Major Issues Facing the Legislature

IV

Part IV

Major Issues Facing the Legislature

In addition to the major policy and funding issues identified in the *Analysis,* this part discusses some of the broader issues currently facing the Legislature. Many of these issues are closely linked to funding requests contained in the Governor's Budget for 1990-91, others are more long-range in nature and will, in all probability, persist for many years beyond 1990.

The issues in this part fall into five general categories:

- The *first* category consists of *drug-related issues:* drug use in California, an inventory of state programs to fight drug abuse, and an analysis of state prevention programs.
- The *second* category deals with *infrastructure topics:* an overview of the state's infrastructure situation and an analysis of the capital outlay needs (including proposed new campuses) of postsecondary education.
- The *third* is comprised of *resources issues:* an alternative method of addressing air pollution and state preparedness for small oil spills.
- The *fourth* category consists of *health issues:* state health services to rural areas, long-term health care, and the status of Proposition 99 programs.
- *Finally,* we analyze the issues of county fiscal capacity and the implementation of Proposition 103.

First In a Series of Three Drug-Related Pieces

Drug Use in California

How Widespread Is Drug Use? What Are the Characteristics of Heavy Drug Users?

Summary

Drug use among the general population has been decreasing since 1979. Specifically, the number of "current users" declined 40 percent between 1979 and 1988. Over the same period, however, several indicators of heavy use have increased. This suggests that the drug-using population can be categorized into two main groups—casual users, whose numbers have been decreasing, and heavy users, whose numbers have been increasing. Available information also indicates that youth who are heavy users of illicit drugs have many more social and behavioral problems than youth who use only alcohol or who only experiment with drugs or than those who abstain. In addition, about three-fourths of all arrestees (all types of crimes) tested positive for drugs.

Alcohol consumption nationwide has also been decreasing since 1979, but at a much more gradual rate. Consumption in California has experienced a similar decline, but residents of the state still drink 21 percent more than the nationwide average. Of the U.S. population 14 years and older, one-third do not drink alcohol, one-third are light drinkers, and one-third are moderate to heavy drinkers. Ten percent of the drinkers account for half of the alcohol consumed.

For the past several years, drug use and abuse has been one of the most prominent issues in the country. The public's interest in and concern about the subject has been heightened by the current federal "war on drugs." While the national focus has been on *illicit* drugs like cocaine and heroin, the most commonly used drug in our society is alcohol. To assist the Legislature in thinking

about and responding to issues relating to both alcohol and drug use, we have prepared three related pieces on the subject.

In *this* analysis, the first of the three pieces, we review national and California-specific estimates of drug and alcohol use and describe use among the two populations that have generated the greatest concern—youths and heavy users. In the following two pieces we (1) describe the state's current alcohol- and drug-related programs and how they would be affected by the proposed federal National Drug Control Strategy and (2) review and analyze the available research on alcohol and drug *prevention* programs and discuss the implications of our findings for California's prevention programs.

DRUG USE

In this section we review various estimates of the use of illicit drugs (such as marijuana, cocaine, and hallucinogens) and the nonmedical use of prescription drugs (such as stimulants and tranquilizers). It is difficult to measure the extent of drug usage, for two main reasons. First, given the illegality of illicit drugs, users are reluctant to identify themselves. In addition, many drug users—especially heavy users—are homeless, unemployed, or both, and therefore are difficult to locate and count. As a result, no one knows precisely how many people use illicit drugs. The estimates that are available rely on surveys. Below, we provide information on the illicit drug-using population based on the most reliable surveys available.

DRUG USE AMONG THE GENERAL POPULATION

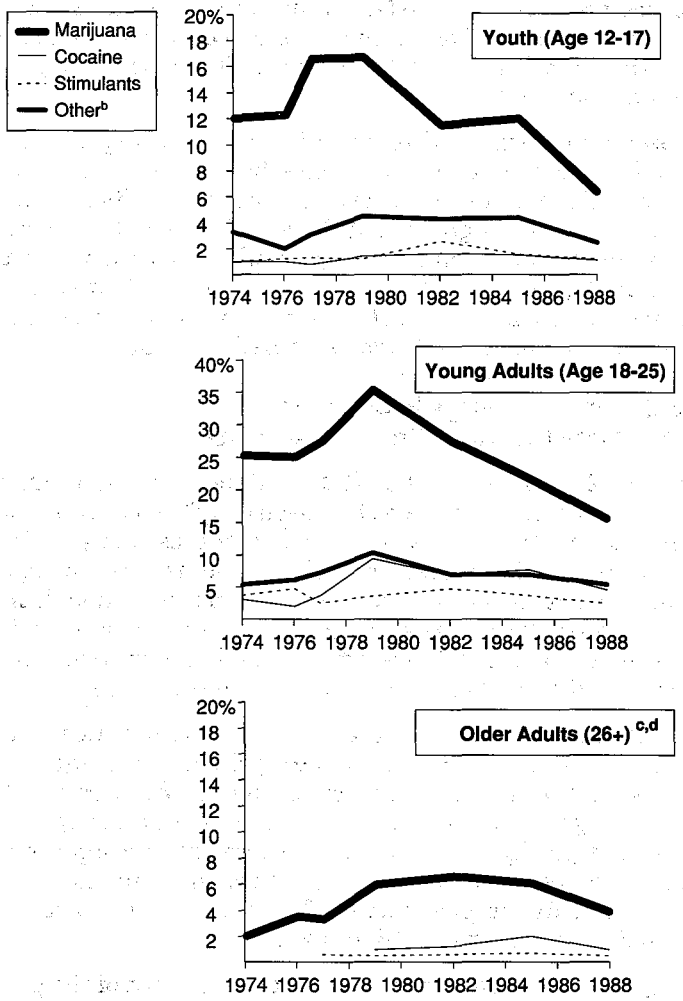
Drug Use Has Been Declining Nationally Since 1979

The National Institute on Drug Abuse (NIDA) has surveyed American households regularly since 1971 in order to estimate drug use in the United States. The NIDA survey is generally regarded as the best estimate of drug use among the general population. It does not, however, provide state-level estimates. Figure 1 displays NIDA's estimates of the prevalence of drug use among three different age groups, from 1974 to 1988. Overall, the percentage of individuals who use drugs has been declining since 1979. As the figure shows, there have been dramatic decreases (over 50 percent) in the use of marijuana by youths and young adults since that time, accompanied by much smaller declines in the usage of most other drugs in recent years. The upswing in cocaine use in 1985 by adults (18 and older) corresponds roughly to the emergence of crack cocaine. Historically, when a new drug

Figure 1

Drug Use Has Decreased for All Age Groups

Prevalence of Current Drug Use, 1974-1988 [a]



[a] A current drug user is defined as an individual who had used drugs at least once in the month prior to the survey.

[b] "Other Drugs" include tranquilizers, hallucinogens, psychotherapeutics, analgesics, and sedatives.

[c] No values are graphed for stimulants before 1977 or for cocaine before 1979 since the responses were too low to give an estimate which would be statistically significant.

[d] For older adults, the values for "other drugs" are not graphed since the survey only received significant values for 1976 (5.0 percent), 1977 (6.0 percent), 1985 (2.5 percent), and 1988 (1.3 percent). The values for the other years were too low to give an estimate which would be statistically significant.

Source: *NIDA Capsules, Overview of the 1988 National Household Survey on Drug Abuse,* National Institute on Drug Abuse.

is introduced into society, its use increases initially, then decreases over time.

The NIDA also reports that drug use declined in all age categories; among both men and women; in all regions of the country; for all levels of education; and for blacks, whites, and Hispanics. Overall, the 1988 NIDA survey found that 14.5 million people, or 7 percent of those surveyed, used drugs at least once during the month prior to the survey. This was a 40 percent reduction since 1979.

America's Drug of Choice Is Marijuana. Figure 1 shows that by far the most commonly used drug for all age groups is marijuana. The second most prevalent drug for adults ages 18 and over is cocaine. Although it is not shown on the graph (due to gaps in survey data), the second most commonly used drugs for youths are inhalants, such as glue, amyl, and butyl nitrates. Lastly, NIDA estimates that many of the 14.5 million current drug users use more than one of the drugs identified in Figure 1.

Experimentation With Drugs Is Common and Significantly More Prevalent Than Regular Use

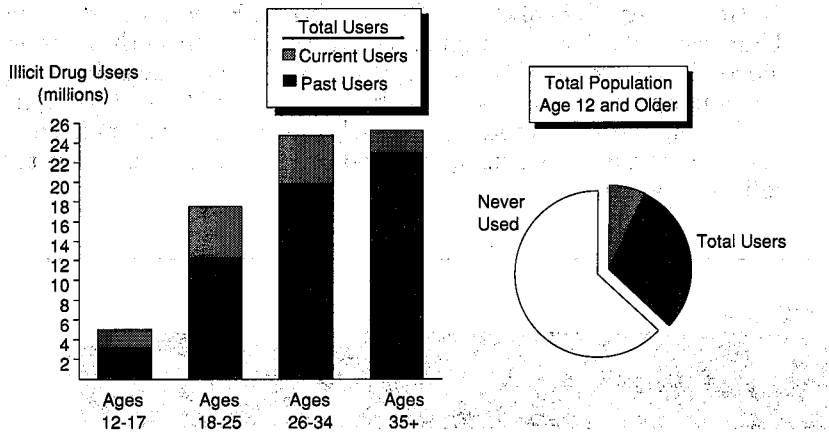
Figure 2 shows the 1988 NIDA estimates of the number of *current* drug users—those who had used drugs at least once in the month prior to the survey—relative to the estimate of "past" users—those who have tried an illicit drug sometime during their lifetime but not in the past month. (The classification "current users" is generally regarded as a reasonable proxy for *regular* users, even though it includes a small number of individuals who had *first* tried a drug in the month prior to the survey.)

As the figure shows, the number of past users is substantially greater than the number of current drug users for all age groups. NIDA estimates that 72.5 million people, or 37 percent of the population age 12 and older, have tried some illicit drug at least once. As the pie figure shows, the 37 percent is comprised of 7 percent who are current users and 30 percent who have used a drug, but not in the past month. The greatest increase in use occurs between the ages of 18 and 25.

In general, this data indicates that over a third of the population has tried at least one drug, but only 20 percent of those who have tried drugs continue to use them. These current drug users are predominately adults; youth (ages 12-17) comprise only 13 percent of the total.

Figure 2

Illicit Drug Use: Current and Past Use 1988 National Population Estimates[a]



[a] Note: A current drug user is defined as an individual who had used a drug at least once in the month prior to when the survey was taken. A past user is an individual who has used a drug at least once, but not in the past month. The sum of the two (the length of the whole bar in the figure) equals "total users."

Source: Household Survey on Drug Abuse, 1988, National Institute on Drug Abuse.

Current Drug Use Varies Significantly Among Subgroups

The NIDA survey also identified subgroups that had a greater prevalence of use than in the general population. While the survey found that the overall current prevalence of illicit drug use was 7.3 percent, the rate for metropolitan areas was 9 percent. Current use among blacks (8.2 percent) and Hispanics (7.8 percent) was slightly higher than among whites (7.0 percent).

In general, women's drug usage was much lower than men's, although in the west current use was greater for women (11 percent) than men (9.3 percent). By region, women's use rate varied dramatically, ranging from 4 percent in the northeast and south to 6.1 percent in the north central region and to 11 percent in the west. In addition, NIDA estimates that 9 percent of women in the child-bearing years of 15-44 are current drug users. This is of special concern since pregnant women can seriously harm their

fetuses if they use drugs during pregnancy. We addressed the issue of substance-exposed infants in *The 1989-90 Budget: Perspectives and Issues* (please see page 250).

DRUG USE AMONG YOUTH

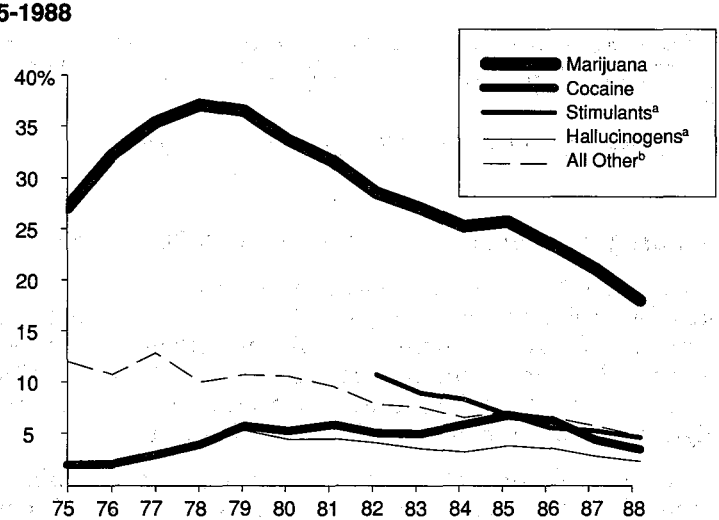
Use Among Youth Has Also Been Declining Since 1979

The major national study of drug use among youth is the National High School Senior Survey (NHSSS), conducted by the University of Michigan. Figure 3 shows the results of that survey since 1975. Like the NIDA data, this survey also shows that drug use among youths has been declining since 1979. As the figure indicates, usage declined significantly over the period for all drugs except cocaine, where usage peaked in 1985 and then fell in the following years.

Figure 3

Current Drug Use Among High School Seniors
National High School Senior Survey

1975-1988



[a] Note: Before 1982 for stimulants and 1979 for hallucinogens, different definitions for these drugs were used and thus those earlier values cannot be compared to the later values.

[b] Note: Includes heroin and other opiates, sedatives, and tranquilizers.

Source: Drug Use, Drinking, Smoking: National Survey Results from High School, College, and Young Adult Populations, University of Michigan, Institute for Social Research.

Another major study of drug use among youth is the series of surveys commissioned by the Attorney General of California in 1985-86, 1987-88, and 1989-90. The Attorney General's surveys covered 7th, 9th, and 11th grade California public school students. Like the surveys reviewed above, the Attorney General's survey found a substantial reduction in drug use from 1985-86 to 1987-88, including a decrease in daily users of marijuana from 7.4 percent to 4.3 percent of 11th grade students. The survey also found that most young people's first intoxication experience involves alcohol and, although drug experimentation can begin at an early age (for example, in 1987-88, 5.6 percent of 7th graders reported they had tried a drug by the 6th grade), most experimentation takes place between the 9th and 11th grades.

Youth Who Are "High-Risk" Users Have More Social Problems Than "Conventional" Users

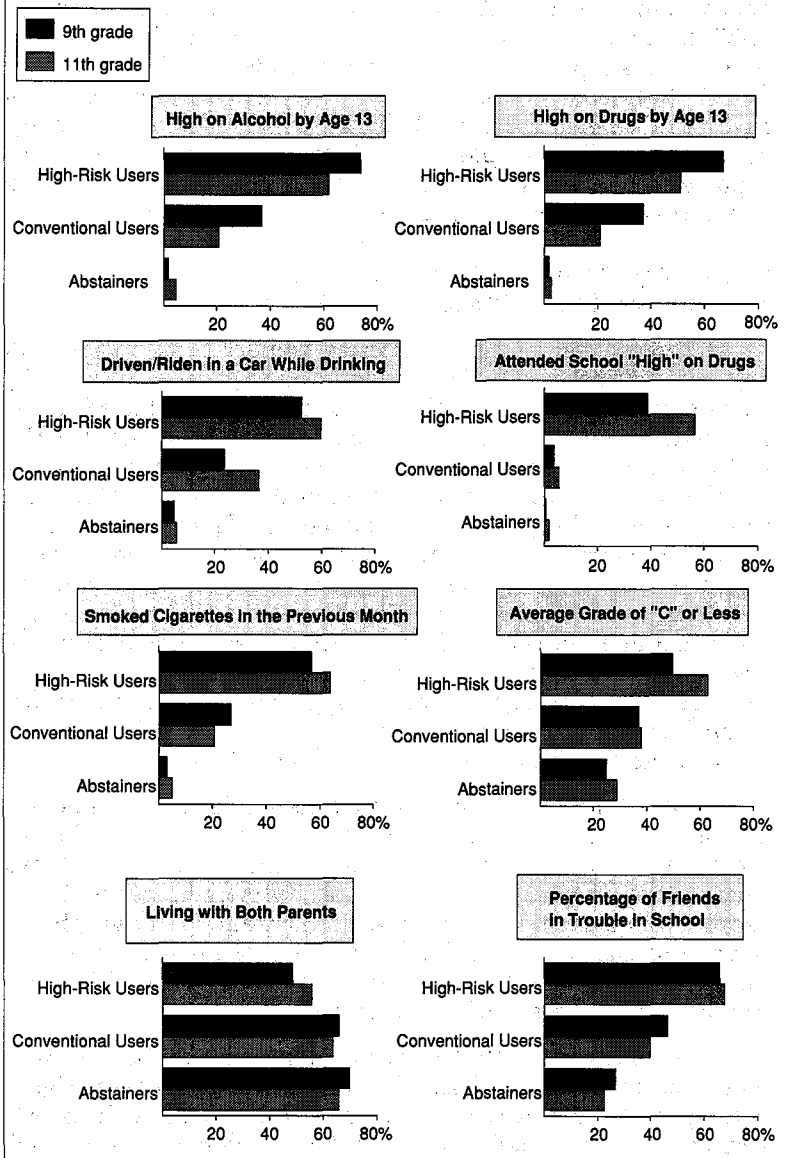
A report based on the Attorney General's survey provides separate estimates of "conventional" and "high-risk" users. High-risk users were defined as those who either (1) had used the less frequently tried and more dangerous drugs such as LSD or PCP, or (2) had used marijuana at least weekly, or (3) were polydrug users (including those who combined drugs and alcohol) on a number of occasions, or (4) had used cocaine. The survey identified 14 percent of 9th graders and 23 percent of 11th graders as high-risk users. However, with regard to the latter group, 60 percent of the 11th graders enrolled in continuation high schools were classified as high-risk users compared to 20 percent of regular high schools. The survey also identified 28 percent of the 9th graders and 19 percent of the 11th graders as abstainers (from alcohol and drugs) within the last six months and 57 percent of both 9th and 11th graders as "conventional" users.

Conventional users are defined as students who had used alcohol or drugs at least once in the past six months. The term "conventional user" was chosen since these students' use characterizes the use patterns of the majority of their peers. For example, conventional users were predominately those who had been intoxicated on alcohol at least once in the last six months. In general, conventional users used alcohol rather than illicit drugs and high-risk users used illicit drugs.

The survey found that there are significant differences in the characteristics of high-risk and conventional drug users. Figure 4 compares the characteristics of high-risk users with those of conventional users and abstainers. As the figure shows, high-risk users were less likely to live with both parents, tend to have lower grades, are more likely to have had earlier experiences with intoxication (age 13 or earlier), scored higher on measures of

Figure 4

California Public School Students Who Are "High-Risk Users" Differ from "Conventional Users" and Abstainers [a]



[a] Abstainers are defined as those who reported no use in the last six months.

Source: *Identifying High-Risk Substance Users in Grades 9 and 11, A Report Based on the 1987-88 California Substance Use Survey.* Rodney Skager, Sandra Firth, 1989.

school dropout potential, and more often engage in high-risk behavior, such as driving or riding in a car while drinking, smoking cigarettes, having friends who have gotten into trouble in school, and attending school while "high" on alcohol or drugs.

The survey also found that high-risk users were more likely to consider alcohol and drugs easy to obtain within their communities and to believe that students used drugs to have a good time or out of boredom. We discuss some of the policy implications of these differences in characteristics in our analysis of prevention programs (please see second following piece).

HEAVY DRUG USE

The National Surveys Are Poor Estimates of Heavy Use

While both the NIDA national household survey and the NHSSS provide reasonably good estimates of drug use among the general population, they miss certain segments of the population. Specifically, the NIDA survey does not include the homeless and persons living on military bases, in dormitories, or in other group quarters or institutions (such as hospitals and jails). The NHSSS only includes high school seniors and thus excludes dropouts. Therefore, these surveys may be missing some of the individuals who are most prone to heavy drug use.

For example, the NIDA survey does not give estimates for current heroin use since the responses it receives are too small to be significant. This is not surprising since heroin use is also considered to be one of the most deviant forms of drug use and therefore is less prevalent among the general population. Likewise, the NHSSS states that the effect of not surveying dropouts means its figures are low, but it estimates that the largest correction for most drugs, taking into account both dropouts and absentees, would be an increase of 7.5 percent. However, NHSSS states that, even with its corrections, it is unable to get a very accurate estimate for heroin use, and perhaps even for crack cocaine and PCP use, since these drugs represent the most deviant end of the drug-using spectrum. Therefore, the use of these drugs by dropouts may be much higher than their use by students who attend class.

Because of these methodological problems with the NIDA survey and the NHSSS, and because drug use by heavy drug users is a major public policy concern, it is important to examine other sources of data on this population. Below we summarize not only the NIDA estimates of heavy drug use but four other major sources of data on this population: The California Department of Alcohol and Drug Program's (DADP) estimate of "problem drug use," the Drug Abuse Warning Network (DAWN), the Drug Use

Forecasting (DUF) Program, and the DADP's California Drug Abuse Data System (CAL-DADS).

Heavy Drug Use: NIDA Survey Results Are Mixed

Until recently, NIDA did not ask any questions specifically about heavy drug use. In 1985, NIDA began to ask additional questions regarding heavy use of cocaine and marijuana, the most prevalent drugs. The NIDA reported in 1988 that the number of frequent users of marijuana declined by 28 percent from 1985. This decrease is not as steep as the decline in casual use, but is still substantial. On the other hand, although the number of current cocaine users *decreased* by 50 percent between 1985 and 1988, the number of heavy users—those who used cocaine at least once a week—*increased* by 33 percent (from 647,000 to 862,000). In addition, NIDA estimates that the number of daily, or almost daily, users of cocaine increased 19 percent between 1985 and 1988. The survey also found that, of the 2.9 million current cocaine users, almost 500,000 used crack cocaine. Thus, although current drug use and cocaine use declined in recent years, the heavy use of cocaine has increased.

The DADP Estimates There Are 2.1 Million Problem Drug Users in California

In 1983, the DADP contracted for a study to estimate the number of "problem drug users" in California. Problem drug users are defined as those who have smoked marijuana for 20 or more of the past 30 days, who have used opiates at least once in the past 30 days, or who have used any other drug (such as cocaine or hallucinogens) for nonmedical purposes for 5 or more of the past 30 days. Based on this study, the department estimated that, in 1986, there were 2.1 million problem drug users in California.

The department's estimate is frequently cited and it *does* suggest that there are a substantial number of problem drug users in California. However, even the department acknowledges that it is a very rough estimate. Moreover, because of the differences in how "problem users" and "heavy users" are defined by the DADP and NIDA, respectively, the department's estimate for California is *not* directly comparable to NIDA's national estimates.

Emergency Room Episodes and Drug-Related Deaths Have Greatly Increased During the 1980s

The DAWN collects data from hospitals and medical examiners on the number of times drugs are reported or mentioned in emergency rooms in certain Standard Metropolitan Statistical Areas (SMSAs) throughout the United States. In California, three

SMSAs are part of the DAWN system: Los Angeles, San Francisco, and San Diego.

Unlike the NIDA survey data, the DAWN data cannot be used to estimate the absolute number of heavy drug users. It does, however, provide a very good estimate of the *trends* in heavy use. In California, DAWN has recorded massive increases in emergency room admissions involving cocaine and therapeutic amphetamines (amphetamines, methamphetamine, etc.) since the early 1980s. Specifically, from 1983 to 1988, DAWN recorded the following increases in California:

- ***Cocaine.*** A 451 percent increase in emergency room episodes and a 457 percent increase in cocaine-related deaths.
- ***Therapeutic Amphetamines.*** A 157 percent increase in emergency room episodes and a 177 percent increase in therapeutic amphetamine-related deaths.
- ***Heroin/Morphine.*** A 122 percent increase in emergency room episodes and a 98 percent increase in heroin/morphine-related deaths.
- ***Marijuana.*** A 57 percent increase in emergency room episodes.

These data strongly suggest that there has been a large increase in the heavy use of cocaine and therapeutic amphetamines, with a smaller relative increase in heavy heroin/morphine and marijuana use. (The data did show a significant decrease of heavy use of one drug—PCP.) While the trends in heavy cocaine and amphetamine use reflected in the DAWN data may appear to contradict the declines in use by the general population reflected in the NIDA data, we believe that *both* estimates are valid. Specifically, the data suggest that casual or experimental drug use is substantially decreasing while heavy drug use is increasing.

Characteristics of Heavy Drug Users

Two other sources of data—the DUF Program and DADP's CAL-DADS—provide additional insights as to the characteristics of many heavy drug users.

Arrestees. The DUF Program conducts interviews and collects urine specimens from arrestees in large cities nationwide. Although the program is voluntary, over 90 percent of the arrestees asked to participate have given interviews and over 80 percent have provided urine specimens. The National Institute of Justice began the DUF Program in New York City in 1986 and has

been expanding it ever since. There are three DUF sites in California: Los Angeles, San Diego, and a new one in Santa Clara.

Currently, there is information available on arrestees (all types—drug-related and nondrug-related) for the period January through March 1988. The data indicate dramatically high levels of drug use. For instance, the percentage of male arrestees testing positive for any drug (not including alcohol) ranged from a low of 58 percent in New Orleans to a high of 82 percent in New York City. Los Angeles registered 74 percent testing positive (64 percent, excluding marijuana) and San Diego, 79 percent (69 percent, excluding marijuana). Female arrestees, although much fewer in number, registered slightly higher values. In Los Angeles 79 percent tested positive for drugs (73 percent, excluding marijuana). (Data for females is not available for San Diego.)

Again, the figures above are for *all* arrestees, not just those arrested for a *drug* violation. For example, in Los Angeles 84 percent of the male arrestees whose major charge at the time of arrest was robbery tested positive for drugs. Similarly, 83 percent of those arrested for burglary, 77 percent for larceny, and 71 percent for stolen property tested positive for drugs. Figure 5 displays some of the characteristics of arrestees interviewed by the Los Angeles DUF Program.

Drug Treatment Clients. The DADP collects data through the CAL-DADS on drug treatment clients who are admitted to publicly funded treatment centers and private methadone clinics. This data also provides some insight into the characteristics of heavy drug users, although since the system includes private methadone providers, the data is somewhat more representative of heroin addicts than of other heavy drug users. Figure 6 shows the characteristics of drug treatment clients, based on the information collected on CAL-DADS.

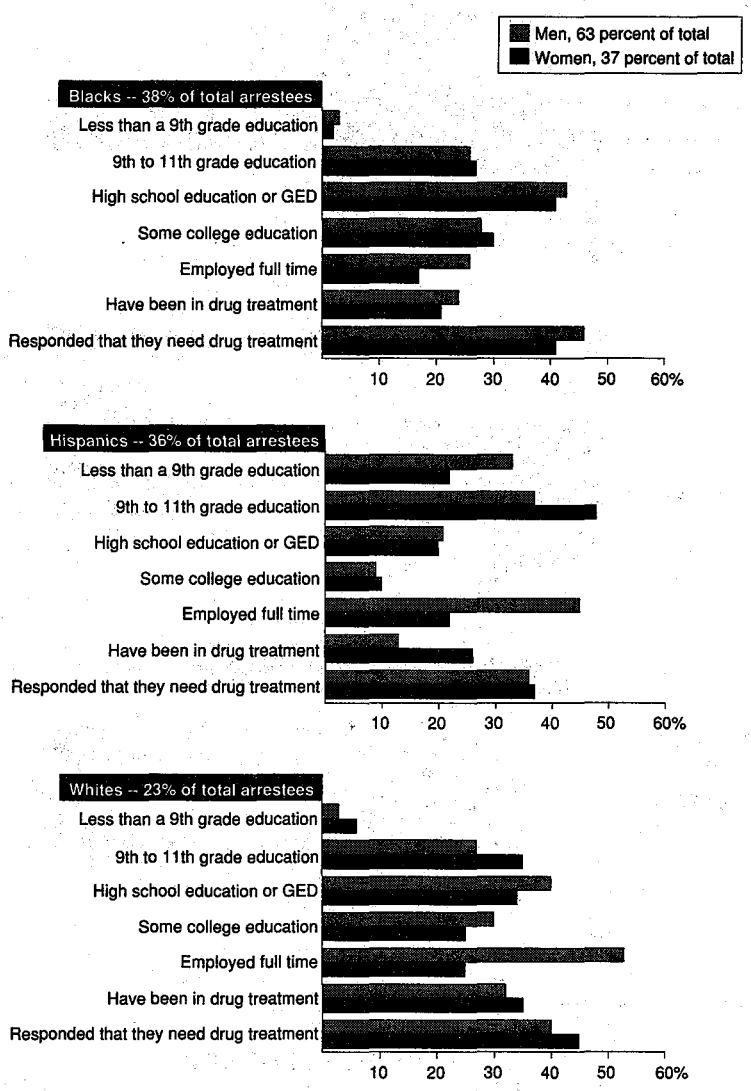
Taken together, Figures 5 and 6 provide a snapshot of the characteristics of two populations of heavy drug users: arrestees and treatment clients. The figures show that:

- ***Most Heavy Drug Users Have at Least a High School Education.*** Figure 5 shows that approximately 70 percent of black and white arrestees had at least a high school education. By comparison, only 30 percent of Hispanic males who are heavy drug users had at least a high school education.
- ***Heavy Drug Users Tend to Be Unemployed.*** The figures show that 71 percent of treatment clients are either seeking work or are out of the labor market altogether. The arrestee data shows that about half of the

Figure 5

Characteristics of Arrestees in Los Angeles County[a]

October 1987-August 1988



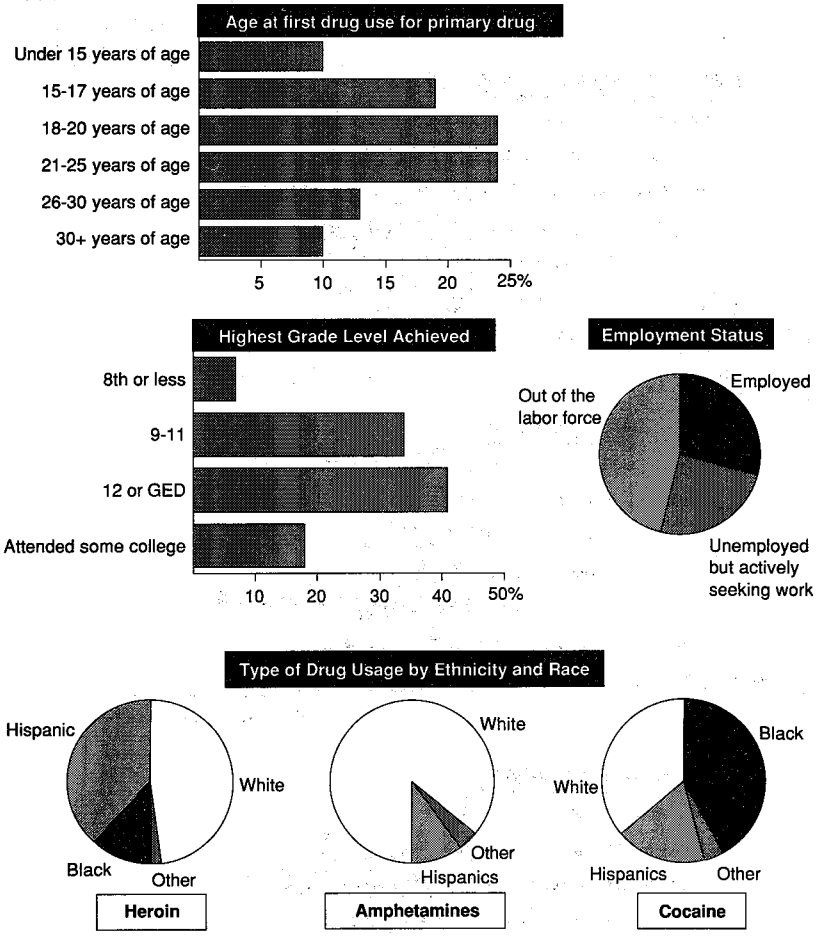
[a] Note: Not shown is the 3 percent of the arrestees who are not black, Hispanic, or white.

Source: *Annual Epidemiological Analysis of Los Angeles County Drug Use Forecasting Data,* UCLA Drug Abuse Information and Monitoring Project, April 1989.

Figure 6

Characteristics of Drug Treatment Clients

1988-89



Source: Department of Alcohol and Drug Programs.

white and Hispanic male arrestees were employed full time, as compared to one-fourth of black males.

- ***Drug Preferences Differ Substantially Along Ethnic and Racial Lines.*** Figure 6 shows that whites constitute 86 percent of the amphetamine users in drug treatment

and only 36 percent of cocaine users. On the other hand, blacks were 42 percent of the cocaine treatment admissions and only 12 percent of the heroin admissions. Hispanics were a significant portion of the heroin admissions.

In addition to the information shown in Figure 6, treatment data from the DADP indicate that the primary drug of choice among addicts differs substantially along geographic lines. For example, in 1987-88 amphetamine admissions were concentrated in the counties of Riverside, San Bernardino, and San Diego and also made up a large proportion of the admissions in rural counties. On the other hand, 46 percent of all cocaine admissions were in Los Angeles County. The counties with the next highest cocaine admissions were Orange County with 11 percent and San Francisco County with 6 percent of statewide cocaine admissions.

SUMMARY

Many Americans have experimented with drugs, but most experimenters have not gone on to become regular users. Among the general population, illicit use of most drugs has been decreasing steadily for many years, although cocaine use has dropped only since 1985. However, indicators of heavy drug use—such as emergency room drug-related admissions—indicate that heavy use of drugs has been increasing for most of this decade. This suggests that the drug-using population consists of two distinct populations—casual users whose numbers have been decreasing and heavy users whose numbers have been increasing.

Drug use among youth, as among the general population, has also been steadily decreasing. Survey data suggest that youth who use drugs regularly or have tried the more dangerous drugs (such as cocaine) are significantly different from the youth who abstain from alcohol and drugs, only use alcohol, or who use drugs infrequently. These frequent drug users have social and behavioral problems (such as poor grades) and engage in more high-risk behavior (like attending school while "high" on drugs). Lastly, treatment and arrestee data indicate that most heavy drug users are unemployed and most arrestees are under the influence of an illegal substance.

ALCOHOL USE AND ALCOHOL-RELATED PROBLEMS

While alcohol is legal for adults, there are still serious societal problems caused by the *misuse* of alcohol (for example, alcoholism and alcohol consumption by pregnant women) and the *illegal use*

of alcohol (for example, driving while intoxicated and the use by minors). Because of its legality, estimates of the amount of alcohol consumed are much more reliable than those for illicit drugs. In this part of the analysis, we review national and California-specific estimates of alcohol consumption as well as some of the data on alcohol-related problems. In addition, we describe alcohol use among youths and heavy drinkers.

ALCOHOL USE AMONG THE GENERAL POPULATION

Alcohol Consumption

As with drug use, per capita consumption of alcohol has been decreasing nationwide and in California since the late 1970s. The decrease in alcohol use, however, has been much more gradual than the decrease in drug use. Figure 7 shows California's consumption as compared to the rest of the nation for beer, wine, distilled spirits, and all alcoholic beverages. (Amounts are expressed in gallons of ethanol consumed, not in gallons of beverage consumed.) As the figure shows, California's per capita (age 14 and older) consumption of alcohol fell from 3.40 gallons in 1979 to 3.12 gallons in 1986 (the last year for which data are available)—a reduction of 8.2 percent.

Figure 7 also shows Californians drank 21 percent more alcohol per capita in 1986 than Americans nationwide, with most of the difference due to wine consumption. In 1986, Californians drank wine at twice the national per capita rate.

ALCOHOL USE AMONG YOUTH

Alcohol Use Among Youth Has Declined Only Slightly

The NHSSS reports only a slight decrease in alcohol use among high school seniors. Figure 8 shows the use of alcohol from 1975 to 1988 for this group. For all three categories—use within the past 30 days, 5 or more drinks in a row in one sitting within the past 2 weeks, and daily use—the survey found very slight gradual decreases. From 1979 to 1988, use within the past 30 days decreased from 72 percent to 64 percent, the number having 5 or more drinks in a row within the past 2 weeks decreased from 41 percent to 35 percent, and daily use decreased from 6.9 percent to 4.2 percent.

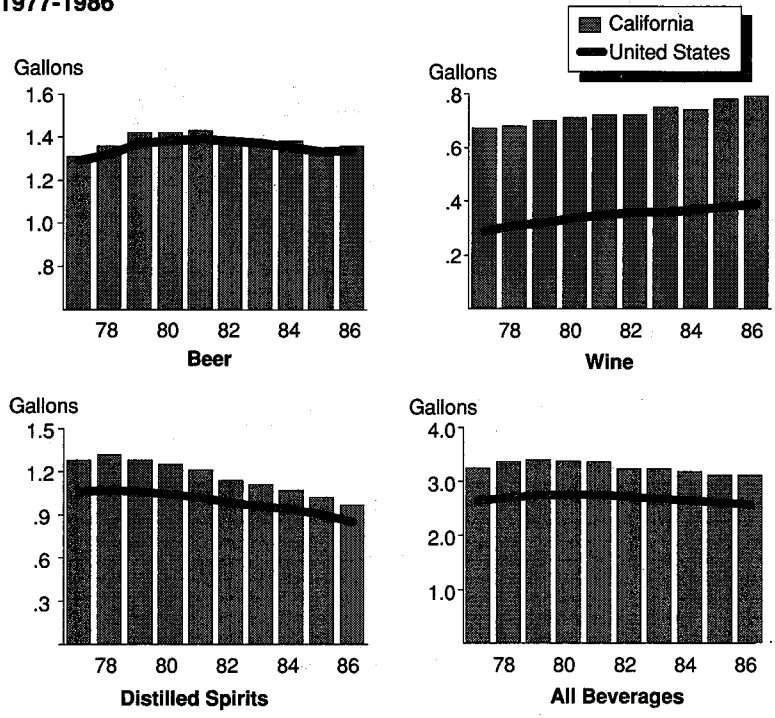
Experimentation Begins at an Early Age

The Attorney General's survey of California's students found that experimentation with alcohol begins at a substantially earlier age than does experimentation with illicit drugs. The survey

Figure 7

Annual Per Capita Consumption of Alcohol in Alcoholic Beverages, U.S. and California

1977-1986 [a]



[a] The per capita values are based on the population age 14 or older. Volumes are in gallons of ethanol consumed (not total liquid).

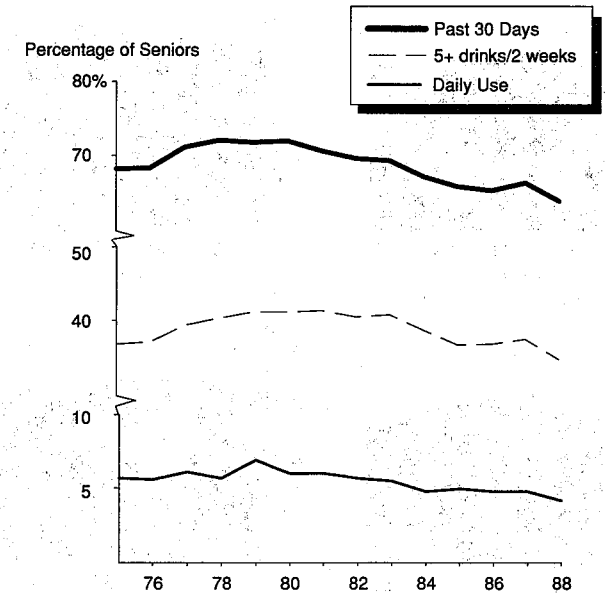
Source: Center for Disease Control, 1989.

reported that, in 1987-88, 46 percent of the 7th graders surveyed had tried alcohol at least once by the time they had reached the 6th grade. However, only 10 percent of them had been intoxicated at least once by that time. By comparison, 40 percent of 11th graders had been drunk at least once by the 9th grade and 62 percent by the 11th grade. Interestingly, only 64 percent of 7th graders said they thought their parents were "strongly against" their use of alcohol. This number dropped to 47 percent for 11th graders.

Figure 8

Alcohol Use Among High School Seniors
National High School Senior Survey

1975 through 1988



Source: Drug Use, Drinking, Smoking: National Survey Results from High School, College, and Young Adult Populations, University of Michigan, Institute for Social Research.

HEAVY ALCOHOL USE AND ALCOHOL-RELATED PROBLEMS

Ten Percent of Drinkers Responsible for Half of Total Consumption

In 1987, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) estimated that there were 18 million adults 18 years of age and older who experienced problems such as loss of memory, inability to stop drinking until intoxicated, inability to cut down on drinking, binge drinking, and withdrawal symptoms. The NIAAA defines persons with such dependent symptoms as alcoholics.

In addition, based on information from various studies, the NIAAA estimates that approximately one-third of the U.S. population age 18 and over are abstainers, one-third are light drinkers, and one-third are moderate to heavy drinkers. Although two-thirds of the adult population drink, consumption of alcohol is very unevenly distributed among the drinking population. NIAAA estimates that 10 percent of the drinkers, or 6.5 percent of the U.S. adult population, account for one-half of all the alcohol consumed in the nation.

Heavy Alcohol Use Is Significantly Higher Among Certain Subgroups

As we saw in drug use, there are racial, ethnic, and gender differences in alcohol use. The NIAAA reports that, with respect to gender, alcohol use differs as follows:

- Among all age groups, more men than women are drinkers, and of those who drink, there are significantly more heavy drinkers among men than among women. For example, among 18-29 year olds, NIAAA estimates that 81 percent of men are drinkers versus 73 percent of women. In this age group, 28 percent of the men are heavy drinkers, whereas only 7 percent of the women are classified as heavy drinkers.
- Among Hispanics, almost half of Hispanic women are abstainers, but less than one-fourth of Hispanic men abstain.

The NIAAA also reports the following ethnic and racial differences in alcohol use:

- Hispanic men have a higher rate of alcohol use and abuse than the general population.
- Abstention from alcohol is more common among blacks than among whites; and in addition, black men who drink are less likely than white men who drink to be heavy drinkers.
- American Indians and Alaskan Natives appear to have very high rates of alcohol abuse and alcoholism. For instance, in 1979 American Indian hospital discharges involving alcohol-related illnesses and injuries were more than three times the rate of the general population. In addition, the combined mortality rate from 1977 through 1979 for alcohol psychosis, alcoholism, and alcoholic cirrhosis of the liver was 57.3 per 100,000 American Indians and Alaskan Natives as compared to 7.4 per 100,000 for the overall population.

- Although alcohol use differs among Asian Americans of different origins, generally Asian Americans of both sexes drink significantly less than whites, blacks, or Hispanics.

Lastly, homeless persons are estimated to have a high rate of alcohol-related problems. For example, in 1988 the Rand Institute reported that 57 percent of the homeless in Alameda, Orange, and Yolo Counties had an alcohol abuse problem.

The data that the DADP collects on alcohol recovery clients is not as extensive as the data on drug treatment clients. For this reason, the department can only estimate the size and makeup of the clientele. The DADP estimates that for 1989-90, alcohol recovery clients are 78 percent male, 64 percent white, and 22 percent black, and predominantly between the ages of 25 and 44. Unlike the drug data, there is no information on their level of education or employment.

Alcohol-Related Problems Are Not Solely Confined to Heavy Users

A National Academy of Sciences report found that although the heaviest drinkers have the highest *rates* of alcohol-related problems, the larger number of light and moderate drinkers account for more of the total alcohol-related problems than heavy drinkers. As noted above, alcohol-related problems result in many different types of costs to individuals and society. For instance, during 1987, there were 45,533 alcohol-related motor vehicle accidents in the state that killed 2,754 Californians and injured 68,817. The number of people killed in alcohol-related motor vehicle accidents in California increased 14 percent between 1982 and 1987. About half of all the people killed—and one-fifth of the people injured—in motor vehicle accidents were in alcohol-related accidents.

In addition to traffic accidents, alcohol is a factor in many nontraffic injuries and deaths such as drownings, falls, fires, and suicides. The DADP estimates that from 20 percent to 25 percent of all hospital admissions are alcohol-related. Lastly, a pregnant woman can cause harm to her fetus if she consumes alcohol during her pregnancy. The DADP estimates that approximately 4,500 infants are born annually in California with either Fetal Alcohol Syndrome or Fetal Alcohol Effects, which are serious medical and developmental conditions directly related to alcohol use.

Almost Half of All Convicted Persons Had Used Alcohol Prior to Committing Their Crime

A 1985 U.S. Department of Justice study sampled county prisons to find out how many prisoners had been under the influence of alcohol at the time of their criminal activity. The study estimated that 48 percent of convicted persons had used alcohol prior to committing their crimes. As was the case with the drug data presented earlier, alcohol was a factor in a wide variety of crimes, not just with infractions associated with alcohol consumption itself, such as public drunkenness or driving under the influence. For example, the study estimated that 54 percent of violent crimes and 40 percent of property crimes were performed under the influence of alcohol. If this national data is considered together with the DUF arrestee data presented earlier, it is clear that many crimes are committed under the influence of *both* drugs and alcohol.

SUMMARY

The consumption of alcohol has been decreasing, but at a much slower rate than drugs. As with drug use, alcohol is used by a large portion of the society, but at varying levels of use. Although two-thirds of the population drink alcohol, 10 percent of the drinkers consume half of all the alcohol.

Alcohol experimentation begins at an early age, much earlier than drug use. Although alcohol is illegal for teenagers, many students reported that they did not think their parents were strongly against their drinking it. Finally, the misuse of alcohol results in serious health and safety problems for both individuals and society.

Second in a Series of Three Drug-Related Pieces

Anti-Drug Programs in California

How Will the Recently Enacted Federal Drug Control Legislation Affect California's Drug Control Programs?

Summary

California will spend more than $1 billion (all funds) for anti-drug programs in the current year. Local expenditures, though difficult to quantify, are probably close to $2 billion. Of the amount spent by the state, almost 70 percent is for enforcement activities. The remainder is spent on the treatment, prevention, and research programs.

As a result of new federal legislation, California will receive a minimum of $100 million in additional federal grant funds available for expenditure beginning in 1989-90 to assist in the fight against substance abuse. The Governor's Budget provides little information on the administration's expenditure plan for these funds. In order for the Legislature to assess the direction of the state's anti-drug programs, the Department of Finance and specified state agencies should report to the Legislature, prior to budget hearings, on the proposed expenditure plan for these monies.

Background

In September 1989, President Bush proposed the first phase of a major new "National Drug Control Strategy," which included requests for federal funding for various anti-drug programs and proposals for changes in federal and state laws. Congress enacted the funding provisions of the strategy, and as a result, California will receive substantial increases in federal funds for anti-drug programs in the current and budget years. The additional funds provide the Legislature with an opportunity to assess California's current expenditures for various drug programs and more sharply focus the state's response to substance abuse.

In this analysis, we review the state's current efforts to control drug abuse through enforcement, treatment, prevention, and research programs. We then examine the changes in federal funding resulting from the President's National Drug Control Strategy. This analysis is designed to assist the Legislature as it considers the options and opportunities available to California as a result of the increased federal funding.

CALIFORNIA'S CURRENT ANTI-DRUG EFFORTS

In order to assess the possible uses of the increased federal funds, it is necessary to know what anti-drug programs currently operate in California, both at the state and local levels. We were able to identify most expenditures at the state level, but because of data limitations, were unable to quantify expenditures at the local government level. It should be noted that our discussion of state and local anti-drug programs includes programs designed to curb the use of both alcohol and other legal and illegal drugs.

State Anti-Drug Programs

Anti-drug programs at the state level can be grouped in one of four categories: *enforcement* programs, *prevention* programs, *treatment* programs, and *research* programs. The total funding levels for these programs in the current year are displayed in Figure 1. It indicates that the state will spend $940 million for anti-drug programs in 1989-90. (For reasons discussed below, this figure should be viewed as the *minimum* amount spent by the state. Actual expenditures are probably much greater.)

As the figure shows, enforcement of drug control laws represents the largest expenditure category for state programs. Federal funding is concentrated primarily in the treatment and prevention categories. In both cases, federal expenditures are roughly

Figure 1

State Expenditures for Anti-Drug Programs

1989-90
(in millions)

Categories	Federal	State	Total
Enforcement	$19.3	$626.6	$645.9
Treatment	94.7	95.1	189.8
Prevention	51.1	39.3	90.4
Research	13.5	0.7	14.2
Total	$178.6	$761.7	$940.3

equivalent to state expenditures. Federal funding provides the bulk of the drug research funding for the state but only a small portion of total spending for enforcement.

Figure 2 provides a detailed listing of the anti-drug programs summarized in Figure 1. Below, we highlight some of the major programs in each category.

Enforcement. We estimate that the state will spend about $646 million for enforcement of drug control laws in 1989-90. The cost of incarcerating drug offenders in state prisons ($501 million) far exceeds all the other identified expenditures in this category, representing about 78 percent of the total spending on enforcement. Drug offenses include possession, manufacture, sale or transportation of illegal drugs. Most of the programs in this category are related to direct enforcement of drug laws by state agencies.

The total enforcement amount includes only those costs *directly* identified as related to imprisonment of drug offenders. In addition, there are many other persons incarcerated for crimes committed as a result of substance abuse (such as burglary to support a heroin habit or assault and battery while under the influence of alcohol), the costs of which are *not* included in the total. We know that these types of crimes represent a large percentage of the total enforcement costs. For instance, 76 percent of state prison inmates have a history of substance abuse. In addition, data collected on a sample of arrestees in Los Angeles indicate that 74 percent of the males and 79 percent of the females tested positive for drugs.

There are also court-related costs which are not included in the enforcement totals of Figures 1 and 2, because these costs cannot be quantified. This is because it is impossible to determine the amount of time and work required by courts to try drug offenders. We do know, however, that the state will spend almost $630 million for court programs in the current year, with a sizeable portion of that amount attributable to drug offenses.

Treatment. The second highest category of state expenditures for anti-drug programs is treatment, with almost $190 million in 1989-90. Almost two-thirds of the state's expenditures for drug treatment is concentrated in the Department of Drug and Alcohol Programs (DADP). The DADP subvenes monies to county offices of alcohol and drug programs, which fund methadone detoxification and maintenance programs as well as alcohol recovery homes and drug-free outpatient and residential programs. In addition, the state funds several treatment programs for inmates, wards, and parolees through the Departments of Corrections and the Youth Authority.

Figure 2

State Anti-Drug Programs

1989-90
(in millions)

Department/Program	Description	Federal	State	Total
Enforcement Programs				
Corrections				
Incarceration and supervision	Incarceration and parole supervision of drug offenders.	—	$500.8	$500.8
Drug testing	Drug testing for parolees.	—	1.5	1.5
Youth Authority				
Incarceration and supervision	Incarceration and parole supervision of drug offenders.	—	34.0	34.0
Drug testing	Drug testing for parolees.	—	0.2	0.2
Justice				
Bureau of Narcotic Enforcement	Statewide law enforcement for narcotics dealers and clandestine drug manufacturers operating in multiple jurisdictions.	—	39.4	39.4
Asset Forfeiture	Seizure of assets earned by illegal narcotics activity.	—	0.2	0.2
Campaign Against Marijuana Planting (CAMP)	Coordination of multi-agency task force program to destroy marijuana.	$0.5	—	0.5
Judiciary				
Trial and appellate courts	Court proceedings for drug-related offenses.	—	Unknown	Unknown
Office of Criminal Justice Planning				
Anti-drug abuse grant programs	Local assistance to various criminal justice agencies for drug-related enforcement activities.	15.8	—	15.8
Marijuana eradication	Grants to selected counties for marijuana eradication and prosecution.	—	2.2	2.2
Major Narcotics Vendor Prosecution	Grant program to counties for support of prosecution in major drug cases.	—	2.8	2.8
Alcoholic Beverage Control				
Licensing and compliance	Licensing the sale of alcoholic beverages. Enforcement of licensing regulations.	—	22.5	22.5
Motor Vehicles				
Discretionary Driving Under the Influence (DUI) actions	Imposing and processing various discretionary actions relating to drivers with an identified substance abuse problem.	—	2.5	2.5
Various mandatory DUI actions	Processing of actions taken when drivers are convicted of of DUI of drugs or alcohol.	—	4.3	4.3

Department/Program	Description	Federal	State	Total
Enforcement Programs—CONTD				
California Highway Patrol				
Traffic management	DUI arrests, narcotics drug enforcement, public relations, drug influence recognition and eradication.	—	14.4	14.4
Office of Traffic Safety				
Community alcohol programs	Special DUI enforcement in 10 communities and a public awareness program. Program education and development.	0.7	0.7	1.4
Various programs	Training to law enforcement and the public, studies and pilot programs.	2.3	—	2.3
Commission on Peace Officers Standards and Training (POST)				
Peace officer training	Courses offered in the areas of alcohol and drug awareness and investigation.	—	0.3	0.3
Board of Corrections				
Peace officer training	Courses offered in the areas of alcohol and drug awareness and investigation.	—	0.6	0.6
Parks and Recreation				
Training	Drug and alcohol training for peace officers.	—	0.2	0.2
Total, Enforcement Programs		$19.3	$626.6	$645.9
Treatment Programs				
Alcohol and Drug Programs				
Various treatment programs	Programs include methadone detoxification and maintenance and alcohol detoxification programs.	$69.6	$51.6	$121.2
Health Services				
Medi-Cal	Heroin detoxification.	0.8	0.8	1.6
Medi-Cal	Health care related to drug and alcohol abuse.	Unknown	Unknown	Unknown
Medically Indigent Services Program	Funds health care related to drug and alcohol abuse, which is provided by counties.	Unknown	Unknown	Unknown
Perinatal substance abuse pilot programs	Funding for prenatal infant care and case management substance abusing mothers.	1.8	—	1.8
Social Services				
Various programs	Programs that target children in families with drug- or alcohol-abusing members, including court dependent and addicted babies.	0.1	2.1	2.2
Alcohol/drug abuse recovery or treatment facilities for adults	Licensing.	—	0.2	0.2

Department/Program	Description	Federal	State	Total
Treatment Programs—CONTD				
Rehabilitation				
Drug and alcohol programs	Basic vocational rehabilitation services to disabled individuals.	22.4	5.0	27.4
Corrections				
Treatment for paroles	Parole programs targeted to substance-abusing parolees.	—	14.2	14.2
Treatment for inmates	Prison programs targeted to substance-abusing inmates.	—	1.1	1.1
Youth Authority				
Treatment for wards	Educational and counseling services in camps and institutions.	—	15.8	15.8
Various				
Employee Assistance Programs	Drug and alcohol counseling for employees of state agencies and licensed professionals.	—	4.3	4.3
Total, Treatment Programs		$94.7	$95.1	$189.8
Prevention Programs				
Alcohol and Drug Programs				
Various prevention programs	Primarily local programs targeting specific groups, provided through county subvention process.	$25.7	$17.7	$43.4
Education				
Federal Drug Free Schools and Communities Act	Funds to school districts for drug and alcohol use prevention.	21.0	—	21.0
Higher Education				
Educational Courses	Various educational courses that cover the academic study of drug and alcohol abuse.	—	3.0	3.0
Drug and Alcohol Problem Management Consortia	Seven regional consortia projects provide information and technical assistance on developing and improving substance abuse programs at member institutions.	0.2	—	0.2
Office of Criminal Justice Planning				
Comprehensive Alcohol and Drug Prevention Education (CADPE)	Grant program provides funds to school districts for coordinated alcohol and drug prevention strategies among schools, law enforcement, and community organizations.	4.2	18.6	22.8
Total, Prevention Programs		$51.1	$39.3	$90.4

Department/Program	Description	Federal	State	Total
Research Programs				
University of California				
Alcohol and drug abuse programs	Numerous research projects related to substance abuse.	$12.9	$0.7	$13.6
Various state agencies				
Various research	Alcohol and drug-related.	0.6	—	0.6
Total, Research Programs		$13.5	$0.7	$14.2
Total, All State Anti-Drug Programs		***$178.6***	***$761.7***	***$940.3***

The state's Medi-Cal program provides assistance to thousands of low-income persons, many of whom suffer from medical problems resulting from alcohol or drug use. Expenditures for Medi-Cal services in the current year are about $7 billion, about half of which is from state funds and half from federal funds. Because of data limitations, it is not possible to quantify the portion of this amount that is devoted to this treatment. However, every 1 percent of total Medi-Cal expenditures which is devoted to treatment of persons for alcohol and drug-related health problems adds $70 million to the total amount in the treatment category.

In addition, the state currently spends about $400 million for the Medically Indigent Services Program (MISP), which provides funding to counties for health services for indigent persons. There is no data on the amount of MISP funding devoted to care and treatment of alcohol and drug-related health programs.

Prevention. Programs designed to prevent alcohol and drug use represent the third highest category of the state's anti-drug expenditures. About $90 million will be spent for these programs in the current year. These programs are administered primarily by three state agencies: the DADP, the State Department of Education (SDE), and the Office of Criminal Justice Planning (OCJP). The largest state expenditures in this category are for the programs administered by DADP ($43 million), which subvenes most of these funds to county offices of alcohol and drug programs. The OCJP provides prevention programs through its Comprehensive Alcohol and Drug Prevention Education (CADPE) program, while the SDE serves primarily as a conduit to local agencies for federal prevention funding. For a detailed discussion of the state's expenditures on prevention programs, see "Drug Prevention in California" following this analysis.

Research. Alcohol and drug research supported by the state is primarily conducted by the University of California. The bulk of this research, which totals $14 million in the current year, is supported by federal funds.

Local Anti-Drug Programs

In addition to federal and state funding for anti-drug programs (much of which is "passed through" to local governments), local entities also spend millions of dollars annually from their *own* revenues on anti-drug programs. In reviewing data on local spending, however, we found that it is not possible to identify all the funding sources and amounts for these programs. This is because anti-drug programs are generally part of a broader reporting category (for example, a local alcohol prevention program might be included in "public health" expenditures). It is possible, however, to offer some general comments on the categories in which local governments spend money for drug control.

Enforcement. Enforcement is also the largest segment of local government expenditures related to anti-drug efforts. Local governments bear the costs for enforcement of drug control laws through county sheriff's, county probation, and city police departments. These law enforcement agencies spend in excess of $5 billion per year statewide to investigate, make arrests, supervise, and incarcerate persons for all crimes. In 1988 nearly 30 percent of all arrests at the local level were for drug-related offenses. *If* the costs were strictly proportional to arrests, the total amount spent by local entities on enforcement costs would be about $1.5 billion.

In addition to the sheriff's, probation, and police expenditures related to drug control, local governments also bear the costs of prosecuting drug offenses and defending indigent defendants through the district attorney's and public defender's offices, respectively. The annual costs for these functions is over $600 million statewide, some sizeable portion of which can be attributed to cases related to substance abuse.

Treatment and Prevention. Other local agencies also bear major costs of drug treatment and prevention services. For example, when indigent substance abusers use a county hospital emergency room, or are admitted to a county hospital, it is often the local agency that absorbs the cost of treatment. In addition to the funds provided by the state, counties spend almost $1 billion in local health care and public health programs. An unknown portion of this amount is related to the effects of substance abuse. Counties also spend an unknown amount of their funds to provide follow-up care and other services (such as homeless shelters) for indigent substance abusers. Local agencies may also provide family counseling and support services to local residents who are victims of substance abuse. In addition, local school districts spend funds for school-based prevention and education programs that are not funded by the state and for the costs of supporting teachers to deliver drug and alcohol education curricula.

In summary, although we cannot precisely quantify the amount local agencies spend on anti-drug programs, the total could easily be close to, or in excess of, $2 billion.

THE NATIONAL DRUG CONTROL STRATEGY

The Bush Administration's strategy released in September was the first of a two-part plan. In the first phase, the president requested $7.9 billion in federal spending for various anti-drug programs. In late November, the Congress increased the president's request and appropriated a total of $8.8 billion for the programs. Although much of the additional funding is confined to federal programs (such as defense and federal prison programs), there are also substantial increases in grant funds available to states.

In this section, we describe the Bush Administration's recommendations for changes in state law, detail the additional federal funds that will be available to California, and provide an overview of the uncertainties about the plan that the Legislature may wish to monitor.

Suggested State Legislation

The Bush Administration recommended that states enact a variety of drug control statutes. Enactment of these statutes is not currently a *requirement* to receive additional federal money. In reviewing the National Drug Control Strategy, we found that the California Legislature has already enacted much of the recommended legislation.

Specifically, the President suggested that states adopt the following:

- ***Mandatory Sentences for Drug Offenses.*** These sentences would carry prison terms for serious drug crimes.
- ***Alternative Sentences for Some Offenses.*** These sentences would include a variety of penalties for drug offenses, including community service, house arrest, and work on environmental projects.
- ***Asset Forfeiture Laws.*** These laws allow confiscation of property that is presumed to be used in facilitating illegal drug transactions. The Administration suggested that states earmark the funds to law enforcement programs.
- ***Schoolyard Laws.*** These laws provide additional penalties for anyone selling or using drugs around a schoolyard or place frequented by children.

- ***Penalties for Drug Possession.*** These laws provide penalties for possession of even a small amount of illegal drugs, such as losing a driver's license.
- ***Drug-Free Workplace Statutes.*** The Administration recommends all state and municipal employers be required to take personnel action against employees found to be using drugs.

Our analysis indicates that most of the provisions suggested by the Bush Administration have already been enacted in California in some form. For instance, the state's determinate sentencing laws provide minimum prison sentences for many drug offenses. The state also has specific laws prohibiting certain drug activities near schools, and laws permitting forfeiture of assets earned as a result of illegal drug activities.

Federal Funding for California

The Congress appropriated additional monies for grant programs that are available to the states. Although the President originally proposed funding his National Drug Control Strategy by redirecting funds from State Legalization Impact Assistance Grants (SLIAG) under the federal Immigration Reform and Control Act, that proposal was rejected by Congress. Had the President's original proposal been enacted, it could have had a significant impact on California, which is estimated to receive almost $2 billion in SLIAG funds over an estimated five-year period.

There are three major federal grant programs that provide funds to states for drug programs: the Drug Control and System Improvement Formula Grant Program; Alcohol, Drug Abuse, and Mental Health Services Block Grant Program; and Drug Free Schools and Communities Block Grant Program. These grants are referred to as "formula" grants because they are allocated to the states on the basis of a formula that takes into account a state's population and other distinguishing characteristics. Of the total amount appropriated by the Congress for the federal plan, approximately $2.2 billion was provided for these various formula grants. Although some of the grants are used to support programs at the state level, the majority pass through state agencies and are spent at the local level.

We estimate that California will receive approximately $209 million for these grants in federal fiscal year (FFY) 1990 (October 1989 to September 1990), an increase of about $100 million, or 91 percent, above the amount provided in FFY 1989. The additional federal funding should be available for expenditure in both 1989-90 and 1990-91, the state fiscal years which overlap with FFY

1990. In some cases, the state will have as long as three years to spend the funds. Figure 3 compares the 1990 amounts for the three grants to the 1989 amount.

Figure 3

Federal Anti-Drug Funding for California

(dollars in millions)

Formula Grant Programs	FFY 1989[a]	FFY 1990[b]	Change
Drug Control and System Improvement	$10.8	$39.7	268%
Alcohol, Drug Abuse, and Mental Health Services (substance abuse portion only)	68.5	120.7	76
Drug Free Schools and Communities	30.0	48.4	61
Totals	$109.3	$208.8	91%

[a] October 1, 1988 through September 30, 1989.
[b] October 1, 1989 through September 30, 1990.

We provide details on the three grant programs below.

Drug Control and System Improvement Grants. California will receive $40 million in FFY 1990, an increase of 268 percent. These funds can be used for virtually any law enforcement function. Federal law requires the state to allocate 64 percent, ($25.5 million) to local law enforcement agencies and 36 percent ($14.1 million) for state agencies and administration.

The federal government made changes to this program when the new funds were appropriated. In the past, states were allowed to allocate up to 10 percent of the grant for administration of the program. This year, only 5 percent is allowed for administration.

We describe the Governor's proposals for use of these funds in our analysis of the OCJP in the *Analysis of the 1990-91 Budget Bill* (please see Item 8100).

Alcohol, Drug Abuse, and Mental Health Services (ADMS) Block Grants. We estimate that California's share of the ADMS Block Grants will be $140.1 million for FFY 1990, of which $120.7 million is for alcohol and drug abuse programs and $19.4 million is for mental health programs. This grant has a number of constraints on its use that require specific expenditure levels for particular program areas. For example, federal law requires that at least 35 percent of the block grant be used for alcohol programs and at least 35 percent for drug programs.

It is not clear whether additional constraints will be placed on these grant funds. At the time this analysis was prepared, there

were still several issues which were awaiting action in Congress. Among the items under discussion are how to allocate the funds, whether treatment programs should be required to show greater accountability, and whether additional portions of the grant should have categorical restrictions. This grant program is discussed in our analysis of the DADP in the *Analysis* (please see Item 4200).

Drug Free Schools and Communities Block Grant. Based on information furnished by the DADP, we estimate that California will receive approximately $48.4 million in federal grants under this program. About $35 million of these funds will go directly to the SDE, with the remaining funds being the "Governor's discretionary funds." In the current year, the Governor's discretionary funds are allocated to the DADP, OCJP, and the Department of the Youth Authority.

With the FFY 1990 appropriation, the grant was amended to create a new program to be funded out of the Governor's discretionary monies. Federal law requires that this new program provide funds to local education agencies at the discretion of the Governor. (Please see Item 6110 of the *Analysis* for our discussion of the SDE portion of these funds and Item 4200 for our discussion of the new Governor's discretionary funds.) At the time this analysis was prepared, no details were available on the new program.

Uncertainties About the Federal Program Remain

The second phase of the President's plan was released in late January 1990. Although the specific provisions of the second phase were not available at the time this analysis was prepared, it appears that the state and local governments could receive *even greater* federal funding in the budget year under the President's proposal. Los Angeles and certain parts of southern California may receive increased funding if designated as a high-intensity drug trafficking area.

Until Congress acts on the the second phase of the President's plan and all regulations are in place, it is impossible to predict what the final result will be. However, we do know that during the past year several changes in the grant requirements were considered, such as:

- Requiring drug testing of inmates and persons arrested for various crimes as a prerequisite to receiving federal criminal justice funds.
- Strengthening accountability requirements for drug and alcohol treatment and prevention programs.

- Requiring all states receiving federal drug funds to have a written state strategy.
- Requiring schools receiving substance abuse funds to develop plans and sanctions for drug-abusing faculty, students, and staff.

At this time, however, it is not clear whether any of these alternatives will be implemented as a requirement for receipt of federal funds.

Legislature Needs Information

We recommend that the Department of Finance, in conjunction with other state agencies, report to the Legislature prior to budget hearings on the administration's proposed expenditure plan for new federal drug control funds.

Based on the information presented above, we estimate that California will receive at least an additional $100 million in federal funds for expenditure in 1989-90 and 1990-91 for anti-drug programs. At this time, however, there is a lack of data on how the administration proposes to spend all of the additional money, and, more specifically, how much will actually be available for expenditure in the budget year. The Legislature needs information to determine whether the proposed expenditures of the increased federal funds is consistent with a balanced approach to substance abuse problems in California and meets the priorities of the Legislature.

In order to adequately address these issues, we believe the administration should provide the Legislature with a comprehensive plan of how it proposes to expend these funds. Accordingly, we recommend that the Department of Finance, in conjunction with the DADP, the SDE, the Department of Justice and the OCJP, report to the Legislature, prior to budget hearings, on its proposed expenditure plan for the additional federal funds. The report should provide information on new programs (their scope and function) as well as information on programs that will be expanded. The report should also note where federal grant money will be replacing existing state funds.

Third in a Series of Three Drug-Related Pieces

Drug Prevention Programs

How Can the Legislature Improve Its Strategy for Preventing Drug Problems?

Summary

The budget proposes to spend over $100 million in state and federal funds for educational and social services programs designed to prevent drug and alcohol abuse. More than one-half of this amount is for school-based programs. Our review of the research on substance abuse suggests that a relatively small subgroup of youths will go beyond experimentation to develop serious substance abuse problems. It therefore appears that drug abuse prevention strategies that focus primarily on discouraging experimental use are too broad-based in their approach. Moreover, these kinds of programs have been extensively evaluated and have not been shown to be effective. We therefore conclude that the best strategy for school-based programs would be to encourage school districts to emphasize programs that target "high-risk" youth.

Community-oriented prevention programs have not been rigorously evaluated. However, one promising approach, which is currently being used in the area of alcohol abuse, is community organization, which is designed to get communities involved in ridding their neighborhoods of environmental factors that contribute to substance abuse problems, such as high concentrations of bars and stores that sell alcoholic beverages. We therefore recommend that the Department of Alcohol and Drug Programs evaluate the current efforts in the alcohol field and help counties develop similar approaches with respect to other drugs.

In general, there is a great deal of uncertainty about what works and what does not work in the prevention field. We therefore recommend that the Legislature encourage programmatic experimentation at the local level and evaluation and information sharing at the state level.

INTRODUCTION

The Department of Alcohol and Drug Programs (DADP) estimates that in 1985 alcohol abuse cost California $11.7 billion and drug abuse $6.0 billion due to reduced productivity, increased mortality and morbidity, increased crimes and accidents, and increased needs for social services. For 1990-91, the budget proposes to spend approximately $100 million on substance abuse prevention programs. These programs provide a variety of educational and social services—such as classroom instruction, counseling, and community outreach—to prevent substance abuse by either (1) focusing on preventing the onset of use (primary prevention) or (2) stopping abuse before it leads to addiction (early intervention). Obviously, these programs do not represent all of California's efforts to prevent alcohol and drug problems. For example, they do not include alcohol and drug treatment programs, or law enforcement's efforts to reduce the supply of illicit drugs and to prosecute individuals who use illegal drugs or who use alcohol illegally (such as drunk drivers and underage drinkers).

In order to assist the Legislature in reviewing the social services and educational components of the state's overall strategy for preventing substance abuse, we have reviewed the research literature on the causes and consequences of substance abuse and the effectiveness of prevention programs. In this piece, the third of three pieces dealing with drugs and alcohol, we provide an overview of the state's prevention programs, review school-based and community-based prevention programs, and provide our recommendations for improving California's substance abuse prevention programs.

OVERVIEW OF CALIFORNIA'S PREVENTION PROGRAMS

Alcohol and drug prevention programs in California are administered by three different state departments—the DADP, the State Department of Education (SDE), and the Office of Criminal Justice Planning (OCJP). In addition, the California State University, University of California, and the California Community Colleges provide educational courses on substance abuse issues. Figure 1 displays the amounts proposed for the programs in 1990-91 (not including administrative costs) by funding source, and presents a brief description of each program. In addition, the figure shows the prevention-oriented technical assistance provided to local governments by the departments. The figure is a more detailed presentation of California's prevention programs than that presented in the preceding analysis, "Anti-Drug Programs in California."

The figure shows that the budget proposes to spend $103 million in state and federal funds on prevention programs. The DADP estimates that counties will spend an additional $9.3 million in local matching and other local funds on prevention programs and we estimate that local education agencies will spend approximately $14.1 million in local funding (district general fund and private funds) on drug and alcohol prevention programs. In addition, we estimate that the annual cost of teacher time to deliver prevention curriculums is from $18 million to $48 million.

As we note in the previous analysis, the budget does *not* include a substantial amount of additional federal funds that we believe will be available to California as a result of recent congressional action on the President's drug control program. Of the additional federal funds, we estimate that the following amounts will be available for prevention programs: (1) $14 million in Drug-Free Schools and Communities (DFSC) block grant funds available for allocation to the SDE; (2) $1.5 million in DFSC block grant funds for the DADP; (3) $2.7 million of DFSC block grant funds for a new program, which requires the Governor to fund programs in local education agencies; and (4) at least $12 million of Alcohol, Drug Abuse, and Mental Health Services (ADMS) block grant funds for the DADP. We discuss these additional federal funds in our *Analysis of the 1990-91 Budget Bill* (please see Items 6110 and 4200).

Figure 1 groups prevention programs into three major categories—school-based programs, community-based programs, and technical assistance. As the figure shows, the budget proposes $54 million for school-based programs, $42 million for community-based programs, and $3.3 million for technical assistance. We discuss each of these categories in more detail below.

REVIEW OF SCHOOL-BASED PREVENTION PROGRAMS

School-based programs designed to prevent the use of drugs and alcohol are generally of two types: (1) curriculum programs, which are delivered to the general school population and (2) high-risk youth programs, which are targeted at students who are using, or who have been assessed as being at high risk of beginning to use, alcohol or drugs.

These programs are provided in the schools but are administered at the state level by the DADP, SDE, and the OCJP. The state does not collect specific data on how school districts spend the monies they receive from the state for school-based programs.

PROGRAMS	DESCRIPTION	GENERAL FUND	FEDERAL FUNDS	TOTALS
Community-Based Programs—contd				
Tule River Indian Health Program	Provides peer support and alcohol education training to teen women who then become voluntary trainers and counselors in the American Indian community.	—	48	48
Modoc Indian Health Project	Provides alcohol prevention and outreach programs to American Indian women in Modoc County.	—	25	25
Red Ribbon campaign	Supports an annual statewide anti-drug campaign during Red Ribbon week.	—	30	30
Subtotals, Community Programs		$14,466	$27,463	$41,929
Technical Assistance to Local Governments				
SDE:				
Technicalassistance	Funds workshops and a resource center to assist school districts with planning and implementing prevention programs.	—	$1,575	$1,575
DADP:				
Prevention coordination	Supports a statewide prevention network comprised of alcohol prevention coordinators from each county.	—	55	55
Prevention roundtable	Supports an annual prevention roundtable of experts from the alcohol and drug prevention field.	—	40	40
COA and SAP evaluation	Evaluates the COA and SAP programs.	—	205	205
County drug program administrators	Funds regular meetings between the DADP and the county drug program administrators.	—	77	77
Technical assistance contracts	Funds the DADP contracts with a variety of organizations to provide technical assistance on specific issues, such as women's and Asian/Pacific Islander concerns.	—	253	253
Prevention resource system	Provides clearinghouse services (operated by the DADP) to collect, analyze, and disseminate information to counties, practitioners, and health care professionals.	—	500	500

PROGRAMS	DESCRIPTION	GENERAL FUND	FEDERAL FUNDS	TOTALS
Technical Assistance to Local Governments—contd				
Public policy	Provides training and technical assistance (including distribution of a manual) to counties to develop policies that address alcohol-related problems in their communities.	—	165	165
Drug abuse information and monitoring project	The DADP has contracted with the University of California at Los Angeles to establish an electronic drug abuse information collection and dissemination system to monitor drug abuse trends.	—	250	250
California State University (CSU)/University of California (UC)/California Community Colleges (CCC):				
Drug and alcohol problem management consortia	Funds seven regional consortia projects that provide information and technical assistance on developing and improving substance abuse programs at member institutions.	—	200	200
Subtotals, Technical assistance		—	$3,320	$3,320
Other				
DADP:				
General education, media campaigns	Supports media and education campaigns on alcohol issues, alcohol-related birth defects, and alcohol and youth.	—	$571	$571
Perinatal drug issues	Provides cross-training conferences, coalition building funds, and a media campaign on the perinatal drug abuse issue.	—	110	110
CSU/UC/CCC:				
Various	Funds various educational courses that cover the academic study of drug and alcohol abuse.	3,000[d]	—	3,000[d]
Subtotals, Other		$3,000	$681	$3,681
Totals, all programs		$47,109	$55,946	$103,055

[a] In addition, we estimate that local education agencies spend approximately $14.1 million in local funding (district general fund and private funds) on drug and alcohol prevention programs. We also estimate the cost of teacher time to deliver the drug and alcohol prevention curriculums to be from $18 million to $48 million.

[b] The DADP does not collect data on the amount of funds spent by counties on specific types of prevention programs. Although some counties spend some of their subvention funds on school-based programs, the DADP estimates that the vast majority of programs are community-based.

[c] In addition, the DADP estimates that counties will spend $9.3 million in local matching and other local funds in 1990-91.

[d] We estimate that *at least* $3 million will be spent on educational courses.

Figure 2, however, lists the typical prevention programs provided by local education agencies. Data from a survey completed for the SDE show that at least 75 percent of the schools in the state have used curriculum programs and that, depending on the definition of a high-risk youth program, between 14 and 48 percent have implemented some type of high-risk youth program.

Figure 2

Typical School-Based Drug Prevention Programs

Programs	Description
Curriculum Programs	
Here's Looking at You, 2000	A commercially developed curriculum that provides classroom teachers with a variety of exercises that are designed to teach refusal skills. The program is used by about 40 percent of all districts in the state.
Drug and Alcohol Resistance Education (DARE)	A 17-week curriculum-oriented program delivered by law enforcement personnel.
Subject-integrated instruction	Many school districts deliver instruction on drugs and alcohol as part of their regular health or science curriculum, or in drivers education.
High-Risk StudentPrograms	
Impact training	Program provides training for a small number of staff in each participating school in assessment of "high-risk," abusive behaviors and potential intervention techniques.
Children of alcoholics	These programs involve support groups and counseling for students with alcoholic parents.
Student assistance programs	These programs involve (1) a variety of support groups for students with different problems (such as emotional instability or family problems) or (2) "peer counseling" (where students assist other students on a one-on-one basis).
Mentor programs	In these programs, adult volunteers (often teachers or community leaders) "watch over" and counsel specific students.

CURRICULUM-BASED PREVENTION PROGRAMS

In curriculum programs, sometimes referred to as "drug education," teachers, nurses, or police officers provide instruction based on a package of written and/or audio-visual materials, generally in a classroom setting. The goal of these programs is primary prevention—preventing the onset of substance abuse.

The curriculums are usually purchased by the school district from a private company.

The practice of using prepared curriculums in classrooms as a way to prevent substance abuse began in earnest in the 1960s. Since then, the curriculums have evolved in several stages, with each new curriculum trying to take into account the results of the previous curriculum's approach. In this section, we review the evolution of these programs and the evaluations that have been done on them.

Information-Only Programs and Scare Tactics Can Increase Use

During the late 1960s and early 1970s, the dominant form of drug education was the information model. This model was based on the assumption that youth use drugs because they are unaware of the harmful effects of the substances. Programs proliferated which provided information about the physical and psychological effects of different substances, and the legal implications of using illicit drugs. Many of these programs used scare tactics or "fear-arousal" techniques to emphasize the consequences of drug use. Some programs were presented by students, and others by outside experts such as nurses or police officers. Rigorous evaluations have repeatedly shown that, although these programs may have increased student's knowledge about drugs, they did not reduce drug use. In fact, some studies found that *the programs actually increased drug use.* These results led the National Commission on Marijuana and Drug Abuse in 1973 to conclude that "no drug education program in this country or elsewhere has been sufficiently successful to warrant our recommending it."

Why were these programs unsuccessful? The most common explanations given are: (1) many people use damaging substances even when they know the harmful implications of their use, (2) programs that exaggerate the harmful effects of drugs and only address the negative consequences tend to be disbelieved, and (3) the underlying assumption—that increased knowledge changes attitudes and that these attitude changes will lead to behavior change—is an oversimplification of the conditions that lead to drug abuse.

"Individual Deficiency Model" Programs Have Shown Little, If Any Effect on Drug Use

In the early 1970s, the "individual deficiency model" became popular. This model assumed that the problem was with the youth: young people use drugs because they lack self-esteem or the proper decision making tools. These programs took many different forms, such as (1) having students work in small groups

to develop communication skills; (2) providing teacher training in communication skills and nonpunitive discipline in the hope of fostering better classroom management, as well as making the classroom environment more responsive to students' needs; and (3) "affective education" designed to help students clarify their values, improve their self-esteem, and enhance their problem-solving skills.

Most of the evaluations done on these types of programs found no positive effects on drug use. For example, the National Institute on Drug Abuse (NIDA) conducted a series of evaluations of individual deficiency model programs in Napa, California from 1978 to 1983. These evaluations were carefully designed and implemented. They probably represent the most conclusive evaluations ever done of this kind of program. The evaluations studied the long-term effects of the programs by following youth who participated in the programs, and youth who did not, for one to three years. The only positive effect that was found was for one of the "affective education" programs, which was shown to have a positive, but short-term effect on girls' cigarette and drug use. Otherwise, the programs failed to affect drug use; attitudes toward peers, school, or self; or academic achievement.

Some of the reasons given for the failures of these programs are that (1) the programs are difficult to implement, (2) research shows that while low self-esteem is somewhat correlated with drug use, other factors are substantially more important, and (3) little is known about which values affect drug use.

"Social Influence Model" Programs Have Been Successful in Delaying the Onset of Cigarette Use

The first major breakthrough in substance abuse prevention came with the application of the "social influence model" to cigarette smoking. The social influence model was based on the premise that peers, family, and—to a lesser extent—the media influence the initiation of cigarette smoking. In general, these programs involved (1) making students aware of the social pressures to smoke, (2) teaching refusal skills, (3) using peer leaders, and (4) correcting misperceptions regarding social norms about smoking (surveys have shown that youth think cigarette smoking and drug use are much more prevalent among their peers than they actually are). In addition, many of these programs encourage students to make public commitments against smoking cigarettes.

Most, but not all of the evaluations that have been done on these programs have found reductions in both experimental and regular cigarette smoking.

Applying the Social Influence Model to Alcohol and Other Drugs: Little Evidence of Its Effectiveness

Based on the success of the social influence model in reducing cigarette smoking, educators applied it to alcohol and other drug use, on the theory that, since family and peers also affect drug use, this model should be effective for other drugs besides tobacco. Unfortunately, the evaluations of these programs as applied to other drugs have been much less promising. A few have found short-term positive effects for alcohol and marijuana use, but most have found no effect on other substances.

The major reasons given for the differences in the model's effectiveness, at least between alcohol and tobacco use, has to do with the difference in society's attitudes about using these different substances. Specifically, in the last 20 years prevailing societal opinion has shifted against tobacco use, whereas attitudes toward alcohol remain mixed. For example, whereas tobacco advertising is banned from television, alcohol advertising is not.

Evaluations of Combined Curriculum Programs: Little Evidence of Effect on Use

During the 1980s, several curriculum programs became popular which *combined* components of the programs described above. For example, many of these programs included information components dealing with the consequences of alcohol and drug use, components aimed at increasing self-esteem, and components on peer resistance skills. As was the case with the other curriculum programs, the evaluations have not found any long-term effect on alcohol and drug use. The most comprehensive evaluation of the combined curriculum approach was a study funded by the National Institute of Alcohol Abuse and Alcoholism (NIAAA) of an early version of a curriculum that is widely used in California schools, "Here's Looking At You" (HLAY). The HLAY curriculum includes materials and exercises designed to increase self-esteem, strengthen decision making skills, increase knowledge about the effects of substances (particularly alcohol), and instill attitudes favoring moderation in consumption. The evaluation collected data over three years, beginning in 1978, on HLAY programs operated in the Seattle, Washington, and Portland, Oregon areas.

The evaluation was designed to measure the effect on variables such as knowledge, self-esteem, and attitudes toward abusing alcohol, as well as the student's actual alcohol and drug use. Students tested two years after the program revealed some increases in *knowledge*, but the study found no effect of the curriculum on alcohol and drug *use*. Moreover, this finding applied even with respect to students who received more than the

average number of HLAY sessions and those who had the most committed teachers.

A Combined School and Community Approach to Primary Prevention: Results Unclear

A relatively new school-based primary prevention program is one which combines a curriculum program with a community-based approach (discussed below). This program, Students Taught Awareness and Resistance (Project STAR), currently operates in the Kansas City and Indianapolis metropolitan areas.

Project STAR combines a social influence model curriculum with an emphasis on getting students and their families involved in the community. The community involvement generally takes the form of advocacy on policy issues surrounding alcohol and drug use (such as restrictions on liquor and cigarette advertising).

The program reports that it has achieved significant reductions in alcohol and cigarette use but not in marijuana use. The program's evaluations did *not* address any effects on the use of harder drugs. Because of several flaws in the program's evaluation—for example, the control groups were *not* randomly selected and published reports of the evaluation results are inconsistent—we are not certain to what extent the reported effects on alcohol and cigarette use are reliable.

Most Curriculum Programs Have Not Been Effective

Evaluations of the most widely used curriculums in California have not supported the effectiveness of the curriculum-based approach. While we acknowledge that an effective model may eventually be developed, the track record of these programs in reducing drug use has not been good.

HIGH-RISK YOUTH PREVENTION PROGRAMS

School-based programs targeted at *high-risk* youth generally include one or more of the following four components:

- ***Identification.*** Often districts train classroom teachers to identify signs of emotional and social instability, such as sudden changes in dress patterns or completion of school work. Other methods of identification may include (1) designating certain staff (or students) as "helpers" whom students may approach in order to talk about their problems and (2) working with law enforcement agencies to identify students who have committed crimes. Although high-risk programs are often used for older children, it is also possible to identify "high-risk" signs in

young children, for example, by determining if there is a drug user in the child's immediate family.

- ***Assessment.*** Typically, once students have been identified as potentially high risk, they are referred to a "core" team of teachers, administrators, and other professionals who have been trained in assessment techniques.
- ***School-Based Support.*** Support services often provide students with training and practice in interpersonal communication skills. Examples of support services include counseling by a school nurse or by peers, or participation in support groups for students with specific problems, such as a drug addiction, having an alcoholic parent, or displaying emotional instability.
- ***Community Referrals.*** Many schools refer students to organizations in the community for more intensive services, such as for drug treatment or counseling.

The most comprehensive programs that we visited during our site visits contain all four of these components; many, however, may contain only one or two of them. In the schools, these programs are not as widespread as curriculum programs.

In the remainder of this section, we review the research literature on adolescent drug use, which shows that casual adolescent drug use usually does *not* result in long-term consequences but that regular and heavy use does. In addition, we review the research literature which shows that youth who have many behavioral and psychological problems are at risk of becoming heavy users and therefore are the group to which prevention programs should be targeted. Finally, we review the limited evaluations available on these programs.

Casual or Experimental Alcohol and Drug Use Does Not Usually Result in Long-Term Negative Consequences

A longitudinal study conducted by two UCLA researchers has shown that most drug use does not lead to addiction or result in serious consequences for the user. This study has followed 1,634 students from 11 Los Angeles County schools since 1976. The study compares students who used alcohol or drugs with those who abstained to determine what effect adolescent drug use had on their lives. For example, the researchers looked at the effect on family formation (marriage and having children), family stability, criminality, and educational attainment. The study found that casual or experimental alcohol and drug use did *not* result in long-term negative consequences. The researchers stated that "the typical youngster who has a beer or some marijuana at a party is

not the one who is going to develop long-term damage as a result of his or her drug use." However, regular drug use during adolescence was found to be associated with increased involvement with drug crimes and stealing, decreased college involvement, and earlier family formation. Furthermore, use of hard drugs significantly reduced the individual's chances of graduating from high school, and was correlated with reduced social support and increased loneliness in young adulthood.

There Are Substantial Differences Between Experimental Drug Users and "High-Risk" Users

Because of the high prevalence of alcohol and drug experimentation by youth, researchers have begun to emphasize the need to differentiate among experimental, regular, and problem use. Those individuals who are able to learn from their drug use experience and eventually give up drugs are significantly different from those who do not stop the risk-taking process, and begin to use drugs as an escape or to resolve severe psychological problems. As we note in the first analysis of this series, a study based on the Attorney General's 1987-88 survey of public school students reported that high-risk users were less likely to live with both parents, tend to have lower grades, are more likely to have had earlier experiences with alcohol and drug intoxication, scored higher on measures of dropout potential, and engaged in more high-risk behavior (such as attending school while "high" on drugs). Other research has also found that, while peer influences affect experimental use of drugs in social settings, such use is not likely to prove harmful unless it is combined with psychological problems, in which case it may well lead to eventual dependence.

Youth Who Will Have Problems With Drugs Are Relatively Easy to Identify

One of the main themes of the recent research literature is the move to a risk factor theory of drug use. This theory is based on the observations that there are many different paths that could lead one to drug use and that youth who regularly use drugs have many other problem behaviors besides their drug use. Because youth who develop drug problems also have other problems, they can be identified relatively easily.

One study using the UCLA longitudinal data base described above identified 10 risk factors that were correlated with substance use. These risk factors, in decreasing order of their affect on drug use, were: peer drug use, deviance, perceptions about adult drug use, early alcohol use, sensation seeking, poor relationship with parents, low religiosity, poor academic achievement, psychological distress, and low self-esteem. The extent to which

these factors correlate with drug use varies. For example, peer drug use was found to be six times as correlated with drug use as poor self-esteem. Many of these factors are related to deviant behavior and correspond with the findings of the UCLA study that drug use is most highly correlated with a lack of social conformity. Figure 3 summarizes the results of the study. The top panel in Figure 3 shows the percentage of youth who had ever tried cigarettes, alcohol, marijuana, and hard drugs (hard drugs include 14 substances, such as amphetamines, cocaine, heroin, and PCP). It shows that the prevalence of use increases steadily with the increase in the number of risk factors. For example, 14 percent of the students who were identified as having 1 risk factor had tried hard drugs at least once, whereas 78 percent of students having 7 or more of the risk factors had tried hard drugs.

The bottom panel of Figure 3 shows the relationship between the number of risk factors and the likelihood of *heavy drug use.* As the figure shows, heavy drug use increased substantially with the number of risk factors. For example, 2 percent of those with one risk factor were found to be heavy users of hard drugs, while 28 percent of those with seven or more risk factors were heavy users of hard drugs. Interestingly, the percentage of heavy users of cigarettes and alcohol dropped off for students with seven or more risk factors for cigarettes and six for alcohol. The authors theorize that this may represent a transfer from cigarettes and alcohol to marijuana and hard drugs.

The figure shows that experimentation is fairly common, but more prevalent among youths with a high number of risk factors. On the other hand, heavy drug use is fairly uncommon, but its incidence increases substantially with the number of risk factors. It is also important to note that these results have held up over time. Specifically, using their longitudinal data, the researchers were able to determine that the number of risk factors were associated with increased likelihood of use, both at the time the risk factors were identified and one year later.

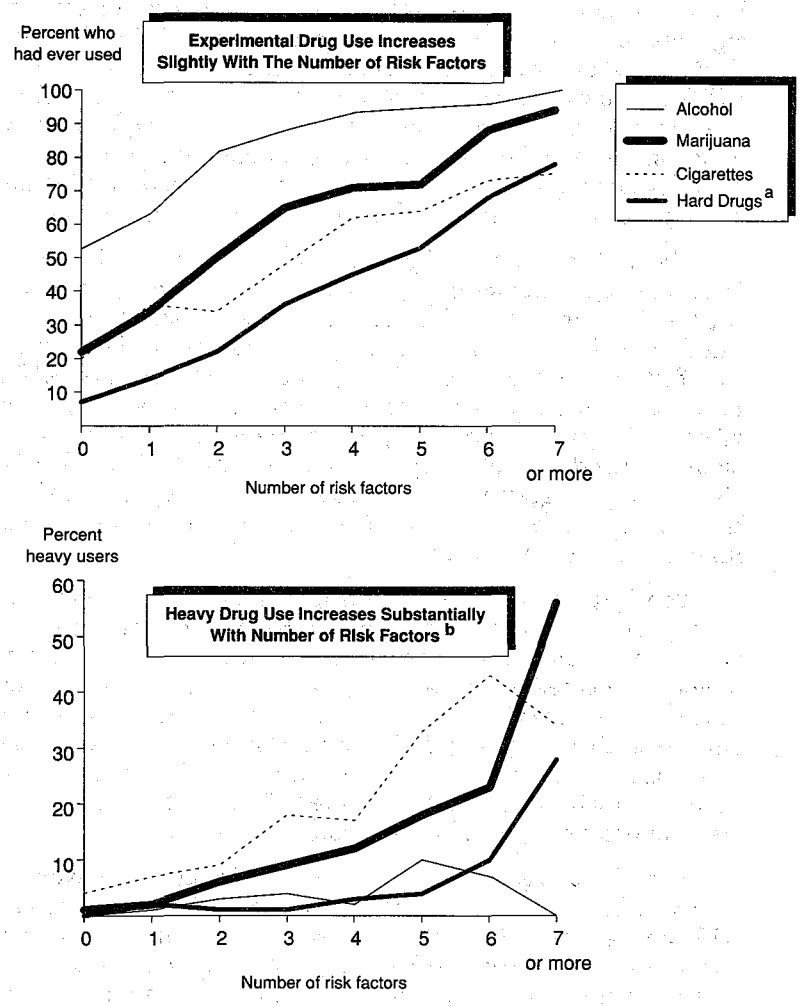
The UCLA study concluded that, although not every drug user will fit this characterization, the average frequent drug user will have a life-style that includes rebellion, involvement with other deviant or illegal behaviors, poor family connections, few educational interests, early involvement in sexual activities, emotional turmoil, alienation, and early involvement with the work force. In general, students exhibiting these characteristics and behaviors are relatively easily identified by school personnel.

Few Evaluations Have Been Done on High-Risk Youth Programs

In general, there have been few evaluations of high-risk youth programs. One study that reviewed evaluations of a number of

Figure 3

Risk Factors and Drug Use Los Angeles Students, Grades 10-12



[a] Hard drugs include 14 substances such as amphetemines, cocaine, heroin, and PCP.

[b] Heavy cigarette, alcohol, and marijuana use is defined as daily or more use, and heavy hard use is defined as weekly or more use of any hard drug substance.

Source: *Risk Factors For Drug Use Among Adolescents: Concurrent and Longitudinal Analysis,* American Journal of Public Health, May 1986, vol. 76, no. 5, Michael D. Newcomb, Ph.D., Ebrahim Maddahion, Ph.D., and P.M. Bentler, Ph.D.

prevention programs found that only two types of programs had an effect on drug use: (1) peer programs—where peers were used for most of the program implementation—and (2) "alternative programs" for special population groups. The alternative programs were aimed at "at-risk" youngsters and emphasized one-on-one relationships, tutoring, job skills, and physical adventure.

Several of the high-risk youth programs we visited were similar to these two programs. For example, many of the programs use peer groups and one-to-one relationships. Since there have been so few evaluations of high-risk programs to date, however, it would be premature to conclude that the current programs operating in the state are effective.

CONCLUSIONS AND RECOMMENDATIONS ON SCHOOL-BASED PROGRAMS

We recommend that the Legislature give funding priority to programs that target high-risk youth.

While experimental drug use by teenagers is still fairly common, such experimental use does not typically lead to the kinds of problems associated with long-term abuse. There is a relatively small subgroup of youth, however, who go beyond experimentation to develop serious substance abuse problems and these youths can be identified relatively easily because they also tend to have many other social and behavioral problems. It therefore appears that drug abuse prevention strategies that focus primarily on discouraging experimental use are too broad-based in their approach. Moreover, the most widely used, broad-based prevention strategies are curriculum programs that have been extensively evaluated and *have not been shown to be effective.*

Therefore we conclude that the best prevention strategy would be to emphasize programs that target high-risk youth. Consistent with this strategy, we recommend that the Legislature adopt Budget Bill language in the SDE, OCJP, and DADP items requiring these departments to give funding priority, within youth prevention programs, to those programs that target high-risk youth.

With regard to OCJP's Comprehensive Alcohol and Drug Prevention Education (CADPE) Program, we also recommend enactment of legislation eliminating the requirement that school districts adopt a standardized age-appropriate curriculum as a condition of eligibility for receiving CADPE funding. Eliminating this requirement would allow districts greater flexibility to use CADPE funds for programs that serve high-risk youth.

COMMUNITY-BASED PREVENTION PROGRAMS

What Is a Community-Based Program?

Rather than being located in and focused on the schools, community-based programs are targeted at *entire* communities. These programs generally entail either communitywide events, or programs targeted at youth, particularly high-risk youth. As Figure 1 shows, state-supported community-based programs are funded predominantly through the DADP county subvention process. In administering these programs, most counties we visited divide their service areas along geographic and ethnic lines and assign a prevention coordinator to each area.

The DADP does not collect data on how counties spend their prevention funds. Figure 4, however, lists the kinds of prevention programs that the department advises are most common. As the figure shows, the programs range from public meetings to individual counseling. The goals behind community-based programs are to (1) get the community involved in ridding its neighborhood of environmental factors that contribute to substance abuse problems (for example, visible drug dealing, a high concentration of bars and stores that sell alcoholic beverages, and empty lots or beaches where youths congregate to drink), (2) make families aware of the alcohol and drug problems in their communities and encourage them to talk with their children about this issue, (3) provide training to families and community leaders, (4) advertise the availability of alcohol and drug treatment and support services in the community, and (5) provide referrals to these programs. Many of the alcohol and drug program administrators work with recognized community leaders—for example, religious and business leaders—to reach out to the rest of the community.

A recurring theme that we heard in our visits to counties was that their greatest difficulties are in organizing community activities within the areas that need assistance the most; that is, the heaviest drug using and selling areas. According to the administrators we spoke with, these areas are difficult to organize because (1) it is difficult to find prevention coordinators who know these areas and their leaders, (2) the communities may lack experience in organizing, or (3) the community's poverty makes it difficult to find the private funds needed to help support prevention efforts.

Community Programs Have Not Been Evaluated

We found no rigorous evaluation of any of the various types of community programs summarized in Figure 4. Several of the researchers we spoke with indicated that the repeated failure of school-based curriculum programs to produce results has, how-

Figure 4

Typical Community-Based Alcohol and Drug Prevention Programs

Programs	Description
Community-Wide Programs	
Family counseling services and parent education	Designed to assist families suffering from alcohol- and drug-related problems and educate parents on alcohol and drug issues.
Prevention, education, and public relations committees	Focused on reducing the environmental risks associated with alcohol-related problems and on issues related to the availability of alcohol in various settings.
Public policy	Public hearings, forums, and training events promoting public policy related to alcohol and drug issues.
Community activities	Focusing on increasing public awareness of alcohol and drug problems and emphasizing the role of the community. These programs include needs assessments, public forums, and providing culturally relevant programs and information to the community.
Alcohol-free living centers	Centers that provide an alcohol- and drug-free environment, open to the community.
High-Risk Youth Programs	
Early intervention programs	Prevention programs, both community and school based, aimed at high-risk youth who have begun to use alcohol or drugs.
Drop-in centers	Centers that provide information and alternative drug-free activities to the community and youth in particular.
Peer leadership training for youth	Many counties have peer-led prevention programs and emphasize leadership training for these peer

ever, led an increasing number of researchers to turn their attention to community programs. While this may ultimately lead to a better understanding of what works and what does not work in this area, any conclusive results of this work will take years to achieve.

While there are no evaluations of community-based programs, there is an extensive literature on one increasingly popular community-based approach to preventing *alcohol*-related problems.

DADP's Community-Based Prevention Strategy for Alcohol-Related Problems

We recommend that the DADP provide the Legislature with its plan to evaluate the effectiveness of the community planning pilots.

The alcohol field and the alcohol research community have for several years promoted a strategy that is based on controlling the availability of alcohol through community organization. This focus has grown out of years of research and study of local programs. For example, research shows that (1) higher densities of bars and stores that sell alcoholic beverages are associated with higher alcohol-related disease rates, (2) more than half of the drivers arrested for driving under the influence of alcohol had their last drink in a bar, and (3) in certain areas (skid rows), store owners cater to the public inebriate.

These findings have led the alcohol research community to promote a strategy that relies on community organization. Under this approach, communities are trained to examine the alcohol-related problems in their area and work to (1) better manage the decisions over the placement and number of alcohol outlets and (2) monitor public places for drinking. The DADP has embraced this strategy and has helped to fund the production of "The Manual For Community Planning to Prevent Problems of Alcohol Availability." This manual has been distributed to county alcohol administrators and the DADP is actively helping them to implement its suggestions.

In addition, the DADP has chosen four pilot communities—the Fremont/Newark/Union City area, Ukiah, Merced, and the San Pedro district of Los Angeles—which will be given additional assistance in implementing this strategy. While the department plans to monitor the implementation of the strategies outlined in the manual in the pilot communities, at the time this analysis was prepared, it had no specific plans to evaluate the pilots. Such an evaluation would help the Legislature in formulating its overall strategy for substance abuse prevention. We therefore recommend that, prior to budget hearings, the DADP provide the Legislature with its plan to evaluate the effectiveness of the pilots.

The DADP Should Develop for a Community Planning Manual to Prevent Drug Problems

We recommend that the Legislature require the DADP to develop a community planning manual to prevent drug use and drug-related problems.

Our analysis indicates that the community organizing approach that has been developed in the alcohol abuse prevention field has potential applications in the area of drug abuse prevention. For example, community action could be used to discourage public drug selling and to prevent people from congregating to use illicit drugs in public areas. The DADP recognizes this and advises that it intends to develop a manual for county drug administrators similar to the one currently available to alcohol administrators. However, at the time this analysis was prepared, the DADP had not provided the Legislature with its specific proposal. We therefore recommend that the Legislature require the DADP to develop a community planning manual to prevent drug use and drug-related problems and distribute the manual to county offices of drug programs.

TECHNICAL ASSISTANCE

As Figure 1 shows, the budget proposes $3.3 million to support a variety of technical assistance activities by the DADP and SDE. The DADP's technical assistance activities include roundtables and meetings with county and departmental staff, maintenance of clearinghouses for prevention information, and training programs for county staff. The SDE sponsors workshops and a resource center to assist school districts in planning and implementing their programs. In addition to formal technical assistance programs, the SDE, DADP, and OCJP monitor and advise on the specific programs for which they provide state and federal funds to counties and school districts.

Departments Need to Provide More Technical Assistance to Local Governments

We recommend that the Legislature encourage the SDE and the DADP to disseminate information on the effectiveness of various prevention programs to school districts and county administrators and to conduct evaluations of programs in order to identify successful approaches.

As discussed in detail above, our review of the research literature in the area of substance abuse prevention programs indicates that there is scant evidence of the effectiveness of any of the current approaches to prevention. The only type of prevention program that has been thoroughly and rigorously evaluated is the school-based primary prevention programs that rely on packaged curriculums, and these evaluations have shown that these programs have little effect, especially on the use of hard drugs. We recognize, however, that policymakers need to continue to look for

ways to prevent substance abuse and to reduce the problems associated with it. We also believe that there are some approaches that have significant potential to reduce abuse; for example, school-based programs targeted at high-risk youth and the community organization approach to community-based programs.

Given the uncertainty about what works and what does not work, we believe that the Legislature should encourage program experimentation at the local level, and evaluation and information sharing at the state level. We therefore make the following recommendations:

- ***Dissemination of Information to Local Governments.*** We recommend that the Legislature require the SDE to summarize in writing the available research literature on school-based prevention programs and disseminate this information to school districts. We also recommend that the Legislature require the DADP to disseminate information on school- and community-based prevention programs to county drug and alcohol administrators.
- ***Evaluations.*** We recommend that the Legislature adopt Budget Bill language directing the SDE to allocate a minimum of $500,000 in federal funds for a longitudinal study of drug prevention strategies. Please see Item 6100-183-890 in the *Analysis of the 1990-91 Budget Bill* for the specific recommended language. We also recommend that the DADP report to the Legislature, prior to budget hearings, on the availability of federal funds through the National Institute on Drug Abuse and the National Institute on Alcohol Abuse and Alcoholism for evaluations of county-run programs.
- ***Data Collection.*** As noted earlier, the state has very little information on how county offices of alcohol and drug programs spend their prevention funds. To address this data deficiency, we recommend that the DADP, in conjunction with county alcohol and drug administrators, develop a way of collecting information on the types of prevention programs administered by the counties.

State Infrastructure

How Should the Legislature Address the State's Growing Capital Facility Needs?

Summary

The state is faced with a large and growing need to revitalize and expand its infrastructure. Although the state does not have a comprehensive plan to identify its specific capital outlay requirements and the associated costs, it is clear that the state's infrastructure needs are in the tens of billions of dollars. To better identify these requirements, establish priorities and develop an appropriate financing plan for this infrastructure, the state needs a comprehensive multi-year capital outlay plan. Until such a plan is available, however, we suggest the Legislature establish criteria to assess specific capital outlay proposals. We also believe the Legislature should establish standards for maintenance of state facilities and set as a high priority goal the elimination of deferred maintenance.

Based on the large volume of infrastructure needs and the state's current budgetary situation, we conclude that the state will have to continue to rely heavily on bonds to finance infrastructure revitalization and expansion. We believe that when borrowing money through the use of bonds, the state should rely as much as possible on general obligation bonds, rather than lease-revenue bonds, in order to minimize General Fund costs.

As California enters the last decade of this century, it will be faced with great demands to revitalize existing infrastructure and develop new infrastructure to meet the dynamic changes occurring in the state. During the past several years the condition of the state's infrastructure has deteriorated and, except in the area of prisons and to some extent education, very little has been done to increase its capabilities. This situation must be turned around if the state's infrastructure is to accommodate future needs. Failure

in this effort could have a significant impact on the social and economic future of the State of California.

In this analysis, we examine some of the major infrastructure related problems facing the Legislature: (1) identifying the state's infrastructure needs (2) setting priorities to meet these needs and (3) establishing a financing plan to carry out the Legislature's priorities.

WHAT ARE THE STATE'S INFRASTRUCTURE NEEDS?

Estimates of Statewide Needs

Available information indicates that the overall magnitude of the demand for improving and expanding the state's infrastructure is large. For example, in 1984 the Governor's Infrastructure Review Task Force reported that over the ensuing 10-year period approximately $29 billion would be needed for deferred maintenance and $49 billion for new infrastructure. For the most part, state expenditures over the intervening six years, with few exceptions (most notably prisons and education), have reflected a status quo effort and have done little to address the needs identified in the Task Force report.

Another indication of the current magnitude of infrastructure needs can be seen from Figure 1, which shows that $18.9 billion will be needed for state and K-12 projects over the next five years. (This amount should be used cautiously because it does not reflect all potential needs due to the incompleteness of the state's planning process, and the plans also may include proposals that do not merit funding.) Moreover, the October 1989 Loma Prieta earthquake heightened the awareness of the need to make the state's infrastructure less hazardous during an earthquake. The state's current plans do not systematically address this issue. Nevertheless, it is clear that the state's infrastructure needs are easily in the tens of billions of dollars.

Figure 1

Projected Capital Needs for the State and K-12 1990-91 through 1994-95

(in millions)

	Five-Year Total
Legislative/Judicial/Executive	$60
State/Consumer Affairs	650
Business/Transportation/Housing	4,990
Resources	470
Health/Welfare	160
Youth/Adult Corrections	3,970
Education	8,560
General Government	30
TOTAL	$18,890

Source: LAO estimates, based on information from departments.

Needs in Specific Program Areas

To illustrate the infrastructure needs of particular programs, we briefly review specific capital outlay requirements in five areas.

Transportation. The 1988 State Transportation Improvement Program (STIP)—the state's current five-year program for all state and federally funded transportation improvement projects—includes about $4.8 billion in highway capital outlay projects scheduled for construction through 1992-93. Resources available through 1992-93, however, fall about $3.7 billion short of funding these projects. To fund this STIP shortfall and to meet other transportation needs identified by the governor and the Legislature, the Legislature enacted Ch 105/89 (SB 300, Kopp), Ch 106/89 (AB 471, Katz) and Ch 108/89 (AB 973, Costa) to provide about $18.5 billion over 10 years (1990-91 through 1999-2000) for transportation purposes through increases in gas taxes, truck weight fees, and issuance of bonds. These additional funds, however, will only be available if voters approve SCA 1 at the June 1990 election. (For a more detailed discussion of these transportation acts, please see the *Analysis of the 1990-91 Budget Bill,* page 263).

Under current law, transportation capital outlay projects are not individually funded through the Budget Bill. Instead, current law requires the California Transportation Commission (CTC) to program projects for funding based on statutory priorities and commission-established guidelines. The commission is also responsible for allocating funds appropriated by the Legislature among projects in this program.

Postsecondary Education. Enrollment in the state's three segments of postsecondary education is expected to grow by between 30 percent and 50 percent over the period 1990 to 2005. Estimates by postsecondary education indicate that $3.6 billion will be required for capital outlay-related expenditures over the next five years. Moreover, several billion dollars more will be needed in subsequent years if the state is to accommodate the enrollments anticipated in 2005.

In addition to the needs generated by enrollment growth, there will be an ongoing need to alter existing facilities to meet changes in academic programs. It will also be necessary to provide sufficient funding to assure that existing and new facilities will be properly maintained and that eventually deferred maintenance will be eliminated. The deferred maintenance problems at UC and CSU, for example, represent multi-million dollar costs. In February 1989, UC estimated $176 million in deferred maintenance and CSU expects a $35 million backlog by July 1990. When this

analysis was prepared, the Legislature was considering SB 147 (Hart), which would authorize (as amended January 18, 1990) a $900 million general obligation bond issue to be submitted to the voters at the June 1990 primary election. (Please see the following piece, "Accommodating Growth in Postsecondary Education," for a detailed review of each segment's proposal for campus expansions.)

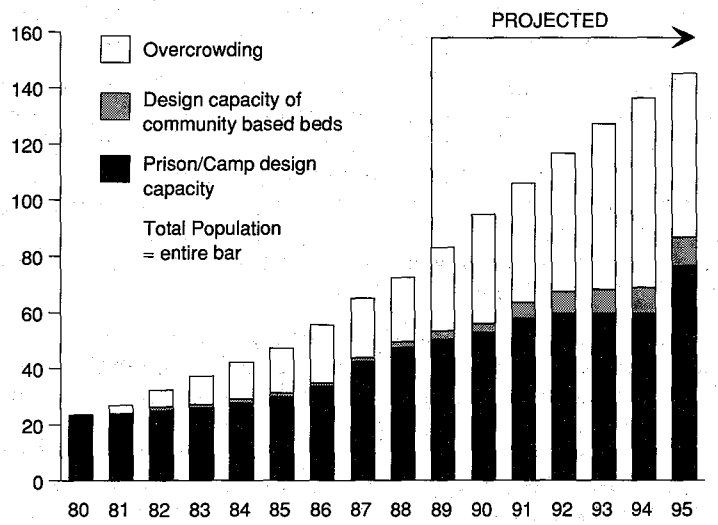
Prisons. In 1980 the inmate population in California's prisons was about 23,500. According to Department of Corrections' projections, that population will be nearly 145,000 by 1995. Thus, in this 15-year period the population in state prisons will have increased *sixfold*. A comparison of this population increase to the physical facilities to accommodate the inmate population is provided in Figure 2.

Since 1980, the Legislature has approved the construction of 41,700 prison beds costing about $3 billion. Even after completion of this massive expansion and assuming the department's overcrowding policy (130 percent of design capacity), the prison system will be 43,900 beds *short* of the expected June 1995 inmate population. To fill this gap, the department estimates that an

Figure 2

State Prison Population and Capacity[a]

1980 through 1995 (inmates in thousands)



[a] Data as of June 30 for each year. Population is based on CDC's fall 1989 projections. Projected design capacity is based on CDC's five-year facilities master plan.

expenditure of about $4 billion will be required over the next five years. Currently, the Legislature is considering SB 842 (Presley), which would place a $900 million general obligation bond issue on the June 1990 ballot.

State Office Buildings. In 1977, the Legislature adopted a Capital Area Plan to coordinate the development and use of state facilities in metropolitan Sacramento. An important element of this plan was the goal to accommodate 90 percent of state office space in *state-owned* buildings by 1987. In 1977, state-owned space represented 64 percent of state office space in Sacramento. Contrary to the stated goal, the proportion of state-owned space fell to 52 percent in 1989. In fact, between 1977 and 1989 total leased space more than doubled and annual leasing costs increased more than sixfold—from $10.1 million to $65.5 million. Meeting the plan's goal for state-owned office space by 1998 would require financing construction of about 3.3 million net square feet, at an estimated cost of around $580 million.

Increase Safety of State Buildings During Earthquakes. A 1981 report from the Seismic Safety Commission identifies 1,350 state-owned buildings in priority sequence (based on life safety considerations) for improving seismic resistance. As mentioned above, however, there is no systematic plan to address this issue. Moreover, the statewide cost to make the necessary improvements is unknown. At the time this analysis was written, the Legislature was considering SB 1250 (Torres), a $250 million general obligation bond proposal to finance the cost of improving seismic resistance of state and local buildings.

WHICH INFRASTRUCTURE NEEDS SHOULD THE LEGISLATURE FUND?

Pending development of a comprehensive multi-year capital outlay plan, the Legislature should establish criteria to assess various proposals according to the Legislature's priorities.

The state's current process for identifying, ranking and financing its capital outlay needs is fragmented. The Legislature receives a series of independent five-year plans in most program areas, but there is no centralized compilation nor ranking of projects across programs to provide a statewide perspective. As a result, there is no easy way to identify the relative priority of those individual projects included in the Budget Bill or the financing required to address overall state needs.

In recognition of this problem, the Legislature enacted SB 2214 (Campbell) in 1988. This bill required the Department of Finance to provide a comprehensive multi-year capital outlay

plan for determining needs and setting priorities. The Governor, however, vetoed the measure. Currently, the Legislature is considering an identical measure (SB 348, Alquist). In addition, the State Treasurer recently announced his support for this concept and indicated that legislation would be introduced on his behalf. We believe that adoption of such a plan is an essential element of the state's infrastructure efforts.

In the meantime, however, the Legislature is faced with the difficult task of determining which infrastructure needs to fund in the short term. For the most part, each program area has identified infrastructure projects which merit consideration for funding. Unfortunately, faced with the magnitude of need identified above, it simply is not possible to finance it all at the same time. Thus, the Legislature must rank these competing projects in terms of importance and urgency and then establish a schedule for when and how much funding should be made available. One way of selecting projects that meet the Legislature's priorities would be to establish criteria to apply in individual cases. To aid the Legislature in this effort, we suggest consideration of the following five criteria:

- ***State's Liability.*** Does the proposal correct life threatening security (such as in 24-hour institutions)/code deficiencies or meet contractual obligations?
- ***Urgency of the Service Need.*** Does the project address an existing deficiency or shortcoming (such as severe overcrowding) as opposed to enhancing a service level?
- ***Alternative Approaches.*** Are there less capital-intensive ways to meet the program objective? For instance, can a project be avoided through more intensive or efficient use of existing space?
- ***Alternative Sources.*** Is it appropriate for the *state* to develop this project? In some cases, proposals could be developed using nonstate sources.
- ***Cost Efficiency.*** Will the proposal reduce state costs (through measures such as reducing office building lease costs)?

TAKING CARE OF THE STATE'S INFRASTRUCTURE

We recommend that the Legislature establish a maintenance standard for state facilities and set as a high priority goal the elimination of deferred maintenance.

In addition to financing the revitalization and expansion of the state's infrastructure, the state is also faced with the task of extending the useful life of its infrastructure through proper

maintenance programs. Because of the aging of existing facilities and the construction of new infrastructure, there will be an increasing demand on the state's resources to maintain the systems in efficient and economic operating condition. To assure that this happens, the state must place a high priority on maintenance.

The Governor's Infrastructure Review Task Force reported in 1984 that during the next decade approximately $29 billion would be needed for deferred maintenance. The task force recommended that deferred maintenance be designated as the state's highest funding priority. During the intervening years the deferred maintenance problem has not lessened and has probably gotten worse. The difficulty in identifying the extent of the problem is that funding for maintenance efforts are generally lumped together in the budget with other support costs under a single line item "facility operations." This also makes it quite easy to use these funds for purposes other than the specified maintenance. In contrast, state office buildings under the Department of General Services are maintained from a dedicated source (the Building Rental Account) that receives revenues from rent charged to those departments occupying the building. In general, these office buildings are well maintained and there is no deferred maintenance.

The consequence of not fully funding regular maintenance is the steady erosion of the state's capital assets. In the near term, this erosion is less evident. Within a short period of time, however, these assets either require higher-than-necessary costs to be operated and properly maintained, or they must be replaced at a high cost before the end of their normal useful life.

To begin addressing this issue, we believe the Legislature should establish standards for maintenance of state facilities and set as a high priority goal elimination of deferred maintenance. There are several steps the Legislature could take to begin moving the state in this direction. For example, the Legislature could require departments that have a large capital outlay budget to:

- Establish a preventive maintenance program;
- Identify specific elements of infrastructure (maintenance, deferred maintenance, special repair, etc.) by line item in the budget (the Legislature could also add budget language restricting the transfer of these funds for other purposes); and
- Provide a post audit report identifying how the appropriated funds were used and how the deferred maintenance backlog is being reduced.

HOW CAN THE STATE FINANCE ITS INFRASTRUCTURE NEEDS?

As discussed in our Policy Brief *Bonds and the 1990 Ballots* issued in January 1990, there are three basic ways that the state can finance infrastructure projects. The state can:

- Pay "up front" through direct appropriations of state revenues;
- Rent, lease or lease-purchase from private parties through annual rental payments; and/or
- Borrow money by issuing bonds that are repaid with interest.

The state uses each of these financing methods in its capital program but relies most heavily on bonds. Financing a project using bonds is about 25 percent more costly than through direct appropriation (after adjusting for the effects of inflation). Nevertheless, given the large volume of infrastructure needs and the state's current tight budgetary situation, there simply is not enough money available to rely primarily on direct appropriations. As a result, we believe the state will have to continue to rely to a great extent on bonds, if these needs are to be met.

The state has generally relied on two types of bonds:

General Obligation Bonds. The use of general obligation bonds is dependent on approval of each bond proposal by a vote of the people. These bonds are backed by the state, meaning that the state is obligated to pay the principal and interest costs on these bonds. Typically, General Fund revenues are used to pay these debt costs. Currently, the main benefits of using this method of borrowing money is that the interest costs are lower than other methods and debt service payments are exempt from the state's appropriation limit.

Lease-Revenue Bonds. Recently, the state has placed an increasing emphasis on using lease-revenue bonds, particularly in the areas of prisons and postsecondary education. Authorization to issue these bonds is *not* dependent on voter approval and the debt is *not* backed by the "full faith and credit of the state." Nevertheless, the lease payments on these bonds (paid from the General Fund) must be included in any calculation of the state's General Fund debt-service.

An advantage of this method of borrowing is that the state does not have to wait until a general election and therefore can respond more quickly to certain infrastructure needs. The disadvantages are: interest rates are higher than general obligation

bonds (by up to 0.5 percent), there are certain other costs that are incurred (such as insurance), and the debt service payments are subject to the state's appropriation limit. (However, under the provisions of SCA 1—on the June 1990 ballot—it appears that the Legislature could exempt these payments from the appropriations limit.)

Given the fiscal advantages of general obligation bonds over lease-revenue bonds, we recommend that the Legislature rely to the maximum extent possible on the former when addressing its infrastructure financing needs. A comprehensive capital outlay plan would help the Legislature achieve this end through improved planning and scheduling of necessary general obligation bond measures for future ballots.

It is, of course, important that the state not indiscriminately issue bonds, thereby incurring excessive indebtedness. However, as our Policy Brief noted, California has a debt burden that is relatively low, enjoys high credit ratings, and can issue more bonds without being financially imprudent.

CONCLUSION

The state must improve and expand its infrastructure to eliminate deficiencies and to accommodate future demographic and economic growth. Based on recent reports and information from various state departments, it is clear that the state's infrastructure needs over the next 15 years are easily in the tens of billions of dollars. In view of the magnitude of these costs, the state must be able to identify specific needs, set priorities and establish a financing plan to carry out the necessary expansion and improvements.

In order to accomplish this effectively, the state needs a comprehensive multi-year capital outlay plan. Until such a plan is available, however, the Legislature is faced with determining which infrastructure needs to fund in the short term. To do this, we suggest that the Legislature establish specific criteria against which various proposals can be assessed. Furthermore, to properly maintain the state's infrastructure, the state needs to place a high priority on maintenance and the elimination of deferred maintenance. Finally, to undertake the necessary revitalization and expansion of its infrastructure, the state will have to rely heavily on borrowing money through the issuance of bonds. In such cases, we believe that the Legislature should rely to the maximum extent possible on general obligation bonds rather than lease-revenue bonds.

Capital Outlay for Postsecondary Education

How Should the Legislature Accommodate Enrollment Growth in Postsecondary Education?

Summary

Over the next 15 years, enrollments in California's three segments of postsecondary education are expected to grow by between 30 percent and 50 percent. To accommodate these growing enrollments, each segment is proposing major facility expansions on existing campuses. The five-year capital outlay plans prepared by the segments propose total expenditures over the next five years of $3.6 billion to fund the initial phase of these expansions, as well as alterations of existing facilities to meet various program needs. In addition, the University of California (UC) is proposing three new UC campuses, the California State University (CSU) is proposing five new CSU campuses and the California Community Colleges (CCC) estimate a need for 23 new community college campuses.

Our review indicates that UC should expedite the development of one new campus, reassess the enrollment assumptions associated with a second new campus and suspend planning for a third new campus. Our review indicates that there currently is no demonstrated need to plan for any new CSU campuses. Due to significant shortcomings in the CCC planning model, we are unable at this time to advise the Legislature as to either the necessary expansion of existing community college campuses or the number of new CCC campuses needed. We further find that billions of dollars will be needed in the next five years and beyond for postsecondary education capital outlay, but the capital outlay planning by the segments does not adequately inform the Legislature on how needs related to projected enrollment growth are to be met. Thus, the Legislature does not have the information it needs to make sure it funds postsecondary education facilities based on its priorities.

INTRODUCTION

The Legislature faces many significant decisions to plan for and fund postsecondary education facility needs in the short-term and into the next century. These needs are generated largely by enrollment increases projected to occur over the next 15 years. Over this time period enrollments in each of the three segments of postsecondary education—the University of California, the California State University and California Community Colleges—are expected to grow 30 percent to 50 percent. To accommodate this growth, the state will have to undertake a multi-billion dollar capital outlay program to renovate facilities and construct new facilities throughout the segments. To address the capital outlay needs associated with this growth, the Legislature will have to determine how much expansion of current campuses is necessary; how many new campuses, if any, are to be developed; and how best to finance these facilities.

In this analysis, we assess for each segment of postsecondary education: (1) long-range enrollment plans, (2) the potential need for new campuses, and (3) how each segment's five-year capital outlay plan addresses needs associated with enrollment growth.

UNIVERSITY OF CALIFORNIA

The University of California (UC) was established in 1868 as the state's land grant university. It encompasses eight general campuses and one health science campus. (For the purposes of this analysis, we will deal only with the eight general campuses.)

UC currently serves about 147,000 undergraduate and graduate students. As virtually all UC students attend school full-time, there is little difference between the number of students and full time equivalents (FTEs), a term commonly used in budgeting. For simplicity's sake, we will use only number of students throughout this section on UC.

Undergraduate Enrollment Projections for UC

In October 1988, the university issued a general campus enrollment plan for the period 1988-89 through 2005-06. These projections were revised in December 1989 and extended to include the year 2020-21. In addition, in November 1989 the Department of Finance's (DOF) Demographic Research Unit developed projections of UC enrollments for the period 1989-90 through 2020-21. Figure 1 displays the UC and DOF projections for undergraduate enrollment for the years 2005-06, 2010-11 and 2020-21.

Figure 1

Projections of UC Undergraduate Enrollment[a]

Years	UC	Department of Finance
1989-90 (estimated)	120,000	120,000
2005-06	162,000	175,000
2010-11	176,000	176,000
2020-21	182,000	169,000

[a] Average annual "headcount." Figures have been rounded to the nearest one thousand.

UC projects that undergraduate enrollments will grow from 120,000 students in 1989-90 to 162,000 students in 2005-06. This represents an average annual growth rate of almost 2 percent, and a 35 percent increase over the period. The DOF, on the other hand, projects 175,000 undergraduates in 2005-06 (a 46 percent increase over the period). The difference between the two projections arises primarily from the university's assumption that a higher rate of the undergraduates who would be eligible to attend UC would instead "...opt to go to the other segments (public and private) because they could not obtain their top choice or choices of campus or program within UC."

Our review indicates that the UC and DOF projections represent a reasonable range of possible enrollments for 2005-06. In other words, we believe the state should plan on accommodating at least 162,000, and as many as 175,000, UC undergraduates in 2005-06.

Growth Beyond 2005-06. Between 2005-06 and 2020-21 UC projects slower, but continued, enrollment growth whereas DOF projects a slight enrollment decline (from 175,000 to 169,000). Consequently, by 2020-21 UC's projection of 182,000 undergraduates exceeds DOF's projection by 13,000 students. It is important to note, however, that enrollment projections for 2010 and beyond are significantly more speculative because the age cohort constituting most of the undergraduate "pool" for that period has not yet been born. Nevertheless, the importance of the projections to 2020, from a planning standpoint, is that under either projection, enrollments remain at a high level after 2005-06. Thus, facilities built to accommodate enrollments for 2005-06 likely will continue to be needed.

Graduate Enrollment Projections for UC

While the undergraduate enrollment projections are based primarily on demographics, UC's graduate enrollment plan is based on educational policy. That is, the university has established, for each campus, desired levels of graduate students (expressed as a percentage of total enrollment). In 1987, UC proposed to gradually raise the graduate enrollment ratios for seven of the eight campuses, resulting in a systemwide average of 21.3 percent (by comparison, the current-year ratio is 18.1 percent).

In October 1988, however, UC proposed to increase this percentage to 22.6 percent. The Legislature, in the *Supplemental Report of the 1989 Budget Act,* directed UC to develop additional justification for its proposed higher rate and stated legislative intent that until the Legislature reviews this justification, graduate enrollment increase requests would be evaluated based on the *1987* plan. As of this writing, no such justification has been submitted to the Legislature.

UC's 1988 graduate plan projects that enrollment will increase from its current level of 26,600 to 47,300 in 2005-06. This estimate is based on the assumption that the graduate enrollment ratio would reach the 22.6 percent proposed in the 1988 plan. Since, however, the Legislature has not yet adopted that ratio, we believe it is premature to use it for planning purposes. If, instead, the 1987 graduate enrollment ratios are used, total graduate student enrollment would stand at 41,500 in 2005-06, or 5,800 less than proposed by UC.

Accommodating Enrollments on Existing Campuses

Figure 2 compares, for each UC general campus, current enrollment and UC's projected enrollment for 2005-06. With the exception of Riverside (see below), the projected enrollment figures for 2005-06 also represent the *maximum* enrollment currently planned for the existing campuses. As the figure shows, the university's plan assumes that the eight campuses will be able to accommodate 187,700 students in 2005-06, an increase of almost 41,000 (28 percent). Thus, assuming funds are provided to build new facilities, the system has the ability to handle substantial enrollment growth on its existing campuses.

UC Riverside Could Grow More Rapidly. As shown above, the university's planned enrollment for Riverside in 2005-06 is 18,000. (This figure was revised upward from 15,000 by the UC President's Office last December.) The 18,000 figure, however, does not represent the university's *maximum* planned enrollment for Riverside, but simply the enrollment that it believes can

Figure 2

The University of California Current and Planned Enrollment for 2005-06 at Existing General Campuses

Campus	Current Enrollment[a]	Planned Enrollment in 2005-06[b]
Berkeley	29,600	28,700
Davis	19,900	25,000
Irvine	15,100	25,000
Los Angeles	31,000	31,000
Riverside	8,000	18,000
San Diego	15,900	25,000
Santa Barbara	18,300	20,000
Santa Cruz	9,300	15,000
Totals	147,100	187,700

[a] UC's estimate for 1989-90. Average annual headcount.
[b] Based on UC's general campus enrollment plan.

reasonably be achieved by 2005-06. We believe UC's plan underestimates the university's ability to absorb enrollment growth at that campus. Last year, in response to concerns raised by us and others, the Legislature directed UC in the *Supplemental Report of the 1989 Budget Act* to evaluate the feasibility of enrolling up to 25,000 students at Riverside by 2005-06 or beyond. UC is to send its evaluation of this issue to the Legislature by January 1, 1991.

University Concerned over Difficulty with More Rapid Growth at Riverside. UC officials have expressed concern that more rapid enrollment growth at Riverside, coupled with the need to replace retiring faculty, could strain that campus' ability to recruit high quality faculty. While we share the university's concerns about the importance of educational quality, we believe UC needs to advise the Legislature on: (1) the rate of enrollment growth at which recruitment would become a problem and (2) which measures, if any, UC and/or the Legislature could adopt to ameliorate this potential problem.

For example, funding could be provided in advance of enrollment growth at Riverside in much the same way as would be done in the case of a new campus. This advance funding could be used to hire visiting scholars to free-up time for permanent Riverside faculty to devote to recruiting. In addition, UC faculty from other campuses could be asked to assist at Riverside and thereby free up

time for Riverside faculty. Help from faculty at other campuses is not uncommon and should be encouraged. In fact, faculty from other campuses would be used for recruiting purposes at the proposed new campuses.

Thus, at this time it is still unclear to us why Riverside could not grow to its maximum enrollment by 2005-06. Pending receipt of information from UC to the contrary, we believe the Legislature should use the higher figure for capital outlay planning purposes. This would increase the total enrollment that could be accommodated by the existing campuses to 194,700.

Other Options. The Legislature may want to consider other options to accommodate projected enrollment. These include increasing enrollments at UC Santa Barbara and UC Santa Cruz beyond planned levels. These sites could accommodate more students, and at one time UC planned for larger enrollments at these campuses. Community opposition to expansion of these campuses beyond current planned levels, however, would be significant. In addition, if enrollments increase faster than projected by UC, or if increasing enrollment to 25,000 (by 2005-06) at Riverside proves infeasible, *temporary* increases above planned enrollments at these and other campuses could be considered as an option. Finally, the university could consider holding classes year-round. All of these options would allow the state to accommodate additional enrollment at the existing campuses.

Conclusions on Need for New UC Campuses

Our analysis indicates a demonstrated need for only one new UC campus by 2005-06. We find further that UC should (1) develop this campus on a faster track than currently proposed, (2) reassess the enrollment assumptions as they relate to the need to plan for a second campus, and (3) suspend planning efforts for a third campus.

As mentioned above, in October 1988 the university issued a general campus enrollment plan for the period 1988-89 through 2005-06. Based on the projected enrollments and UC's assessment of its ability to accommodate enrollments on existing campuses, UC proposed establishment of three new campuses later in this decade. (Specifically, the campuses would open in the fall of 1998, 1999 and 2000.) In December 1989, the university revised slightly its enrollment projections and continued to plan for three new campuses.

Figure 3 shows, for the year 2005-06, UC's current projections of total enrollment for 2005-06, the extent to which this enrollment would be accommodated on existing campuses and the "unaccommodated" enrollment which would result. It also shows

our estimate of a range of potential "unaccommodated" enrollment, using (1) UC's and DOF's undergraduate enrollment projections, (2) our recommended graduate student ratio (discussed above), and (3) the assumption that 7,000 additional students can be accommodated at UC Riverside (also discussed above).

Figure 3

Projected UC Enrollment Accommodated and Unaccommodated for 2005-06[a]

	UC Plan	LAO Estimated Range[b] Low	High
Projected Enrollment:			
Undergraduate	161,800	161,800	175,300
Graduate	47,300	41,500	43,800
Total Enrollment	209,100	203,300	219,100
Projected Enrollment at Existing Campuses	187,700	194,700	194,700
Unaccommodated Enrollment	21,400	8,600	24,400

[a] Average annual headcounts.

[b] The low estimate uses UC's estimate of undergraduate enrollment and the high estimate uses the Department of Finance's. Both estimates assume (1) the graduate enrollment ratios in UC's 1987 plan and (2) that UC Riverside could grow to 25,000 by 2005-06.

One Campus Needed. UC's proposal for three new campuses is based on its projection of "unaccommodated" enrollment of 21,400 students in 2005-06. On the other hand, using UC's undergraduate enrollment projection and what we believe are reasonable assumptions regarding projected capacity for UC Riverside and the graduate student ratio in the 1987 plan, we estimate an unaccommodated enrollment of 8,600 students. This assumes that the long-term enrollment ceiling for each campus (other than Riverside) will not be increased and that year-round scheduling will not be implemented. On this basis, we believe the Legislature should use this estimate in planning for UC's long-term facilities needs, and we conclude that an unaccommodated enrollment of 8,600 students justifies the need to plan **only one** new campus before 2005-06.

Furthermore, given the likelihood of having at least 8,600 unaccommodated students, we see no reason to delay planning and development of this new campus. Placing the campus on a faster track than the current UC plan would not only ensure the availability of capacity for the 8,600 students, it would also allow

UC to accommodate more students in the event UC's undergraduate enrollment exceeds the low end of the range. A concentrated effort by the university to develop this campus could result in an opening date in the mid-1990s rather than in 1998, as currently planned by UC.

Enrollment Assumptions for Second Campus Should Be Reassessed. If the higher end of the projected enrollment range proves correct, a second campus would be needed. For example, if the Department of Finance's enrollment projections are correct, UC will have 24,400 in unaccommodated enrollment. This shortfall could *not* be met by one new campus by 2005-06. The decision to plan for a second campus, however, can be deferred for at least a year without jeopardizing UC's schedule to bring it into operation in time to accommodate a higher enrollment. Deferring this decision would permit UC to concentrate its planning efforts in the coming year on the first campus. This would also allow UC and the Legislature to reassess enrollment projections and their underlying assumptions, as they relate to the need to plan for a second campus.

Suspend Planning for Third Campus. Even at the high end of our estimated range of enrollment for 2005-06, a third campus would not be needed. The additional enrollment at the high end of the range could be accommodated through (1) more rapid enrollment growth at two new campuses and/or (2) temporary over-enrollment at existing campuses. Therefore, we recommend that UC suspend its planning efforts for a third campus. Instead, UC should (1) concentrate its planning efforts on one campus and (2) reassess the need for a second campus based on further experience with enrollment growth.

The University of California's Five-Year Capital Outlay Plan

We find that UC's five-year capital outlay plan does not adequately inform the Legislature on how needs related to projected enrollment growth are to be met. We find further that a significant portion of the plan's proposed expenditures do not address enrollment-related needs.

In the *Supplemental Report of the 1989 Budget Act,* the Legislature directed each of the segments to submit five-year capital outlay plans to the Legislature by September 1, 1989. These plans were to include projected enrollments for each campus for each year of the plan and are to be updated annually. UC's November 29, 1989 five-year capital outlay plan (1990-91 to 1994-95) indicates that UC expects undergraduate enrollment systemwide to increase by over 12,000 (8 percent) over the five-year period. This includes a 6 percent increase in undergraduate and an 18 percent increase in graduate enrollments.

To meet this enrollment growth, and also to renovate existing facilities that may be obsolete for physical or program reasons, UC's plan calls for the expenditure of about *$1.1 billion* of state monies during the five-year period 1990-91 to 1994-95. The proposed program includes funds for 139 major projects at the nine campuses as well as an ongoing minor capital outlay program (projects costing $250,000 or less). While the plan does *not* include any proposed expenditures for planning or establishing new campuses, it does include projects designed to meet needs associated with enrollment growth at existing campuses. This year the university incorporated several elements into its five-year plan that make it more useful to the Legislature. For example, the plan now covers the full five years, includes estimated costs to complete each project and lists the projects in priority. Although the university's plan has been improved and is generally responsive to the Legislature's directive, we have several concerns about it.

Plan Does Not Provide Enrollment-Related Information. The Legislature directed that the capital outlay plans include, among other information, a discussion of how each project contributes to accommodating needs associated with current/projected enrollments. The UC plan does not include this information. Without this information it is impossible for the Legislature to determine the extent to which the capital outlay plan meets needs generated by enrollment growth or the cost of meeting those needs. This places the Legislature in a difficult position for making funding decisions on UC's capital outlay program.

Plan Includes Significant Expenditures for Purposes Not Directly Related to Enrollment Growth. Some indirect measures indicate that a significant portion of the university's proposed capital outlay expenditures do not meet needs generated by enrollment growth. For example, the university expects enrollment growth at six of the eight general campuses and modest enrollment declines at two campuses—Berkeley and Los Angeles. The plan, however, proposes expenditures of about $160 million (excluding projects related to seismic safety), or 17 percent of the five-year total, at Berkeley and Los Angeles, *even though current capacity at those campuses exceeds current enrollment.*

In addition, our analysis indicates that about $100 million proposed for expenditure in 1990-91 is for projects that are primarily for research-related space rather than enrollment growth. The estimated future cost to complete these projects is over $180 million.

Expenditures for capital improvements that are not related directly to enrollment growth are certainly appropriate and may

be necessary. The Legislature, however, needs better information in the five-year capital outlay plan so that it can assess the needs for projects related to enrollment growth (including new campuses) and other improvements, in order to set the Legislature's priorities and strike an appropriate funding balance between the two.

CALIFORNIA STATE UNIVERSITY

The California State University (CSU) system is composed of 20 campuses and nine off-campus facilities which provide instruction in the liberal arts and sciences as well as in applied fields which require more than two years of college education. In addition, CSU may award a doctoral degree jointly with the University of California or a private university.

Enrollment Projections for CSU

In October 1989, CSU issued a *Growth Plan for 1990-2005* that included enrollment projections for the period 1990-91 through 2005-06. The plan also includes a proposal to start five new campuses, with the first to be brought on line in 1994. In November 1989, the Department of Finance's Demographic Research Unit developed projections of CSU enrollments for the same time period. (These projections do not distinguish between undergraduate and graduate students. CSU has a smaller percentage of graduate students than UC and, unlike UC, is not proposing to increase that percentage.)

In preparing for its facilities needs for the year 2005-06, CSU assumes that enrollment will grow from 361,000 students in 1990-91 to 541,000 in 2005-06. This is an increase of 180,000 students, or 50 percent. By contrast, DOF—based on demographic data and historic participation trends—projects an enrollment of 466,000 students—an increase of 105,000 students. This represents an average annual enrollment growth of 1.7 percent and growth of 29 percent over the period. The key difference between the numbers arises from an assumption by CSU that, by 2005, it will reach the state's goal of educational equity—that is, the current low participation rates of students from under-represented ethnic groups will increase to rates comparable for those of whites. (Currently, blacks participate at about one-half, and Hispanics at about one-third, the rate of whites.)

Clearly, attaining educational equity at CSU (and all postsecondary segments) is an important priority. But for capital planning purposes, projections of enrollment need to be based on the best available demographic data, not on policy goals. CSU cannot accomplish this objective as an institution acting alone.

The state's K-12 system must graduate qualified students in sufficient numbers to put the policy goal within reach. There is no evidence that we know of which suggests that the laudable objective of equal participation rates can be achieved within the next 15 years. For example, there are currently about 40,000 Hispanics in the CSU system. If the participation rate for Hispanics continues to increase as it has during recent years, there would be about 115,000 Hispanics—almost three times the current numbers—by 2005-06. To meet CSU's plan, however, the system would have to enroll over 190,000 Hispanics—almost five times the current number—over the period. The improvement in black participation rates would have to be even more pronounced in percentage terms in order to meet CSU's objective. In short, CSU's enrollment figure for 2005-06 is not a projection based on demographic trends.

By comparison, the DOF projections are based on enrollments growing generally according to historic trends during the planning period. If these past trends continue, this assumption implicitly reflects substantial increases in the enrollments of under-represented students. In relying on these DOF figures, we note two caveats. First, the trends in participation rates should be carefully monitored to capture changes as they occur and to make necessary changes in out-year enrollment projections. Second, it is possible that, in the near future, DOF will be able to provide projections with more detail by race and ethnic group. This will greatly assist the Legislature in its efforts to equalize future participation rates.

Accordingly, we suggest that CSU develop a more realistic enrollment projection through the year 2005-06 that could serve capital outlay planning purposes. If participation rate experience in the future indicates that CSU is more rapidly attaining this goal, the enrollment projection *can* and *should* be revised upward. Until actual trends (including high school graduation rates) demonstrate otherwise, however, we believe DOF's enrollment projection forms a more reasonable basis for planning CSU facility needs. On that basis, the state at this time should plan on accommodating 466,000 CSU students in 2005-06. Because many CSU students are part-time, this level of enrollment would be 350,000 full-time equivalent (FTE) students. For the remainder of this section on CSU, we use FTE enrollment figures.

Accommodating Enrollments on Existing Campuses

Figure 4 shows, for each CSU campus, the current enrollment, CSU's projected enrollment for 2005-06 and CSU's recommended master plan ceilings. As the figure shows, CSU's growth plan projects that its existing campuses and off-campus centers can be

expanded to accommodate an enrollment of 365,400 FTE by 2005-06, an increase of about 93,000 FTE (34 percent increase) over the current enrollment.

Figure 4 also shows that CSU's projected enrollment for the 20 campuses (344,100) is almost *60,000 less than* the total campus enrollments under proposed master plan ceilings (404,000). This master plan total includes CSU's plan to raise ceilings at five campuses: (1) Fresno and San Francisco from 20,000 to 25,000

Figure 4

CSU Current and Projected Enrollment and Master Plan Ceilings at Existing Campuses[a]

	Current Enrollment[b]	Planned Enrollment in 2005-06[c]	Master Plan Ceilings
Bakersfield	4,000	8,500	12,000
Chico	14,000	14,000	14,000
Dominguez Hills	6,200	12,000	20,000
Fresno	16,100	25,000	25,000[d]
Fullerton	17,600	20,000	20,000
Hayward	8,300	12,100	18,000
Humboldt	6,800	8,000	8,000
Long Beach	23,600	25,000	25,000
Los Angeles	13,600	18,500	25,000
Northridge	20,900	25,000	25,000
Pomona	14,700	19,100	20,000
Sacramento	19,000	23,400	25,000
San Bernardino	7,800	17,100	20,000[d]
San Diego	25,000	25,000	25,000
San Francisco	20,000	25,000	25,000[d]
San Jose	20,500	25,000	25,000
San Luis Obispo	14,700	17,400	20,000[d]
San Marcos	300	7,000	25,000
Sonoma	5,400	10,000	15,000[d]
Stanislaus	3,900	7,000	12,000
Subtotals	(262,400)	(344,100)	(404,000)
Off-campus centers	3,500	10,400	n/a
Year-round operation[e]	6,000	10,900	n/a
Totals	271,900	365,400	404,000

[a] Full-time equivalent students.
[b] CSU's estimate for 1990-91.
[c] Enrollment planned by CSU.
[d] Increased ceiling recommended by CSU.
[e] Use of summer quarters at four existing year-round campuses.

FTE each, (2) San Bernardino from 12,000 to 20,000 FTE, (3) San Luis Obispo from 15,000 to 20,000 FTE and (4) Sonoma from 10,000 to 15,000 FTE. Although these master plan changes will require a detailed review process, including environmental impact assessments, we have no basis for assuming the ceilings cannot be raised.

We believe CSU's estimate of the ability of existing campuses to absorb growth is conservative. Under CSU's plan, 11 campuses would still be below their recommended master plan ceilings in 2005-06. Some of these campuses (such as Hayward or Dominguez Hills) may not be able to grow faster than CSU has planned, given problems experienced by those campuses in attracting enrollment. Several of the other campuses, however, have the potential to grow faster than CSU has planned, including Sacramento, Pomona and San Marcos.

Conclusions on Need for New CSU Campuses

Our analysis indicates that there currently is no demonstrated need to plan for any new CSU campuses.

As mentioned above, the CSU growth plan for the period 1990 through 2005 calls for establishment of five new campuses. Under this plan, the new campuses would be brought into operation at two-year intervals beginning in 1994. The plan also calls for establishment of five new off-campus centers to serve upper division and graduate students.

Statewide Enrollment Needs. Figure 5 shows for the year 2005-06 CSU's projections of total enrollment, enrollment accommodated at existing campuses (including summer quarter enrollment) and off-campus centers, and the "unaccommodated" enrollment on which its proposal for five new campuses and five new off-campus centers rests. The figure indicates that under CSU's enrollment projections, the system could not accommodate 41,000 students within existing facilities. CSU's growth plan assumes that this shortfall would be addressed through:

- The five new campuses (20,000 FTE).
- The five new off-campus centers (6,000 FTE).
- Other off-site instructional areas (3,000 FTE).
- An undefined combination of measures, including various forms of off-site instruction and expanded use of summer terms (12,000 FTE).

As discussed above, however, we believe CSU's enrollment projection is unrealistically high and that DOF's enrollment

Figure 5

Projected CSU Enrollment Accommodated and Unaccommodated for 2005-06

	CSU Plan	DOF Projection
Projected enrollment	406,000	350,000
Projected enrollment at existing sites	365,000	365,000
Unaccommodated enrollment (surplus capacity)	41,000	(15,000)

projections are more appropriate to use at this time for planning purposes. Under DOF's projection, the potential for existing campuses to accommodate enrollments significantly *exceeds* the expected enrollment level. As Figure 5 shows, existing campuses and centers can accommodate projected enrollment growth (through capacity-expanding construction projects), and still have the potential to accommodate 15,000 *additional* FTE students in 2005-06 and beyond. Moreover, as discussed above, under CSU's recommended master plan ceilings there would be *further* potential to expand existing campuses to accommodate another 60,000 FTE students.

Regional Aspect of Accommodating Enrollment. Some may argue that, even if there were existing capacity in the system as a whole, CSU's regional focus requires that new campuses be built in areas where campuses are reaching or have reached capacity. In considering the question of accommodating enrollment, however, it is important to recognize the *mixed state/regional nature* of CSU campuses. According to CSU's publication, *Origin of 1988 Fall Term Enrollment,* 12 of the 20 campuses draw a majority of their freshmen classes from the region (defined as the metropolitan statistical area) in which the campus is located. The same document indicates that 40 percent of all entering freshmen come from *outside* the region in which the campuses they are attending are located. Thus, a substantial portion of enrollment is from outside the campus region and could be viewed as a statewide component of the enrollment.

Nevertheless, it is conceivable that one or more new campuses could be justified strictly on the basis of regional enrollment needs. We believe, however, there are several options for meeting regional enrollment needs that should be examined *before* under-

taking the costly (and irreversible) step of acquiring and constructing new campuses. These options include:

- ***Extending Year-Round Operations.*** Since year-round operation uses existing facilities, it has the potential to reduce future needs for additional space. Currently, four campuses (Hayward, Los Angeles, Pomona, and San Luis Obispo) have state-funded summer quarters. We recommend in our *Analysis of the 1990-91 Budget Bill* (Item 6610-001-001) that the CSU conduct a comprehensive cost-benefit analysis of this option.
- ***Raising Master Plan Ceilings.*** The CSU's growth plan projects that campus master plan ceilings will range from 8,000 to 25,000 FTE students. The CSU should consider raising some of the master plan ceilings for those campuses which are below the maximum level of 25,000 FTE.
- ***Establishing Off-Campus Centers.*** The CSU may wish to establish off-campus centers near students' homes or workplaces. Since such space can often be leased on a short-term basis, off-campus centers could also be used to meet one-time peaks in enrollment demand.

In view of statewide enrollment trends and the variety of options available to meet regional enrollment needs, we conclude that there is no demonstrated need for CSU to plan new campuses at this time. Although the need for new off-campus centers is not justified on the basis of statewide enrollment projections, we reserve judgment on CSU's proposal for five new off-campus centers pending additional information from CSU on the regional basis for these centers.

The California State University's Five-Year Capital Outlay Plan

We find that CSU's recent five-year capital outlay plan does not adequately inform the Legislature on how needs associated with projected enrollment growth are to be met. We find further that a significant portion of the plan's proposed expenditures do not address these needs.

According to CSU's five-year capital outlay plan (submitted to the Legislature August 31, 1989), enrollment at CSU campuses will increase 15,000 FTE (5.7 percent) by 1995-96.

To meet this enrollment growth and also to renovate existing facilities that may be obsolete for physical or program reasons, CSU's plan calls for the expenditure of about *$1.4 billion* of state monies during the five-year period 1990-91 through 1994-95. The

proposed program includes 166 major projects at the 20 campuses, eight major projects at two off-campus centers (Contra Costa and Ventura) and ongoing programs for energy conservation and minor capital outlay (projects costing $250,000 or less). This year, CSU has improved its five-year capital outlay plan by providing more information on proposed projects. For example, the plan has been expanded to include limited descriptions of all projects and estimated costs to complete each project. While including this additional information is generally responsive to the Legislature's directive, we still have several concerns aboutthe plan.

First, CSU's capital outlay plan does *not* include any proposal for the planning or establishment of new campuses. Consequently, the current capital outlay plan will not implement the CSU Trustees' growth plan that calls for five new campuses (with the first campus to come on line in 1994). Moreover, the plan does not include any information regarding establishment of off-campus centers.

In addition, the capital outlay plan does include projects designed to meet needs associated with enrollment growth at existing campuses. The plan indicates that instructional facility capacity will increase from 98 percent (systemwide average) of enrollment to 102 percent. Our analysis indicates, however, that the plan contains inconsistencies regarding capacities associated with specific projects and campuses. These inconsistencies, which are numerous and significant, call into question the reliability of the information included in the plan. For example, the plan indicates that either 3,321 FTE capacity or 1,766 FTE capacity will be added at CSU Fresno, depending on the page of the document chosen. In another case, the document indicates in one part that proposed projects will add 4,407 FTE capacity at CSU Northridge. Yet, the plan's summary table indicates that 4,244 FTE capacity would be added at Northridge during 1991-92 through 1993-94, followed by ***deletion*** of 3,330 FTE capacity in 1994-95.

Our analysis further indicates that many of the proposed expenditures do not substantially address needs associated with enrollment growth. For example, CSU San Diego already is at its master plan ceiling in terms of both enrollment and facility capacity. Yet CSU's plan proposes spending more capital outlay funds at San Diego than at any other campus—$141 million over the five-year period.

As mentioned under the section on UC, many projects that do not contribute directly to accommodating enrollment growth may be necessary. The Legislature needs better information in the five-year plan, however, so that it can (1) assess ways to accommo-

date enrollment growth and other needs and (2) strike an appropriate funding balance between the two.

CALIFORNIA COMMUNITY COLLEGES

The California Community Colleges (CCC) consist of 71 locally governed districts operating 107 colleges throughout the state. In addition, the CCC provides instructional services to students at off-campus sites. The community colleges are authorized to provide associate degrees, occupational certificates and credentials, and various service instruction.

Enrollment Projections

By statute, long-term enrollment projections for use by the community colleges are prepared by DOF. The enrollment projections are formulated by applying expected participation rates to projections of future population groups, categorized according to age and gender. This method is similar to the one DOF uses for determining enrollment projections for both UC and CSU. However, this projection is also based on input from local districts (through an annual enrollment survey), and a qualitative assessment of each district's situation by DOF staff. Using this method, DOF projects community college enrollment to grow from 1,333,000 in 1988-89 to 1,873,000 by 2005-06, an increase of 540,000 students.

This represents an average annual growth of 2 percent, and growth over the period of 41 percent. This projection is also higher than DOF's 1988 projections, which estimated an increase of 400,000 students over that same period. Figure 6 illustrates the enrollment growth trend between 1988-89 and 2005-06. It shows that over two-thirds of the projected enrollment increase would occur after 1994-95. The DOF's enrollment projections appear to be reasonable for purposes of long-range facilities planning.

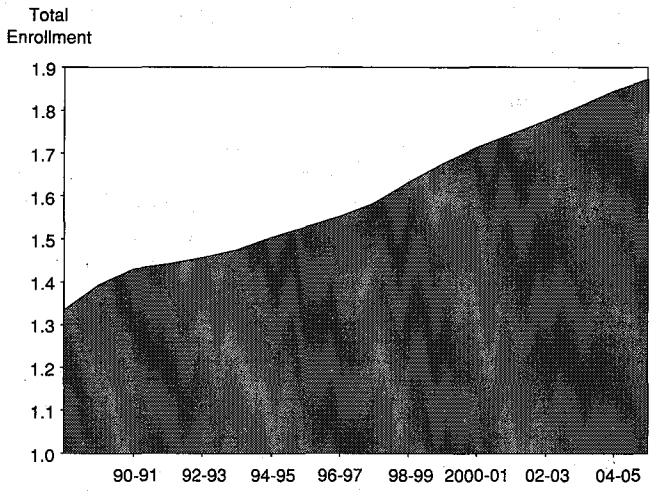
Similar to the DOF projections for CSU enrollment growth, the DOF model for community colleges does not make explicit assumptions about how participation rates for underrepresented groups will change by 2005. During the 1980s, increases in total participation rates have reflected the increased participation rates of underrepresented ethnic groups. Therefore, to the extent these trends continue, DOF's projections implicitly reflect increased movement towards meeting educational equity goals. The DOF is currently developing an alternative projection based on the attainment of equal access (participation rates of underrepresented groups equal to that of whites).

The alternative projection should provide useful information because unlike the other segments of postsecondary education,

Figure 6

California Community Colleges
Projected Student Enrollment

1988-89 through 2005-06
(in millions)



the California Community Colleges have an open enrollment policy. Simply stated, no minimum criteria or standards must be met to enroll into a community college. Therefore, the possibility of the community colleges achieving equal access within the timeframe of the projections merits examination. These projections should be available for review in spring 1990.

Accommodating Increased Enrollment

We find that the community colleges' current simulation model has shortcomings which make it unreliable as an accurate predictor of the system's future capital outlay needs. As a result, we cannot at this time advise the Legislature as to either the necessary expansion of existing campuses or the number of new community college campuses that will be needed to accommodate projected enrollment through 2005-06.

To plan for the projected enrollment increase, the Chancellor's Office has developed a computer simulation model. The

model employs twenty-nine different data elements about each district's enrollment and facilities. This information is processed with space utilization standards and with a series of planning assumptions about such variables as campus capacity, service area limitations, and average construction costs. For *each* of the 71 community college districts, the model projects capital outlay needs through 2005-06 for remodeling and altering existing facilities, constructing and equipping new facilities, and acquiring new sites and developing new campuses. The model aggregates district needs into regional and statewide summaries. (These projections do not incorporate future capital outlay expenditures for safety requirements, correction of hazardous conditions, and physical access for disabled persons.)

Using this model and DOF's 1988 enrollment projections, the Chancellor's Office estimated that about two-thirds of the 400,000-student enrollment growth could be accommodated in existing facilities or by expanding existing campuses. Accommodating the remaining one-third would require 16 additional campuses averaging 8,000 students. The Chancellor's Office has not run the model using the higher enrollment figures in DOF's 1989 enrollment projection (540,000 additional students by 2005-06). The office estimates, however, that accommodating this higher enrollment would require about 5.1 million assignable square feet (asf) of new facilities on existing campuses and the development of 23 new campuses (2.9 million asf).

The simulation model may be a useful tool for estimating the potential *magnitude* of long-range planning needs. The current model, however, should *not* be considered as the final determinant for expanding a campus or establishing a new campus. This is because the model includes a wide range of subjective planning assumptions that, if modified, could significantly alter the projections for the expansion of the community college system. Examples of these assumptions are discussed below.

Potential for Expanding the Use of Off-Campus Facilities. One planning assumption is that a district's current proportion of off-campus to on-campus weekly student credit hours (WSCH) will remain the same through 2005-06. (Currently, about 10 percent of all systemwide WSCH are off-campus.) Increasing the use of off-campus space could reduce the need for building new campuses *or* for expanding existing campuses. Off-campus use could be increased in part by offering more evening classes at existing secondary schools. This alternative could accommodate a substantial number of evening students in existing, and often under-used, lecture space. Using multiple, decentralized secondary schools would also offer many students an educational

opportunity closer to their homes or workplaces than existing community college campuses.

Potential for Inter-District Sharing of Facilities. The Chancellor's Office model omits a key variable which must be considered when determining whether a new campus is fully justified. The model only examines the capacity at District A's existing campuses in determining the need for a new District A campus. The model does not consider whether an existing campus in District B—an *adjoining* district located within a reasonable commuting distance—has the capacity to accommodate more students from District A.

Inappropriate Criterion for Establishing New Campuses. The two conditions imposed by the model in projecting the need for a new campus are that (1) the average size of a district's existing campuses is not to exceed 750 WSCH per campus acre *and* (2) the service area of existing campuses is not to exceed certain limits—based on a 30-minute maximum travel time—for urban, suburban, and rural areas. We believe the first condition is an inappropriate criterion.

First, it is unclear to us why the 750 WSCH per acre standard is the appropriate one. We sampled 20 representative urban, suburban, and rural campuses and found that current enrollments ranged from 44 to 3,350 WSCH per acre. Additionally, ten campuses in our sample exceeded 1,100 WSCH per acre. Thus, many campuses *now* accommodate considerably more students than the capacity standard used in the model for projecting new campuses. We therefore question the use of a single, statewide campus capacity parameter for projecting each district's ability to accommodate enrollment growth. Second, and more importantly, we believe it is inappropriate to use, as a capacity standard, a variable that relates academic load to a campus *land base.* As an alternative to this parameter, the Chancellor's Office, in cooperation with the districts, should determine the capacity of the community college campuses based on what is academically sound.

Further Work. A private consultant is assisting the Chancellor's Office in refining the model. The consultant will also provide long-range planning assistance to those districts for which new campuses are projected. This process will be complete in June 1990, at which time the Chancellor's Office should have a more definitive answer as to the number, location, and timing of new campuses which they believe will be needed by 2005-06. We urge the Chancellor's Office to reevaluate the assumptions used as a basis for its projections and to incorporate the above changes,

along with any other changes they may deem appropriate, prior to completing this process.

The community colleges simulation model is an important first-step in projecting the system's long-range capital outlay needs. In view of the current shortcomings of the model, however, we cannot at this time advise the Legislature as to either the necessary expansion of existing campuses or the number of new community college campuses that will be needed to accommodate projected enrollment through 2005-06. As indicated earlier, however, of total projected enrollment growth in the community college system through 2005-06, over two-thirds will occur *after 1994-95*. Therefore, existing campuses and off-campus centers should be able to accommodate the system's short-term growth. This, in turn, should give the Chancellor's Office sufficient time to refine its proposal before seeking approval by the Legislature.

The California Community Colleges' Five-Year Capital Outlay Plan

We find that the community colleges are not adequately addressing growth-related capital outlay needs, as evidenced by the lack of a systemwide five-year plan as required by the Legislature.

In accordance with the *Supplemental Report of the 1989 Budget Act,* the Chancellor's Office submitted a five-year capital outlay plan. This plan falls woefully short of the supplemental language report requirements. Rather than providing a systemwide plan showing statewide five-year priorities, as required by the Legislature, the Chancellor's Office simply included copies of *each district's* two- to five-year priority list of projects. The Chancellor's Office, however, estimates that the community colleges will be seeking state appropriations totaling *$1.0 to $1.2 billion* during the five-year period 1990-91 to 1994-95.

The systemwide five-year plan was also to include a discussion of the programmatic basis for each project and how the project contributes to accommodating needs associated with current and projected enrollments. This requirement has not been fulfilled in the plan submitted to the Legislature.

The individual district's five-year plans include a calculation of the net increase in WSCH that each capital outlay project will accommodate. Our review of these documents shows that the various projects will accommodate an additional 110,000 students over the next five years, which compares well to DOF's latest enrollment projections. On closer examination, however, it is

clear that the proposed expansion is not located where the enrollment growth is expected. For example, many districts that currently have substantial capacity are planning additional facilities. In fact, two-thirds of the proposed increase in lecture or laboratory space planned for the next five years—enough for 74,000 students—is in districts whose *present* facilities can accommodate over 120 percent of their projected enrollment over the same time period.

A community college five-year plan in essence does not exist and systemwide planning for enrollment growth is totally inadequate. Judging by the current five-year plans of many individual districts, a large portion of proposed future expenditures will *not* address enrollment-related capital outlay needs. It is essential that the Legislature have a systemwide five-year plan in order to assess whether project proposals, including those associated with new campuses, address enrollment growth and other legislative priorities. The Chancellor's Office needs to provide the Legislature with the information requested by the Legislature in the *Supplemental Report of the 1989 Budget Act.*

HOW CAN THE LEGISLATURE BEST PROVIDE THE FACILITIES NEEDED FOR ENROLLMENT GROWTH?

Although there are no precise estimates of the costs to meet postsecondary education capital outlay needs over the next 15 years, it is clear from the segments' five-year capital outlay plans and other information that a *multi-billion* dollar effort will have to be funded. Given the magnitude of this fiscal commitment, the Legislature will have to consider carefully how best to plan and finance these facility needs.

Legislature Needs Better Information

We recommend that the segments provide better capital outlay planning information to the Legislature, particularly with regard to how proposed projects meet needs associated with enrollment growth, and including information on proposed new campuses or off-campus centers.

Competing Statewide Needs and Limited Resources. As discussed above, billions of dollars will be needed in the next five years and beyond for postsecondary education capital outlay. At the same time, these needs will compete with various other statewide needs for limited funding. Consequently, the Legislature needs improved information from the segments so that it can better assess, control and plan for postsecondary education capital outlay needs.

Better Information Needed on How Projects Address Enrollment Needs. The Legislature, in the *Supplemental Report of the 1989 Budget Act,* already has requested much of what we believe is needed. In attempting to follow this legislative direction, UC and CSU have made significant improvements in the informational content of their plans. Our review indicates, however, that the segments still need to refine information on how proposed projects meet needs associated with enrollment growth and changing program requirements in order to assist the Legislature in determining if proposals meet legislative priorities. For each project, the segments should: (1) indicate the extent to which the space serves undergraduate and graduate enrollments, instructional needs, and other capital improvement needs; and (2) specify the cost of providing the space for meeting enrollment needs. In addition, the segments should include in their five-year capital outlay plans information on the costs and timing of proposed new campuses or off-campus centers and how these centers are related to facilities to be constructed through capital outlay expenditures.

The Legislature needs the above information to make sure that it funds postsecondary education facility priorities as the Legislature sees them.

Legislature Will Have to Rely Heavily on Bond Financing

Improved planning information is important not only so the Legislature can establish priorities within each segment and among segments, it also is critical in preparing a financing plan for needed facilities. Given the magnitude of postsecondary education needs relative to General Fund and tideland oil resources, the state will almost certainly have to rely heavily on bond financing. In the past four years, for example, the state has financed 99 percent of postsecondary education capital outlay costs through either general obligation bonds ($1 billion) or lease-revenue bonds ($611 million). Since the state has used virtually all of its existing authorized general obligation bonds, future expansion of postsecondary education facilities will depend on *new* general obligation bond authorizations by the voters and, potentially, new lease-purchase revenue bond authorizations by the Legislature.

In comparing these two types of bonds, it should be noted that the *General Fund* provides the debt service payments in both cases. General obligation bonds, however, have two principal advantages over lease-revenue bonds. First, general obligation bonds are less expensive (currently an interest rate differential of up to 0.5 percent). Also, the state does not have to obtain insurance for facilities funded with general obligation bonds, as is required under lease-revenue bonds. (UC generally meets this require-

ment through self insurance.) Second, unlike the case for lease-revenue bonds, debt payments on general obligation bonds are exempt from the state's appropriations limit and therefore enhance the Legislature's ability to fund competing state needs. (Under the provisions of SCA 1, if approved by the voters in June 1990, it appears that the Legislature could exempt lease-revenue debt payments from the appropriations limit.)

Currently, the Legislature is considering SB 147 (Hart), which would authorize (as amended January 18, 1990) a $900 million general obligation bond measure to be submitted to the voters at the June 1990 primary election. Considering only the first two years (1990-91 and 1991-92) of the five-year plans, the amount proposed under SB 147 falls short of the segments' stated needs by more than $500 million. Some of the projects proposed by the segments may, upon legislative review, not merit funding during 1990-91 or 1991-92. If, however, the Legislature wishes to fund the segments' plans in the two-year period, it may wish to increase the amount of general obligation bonds to be authorized.

If the $500 million "shortfall" were instead funded through revenue bonds, we estimate it would require up to an additional $125 million in principal and interest payments (plus major unknown costs for insurance) over a 20-year period. This added cost is a result of two factors—lease revenue bonds carry a higher interest rate and, under the State Treasurer's current policy, these bonds are paid off using a different financing schedule. Given, however, the 20-year time frame for paying off the debt service, the $125 million cost would be equivalent to $40 million in 1990 dollars.

SUMMARY AND CONCLUSIONS

Above, we have reviewed the ways each segment of public postsecondary education is preparing for enrollment growth over the next 15-year horizon. The following is a summary of our findings and conclusions:

Enrollment. Enrollment for each of the segments is projected to grow steadily between now and 2005-06 (average annual growth of between 1.7 percent to 2.0 percent), resulting in significant increases in the numbers of students the state must accommodate by the end of that period.

Projections. While there is agreement that each segment will experience significant enrollment growth by 2005-06, we have identified concerns with specific projections on enrollment and existing capacity made by the segments. We believe UC and CSU have made assumptions which result in an overstatement of the need for new campuses. Data for the Community Colleges are

insufficient for us to draw conclusions at this time.

Need for New Campuses. Based on our review of systemwide and campus enrollment projections, we find that:

- ***University of California.*** The university will need at least one new campus by 2005-06 and should immediately begin planning and development efforts for that facility. In addition, the university should reassess its enrollment assumptions with regard to the need for a second campus and suspend planning for a third campus.
- ***California State University.*** The system at this time should not plan for any additional campuses, as existing campuses will be able to accommodate projected enrollment growth through 2005-06.
- ***California Community Colleges.*** Given the shortcomings in the Chancellor's Office model used to project facilities needs, we cannot at this time assess their need for new campuses.

Funding Expansion of Existing Facilities. Regardless of what decisions are made on new campuses, all three segments will require significant capital outlay improvements and expansion. Over the 15-year period to 2005-06, the state will have to undertake a multi-billion dollar capital outlay program to meet these postsecondary education facilities needs.

Planning. All three postsecondary education segments should significantly improve the information provided to the Legislature in their five-year plans. This would allow the Legislature to better assess, control, and plan for the state's postsecondary education capital outlay needs.

Air Quality Improvement: An Alternative Strategy

Is the Current Regulatory Approach the Most Effective Way to Meet the State's Air Quality Goals?

Summary

California has serious air quality problems as there are many parts of the state which do not meet federal or state air quality standards. The state's reliance on "command and control" regulatory policies has resulted in significant improvements in air quality. However, policy makers are increasingly expressing concern about the ability of the current policies to provide cost-effective future gains in air quality.

Because the major sources of pollution are more difficult to regulate using command and control policies, more and more proposals are beginning to stress economic incentives. Incentives-based regulatory policies can offer a more cost-effective method for achieving air quality goals because they encourage cost-avoiding behavior, and innovative and flexible approaches to controlling pollution. In order to encourage the implementation of incentives-based policies, we recommend that the Legislature: (1) amend the California Clean Air Act to explicitly authorize the use of incentives-based regulatory policies, (2) authorize the Air Resources Board and local air pollution control districts to use fees, and (3) establish and evaluate a tradeable discharge permit pilot program in a major air basin.

California suffers from some of the country's worst air quality problems. In order to improve air quality, the state and local air quality districts have implemented some of the toughest air quality controls in the country. The state's primary approach to improving air quality has been to use "command and control" regulation of pollution sources, which relies on administrative

processes to establish rules that mandate or prohibit actions, and to appeal to voluntary cutbacks in activities that create pollution. This approach has achieved significant success in reducing outputs of certain pollutants. Yet virtually every urban and many rural areas of the state remain out of compliance with existing state and federal standards.

Last year we discussed amendments to the California Clean Air Act (please see *1989-90 Budget: Perspectives and Issues,* page 111) that are designed to strengthen the authority of regulatory agencies and improve coordination between air districts. Policy makers at the federal, state and local levels, however, are increasingly expressing concerns about the current strategies for improving air quality. More and more proposals are beginning to surface that look beyond the state's current regulatory policies to ones that stress incentives and flexibility in order to improve the prospects for achieving the state's air quality goals at lower cost to society. These policies are known as incentives-based regulatory policies.

In this analysis we review command and control regulatory policies (CCR), examine the deficiencies of CCR policies, present an overview of incentives-based regulation (IBR) and discuss specific IBR policies.

BACKGROUND

California residents experience more days of poor air quality than do residents of any other state in the nation. Air pollution can cause health problems (severe ones for some people), kill trees, damage agricultural crops, and damage buildings, infrastructure and other exposed materials. One recent study by the South Coast Air Quality Management District (SCAQMD) estimates that air pollution in that region alone could cost individuals and businesses as much as $9.6 billion annually. While that study has received some criticism, most experts would agree that air pollution is very costly. Last year (please see *1989-90 Budget: Perspectives and Issues,* page 115), we identified 25 counties in California that continue to violate federal standards for at least one pollutant (such as sulfur and nitrogen oxides, particulates, hydrocarbons, and carbon monoxide).

One reason why air pollution is more serious in California than elsewhere is because of the state's weather and topography. Rapid population growth and life-style choices, which include the widespread use of automobiles, intensify the state's air quality problems. Past federal and state regulatory activity has identified and implemented most of the relatively inexpensive, known pollution control technologies on large, easily identifiable pollu-

tion sources (such as manufacturing and power plants). Future efforts to comply with state and federal air quality standards increasingly will have to deal with individually smaller and more diffused sources of pollution (such as automobiles and consumer products). This will (1) increase the costs of control efforts in order to obtain relatively modest improvements in air quality and (2) limit the ability of government to improve air quality merely by mandating specific technologies. Significant future gains in air quality are likely to require major changes both in the way we produce products and in individual life-styles.

CURRENT REGULATORY SYSTEM

In this section we review the command and control regulatory process and examine its advantages and deficiencies.

The Components of CCR

California currently relies heavily on command and control regulation (CCR) to meet air quality goals. In part, this has developed due to the role of the federal Environmental Protection Agency in implementing the federal 1970 Clean Air Act (including the 1977 amendments). The CCR approach consists of the following major processes:

- ***Planning.*** Once goals (such as pollutant standards) have been established, a planning process (which typically follows a regulatory proceeding format) is undertaken to develop particular strategies for achieving the standards. An example of such a plan is the SCAQMD plan, (released in 1988 and known as the South Coast plan) which anticipates compliance with all federal standards (except ozone) by the year 2007.
- ***Approving Control Technologies.*** Generally compliance strategies rely heavily on tailend control technologies (that is controls on the exhaust from factories and automobiles), and regulatory proceedings are used to identify those technologies. For example, the regulatory agency may determine that a particular kind of smokestack attachment (a "scrubber") is needed in order to remove additional sulfur dioxide from electric power plant exhaust.
- ***Permitting New Pollution Sources.*** A permitting process (also using an administrative proceeding format) is designed in order to site new facilities that might be sources of pollutants.

- ***Monitoring and Enforcement.*** In order to assure compliance with the foregoing decisions, regulatory agencies engage in enforcement and monitoring activities.

The unifying feature of these CCR elements is that they rely on administrative procedures which typically include: hearings with written and oral testimony, workshops where participants discuss options, analysis and evaluation of proposals by staff, decisions rendered by a governing board and challenges to the decisions pursued in the courts.

Command and Control in California

The components discussed above can be seen in the regulatory systems used in California. It is a complex system to describe for several reasons:

- Both federal and state statutes apply;
- There are regulatory agencies at the federal, state and local levels; and
- There are different types of pollution sources: stationary (such as factories and power plants), mobile (such as cars and trucks) and so-called "area" (such as paint, deodorants, pesticides, solvents, and lubricants) sources.

The mix of agency regulatory and enforcement responsibilities is somewhat different for each source. Additionally, agencies develop regulations that can require either existing technologies or not-yet-developed technologies (so-called technology-forcing). Therefore, in describing CCR in the state, we focus on its general features rather than on specific regulatory institutions (except where examples help illustrate our analysis).

The federal Environmental Protection Agency (EPA) sets ambient air quality standards for certain specified pollutants and requires states to develop state implementation plans (SIPs) for achieving compliance with those standards. Additionally, because of its more severe problems, California has set standards for certain pollutants that are more stringent than the federal standards. Under California's SIP, air pollution control districts (APCDs) prepare the local implementation plans and manage the stationary source regulatory programs and the state Air Resources Board (ARB) has primary responsibility for the mobile source regulatory program and for reviewing district regulatory programs for conformance with clean air goals.

The ARB and APCDs inventory and monitor sources of pollution, which make it possible to establish and enforce maximum allowable concentrations of emissions *at each source.* This ap-

proach is limited, however, since in many areas the relationship between the amount and pattern of emissions and the measured ambient air quality is complex and poorly understood. As a result, it is sometimes difficult to ascertain exactly what improvement in air quality would result from requirements (for example, a particular control technology) placed on a specific source. Nonetheless, the plan must make a convincing case that it would achieve compliance or the EPA is authorized to impose sanctions (such as prohibiting construction or withholding certain federal funds). A state plan can be approved, however, if it shows "reasonable effort" to achieve compliance, including the requirement that emissions sources adopt the *best available control technology* (BACT).

Since the BACT depends on specific technical features of particular facilities (such as manufacturing plants, oil refineries, automobiles and power plants), the agencies identify a BACT *for each polluter.* These decisions are based on evidence submitted during a formal public hearing process. Further, the agency bears the burden of showing that the technology is feasible and will make progress toward reducing emissions. The federal BACT standard also has an economic reasonableness component. Because of the severity of California's air pollution problem, however, the state's regulatory program places less emphasis on whether the required technology is economically feasible.

WHAT ARE THE ADVANTAGES OF COMMAND AND CONTROL REGULATION?

The regulatory process outlined in the previous section is complex, yet it has perceived advantages that make it a popular means of achieving compliance with the state's air quality standards. These include:

- ***"Fairness" And Targeted Relief.*** CCR encourages public input, requires equal compliance from all polluters, yet allows for specific implementation delays or variances from general rules. Because CCR focuses on individual concerns and because CCR results mainly in indirect costs to individuals (such as control costs that are buried in product prices, general taxes and regulatory fees), it gives the appearance of fairness.
- ***Ease of Enforcement.*** CCR typically results in requirements for particular technologies that are easily monitored because in many cases the inspector need only visit the plant to take readings from the mandated device and make inspections to determine that it is operating within defined specifications.

- ***Familiarity.*** CCR has been developed over a long period; therefore, the rules and procedures are understood by the parties that have an interest in the process. Further, a practitioner "industry" of consultants, lawyers, analysts and others have created a knowledge-base about the workings of CCR processes.

The advantages of CCR are most pronounced when (1) the regulatory goals are well-defined; (2) the problems are not susceptible to other, less intrusive, regulatory mechanisms; (3) there are relatively few, noncomplex pollution sources and (4) the administrative process can be operated in a cost-effective and timely manner. Too often, however, the world in which CCR operates is not so clear cut.

WHAT ARE THE PROBLEMS WITH THE CURRENT REGULATORY SYSTEM?

Command and control regulation has been able to achieve success in the past because the technological and behavioral changes mandated by regulatory agencies could be accommodated by most segments of the population without significant disruptions to their existing life-styles. However, the cost of additional controls is increasing dramatically and intruding more and more on current life-style choices. As a result, the regulatory process is becoming less effective in achieving further improvements in air quality. There are several reasons why direct regulation is likely to be less effective in the future than it has been in the past.

Social Costs Not Reflected in Prices

Everyone suffers substantial economic costs from dirty air. However, none of us pay the full costs of the damage that our pollution creates. Moreover, where we *indirectly* pay the cost for pollution (such as in higher car prices because of catalytic converters), we seldom think of these costs as related to pollution. Consequently, we have little economic incentive to modify our behavior. Because CCR generally imposes a technological solution, it can increase the "up front" cost of a product or facility (such as a car or a power plant), but is unlikely to affect decisions about use of the services provided by the product or facility (such as the amount of driving or electricity use). For example, once you purchase the car (with its pollution control equipment) there is little incentive to stop driving to the grocery store everyday in favor of fewer, better planned trips.

Reduced Incentives to Innovate or to Minimize Control Costs

The current regulatory model provides little incentive for *polluters* to develop alternative pollution control technologies that

would reduce pollution *beyond* the levels required by regulations. Regulatory agencies also do not often encourage changes in production processes (such as the use of recirculation systems that capture polluting gases for reuse or the use of different, less harmful chemical processes for cleaning parts in factories) that could be more cost effective. Instead, the regulations typically require specific control technologies (some of which have not yet been developed) that industries must use in order to reduce specified pollutants (generally at the tailend).

If an industry develops an alternative method for controlling emissions (whether it is a change in the production process or an alternative tailend control technology), it must show, through an administrative process, that the alternative reduces emissions by as much as the control measure specified in the regulations. This can be costly and there is no guarantee that the regulatory authority will approve the measure. As a result, industries have relatively little incentive to budget significant research monies for the development of alternative technologies or processes beyond those expenditures necessary to develop the mandated technology.

Regulatory Agency Bears Burden of Proof

The burden of proving that a particular control should be imposed lies with the regulatory agency (such as an APCD or the ARB) rather than with those who pollute. While basic pollution standards exist which businesses and individuals are expected to meet, the regulatory agency must generally decide how this will be done. Thus, the regulatory agency is placed in the position of having to defend its decisions about control strategies or technologies. Polluters are not required to defend their continued violation of the standards or mandated reductions during the regulatory process that determines the control strategy. With the burden of proof on state and local agencies, polluters have incentives to postpone, or weaken regulations because they need not comply until all appeals to the proposed regulations are exhausted.

The burden placed on direct regulation can be seen in the efforts of the Air Resources Board to regulate underarm aerosol deodorants. This product group was chosen as the prototype consumer product group by the ARB since economic alternatives were already in the market (roll-on's and other non-aerosols). Thus, it was thought to be the easiest product group to regulate. Nonetheless, the proceeding took about two years from beginning to end. To repeat this process for each of the over 100 product categories identified by the ARB could last into the next century. The process would probably be more difficult for the remaining product groups because many of them do not have readily identifiable alternatives that would be considered less environmentally harmful.

Emphasis on Planning Not Achievement

The federal Clean Air Act requires regulatory authorities to place an emphasis on the development of plans that show how each political entity will meet standards. As we discussed last year (please see *The 1989-90 Budget: Perspectives and Issues,* page 116) if a district *knowingly* submits a plan that would fail to meet federal standards, the EPA is required to impose sanctions. The districts have great latitude regarding actual implementation or attainment of their plans so long as the districts can show that they reasonably thought their plans would meet the standards by the target date. Adopting a plan, however, does not guarantee either (1) that the plan will be implemented as adopted, or (2) that implementation will necessarily lead to the attainment of air quality standards.

For example, San Diego was *not* sanctioned for failing to meet federal standards for ozone and carbon monoxide by 1988 because its plan, when originally adopted, was determined to have sufficient measures to achieve the standards. On the other hand, the EPA was forced by court order to impose construction sanctions in the South Coast and Sacramento County districts because the EPA found that these district plans, when originally submitted, did not include sufficient measures to ensure a reasonable expectation of meeting the standards.

A more specific example of how focusing on technological solutions developed through regulation can divert energy from achieving mandated standards is the effort of the SCAQMD to develop rules needed to meet the 1988 federal deadlines. In 1986, we examined the stationary source control measures proposed by the SCAQMD as part of its 1982 south coast air quality plan. We found that, of the 24 rules and regulations included in the plan, 13 rules were either relaxed or deferred entirely pending further research. The deferrals came about because the technologies required by the rules were either not yet developed or were too expensive. This is not a criticism of the district, rather it shows how difficult it can be to find ways to solve an extremely difficult air quality problem within the framework of CCR.

The emphasis on planning and on developing technology also can draw resources away from enforcement. For example, in three of the largest air pollution control districts, only 14 percent of the staff actually enforce regulations. Most of the staff are employed developing plans and regulations, collecting data, and developing new technologies.

Emissions Clean-Up Cost Is Increasing Rapidly

Current control technologies, required for both stationary and mobile sources, have considerably reduced individual source

emissions. But the costs of tailend control technologies offering the ability to achieve significant *additional* emissions reductions are escalating rapidly. For example, in Los Angeles, recent estimates of costs to control nitrogen oxide emissions from stationary sources are about $20,000 per ton reduced. These control costs are likely to be much higher in the future as the district is required to make additional reductions in order to attain compliance.

Further, past federal and state requirements for mobile source pollution reduction added relatively moderate costs to the base price of automobiles and resulted in engines that are about 90 percent cleaner than prior to controls. Most observers believe, however, that the cost for cleaning up the remaining 10 percent is likely to be much more expensive. In general, the notion of escalating costs makes sense because it is reasonable to expect air quality districts to impose the least costly technologies before requiring more expensive, exotic technologies.

Summary Regarding CCR

Growth is outstripping the states's ability to regulate and enforce clean air requirements using the traditional policies. Additionally, the main pollution sources in the future are increasingly becoming small, numerous, and difficult to identify mobile and area sources rather than large, easily identified stationary sources. Given tough new planning and regulatory requirements enacted by the Legislature in 1988, it appears that significant improvements in air quality will be costly and difficult to achieve. This is because future air quality improvements are going to require much greater behavioral change and more reliance on innovative technologies. CCR does little to alter the incentives individuals and firms face when making decisions that result in air pollution. In the next section, we examine an alternative regulatory strategy that offers advantages over the CCR strategies currently used.

INCENTIVES-BASED REGULATION: A COST-EFFECTIVE APPROACH

What Is Incentives-Based Regulation?

Incentives-based regulation (IBR) relies on several basic principles that complement the way individuals and businesses respond to each other during the course of their everyday activities. The basic principles of IBR include:

- ***Recognizing Full Costs of Actions.*** The most fundamental principle of IBR is that individuals and businesses must recognize the ***full costs to society*** (including damage to the environment) of the goods and services they pur-

chase. Currently, prices of goods and services do not include a component that fully reflects damage to air quality; thus, individuals have reduced incentives to engage in more environmentally sound activities.

- ***Recognizing "Ownership" of the Environment.*** Second, IBR explicitly recognizes society's "ownership" of the environment by placing the burden of proof for damage to the environment on the polluter. Hence, the polluter must justify why it is violating society's right to clean air. By analogy, an individual has the right to seek damages from someone who disposes of garbage on his or her property.
- ***Creating Private Incentives to Comply.*** Third, IBR creates private incentives both to avoid polluting and to develop innovative solutions to the pollution problem. Individuals and businesses tend to engage in activities that are cost-avoiding. IBR would act to modify prices in a way that causes goods and services to reflect the full costs to society associated with their use. Thus environmentally harmful products or activities would become more expensive compared to less harmful products or activities; and individuals would tend to shift their purchases to relatively lower-cost "clean" products or activities.
- ***Changes the Focus of Regulatory Activity.*** Finally, IBR changes the nature of regulatory activity from its current emphasis on administrative process to an emphasis on enforcement of standards and permits, identifying problems, and crafting rules that improve private incentives.

How Would IBR Produce Cleaner Air?

Ideally, polluters should pay all of the costs of the pollution they cause, thereby imposing no costs on society. When someone drives a car, or manufactures a product, that individual faces costs associated directly with that activity (these costs usually are referred to as private costs). A motorist pays for the car, for the gasoline, and for insurance. A manufacturer faces costs for capital and labor. In the process of driving or manufacturing, these individuals also usually produce pollutants.

Under the current system of regulation, polluters do not pay *directly* for the damage to the environment caused by their activity (these costs usually are referred to as social costs). Instead, most of these social costs are borne by individuals *indirectly* either through (1) impaired life-style due to damage to the environment

(such as visual impacts, damaged buildings, and poorer health), (2) higher cost for products resulting either from the use of mandated emissions control technology or from damage to products caused by pollution, and (3) tax support for regulatory agencies. But, paying for pollution indirectly through degraded life-styles, hidden costs and taxes *does not send clear signals to individuals about the air quality consequences of their choices.*

An incentives-based regulatory strategy attempts to assign the cost of pollution *directly* to those that cause it, primarily by the use of fees that are added to the prices of goods and services. These fees would be set so that they are related to the amount of damage resulting from the polluting activities. Under this approach, motorists, for example, would pay for environmental damage, just as motorists currently pay for gasoline and the wear and tear on their vehicles. They would then have clear incentives to seek less costly alternatives. Correspondingly, the manufacturer would be faced directly with the costs of pollution when making production decisions and would have greater flexibility regarding how to avoid the costs.

By confronting individuals and firms with the full social cost of their choices, they would have incentives to avoid activities, modes of transportation and production processes that cause pollution. Presumably, rational individuals will alter their behavior to reflect more environmentally sound options: car pooling, driving at non-peak hours, taking public transit, and moving closer to their work. Similarly, manufacturers and other businesses would strive to avoid costs by seeking innovations on the production floor, changing the hours of operation, or perhaps by offsetting their pollution by purchasing discharge permits from other manufacturers who can reduce their pollution at lower cost (see below). Prices that reflect the environmental costs of particular activities are *constant reminders* that individuals and businesses can reduce costs by seeking ways to reduce pollution.

There are numerous examples of how price changes can affect behavior. For example, after the oil embargo in the early 1970s, the price of gasoline increased dramatically. As a result, drivers significantly reduced their overall consumption of gasoline by changing driving habits and by purchasing increased numbers of more fuel-efficient cars. When gasoline prices dropped in the 1980s, consumption increased again. Another example concerns the rapidly increasing cost of disposing of toxic substances (both landfill costs and liability costs). The result is that manufacturers are investing in less toxic manufacturing processes and recycling toxic chemicals for reuse within their facilities in order to avoid costs.

Advantages of an IBR Policy

Our analysis indicates that society would experience a number of benefits from an IBR strategy for reducing air pollution.

Lower-Cost Approach to Achieving Compliance. An incentives-based regulatory policy offers individuals and businesses many more opportunities for reducing the costs required to meet air quality standards. The basis for this is that IBR establishes a system that, in effect, forces individuals and businesses to confront the social costs of their activities *and* offers them direct incentives to engage in activities that allow them to avoid those costs. Since these incentives are driven by individual behavior, they are more likely to be an *effective* approach to achieve compliance than is CCR. Additionally, since IBR allows for flexibility in decisions about how to achieve compliance, IBR is more likely to be an *efficient* means of achieving compliance than is CCR.

An example of how flexibility can reduce costs and achieve compliance is offered by an experiment undertaken by the EPA at the request of Du Pont. Rather than requiring a specific emissions-reducing technology, as was the traditional practice, Du Pont proposed that the EPA establish a "bubble" over one of its plants and establish the maximum allowable emissions level from the entire plant (this level was set equal to the total emissions that would have occurred using EPA mandated equipment on each source of emissions). Du Pont estimated that the more flexible approach would allow it to save about $81 million compared to the costs of using the traditional technology and still reduce emissions to the same level that would have occurred under the old system.

3M Corporation also has been actively working with the EPA and local air quality districts to allow changes in production process that would allow it to meet its required emissions reductions more cheaply than would tailend controls. 3M estimates that it has achieved cumulative savings of about $400 million since 1975 compared to its anticipated costs if it just installed required control technology.

Another example of how IBR can reduce costs by increasing flexibility is found in a recent study undertaken for the EPA. This study estimates the savings that could result from using transferable discharge permits (discussed below) to reduce the emissions of sulfur oxides at electrical generating plants in the Midwest. It found that the use of transferable permits to reduce emission of sulfur oxides by 10 million tons annually could result in cumulative capital cost savings of almost $26 billion by the year 2010 (leading to reduced consumer utility bills of about $5 billion annually by 2010). These estimates could prove to be too high.

Nonetheless, they suggest that considerable savings could result from the use of more flexible approaches to emissions reduction.

Incentives for Innovation. In addition to changing behavior, a crucial part of achieving current and future standards is to find and implement new control technologies and less polluting production processes and products. Under the current system, there is little incentive for corporations to make those research and development investments. By focusing on cost avoidance, IBR would reward manufacturers and others that make investments in emissions reducing technology research. Further, by creating a market in these technologies, IBR would encourage entrepreneurs to engage in research and development of new technologies. While it is true that some research and development activity occurs now, there is general agreement that much more could be done.

What Is the Role of the Regulatory Agency Under IBR?

Incentives-based regulation does not eliminate the need for regulatory agencies or for command and control regulation. However, since IBR relies more heavily on individual responses that avoid costs than on administrative processes, the regulatory agency would have a different role than is the case currently. These agencies would be more heavily focused on developing strategies to enhance the workings of IBR and on solving implementation problems. Additionally, they would be more oriented toward monitoring and enforcing the incentives schemes used to achieve compliance with the standards.

Finally, an important function of the regulatory agency under IBR would be to evaluate problems as they arise in order to determine the appropriate mix of regulatory strategies to pursue for any given source of pollution. These evaluations would be based on an impartial analysis of the benefits and costs of each approach. Incentives-based regulation could, in some instances, prove to be a less effective means of achieving agency goals than CCR. For example, in emergency situations (like extreme atmospheric inversion layers), the direct, prohibition or restriction of certain activities may be necessary. Consequently, there would be a continued need for some CCR, but these instances would be both more limited and better focused than is the case now.

APPLICATIONS OF INCENTIVES-BASED REGULATION

California's air quality problems come from three major sources; stationary (such as power plants and manufacturing plants), mobile (such as cars and trucks), and area (such as consumer products). Each of these major sources possesses unique

characteristics. Therefore, we describe a number of possible incentives-based strategies to use in achieving air quality improvements.

Stationary Sources

Stationary sources have received considerable attention by regulators. As we discussed earlier, the command and control regulation of these sources is beginning to require large investments for relatively modest additional reductions in emissions. One alternative approach to regulating stationary sources is the IBR option of transferable discharge permits.

Transferable Discharge Permits. Transferable discharge permits (TDPs) are permits to release specified amounts of certain pollutants into the air. The holder of the TDP, which would be issued by a regulatory agency, could either use, sell, or "bank" the permits. The regulatory agency would establish the maximum level of permissible emissions for each geographic area. Then, TDPs equal in total to the permissible discharge level would be created and distributed in some manner. The Congress currently is debating proposed amendments to the 1970 Clean Air Act, and at least one version of these amendments includes a provision for TDPs for sulfur oxides (a major component of acid rain).

Once the permits are allocated, any party (including environmentalists or government agencies) could buy, sell, trade or bank the TDPs for future use. The regulatory agency's main function after the initial distribution of the permits would be to act as the recorder of all transactions and to monitor emissions from all sources to determine compliance with permit holdings (the agency would no longer be involved in approving the technologies chosen by permit holders). If properly designed, TDPs also could be used to "ratchet-down" the total allowed emissions year by year in order to meet established standards. This would be done by reducing, at regular intervals, the amount of pollution allowed by each permit.

Noncompliance Penalties. Clearly, there would be incentives for a company to violate the terms of its TDPs unless penalties were imposed and strictly enforced to ensure that companies and individuals comply with the permits they hold. It is important that these penalties be set at a level higher than the price of TDPs. If they are not, it would be cheaper for a company to pay the penalty and continue to pollute in excess of its TDP allowance.

Mobile Sources

Tradeable discharge permits also could be designed for mobile sources. Markets for these permits, however, would likely be

expensive to organize and operate. Therefore, we focus on various fee systems for mobile sources. Designing a fee system that recognizes the full social cost of air quality degradation caused by mobile sources requires several strategies. Among the issues that would need to be dealt with are: (1) intensity of use of the vehicle (miles driven), (2) fuel efficiency and ability to operate without polluting, and (3) where and when the vehicle is used (particularly in congested areas).

Emission Fees. One IBR strategy is to increase the price of gasoline by adding an environmental fee. The price of gasoline currently does not reflect the full costs of the damage its use causes to the environment. Thus, an environmental fee would be established that would reflect the damage it causes. Since the social costs could be expected to change over time, the environmental fee could be adjusted periodically as estimates of environmental costs change.

Differential Registration Fees. Another IBR strategy that could be used to create incentives to purchase less polluting cars is a differential registration fee (DRF). DRFs are designed to encourage motorists to purchase less polluting cars by imposing surcharges at the time of purchase for vehicles having higher-than-average expected emissions levels. Individuals purchasing vehicles having lower emissions than the average would receive a subsidy (paid from the surcharges imposed on high-emissions vehicles), which would in effect lower the price of low-emissions vehicles. The surcharges and subsidies could be designed so that they would offset each other (except for administrative costs). The subsidies and surcharges should provide incentives both to individuals to purchase cars that pollute less and to manufacturers to produce more of the less-polluting vehicles. The DRFs could be combined with emissions fees in order to (1) reinforce the incentive for both purchasers and manufacturers to change the fleet composition and (2) to capture both up front and continuing costs of pollution.

Congestion Fees. A third IBR strategy that also could be used to encourage changes in driving behavior is the congestion fee. Delays on highways caused by congestion can significantly increase the level of pollutants compared to travel at normal speed. Congestion fees could help to "internalize" the environmental damage caused by the overuse of highways during peak times. The fee would be assessed during peak times to discourage travel then and encourage use of highways during off peak times. Crude congestion fee experiments (for example, in Singapore and Hong Kong) have been underway for a number of years and have met with some success. Presently, Caltrans is experimenting with a toll fee system on the Coronado Bridge in San Diego that allows

commuters to pass the toll booth at highway speed, electronically registers the fee, and bills the commuter monthly in much the same way as one pays the telephone or electric bill. Systems like this one could also be used to reduce congestion on freeways and other roads by assessing fees based on the level of congestion at a given time and place.

Area Sources

Area sources are primarily consumer products such as deodorants, charcoal lighter fluid, felt tip pens, aerosol sprays and house paint. Collectively, these products represent a relatively small part (approximately 10 percent of total volatile organic compound, or VOC, emissions) of our current air quality problem. However, in the south coast air basin, emissions from these products are estimated to be up to half of the total allowable VOC emissions (measured in tons per year) allowed by current standards. As emissions from stationary and mobile sources are reduced and as population grows, these products are becoming a much more important focus of the state's effort to improve air quality. There are several IBR strategies that could be used for these products.

One possibility is to establish fees, collected at retail sales outlets that would be imposed on those products that cause environmental damage. This approach, however, could prove costly to operate and monitor in many cases. Another possibility, which the ARB is investigating, is the use of fees or TDPs that would be applied at the manufacturing level in order to reduce monitoring and enforcement costs. The higher retail cost of products should induce consumers to switch to less-polluting products. An example of how this could work is found in the recently imposed federal excise tax on chlorinated fluorocarbons (CFCs). This tax was set at a level that would make the cost of CFCs to purchasers equal to more environmentally sound alternatives.

WHAT ARE THE OBJECTIONS TO AN IBR POLICY?

Over the years several objections to an IBR approach to improving air quality have been raised.

Equity Considerations. Fees can place a burden on low income individuals. This is a reasonable concern. What is not often recognized, however, is that the current regulatory policies also impose costs. Under CCR, these costs often are hidden in the price of products sold by companies that are subject to the regulatory process. In any case, the equity concerns raised by an IBR approach could be addressed by the use of other policy tools

such as redistributing fees back to low-income groups or by using fees to improve public transit facilities.

"Right" to Pollute. This alleged problem is heard less frequently now than was the case several years ago. The expressed concern is that polluters, by paying a fee or purchasing a TDP, are buying a right to pollute. It is true that this system explicitly recognizes that individuals and firms will continue to pollute, however, it forces them to pay the full costs of their actions. Conceptually, this is no different than paying for the use of a landfill where the landfill operator sets fees based on the type of waste. Command and control regulation also creates a "right" to pollute by issuing permits to individuals and businesses. Additionally, for mobile sources, once a car is purchased (including the cost of on-board control technologies) there is no additional fee for the pollutants discharged. In essence, individuals receive a "right" to pollute for *free* under CCR.

Difficulties in Setting Fees and Penalties. Setting the correct fees and penalties is central to the operation of a successful IBR policy. Fees and penalties that are too "low" would lead to insufficient reductions to meet air quality goals while fees and penalties that are too "high" would lead to greater costs than are necessary to meet the goals. The regulatory agency would have to be careful to adjust them regularly and in ways that did not disrupt the overall goals for which they were adopted. While setting fees and penalties could present a challenge, the basic fee levels could be determined using both data collected by regulators and criteria developed by researchers. Experience with effluent charges (fees used to control water pollution) both in the U.S. and in Europe suggest that the fee setting process can work well. Changes to fees and penalties could be done by the agencies at regular intervals.

"Hot Spots" and "Pollution Events." Geographic features or local increases in pollution sources can lead to a build up in pollutants called hot spots. Hot spots can cause health-threatening levels of pollution locally even though the air basin as a whole is not suffering from air quality problems. Weather conditions or seasonal factors also can lead to concentrations of pollution (these are known as pollution events). TDPs and fees might prove to be inefficient ways to counter these isolated or short-duration problems because it could be too costly to develop permits and fees that are sufficiently specific and enforceable to be practicable. The nature of these events could require the use of administratively imposed controls to supplement emissions and congestion fees in emergencies. This use of emergency regulations is an excellent example of the *focused use of CCR, especially in combination with IBR policies.*

SUMMARY AND RECOMMENDATIONS

We recommend the Legislature (1) amend current law to authorize the use of economic incentives (including the ability to assess fees) and (2) establish a tradeable discharge permit pilot program.

Air pollution is enormously costly to Californians. The current command and control regulatory policies that state and local agencies use to improve air quality have achieved substantial improvements but may not be effective in solving the state's remaining air quality problems. As a result, it may prove difficult to reach the state's air quality goals in a cost-effective way. If the state hopes to achieve these goals, an alternative set of regulatory policies should be considered.

Incentives-based regulatory policies offer a more cost-effective method for achieving air quality standards because they encourage cost-avoiding behavior, innovative solutions, and flexibility in achieving the state's goals. Given the advantages of incentives-based regulatory policies, we believe the Legislature should begin to implement such policies in addressing the state's air pollution problems. As some key first steps toward that end, we recommend that the Legislature take the following actions:

- ***California Clean Air Act.*** Amend the California Clean Air Act to explicitly authorize the use of economic incentives, particularly for mobile sources and consumer products.
- ***Fee Authority.*** Provide the ARB and the local districts with the authority to impose fees such as emissions fees, congestion fees, and variable registration fees in order to further the objective of developing effective economic incentives programs.
- ***Pilot Program.*** Establish and evaluate a tradeable discharge permit pilot program for stationary sources in a large air basin.