

The Changing California Highway Program

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The era of limited financial resources has caused California to change the emphasis of its highway programs from long-range expansion programs toward short-range maintenance and rehabilitation programs. This change has created the need to reorganize, reduce staff, abandon planned freeway routes, sell surplus rights-of-way, scale down project designs, and develop a new study of needs. A 6-year highway program based on short-range, cost-effective solutions to current highway problems was recently developed. The federal government provides nearly half of the money in California's highway program. Federal dominance of capital improvement programs has reduced the states' ability to address priority needs; California, therefore, continues to press for greater program flexibility and reduced federal involvement. The purpose of this paper is to describe the impacts on California's highway program of changing financial support and changing federal program emphasis, as well as the effect of environmental concerns.

California's state highway program in the 1950s and early 1960s enjoyed public support for the expansion of the highway transportation system. Few questioned the wisdom of constructing new freeways and expressways to increase urban and rural mobility. The enthusiasm was sustained by adequate federal and state support in the form of trust fund dollars. Cost escalations were moderate because good competition among construction contractors fostered progressive improvements in work methods and productivity.

This is not to imply that all new highway facilities were well received and that some planned routes and designs were not hotly contested. In the early 1960s, some mitigation measures, including aesthetic treatments, that were instituted to gain continued public acceptance began to noticeably increase the costs of new facilities. Subsequently, environmental concerns accelerated the trend toward increases in facility costs and substantially lengthened the development time of projects.

Environmental impacts on the program include (a) redirection from expansion programs to maintenance and operations programs, and (b) project delays because of requirements for documentation of environmental impacts. Increasingly, emphasis is placed on noise abatement, aesthetic treatments, high-occupancy vehicle facilities, and car-pool matching programs.

The California Department of Transportation (Caltrans) completed a cost-effectiveness study of highway system improvements and designs in July 1974. The result was a concentrated effort to redesign projects to obtain the greatest value for the money.

A new equilibrium between program and resources was emerging when the Arab oil embargo created new problems. The costs of construction and materials soared. At the same time, lower gasoline consumption meant decreased revenues. The historic revenue growth trend of about 4 to 5 percent compounded annually suddenly nose-dived in 1973 to -1 percent, and the outlook indicated no substantial recovery to past trends. The state's immediate reaction was to impose a moratorium on advertising new state-funded (without federal-aid) construction projects. In 1975, the federal government released an additional \$2 billion worth of obligational authority, which accelerated the advertisement of federally aided projects for a short period and further strained the state's resources. The moratorium was therefore extended to all projects except those of an

emergency reconstruction nature.

The California highway program was nearly broke; we forecast deficit spending within a year's time unless drastic action was taken to not overcommit future resources. We were concerned about excess staff and were trying to stretch the funds by expanding the application of cost-effectiveness to more projects in the design stage as well as to those under construction.

"Downscope" design became a department byword, and "lowered expectations" were imposed by the new administration of Governor Brown in 1974. An attempt by the state legislature to raise gasoline taxes eventually died in committee.

At the same time, Congress voiced greater concern for safety and urban transportation problems. Program changes in the Federal-Aid Highway Acts of 1973 and 1976 and in environmental law were applied selectively to challenge not only the adequacy of environmental mitigation measures on projects nearing design completion and under construction but also the need for the project. This had the effect of interrupting the design process on major projects because the design steps had to be repeated to ensure compliance with new federal environmental regulations.

CHANGING FINANCIAL SUPPORT

The financial planning for California's state highway program has traditionally accommodated the state's funding allocation process, which operates in cycles of 4 years. Long lead times for the development of major projects require planning for capital outlay at least 8 years in advance. Projected resources and program levels were traditionally balanced over an 8- to 11-year period. Estimates of state and federal highway revenues were made, future fixed expenses (such as administration, maintenance, and operations) were projected, and local assistance subventions based on previous trends were subtracted. The remaining funds were assigned to capital outlay and support costs. Programs were revised annually to reflect changes in fixed costs and revenue projections. Programmed projects were adjusted to reflect new data and conditions, and new projects were added, when necessary, to adjust to changes during the program period.

The keys to programming success were (a) good revenue forecasts, (b) accurate estimates of project costs and development lead times, and (c) relative stability in program objectives. During the late 1950s and 1960s the only real weakness in the programming process was in obtaining accurate estimates of cost and lead time. Caltrans continually sought ways to more accurately estimate cost at various stages of project development and ways to anticipate normal cost escalations and to ensure accurate forecasts of project delivery dates for start of construction. State revenues were predictable; therefore, changes in revenue forecasts resulted mainly from biennial revisions to Federal-Aid Highway Act programs and funding. Increases in Interstate funding, for instance, were typically offset by increasing the staff or project development productivity or by using projects that were planned and ready for construction advertising. The program objective, during this period, was to build

as many new kilometers of freeway and expressway as funds would allow. This translated into a desire to complete the state's share of the Interstate system [3540 km (2200 miles)] and the additional 16 580 km (10 300 miles) on the state's statutorily designated freeway and expressway system as soon as practical.

California developed, with the help of the construction industry, a well-oiled freeway production machine that gained worldwide recognition. Then the pattern of community acceptance changed. The federal government responded to community objections by requiring public hearings and multidisciplinary design teams. Mitigation measures added to the cost of projects and soon successive needs studies reflected increases in the cost to satisfy highway needs each year, despite substantial annual investments in the new highway plant.

California trimmed its highway program toward a more realistic level of accomplishment. This led to two actions—scaling down project designs and systematically reducing project development and right-of-way inventories. We reevaluated the scope of the design of projects from a cost-effectiveness viewpoint, for example, we eliminated freeway interchanges in favor of at-grade intersections, reduced the number of lanes to be constructed, provided passing lanes instead of continuous widening, and emphasized spot improvements rather than extensive new construction.

We found that too many freeway routes were adopted in relation to pipeline needs and that we had made an excessive advance investment in rights-of-way along the many freeway routes, which were no longer affordable over the next 20 years. In 1974 we began to eliminate routes and sell excess land, and we continue to do so. We have not adopted a new freeway location in the past 4 years. To date we have given up 626 km (389 miles) and sold \$34 million of property on the rescinded routes. We were overstaffed for the new program levels, so we froze hiring. Our non-maintenance-related staff was reduced gradually from a high of 14 600 to 11 600 by 1974.

Then, the Arab oil embargo confronted us with increased project costs and decreased revenue. A fiscal crisis was imminent because we use future revenue for future contract payments. In other words, we start construction without the funds on hand to cover the full value of the contract; we expect to make the monthly progress payments out of anticipated revenues. With the prospect of decreased revenues from gasoline tax, we imposed an immediate moratorium on state-funded construction contracts.

A short while later the President announced the immediate release of \$2 billion of federal highway funds on a first come, first served basis in an effort to stimulate work in the construction industry. We advertised as many federally aided projects for construction as we could get ready. This further aggravated our projected state cash situation, so we extended our moratorium to all but emergency reconstruction projects. We also reviewed internal expenditures, instituted cost-saving measures in overtime, travel, supplies, and new equipment and considered further staff reduction. This resulted in an immediate 1-year saving of \$55 million.

Each person-year of work costs Caltrans about \$30 000/year, including overhead. We set a goal of a 2700-person staff reduction by July 1, 1976. Reduction of a multidisciplinary staff, dispersed in 11 districts and in a headquarters office, was difficult. All decisions had to stand the test of personnel grievance hearings and legal redress by employee groups.

An early requirement of the staff-reduction process was the development of a short-range 3-year work plan.

We needed to look at what the highway program's emphasis should be and what changes were required. We responded by announcing some new priorities.

The staff-reduction process was executed successfully. On July 1, 1976, we had 2722 fewer personnel than we had in July 1975. Of those, only 588 were actually laid off. Jobs were found in state service or with outside employers for the majority of the others. Special legislation made early retirement possible by offering 2 years of service credit toward retirement; 631 employees availed themselves of this option.

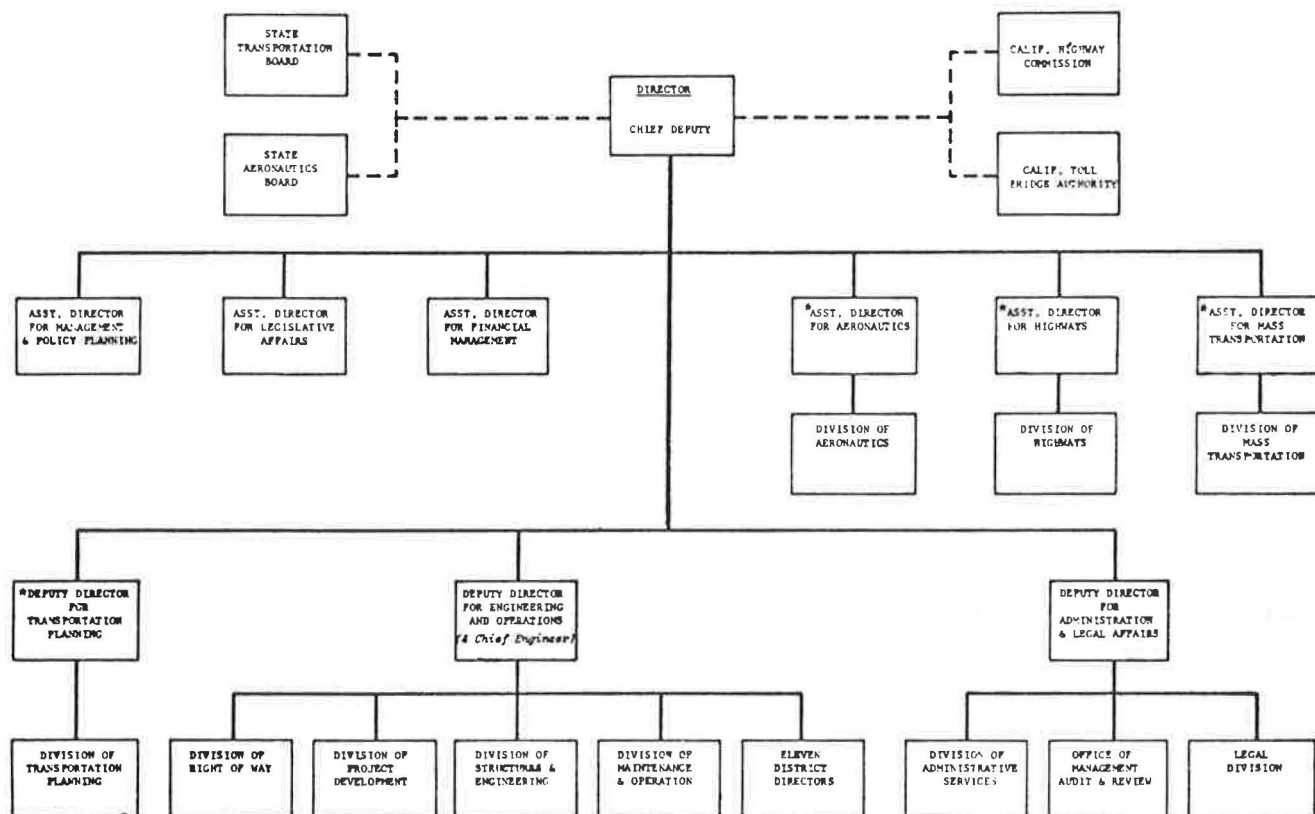
We also reorganized our headquarters office by removing programming activities from the state highway engineer and creating a separate programming and budgeting organization under a new assistant director for highways. The chief engineer's new role was the design and construction of all types of facilities and the maintenance and operations of the state highway system (Figure 1). The 11 district directors report to the chief engineer (a line position), but functional responsibility for the highway system is divided between 2 headquarters administrators. This continues an organizational trend started 6 years earlier, when a headquarters Division of Administrative Services was created to have functional responsibility for administrative management (personnel, fiscal, and office facilities) within the department. This concept was expanded further with the creation of Caltrans on July 1, 1973, when the divisions of mass transportation, transportation planning, and financial management were added.

The intent of these changes was to (a) remove transportation system planning from the direct influence of highway planners in order to develop a multimodal state transportation plan and (b) remove state highway system programming and budgeting from the direct influence of highway engineers in order to develop a program emphasis on highway expenditures. The goals of the highway program were expressed by the director of transportation in a statement on August 26, 1976, to the State Transportation Board about the second draft of the California Transportation Program. The goals are

1. To provide for maintenance, rehabilitation, and reconstruction of the existing system;
2. To make operational improvements to the existing system, both to improve traffic flow and safety (for example, by means of left-turn pockets and median barriers) and to encourage greater efficiency in facility use through traffic management techniques designed to move greater numbers of people in fewer vehicles;
3. To make our highways environmentally compatible with their surroundings, landscaping and noise walls are an essential component of highway facilities. People who live in areas adjacent to highways should not be forced to absorb unnecessary health and aesthetic costs of highways; and
4. To build new facilities only where they are the most cost-effective solution to a particular transportation problem.

An immediate problem for the highway program is a legacy of unfulfilled promises regarding the construction of new freeway projects that remain in the development plans of many cities and counties. These require reaffirmation, renegotiation to more modest scale, or abandonment, according to the amount of highway improvement resources that become available. Clearly, highway improvements planned for construction as recently as 3 years ago are now no longer affordable. The department has to redefine need based on newly expressed public attitudes, to renegotiate project scopes,

Figure 1. Organizational chart of the California Department of Transportation.



* The Assistant or Deputy Director is also the Chief of the Reporting Division

and to develop annual short-range (5- to 6-year) programs of implementation. This is now being done.

A 6-year highway program was developed in line with the program objectives stated above. The program is constrained by the level of anticipated resources and assumes no tax increases over the next 6 years. It was presented to the California Highway Commission in July 1976. Major policy differences between the California Highway Commission and Caltrans regarding three issues—(a) revenue forecasting methods, (b) program emphasis, and (c) the reservation of money in the early years of the program in order to match federal aid funds later—prevented adoption of this program. These differences may not be resolved before January 1977, when the composition of the commission will change.

The adoption of the 1977-1978 budget enables us to prepare a work plan for the projects and activities authorized and to identify additional projects that require immediate work because of their long lead time or the desirability of maintaining projects ready for construction in case of project casualties or new resources.

Simultaneously, the department has begun a needs study, which is required by state law every 4 years to report the level of construction needed now on the state highway system. The department has expanded this study, which is due in January 1977, to include all immediate needs on the state highway system, including maintenance, operations, administration, and capital outlay. The approach establishes cost-effectiveness criteria to solve problems on the existing highway system. Each nominated capital outlay project will have to pass the test of need posed by questions such as whether maintenance is more effective than rehabilitation, whether rehabilitation or an operational improvement to the existing system is better than providing a new fa-

ility, and whether a nonhighway solution to the transportation problem is available.

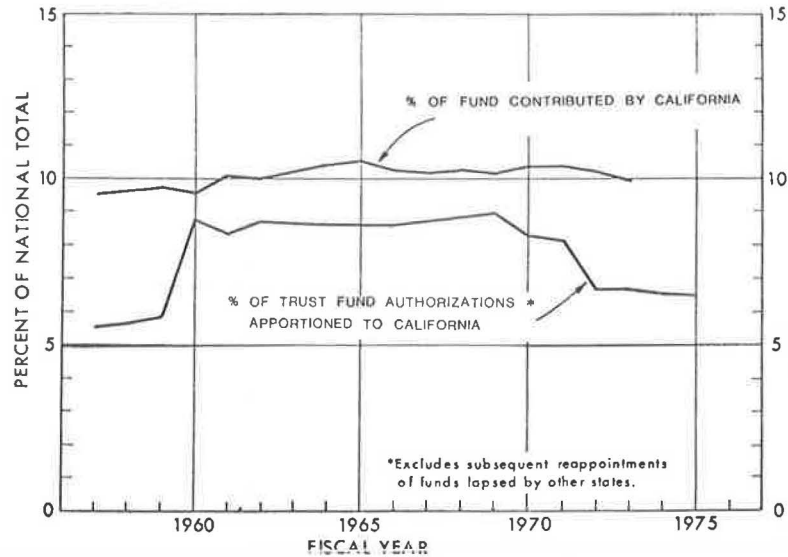
CHANGING FEDERAL PROGRAMS

As the level of state and federal resources remains relatively stable, federal programs have an increasingly important influence on the state highway program. The federal government supplies nearly half of the money received as revenue in the state highway account. Federal funds do not support administration and maintenance but reimburse state and local governments for capital expenditures. Each year more of the available state funds are needed for maintenance. Since maintenance costs continue to increase as facilities age and there is additional inventory, less state money is available for construction purposes, and the program becomes federally dominated. This has serious implications for the state's program because federal programs address the composite needs of all 50 states.

The federal-aid highway program forces the establishment of relations and cooperation for administrative purposes, while at the same time constraining flexibility in the expenditure of already limited resources to programs written to satisfy a national purpose. If California does not need a federal program, we either lose apportionment or undertake federal-aid projects of low priority to the state. New federal-aid highway acts seem to offer these alternatives: (a) more flexible programs, (b) block grants, or (c) transfer collection of taxes to the states.

A further concern to some states is their low rate of return from the Highway Trust Fund. California enjoyed a high rate of return in the 1960s but recently has received only about 65 percent of its total contribution

Figure 2. California and the Federal Highway Trust Fund.



(Figure 2). As a matter of policy, California is not contesting the need for donor states in the Interstate program since, by its nature, the program requires some states to contribute to the building of highway segments in sparsely populated states. California is concerned about contributing 30 percent of its taxes to the non-Interstate programs in other states.

In California, by law, federal funds are commingled with state funds into a state highway account, which is allocated among projects by geographic distribution formulas. In many areas of the state, statutory allocation amounts are more than satisfied by the Interstate program. Non-Interstate funding is used in other areas of the state. This leaves little discretion for allocating the remaining funds to projects on a merit basis. As state capital outlay funds decrease, many low-priority Interstate and non-Interstate projects may be constructed.

The increased federal funding of local highway projects as a result of federal emphasis on urban system, off-system, and safety improvements has been at the expense of improvements on the federal aid primary and Interstate systems in California. The state's road system receives fewer federal dollars and the local road systems more, yet the relative needs of these systems remain in about the same ratio. Local governments, in effect, use the federal funds to reduce their own contributions to improvements of their systems; the effect on the state's systems has been reduced expenditure.

Before enactment of the Federal-Aid Highway Act of 1970, the major portion of the funds used for capital outlay in our non-Interstate capital outlay program came from state funds. Therefore, the state could select the activities and projects to be qualified for federal aid. We qualified all Interstate projects but only the largest capital outlay projects on the non-Interstate system. Right-of-way acquisition, design engineering, and small projects were funded by state funds. The benefits in circumventing federal red tape are obvious. Now nearly all of our capital outlay program is subject to federal processing. Further, in order to continue to qualify for all of our anticipated federal apportionments over the next 6 years without increasing state taxes, we need to reserve state funds for use as matching funds in the late years of the program period.

The influence of federal design requirements and standards prevents us from taking full advantage of the change the Federal-Aid Highway Act of 1976 made in the definition of construction to include reconstruction, res-

toration, and rehabilitation. We cannot, for instance, qualify some resurfacing projects where roadway widths, including shoulders or guardrail installations, are substandard, even though no safety problems have been identified under existing traffic conditions. California, in response to these concerns, continues to advocate increased federal program flexibility; our primary effort is to reduce the overall level of federal programs.

The change in emphasis in the federal highway program toward urban system improvements has increased the state's involvement in local projects. The Federal Highway Administration (FHWA) uses the states as the middlemen in dealing with local agencies. A state-federal agreement is necessary on all federally aided projects, whether they are on the state or local road systems. The federal government can then rely on the state's ability to explain federal requirements as part of other state-local liaison activities. The state can also apply what it has learned in processing federally aided projects to bettering the process. California supports this administrative system and would like to see it extended to other federal transportation programs. The main weakness in the system is a natural tendency among the participants to pass the blame for problems. For example, the local authorities may become confused as to where to place the blame when projects experience processing delays. A common concern is whether delay is the result of (a) federal requirements, (b) federal requirements misinterpreted or overzealously applied by the state, or (c) state administrative requirements that have nothing to do with the federal government. Better communications and good will can solve these concerns. These problems cannot be legislated out of the administrative system.

California has applied for certification acceptance. Certification acceptance delegates project approvals to the states based on a federal finding that the state and local administrative processes for project standards and development are equal to those of the federal agency. This may reduce some of the confusion concerning roles and responsibilities.

A more recent concern regarding federal requirements is in the area of metropolitan planning. Transportation improvement programs (TIP) in urban areas have imposed another layer of program review and approval, which requires adjustment of past procedure and process. Transportation agencies are being forced to adjust their own programming and budgeting cycles to

ensure that federal aid projects authorized by their own policy groups can qualify for funding by obtaining the additional endorsement of the Metropolitan Planning Organization (MPO). The concept is good if applied appropriately to those projects associated with system capacity enhancements, i.e., new facilities and operational improvements that seek to remove bottlenecks. The approval of smaller rehabilitation, restoration, and repair projects, which are responses to the need to restore safety and existing service levels, should be addressed through some exception or blanket-approval process. Projects of this type should not be commingled with the other major projects on a project-specific basis. As more of these projects qualify for federal aid, this problem will be magnified.

ENVIRONMENTAL CONCERNS

The impact of environmental concerns, including energy conservation, on the highway program in California is difficult to assess. To date, there seem to be two primary influences: (a) the redirection of a major portion of the program from expansion to the maintenance and operation of the existing highway system, including greater emphasis on high-occupancy vehicle programs, and (b) delays in implementing projects because of the length of time involved in the preparation and processing of documentation of environmental impacts.

Awareness of the environmental impact of the highway program on urban areas developed slowly because of the overwhelming public support for projects offering congestion relief in the period following World War II. Another difficulty is that highways are facilities that are used by several modes of transportation from walking to transit. Establishing the ultimate responsibility for environmental planning between the facility supplier and the user is, therefore, difficult.

The original concerns about highways were the impacts of the facility on the directly affected community. Later concerns of urban sprawl, air pollution, and energy conservation expanded considerations to the automobile mode. These were addressed sequentially by requiring (a) public hearings, (b) environmental statements, and now (c) the state's action plan. The state's action plan, approved in late 1973, documents our process for ensuring full consideration of possible social, economic, and environmental impacts and ensuring that the public interest is served by proposed highway projects.

The increasing length of time necessary to develop the project reduces the probability of initiating large public transportation improvements, such as California's freeway and expressway system or the Bay Area Rapid Transit (BART) system, unless small elements of the system can be implemented incrementally. Increasingly, the highway program is becoming a short-range program so that public decisions can be implemented while the facts remain relevant and politically acceptable. Public agency projects can now become mired in a continuous environmental review, especially if public ratification of financing is required.

These considerations limit the number of new and innovative alternatives that are available for solving current transportation problems and refocus attention on existing facilities and technology. We are now emphasizing ways to make better use of our existing facilities to increase the flow of people and goods but avoid the extensive impact of enlargements and new facilities. Emphasis is placed on better traffic management of all elements of the highway system. Success in operating urban freeways relates to the identification and relief of bottleneck sections. Bottlenecks are of three types: (a) con-

striction in flow because of unbalanced design (capacity) of successive sections of the same highway or between local and freeway systems at interchanges, (b) constriction in flow because short sections of freeway are not yet completed, or (c) demand in excess of capacity. We are trying to develop cost-effective operational and new facility solutions to relieve the first two problems on a priority basis, within existing financial constraints. Where demand exceeds capacity, or is expected to, we are installing ramp metering to smooth out freeway flow and are providing preferential treatments in the form of bypass or exclusive lanes for car pools and buses. This strategy is effective in implementing urban air pollution control strategies and reducing energy consumption. These capital investments are supplemented by state investment in car-pool, van-pool, and bus matching programs.

The Caltrans highway program also places increased emphasis on noise abatement structures, on both new facilities and existing facilities. A new noise policy is being implemented to handle situations in which readings exceed the FHWA's standard of 70 dB(A) in residential areas where freeways have intruded. We expect local communities, through subdivision, housing, and planning regulations, to control new development against noise intrusion from existing freeways. State law also requires remedial work at schools where classroom noise exceeds 50 dB(A).

Emphasis is also being placed on special facilities for transit, including exclusive lanes, special loading areas, and park-and-ride facilities. The state constitution was recently amended to allow the expenditure of state and local gasoline-tax revenue for the construction of mass transit guideways in those counties that vote to do so. Thus far, seven urban counties have passed enabling legislation. Four years ago, when the state extended the sales tax to gasoline sales, 0.25 cent of the state sales tax was set aside as a local transportation fund for capital outlay and operating subsidy use by transit properties. At the present time, this provides the opportunity to expand transit systems in most communities and allows transit properties to share in the funding of special freeway facilities provided for transit.

Special consideration has also been given to the protection of the sensitive coastline of California. Coastal commissions have formulated plans to control development, including highways, within the coastal zone. The department responded earlier by restricting the development of interregional routes along the coast.

An assessment of the cumulative impact of the concern placed on environmental protection by the highway program is difficult because of the overriding influence of the current fiscal constraints. It appears, however, that an apparent reduction in automobile air pollution emissions and an increase in automobile energy efficiency will continue to focus concern on the highway facility's proper role in community development. In summary, California is currently coping with highway program changes in the following ways:

1. Increased emphasis on maintaining and operating the existing system,
2. Encouragement of the use of high-occupancy vehicles by fostering facility programs that are supportive of this goal,
3. Balancing programs and resources at a realistic level of accomplishment, and
4. Fostering greater flexibility in the use of federal transportation funds.