment projections through 1994-95. We projected demand separately for elementary and secondary public schools and for all California counties. Next we calculated demand due to attrition and retirements by applying State Teachers' Retirement System (STRS) attrition and retirement rates to the total 1984-85 K-12 teacher work force as determined from the California Basic Educational Data System (CBEDS). Finally, we examined demand for math, science, and bilingual teachers.

## Projected Enrollment Growth

K-12 enrollment (Chart 2 and Appendix Table 1) is expected to grow 11 percent between 1984-85 and 1989-90, an increase of 465,000 students.[1] Elementary (grades K-8) enrollment will increase 18 percent (506,000), but secondary (grades 9-12) enrollment will decrease 3 percent (42,000).

For the period through 1994-95, K-12 enrollment is expected to increase by 1.08 million students, a 26 percent increase over 1984-85. Thirty-two percent growth in elementary enrollment is projected during this period (897,000); secondary enrollment will increase 14 percent or 184,000 students.

Enrollment is not increasing evenly throughout California. The projected change in enrollment ranges between an increase of 86 percent in Nevada County to a decrease of almost 9 percent in Marin County. Nearly one-fourth of the total projected ten year growth in enrollment will occur in Los Angeles County (Appendix Table 2).

---

[1]DOF's progression ratios which use three year weighted averages emphasize recent historical enrollments. The 1985 DOF projections used in this analysis predict a lower rate of increase in total enrollment than the 1982 projections used in earlier studies. The 1985 elementary enrollment projections to 1990-91 are 166,539 less than the 1982 projection, while secondary enrollments are 94,116 more than the 1982 projection. As a result, demand for elementary teachers is lower than earlier projections, while secondary teacher demand is greater.

## Chart 2

### California Public School Enrollment Projections,
### 1984-85 to 1994-95

K-12 Total

Grades K-8

Grades 9-12

Enrollment
(millions)

6

5

4

3

2

1

84-85  85-86  86-87  87-88  88-89  89-90  90-91  91-92  92-93  93-94  94-95

Year
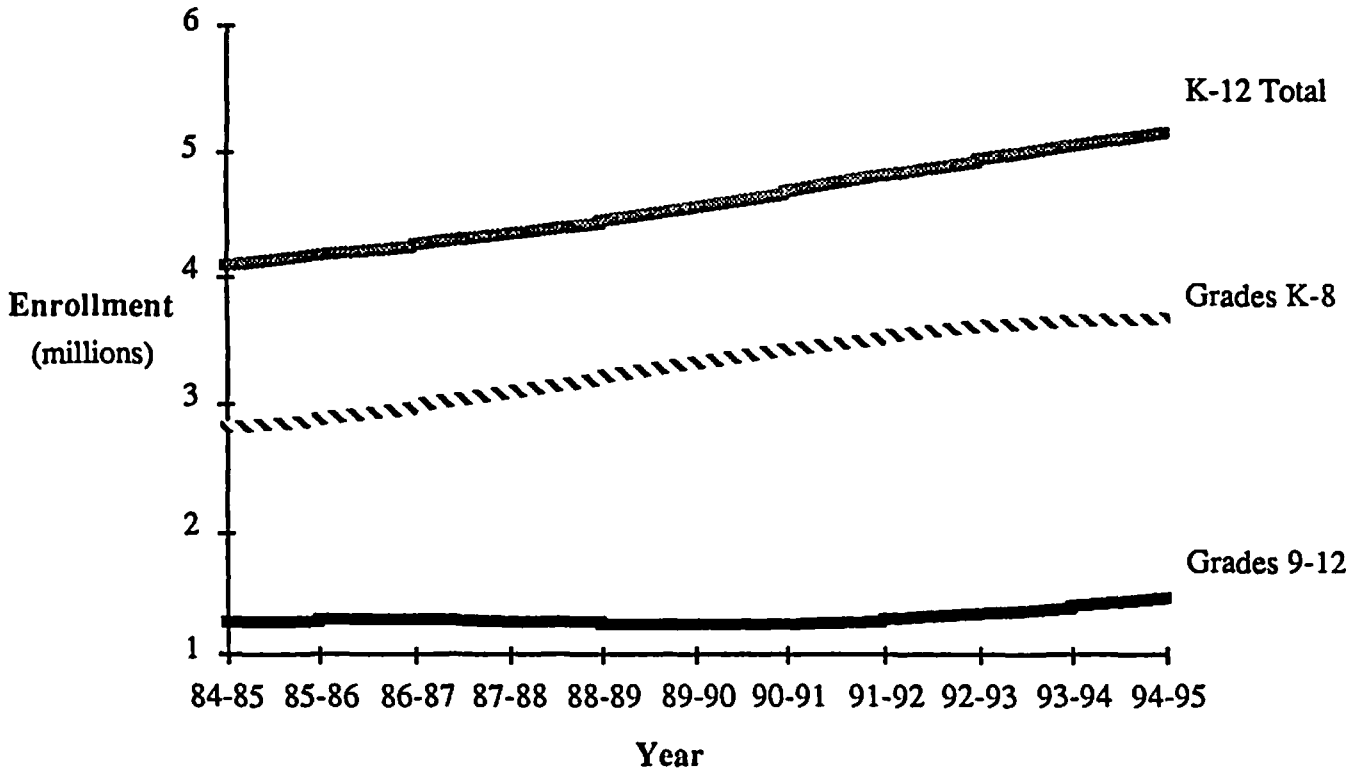
| Summary of Enrollment Projections (millions) | | | |
|---|---|---|---|
| | K-8 | 9-12 | K-12 |
| 1984-85 | 2.80 | 1.28 | 4.08 |
| 1989-90 | 3.31 | 1.24 | 4.55 |
| 1994-95 | 3.70 | 1.46 | 5.16 |

Source: California State Department of Finance.

## Calculating Pupil/Teacher Ratios

Pupil/teacher ratios have been calculated using 1984-85 CBEDS teacher data and Department of Finance (DOF) enrollment information.[2] The number of teachers is reported in full-time equivalents (FTEs) rather than the actual number of individuals. Pupil/teacher ratios are held constant for demand projections in this section. Demand under an alternative class size assumption is reported in section three.

Elementary FTEs include teachers responsible for classroom instruction in grades K-8 but not their administrative, adult education, or special education assignments. In 1984-85 there were 117,236 FTE elementary positions. The elementary pupil/teacher ratio was 23.89 to 1.

Similarly, secondary FTEs include classroom teaching responsibilities but exclude periods assigned for administration, adult education, and special education. There were 45,526 secondary FTEs in 1984-85. The secondary pupil/teacher ratio was 28.08 to 1.

## Demand Projections Due to Enrollment Growth and Attrition/Retirement

To project demand for teachers, we estimated (1) the number of teachers needed as a result of enrollment growth (maintaining current pupil/teacher ratios) and (2) the number of teachers needed to replace those who leave teaching through attrition and retirement.

### Enrollment Growth

*Five Year Demand.* Assuming that pupil/teacher ratios remain constant, California will need to locate and train 21,200 additional elementary teachers through 1989-90 to accommodate enrollment growth. Since secondary enrollment will decrease in the years through 1989-90, 1,400 fewer teachers will be needed to maintain current secondary pupil/teacher ratios. *Thus, through 1989-90 a total of 19,800 K-12 teachers will be needed to accomodate enrollment growth and maintain current pupil/teacher ratios* (Chart 3 and Appendix Tables 3 and 4).

*Ten Year Demand.* For the period through 1994-95, 37,500 new elementary teachers will be needed due to increased enrollment. Since secondary enrollment will begin to increase in 1990-91, 6,500 additional teachers will be needed to maintain current

---

[2]DOF projections excluded special education, adult, and Regional Occupation Centers (ROC/ROP) enrollment. We have, therefore, excluded these teachers as well. Thus, our pupil/teacher ratios differ from previously published ratios which included these teachers, but not their pupils. We have also included teachers of departmentalized junior high schools in K-8 ratios rather than in secondary ratios.

# Chart 3

## Annual Demand Due to Enrollment Growth

**FTEs Needed for Enrollment Growth**
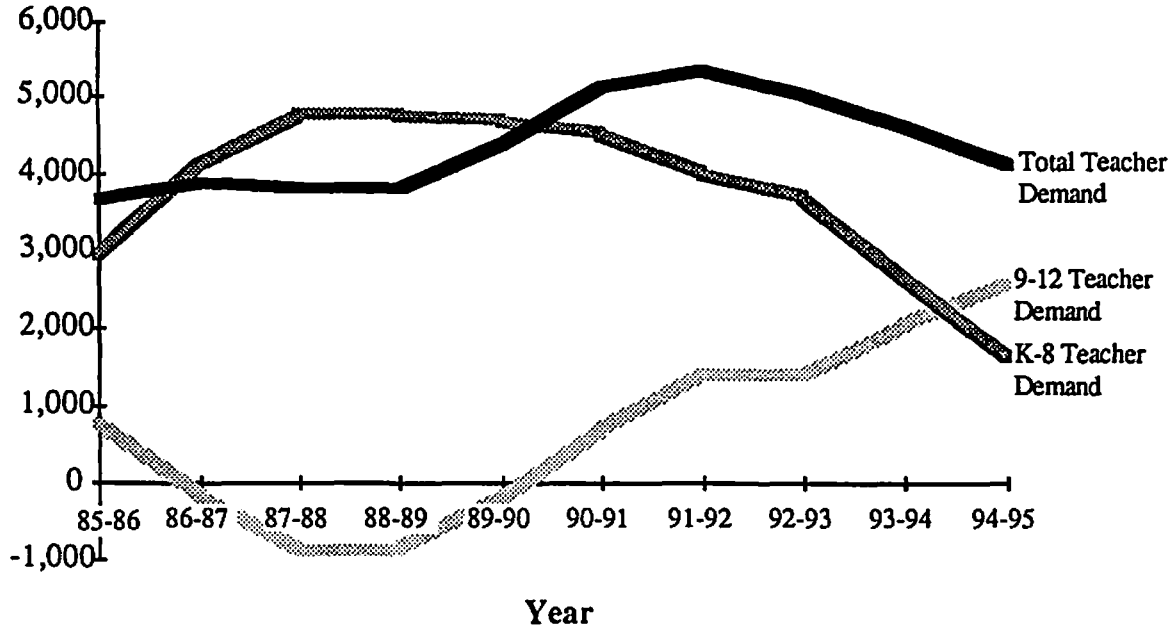


|  | Summary of Total Demand Due to Enrollment Growth | | |
|---|---|---|---|
|  | K-8 | 9-12 | K-12 |
| Through 1989-90 | 21,200 | -1,400 | 19,800 |
| Through 1994-95 | 37,500 | 6,500 | 44,000 |

6

pupil/teacher ratios through this period. *Thus, through 1994-95 California will need an additional 44,000 teachers due to enrollment growth alone, 85 percent of whom will be elementary (K-8) teachers* (Chart 3 and Apppendix Tables 3 and 4).

## Differences Among Counties

Eleven of California's 58 counties account for 70 percent of demand due to elementary enrollment growth. Since enrollment growth and pupil/teacher ratios vary widely between counties, we projected elementary and secondary five and ten year demand due to growth for each county in California, assuming constant pupil/teacher ratios from CBEDS. The projections are found in Appendix Table 5.

Eleven counties will experience enrollment growth greater than 50 percent in the next ten years. Three are in Southern California (San Bernardino, Riverside, and San Luis Obispo). Enrollment growth in six eastern California counties (Nevada, Placer, El Dorado, Calaveras, Mariposa, and Mono), one Central Valley county (San Joaquin), and Lake County will also exceed 50 percent.

Enrollment in seven Bay Area counties (Marin, San Francisco, Alameda, Contra Costa, San Mateo, Santa Clara, and Napa) will grow less than 20 percent, as will Orange, Plumas, Sierra, Yuba, Alpine, Inyo, Humboldt, Del Norte, and Siskiyou counties. Enrollment in the remaining 31 counties is expected to grow between 20 percent and 50 percent.

Of course, the rate of growth alone does not indicate the magnitude of teacher demand faced by individual counties. Nevada County will require only an additional 300 teachers through 1994-95 to meet the demand from its 86 percent enrollment growth. Los Angeles County, with a projected enrollment increase of just over 20 percent, will require 10,000 new teachers through 1994-95. In fact, Los Angeles County's growth will account for nearly 23 percent of California's demand for new teachers due to enrollment growth.

## Attrition and Retirement

Teacher retirements are increasing both in absolute numbers and as a percentage of active teachers. In addition, teachers are retiring at younger ages and after fewer years teaching than was previously the case. In 1971 the average teacher retired at 62.2 years of age, while in 1983-84 the average age at retirement was 60.6. The average years of service for all teachers in 1971 was 26.3. In 1984 the average was 24.1. In 1977-78, 1.5 percent of STRS members retired; in 1983-84, 2.3 percent retired.

In contrast, STRS records indicate that attrition has declined over the past seven years. Nonetheless, 77.6 percent of total demand through 1989-90 is due to attrition. We projected attrition and retirements by two methods:

7

1. Using the mean of the annual rates of attrition for the last seven years from STRS data base (Method 1).

2. Using the trend (from a linear regression) of these rates of attrition from STRS (Method 2).

Each method estimates attrition rates from STRS and applies these rates to the number of FTEs required to maintain current pupil/teacher ratios through 1989-90 and 1994-95. Method 1 uses a constant attrition rate of 7.67 percent for these projection periods. This is the average attrition rate for STRS during the years 1977-78 to 1983-84. Method 2 uses a declining rate of attrition for the ten year period. The rate ranges from 7 percent in 1984-85 to 5.6 percent in 1994-95. *We believe that Method 1 provides an upper bound while Method 2 provides a lower bound for the rate of attrition.*

Using the two methods, it is estimated that between 57,600 and 65,300 new teachers will be needed to replace those lost to attrition and retirement through 1989-90. Seventy-three percent of this demand (between 42,200 FTEs and 47,900 FTEs) is at the elementary (K-8) level. Demand for attrition at the secondary level is between 15,400 and 17,400 FTEs (Charts 4 and 5, Appendix Tables 6 and 7).

For the period through 1994-95, between 115,600 and 139,300 teachers will be needed to replace all teachers who leave or retire. At the elementary level, between 86,300 and 104,000 FTEs will be needed. At the secondary level, between 29,300 and 35,200 FTEs will be needed to replace loss due to attrition for this period (Charts 4 and 5, Appendix Tables 6 and 7).

Enrollment Growth and Attrition/Retirement Combined

Total projected demand for growth and attrition combined, by Method 1, using the average attrition rate of 7.67 percent, is estimated to be 69,100 elementary teachers and 16,000 secondary teachers through 1989-90. By Method 2, the projected demand is somewhat lower: 63,400 elementary teachers and 13,900 secondary teachers. *Thus, between 77,300 and 85,000 K-12 teachers will be needed by 1989-90, and between 159,700 and 183,400 by 1994-95, for growth and attrition combined* (Chart 6).

**Demand for Math, Science, and Spanish Bilingual Teachers**

Every report on teacher shortage[3] indicates serious shortages for math and science teachers. Although accurate demand projections cannot be calculated from existing data,

---

[3]For example, Teacher Shortage Loan Assumption Program 1984-85, and Kaye 1985.

8

## Chart 4

## Annual Teacher Demand Due to Attrition, Method 1

### (Average Annual STRS Attrition Rates, 1977-78 to 1983-84)
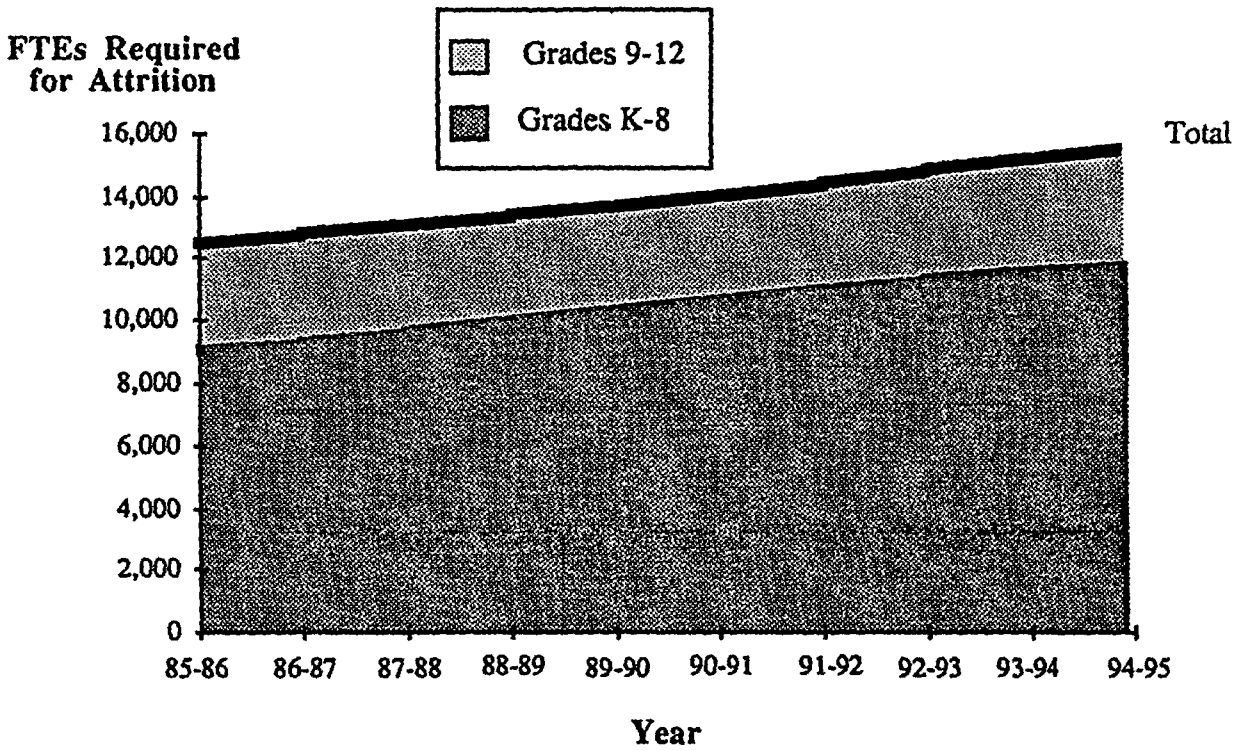


| Summary of Total Demand Due to Attrition, Method 1 | | | |
|---|---|---|---|
| | K-8 | 9-12 | K-12 |
| Through 1989-90 | 47,900 | 17,434 | 65,334 |
| Through 1994-95 | 104,049 | 35,213 | 139,262 |

## Chart 5

### Annual Teacher Demand Due to Attrition, Method 2

(Trend of Averages of STRS Annual Attrition Rates, 1977-78 to 1983-84)
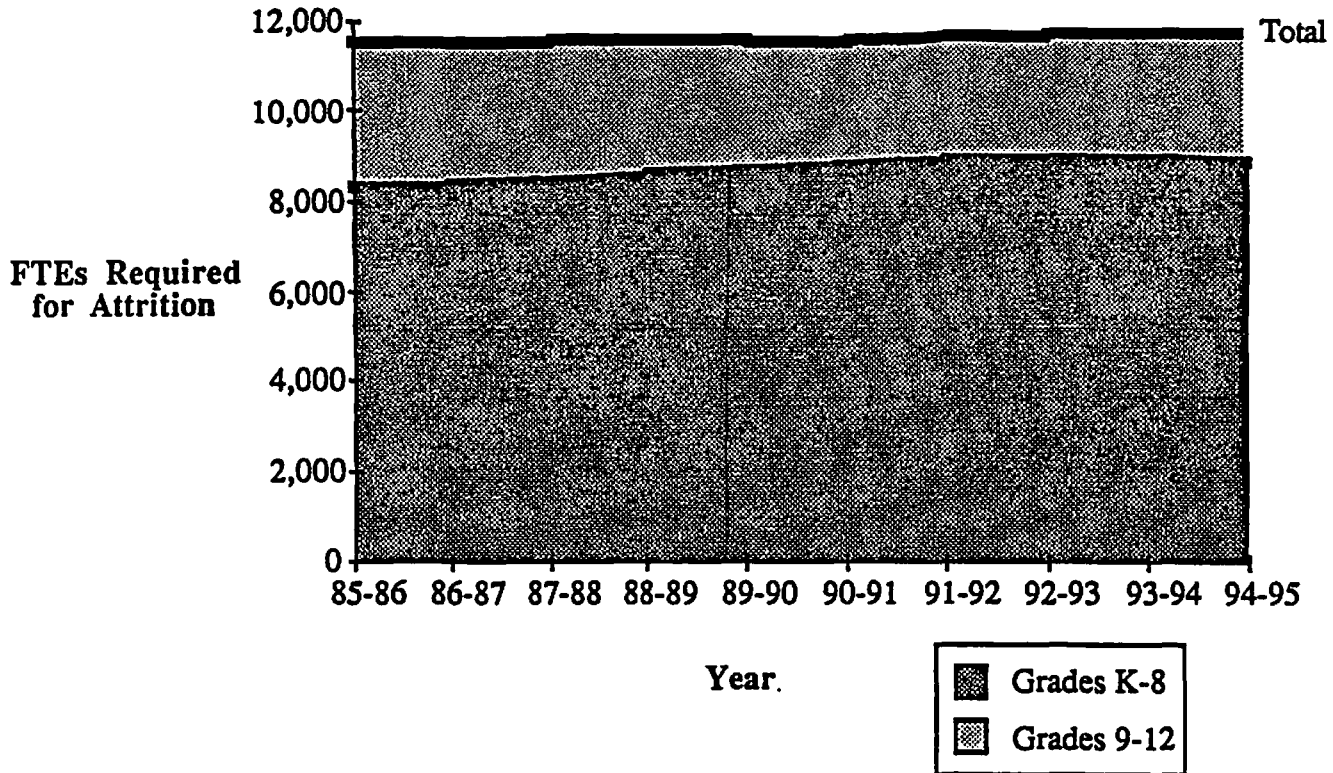


| Summary of Total Demand Due to Attrition, Method 2 | | | |
|---|---|---|---|
| | K-8 | 9-12 | K-12 |
| Through 1989-90 | 42,226 | 17,434 | 57,623 |
| Through 1994-95 | 86,296 | 35,213 | 155,645 |

## Chart 6

### Total Teacher Demand (FTEs)
### Due to Enrollment Growth and Attrition



Legend:
- Demand Due to Attrition
- Demand Due to Enrollment Growth
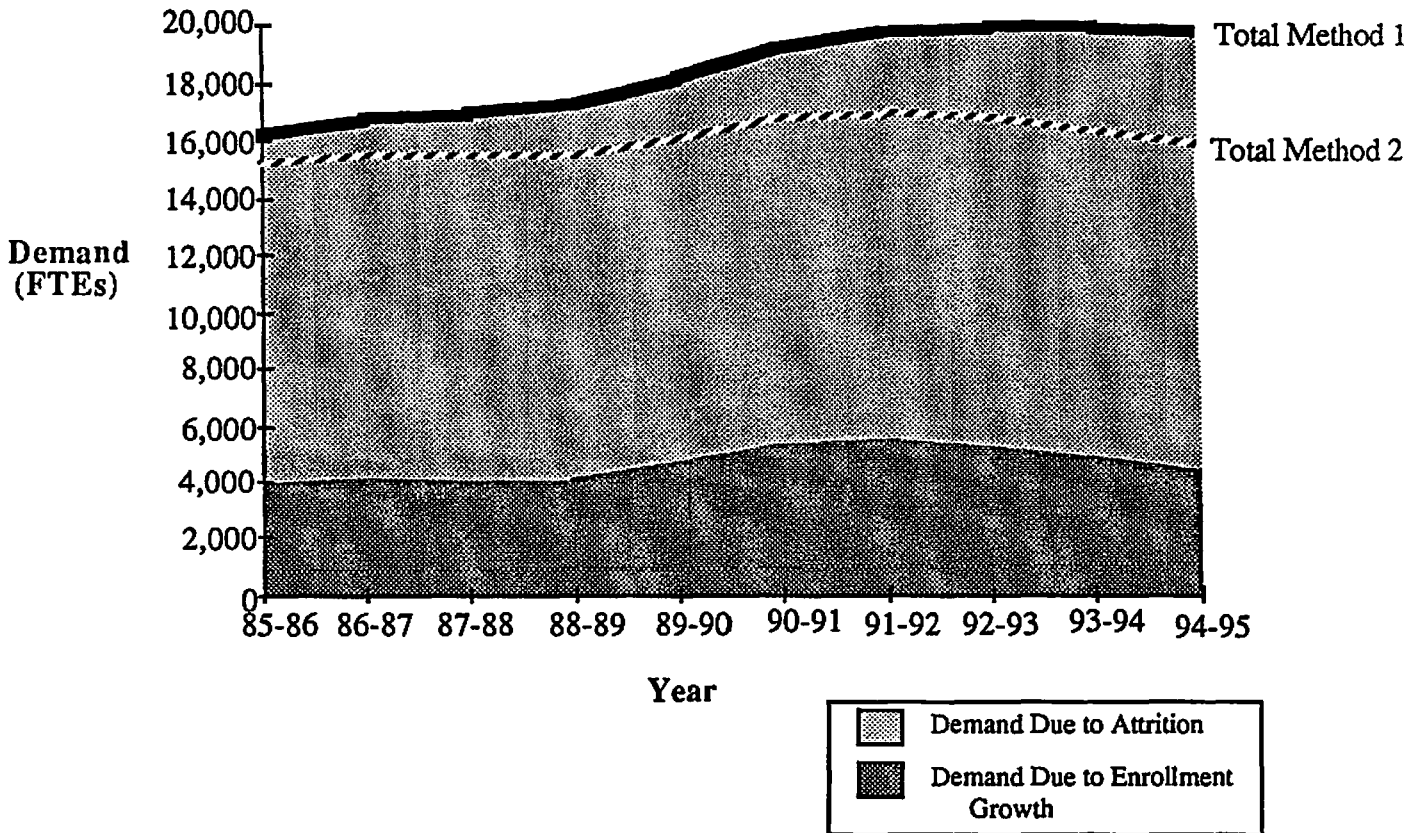
| Summary of Total Demand Due to Growth and Attrition | | |
|---|---|---|
| | Method 1 | Method 2 |
| K-8 through 1989-90 | 69,102 | 63,428 |
| 9-12 through 1989-90 | 15,950 | 13,914 |
| K-12 through 1989-90 | 85,052 | 77,342 |
| K-8 through 1994-95 | 141,599 | 123,846 |
| 9-12 through 1994-95 | 41,761 | 35,897 |
| K-12 through 1994-95 | 183,360 | 159,743 |

11

those reported by the Teacher Shortage Loan Assumption Program are probably reasonably accurate.

Of 765 districts eligible[4] to participate in the Teacher Shortage Loan Assumption Program (TSLAP) in 1985, 670 responded to a survey by TSLAP. Three hundred sixty-seven districts reported shortages in secondary teaching fields. (Three hundred and three districts reported no shortages. The remainder did not respond.) Between 1983-84 and 1984-85 increased shortages were reported in six subject areas (bilingual, English/language arts, mathematics, music, reading, and science). Shortages were reported to have declined in ten areas and remained unchanged in two.

The most severe shortage was reported in math, which had a total shortage of 965 teachers (885 teachers not holding certificates, 80 positions vacant) compared to 8,352 math teachers employed in responding districts, or approximately 12 percent. Four hundred teachers without appropriate certificates and 40 vacant positions, of a total of 5,446 science teachers employed, added to an eight percent shortage of science teachers. Altogether, four percent of secondary teachers did not hold appropriate certificates and less than one percent of secondary positions were vacant in the reporting districts.

Demand for bilingual teachers can be expected to increase as the proportion of limited-English-proficient (LEP) students increases. The number of LEP students increased six percent or more in each of the last three years, following three years when growth was 13 percent or greater.[5] Bilingual teachers are required if 10 or more students speaking the same language are in the same grade level in the same school. The State Department of Education (SDE) reported that 524,000 LEP students, 73 percent of whom were Spanish speaking, were enrolled in K-12 classes in spring 1985.[6]

The total demand for Spanish bilingual teachers was 10,967. Fifty-one percent of the demand was met by credentialed teachers, 42 percent by teachers with waivers,[7] and 8 percent of demand was unmet. For the next largest LEP group, Vietnamese, only 213 teachers were required, but 93 percent of demand was met by teachers with waivers. Mandarin Chinese was the only language for which a supply of credentialed teachers exceeded demand.

---

[4] Elementary districts with departmentalized seventh and eighth grades, and high school and unified districts were eligible.

[5] State Department of Education 1985. DATA/BICAL Reports 85-2; 85-9C. Pailthorp and Gold 1985.

[6] *Ibid.*

[7] Waivers allow teachers who agree to learn the language within six years to teach bilingual classes when certified bilingual teachers are not available.

LEP enrollment is concentrated in six counties (Los Angeles, Orange, San Diego, San Francisco, Alameda, and Santa Clara) which contain 72 percent of California's LEP students. Forty-six percent of the state's LEP population is in Los Angeles County, where LEP students account for 19 percent of the county's student population. The next highest number of LEP students is found in Orange County, which contains eight percent of California's LEP population. Four counties (San Francisco, Monterey, Imperial, and San Benito) have LEP enrollments larger than 20 percent of total county enrollment. In 11 other counties, LEP students account for more than 10 percent of total county enrollment.

Another indication of shortage is the number of emergency, long-term-substitute and limited-assignment credentials issued. Summary statistics are not yet available. Partial information from the Commission on Teacher Credentialing (CTC) indicates that 290 limited-assignment and 402 long-term-substitute math credentials were issued in 1983-84, four times the number of single-subject credentials issued in math that year (168). Only one in five new math teachers is fully credentialed, even if all newly credentialed math teachers find teaching jobs.

# Supply Projections

It is much more difficult to develop a reasonable estimate of teacher supply than to project demand. Estimating supply requires more assumptions and more uncertainty. Not everyone who receives a first teaching credential is available to teach. Teachers also move in and out of the teaching work force frequently. Even the rate of credential renewal cannot be a proxy for supply. Many people who have never taught keep their credentials up to date as a kind of insurance policy.

Given these constraints we estimated supply in two ways:

*Method 1:*    *By estimating the likelihood that members of four supply groups will actually teach.*

*Method 2:*    *By using information on entries and returns to the active teacher work force from State Teachers' Retirement System (STRS) records.*

## *Method 1: Estimating Supply from Four Sources*

There are four sources of teacher supply:

1. Recent graduates of California credential programs.

2. Credential holders from out of state.

3. College graduates who pass CBEST and obtain emergency credentials.

4. Teachers returning after a period of time away from teaching (the so-called reserve pool).

An estimate of the annual contribution to teacher supply of each of these four sources is developed below.

## Recent Graduates of California Credential Programs

Although enrollment in teacher training programs has increased, the number of credentials issued has decreased in the last three years. CTC issued 14,210 first single- (secondary) and multiple-subject (elementary) credentials between 1981-82 and 1983-84 to

14

students from California teacher training institutions (Chart 7).[8] The number issued declined 23 percent between 1981-82 and 1983-84.

In contrast to the decline in the number of credentials issued, first time enrollment in credential programs increased 11 percent between 1982-83 and 1983-84. Informal reports indicate that enrollment increased more than 11 percent in 1985-86. Yet more than two times as many people were first enrolled as received credentials from California schools of education in 1983-84 (Chart 8). It is not clear why fewer credentials are being issued even though enrollment is increasing. The discrepancy may result from comparing different cohorts of credential candidates or from a declining rate of completion of teacher training programs. Available data does not distinguish among these possibilities. Despite the ambiguity, we may safely anticipate that a larger pool of teacher trainees will eventually result in a larger number of credentials issued.

Newly Credentialed Teachers

Although the number of first credentials issued indicates how many people might be available to teach, not all new teachers actually enter teaching. Some cannot find a job in their area of specialization or within commuting distance of their homes; others decide that teaching is not for them. We estimated the proportion of new teachers who actually taught from a stratified random sample of first-credential recipients matched to STRS membership data.

Chart 9 (and Appendix Table 8) shows that between 45 percent and 58 percent of credential recipients from the years 1981-82 to 1984-85 taught (active) in 1984-85, and between 20 percent and 32 percent worked less than 10 days per 40 day pay period (non-member). In addition, some of these *new* credential holders had already resigned (refund) or had taken a leave without pay (inactive). Of all the 608 new credential holders, 302 (50 percent) taught in 1984-85. Some earnings were reported to the retirement system for another 150 (25 percent) in 1984-85. One hundred twenty-four, or 20 percent, had never worked for pay in a public school system. Based on this sample, 50 percent of new credential recipients (11,500) taught in 1984-85.

The age range of "first ever" credential recipients in our sample is nearly as wide as that of the active teaching work force. People as young as 23 and as old as 67 obtained first credentials between 1981-82 and 1984-85. The average age was 31.8. Single-subject credentials were earned by 45 percent of the sample, while 55 percent earned multiple-subject credentials.

---

[8] Commission on Teacher Credentialing. CTC compiles statistics separately for "first ever" credentials (the first credential of any type received by an individual), new (the first of a particular type for an individual), and emergency credentials. Therefore, we can estimate the number of persons first available in any one year for teaching.

## Chart 7

### First Credentials Recommended
### by California Training Institutions

**Credentials
Recommended**



Multiple Subject
Single Subject

| | Multiple Subject | Single Subject |
|---|---|---|
| 81-82 | 3,053 | 2,174 |
| 82-83 | 3,003 | 1,950 |
| 83-84 | 2,496 | 1,534 |

Year
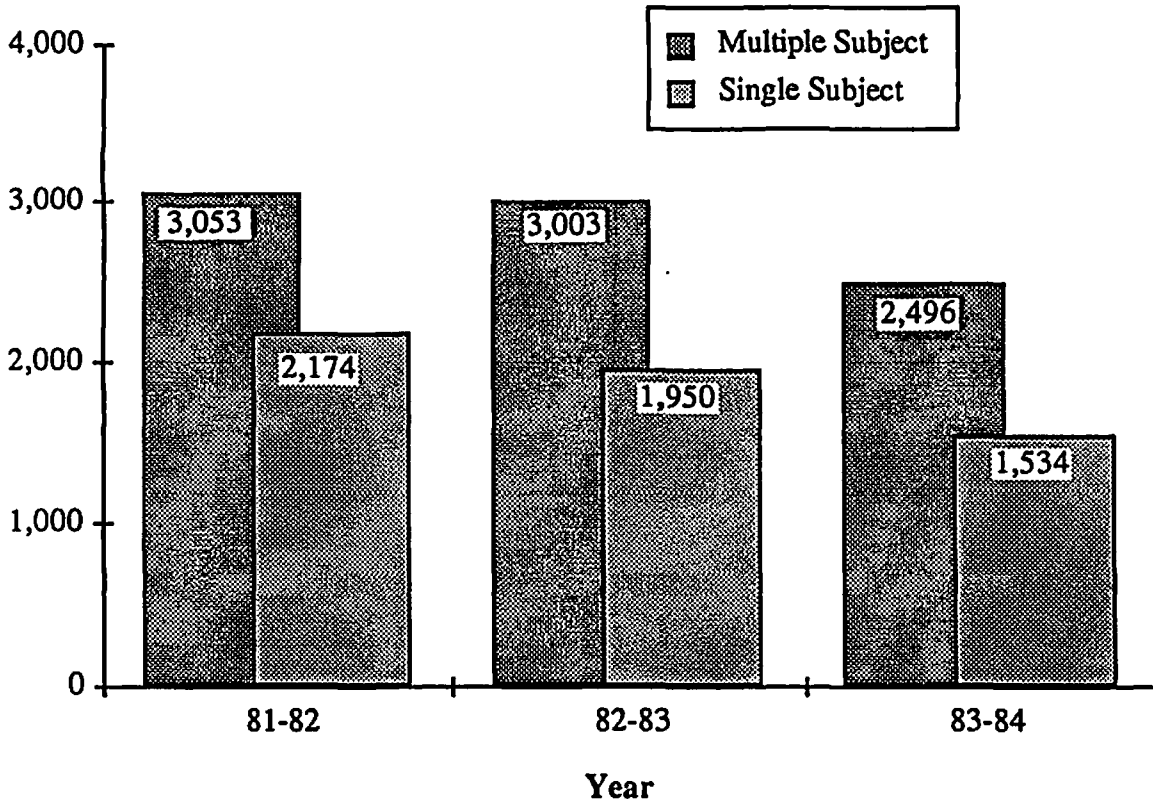
| Summary of First Credentials Recommended 1981-82 to 1983-84 | | |
|---|---|---|
| Total | % Change | Average |
| 14,210 | 22.9% decrease | 4,737 |

Note: Multiple- and single-subject credentials include bilingual emphasis.

Source: Lee Huddy (CTC). Telephone conversation with author, September 18, 1985.

16

## Chart 8

### First-time Enrollment in Single- and Multiple-Subject Credential Programs Compared to First Single- and Multiple-Subject Credentials Issued

**First-time Enrollment and Number of Credentials Issued**

| Year | First-time Enrollments | First-time Credentials Issued |
|------|------|------|
| 1981-82 | 5,857 | 5,227 |
| 1982-83 | 7,854 | 4,953 |
| 1983-84 | 8,699 | 4,030 |

**Year**

☐ First-time Enrollments
☐ First-time Credentials Issued
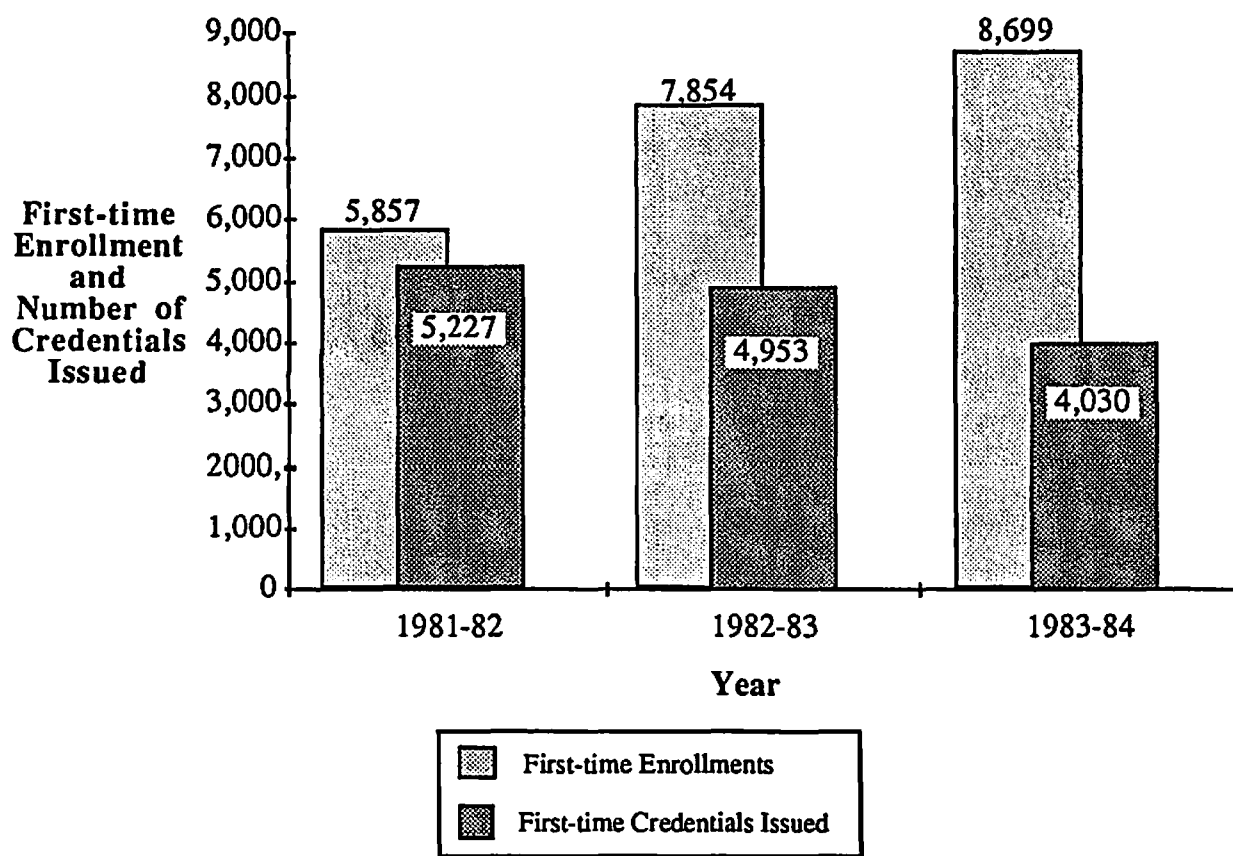
Sources: 1. 1981-82 enrollment extrapolated from CSU enrollment. Marge Lazar (CSU). Personal communication with author, September 1985.

2. Enrollment for 1982-83 to 1983-84 from Dr. Victoria Bernhardt (CTC). Personal communication with author, 1985.

3. Credentials issued from Lee Huddy (CTC). Personal communication with author, 1985.

# Chart 9

## STRS Status of Teachers
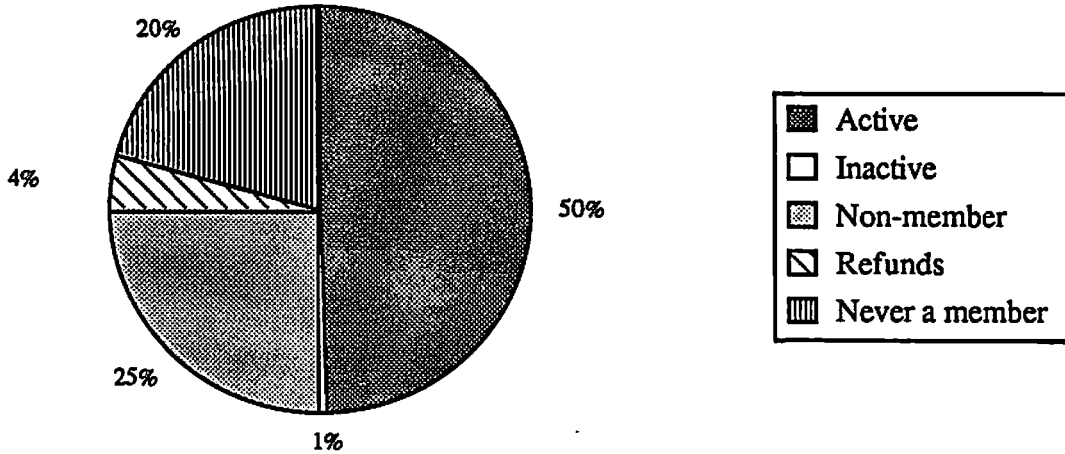


| | |
|---|---|
| ▦ | Active |
| ☐ | Inactive |
| ▨ | Non-member |
| ◺ | Refunds |
| ▥ | Never a member |

### STRS status of teachers first credentialed
### in 1981-82 to 1984-85

(from a random sample of teachers
credentialed by the CTC)



| | |
|---|---|
| ▦ | Active |
| ☐ | Inactive |
| ▨ | Non-member |
| ◺ | Refunds |
| ▥ | Never a member |
| ▦ | Other† |
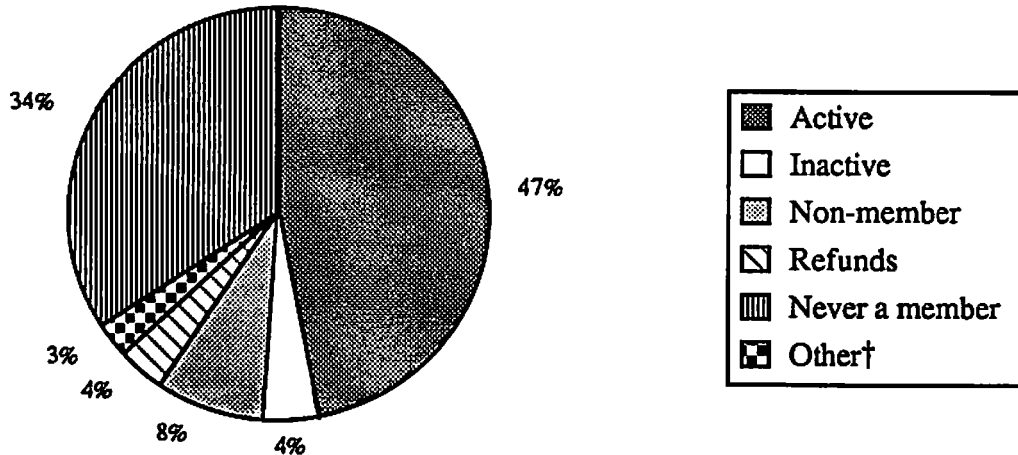
### STRS status of teachers credentialed before 1981-82

(from a random sample of 455 teachers with valid
credentials in the microfiche files of the CTC)

† Other includes separations for retirement, disability, death, and miscellaneous other.

18

## Enrollment in Science and Math Credential Programs

Enrollment in training programs for science and math teachers increased much faster than enrollment in all single-subject programs between 1982-83 and 1983-84. Although the numbers are still very low, the rate of increased enrollment in teacher training programs in science and math is encouraging. Enrollment in science credential programs increased 165 percent between 1981-82 and 1983-84, from 184 to 487 (Chart 10). Math enrollments increased 117 percent in the same time period, from 110 to 239.

## CBEST and Teacher Supply

The California Basic Educational Skills Test (CBEST) may explain the apparent contradiction between increasing enrollments in credential programs and declining numbers of credentials issued. This discrepancy should diminish now that CBEST is required for admission to credential programs.

CBEST was first required for new credential applicants in February 1983 and for enrollees in teacher training programs in fall 1983. CTC attributes some of the decline in the number of credentials issued between 1982-83 and 1983-84 to CBEST. This test may continue to have a dampening effect on the supply of teachers in the absence of incentives to attract more academically skilled candidates or training programs to help others avoid failure.

In 1983-84 only 69 percent of 39,900 (or 27,600) applicants for credentials passed CBEST the first time. Pass rates differ by race. Seventy-nine percent of whites, 55 percent of Asians, 38 percent of Mexican-Americans/Chicanos, and 30 percent of blacks passed on the first attempt. The pass rates for 1984-85 are expected to be about the same or a little higher than those of 1983-84.

## Summary of Supply from New Graduates

An average of 4,737 teachers earned first single- or multiple-subject credentials in each of the last three years. We estimate conservatively, given the rapidly increasing enrollment in teacher training programs and the ambiguity of steadily decreasing numbers of first credentials issued, that this average number of new credentials will continue to be issued each year. We use the average labor force participation rate for new credential holders to project actual number of teachers. An average of 50 percent of recent credential recipients were teaching in 1984-85. This translates into an annual average contribution to supply of 2,400.[9]

---

[9]Richard Watkins (CTC). Personal communication with author.

## Chart 10

### First Enrollment in Single-Subject Credential Programs, Math and Science Credentials
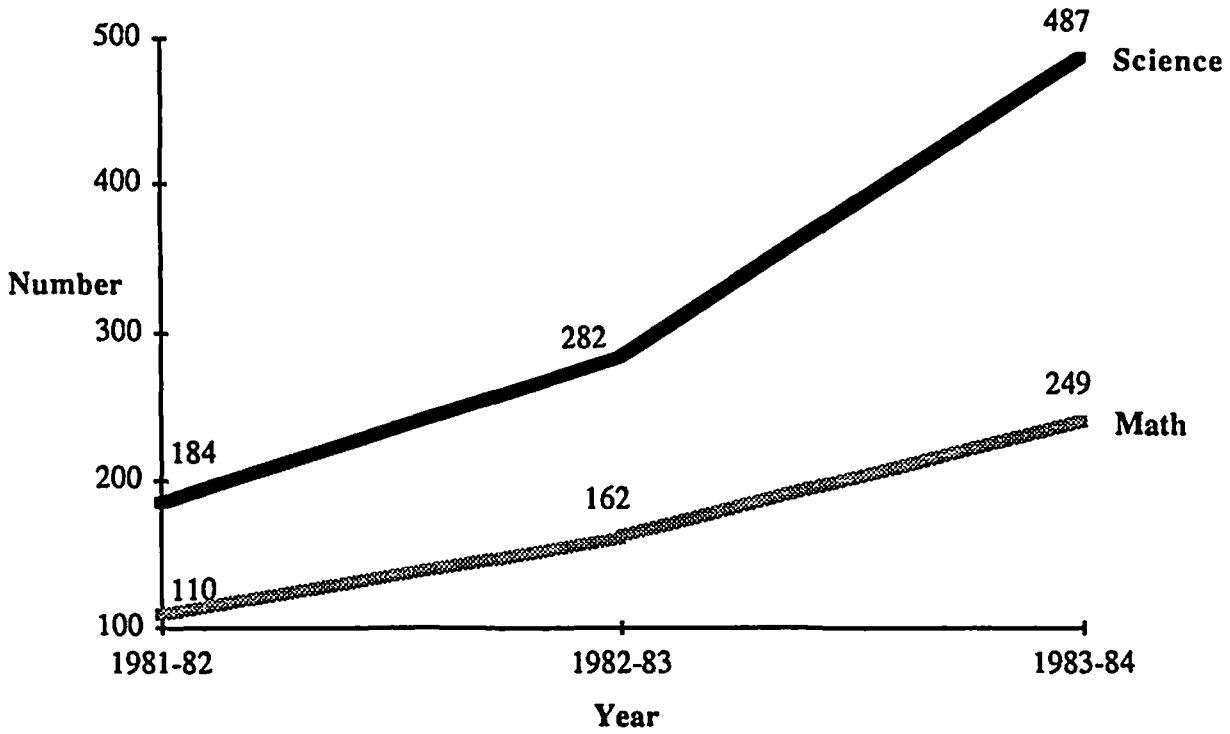


Sources:   1981-82 data from Guthrie and Zusman 1982

1982-83 and 1983-84 data from Lee Huddy (CTC).  Personal communication with author, September 19, 1985.

## Credential Holders From Out of State

Teachers from out of state may apply directly to CTC for regular credentials after passing CBEST. Nine thousand forty-three teachers applied directly to CTC for first single- and multiple-subject credentials in the past three years. Although the annual average number of credentials issued was 3,004, the number issued declined 65 percent in the three year period, from 4,298 in 1981-82 to 1,484 in 1983-84 (Chart 11). The decline was primarily due to the new requirement that out-of-state teachers complete a district-prepared competency test, in lieu of CBEST, for a one-year, non-renewable (OYN) credential. Districts have not had the resources to prepare the tests; consequently, they have reduced out of state recruiting. In 1983-84, 454 OYN credentials were issued.

### Summary of Supply From Out of State

An average of 3,000 first credentials were issued to teachers from out of state who applied directly to CTC for credentials in each of the past three years. We assume about 50 percent of out-of-state teachers enter teaching in California, or 1,500 per year.[10]

## College Graduates Who Pass CBEST and Obtain Emergency Credentials

The number of emergency credentials issued is one measure of teacher shortage because emergency credentials can be issued only if a school board formally finds that no fully credentialed candidates are available. The applicant must have a BA degree, pass CBEST, and be offered a job. Renewal (and re-employment) is contingent on the completion of another statement of need the following year and on completion of six units of teacher preparation courses during the year. CTC issued approximately 3,200 single- and multiple-subjects emergency credentials in each of the last three years.

### Summary of Supply from Emergency Credentials

Emergency credentials are the stopgap between demand and available supply. About 3,200 were issued in each of the last four years. If past trends continue, about one-third of new teacher supply will come from emergency credential holders (3,200).

## The Reserve Pool

Teachers frequently take a year or more away from the classroom (the rate may be as high as 98 percent, based on the random sample discussed below). We are concerned here with teachers who have been out of the classroom for an extended period of time--the so-called "reserve pool."

---

[10]Lee Huddy (CTC). Personal communication with author, September 23, 1985.

# Chart 11

## First Credentials Issued
## Direct (Out of State) Application
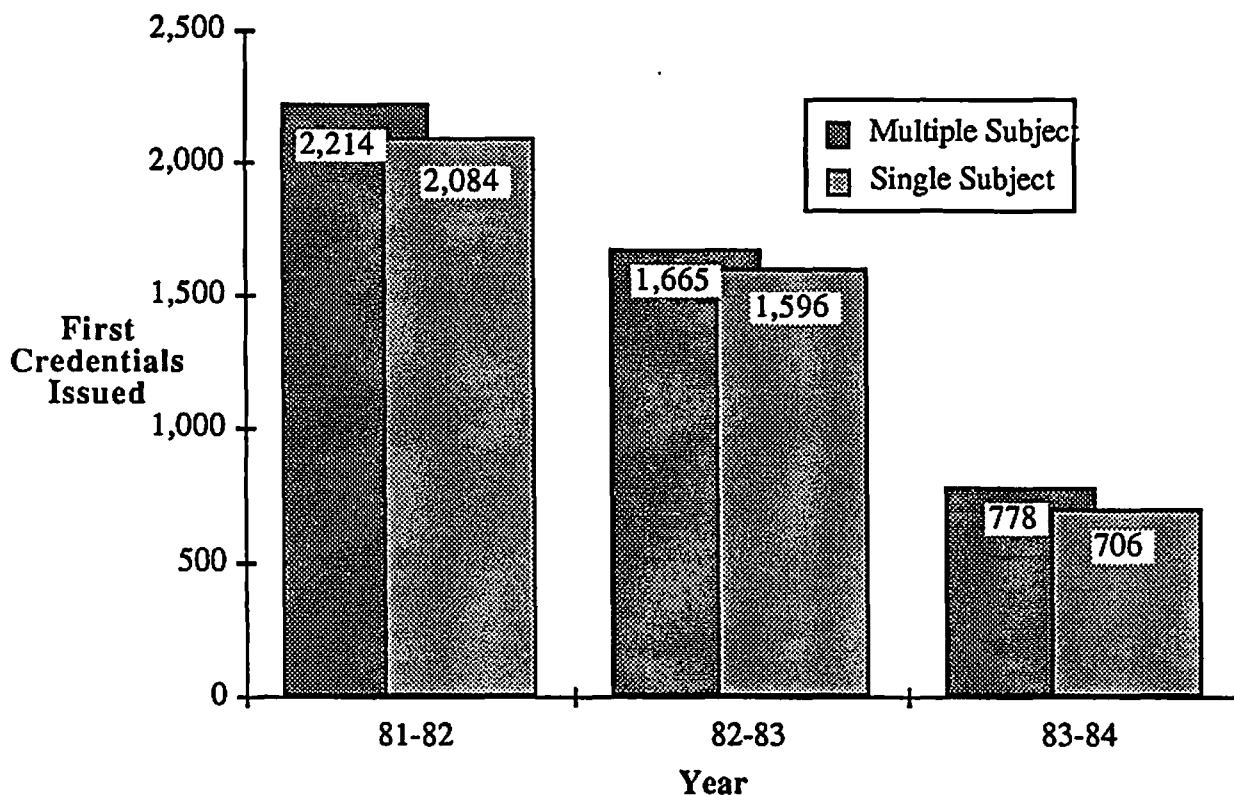


Summary of First Credentials Issued
Direct (Out of State) Application
1981-82 through 1983-84

| Total | % Change | Average |
|-------|----------|---------|
| 9,043 | 65.5% decrease | 3,014 |

Note:   No single- or multiple-subject credentials with bilingual emphasis were issued
to direct applicants in these years.

Source:  Lee Huddy (CTC).  Telephone conversation with author, September 18, 1985.

Faced with the likelihood of a severe teacher shortage, policy makers have looked to the reserve pool as a potential source of trained teachers. Schletchy and Vance (1983) suggest that members of the reserve pool may be better qualified to teach than the average current teacher. They reported that teachers with higher personal and social aspirations and academic ability were more likely to leave teaching. As desirable as it might be for these well educated, aspiring people to return to teaching, how realistic is it to rely on the reserve pool to meet demand for teachers?

We have approached that question from two directions:

1. By approximating the size of the reserve pool, that is the number of people with valid credentials available to teach.

2. By assessing the likelihood that reserve pool members would return to the classroom.

The size of the reserve pool was estimated by comparing a random sample of CTC records of valid credentials with membership files of STRS. We established an estimate of the likelihood that reserve pool members would return to teaching under present conditions from a focus group (Cory, Canapary, McCullough May 1985) and a follow-up telephone survey of former teachers.

The random sample of 907 CTC records indicates that 455 (50 percent) of those who obtained any kind of credential from CTC before 1981-82 still have valid K-12 teaching credentials. Of these 455 with valid credentials, 300 (66 percent) also had records in STRS (Chart 9 and Appendix Table 9).[11]

Of the 455, 47 percent taught (were active) in the 1984-85 school year, 8 percent were non-members, 2 percent had retired, 4 percent had requested refunds, and 0.2 percent had died. Four percent were inactive, and had not taught for from one to more than nine years. The remaining 35 percent did not have records in STRS.

The mean age of the 455 member sample was 43.7, the median age 43, with the range between 22 and 76 years of age. Ten percent of the sample was older than 60, the average retirement age in California.

---

[11] Until 1984-85, STRS purged its files of people who had requested refunds three years before the current year. A portion of the sample who do not now have records in STRS is likely to contain some who requested refunds in the years prior to 1981-82. Therefore, the unmatched group probably over-estimates the number who never taught. (See Appendix 2 for definitions of STRS membership categories.)

From CBEDS we know that 172,853 people taught in K-12 classrooms in 1984-85. Since approximately 47 percent of people with valid credentials are teaching, we estimate that 370,000 people have valid K-12 credentials. The reserve pool is what remains after subtracting the following groups of people who are not available to be new teachers: current public school teachers; private school teachers with credentials; and those who have retired, died, become disabled, or emigrated from California. In 1984-85, 172,853 people taught in public school. Perhaps 50 percent of private school teachers had credentials, or 14,000.[12] Based on the matched sample, 3,500 retired, 300 were deceased, and 700 were disabled. The emigration rate of seven percent for California was estimated from U.S. Census emigration rates.[13] Assuming that teachers emigrate at the same rates as the general population, approximately 12,000 credentialed teachers left the state between 1980 and 1985. However, undoubtedly other teachers left California prior to 1980. Thus, a conservative estimate of the total number of teachers with valid credentials unavailable for teaching is 203,000. This leaves the reserve pool containing, at most, 167,000 teachers with valid K-12 credentials.

Of this estimated reserve pool of 167,000 individuals, what proportion would be likely to return to teaching?

Based on the results of a focus group conducted in April 1985, former teachers would be unlikely to return to teaching under the present circumstances, i.e., current wages and working conditions. Each of the participants judged current salaries to be too low. Large class sizes, outdated and inadequate materials, and lack of auxiliary professional support discouraged the former teachers from resuming teaching. If focus group participants are representative of the reserve pool,[14] no reserve pool members could be expected to return to teaching under present conditions. Based on the focus group alone, the reserve pool is only a puddle.

Forty-two of 60 (70 percent) former teachers surveyed by phone following the focus group indicated they would be unlikely to return to teaching given present working conditions. Eighteen (30 percent) were either looking for teaching positions or would be likely to return if their current jobs ended. In contrast to focus group members, survey respondents mentioned salary less often than working conditions as an impediment to returning to teaching. They

---

[12] Private school enrollment was 540,127 in 1984. State Department of Finance. Pupil/teacher ratio was 19.1 to 1. National Center for Education Statistics, 1985.

[13] Statistical Abstract of the United States, 1985, Table 15. Also, series P-26 No. 82-5-C. 2/84. Local Population Estimates. Bureau of the Census.

[14] Focus group members were chosen to represent the teacher population, in that two were minority, nine female, two male, six former elementary teachers and five former high school teachers.

mentioned "impossible" class sizes, lack of materials and texts, and too wide a range of student abilities and preparation in each class.

For these former teachers, only individual circumstances such as the need to support a family after divorce or a general economic downturn would outweigh their reluctance to return to teaching. Alternatively, salaries greater than $30,000 for a 180 day work year would encourage focus group members and survey respondents to consider teaching.

The likelihood that reserve pool members would return to teaching ranges from 0 to 30 percent based on the two representative samples: the focus group and respondents to the telephone survey. Given these likelihoods, the reserve pool available for teaching is less than 50,100 with current wage structures and working conditions.

### Summary of Supply from the Reserve Pool

The reserve pool may contain at most 167,000 members. As we have shown, perhaps 50,000 of those may realistically be considered part of the teacher supply. Again, estimating conservatively, we project that reserve pool members will return to teaching at the same rate that inactive members of STRS resume teaching.[15] For K-12 that translates to 3,000 teachers per year.

## Summary of Supply Projection by Method 1

Based on the above discussion, the average annual estimate of teachers available is 10,100 as follows:

| | |
|---|---|
| Newly credentialed teachers | 2,400 |
| Out-of-state teachers | 1,500 |
| Emergency credentials | 3,200 |
| Reserve pool | 3,000 |
| Total | 10,100 |

This estimate of 10,100 should be considered a low estimate as the number of new teachers is likely to increase to reflect the recently increased enrollments in credential programs.

### Method 2: Estimating Supply from STRS Entry and Re-entry Rates

As a profession, teaching is one of the easiest to re-enter. The matched sample of CTC and STRS records indicates that 99 percent of teachers credentialed before 1981-82 had

---

[15] The average precentage of inactive, refunded, retired and disabled members who returned to active status in STRS each year is 1.7 percent of the active membership. From CBEDS, 172,853 individuals taught in 1984-85. Approximately 3,000 (172,853 x 1.7 percent) can be expected to enter from the reserve pool.

been inactive for at least one full fiscal year during their career. Of the 20 teachers inactive in 1984-85, seven, or 35 percent, had been inactive more than five years.[16] Unpaid leaves of absence for maternity, personal growth, or additional degrees increase the uncertainty in projecting future teacher supply.

From STRS matrices, we estimated the number of teachers expected to enter active teaching from non-active categories. This type of analysis includes both new and re-entering teachers from all sources. STRS data show changes from inactive (non-member, refund, inactive, retirement, new, disability) statuses to active status during a fiscal year.

In 1977-78, 17,700 teachers (six percent of active teachers for the year) entered the active teaching work force from the six STRS groups (including new teachers). In the most recent year for which we have information, fewer inactive members entered the active teaching work force. Entries as a percentage of the active teaching work force declined to five percent in 1983-84.

The teacher work force appears to be stabilizing. Fewer active members transfer to inactive status or seek refunds. Fewer non-members and inactive members return to teaching. Since retirements are increasing, new teachers will become a larger component of supply.

The reasons for the changes are unclear. Increasing female labor force participation may reduce turnover. The passage of Proposition 13 was followed by increased layoffs, so the amount of turnover in the last seven years may exaggerate long-term trends. The general shortage of teaching jobs meant that fewer teachers were hired. As more jobs become available, experienced teachers may return.

The average rate of entry over the last seven years was 6.5%. Using that figure to project new supply, by 1989-90, 56,000 teachers can be expected to enter and return to the schools (Appendix Table 10). Since the mean entry rate is only 1.09 percent below the mean rate of attrition, the teacher shortage may not be as severe as originally anticipated.

For the period through 1994-95, 119,500 teachers can be expected to enter and return to teaching with current recruitment efforts (Appendix Table 10).

---

[16] This underestimates the number of former teachers. STRS does not maintain records of teachers inactive more than nine years, because the likelihood of their returning to teaching is so small. As mentioned before, they also purged files of teachers who received refunds issued prior to 1981.

# Demand From Three Educational Reforms

Three proposed educational reforms--reducing class size, eliminating emergency credentials, and requiring teachers to teach only in their fields of expertise--will increase demand 70 to 76 percent through 1989-90 and 46 to 50 percent through 1994-95 (Chart 12 and Appendix Table 11).

Reducing pupil/teacher ratios over five years to 20 to 1 at both the elementary and secondary levels would require an additional 49,658 to 50,461 teachers by 1989-90.

Approximately 3,200 emergency single- and multiple-subject credentials are issued each year in California. About one-third are renewed the next year. If emergency credentials are no longer allowed, then about 4,200 more credentialed teachers would be needed.

Approximately six percent of teachers reported they were teaching outside their main area of expertise in 1984-85.[17] There was no statistical difference between the proportions of elementary and secondary teachers who reported teaching outside their area of expertise. If each teacher taught outside his or her area of expertise at least 50 percent of the time, then 4,883 more FTEs would be needed to meet the third standard for educational reform.

The three proposed alternatives would increase demand to between 136,100 and 144,600 for the years through 1989-90 and to between 239,100 and 267,400 for the period through 1994-95.

---

[17] Koppich, Gerritz, and Guthrie 1985.

## Chart 12

### Additional Demand for K-12 Teachers
### Due to Educational Reforms,
### 1984-85 to 1989-90,
### High and Low Projections

**Number**
**(thousands)**

| | Total Demand with Reforms |
| | Demand Under Current Practices |

160 —

144,596

136,083

140 —

120 —

100 —

85,052

80 —

77,342

60 —

40 —

High Projection          Low Projection
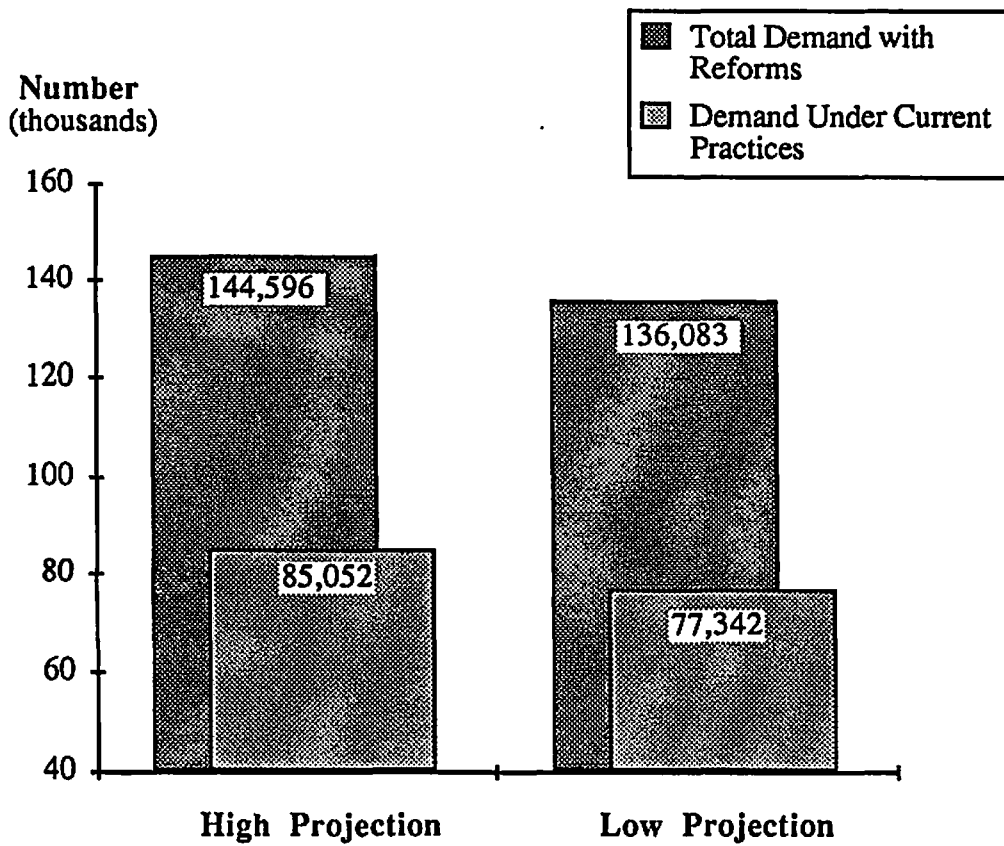
# Projected Shortfall:
## Summary Of Supply and Demand

**Total Demand**

Demand for teachers is expected to be between 77,300 and 85,100 for the period through 1989-90, and between 159,700 and 183,400 for the period through 1994-95.

**Annual Demand**

Between 15,000 and 17,000 new teachers will be needed in each of the next five years to meet demand for growth and attrition.

**Supply: Projection Method 1**

The supply consists of 2,400 individuals with new credentials, 1,500 from out of state, about 3,200 emergency credentials per year, and a reserve pool of 50,000 members, of whom approximately 3,000 may return each year. This totals 10,100 new teachers per year, and this rate is projected to remain constant for 10 years. This may be considered a conservative (low) estimate because even though enrollments in teacher training programs are increasing, our projections assume a constant number of credentials over the next 10 years.

**Supply: Projection Method 2**

From past STRS re-entry rates we anticipate that 56,000 people can be expected to enter teaching in the next five years if current recruitment efforts and policies continue unchanged. Fifty-nine percent of these will be increasing the amount of time they work from occasional to more than half time. The remainder are new teachers (16 percent) or teachers who have taught in the past (25 percent). By 1994-95, 119,000 teachers can be expected to return with current recruitment efforts.

**Supply and Demand: Projected Shortages**

1. Demand will exceed the supply of teachers (Chart 13) by 21,300 to 34,800 FTEs for the period through 1989-90.

2. Demand will exceed the supply of teachers by 40,300 to 82,800 FTEs for the period through 1994-95.

29

# Chart 13

## Projected Shortfall through 1989-90
## With and Without Educational Reforms



Without Educational Reforms | With Educational Reforms | Demand

Shortfall axis values: 10,000; 20,000; 30,000; 40,000; 50,000; 60,000; 70,000; 80,000; 90,000; 100,000

Without Educational Reforms: 21,293 (Best Case); 34,782 (Worst Case)

With Educational Reforms: 80,034 (Best Case); 94,326 (Worst Case)

Legend:
- Worst Case
- Best Case
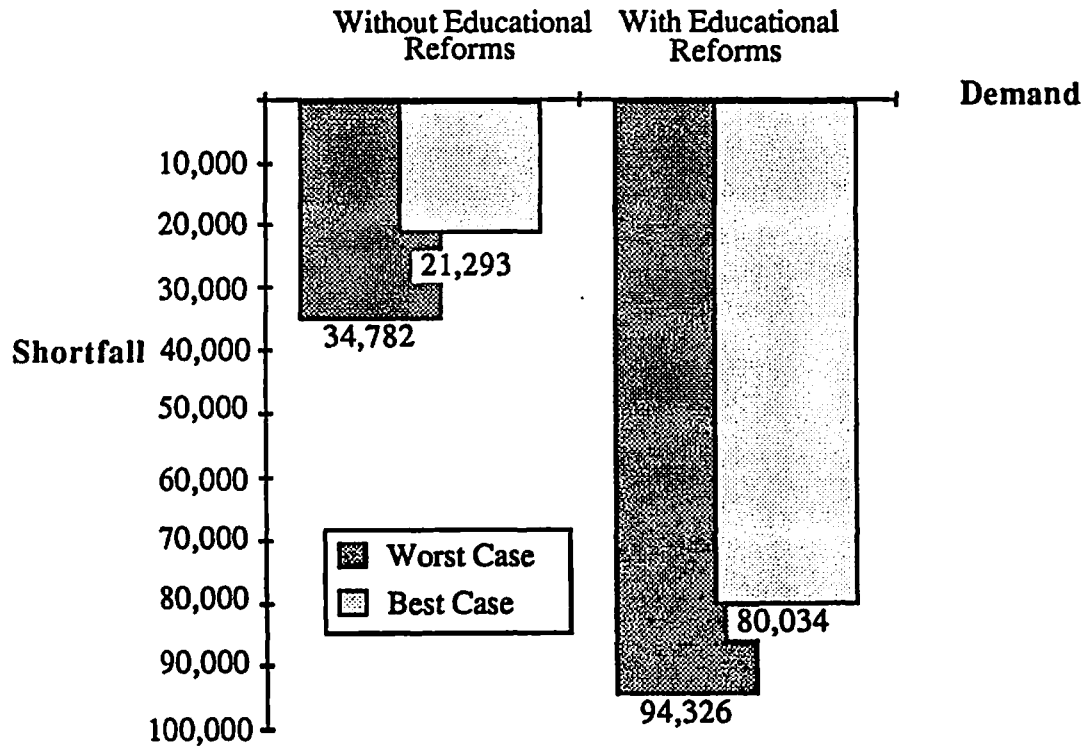
3. If pupil/teachers ratios are lowered to 20 to 1, teaching out of field is curtailed, and emergency credentials are eliminated, the shortage of teachers will increase dramatically.

Using supply projection method 1, the shortfall, the difference between demand (15,500 and 17,000 per year) and supply, (10,100 per year) is between 5,400 and 6,900 teachers per year, or between 27,000 and 34,500 teachers for the period through 1989-90 (Chart 14). Alternatively, if entries are projected from STRS rates alone (supply projection method 2), an average of 11,200 FTEs may be expected to enter and return to teaching each year. This would result in a shortfall of between 4,300 and 5,800 teachers per year, or between 21,500 and 29,000 for this period (Chart 15). Using both methods of forecasting supply, the shortfall, then, can be expected to be between 21,500 and 34,500 through 1989-90.

For the period through 1994-95, the shortfall is between 40,300 and 82,800. Average annual demand for this ten year period is projected to be between 16,000 and 18,300 teachers. If supply is projected conservatively to be 10,100 (method 1), the annual shortfall is between 5,900 and 8,200. Alternatively, if entries are projected from STRS rates (method 2), an average of 11,200 teachers per year may be expected to enter teaching. The shortfall, then, for this projection period is between 4,800 and 7,100 FTEs annually.

The three proposed reforms-- reducing pupil/teacher ratios to 20 to 1, eliminating emergency credentials, and requiring teachers to teach only in their fields of expertise -- would increase the shortfall to between 80,000 and 94,100 FTEs through 1989-90 and between 120,000 and 166,500 FTEs through 1994-95. These numbers represent a 70 to 76 percent increase in total demand for the period ending in 1989-90. However, they represent a 171 to 276 percent increase in the projected shortfall. Clearly, if California is seriously contemplating such reforms, strong incentives to recruit people into teaching will be required.

31

## Chart 14

### Total Demand for Teachers,
### Supply from Four Sources,
### and Shortfall through 1989-90

**Number of Teachers**
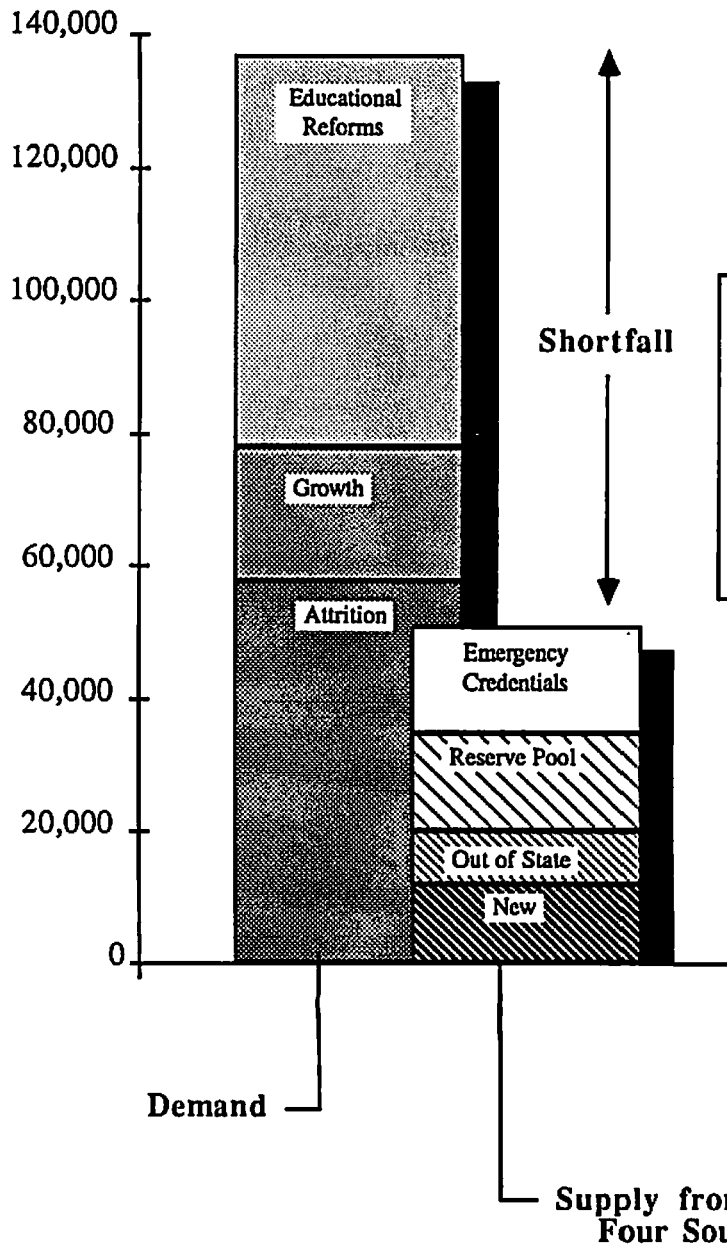


| Summary of Supply, Demand, and Shortfall | | |
|---|---|---|
| | Current Practices | Educational Reforms |
| Demand | 77,342 | 136,083 |
| Supply | 50,500 | 50,500 |
| Shortfall | 26,842 | 85,583 |

Chart 15

**Total Demand for Teachers,
Supply from STRS Re-entry Rates,
and Shortfall through 1989-90**

Number of
Teachers

| | Summary of Supply, Demand, and Shortfall | |
|---|---|---|
| | Current Practices | Educational Reforms |
| Demand | 77,342 | 136,083 |
| Supply | 56,049 | 56,049 |
| Shortfall | 21,243 | 79,934 |

Educational Reforms

Shortfall

Growth

Attrition

STRS

Demand

Supply from STRS
Re-entry Rates
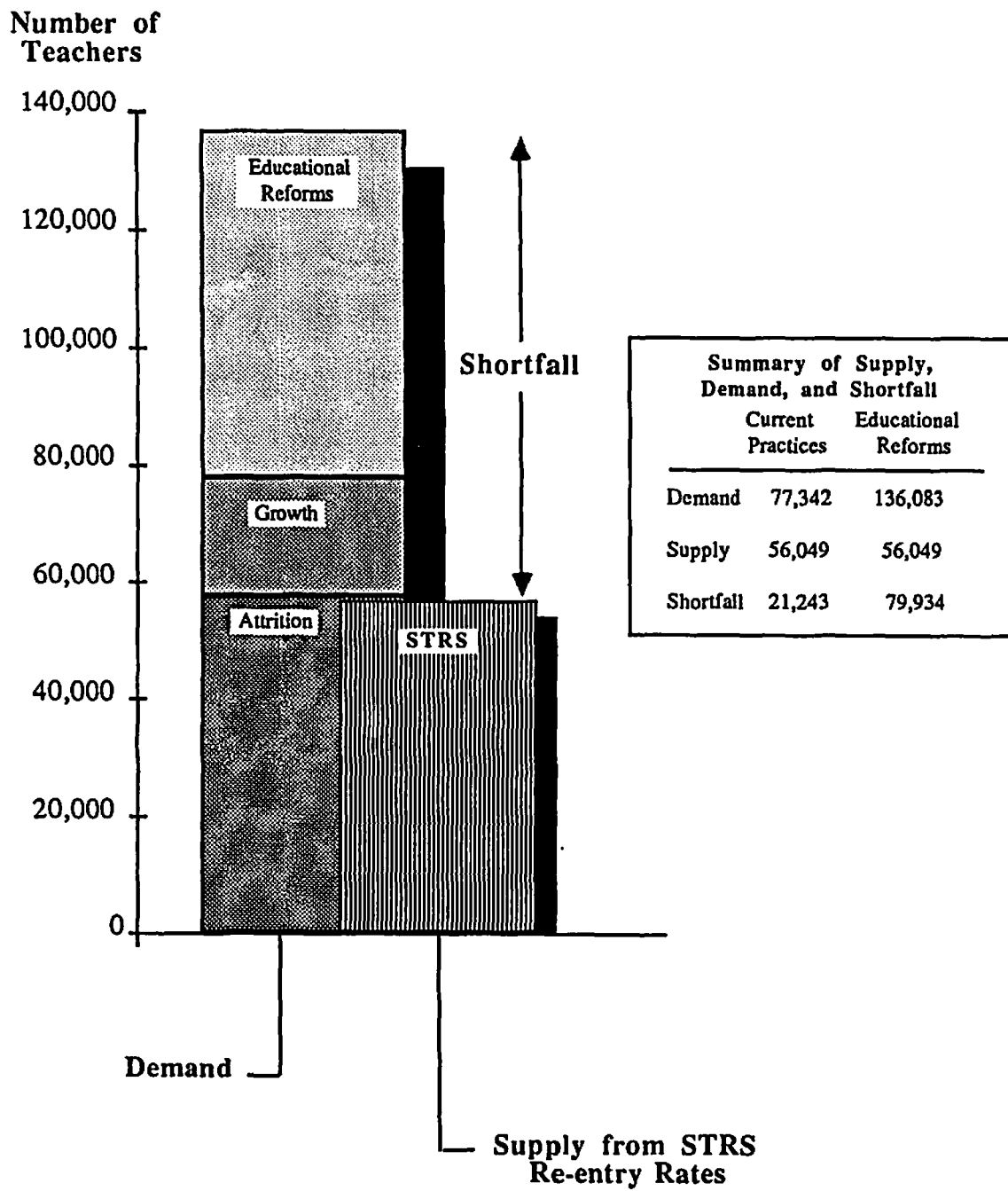
# APPENDIX 1

*Enrollment Projections by County,*
*Projection of FTEs Needed by County, and*
*Miscellaneous Tables*

## Appendix Table 1

### California Public School Enrollment Projections (1985-86 to 1994-95)

| Year | Grades K-8 | Enrollment increase | Percent increase | Grades 9-12 | Enrollment increase | Percent increase | K-12 Total | Enrollment increase | Percent increase |
|---|---|---|---|---|---|---|---|---|---|
| 1984-85 | 2,800,296 | | | 1,278,447 | | | 4,078,743 | | |
| 1985-86 | 2,870,314 | 70,018 | 2.50% | 1,299,559 | 21,112 | 1.65% | 4,169,873 | 91,130 | 2.23% |
| 1986-87 | 2,968,768 | 98,454 | 3.43% | 1,293,804 | -5,755 | -0.44% | 4,262,572 | 92,699 | 2.22% |
| 1987-88 | 3,082,385 | 113,617 | 3.83% | 1,267,982 | -25,822 | -2.00% | 4,350,367 | 87,795 | 2.06% |
| 1988-89 | 3,195,333 | 112,948 | 3.66% | 1,243,084 | -24,898 | -1.96% | 4,438,417 | 88,050 | 2.02% |
| 1989-90 | 3,306,729 | 111,396 | 3.49% | 1,236,793 | -6,291 | -0.51% | 4,543,522 | 105,105 | 2.37% |
| 1990-91 | 3,414,041 | 107,312 | 3.25% | 1,255,563 | 18,770 | 1.52% | 4,669,604 | 126,082 | 2.77% |
| 1991-92 | 3,509,047 | 95,006 | 2.78% | 1,294,090 | 38,527 | 3.07% | 4,803,137 | 133,533 | 2.86% |
| 1992-93 | 3,596,777 | 87,730 | 2.50% | 1,333,122 | 39,032 | 3.02% | 4,929,899 | 126,762 | 2.64% |
| 1993-94 | 3,659,392 | 62,615 | 1.74% | 1,389,946 | 56,824 | 4.26% | 5,049,338 | 119,439 | 2.42% |
| 1994-95 | 3,697,205 | 37,813 | 1.03% | 1,462,322 | 72,376 | 5.21% | 5,159,527 | 110,189 | 2.18% |
| **1985-86 to 1989-90:** | | 506,433 | 18.08% | | -41,654 | -3.26% | | 464,779 | 11.40% |
| **1985-86 to 1994-95:** | | 896,909 | 32.03% | | 183,875 | 14.38% | | 1,080,784 | 26.50% |

37

Source: California State Department of Finance

## Appendix Table 2

## Enrollment Projections by County

| County | K-12 enrollment 1984-85 | Projected enrollment 1989-90 | 5-year projected enrollment increase (%) | Projected enrollment 1994-95 | 10-year projected enrollment increase (%) |
|---|---|---|---|---|---|
| Alameda | 169,820 | 177,607 | 4.59% | 195,566 | 15.16% |
| Alpine | 221 | 248 | 12.22% | 250 | 13.12% |
| Amador | 3,532 | 4,111 | 16.39% | 5,177 | 46.57% |
| Butte | 22,914 | 27,314 | 19.20% | 33,412 | 45.81% |
| Calaveras | 4,354 | 5,521 | 26.80% | 7,505 | 72.37% |
| Colusa | 2,883 | 3,346 | 16.06% | 3,884 | 34.72% |
| Contra Costa | 111,037 | 115,605 | 4.11% | 129,980 | 17.06% |
| Del Norte | 3,279 | 3,596 | 9.67% | 3,789 | 15.55% |
| El Dorado | 17,511 | 21,625 | 23.49% | 27,217 | 55.43% |
| Fresno | 109,506 | 127,282 | 16.23% | 144,717 | 32.15% |
| Glenn | 4,641 | 5,262 | 13.38% | 5,883 | 26.76% |
| Humboldt | 17,736 | 18,565 | 4.67% | 19,572 | 10.35% |
| Imperial | 23,277 | 26,267 | 12.85% | 28,849 | 23.94% |
| Inyo | 3,187 | 3,269 | 2.57% | 3,539 | 11.04% |
| Kern | 87,834 | 107,638 | 22.55% | 124,912 | 42.21% |
| Kings | 16,488 | 18,429 | 11.77% | 20,533 | 24.53% |
| Lake | 7,100 | 9,279 | 30.69% | 12,812 | 80.45% |
| Lassen | 4,300 | 4,849 | 12.77% | 5,389 | 25.33% |
| Los Angeles | 1,239,518 | 1,357,440 | 9.51% | 1,488,187 | 20.06% |
| Madera | 15,310 | 18,714 | 22.23% | 22,408 | 46.36% |
| Marin | 25,279 | 22,116 | -12.51% | 23,061 | -8.77% |
| Mariposa | 2,022 | 2,436 | 20.47% | 3,321 | 64.24% |
| Mendocino | 13,756 | 15,296 | 11.20% | 17,128 | 24.51% |
| Merced | 31,792 | 39,129 | 23.08% | 46,242 | 45.45% |
| Modoc | 1,939 | 2,210 | 13.98% | 2,547 | 31.36% |
| Mono | 1,246 | 1,496 | 20.06% | 1,940 | 55.70% |
| Monterey | 50,724 | 57,130 | 12.63% | 62,344 | 22.91% |
| Napa | 13,538 | 13,711 | 1.28% | 15,057 | 11.22% |
| Nevada | 9,213 | 12,534 | 36.05% | 17,177 | 86.44% |
| Orange | 329,340 | 342,170 | 3.90% | 380,780 | 15.62% |
| Placer | 24,593 | 29,293 | 19.11% | 37,311 | 51.71% |
| Plumas | 3,491 | 3,806 | 9.02% | 4,139 | 18.56% |
| Riverside | 134,678 | 170,245 | 26.41% | 212,309 | 57.64% |
| Sacramento | 142,920 | 166,307 | 16.36% | 195,595 | 36.86% |
| San Benito | 5,754 | 6,388 | 11.02% | 7,154 | 24.33% |
| San Bernardino | 189,632 | 239,100 | 26.09% | 296,124 | 56.16% |
| San Diego | 313,212 | 351,958 | 12.37% | 404,239 | 29.06% |
| San Francisco | 62,730 | 68,650 | 9.44% | 74,168 | 18.23% |
| San Joaquin | 72,308 | 90,206 | 24.75% | 109,627 | 51.61% |
| San Luis Obispo | 24,034 | 29,074 | 20.97% | 36,115 | 50.27% |
| San Mateo | 74,455 | 75,186 | 0.98% | 81,453 | 9.40% |
| Santa Barbara | 44,558 | 47,897 | 7.49% | 53,984 | 21.15% |
| Santa Clara | 215,640 | 220,258 | 2.14% | 239,676 | 11.15% |
| Santa Cruz | 30,366 | 34,377 | 13.21% | 40,245 | 32.53% |
| Shasta | 22,710 | 24,862 | 9.48% | 28,560 | 25.76% |

38

| | | | | | |
|---|---|---|---|---|---|
| Sierra | 679 | 724 | 6.63% | 780 | 14.87% |
| Siskiyou | 8,005 | 8,555 | 6.87% | 9,442 | 17.95% |
| Solano | 46,287 | 53,703 | 16.02% | 62,768 | 35.61% |
| Sonoma | 50,564 | 55,412 | 9.59% | 63,838 | 26.25% |
| Stanislaus | 55,329 | 64,261 | 16.14% | 74,714 | 35.04% |
| Sutter | 10,212 | 11,190 | 9.58% | 12,560 | 22.99% |
| Tehama | 7,677 | 8,967 | 16.80% | 10,558 | 37.53% |
| Trinity | 2,244 | 2,596 | 15.69% | 2,987 | 33.11% |
| Tulare | 57,081 | 67,730 | 18.66% | 78,344 | 37.25% |
| Tuolumne | 6,173 | 6,929 | 12.25% | 8,374 | 35.66% |
| Ventura | 102,232 | 111,136 | 8.71% | 127,127 | 24.35% |
| Yolo | 17,598 | 19,301 | 9.68% | 21,929 | 24.61% |
| Yuba | 10,284 | 11,216 | 9.06% | 12,229 | 18.91% |
| | | | | | |
| State | 4,078,743 | 4,543,522 | 11.40% | 5,159,527 | 26.50% |

Source: State Department of Finance.

## Appendix Table 3

### Teacher Demand Due to Elementary (K-8) Enrollment Growth

|  | Year | K-8 enrollment | Class size | K-8 enrollment growth | FTEs needed for enrollment growth | Cumulative new FTEs required for enrollment growth |
|---|---|---|---|---|---|---|
| Actual | 1984-85 | 2,800,296 | 23.89 |  |  |  |
| Projected | 1985-86 | 2,870,314 | 23.89 | 70,018 | 2,931 | 2,931 |
|  | 1986-87 | 2,968,768 | 23.89 | 98,454 | 4,122 | 7,053 |
|  | 1987-88 | 3,082,385 | 23.89 | 113,617 | 4,757 | 11,810 |
|  | 1988-89 | 3,195,333 | 23.89 | 112,948 | 4,729 | 16,538 |
|  | 1989-90 | 3,306,729 | 23.89 | 111,396 | 4,664 | 21,202 |
|  | 1990-91 | 3,414,041 | 23.89 | 107,312 | 4,493 | 25,695 |
|  | 1991-92 | 3,509,047 | 23.89 | 95,006 | 3,977 | 29,672 |
|  | 1992-93 | 3,596,777 | 23.89 | 87,730 | 3,673 | 33,345 |
|  | 1993-94 | 3,659,392 | 23.89 | 62,615 | 2,621 | 35,967 |
|  | 1994-95 | 3,697,205 | 23.89 | 37,813 | 1,583 | 37,550 |

**Total 1985-86 to 1989-90:**         506,433       21,202

**Total 1985-86 to 1994-95:**         896,909       37,550

## Appendix Table 4

### Teacher Demand Due to Secondary (9-12) Enrollment Growth

|  | Year | Grade 9-12 enrollment | Class size | 9-12 enrollment growth | FTEs needed for enrollment growth | Cumulative new FTEs required for enrollment growth |
|---|---|---|---|---|---|---|
| Actual | 1984-85 | 1,278,447 | 28.08 |  |  |  |
| Projected | 1985-86 | 1,299,559 | 28.08 | 21,112 | 752 | 752 |
|  | 1986-87 | 1,293,804 | 28.08 | -5,755 | -205 | 547 |
|  | 1987-88 | 1,267,982 | 28.08 | -25,822 | -920 | -373 |
|  | 1988-89 | 1,243,084 | 28.08 | -24,898 | -887 | -1,259 |
|  | 1989-90 | 1,236,793 | 28.08 | -6,291 | -224 | -1,483 |
|  | 1990-91 | 1,255,563 | 28.08 | 18,770 | 668 | -815 |
|  | 1991-92 | 1,294,090 | 28.08 | 38,527 | 1,372 | 557 |
|  | 1992-93 | 1,333,122 | 28.08 | 39,032 | 1,390 | 1,947 |
|  | 1993-94 | 1,389,946 | 28.08 | 56,824 | 2,024 | 3,971 |
|  | 1994-95 | 1,462,322 | 28.08 | 72,376 | 2,577 | 6,548 |

Projected 1985-86 to 1989-90:  -41,654  -1,483

Projected 1985-86 to 1994-95:  183,875  6,548

# Appendix Table 5

## Projections by County of FTEs Needed
## to Maintain Current Pupil/Teacher Ratio

|  | Total FTEs | Grades K-8 Enrollment 1984-85 | Enrollment 1989-90 | Enrollment 1994-95 | Current Ratio | No. of FTEs needed in 1989-90 | Increase over current | No. of FTEs needed in 1994-95 | Increase over current |
|---|---|---|---|---|---|---|---|---|---|
| 1 Alameda | 4,988 | 114,725 | 128,581 | 140,206 | 23.00 | 5,591 | 602 | 2,096 | 1,108 |
| 2 Alpine | 3 | 170 | 183 | 180 | 56.11 | 3 | 0 | 3 | 0 |
| 3 Amador | 104 | 2,281 | 2,939 | 3,578 | 21.91 | 134 | 30 | 163 | 59 |
| 4 Butte | 661 | 15,807 | 20,210 | 24,373 | 23.93 | 845 | 184 | 1,019 | 358 |
| 5 Calaveras | 128 | 2,855 | 3,971 | 5,381 | 22.33 | 178 | 50 | 241 | 113 |
| 6 Colusa | 95 | 1,990 | 2,437 | 2,706 | 21.00 | 116 | 21 | 129 | 34 |
| 7 Contra Costa | 3,147 | 73,245 | 83,774 | 92,900 | 23.28 | 3,599 | 452 | 3,991 | 844 |
| 8 Del Norte | 93 | 2,255 | 2,587 | 2,571 | 24.20 | 107 | 14 | 106 | 13 |
| 9 El Dorado | 497 | 11,816 | 15,874 | 19,415 | 23.77 | 668 | 171 | 817 | 320 |
| 10 Fresno | 3,325 | 78,477 | 95,376 | 105,107 | 23.60 | 4,041 | 716 | 4,453 | 1,128 |
| 11 Glenn | 156 | 3,316 | 3,908 | 4,251 | 21.22 | 184 | 28 | 200 | 44 |
| 12 Humboldt | 541 | 12,608 | 13,809 | 14,065 | 23.31 | 592 | 52 | 603 | 63 |
| 13 Imperial | 671 | 16,508 | 19,118 | 20,571 | 24.59 | 777 | 106 | 837 | 165 |
| 14 Inyo | 106 | 2,124 | 2,407 | 2,558 | 20.03 | 120 | 14 | 128 | 22 |
| 15 Kern | 2,696 | 63,897 | 80,702 | 91,386 | 23.70 | 3,405 | 709 | 3,856 | 1,160 |
| 16 Kings | 495 | 12,078 | 13,699 | 14,992 | 24.41 | 561 | 66 | 614 | 119 |
| 17 Lake | 210 | 4,975 | 7,192 | 9,653 | 23.71 | 303 | 94 | 407 | 197 |
| 18 Lassen | 128 | 2,930 | 3,537 | 3,794 | 22.85 | 155 | 27 | 166 | 38 |
| 19 Los Angeles | 36,057 | 855,862 | 978,592 | 1,055,760 | 23.74 | 41,227 | 5,170 | 44,478 | 8,421 |
| 20 Madera | 467 | 11,152 | 14,145 | 16,713 | 23.88 | 592 | 125 | 700 | 233 |
| 21 Marin | 760 | 15,543 | 15,451 | 16,453 | 20.46 | 755 | -4 | 804 | 44 |
| 22 Mariposa | 65 | 1,316 | 1,845 | 2,435 | 20.18 | 91 | 26 | 121 | 55 |
| 23 Mendocino | 414 | 9,360 | 10,880 | 11,755 | 22.63 | 481 | 67 | 520 | 106 |
| 24 Merced | 937 | 22,713 | 28,757 | 33,240 | 24.23 | 1,187 | 249 | 1,372 | 434 |
| 25 Modoc | 72 | 1,392 | 1,686 | 1,915 | 19.43 | 87 | 15 | 99 | 27 |
| 26 Mono | 54 | 877 | 1,220 | 1,540 | 16.16 | 75 | 21 | 95 | 41 |
| 27 Monterey | 1,591 | 37,331 | 43,288 | 46,305 | 23.47 | 1,845 | 254 | 1,973 | 382 |
| 28 Napa | 378 | 8,948 | 9,819 | 10,854 | 23.66 | 415 | 37 | 459 | 81 |
| 29 Nevada | 266 | 6,227 | 9,577 | 12,365 | 23.41 | 409 | 143 | 528 | 262 |
| 30 Orange | 8,576 | 212,353 | 240,241 | 269,904 | 24.76 | 9,702 | 1,126 | 10,900 | 2,324 |
| 31 Placer | 647 | 16,066 | 21,174 | 26,154 | 24.83 | 853 | 206 | 1,053 | 406 |
| 32 Plumas | 105 | 2,389 | 2,738 | 2,824 | 22.86 | 120 | 15 | 124 | 19 |

42

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 33 | Riverside | 3,870 | 95,455 | 126,676 | 153,165 | 24.67 | 5,135 | 1,266 | 6,209 | 2,340 |
| 34 | Sacramento | 4,187 | 98,601 | 121,604 | 139,232 | 23.55 | 5,164 | 977 | 5,913 | 1,725 |
| 35 | San Benito | 179 | 4,109 | 4,635 | 4,944 | 22.93 | 202 | 23 | 216 | 36 |
| 36 | San Bernardino | 5,139 | 135,353 | 179,924 | 216,430 | 26.34 | 6,831 | 1,692 | 8,217 | 3,078 |
| 37 | San Diego | 9,023 | 214,376 | 255,320 | 289,862 | 23.76 | 10,746 | 1,723 | 12,200 | 3,177 |
| 38 | San Francisco | 1,800 | 41,012 | 45,378 | 47,597 | 22.79 | 1,991 | 192 | 2,088 | 289 |
| 39 | San Joaquin | 2,059 | 51,285 | 66,997 | 79,098 | 24.90 | 2,690 | 631 | 3,176 | 1,117 |
| 40 | San Luis Obispo | 688 | 16,383 | 21,278 | 25,598 | 23.83 | 893 | 205 | 1,074 | 387 |
| 41 | San Mateo | 2,281 | 48,860 | 55,182 | 58,390 | 21.42 | 2,576 | 295 | 2,726 | 445 |
| 42 | Santa Barbara | 1,260 | 30,229 | 34,990 | 39,069 | 23.99 | 1,459 | 198 | 1,629 | 368 |
| 43 | Santa Clara | 5,890 | 143,275 | 159,298 | 174,331 | 24.33 | 6,548 | 659 | 7,166 | 1,277 |
| 44 | Santa Cruz | 852 | 20,691 | 25,518 | 29,224 | 24.29 | 1,050 | 199 | 1,203 | 351 |
| 45 | Shasta | 667 | 15,332 | 18,044 | 20,229 | 23.00 | 784 | 118 | 879 | 213 |
| 46 | Sierra | 27 | 450 | 496 | 552 | 16.42 | 30 | 3 | 34 | 6 |
| 47 | Siskiyou | 278 | 5,590 | 6,390 | 6,783 | 20.09 | 318 | 40 | 338 | 59 |
| 48 | Solano | 1,361 | 32,512 | 39,481 | 45,721 | 23.89 | 1,653 | 292 | 1,914 | 553 |
| 49 | Sonoma | 1,493 | 34,488 | 40,803 | 46,139 | 23.10 | 1,766 | 273 | 1,997 | 504 |
| 50 | Stanislaus | 1,666 | 39,693 | 48,350 | 54,786 | 23.82 | 2,030 | 363 | 2,300 | 634 |
| 51 | Sutter | 312 | 6,895 | 8,036 | 8,981 | 22.10 | 364 | 52 | 406 | 94 |
| 52 | Tehama | 238 | 5,374 | 6,591 | 7,601 | 22.57 | 292 | 54 | 337 | 99 |
| 53 | Trinity | 81 | 1,536 | 1,866 | 2,092 | 19.02 | 98 | 17 | 110 | 29 |
| 54 | Tulare | 1,755 | 42,001 | 51,803 | 58,101 | 23.93 | 2,165 | 410 | 2,428 | 673 |
| 55 | Tuolomne | 189 | 4,110 | 4,986 | 5,878 | 21.77 | 299 | 40 | 270 | 81 |
| 56 | Ventura | 2,665 | 69,342 | 80,861 | 92,726 | 26.02 | 3,107 | 443 | 3,563 | 899 |
| 57 | Yolo | 523 | 12,083 | 13,911 | 15,663 | 23.09 | 603 | 79 | 678 | 155 |
| 58 | Yuba | 321 | 7,675 | 8,594 | 9,109 | 23.88 | 360 | 38 | 381 | 60 |
| | Totals | 117,235 | 2,800,296 | 3,306,729 | 3,697,205 | 23.89 | 138,437 | 21,202 | 154,785 | 37,549 |

43

| | | Total FTEs | Grades 9-12 Enrollment 1984-85 | Enrollment 1989-90 | Enrollment 1994-95 | Current Ratio | No. of FTEs needed in 1989-90 | Increase over current | No. of FTEs needed in 1994-95 | Increase over current |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Alameda | 2,108 | 55,095 | 49,026 | 55,360 | 26.13 | 1,876 | -232 | 2,118 | 10 |
| 2 | Alpine | 0 | 51 | 65 | 70 | 0 | 0 | 0 | 0 | 0 |
| 3 | Amador | 44 | 1,251 | 1,172 | 1,599 | 28.30 | 41 | -3 | 56 | 12 |
| 4 | Butte | 317 | 7,107 | 7,104 | 9,039 | 22.42 | 317 | 0 | 403 | 86 |
| 5 | Calaveras | 67 | 1,499 | 1,550 | 2,124 | 22.26 | 70 | 2 | 95 | 28 |
| 6 | Colusa | 50 | 893 | 909 | 1,178 | 18.01 | 50 | 1 | 65 | 16 |
| 7 | Contra Costa | 1,256 | 37,792 | 31,831 | 37,080 | 30.09 | 1,058 | -198 | 1,232 | -24 |
| 8 | Del Norte | 47 | 1,024 | 1,009 | 1,218 | 21.81 | 46 | -1 | 56 | 9 |
| 9 | El Dorado | 201 | 5,695 | 5,751 | 7,802 | 28.31 | 203 | 2 | 276 | 74 |
| 10 | Fresno | 1,264 | 31,029 | 31,906 | 39,610 | 24.54 | 1,300 | 36 | 1,614 | 350 |
| 11 | Glenn | 68 | 1,325 | 1,354 | 1,632 | 19.58 | 69 | 1 | 83 | 16 |
| 12 | Humboldt | 240 | 5,128 | 4,756 | 5,507 | 21.38 | 22 | -17 | 258 | 18 |
| 13 | Imperial | 288 | 6,7149 | 7,149 | 8,278 | 23.52 | 304 | 16 | 352 | 64 |
| 14 | Inyo | 58 | 1,063 | 862 | 981 | 18.36 | 47 | -11 | 53 | -4 |
| 15 | Kern | 976 | 23,937 | 26,936 | 33,526 | 24.54 | 1,098 | 122 | 1,366 | 391 |
| 16 | Kings | 175 | 4,410 | 4,730 | 5,541 | 25.20 | 188 | 12 | 220 | 45 |
| 17 | Lake | 105 | 2,125 | 2,087 | 3,159 | 20.28 | 103 | -2 | 156 | 51 |
| 18 | Lassen | 72 | 1,370 | 1,312 | 1,595 | 19.02 | 69 | -3 | 84 | 12 |
| 19 | Los Angeles | 12,811 | 383,656 | 378,848 | 432,427 | 29.95 | 12,650 | -161 | 14,439 | 1,629 |
| 20 | Madera | 160 | 4,158 | 4,569 | 5,695 | 26.03 | 176 | 16 | 219 | 59 |
| 21 | Marin | 377 | 9,736 | 6,665 | 6,608 | 25.82 | 258 | -199 | 256 | -121 |
| 22 | Mariposa | 31 | 706 | 591 | 886 | 22.43 | 26 | -5 | 39 | 8 |
| 23 | Mendocino | 219 | 4,396 | 4,416 | 5,373 | 20.08 | 220 | 1 | 268 | 49 |
| 24 | Merced | 357 | 9,079 | 10,372 | 13,002 | 25.40 | 408 | 51 | 512 | 154 |
| 25 | Modoc | 37 | 547 | 524 | 632 | 14.67 | 36 | -2 | 43 | 6 |
| 26 | Mono | 12 | 369 | 276 | 400 | 31.95 | 9 | -3 | 13 | 1 |
| 27 | Monterey | 551 | 13,393 | 13,842 | 16,039 | 24.32 | 569 | 18 | 660 | 109 |
| 28 | Napa | 178 | 4,590 | 3,892 | 4,203 | 25.75 | 151 | -27 | 163 | -15 |
| 29 | Nevada | 114 | 2,986 | 2,957 | 4,812 | 26.08 | 113 | -1 | 184 | 70 |
| 30 | Orange | 3,932 | 116,987 | 101,929 | 110,876 | 29.75 | 3,426 | -506 | 3,726 | -205 |
| 31 | Placer | 363 | 8,527 | 8,119 | 11,157 | 23.52 | 345 | -17 | 474 | 112 |
| 32 | Plumas | 58 | 1,102 | 1,068 | 1,315 | 19.03 | 56 | -2 | 69 | 11 |
| 33 | Riverside | 1,443 | 39,223 | 43,569 | 59,144 | 27.19 | 1,603 | 160 | 2,175 | 733 |
| 34 | Sacramento | 1,564 | 44,319 | 44,703 | 56,363 | 28.34 | 1,577 | 14 | 1,989 | 425 |
| 35 | San Benito | 49 | 1,645 | 1,753 | 2,210 | 33.63 | 52 | 3 | 66 | 17 |
| 36 | San Bernardino | 2,135 | 54,279 | 59,176 | 79,694 | 25.42 | 2,328 | 193 | 3,135 | 1,000 |

44

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 37 | San Diego | 3,118 | 98,836 | 96,638 | 114,377 | 31.70 | 3,048 | -69 | 3,608 | 490 |
| 38 | San Francisco | 862 | 21,718 | 23,272 | 26,571 | 25.21 | 923 | 62 | 1,054 | 193 |
| 39 | San Joaquin | 804 | 21,023 | 23,209 | 30,529 | 26.16 | 888 | 84 | 1,168 | 364 |
| 40 | San Luis Obispo | 289 | 7,651 | 7,796 | 10,517 | 26.46 | 295 | 5 | 397 | 108 |
| 41 | San Mateo | 825 | 25,595 | 20,004 | 23,063 | 31.04 | 645 | -180 | 743 | -82 |
| 42 | Santa Barbara | 542 | 14,329 | 12,907 | 14,915 | 26.43 | 488 | -54 | 564 | 22 |
| 43 | Santa Clara | 2,437 | 72,365 | 60,960 | 65,345 | 29.70 | 2,053 | -384 | 2,201 | -236 |
| 44 | Santa Cruz | 370 | 9,675 | 8,859 | 11,021 | 26.16 | 339 | -31 | 421 | 51 |
| 45 | Shasta | 293 | 7,378 | 6,818 | 8,331 | 25.18 | 271 | -22 | 331 | 38 |
| 46 | Sierra | 17 | 229 | 228 | 228 | 13.15 | 17 | 0 | 17 | 0 |
| 47 | Siskiyou | 123 | 2,415 | 2,165 | 2,659 | 19.71 | 110 | -13 | 135 | 12 |
| 48 | Solano | 536 | 13,775 | 14,22 | 17,047 | 25.70 | 553 | 17 | 663 | 127 |
| 49 | Sonoma | 598 | 16,076 | 14,609 | 17,699 | 26.89 | 543 | -55 | 658 | 60 |
| 50 | Stanislaus | 536 | 15,636 | 15,911 | 19,928 | 19.19 | 545 | 9 | 683 | 147 |
| 51 | Sutter | 166 | 3,317 | 3,154 | 3,579 | 20.04 | 157 | -8 | 179 | 13 |
| 52 | Tehama | 111 | 2,303 | 2,376 | 2,957 | 20.81 | 114 | 4 | 142 | 31 |
| 53 | Trinity | 40 | 708 | 730 | 895 | 17.88 | 41 | 1 | 50 | 10 |
| 54 | Tulare | 592 | 15,080 | 15,927 | 20,243 | 25.49 | 625 | 33 | 794 | 203 |
| 55 | Tuolomne | 75 | 2,063 | 1,943 | 2,496 | 27.47 | 71 | -4 | 91 | 16 |
| 56 | Ventura | 1,121 | 32,890 | 30,275 | 34,401 | 29.34 | 1,032 | -89 | 1,172 | 51 |
| 57 | Yolo | 253 | 5,515 | 5,390 | 6,266 | 21.38 | 247 | -6 | 287 | 34 |
| 58 | Yuba | 96 | 2,609 | 2,622 | 3,120 | 27.21 | 96 | 0 | 115 | 19 |
| | Totals | 45,526 | 1,278,447 | 1,236,793 | 1,462,322 | 28.08 | 44,043 | -1,483 | 52,074 | 6,548 |

45

# Appendix Table 6

## Teacher Demand Required for Attrition, Method 1
### (Average of STRS Attrition Rate 1977-78 to 1983-84)

| | Year | Elementary (grades K-8) | | | Secondary (grades 9-12) | | | Total (K-12) |
|---|---|---|---|---|---|---|---|---|
| | | FTEs required for 23.89 class size | Attrition rate | FTEs needed to replace attrition | FTEs required for 28.08 class size | Attrition rate | FTEs needed to replace attrition | FTEs needed to replace attrition |
| Actual | 1984-85 | 117,236 | 7.67% | | 45,526 | | | |
| Projected | 1985-86 | 120,167 | 7.67% | 8,992 | 46,278 | 7.67% | 3,492 | 12,484 |
| | 1986-87 | 124,289 | 7.67% | 9,217 | 46,073 | 7.67% | 3,550 | 12,766 |
| | 1987-88 | 129,046 | 7.67% | 9,533 | 44,280 | 7.67% | 3,534 | 13,067 |
| | 1988-89 | 133,774 | 7.67% | 9,898 | 44,267 | 7.67% | 3,463 | 13,361 |
| | 1989-90 | 138,438 | 7.67% | 10,261 | 44,043 | 7.67% | 3,395 | 13,656 |
| | 1990-91 | 142,931 | 7.67% | 10,618 | 44,711 | 7.67% | 3,378 | 13,996 |
| | 1991-92 | 146,908 | 7.67% | 10,963 | 46,083 | 7.67% | 3,429 | 14,392 |
| | 1992-93 | 150,581 | 7.67% | 11,268 | 47,473 | 7.67% | 3,535 | 14,802 |
| | 1993-94 | 153,203 | 7.67% | 11,550 | 49,497 | 7.67% | 3,641 | 15,191 |
| | 1994-95 | 154,786 | 7.67% | 11,751 | 52,074 | 7.67% | 3,796 | 15,547 |
| **Projected 1985-86 to 1989-90:** | | | | 47,900 | | | 17,434 | 65,334 |
| **Projected 1985-86 to 1994-95:** | | | | 104,049 | | | 35,213 | 139,262 |

46

## Appendix Table 7

### Teacher Demand Required for Attrition, Method 2
(Trend of STRS Attrition Rate 1977-78 to 1983-84)

| | Year | Elementary (grades K-8) | | | Secondary (grades 9-12) | | | Total (K-12) |
| | | FTEs required for 23.89 class size | Attrition rate | FTEs needed to replace attrition | FTEs required for 28.08 class size | Attrition rate | FTEs needed to replace attrition | FTEs needed to replace attrition |
|---|---|---|---|---|---|---|---|---|
| Actual | 1984-85 | 117,236 | 7.07% | | 45,526 | 7.07% | | |
| Projected | 1985-86 | 120,167 | 6.92% | 8,287 | 46,278 | 6.92% | 3,218 | 11,506 |
| | 1986-87 | 124,289 | 6.77% | 8,316 | 46,073 | 6.77% | 3,203 | 11,518 |
| | 1987-88 | 129,046 | 6.62% | 8,416 | 45,153 | 6.62% | 3,120 | 11,536 |
| | 1988-89 | 133,774 | 6.47% | 8,546 | 44,267 | 6.47% | 2,990 | 11,537 |
| | 1989-90 | 138,438 | 6.33% | 8,660 | 44,043 | 6.33% | 2,866 | 11,526 |
| | 1990-91 | 142,931 | 6.18% | 8,756 | 44,711 | 6.18% | 2,786 | 11,542 |
| | 1991-92 | 146,908 | 6.03% | 8,828 | 46,083 | 6.03% | 2,762 | 11,589 |
| | 1992-93 | 150,581 | 5.88% | 8,855 | 47,473 | 5.88% | 2,778 | 11,633 |
| | 1993-94 | 153,203 | 5.73% | 8,852 | 49,497 | 5.73% | 2,791 | 11,643 |
| | 1994-95 | 154,786 | 5.58% | 8,779 | 52,074 | 5.58% | 2,836 | 11,615 |
| **Projected 1985-86 to 1989-90:** | | | | 42,226 | | | 17,434 | 57,623 |
| **Projected 1985-86 to 1994-95:** | | | | 86,296 | | | 35,213 | 115,645 |

47

## Appendix Table 8

### STRS status of teachers first credentialed in 1981-82 to 1984-85
(from a random sample of teachers credentialed by the CTC)

| STRS status | 1981-82 | | 1982-83 | | 1983-84 | | 1984-85 | | Total 1981-82 to 1984-85 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Active | 75 | 49.7% | 70 | 46.1% | 89 | 57.8% | 68 | 45.0% | 302 | 49.7% |
| Inactive | 4 | 2.6% | 1 | 0.7% | 0 | 0.0% | 0 | 0.0% | 5 | 0.8% |
| Non-member | 32 | 21.2% | 31 | 20.4% | 39 | 25.3% | 48 | 31.8% | 150 | 24.7% |
| Refunds | 10 | 6.6% | 12 | 7.9% | 2 | 1.3% | 3 | 2.0% | 27 | 4.4% |
| Never a Member | 30 | 19.9% | 38 | 25.0% | 24 | 15.6% | 32 | 21.2% | 124 | 20.4% |
| Total | 151 | 100.0% | 152 | 100.0% | 154 | 100.0% | 151 | 100.0% | 608 | 100.0% |

## Appendix Table 9

**STRS status of teachers credentialed before 1981-82**
**(from a random sample of 455 teachers with valid credentials**
**in the microfiche files of the CTC)**

| STRS status | Number | Percent |
|---|---|---|
| Active | 213 | 46.8% |
| Inactive | 20 | 4.4% |
| Non-member | 37 | 8.1% |
| Retired | 9 | 2.0% |
| Refunds | 17 | 3.7% |
| Death | 1 | 0.2% |
| Disability | 2 | 0.4% |
| Other | 1 | 0.2% |
| Never a member | 155 | 34.1% |
| | | |
| Total | 455 | 100.0% |

## Appendix Table 10

### Teacher Supply Projections
### (using STRS average entry and re-entry rate)

| Year | Total FTEs required (K-12) | STRS average entry & re-entry rate | Projected annual supply (FTES) |
|------|---------------------------|-----------------------------------|-------------------------------|
| 1984-85 | 162,762 | 6.58% | 10,710 |
| 1985-86 | 166,445 | 6.58% | 10,952 |
| 1986-87 | 170,362 | 6.58% | 11,210 |
| 1987-88 | 174,199 | 6.58% | 11,462 |
| 1988-89 | 178,041 | 6.58% | 11,715 |
| 1989-90 | 182,481 | 6.58% | 12,007 |
| 1990-91 | 187,642 | 6.58% | 12,347 |
| 1991-92 | 192,991 | 6.58% | 12,699 |
| 1992-93 | 198,054 | 6.58% | 13,032 |
| 1993-94 | 202,699 | 6.58% | 13,338 |
| 1994-95 | 206,859 | 6.58% | |

Projected 5 year supply
(1985-86 to 1989-90):                                    56,049

Projected 10 year supply
(1985-86 to 1994-95):                                    119,472

# Appendix Table 11

## Teacher Demand With Educational Improvements

### Demand Projection Method 1

| | 5 year projection | | 10 year projection | |
|---|---|---|---|---|
| | Increased demand (FTEs) | % Increase Over Demand Without Improvements | Increased demand (FTEs) | % Increase Over Demand Without Improvements |
| Class size reduction to 20:1 | 50,461 | 59.3% | 74,975 | 40.9% |
| Elimination of emergency credentials | 4,200 | 4.9% | 4,200 | 2.3% |
| Elimination of teaching out of field | 4,883 | 5.7% | 4,883 | 2.7% |
| Total increased demand | 59,544 | 70.0% | 84,058 | 45.8% |
| Demand under current practices | 85,052 | | 183,360 | |
| Total demand with improvements | 144,596 | | 267,418 | |

### Demand Projection Method 2

| | 5 year projection | | 10 year projection | |
|---|---|---|---|---|
| | Increased demand (FTEs) | % Increase Over Demand Without Improvements | Increased demand (FTEs) | % Increase Over Demand Without Improvements |
| Class size reduction to 20:1 | 49,658 | 64.2% | 70,280 | 44.0% |
| Elimination of emergency credentials | 4,200 | 5.4% | 4,200 | 2.6% |
| Elimination of teaching out of field | 4,883 | 6.3% | 4,883 | 3.1% |
| Total increased demand | 58,741 | 75.9% | 79,363 | 49.7% |
| Demand under current practices | 77,342 | | 159,743 | |
| Total demand with improvements | 136,083 | | 239,106 | |

# APPENDIX 2
## Categories of STRS Membership

The records of the State Teachers' Retirement System form the basis of our projections of demand for retirement and attrition, as well as for Method 2 of the supply forecasts. STRS membership is composed of all certificated teachers and administrators in California public schools, county offices of education, and community colleges. STRS does not separate teachers from administrators, nor K-12 from junior college instructors. For our analysis we have assumed that attrition and retirement rates and the rate of full-time employment is the same for K-12 teachers as for all members of STRS.

STRS records five categories of separation (attrition) from the active teacher work force in addition to retirements: refund (withdrawing from the retirement system after resigning from the district); inactive (not teaching, but not withdrawing contributions from the retirement system); disability; non-member (teaching less than 10 days in any 40 day pay period); and death.

Members can transfer to active status from six categories: non-member, refund, retirement, disability, new (no previous recorded contributions), and inactive. Non-members have no opening balance, which means that less than $100 per year of contributions were received for the person.

# APPENDIX 3
## Methodology

Department of Finance (DOF) school enrollment projections, revised in 1985, were used to project demand for teachers due to enrollment growth. The 1984-85 California Basic Educational Data System (CBEDS) data tape was used to calculate full-time equivalent (FTEs) teaching positions. Only actual teaching time was included in the FTE calculation. Teachers' administrative responsibilities were not included when the pupil/teacher ratios were calculated. Special education, adult education, and ROC/ROP assignments were also excluded since DOF does not include enrollment data for those programs in its enrollment projections. Projections were separately calculated for elementary and secondary levels because pupil/teacher ratios were markedly different.

Demand due to attrition and retirement was calculated using separation rates from the State Teachers' Retirement System (STRS). STRS does not differentiate between K-12 and community college staff, nor between administrators and teachers. For these projections, we assumed that attrition and retirement rates do not differ meaningfully among these groups.

Supply projections were based on Commission on Teacher Credentialing (CTC) statistics on enrollment in teacher training programs, credentials recommended, and first credentials issued. Data on first credentials issued is preliminary. Published data will become available later.

Twenty-three districts, including the 15 largest, which account for more than 25 percent of California's K-12 enrollment, were surveyed to identify areas of shortage and plentiful supply. Districts chosen were representative of the geographical areas of the state, the range of district size and type, and the majority of school children.

The likelihood that newly credentialed teachers would teach was estimated by using a random sample. A random sample (N= 650) of first-credential recipients from 1981-82 to 1984-85 was chosen from the computerized files of CTC. Birth dates and social security numbers were matched with STRS records to estimate the teacher work force participation rate for newly credentialed teachers. Teachers were identified as members of STRS categories which are described in Appendix 2.

The size of the reserve pool was estimated from a random sample of 907 individuals who obtained any kind of credential before 1981-82. Of the total sample, 455 had valid K-12 teaching credentials. The social security numbers and birthdates of those with valid K-12 credentials were matched against STRS records to identify those with valid credentials who were teaching or had taught in the past. The participation rates were applied to CBEDS teachers for 1984-85 to estimate the number of people with valid K-12 credentials.

55

From the total pool of people with valid K-12 credentials, the reserve pool was calculated using frequencies from the matched sample.

The probability that reserve pool members would return to teaching was estimated from an eleven-member focus group and a telephone survey of a "snowball" sample of 60 former teachers.

.

# References

Bernhardt, Victoria L. *Enrollments and Recommendations of California College and University Teacher Credentialing Programs: 1982-83, 1983-84.* Sacramento: Commission on Teacher Credentialing, September 1985.

California Round Table on Educational Opportunity. *Improving the Attractiveness of the K-12 Teaching Profession in California.* Sacramento: State Department of Education, 1983.

California State Department of Education. Bilingual Education Office. *DATA/BICAL Reports,* Numbers 85-2, 85-9C, and 85-5C. Sacramento, 1985.

_____. California Basic Education Data System. Scaramento, 1983-84.

_____. California Basic Education Data System. Sacramento, 1984-85.

_____, Planning, Evaluation and Research Division. "The Teacher Shortage in California: A Preliminary Analysis." n.d., mimeographed.

_____. *Teacher Shortage Loan Assumption Program.* Sacramento, 1985.

California State Department of Finance. *Ten Year Public and Private School Enrollment Projections.* Sacramento, 1985.

California State Teachers' Retirement System. *63rd Annual Report.* Sacramento, June 30, 1976.

_____. *67th Annual Administrative and Financial Report.* Sacramento, June 30, 1980.

_____. *68th Annual Administrative and Financial Report.* Sacramento, June 30, 1981.

_____. *69th Annual Administrative and Financial Report.* Sacramento, June 30, 1982.

_____. *70th Annual Administrative and Financial Report.* Sacramento: 1983.

Commission on Teacher Credentialing. *The Challenges of Teacher Preparation, Thirteenth Annual Report: 1983-84.* Sacramento, n.d.

Commission for Teacher Preparation and Licensing. *Credential Profiles in 1980-81.* Sacramento, n.d.

Connecticut State Department of Education. Office of Research and Education. *Teacher Supply and Demand in Connecticut: A Report Prepared for the Governor's Commission on Equity and Excellence in Education.* April 4, 1985. Advance copy.

Cory, Canapary, McCullough. *Focus Group Report Concerning the Teaching Profession.* San Francisco: The California Commission on the Teaching Profession, May 1985.

Fulton, James A. *Teacher Salaries: A Preliminary Analysis.* Sacramento: California State Department of Education, Program Evaluation and Research Division, October 1984.

Guthrie, James W. and Ami Zusman. *Mathematics and Science Teacher Shortages: What Can California Do?* Berkeley: University of California, Institute of Governmental Studies, 1982.

Kaye, Loren. *Making the Grade? Assessing School District Performance on SB 813.* Sacramento: California Tax Foundation, 1985.

Koppich, Julia, William Gerritz, and James W. Guthrie. *A View From the Classroom: California Teachers' Opinions on Working Conditions and School Reform Proposals.* Berkeley: Policy Analysis for California Education (PACE), University of California, Berkeley, March 1986.

Pailthorp, Keith and Norman Gold. *The Class of 1999: Demographic Projections of California's Student Population in the Next Decade.* Presentation to the California Postsecondary Education Commission, March 14, 1985.

Schlechty, Phillip C. and Victor S. Vance. "Recruitment, Selection and Retention: The Shape of the Teaching Force." *Elementary School Journal,* 83 (March 1983), pp. 469-487.

Statistical Abstract of the United States (Table 15), 1985.

U.S. Bureau of the Census. *Local Population Estimates,* Series P-26, No. 82-5-C, 2/84. Washington, D.C., 1985.

U.S. Department of Education. National Center for Education Statistics. Washington, D.C., 1985.

*Personal Communications*

California State University, Long Beach
   Marge Lazar

California State Department of Finance
   Carol Corcoran, Research Manager

Commission on Teacher Credentialing, Sacramento, California
   Dr. David Wright, Coordinator, Planning and Research
   Lee Huddy, Consultant, Planning and Research
   Dr. Victoria Bernhardt, Consultant
   Richard Watkins, Consultant

California State Department of Education
   Norman Gold, Bilingual Education Consultant
   Leroy Hamm, Bilingual Education Consultant

State Teachers' Retirement System, Sacramento, California
   Gretchen Cooper, Actuarial Coordinator, Program and Policy Unit
   Pete Hough, Manager

Student Aid Commission, Sacramento, California
   Ken Harber, Consultant