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AN ILLUSTRATIVE ENVIRONMENTAL ASSESSMENT

THE CAMERON PASS HIGHWAY IMPROVEMENT

by

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This report comprises the case study, Chapter 7, in the report: Vlachos, E. and D. W. Hendricks, Secondary Impacts and Consequences of Highway Projects, DOT-TST-77-24, Department of Transportation, Washington, D.C., October 1976.

7.0 THE CAMERON PASS

Highlights/Findings

- The case study is intended to demonstrate a systematic procedure for secondary impact analysis.

- The use of an interaction matrix for analysis and display of a large number of mutual interactions is demonstrated.

- The Cameron Pass Highway improvement project is not important in the national or regional highway access. It is significant as a local highway in providing better access to the North Park area.

- Two direct effects of the Cameron Pass project are localized aesthetic impact and year-round and improved access to the North Park area. These are key factors in triggering "ripple effects" to other areas.

- The aggregate in potential changes to the Poudre Canyon and North Park areas caused by the project could result in different regional characters for the two areas--from "undeveloped" to "developed."

- Continued improvement of Colorado 14 (e.g., curve straightening, upgrading of bridges, etc.) could be a future trend stimulated by the design differences between the improvement project and the present canyon highway.

- The changes which may stem from the project could occur at a faster rate than the public management systems can respond.

- The project will force decision-makers (public agencies, politicians, the public) to face critical policy decisions sooner than if the project were not built.

7.0 THE CAMERON PASS

The foregoing chapters have provided a theoretical framework for secondary impact analysis. The objective has been to develop some ordered thinking in an area only recently given any recognition (i.e., in the August 1, 1973 CEQ Guidelines on Environmental Impact Statements). Systematic and ordered thinking is one dimension of *science*; empirical validation is another. This case study attempts to "grapple" with the empirical reality of a case situation. The case study strives toward the science from this point of view while, at the same time, it selects those contributions from the previous chapters which seem to provide guidance or work for the case at hand. The ultimate goal in an action oriented situation, however, is to reduce the *science* to an *engineering procedure*. This is attempted somewhat through *demonstration*. While further delineation of a procedure would be desirable, this is premature at the present time.

The case study chosen for this purpose was the Colorado Highway 14 improvement over Cameron Pass in northern Colorado. The improvement is an 11.2 mile stretch of new all weather highway to replace a narrow, twisting gravel road. Because this new highway will be the final linkage of paved road connecting an urbanizing Colorado Front Range with an isolated mountain valley, called North Park, the induced effects of the project could be significant.

The case study does not purport to be a comprehensive analysis of induced effects, but it does attempt to address the question and to illustrate a *process* for secondary impact analysis. It also attempts to be systematic, internally consistent, and hopefully exemplary. Thus it seeks to *demonstrate*, as noted above, a systematic procedure for secondary impact analysis, while dealing with the empiricism of a real case situation.

The approach is basically a systems analysis algorithm. The steps are:

1. System Description
   a) Describe proposed action
   b) Describe surrounding environment
2. Develop Data
   a) Determine data requirements
   b) Generate data
3. Project Effects of Project
   a) Determine interactions
   b) Assess effects
   c) Judge consequences

The case is developed for learning and demonstration purposes rather than to find answers to questions. While it is intended to be realistic it lacks completeness.

A note of caution is in order. It may be difficult sometimes for the analyst to separate his personal biases from his professional charge - especially in studies so value-laden as socio-environmental assessments. Even the "scientific method" is not absolutely free from the value oriented commitments of a given scientist. However, the analyst should attempt to recognize his own biases and be sensitive as to how this may affect the study. He may find it useful, in the interest of professionalism, to seek an input of critical opinion in order to assure a better balance in the tone of the study.

In this particular study the writers found that any beginning biases which they may have had as individuals in the community soon become overshadowed by a "professional approach" characterized by a detachment from the analysts' personal values. The greater knowledge and understanding gained through the process of the study also tended to counter or dilute the influence of initial biases.

In addition, it should be noted that analysis of primary environmental impacts or of secondary impacts is likely to be an adversary exercise in relation to highway construction. This is because the environmental analysis focuses on the effects on *affected systems;* these effects are generally unfavorable since they most often seem to interfere in an adverse manner with the values of the parties related to affected systems. But this is the whole purpose of the analysis anyway - to identify and articulate those effects so that they are plainly visible to all parties.

7.1 Description of Proposed Action

The first task of a systems analysis is to understand the nature of the proposed intervention on the system. This cannot be done in a perfunctory manner; instead it must be accomplished with sensitivity toward the system being analyzed. While one must describe the complete project in order to give a broad "picture" of what is contemplated, the special emphasis of detail should be on those elements of the project which have interactions with the surrounding environment. Delineation of these direct interactions form the basis for understanding further system changes - termed "secondary effects".

The description of a project entails much more than a simple listing of its structural characteristics. The history and evolvement of the project, the functions it is to serve, and the activities associated with its construction and operation are all intimately linked to the proposed highway project itself and must also be described. This comprehensive description of the project is necessary to the development of a thorough understanding of the proposed intervention. It is through such an understanding of the project, coupled with a firm knowledge of the system that it is impinging upon, that provides the basis for the assessment of long-range system changes.

After a brief introduction to the proposed project, this section is divided into three main parts: *evolvement*, relating the history, funding process, and motivations behind the project; *physical structure* (project design) which includes alignment, dimensions, and special environmental impact mitigation features; and *activity* associated with the completed project (related to transportation utility). The latter two sections are really classifications related to impact caused by the highway. The physical presence of the project is one broad categorical cause of impacts while the activities permitted by its functioning is another.

7.1.1 *The Project*

The proposed project involves route location, roadway design, and construction of an 11.2 mile stretch of Colorado Highway 14 over Cameron Pass, in the mountains of Northern Colorado. The project location is shown in Figure 7-1. Figure 7-2 is a photograph of the project area, showing the rough terrain and spectacular scenery surrounding the project.

Presently there is a gravel road through the area but it is open only from May to the first snows in early October. The paving of this 11.2 mile stretch will allow Highway 14 to remain open year around and will complete the final link of paved highway between Fort Collins to the east and Walden to the west.

7.1.2 *Evolvement of Project*

HISTORY OF COLORADO HIGHWAY 14

The Cameron Pass project did not arise spontaneously, instead it is the product of a complex process of evolution. A thorough examination

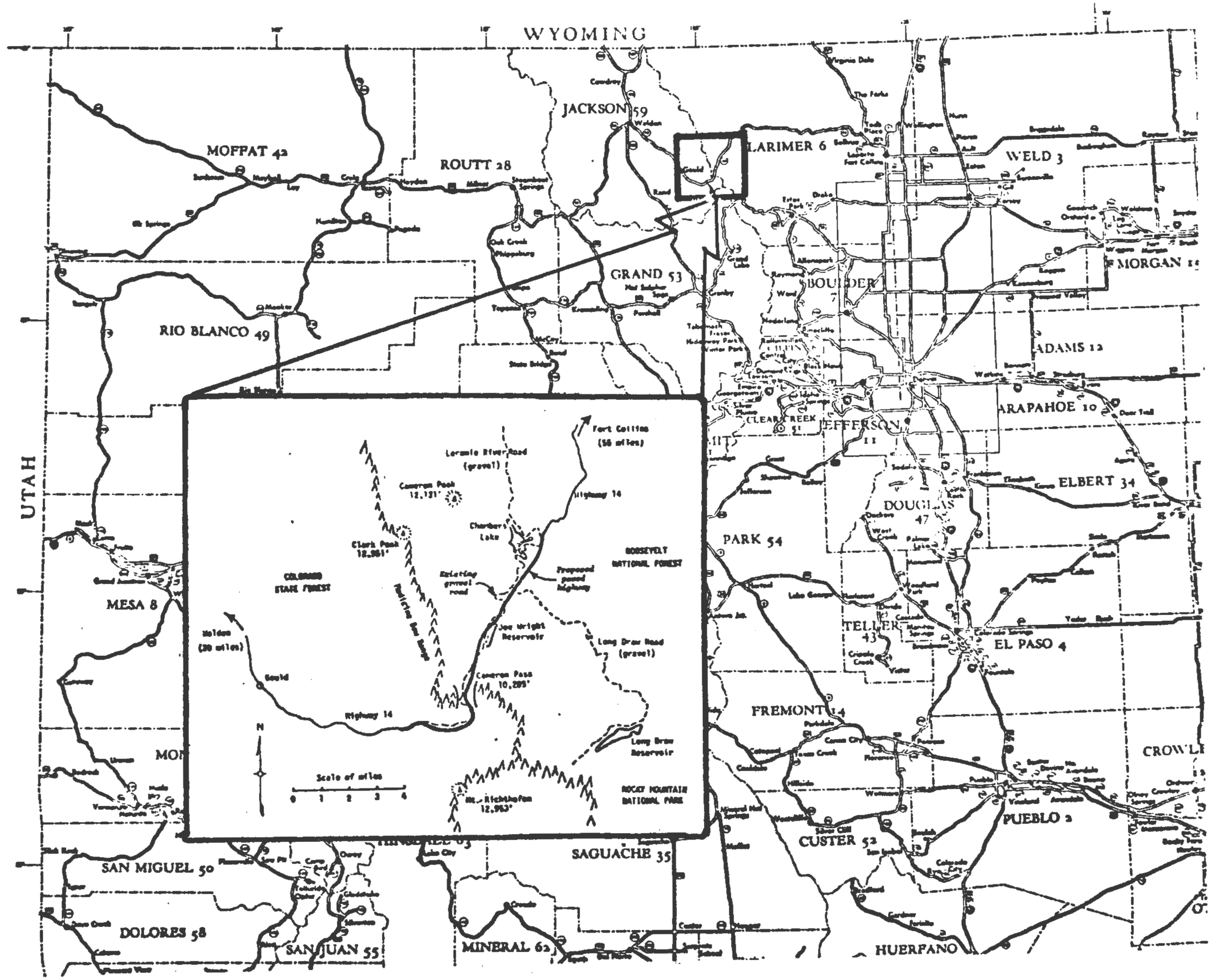


Figure 7-1 Location Map for the Cameron Pass Project.

Figure 7-2 The Project Area Showing in the Top Left Quadrant the Cleared Corridor for the New Road. Barnes Meadow Reservoir and Chambers Lake are Shown in the Center. The Snow-capped Peaks of the Medicine Bow Range Line the Background.

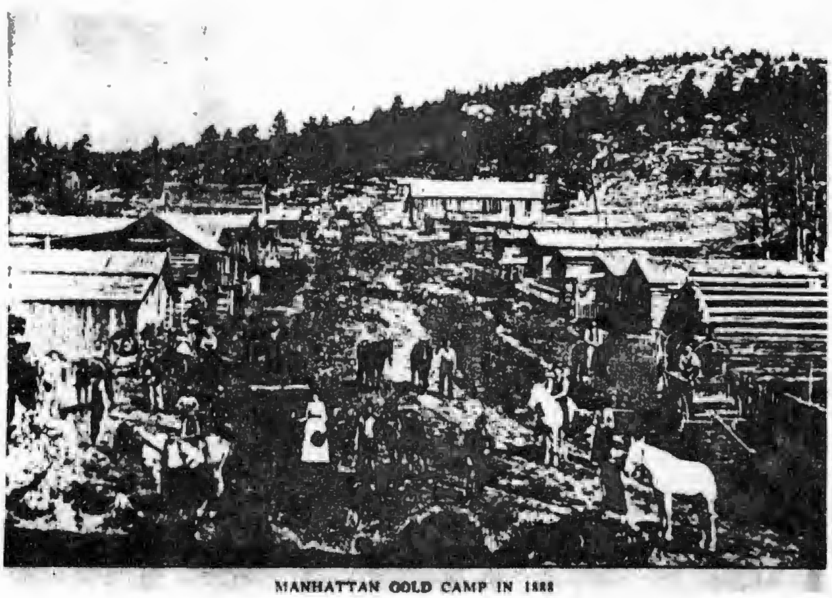
and understanding of this evolvement of the project is fundamental to secondary impact analysis in that the motivations and visions of the people and the opportunities of the land form the basis for activities which are, indeed, secondary impacts. Thus the history of the project highlights important aspects of the project itself such as its costs, goals, and supporters. But also it reveals how change has taken place in the region surrounding the project and the motivations and aspirations of those who have influenced the region. These reveal the visions and hopes that will indeed shape the future beyond the project. To talk about the future we must understand the past.

Indians, trappers, and the discovery of the pass - The valleys and parks of the mountains in Northern Colorado were the home of the Ute Indians. Their hunting and trading trails were the first routes of travel in the area. The first white men to enter the mountains of Northern Colorado were trappers and mountain men in their search for pelts, solitude, and adventure. They made their first trips up the Cache la Poudre River around the year 1850. Cameron Pass was discovered in 1870 by General R. A. Cameron while on a prospecting trip. General Cameron was a leading figure in the founding of the first agricultural settlements in the lower Cache la Poudre Valley. Years later the Union Pacific engineering department named Cameron Pass in honor of the General.

The tie industry builds the first road - The coming of the railroads really started to open up Poudre Canyon. In 1869 this area became a source of railroad ties for the Union Pacific Railroad. These tie contractors built the first road into the area - a narrow gauge, three foot wide road that descended into the canyon at the site of Rustic and continued on up the canyon to Cameron Pass.

The silver and gold booms - By the early 1880's the last of the tie timber was cut, but the discovery of silver just west of Cameron Pass brought a new wave of activity to the area. The mining camp established, Teller City, was established along the headwaters of the Michigan River in 1879; it rapidly grew to 1,300 by 1882. The road up the Poudre Canyon across the Pass was quickly widened to standard wagon width and a line of stages and daily mail service was established from Fort Collins. A hotel was even built at the Pass. The boom was short and by 1884 only 300 people remained in Teller City.

But just as the silver boom collapsed, gold fever struck. In 1886 gold-bearing ore was discovered in the hills north of Rustic. As thousands rushed to the area a new boom town arose, called Manhattan. Figure 7-3 is a photograph of this gold rush town in 1888. The tremendous traffic into the area induced further improvements to the road. It took a full ten years before everyone was convinced that the cost of extracting the gold exceeded its value.



MANHATTAN GOLD CAMP IN 1888

Figure 7-3 This Short-lived Town was Located on Pingree Hill, Just Above Rustic. (Watrous, 1911).

Other activities - In 1881 the Burlington Railroad sent a party of engineers to locate and survey a route up the Poudre Canyon and across Cameron Pass in order to compete with the Union Pacific. But the Union Pacific got their own party up first and started grading from the mouth of the canyon upward, thus gaining title to the only possible roadbed. They continued up the canyon for about 20 miles before abandoning the project.

Back down on the flatlands, irrigated agriculture was rapidly developing and soon the quest for water extended up into the headwaters of the Cache la Poudre River. First Chambers Lake was enlarged in 1883. In 1893, construction was started on the Skyline Ditch, the first trans-basin diversion in Colorado, which intercepted waters from the head of the Laramie River basin with diversion to Chamber's Lake. Within the next 15 years three other trans-basin diversions were built in the area, along with three supporting storage reservoirs, and a 2.1 mile water diversion tunnel. The road played an important role in this water resources development in the area, by bringing in people, and supplies.

In 1897 the Medicine Bow Forest Reserve was established, including much of the land around Cameron Pass. This land became the Colorado National Forest in 1910 and was later renamed Roosevelt National Forest in 1932. In 1939 the western side of the Medicine Bow range was consolidated into the Colorado State Forest.

In the years just before the turn of the century a small community of cattlemen became established in the canyon. Tourism was also starting, beginning with the hotel built in Rustic in 1881. John Zimmerman, a famous pioneer of the area, built some small cottages in the 1880's and finally a three story hotel in 1896. Figure 7-4 shows how some of the early tourists traveled into the canyon.

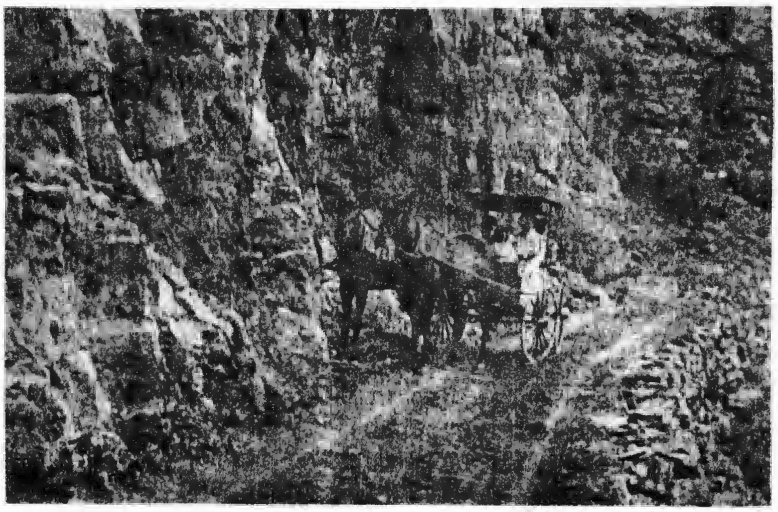


Figure 7-4 A Surrey in Poudre Canyon in 1906. (Parrish, 1960).

The old road - The first road did not travel up the lower part of the canyon but instead came from the north by way of Livermore (a former stage stop on what is now U.S. Highway 287 connecting Fort Collins and Laramie). The road descended down Pingree Hill into the canyon to Rustic, a drop of 1,100 feet in 2.5 miles. From there it generally followed the present highway route, up the Cache la Poudre Canyon and then ascending Joe Wright Creek, past Chambers Lake, and finally over the Cameron Pass to the Michigan River. The old road is traced in Figure 7-5 on an old map of Larimer County. At the time there was also another road across the Medicine Bow mountains. Instead of going down Pingree Hill, one continued traveling due east past Red Feather Lakes and then down into the Laramie Valley to the present site of Glendevy. The road then ascended the Medicine Bow Range and crossed the Divide through Ute Pass. In the History of Larimer County, written in 1911, this road was called the State Road but no further mention of it can be found. Presently all but the first section of this road, to Deadman Hill, has been abandoned. The forces leading to this road's demise are unknown.

The canyon road - Pingree Hill was the weakest link in the route up the canyon so that public pressure soon rose to forge a road up the lower section of the Poudre Canyon, through the Narrows. Construction on a gravel road finally began in 1912. The first five miles were funded by public subscription but later that year the Larimer County Commissioners appropriated $24,000 for construction of an additional five mile section. The next year the route was formally added to the state highway system. Road construction continued steadily in a joint effort by the Colorado State Highway Department, Larimer County, and the Colorado State Penitentiary, which provided convict labor. The construction crew is shown on the job in Figure 7-6. Grand opening ceremonies for the road up to Rustic, where it linked up with the old road, took place in 1920 and is shown in Figure 7-7. Once momentum was gained, improvement of the roadbed continued toward Cameron Pass. Similar construction took place on the west slope by Jackson County; a 6.45 mile U.S. Forest Service project completed the final link across the Pass. In 1926 the completed road was dedicated and opened.

The paving of the road - About 1950 Larimer County officials approached the State Highway Department seeking help in improving and paving the highway. As a result, a joint effort began; utilizing state and county funds, personnel, and equipment. No private contractors were involved. Starting at the mouth of the canyon, the paving progressed at a rate of three to five miles per year, depending on available funds. Jackson County started feeling some of the benefits of the improved road, acquired the right-of-way, and similarly paved their side of the highway to within four miles of Cameron Pass.

The Cameron Pass project - About 1970 Larimer and Jackson counties and the Colorado State Highway Department began to feel that it was getting beyond their collective capability to continue financing and building the paved road. Not only was the terrain becoming more difficult but they felt it necessary to widen the cross section of the roadbed to increase safety. Also they felt it was finally becoming necessary to hire a road contractor. These factors raised construction costs, causing the counties and the State to seek federal support.

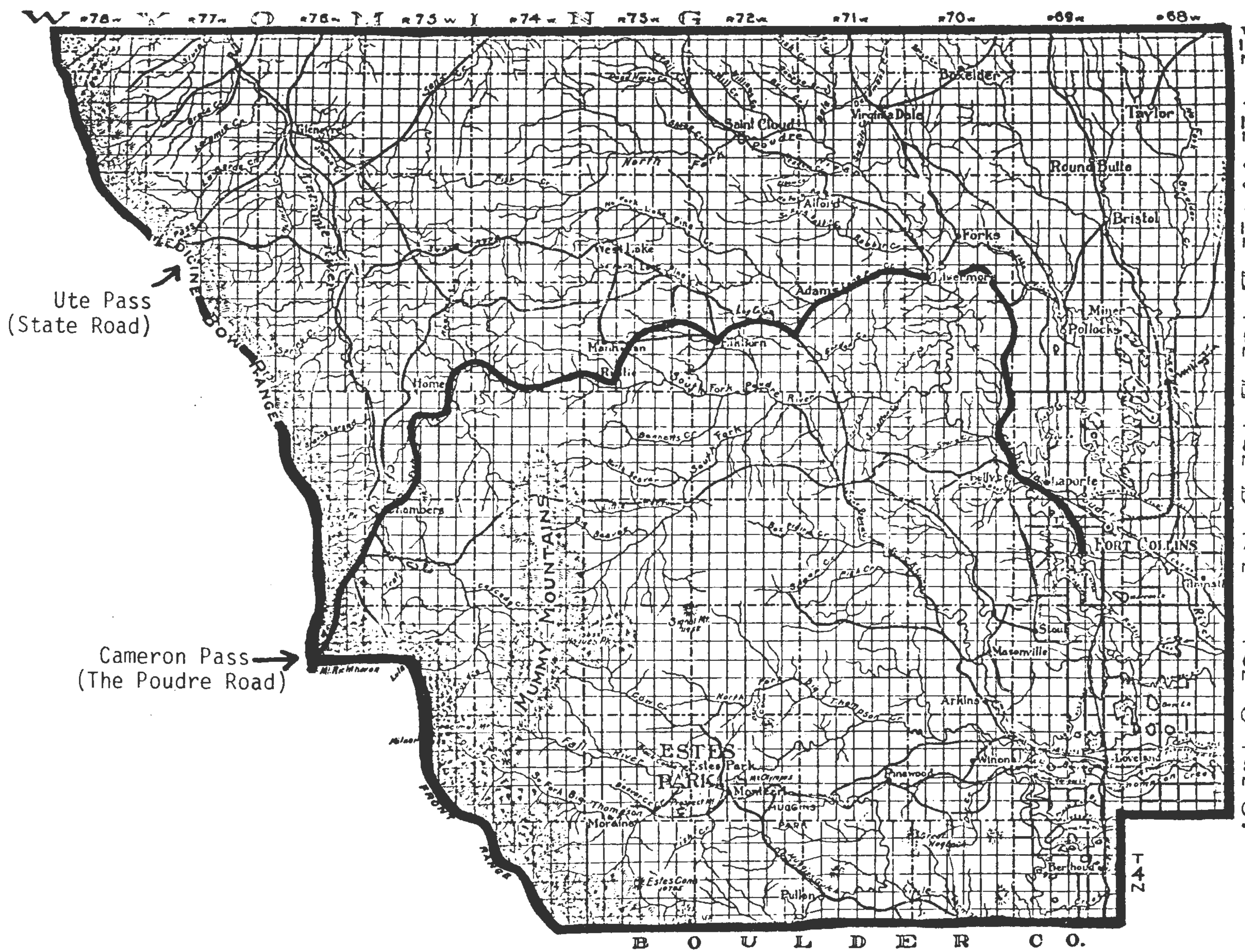


Figure 7-5 Map of Larimer County in 1911 (Watrous, 1911).

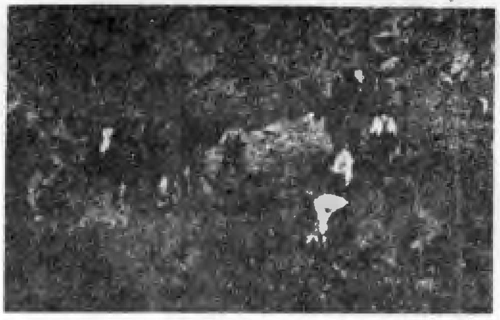


Figure 7-6 On the Job. The road Men at Work on the Construction of the Poudre Canyon Road in 1914. (Fry, 1954).

Figure 7-7 Grand Opening of Poudre Canyon Highway. These Ceremonies Took Place October, 1920. (Fry, 1954).

Details of the funding procedure for the project are described in the section following. The Forest Highway Program is also a source of funding for the 7.3 miles of construction planned in the Roosevelt and Routt National Forests. This money comes from the Highway Trust Fund and provides for 100 percent financing for construction and maintenance of highways in the Forest Highway system. The remaining 3.9 miles of the project on the western side of the Pass is being funded as part of the Federal-aid secondary system which in Colorado provides 80 percent of the cost of construction. Total cost for the 11.2 mile project will be over six million dollars.

Surveying and preliminary engineering was begun in 1969 by the regional office of the Federal Highway Administration. The next year funds for construction were assigned for fiscal year 1973. In 1972, a Negative Declaration of Environmental Impact was distributed but public concern expressed subsequently indicated that an Environmental Impact Statement should be prepared. The Draft EIS came out in 1973. Considerable concern was expressed in the comments (particularly by the Department of Interior and the Environmental Protection Agency) that the secondary impacts of the project had not been adequately assessed. The Final EIS was submitted to the Council on Environmental Quality on May of 1974. Again concern was expressed about the secondary impacts assessment of the project, this time during the Department of Transportation review by the Assistant Secretary for Environment, Safety, and Consumer Affairs.

Construction commenced later in 1974 on a 1.5 mile stretch on the western end of the project. The next year work began on a 2.7 mile section and in 1976 a 1.3 mile section is being started. At least two other sections remain to finish the roadbed. Paving of the road will be done at one time at the end. It is estimated that the project will be completed around 1982.

Synopsis - There is considerable value in viewing the Cameron Pass project within a historical perspective. The project then can be seen as more than an isolated engineering project, but instead as a step in the evolution of the surrounding region. Three rather distinct stages in the development of the road become evident. Figure 7-8 illustrates graphically. First the road became established by the tie industry and the silver boom. During the next developmental stage the roadway through the lower part of the canyon was built and the upper part of the road was improved. The paving of the road, begun in 1950, is the third stage of development. It becomes apparent that the Cameron Pass project is the culmination of this third phase and the fulfillment of a long-held dream to improve the road. This is evidenced by the concluding lines of a small book on the Cache la Poudre Canyon, written in 1954 by Norman Fry, a resident of the Canyon since 1889:

> Road construction continued. Oiling and resurfacing is being done on the River, and before many years it seems likely that all of Poudre Canyon highway will be dustless clear to Cameron Pass.
>
> That will be good, for more people can then share in the enjoyments those of us who have lived on the River have had.

A study of the history of the road has brought several points to light:

(1) The road has always played a necessary role in the activities of the area.
(2) There is a long history of cooperation between the Colorado Highway Department and the county governments.
(3) There is a considerable historical momentum behind the current Cameron Pass project.
(4) The project will culminate the third stage in the development of the road, as seen in Figure 7-8.

A question that now confronts us is whether there will be a new, fourth stage, which might upgrade the road toward higher speeds and heavier load limits. While this cannot answer the question it should be addressed.

FUNDING OF THE CAMERON PASS PROJECT

An extensive administrative infrastructure has evolved to administer federal highway funds. Figure 7-9 outlines the components of this infrastructure and schematically displays the process through which federally supported highway projects in Colorado are funded. This process is traced with special reference to the Cameron Pass project.

The large-scale federal commitment to highway construction began with the passage of the Federal-Aid Road Act of 1916 which provided funding for rural post roads. Since that time a continuing series of Federal-Aid highway acts has been enacted to provide for the construction of a national system of interconnected roads. A major milestone in the evolution of Federal highway laws was the Federal-Aid Highway Act of 1956 which created the Interstate Highway System and established Highway Trust Fund as a source of funds for the Federal highway development program. In

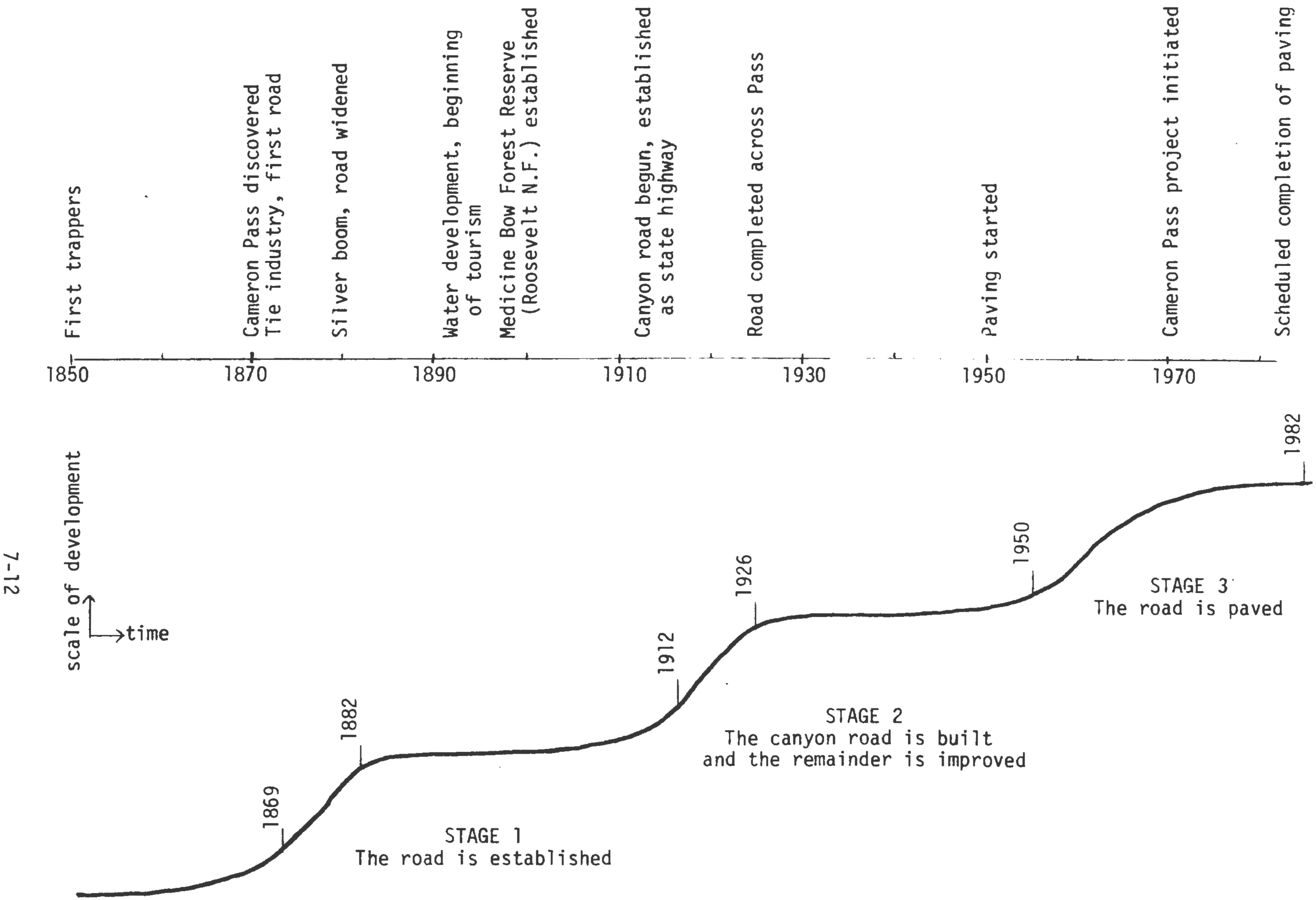


Figure 7-8 Development of State Highway 14 across Cameron Pass.

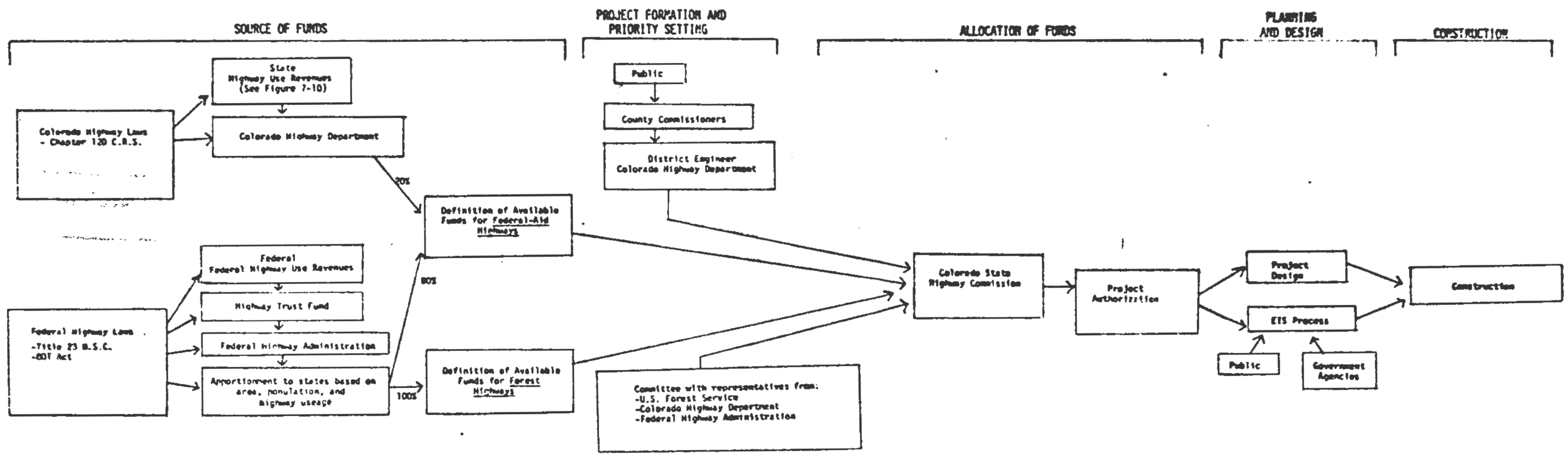


Figure 7-9 Outline of Management Infrastructure for Highway Project Evolvement in Colorado

1958, all Federal highway laws were compiled under Title 23 of the United States Code. Title 23 has been considerably expanded and revised in the years since 1958 and remains the "bible" of Federal highway laws.

The Cameron Pass project was eligible for Federal financing in two ways: (1) as part of the Federal-Aid Highway System, and (2) under the Forest Highway program. Both alternatives would receive their monies from the Highway Trust Fund which annually supplies about six billion dollars for highway development. On the order of 100 million dollars goes to Colorado each year. The Federal-Aid Highways have been divided into four types of systems: interstate, primary, secondary, and urban. Highway 14 is part of the secondary federal aid system. Table 7-1 characterizes each system of federal-aid highways and lists the percentage

Table 7-1 Classifications of Federal-Aid Highways

Highway Classification	Description[1/]	Federal[2/] Share Payable
Interstate	Connections between major metropolitan-industrial areas. Also serve the national defense.	90%
Primary	Main roads providing for interstate, statewide, and regional travel.	80%[a/]
Secondary	Farm to market roads, rural main routes, school-bus routes, local rural roads, country roads (after June 1976 this system shall consist of rural major collector routes).	80%[a/]
Urban	High traffic volume arterial and collector routes serving major centers of activity	80%[a/]

[1/] Title 23, U.S.C., Section 103.

[2/] Title 23, U.S.C., Section 120.

[a/] For Colorado only, includes additional 10% because of the large tracts of Federal land in the state.

of costs payable by the Federal government. The remainder must be provided by the state from gas and road taxes and other highway user fees. Figure 7-10 has been included to show the flow of highway-user revenues through the Colorado Highway User Tax Fund. This is the source of the state's share for Federal-Aid highways.

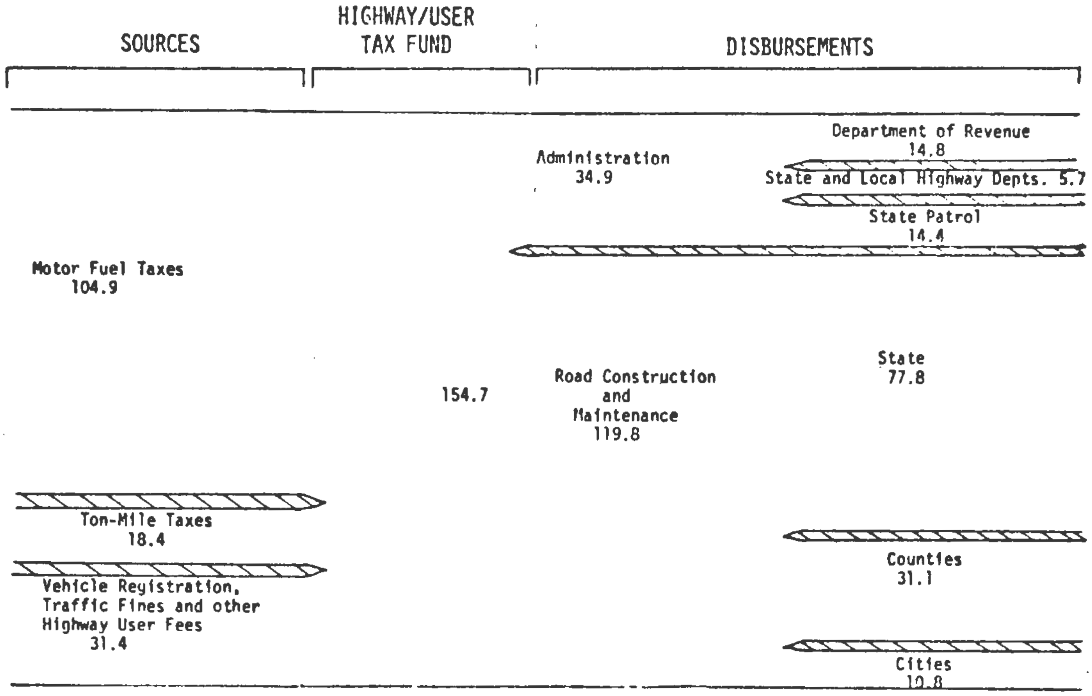


Figure 7-10 Schematic Representation of the Flow of State Highway Use Revenues in Colorado. Shown are Projected 1977 Values. Units are Million Dollars (1976 Colorado Annual Highway Report).

Forest highways are defined in Title 23, Section 101 as "a forest road which is of primary importance to the states, counties, or communities within, adjoining, or adjacent to the national forests, and which is on the Federal-aid system." Forest highways are given special status in Section 204 of Title 23 in that 100 percent of the construction and maintenance costs will be paid by the Federal government. Funds for the Forest Highway program are first authorized by the Congress and then are apportioned according to the area and value of Forest Service land. Colorado receives approximately 2.3 million dollars each year. In Colorado the monies are further allocated to specific projects by a committee made up of representatives from the Forest Service, the Federal Highway Administration, and the State Highway Department. Finally all projects must be approved by the State Highway Commission.

Returning again specifically to the Cameron Pass project, the eastern 7.3 miles of the project is being funded as a forest highway. This method of funding was sought primarily because the federal share is 100 percent. The release of impounded funds around 1974 facilitated funding through this channel. The remaining 3.9 miles of the new road, lying in the State Forest west of the pass, will be funded as a part of the Federal-aid secondary system. Because available funding is limited for any one year, the project will have to be built in at least five sections. Funding is not automatic for the next section once the project has been started. Each section must be funded separately through the process outlined in Figure 7-9. Total cost will be at least six million dollars and the estimated completion date is projected to be about 1982, eight years from the beginning of construction (Dwight Bower, District Engineer, Colorado Highway Department, personal communication, June 1976).

THE FORCES BEHIND THE PROJECT

The Cameron Pass project is not simply a technical undertaking but it is also a socio-political one in that it represents the culmination of the hopes and desires of many people. There is value in exploring these motivations behind the project, not only to gain understanding of its true context, but also because of similar types of forces will produce future events. The first step will be to identify and classify the forces involved with the project. Then each motive can be examined in closer detail to reveal how it was expressed and by what party.

Table 7-2 lists some of the motivations behind the Cameron Pass project. Not all of these forces were expressed explicitly during project evolvement yet, nonetheless, they are important generally. Therefore, the classificatory scheme used in Table 7-2 separates between *explicit* and *implicit* motivations. There have been essentially two explicit motives behind the project: 1) to improve the existing gravel road and 2) to create new opportunities. The vision has been that paving, widening, and realigning the road would make it a safer, more convenient, and problem-free facility. But also it was felt that the year round access into and through the area provided by the new road would stimulate new opportunities. For example, on both ends of the road it was hoped that the completed link would promote better trade between North Park and the communities along the Front Range. North Park residents saw the road as a better way to supply their markets for hay and cattle. Also, but to a smaller extent those in Jackson County wanted to get services and supplies from Fort Collins simply because of a natural tendency toward promoting ties within one's own political unit. Laramie has been the main supply center for North Park.

As the completion of the paving of Colorado Highway 14 became more a reality the desire for tourism developed. It was hoped that this would bring more revenues into the area thereby further stimulating the economy

Table 7-2 Motivations Leading to the Cameron Pass Project

Explicit Motivations	Implicit Motivations
Improve the existing facility -Increase safety, capacity, convenience, ease of maintenance, speed of travel, and driveability -Reduce travel time and pollution from dust, rockslides, siltation, and poor drainage	**Momentum from the past** -National trend to upgrade roads -Complete paving of Highway 14 -Maintain stability of highway infrastructure (Highway departments and road contractors).
Create new opportunities -Intercounty Commerce -Tourism -Winter access, ski development -Economic development -Increased recreation	**Fulfill obligations** -Regional allocation of public spending -Political promises to finish road
	Take advantage of opportunities -Funds available from highway user fees to improve highways
	Rivalries -North Park residents prefer to keep social and business ties in Colorado.

of the region. Of particular interest has been the Seven-Utes ski area. The establishment of this enterprise is entirely dependent upon the completion of an all-weather highway across Cameron Pass.

The implicit forces also have played an important role in producing the project. First of all there was tremendous amount of historical momentum behind the project. The road across the mountains has been consistently upgraded since it was first forged through the area a hundred years ago. Paving of the road has progressed steadily since 1950 and the Cameron Pass project will complete the third phase in the development of the road. In addition to the above specific forces there has been a long history of improving all the highways in the nation. This has produced a large institutional infrastructure within both the public and private sectors. In order to insure the stability of this highway infrastructure forces from within tend to promote a continued program of highway improvement. It is sustained by the fact that highway user fees provide a constant source of funds for highway construction. This produces more autonomy in the highway industry than in any of the other public service sectors of society.

The motives displayed in Table 7-2 are those which *led* to the Cameron Pass project. There are also those which *modified* the project during its planning and design. These include not only the traditional desires for safety, convenience, and reliability, but also the more recent ideals of ecological preservation and aesthetic appeal.

7.1.3 *Project Design*

The design description of the highway improvement project could become a laborious task if done in extensive detail. This is avoided in favor of giving an overall impression of the project supplemented by selected detail of project features which have significant interaction potential with the environment. At the same time special effort should be given to comparing the proposed project with the existing facility in order to highlight the *increment of change*.

Project Locale - The Cameron Pass project starts some 63 miles west of Fort Collins, Colorado at an elevation of 9,000 feet. The new road will climb for 7.0 miles through lodgepole pine forests and alpine meadow to the 10,285 foot high pass. The new road will then descend the valley of the Michigan River for another 4.2 miles until it meets existing pavement from Walden at an elevation of 9,400 feet. It is then another 27 miles to Walden, the center of North Park. The general location of the Cameron Pass project in relation to Colorado Highway 14 is shown in Figure 7-1.

Colorado 14 and Present Gravel Road - Colorado Highway 14 winds its way up the canyon of the Cache la Poudre River, a cold mountain stream fed from the snows along the Continental Divide. At times the canyon narrows forcing the road to hug the steep rock walls of the canyon. At one particularly narrow spot the road must travel through a short tunnel cut into the rock. At other spots the canyon opens up providing areas for camping, hiking, and small cabins. Through the length of the canyon Colorado Highway 14 meanders along side of the river providing for relaxing, scenic journey into the mountains (Figure 7-11 shows a representative stretch of Colorado 14 as it relates to the canyon and the Cache la Poudre River).

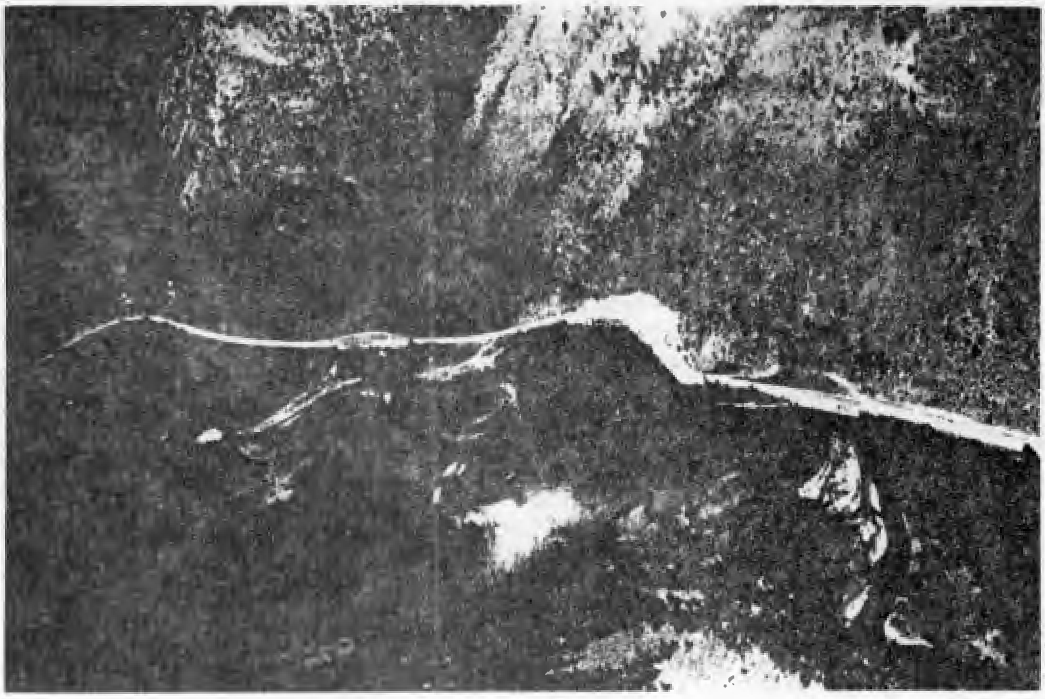


Figure 7-11 Typical Setting of Colorado Highway 14 in the Cache la Poudre Canyon above Rustic (June 1976)

Fifty miles up the canyon the highway turns up Joe Wright Creek and the grade steepens. Soon, at Chambers Lake, the pavement ends signifying the beginning of the project. The present gravel road passes Chambers Lake and continues as a forest lane, twisting as it climbs gently to Cameron Pass. Figure 7-12 shows the character of the present gravel road in this vicinity. From Cameron Pass the road descends into the valley of Michigan River, hugging the northern side of the canyon. Figure 7-13 shows this portion of the road. Finally the road levels out as it enters the rolling terrain of North Park where it again joins the paved highway at Gould.

Comparing Present Road and Proposed New Highway - Figure 7-14 is a map of the project area showing the alignment of both the old present gravel road and new highway. Figure 7-2 shows the alignment and cut for the new highway as it appeared in June 1975 construction for the new highway was in progress. Figure 7-15 is another view of the new construction near Chambers Lake. The present gravel road is seen winding through the forest above the construction cut. This winding, gravel road will be replaced by a smooth, fast, more direct highway. Figure 7-16 shows a recently completed stretch of Colorado 14 just below Chambers Lake to the east, which compares to the types of highway presently under construction. The comparison of the two roads seen in Figure 7-15 and between Figures 7-12 and 7-16 are also indicative of the respective driving *experiences* which each provides.

Figure 7-12 Ground Level Photograph of Existing Cameron Pass Gravel Road (taken in June 1975)

Figure 7-13 The Present Gravel Road West of Cameron Pass is Seen in the Lower Right Hand Corner as it Descends the Michigan River Valley. Photograph is Looking North from Mount Richthofen (June 1976)

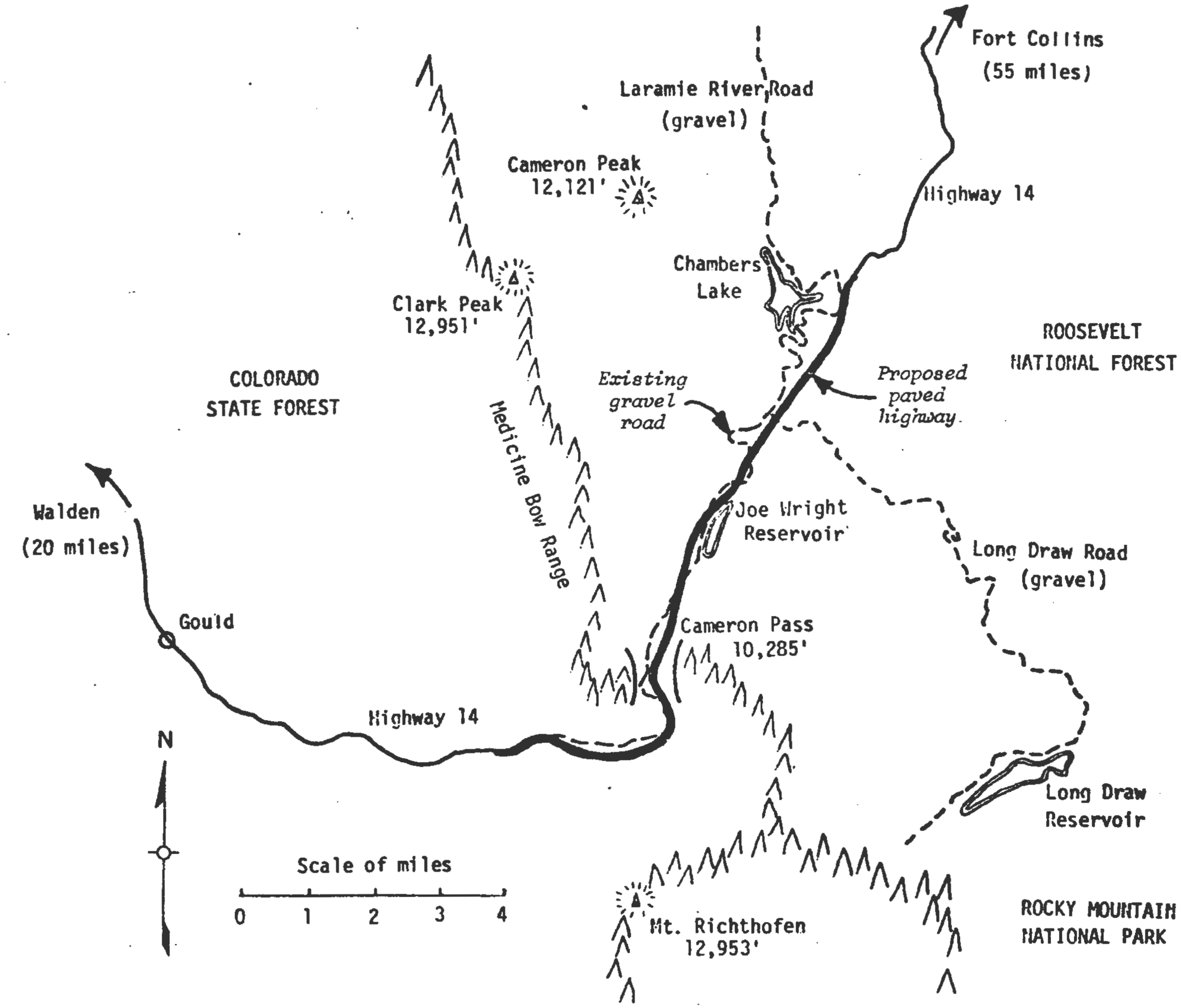


Figure 7-14 The Cameron Pass Project Area Showing the Alignment of both the Existing Gravel Road and the Proposed Paved Highway

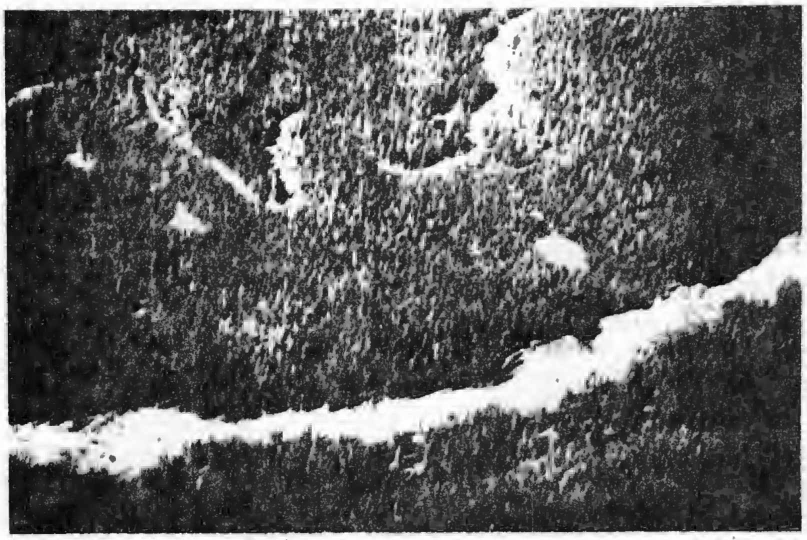


Figure 7-15 Aerial Photograph of Colorado 14 Leading to Cameron Pass Present Gravel Road is Shown Winding Through Trees. Construction Activity for New Alignment is Clearly Visible (Photograph October 1975)

Figure 7-16 Recently Completed (1974) Stretch of Colorado 14 Leading to New Construction Design is Similar to Proposed Project (Photograph June 1975)

The cross sections comparing the present and proposed roads at two stations, shown in Figures 7-17 and 7-18, relate not only the difference in roadbed widths but also the order of magnitude of the road cuts involved. This further illustrates the marked differences in the character between the old road and the new highway.

The new highway - Table 7-3 gives data for the right-of-way corridor needed for the new highway project. Design data for the 2.7 mile stretch on the eastern end of the poposed project are listed in Table 7-4. Notice that the bridge across Joe Wright Creek will have an HS 20-44 load rating as assigned by the American Association of State Highway Officials (AASHO) standards. This would allow passage of a 20 ton semi-trailer truck, and will permit any legal load to cross. The bridges on Highway 14 in the Poudre Canyon were recently rated and at least two bridges do not have the capacity to support this size truck.

Special features to be included in the design of the new road are three parking areas, a parallel pull-out area, and four sections with passing lanes. Access will be provided to existing recreational areas at Chambers Lake, Long Draw Reservoir, Barnes Meadow Reservoir, Joe Wright Reservoir, Zimmerman Lake, the Crags Scenic Area, and other smaller sections including existing streams.

Special problem areas in the construction of the new alignment are four stream crossings, several channel changes, and a slide area on the western side of the pass. Stream crossings were designed in cooperation with the Colorado Division of Wildlife so as to enable upstream trout migration and the movement of fisherman under the road.

Several impact mitigating measures have been included in the project design. Landscaping innovations are shown in Figures 7-19, 7-20, and 7-21. Figure 7-22 shows erosion control measures.

7.1.4 *Transportation Utility of Improved Colorado Highway 14*

The *activities* generated by the completion of Colorado 14 as an all weather paved highway relates to the types of *utility* which it affords various categories of highway users. For example will the completed highway be important in national, regional, or local highway travel. Also what categories of users will find it most useful? Truckers, loggers, Sunday recreation drivers, campers, persons traveling between Fort Collins and Walden? A casual look at a map will give quick answers to these questions. But they should be addressed systematically and not casually. This section will attempt to do this. One can see also from this analysis that the type of utility afforded will affect the secondary impacts. For example, if the new highway affects the aesthetic sensibilities of the recreation driver who then seeks other outlets for these needs, that is a secondary impact. But this conclusion is dependent upon identifying whether the aesthetic utility of the new highway is high or low to the recreational driver. One way this can be determined is to conduct an origin-destination survey of the highway users before and after the highway improvement project (which was not done).

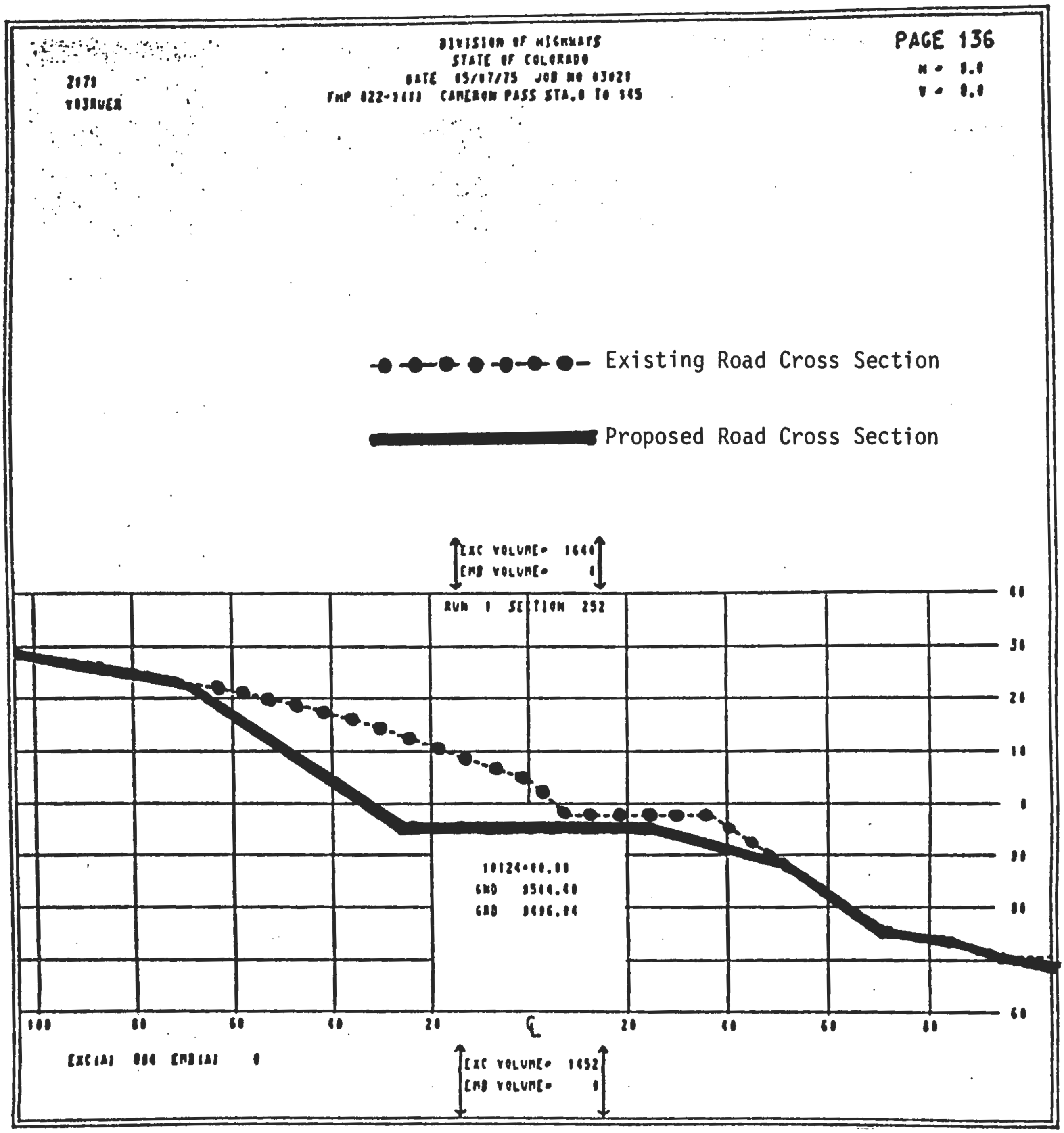


Figure 7-17 Cross Sections of Proposed Cameron Pass Improvement for Colorado 14, Compared with Present Road (1975). (Colorado Division of Highways, Design Book on Cameron Pass Highway Improvement, Date 05/07/75, Job No. 03021, Cameron Pass Sta. 0 to 145). Typical Cross Section Showing Cut and Fill, p. 136.

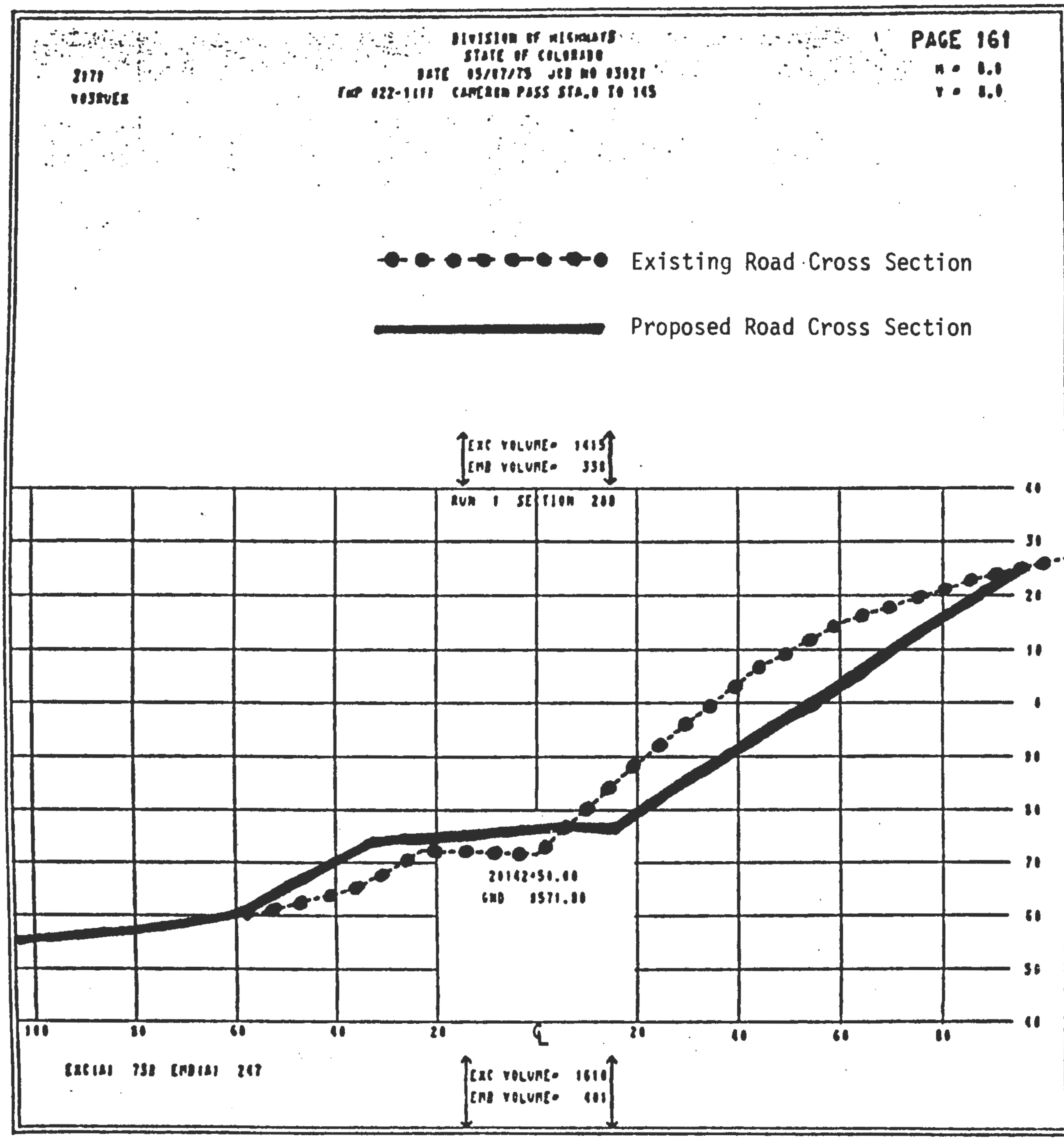


Figure 7-18 Cross Sections of Proposed Cameron Pass Improvement for Colorado 14, Compared with Present Road (1975). (Colorado Division of Highways, Design Book on Cameron Pass Highway Improvement, Date 05/07/75, Job No. 03021, Cameron Pass Sta. 0 to 145). Typical Cross Section Showing Cut and Fill, p. 161.

Table 7-3 Length of the Corridor and Right-of-Way Acreage from the Cameron Pass Project

Land Owner	Length of corridor (miles)	Acreage to be cleared
Roosevelt N. F.	7.0	160
Routt N. F.	0.3	12
State Forest	3.9	110
Private	0.0	8
TOTAL	11.2	490

Table 7-4 Design Data for First 2.7 Miles of Cameron Pass Highway Improvement Project (taken from Plan and Profile of Proposed Federal Aid Project No. FHP 022-1(1), State Highway No. 14, Larimer County, Colorado State Department of Highways, July 1975).

Maximum degree of curvature	16°00'
Maximum grade	7.7%
Minimum S.S.D. horizontal	310 ft.
Minimum S.S.D. vertical	400 ft.
Maximum design speed	40 miles per hour
Design traffic volumes, 1995	
-average daily traffic	420 vehicles per day
-design hour volume	105 vehicles per hour
Major structures	105 ft. of bridges
Load rating of bridge	HS 20-44

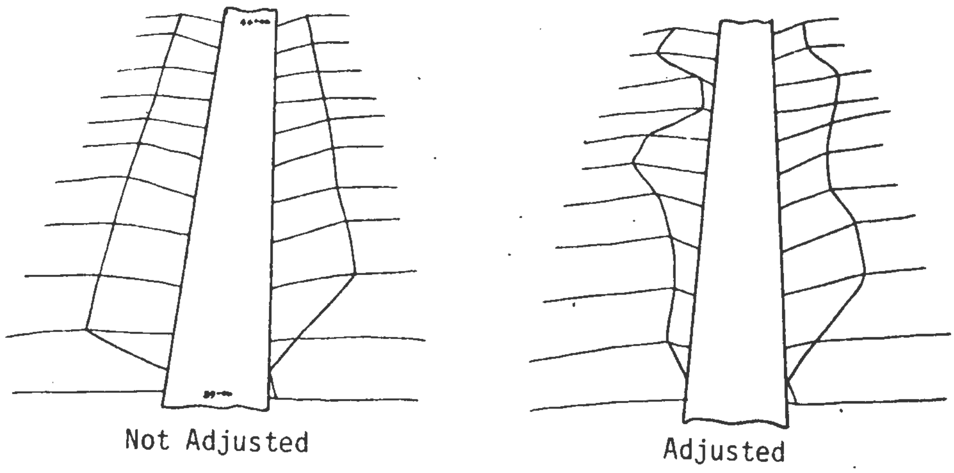


Figure 7-19 Slope Adjustments. Environmental Impact Mitigating Measures for Colorado 14 Cameron Pass Improvement. (Taken from Plan and Profile of Proposed Federal Aid Project No. FHP 022-1(1), State Highway No. 14, Larimer County, Colorado, State Department of Highways, July 1975).

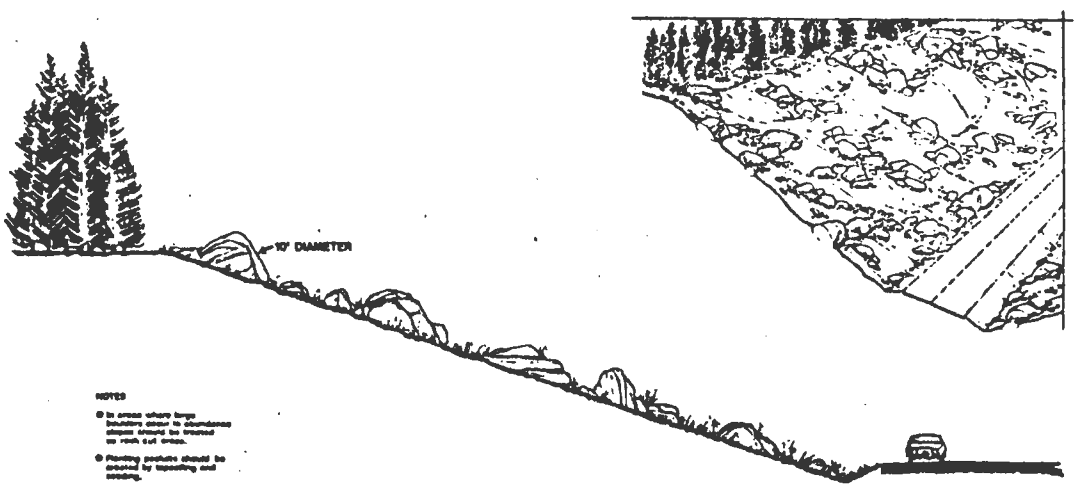


Figure 7-20 Landscaping by Boulder Field. Environmental Impact Mitigating Measures for Colorado 14 Cameron Pass Improvement. (Taken from Plan and Profile of Proposed Federal Aid Project No. FHP 022-1(1), State Highway No. 14, Larimer County, Colorado, State Department of Highways, July 1975).

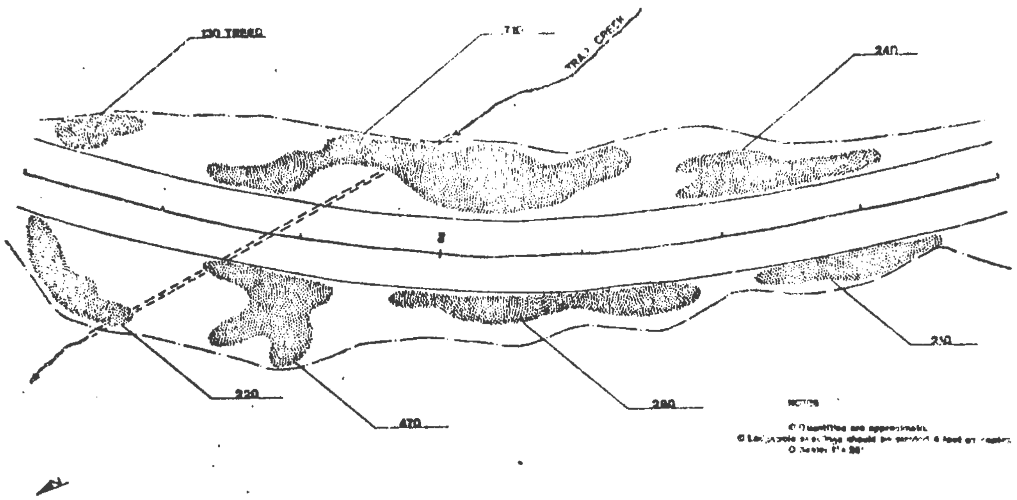


Figure 7-21 Landscaping by Plantings. Environmental Impact Mitigating Measures for Colorado 14 Cameron Pass Improvement. (Taken from Plan and Profile of Proposed Federal Aid Project No. FHP 022-1(1), State Highway No. 14, Larimer County, Colorado, State Department of Highways, July 1975).

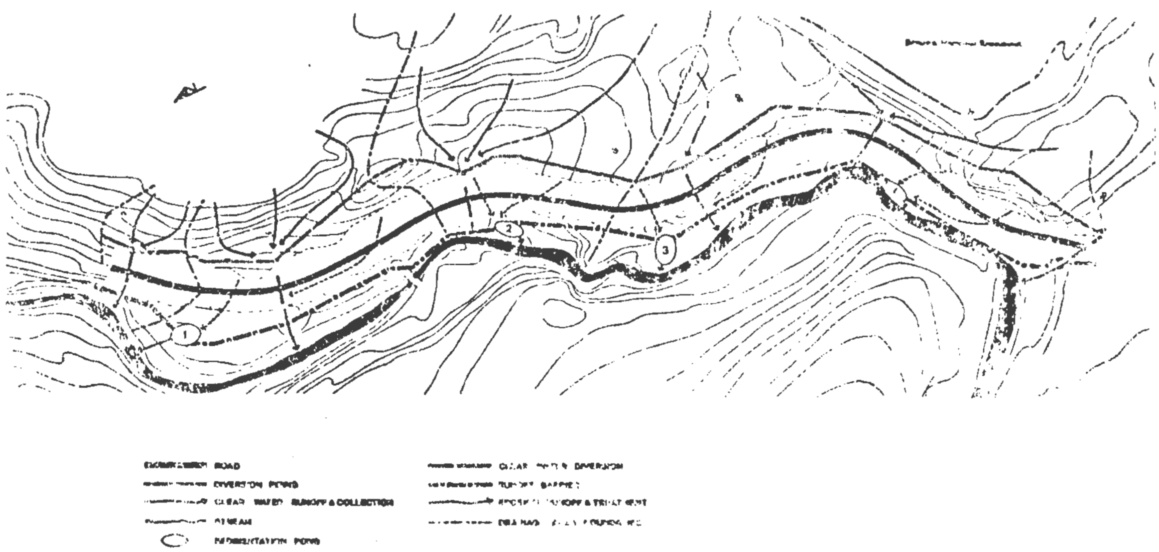


Figure 7-22 Erosion Control Plan During Construction. Environmental Impact Mitigating Measures for Colorado 14 Cameron Pass Improvement. (Taken from Plan and Profile of Proposed Federal Aid Project No. FHP 022-1(1), State Highway No. 14, Larimer County, Colorado, State Department of Highways, July 1975).

Role in the national highway network - In order to gain an understanding of the transportation utility of the proposed Cameron Pass improvement it is necessary to examine the role the new stretch will play in the surrounding highway network. The first question is: how does the project relate to the highway system? The national-level highway network is best characterized by the interstate highway system. Figure 7-23 shows the interstate system for the area surrounding the Cameron Pass project. From this map it is evident that the Fort Collins-Walden stretch plays little role in any inter-regional linkages that involve interstate highways.

Role in the regional highway network - The next level to examine is the regional highway network. Figure 7-24 shows the system of highways important in the regional system of the Northern Colorado Front Range. Notice that there are four routes linking the east and west sides of the mountains. They are from north to south:

1) U.S. 287 to Laramie and then southwest on Wyoming 230 and Colorado 127 to Walden
2) Colorado 14 through Cameron Pass
3) U.S. 34, the Trailridge road, through Rocky Mountain National Park
4) U.S. Interstate 70, then U.S. 40 to Granby and Colorado 125 to Walden.

At present only the most northerly and southerly routes (1) and (4), are open through the winter. The Cameron Pass improvement will open a third all-weather road across the mountains.

Table 7-5 compares mileages across the Front Range for each of these four routes. The shortest mileage on a year-round route is circled to accent the most probable route that would be used between the two points. To reach Granby from all points on the east slope it is shorter to use I-70. The Cameron Pass improvement will not improve access between Denver and the western side of the Front Range. Interstate 70 remains the shortest route. The only regional transportation utility of the Colorado Highway 14 route is in linking the Fort Collins-Greeley area with Walden and Steamboat Springs.

Even in those cases where the Cameron Pass project will shorten mileages between two points, the travel time will not be reduced proportionately. This is because the twisting character of Highway 14 between Fort Collins and Walden necessitates slower speeds than the other routes.

Table 7-6 compares distance, speeds, and travel times between the present Colorado Highway 14 with the 12 miles of gravel road over Cameron Pass, Colorado 14 with the 11.2 miles improved paved highway now being constructed, and the alternative of travel via Laramie. From this it is seen that driving time between Fort Collins and Laramie, using official or advisable or practicable speed limits is still not more favorable via the improved Colorado 14 instead of the Laramie route. Thus Colorado Highway 14 seems not to have a dominant role in the regional highway network nor will the Cameron Pass improvement project change this in any

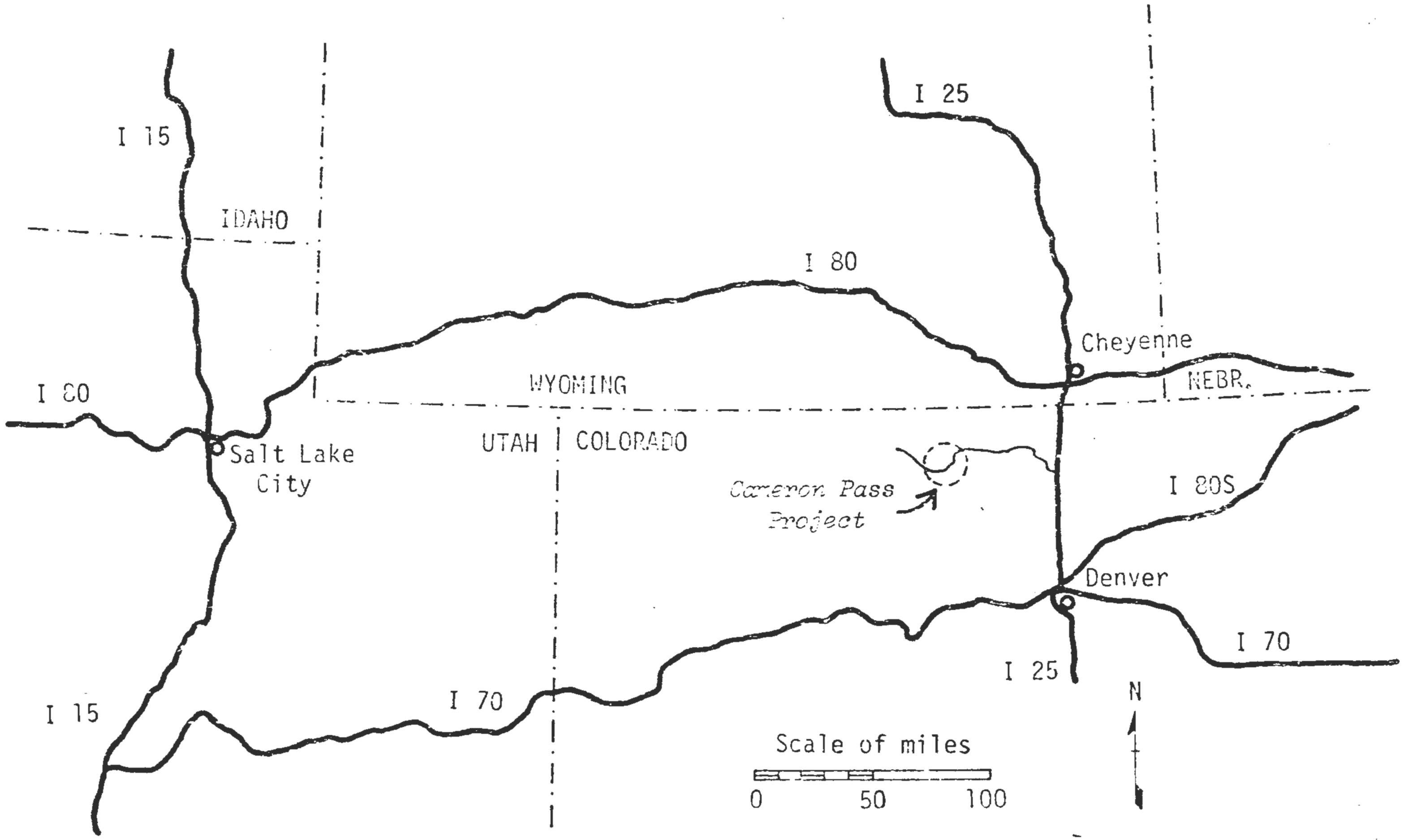


Figure 7-23 Colorado Highway 14 and the Cameron Pass Project in Relation to the Interstate Highway System

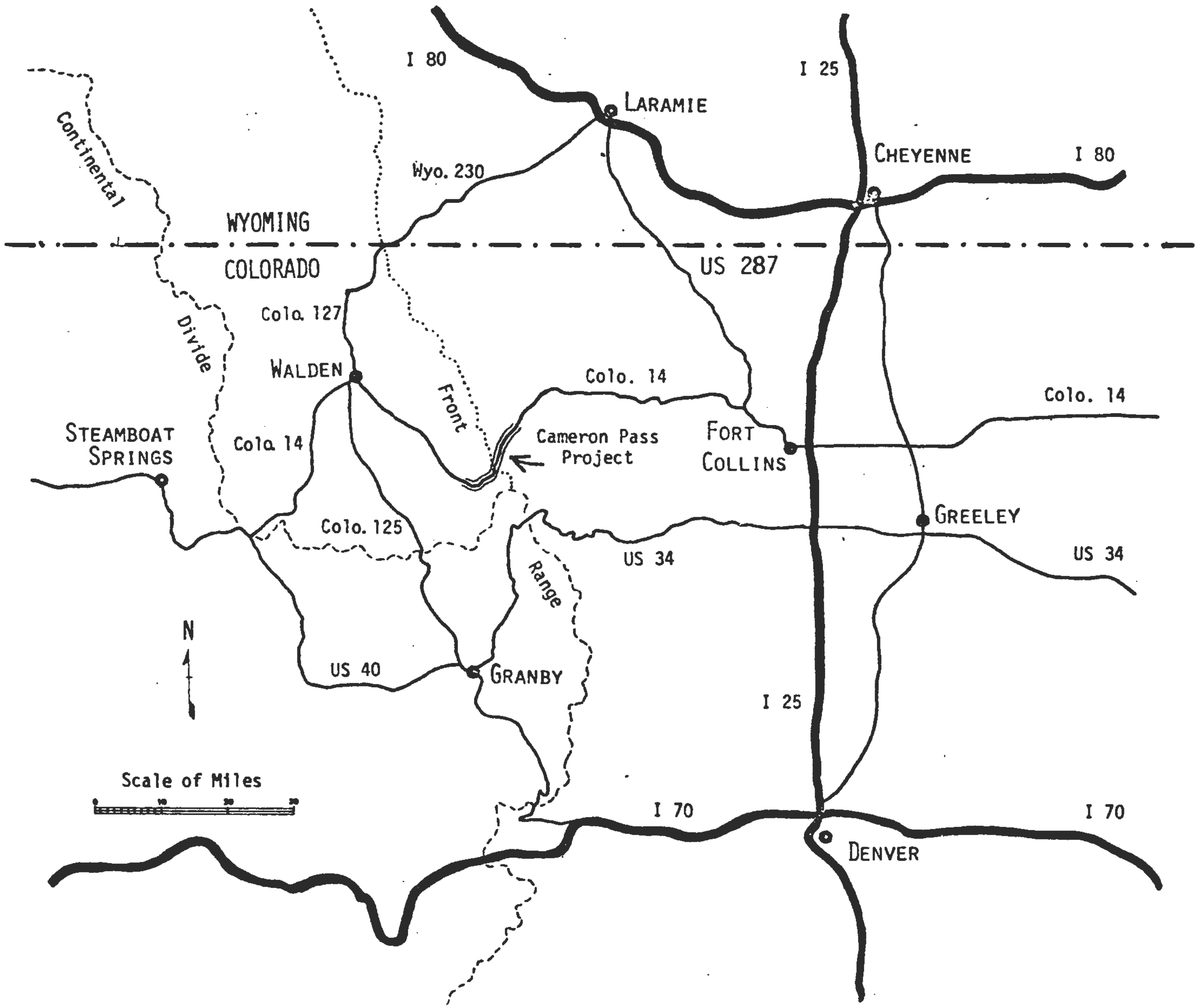


Figure 7-24 Colorado Highway 14 and Cameron Pass in Relation to the Regional Highway Network

Table 7-5 Mileages Between Points on the Eastern and Western Side of the Front Range - A Comparison for Four Different Routes[a/]

To	From	via Cameron Pass	via Laramie	via I-70	via Trailridge Road[b/]
Walden	Fort Collins	102	129	206	160
	Greeley	136	163	196	168
	Denver	166	193	142	198
Steamboat Springs	Fort Collins	161	188	230	184
	Greeley	195	222	220	187
	Denver	225	252	166	217
Granby	Fort Collins	157	184	151	105
	Greeley	191	218	141	113
	Denver	221	248	87	143

[a/] Circles indicate shortest year-round route.

[b/] Open only May to October

Table 7-6 A Comparison of Driving Times Between Fort Collins and Walden Along Two Different Routes

	via Present Cameron Pass Road 1972[1/]	via Improved Cameron Pass Highway (after 1982)	via Laramie
Distance (miles)	103[2/]	102	129
Average Speed (mph)			
summer	35	40[3/]	55
winter	(not open)	35	43-55
Driving Time (hours)			
summer	2.9	2.6	2.3
winter	(not open)	2.9	2.3-3.0

[1/] 1972 is used to indicate conditions prior to construction interferences with travel.

[2/] We estimate that the present road is about one mile longer in length than the highway being constructed.

[3/] Design speed of new stretch over Cameron Pass significant way. For a significant change to take place a *program* of improvements would be required to upgrade Colorado 14 to a primary highway along its entire canyon length. This could occur as a *de facto* program through a series of individual projects, such as the Cameron Pass project.

Traffic patterns - The average daily traffic volume (ADT) data[1/], for Colorado 14, obtained from the Colorado Division of Highways is revealing about the nature of the use of the highway. Figure 7-25 shows 1974 ADT data for Northern Colorado highways. Traffic volume reported as ADT, decreases continuously from 900 at the mouth of Poudre Canyon near Ted's Place, to 160 across Cameron Pass. From the Walden side, the ADT decreases from 370, to the 160 count at Cameron Pass. It seems clear from these data that the Colorado 14 is used presently to provide access to destinations (or from origins) along or adjacent to the highway. By comparison, U.S. 34 through Rocky Mountain National Park seems to be a through highway. The comparatively light ADT counts in the Walden vicinity is of interest also, in that these data underline the remoteness of the North Park area.

Additional ADT data are given in Table 7-7, which shows changes from 1950 to 1974 at four locations along Colorado 14; comparisons are seen also with U.S. 34 and I-70 the next two transmountain highways to the south of Colorado 14. Figure 7-26 shows graphically the overall trend in ADT for Colorado 14 within Poudre Canyon. The upward trend is clearly evident; the projected 20 year forecast ADT for 1994 for this lower stretch of Colorado 14 is about 1500 vehicles per day (1974 Colorado Traffic Volume Study).

Local access - Colorado 14 seems to provide transportation utility primarily as a local highway to those who have origins or destinations within the Canyon or in North Park, with little through traffic. Although an origin-destination survey would provide the best information on the highway users, there is much that can be understood about the present and future uses of the highway by knowing the type of land adjacent to the highway and the nature of its development. This is discussed in subsequent sections in more detail. However, Figure 7-27 shows Colorado 14 from Ted's Place to Gould. From this, the variety of outdoor recreation activity, characteristic of scenic mountain lands, is evident. The predominant role of Colorado 14 in providing recreation access to persons from the Front Range and other areas is evident through casual observation of activities adjacent to Colorado 14.

Role of improved Colorado Highway 14 - Because of the large number of recreation sites and side roads along the full length of Colorado 14 it does not appear that the Cameron Pass improvement will affect the structure

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[1/] Average daily traffic is determined from count surveys conducted by the Colorado Division of Highways.

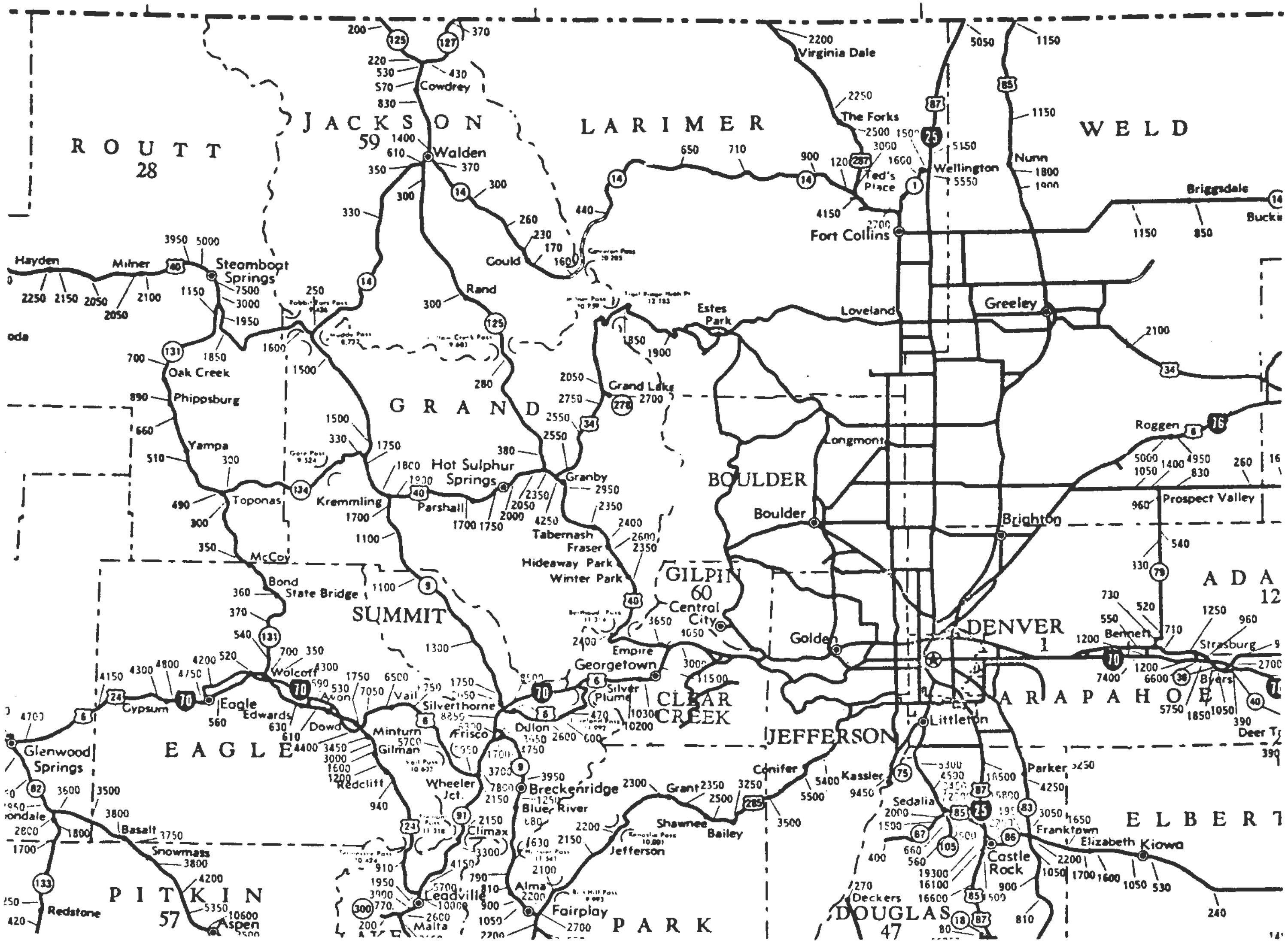

Figure 7-25 1974 Average Daily Traffic Volumes for Highways in Northern Colorado (1974 Traffic Volume Map, Colorado State Highway System)

Table 7-7 Trends in Average Daily Traffic at Selected Points on Colorado Highway 14 Compared with Two Nearby Cross-Mountain Highways[1/]

	Site	1950	1954	1956	1958	1960	1962	1964	1966	1968	1970	1972	1974
Colorado 14	Ted's Place	490	550	600	600	700	690	720	1100	800	880	1100	1200
	Near Eggers	140	200	290	290	400	320	400	500	260	330	560	710
	Across Cameron Pass	100	-	-	-	-	-	-	-	-	140	150	160
	Near Gould	125	-	-	-	-	-	-	80	120	160	170	170
Other High-Ways	US 34 at Milner Pass	500	850	900	900	800	850	950	1000	950	1300	1700	1850
	I-70 West of Silver Plume	920	1420	1950	2400	2100	2500	3050	3400	3750	5450	6300	10200[2/]

[1/]Data were compiled from the semiannual Traffic Volume Map, Colorado State Highway System, for the years 1950 to 1974.

[2/]Eisenhower Tunnel was opened in 1973 probably accounting for the large increase.

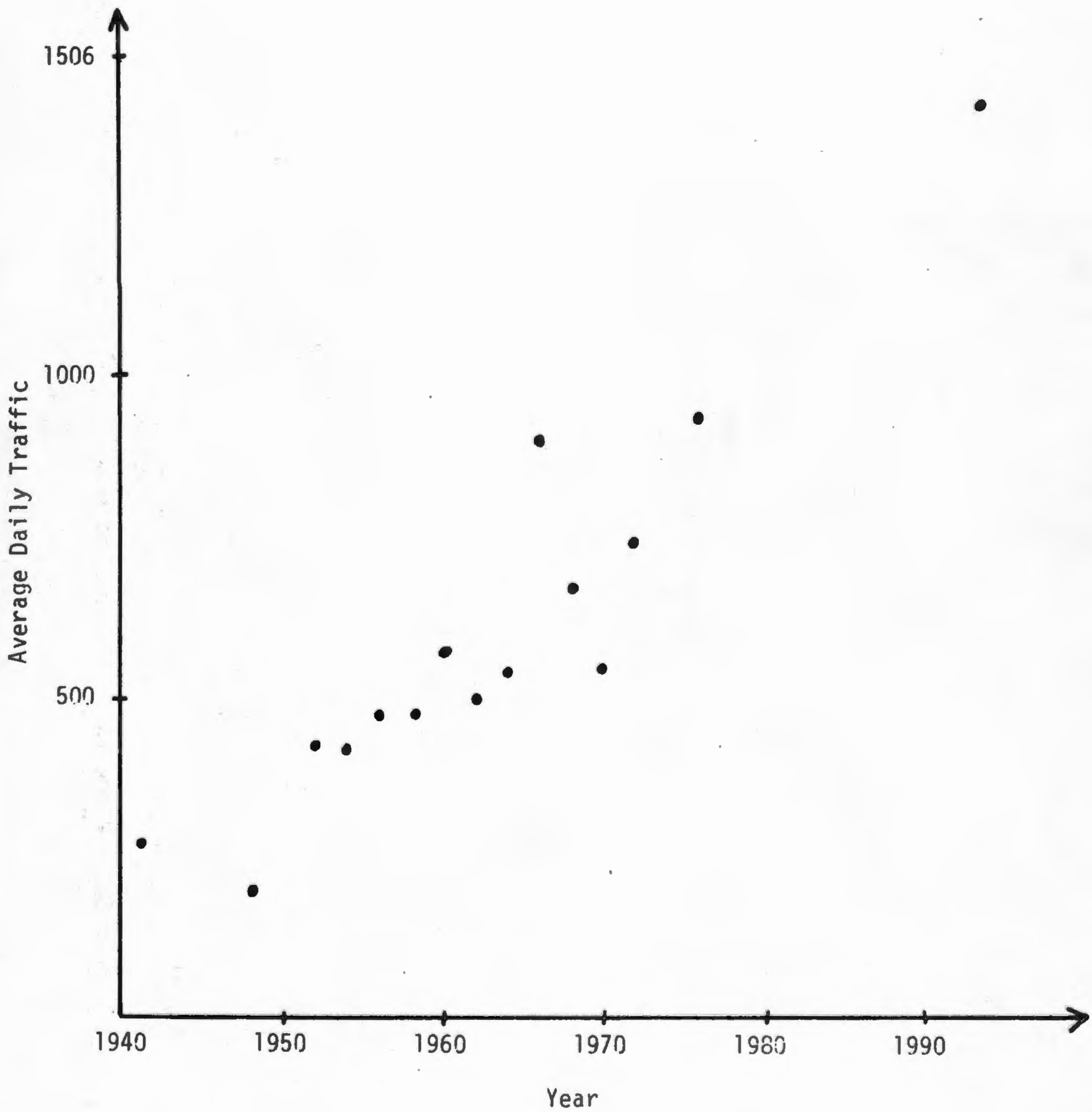

Figure 7-26 Trends in Average Daily Traffic Volumes for 26.3 Mile Stretch of Colorado Highway 14 Between Ted's Place and Eggers, Showing Also Projection to 1994 (Data Compiled from Annual Colorado Traffic Volume Study, Division of Highways, State of Colorado, Denver, for Years 1941 to 1974)

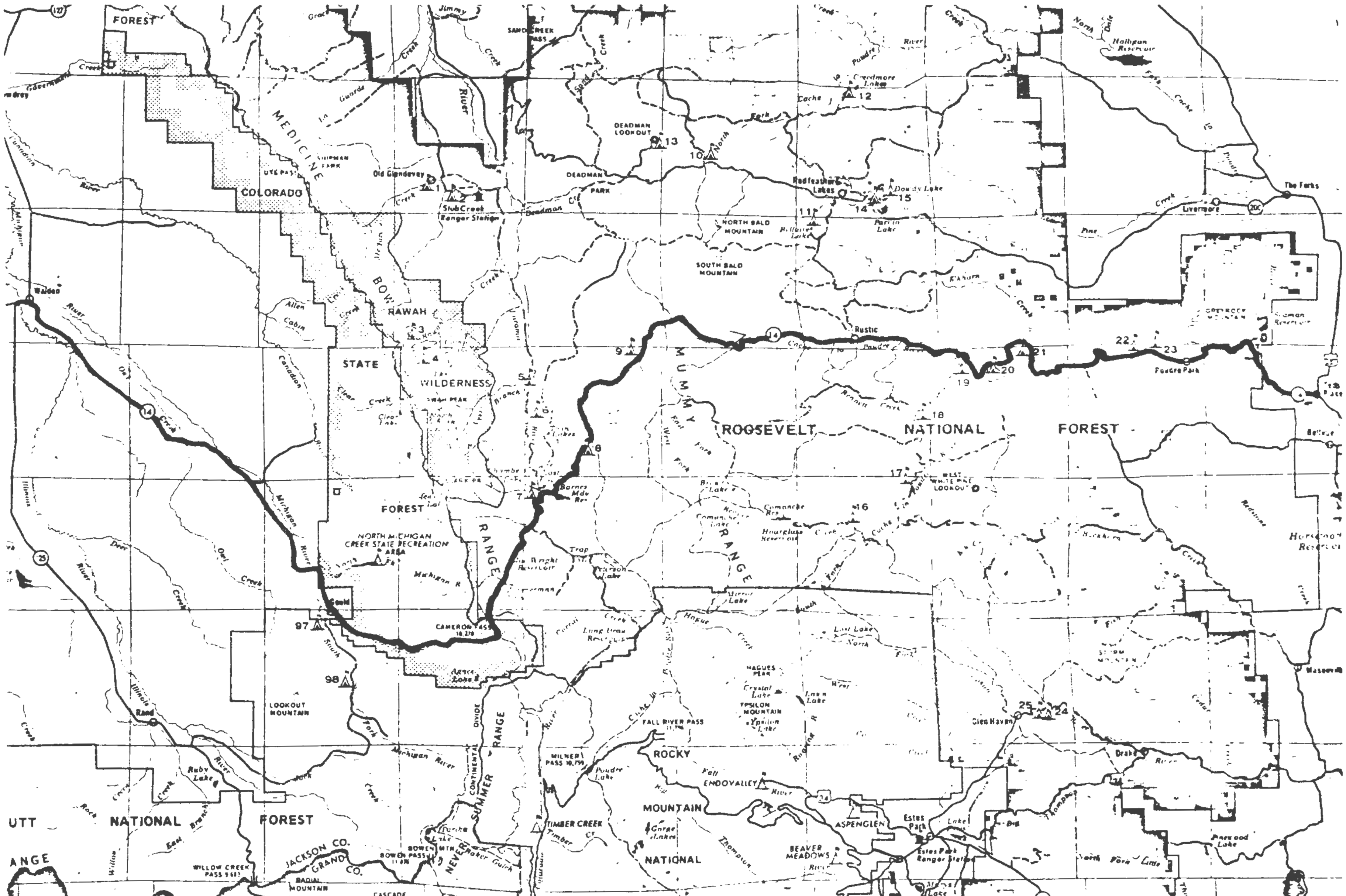

Figure 7-27 Colorado Highway 14 from Ted's Place to Gould, Showing Proximity of Highway to Recreation Lands (U.S. Forest Service Recreation Map)

of uses in a manner greatly different from the present. However, the present gravel road over Cameron Pass is often dusty for travel and is definitely a slower speed road (about 20 mph). The completed paving may induce some additional traffic across Cameron Pass to explore other recreation opportunities in the Michigan River area and other areas of North Park. But the improvement does not seem to change the role of Highway 14 in the present structure of recreation. However, the improved all-weather highway is a necessary factor in the development of the proposed Seven Utes ski area since the Front Range communities would be the main clientele served. Many residents within the Poudre Canyon are also served by Colorado 14. These people are tied into the Fort Collins community and economic structures and so would not benefit from the improvement.

Synopsis - From the preceding analysis one can assert:

1) Colorado 14 will probably not be an important regional highway. It is important presently, and will be important in the future, mostly in providing access to recreation within the mountain areas served.
2) The Colorado Highway 14 improvement will probably not affect the present structure of how the highway is used for local recreation. However, it may induce further recreation in the North Park area with dust free and faster access provided.
3) The Colorado 14 improvement *per se* will probably not affect the present light traffic in the Walden area.

7.2 System Description

The main concern of this section is to describe the present ambient environments prior to the construction of the Cameron Pass highway improvement project. This requires:

1) Determination of the influence zones of the project
2) A general description of the various subsystems within the local influence zone of the project
3) Selection of the critical issues
4) Description of system state of selected subsystems.

These requirements are the outline of this section. They also provide some guidance on scoping the system description task. This is given intrinsic in the requirements themselves.

The general scheme is to provide the reader first with an overall picture or a context of the system within which the proposed project is imposed. This is a description of the existing "system state", or the "baseline conditions".

7.2.1 *Project Influence Zone*

Ideal boundaries - The project influence zone might be considered ideally as: (1) local, (2) regional, and (3) national. Figure 7-28 shows a set of "ideal boundaries" for the Colorado Highway 14 improvement; Table 7-8 describes these boundaries. The "local boundary" was based upon the area served by Colorado 14 as a major access route to the canyon area and to North Park. Campgrounds, stores, cabins, fishing waters, hiking areas, etc. adjacent to the highway obviously are included. Areas served by gravel roads feeding into Colorado 14 are included also. Such roads are used for fishing, hunting, camping, mining access, logging, etc. Any change in access provided by Colorado 14 will affect these activities.

The "regional boundary" includes that regional area for which North Park-Poudre Canyon may be a destination for recreation or some other purpose. Other options for these outlets are within proximity too but North Park-Poudre Canyon is definitely a part of the regional "capital stock" of environmental assets. The same is true at the national level. The local system may be important as a destination for some out of state persons. Also it constitutes a part of the national capital stock of environmental assets.

Ideally a system boundary should encompass all those subsystems that will participate in producing an effect from the project. It is often difficult to delineate the influence zones by spatial boundaries but in the case of Colorado 14 this doesn't seem to be a bad way to handle the problem.

Data units - When collecting data for the system description one soon realizes that the ideal boundaries, as defined by the influence zones, may not coincide with the spatial units for which the data are aggregated. Information is generally collected and aggregated for a specific administrative unit which are also data units. Table 7-9 lists several of these data units

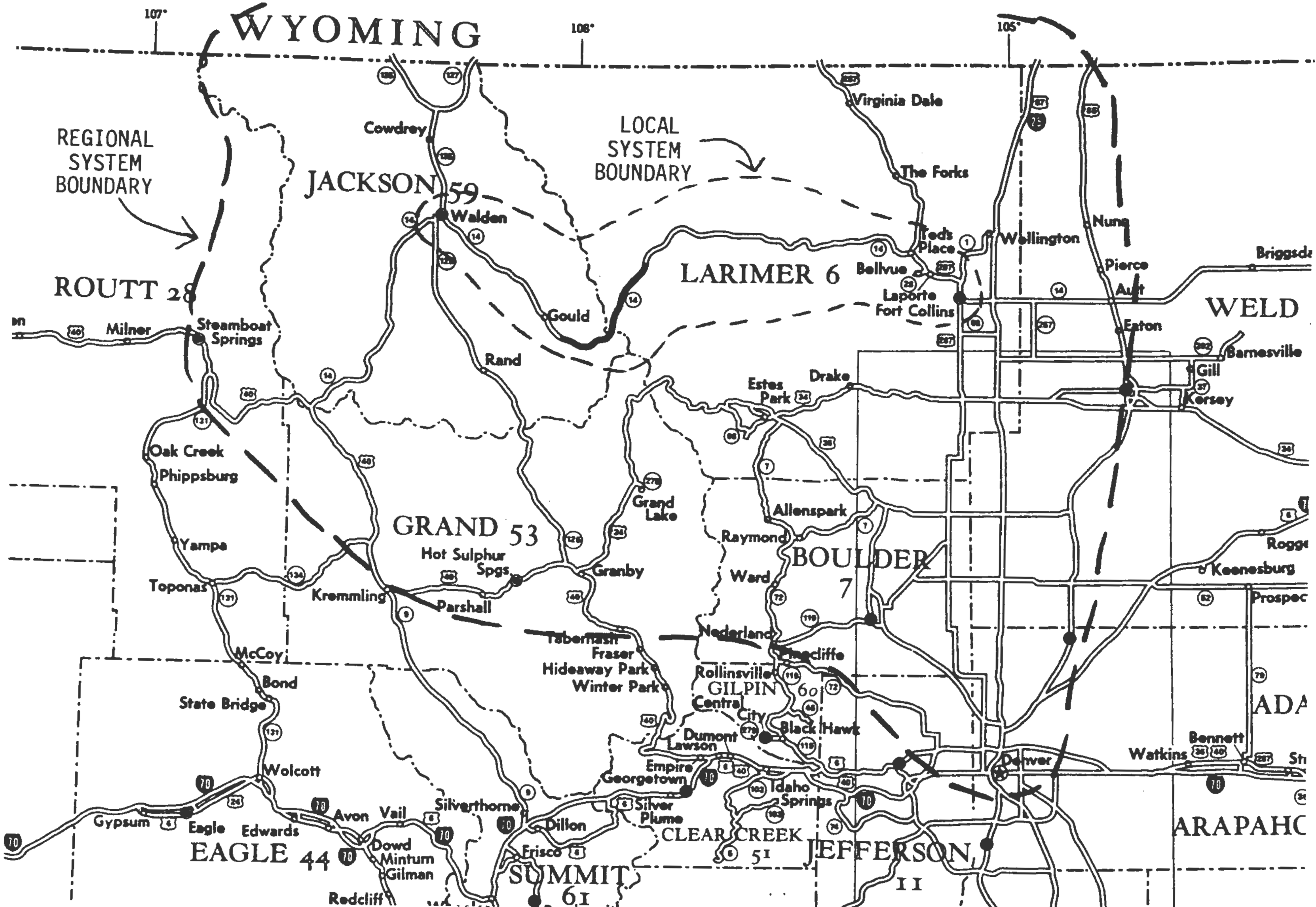

Figure 7-28 "Ideal" System Boundaries at the Local and Regional Level

Table 7-8 "Ideal" System Boundaries

	System Scale	Boundary
	Local	Twenty miles from Highway 14 between Ted's Place and Walden
Size of Zone / Degree of Specificity	Regional	Fifty to seventy miles from Highway 14 (includes Front Range cities, North Park, and the mountains in between).
	Large Scale	Rocky Mountain region, Western United States, or the Nation

Table 7-9 Data Units for the Cameron Pass Case

Administrative Unit	Units Applicable for Cameron Pass Study	Available Data
County	Jackson County Larimer County	Census date (population, housing, business patterns, education, employment), zoning, recreation use, land use plans
Public Forest	Roosevelt N.F. Routt N. F. Colo. State Forest	Logging, recreation, mining, grazing, land use plans
State Game Unit		Wildlife inventories, hunting
State Planning Region	Region 2 Region 12	Population, recreation supply and demand, land use plans
State	Colorado Wyoming	Census data
Large Scale Region	Rocky Mountain region United States	Census data

relevant to the Cameron Pass case. Also given are the types of information available within each unit. Note that different types of information are available for each. There is no single data unit for which all types of data are aggregated. Figures 7-29 and 7-30 show some of the data units, bringing out the dilemma that none even resemble the ideal boundaries delineated in Figure 7-28. Therefore, in the system description that follows it will be impossible to use a consistent boundary, much less an ideal boundary. Instead each component of the impacted system will be profiled in a fashion prescribed by the availability of data. The ideal system boundaries will be approached by choosing and combining the most appropriate data boundaries.

7.2.2 *Subsystems Affected by Proposed Location*

The emphasis of this section is on describing the land and the activities associated with the land which most likely would be affected by the project (i.e. the land within the "local influence zone"). The general regional setting is first described so that the project zone has some regional context. A photographic essay and a descriptive summary are then used to give a general understanding of the ambient environment "before the project".

The regional setting - Figure 7-31 is a satellite photograph which shows the physiography of the "regional zone of influence" of the Cameron Pass project (as defined in Figure 7-28). The right portion of the photograph is the Great Plains, seen in the photograph as farmland, both irrigated and dryland. The major cities of Colorado are located in an urban strip at the western edge of the Great Plains, at the base of the mountains. They are not easily visible in the photograph. The Front Range mountains are seen in the left side of the photograph. They culminate in 13,000 and 14,000 foot peaks, plainly visible because they are snowcapped.

Poudre Canyon is easily seen as it cuts into the Front Range in an east-west direction near the top of the photograph. It turns abruptly south-west as it nears Cameron Pass. The canyon of the Michigan River can be seen heading northwest from Cameron Pass, widening finally into North Park (only the eastern edge is visible).

Most of Colorado's 2,207,259 population (1970 census) resides in the urban strip from Fort Collins in the north to Pueblo in the south. The proximity to the mountains and access by good highways is important in recreation and commerce for the region.

The local zone of influence - The local zone of influence is seen in Figure 7-28 as extending from Fort Collins to Walden. The "character" of this zone is of greatest interest in this study since its subsystems are the most subject to change by the project. This character will be described first to give a general impression or image of the whole influence zone in aggregate. Detailed data on two of its subsystems are given in Section 7.2.4.

Photographs - Photographs are perhaps the easiest way to convey a sense of character about the land and the way it is used. A "picture essay" for this purpose has been compiled as section 7P of this chapter (colored pages).

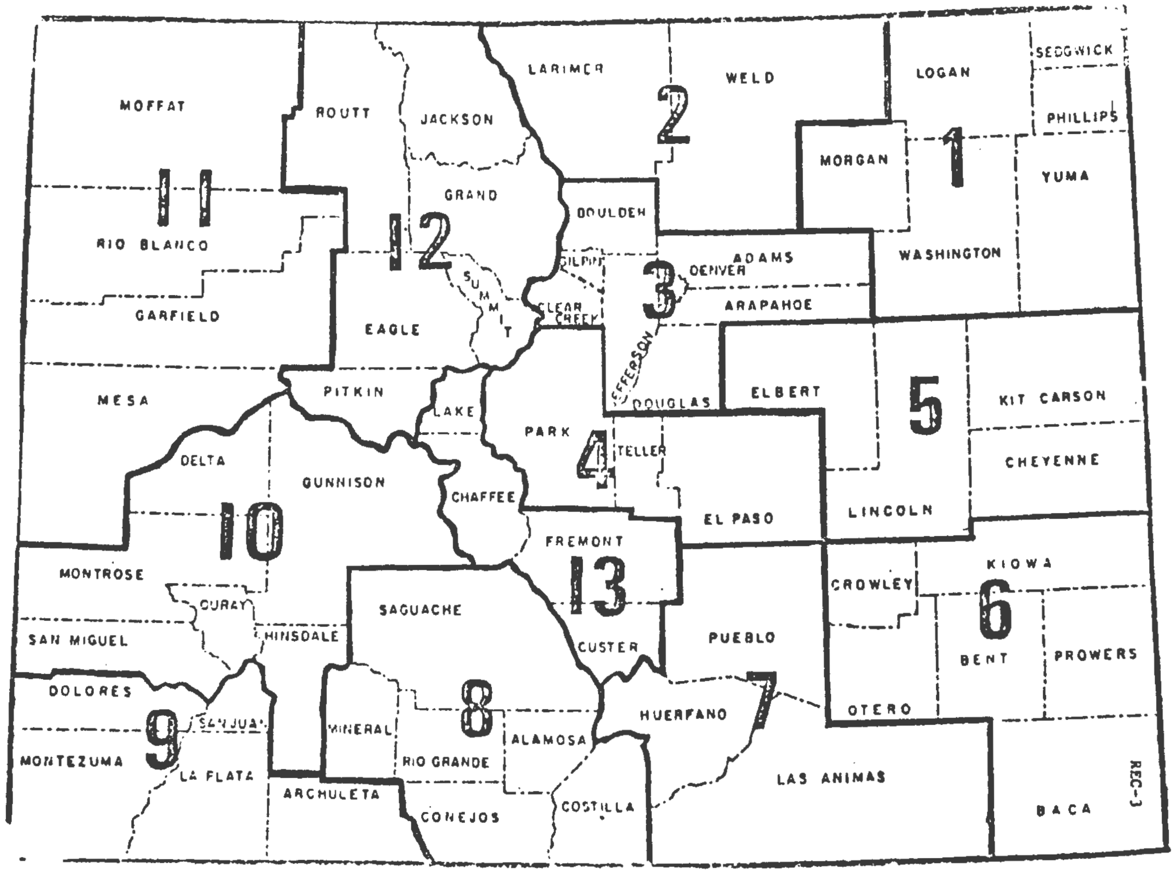

Figure 7-29 Counties and State Planning Regions of Colorado

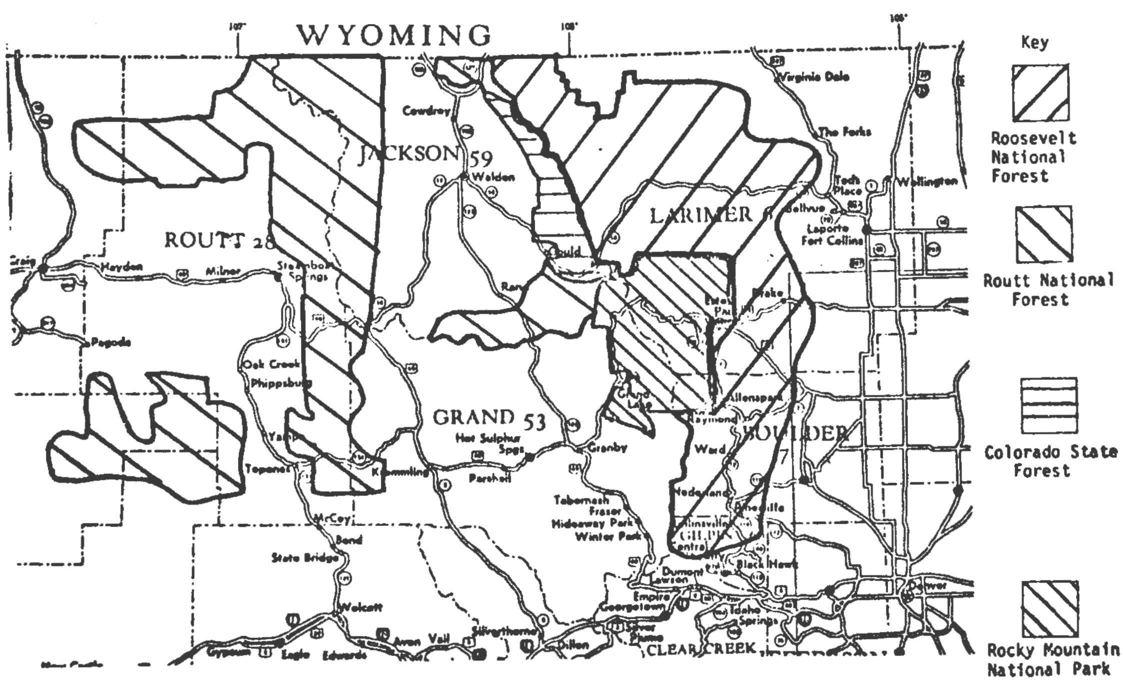

Figure 7-30 Public Parks and Forests in the Cameron Pass Area

Figure 7-31 Front Range Mountains and Plains in Colorado from Colorado Springs to Wyoming Border (Photo by NASA ERTS Program, Frame No. E-1388-17131, 8/15/73, USGS reproduction).

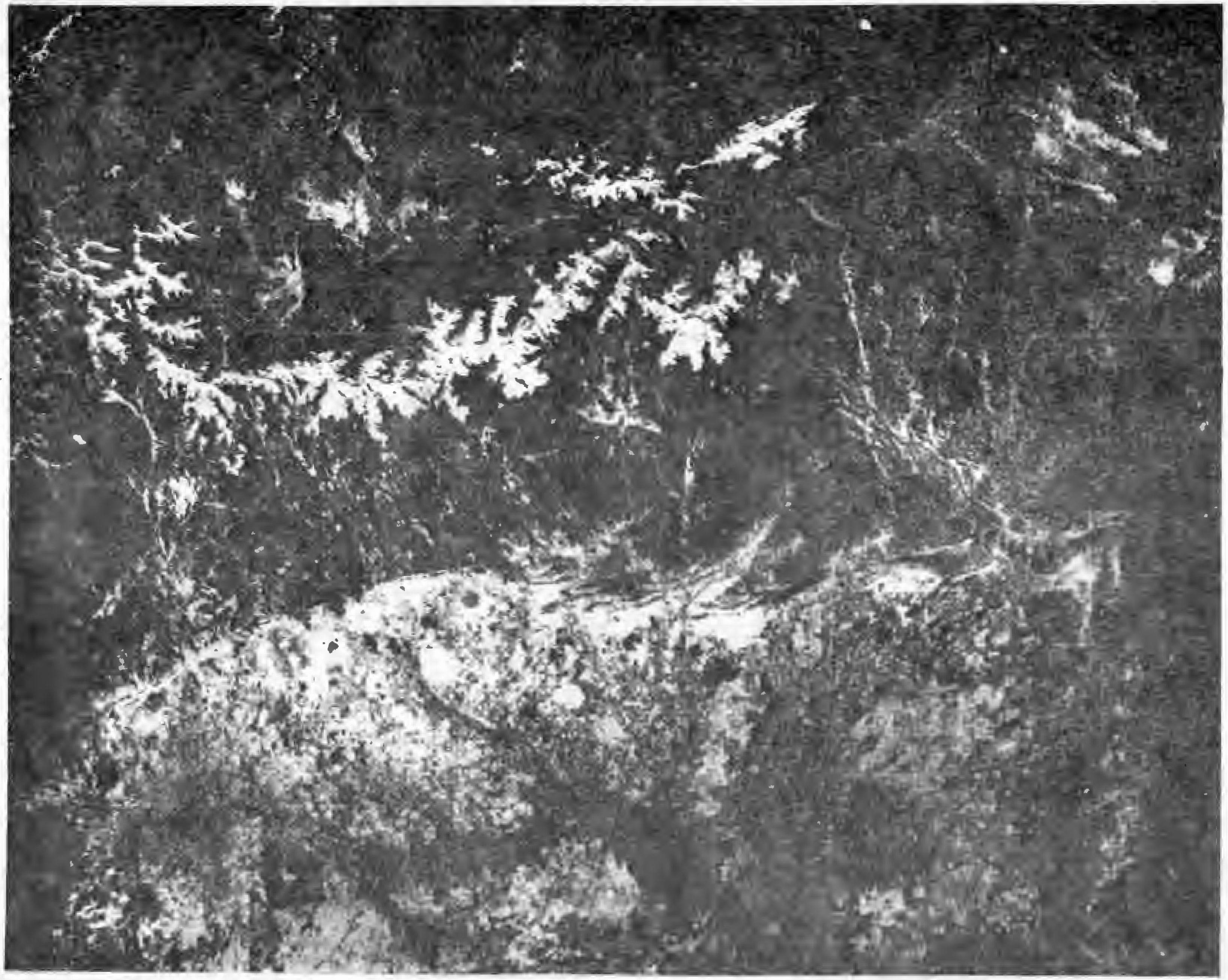

Figure 7-31 Front Range Mountains and Plains in Colorado from Colorado Springs to Wyoming Border (Photo by NASA ERTS Program, Frame No. E-1388-17131, 8/15/73, USGS reproduction).

These photographs are oriented mostly about Colorado 14. They begin at Interstate 25 near Fort Collins and terminate with an aerial veiw of Walden and North Park on the west. While each photograph is intended to convey its own message, the photographs should be considered collectively also. Some of the observations from the photographs relevant to this study are:

1) Fort Collins is an urbanized area whose population exerts use pressures in Poudre Canyon
2) Poudre Canyon is not suited for a high speed major highway; it is very narrow in places and has many curves.
3) The present highway up Poudre Canyon conforms well to the landscape without dominating it.
4) The present road serves a variety of recreation activities in the canyon area.
5) Logging has been an activity in the area
6) The area is highly scenic
7) The recreation activities in the area seem to have an informal spontaneous character vis a vis the more formal character of the national parks (e.g. Rocky Mountain National Park).
8) The North Park area has an isolated, ranching character.

While there is much not said by the photographs, the above information is considerable and important in the development of an impression. It should be noted of course that the impressions and the observations are not value free and may be somewhat different for each individual.

Components of the local system - To describe the various components and subsystems found in the local influence zone is a prodigious task unless there is some structure provided. Figure 7-32 displays a classification structure (i.e. a taxonomic system) developed to describe the components and subsystems in the "local influence zone" of the study. Indeed one of the purposes is *display* of information.

The information displayed in Figure 7-32 summarizes essential information for each category. It permits one to grasp a large amount of detailed information and, at the same time to see some order or categorization, and thus grasp the *whole*. Coupled with the photographs the data given under the categories of the taxonomic system tend to give a rather a comprehensive picture of the local influence zone.

Figure 7-33 is a modification of the taxonomic system of Figure 7-32. This may be used as a structure for developing further studies. Also it may facilitate the selection of priorities for detailed studies.

7.2.3 *Critical Issues*

While a classification system such as described in Figures 7-32 and 7-33 provides an organizational scheme for the study. It does not *discriminate* important from less important areas of interest. Without such a means of discrimination, or some guidelines on scoping the study to something tractable within time and budget constraints, the study could be interminable. Also, without this, the key issues may be overwhelmed by the shear volume of data which could be generated.

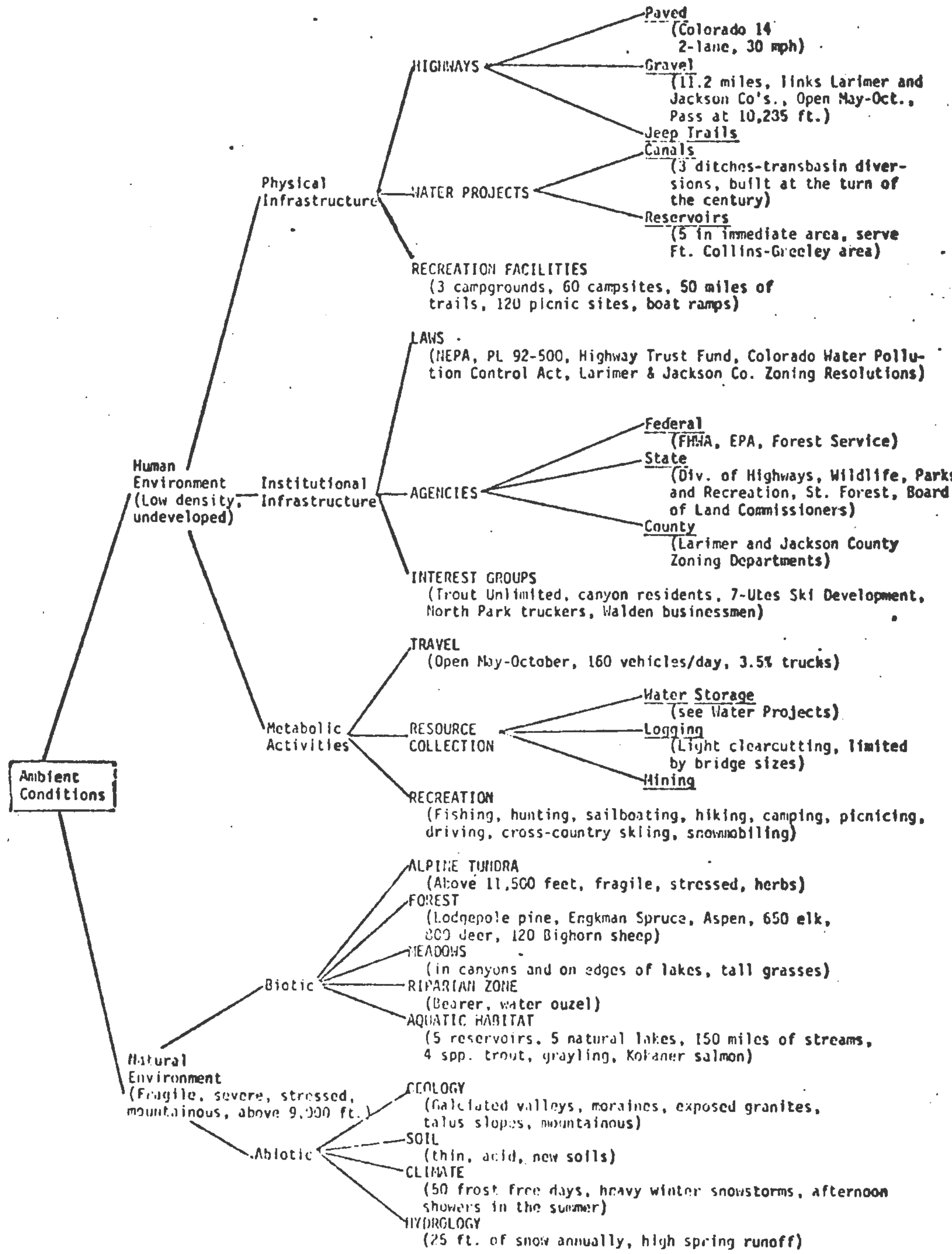

Figure 7-32 Taxonomy of Subsystems and System Components for Colorado Highway 14 Cameron Pass Improvement Local Influence Zone

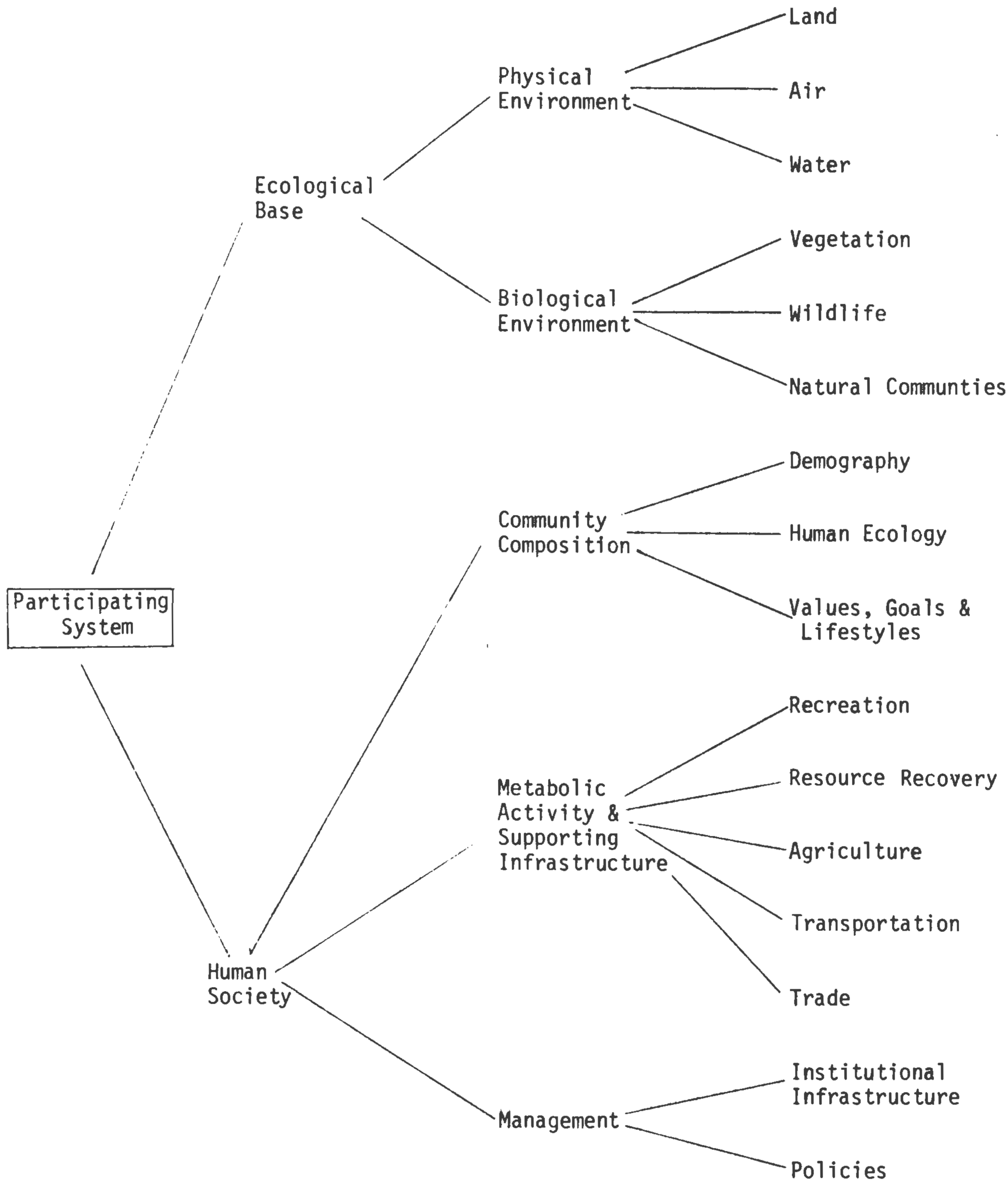

Figure 7-33 Simplified Taxonomic System of Classification of Environmental Subsystems and Components

To focus on the most relevant concerns and issues of a study requires considerable judgement - coupled with some scheme.

To facilitate the focusing on the most relevant concerns and critical issues the following questions may be useful:

1) Why is the assessment being done and how will it be used?
2) What topics are most important to examine and what are not? and,
3) What critical questions must be answered?

The preliminary answering of these questions starts the analysis off and sets it in the right direction.

The task of this section is to focus this assessment effort onto the critical issues and to formulate specific questions that should be addressed. The method used will be to systematically work down from the general to the specific, from the broad goals of the study to precise questions needing answering. At the same time tentative answers will be given to these questions. These initial estimates are actually a set of *hypotheses*. True to the fundamentals of the scientific method, these hypotheses will be investigated (tested) in the latter parts of the study. They also provide a reasonable beginning point and thereby establish a base upon which further study will build. As experience is gained and judgement develops these preliminary answers will evolve toward the final conclusions of the assessment.

At the most general level, the task of this assessment is to forecast the probable future effects of changing Colorado State Highway 14 into a year-round, cross-mountain highway. Special emphasis will be directed towards describing the long range, induced consequences of this highway project. There is much uncertainty associated with the future so that instead we can only strive to describe the range of possible future states and to differentiate between those that will be influenced, preordained, or even foreclosed by improving Highway 14.

The ultimate purpose of this assessment though, and of technology assessment in general, is to facilitate decision making. It does so by displaying the consequences of decisions, in other words, the future states that will be created. This shows not only what futures are possible but also what decisions are crucial to their attainment. Now decision-makers can consider which of these possible futures are most desirable and they then can make the appropriate decisions that will steer toward these preferable states. Although the study may reveal some unanticipated consequences it largely will document and display much that was expected from the beginning. But now at least decisions can be made with more confidence since they will have been based upon systematic study rather than intuition alone.

Now that the broad goals of the analysis have been set it is necessary to break these down into more specific objectives. This can be accomplished by considering the *process* by which impacts and consequences occur. Figure 7-34 displays one possible model relating how a project can produce long-range impacts and consequences.

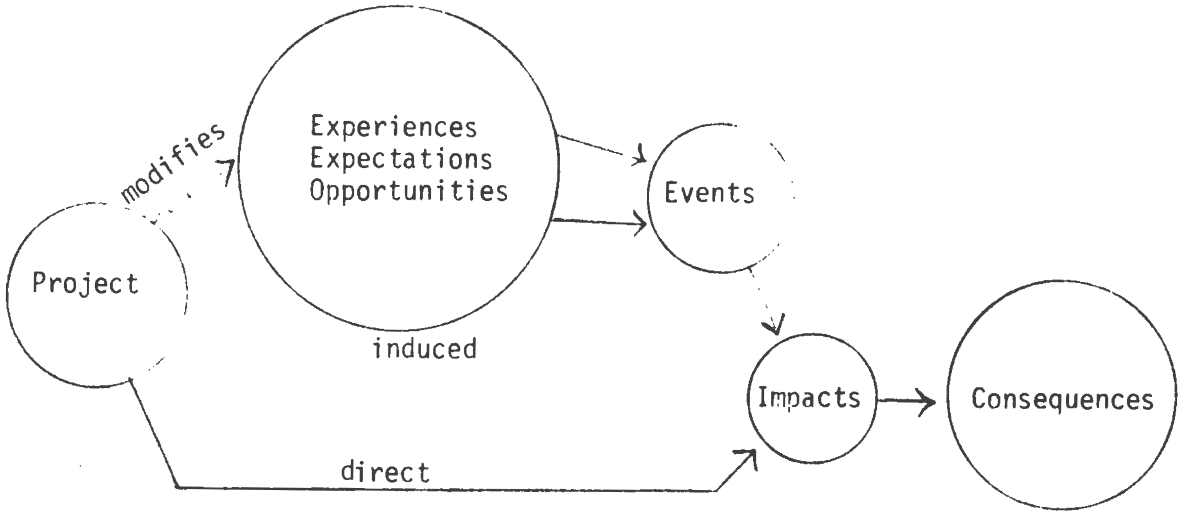

Figure 7-34 The Process Through Which Impacts and Consequences Occur

All projects produce direct impacts. These types of impacts have been examined in conventional environmental impact analyses. But also a project can *induce* impacts. By modifying experiences, expectations and opportunities the project stimulates the occurrence of certain events. These events then in turn have their own impacts which can be considered induced, secondary effects of the original project. All these induced impacts, when combined with the direct effects of the project, act cumulatively to produce consequences.

Based upon the model displayed in Figure 7-34 several basic questions arise:

1) How does the project modify *experiences, expectations,* and *opportunities*, i.e., how does the project interface with the surrounding system?
2) What *events* may possibly occur and what factors would condition their occurrence?
3) What will be the *immediate impacts* of these events?
4) What will be the *aggregative consequences* of these impacts?

In order to start the analysis off, and to allow for a progression toward a more specific level of problem definition, it is necessary to make some speculations for the answers to the basic questions just listed. Table 7-10 pertains specifically to the Cameron Pass project and lists preliminary estimates of the critical events, impacts, and consequences that may occur. This list represents an initial conception of the problem and could be formulated from newspaper articles, letters to the editor, public meetings, preliminary interviews, and professional judgement. One task of this assessment is to systematically probe this list, carefully exploring each entry, thereby refining it until it represents the best judgement of what will actually occur.

Table 7-10 Preliminary Listing of Critical Events, Impacts, and Consequences Produced by the Cameron Pass Project

Critical Events →	Critical Impacts →	Critical Consequences
- Cameron Pass highway improvement	- Aesthetic change to a wide, straight, highly visible, higher speed highway	- Change in the character of the road and the type of driving experience
- Ski development	- Elimination of present dust nuisance in traveling over the summit	- Disruption of local, social, economic, and ecological equilibria
- Second home development	- Crowding, more traffic	- Change in character of the area
- Increased recreational activity	- Aesthetic insults	- Change in aesthetic enjoyment of the area
- Trucking	- Noise, pollution	- Change in experience of the area and of life
- Logging	- Loss of wildlands	- Loss of tranquil outdoor opportunities
- Expansion of the road	- Commercialization	- Greater economic development of Poudre Canyon and North Park business
- Tourism	- Loss of community	- Pressure to upgrade Colorado 14 at other places
- Mining	- Change in employment	
	- Influx of outsiders	
	- Change in land values	

In order to assess whether the potential future events listed in the first column of Table 7-10 are likely to come about it is necessary to ask: what factors would condition the occurrence of these events? This is a complex question and to answer it several more specific questions must be posed.

1) What is the *current level* of activity?
2) What have been the past *trends* and history of this event?
3) What is the *ultimate level* of activity (carrying capacity)?
4) What is the *desired level* of activity?
5) What are the *limiting factors* that are acting now and what limiting factors will control in the future?

Table 7-11 suggests possible limiting factors for the future events postulated previously. The analysis should investigate this list and find which are most likely to be the actual limiting factors in the future. Is access to the area the only constraint preventing the occurrence of any of the potential events? If so then the highway improvement will trigger those events. These events in turn may stimulate other events. The limiting factor approach will provide the basis for the analysis.

The last step in the problem definition stage involves aggregating the critical events, impacts and consequences in Table 7-10 to form a set of *critical issues*. Each critical issue is really like a mini-scenario in that it synthesizes several factors into a short story that relates a possible progression of events. Since these formulated critical issues are only hypotheses it is necessary to test them by posing critical questions. Table 7-12 lists the critical issues and questions for the Cameron Pass project. They provide specific guidance in both choosing the *areas* of detailed study and what details should be generated within that area.

Tables 7-11 and 7-12 provide some guidance in discriminating areas which warrant further study and on the amount of information which ought to be generated within each area. These individual studies then can provide the basis for projection of secondary impacts based upon factual data. This demonstration study selects two of these areas, logging and recreation, for more detailed study.

7.2.4 *State Descriptions of Subsystems*

From the list of subsystem areas which ought to be studied, as defined in Figure 7-33 generally and with more sensitivity in Table 7-11, two, logging and recreation, are picked as examples for more detained study. The logging subsystem was picked because it is a possible commercial activity which seemingly has the potential for considerable expansion. Recreation, on the other hand, is so widespread and important it was felt to warrant further study.

Both of the studies were developed in order to provide a selected base of factual data and a descriptive understanding about the respective subsystems. From this data base and understanding provided further analyses where applicable can be made concerning secondary impacts. But just as important, more informed *judgements* about secondary impacts can be made.

Table 7-11 Possible Limiting Factors for Potential Future Events

Event-Activity	Speculated Limiting Factor
Logging	Amount of Timber Access Market for wood Ability of Forest Service to supervise harvesting
Ski development	Snowfall Access Market Financial Backing Approval of the Board of Land Commissioners and Jackson County
Recreation	Developed sites Access Recreation Demand
Trucking	Curves Bridge ratings Tunnel clearance Travel time Markets
Second Home Development	Zoning Access Permits Demand Investors Environmental Constraints
Further Highway Improvement	Funding Public Approval Environmental Constraints Demand
Tourism	Lodging Access Demand Recreational Opportunities

Table 7-12 Critical Issues and Appropriate Critical Questions for the Cameron Pass Project

Critical Issues (hypotheses)	Critical Questions (test questions for hypotheses)
New road may stimulate logging. Would lead to strengthing of bridges, increased traffic, and scarring of landscape.	What is the potential for logging in the area (# of trees, type of wood, market)? How much logging is going on now and where? What is the rating of the bridges (in relation to weight of log trucks)? What is limiting factor on logging?
Recreational use of the area will increase leading to construction of second homes, crowding, and change in character of region.	What recreation goes on now in the area and where? What is the carrying capacity of the region? What is the outlook for the future?
Area may change at too fast a rate to control leading to poor decision making. This in turn will cause commercialization, environmental degradation, and change in character of the area	What is the decision making structure in the area? What is its capacity? How fast is the area now changing? How fast will it change? What is the present land-use policy? What are the prospects for the future?
Loss of valuable wild lands due to development of the area	What wild lands exist in the area and what is their condition? Is this area unique?
Composition of communities in Poudre Canyon and North Park will change drastically leading to loss of community spirit & other manifestations of social disequilibrium.	What is the composition and spirit of these communities now. What possible forces might change the area and how? What are the goals and values of these communities?
Ski development will be built attracting more people - particularly during the winter. Will stimulate even further development leading to loss of wilderness	What do we know about the ski development location, size, type, origin of visitors, type of facilities, strength of market? What factors have prevented development to date?
Road may become a truck route across the mountains. Would lead to congestion, noise & air pollution	What is present amount of trucking across the pass? What are the advantages & disadvantages of using this route?
High quality of new section would act as a precedent for upgrading of other stretches of Highway 14 disrupting another set of environments	What is present condition of the other parts of the road? What physical limitations are there for improving the road? What procedures must be followed to fund further construction?

It should be noted that the individual subsystem studies are not comprehensive or exhaustive. This would defeat the purpose of their use. They are intended to provide the reader with an adequate basis for analysis and judgement related to the effect of the proposed change on that particular subsystem. This also highlights one of the essential concerns in the detailed subsystem studies: it is also necessary to provide an indoctrination of the reader into an area with which he may not be familiar. Thus to provide a factual data base for the subsystem, a general understanding of the subsystem, and an indoctrination on how to understand the subsystem, are all objectives in the subsystem studies.

LOGGING

Much of the land surrounding the Cameron Pass project is forested and consequently there is a long history of logging in the area. In fact it was the search for railraod ties in the 1870's that brought the first road up into this part of the Rocky Mountains. Timber harvesting still continues today and it is the purpose of this section to describe that activity. First the current state of the *timber resource* will be described; the types, quantity, location, condition of trees in the area. Next the *harvest activity* will be discussed. This includes the level of activity, the harvesting techniques, and the markets for the timber. Finally, after summarizing the present situation, the prospects for the future of the logging industry in the area will be considered.

Essentially all of the marketable timber in the area is located within the boundaries of National and State Forests. Therefore, data compiled for these public forests will adequately describe the timber resource and harvest activity in the area. In the following paragraphs logging will be discussed for the Colorado State Forest and Roosevelt National Forest. Their borders are shown in the section on boundaries. Although parts of Routt National Forest are located adjacent to the project, this forest will be discussed only briefly since boundaries are mostly in another region.

Finally, a mild warning. The logging industry, like any well developed activity, has developed its own jargon that can create confusion in the general reader. In general these terms have been avoided in the following discussion but when they must be used definitions are provided.

The timber resource - The Colorado State Forest and Roosevelt National Forest have a combined area of 947,300 acres, of which just over 90 percent is forested. The remaining 10 percent is either above timberline, covered by water, or supports an activity that precludes its use as forest land. Not all of the forested land can be considered available though for timber utilization. Some lands are not suitable for logging because of their extremely low productivity. Also some portions of the productive forest have been deferred or reserved for uses other than logging. As a result, while over 90 percent of the State Forest and Roosevelt National Forest is covered with trees, only 66.8 percent can be considered to be commercial forest[a/]. Table 7-13 displays the preceding information in more detail.

Table 7-13 Area of Types of Land in Roosevelt National Forest and the Colorado State Forest. Units are Acres

	Roosevelt[1/] National Forest	Colorado[2/] State Forest	Total	Percent of Total
Nonforest Land	72,700	19,100	91,800	9.7%
Forest Land	803,400	52,100	855,500	90.3%
Commercial Forest	585,200	47,900	633,100	66.8%
Noncommercial Forest	218,200	4,200	222,400	23.5%
Total	876,100	71,200	947,300	100.0%

[1/] Forest Service documents

[2/] Colorado State Forest Resource Management Plan, 1970

There are four basic types of forests in the area. At the lower elevations (6,000 ft - 9,000 ft) are the Ponderosa-Douglas Fir Forests which provide the largest trees in the area. Around 8,000 ft Aspen groves begin to appear. Commonly associated with aspen trees are the Lodgepole Pine Forests. The Spruce-Fir Forests are the highest forests and reach up to timberline above 11,000 feet. A point to be made here is that timber size, economic value, and harvest methods vary between forest types. Therefore, it is important to know what types of trees grow in the area.

Since essentially all of the Colorado State Forest lies above 8,500 ft only Aspen, Lodgepole pine, and Spruce-fir forests grow within its boundaries. Figure 7-35 displays the distribution of timber types on the State Forest. The location of these forest types is mapped in Figure 7-36. Notice that large tracts of forest land lie adjacent to Highway 14, particularly to the north.

An early estimate of timber volumes in the State Forest is shown in Table 7-14. This table hints at a major problem with the timber resource in the State Forest: the trees in the forest are all very small and can

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[a/] Commercial Forest - Forest land which is producing or capable of producing crops of industrial wood and has not been reserved or deferred. This includes areas capable of producing in excess of 20 cubic feet per acre of annual growth.

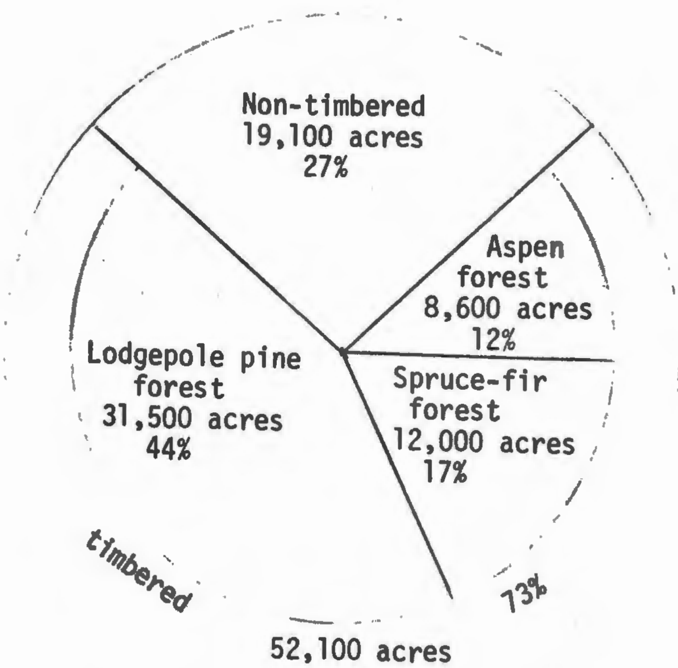

Figure 7-35 Distribution of Forest Types in the Colorado State Forest.
Ref: Colorado State Forest Resource Management Plan, 1970

Table 7-14 Estimated Timber Volumes for the Colorado State Forest, 1966.
(Table 10 in Colorado State Forest Management Plan, 1970)

Species	Size Class*	Acres	Bd. Ft.	Volume Cu. Ft.	Cords
Lodgepole pine	Sawtimber	3,200	44,717,000	15,834,000	
	Poletimber	26,700	43,058,000	60,824,000	712,500
Spruce-fir	Sawtimber	3,200	117,923,000	32,040,000	
	Poletimber	7,300	10,124,000	8,443,000	126,550
Aspen	Poletimber	7,500	13,666,000	17,173,000	214,660

*Sawtimber is material larger than 10.9" diameter at 4.5 feet above ground level.
Poletimber is material from 5" to 10.9" diameter at 4.5 feet above ground level.

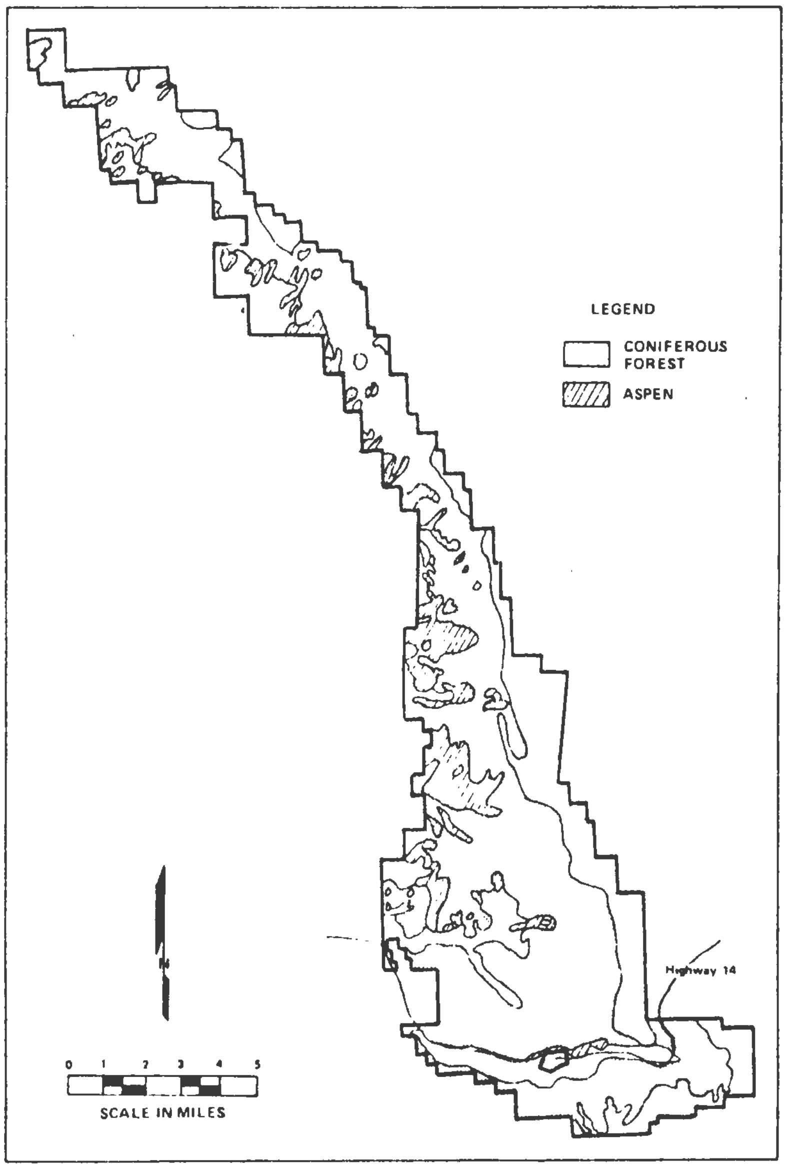

Figure 7-36 Forest Types in the Colorado State Forest (Figure 8 in <u>Colorado State Forest Resource Management Plan</u>, 1970)

only be used as poletimber[a]. Approximately 100 years ago a major fire swept across the land that now comprises the State Forest. Therefore all the trees in the forest are younger than this. But more serious yet, the new stands came in too dense to maintain good health and vigor. This crowding has stagnated growth resulting in a forest with thin, stunted trees.

Roosevelt National Forest contains all four types of forests since its lands range in elevation from 6,000 feet to almost 13,000 feet. The trees in the National Forest are in better condition than those in the State Forest so that there is a much higher proportion of large trees (sawtimber). Figure 7-37 compares the poletimber and sawtimber acreages for the State and National Forest.

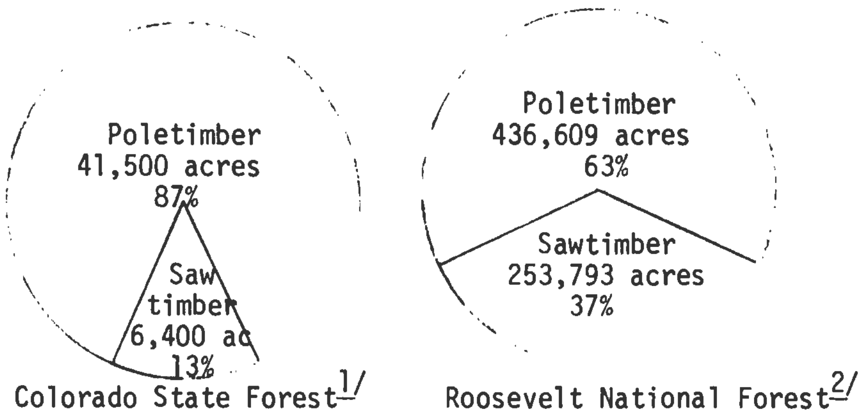

Figure 7-37 A Comparison of the Distribution of Timber Size Between the Colorado State Forest and Roosevelt National Forest

[1] Colorado State Forest Resource Management Plan, 1970

[2] Roosevelt National Forest Timber Management Plan, 1961

Not all of the land within the boundaries of the National Forest is under Forest Service control. In fact, Table 7-15 shows that 26 percent of this land is privately owned. Nonetheless this private land has a much smaller proportion of the marketable timber in the forest. As shown in Table 7-16 only 10 percent of the sawtimber and 16 percent of the poletimber lie on private lands within the forest. Therefore, it can be concluded that logging in the area is largely under the control of the Forest Service.

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[a] Timber is customarily classified according to size. Small trees are termed poletimber and are usually used whole. Larger trees are termed sawtimber and can be milled.

Table 7-15 Land Ownership Within the Boundary of Roosevelt National Forest in 1961. (Data taken from the Timber Management Plan for the Forest)

Owner	Commercial Forest Land: Thousand Acres	Commercial Forest Land: % Total	Other[a/] Land: Thousand Acres	Other[a/] Land: % Total	TOTAL: Thousand Acres	TOTAL: % Total
National Forest	536	76	250	67	786	73
State & County	8	1	11	3	19	2
Private	165[b/]	23	111	30	276	26
Total	709 (66%)	100	372 (34%)	100	1081 (100%)	100

[a/]Reserved, Non-commercial, and Non-forested

[b/]50% Ponderosa Pine, 38% Lodgepole Pine, 12% other species

Table 7-16 Total Volume of Softwood Trees on Commercial Forest Land Within the Boundary of Roosevelt National Forest in 1961. (Data taken from the Timber Management Plan for the Forest)

	Sawtimber[a/] 9.0" diameter or larger: Million Board-feet	Sawtimber[a/] 9.0" diameter or larger: % Total	Poletimber[b/] 5.0" - 9" diameter: Million Cubic-feet	Poletimber[b/] 5.0" - 9" diameter: % Total
National Forest	1610	89	799	83
State	32	2	12	1
Private	174	10	152	16
Total	1,816	100	963	100

[a/]Traditionally larger trees, termed <u>sawtimber</u> are measured in board-feet (12" x 12" x 1") which only includes usable lumber after milling.

[b/]Smaller logs, termed <u>poletimber</u>, are measured in cubic feet which includes the entire volume of the trunk greater than 4" in diameter.

The Forest Service has classified all lands within the National Forest boundary according to their suitability for logging. A consistent system is used for all National Forests. Figure 7-38 graphically portrays the land classifications for the Roosevelt National Forest. Definitions of the terms are also provided. Notice that only 19 percent of the Forest is prime forest land (Standard component). The distribution of these types of land are mapped in Figure 7-39 for the section of Roosevelt National Forest adjacent to the Cameron Pass Project. This figure shows that almost all of the commercial forest lies below the project area. Much of the land surrounding the project is either reserved or deferred. What commercial forest there is in the area is largely in the special component meaning that it is not readily harvestable.

Timber harvest activity - There has been very little logging in the State Forest because of its poor timber quality. As shown in Figure 7-39 most of the available timber in the State Forest is poletimber, for which the market is very poor. Since the establishment of the State Forest in 1939 only 11,000 acres (21 percent of the commercial forest) has had any trees harvested[1/]. Total logging receipts for this period were about $800,000. Four percent of these logged areas were clear-cut, while the remainder was selectively cut. Since the establishment of the State Forest in 1939 logging has been confined primarily to the southern third of the Forest. Currently thinning operations are the only logging in the State Forest. The objective of this thinning is to improve the health of the forest, thereby stimulating the productivity and quality of the resource.

Timber harvests in Roosevelt National Forest vary from year to year according to changes in market demand, the cutting budget, and funding for harvest supervision. Figure 7-40 graphically displays the range in past timber harvests in the National Forest. The average annual harvest for the years of record between 1957 and 1975 was 9.5 million board feet. The cutting budget for the next four years is also included in the graph.

An interesting point arises when actual harvests are compared with the estimated sustainable yield for the Forest. Table 7-17 shows that in the past the actual harvest has been only 35 percent of the allowable cut and in the future the actual harvest is projected to be even lower to about 23 percent of the potential yield. These values are more meaningful when compared with figures for several other adjacent National Forests. In all cases a larger proportion of the sustainable yield is actually harvested. The significance of this comparison is that it indicates that the timber in the Roosevelt National Forest is generally of poorer quality than in adjacent forests. Due to a combination of moisture, soil, and other environmental conditions the trees in the National Forest are smaller and of poorer quality. Timber buyers would rather obtain their supply from other more healthy forests where the trees are larger and where a higher volume per acre can be harvested. Consequently demand for timber in Roosevelt National Forest is low, resulting in a below average harvest.

[1/] Colorado State Forest Resource Management Plan, 1970.

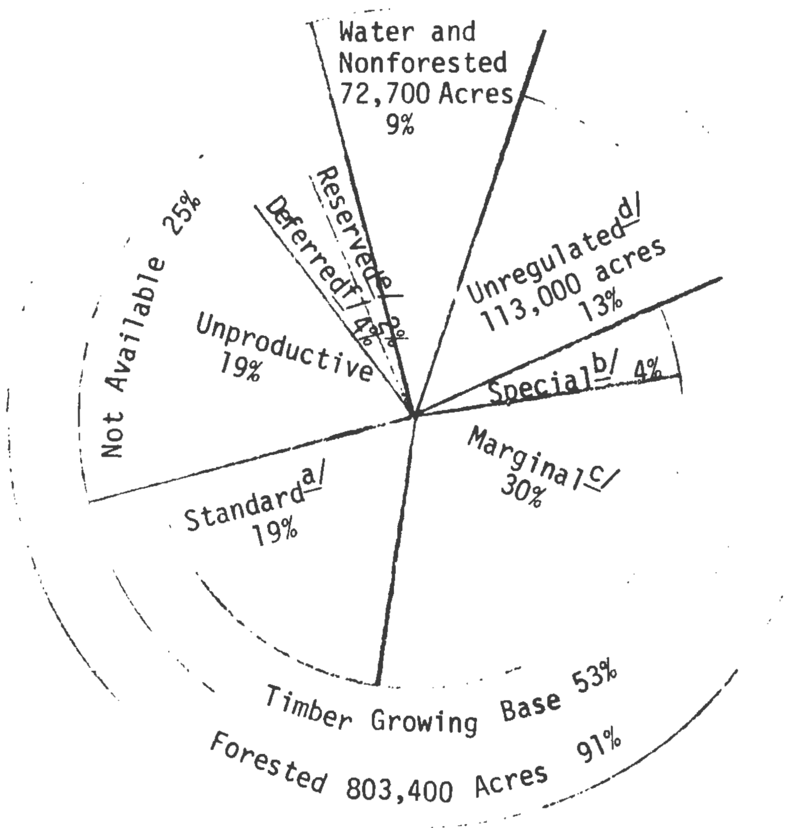


Figure 7-38 Land Classifications for Roosevelt National Forest in 1976. (Data Taken from Forest Service Files)

a/ Standard Component: The component of the regulated forest land suitable and available for timber production on which crops of usable wood can be grown and harvested with adequate protection of the forest resources under the usual provisions of the timber sale contract.

b/ Special Component: That part of the regulated forest land suitable and available for timber production which is recognized as needing specially designed silvicultural treatment of the timber resource to achieve landscape or other key resource objectives.

c/ Marginal Component: That part of the regulated forest land suitable for timber production which, to become available, requires investment above current levels for such items as planting, thinning, access development, or specialized woods or plant equipment.

d/ Unregulated: Forest land that is suitable and available but not organized for timber production under sustained yield principles; where timber harvests permissible but not a goal of management, such as Experimental Forests, Ranger Stations, and isolated tracks so completely remote from manufacturing centers that organizing periodic harvest is impractical.

e/ Productive Reserved: Forest lands withdrawn from timber utilization by statute, administrative regulation or by designation in land use plans approved by the Regional Forester. (Wilderness and Primitive areas).

f/ Productive Deferred: Forest land administratively identified for study as possible additions to the Wilderness System or other withdrawal from timber utilization. An environmental impact statement is required before these lands may be logged.

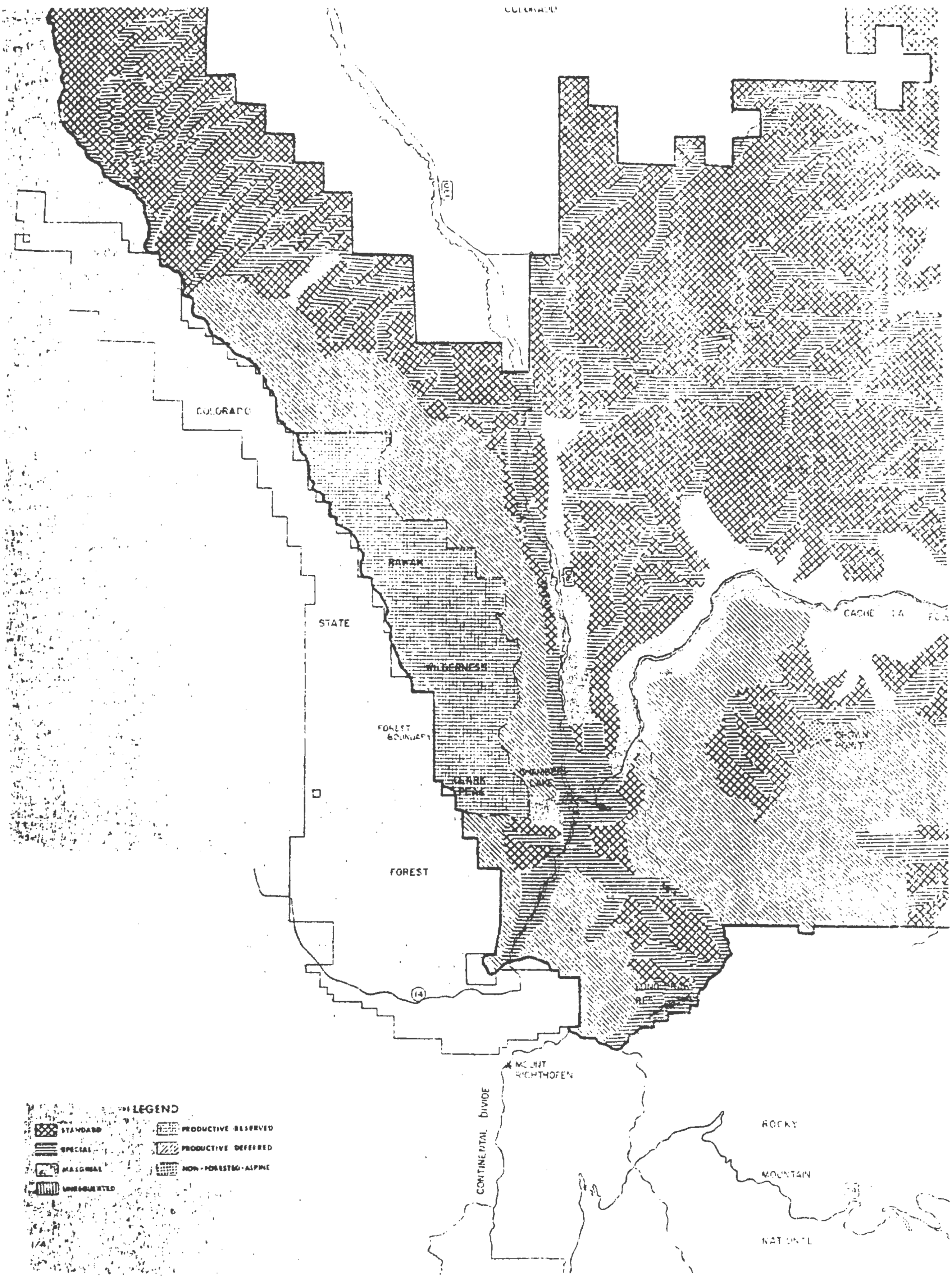


Figure 7-39 Roosevelt National Forest Standard Land/Use Classification for Timber Resource (unofficial)

Table 7-17 Sawtimber Production in Several National Forests in the Rocky Mountain Region - A Comparison Between Sustainable and Actual Yield

	PAST (1961-1970)				FUTURE (1976-1979)			
	Allowable Cut[a] (average per year)		Actual Cut (average per year)		Potential Yield[b] (average per year)		Cutting Budget (average per year)	
National Forest	million board feet	acres[c]	million board feet	acres[c]	million board feet	acres[c]	million board feet	acres[c]
Roosevelt[1]	28.3	3,350	9.5 (35% of allowable)		37.4	6,320	8.6 (23% of potential)	
Routt[2]	50.7	5,720	33.7 (66% of allowable)	3,050 (53% of allowable)	64.4	11,400	18.0[d] (28% of potential)	4,300[d] (38% of potential)
Medicine Bow[3]	59.1	14,000	28.3 (48% of allowable)	3,042 (22% of allowable)	92.0	16,760	36 (39% of potential)	6,600 (38% of potential)
Black Hills[4]	152	36,000	89 (59% of allowable)	25,000 (69% of allowable)	190	39,000		

1/Timber Management Plan - Roosevelt National Forest, 1962-1972, and other Forest Service documents
2/Timber Management Plan for the Routt National Forest, Final Environmental Statement, 1975 and other Forest Service Documents
3/Timber Management Plan for the Medicine Bow National Forest, 1975
4/Timber Management Plan, Black Hills, National Forest, 1975.

a/The acreage of forest land, suitable and available under specified management plans for sustained productions of timber products, that would be cut during a given period. Also can be expressed as the anticipated volume yield.
b/The maximum harvest needed to achieve the optimum sustained yield level under intensive forestry on regulated areas - considering the productivity of land, conventional logging technology, standard cultural treatments, and interrelationships with other resource uses and the environment.
c/Total acreage for both sawtimber and poletimber
d/Budgeted for fiscal year 1976

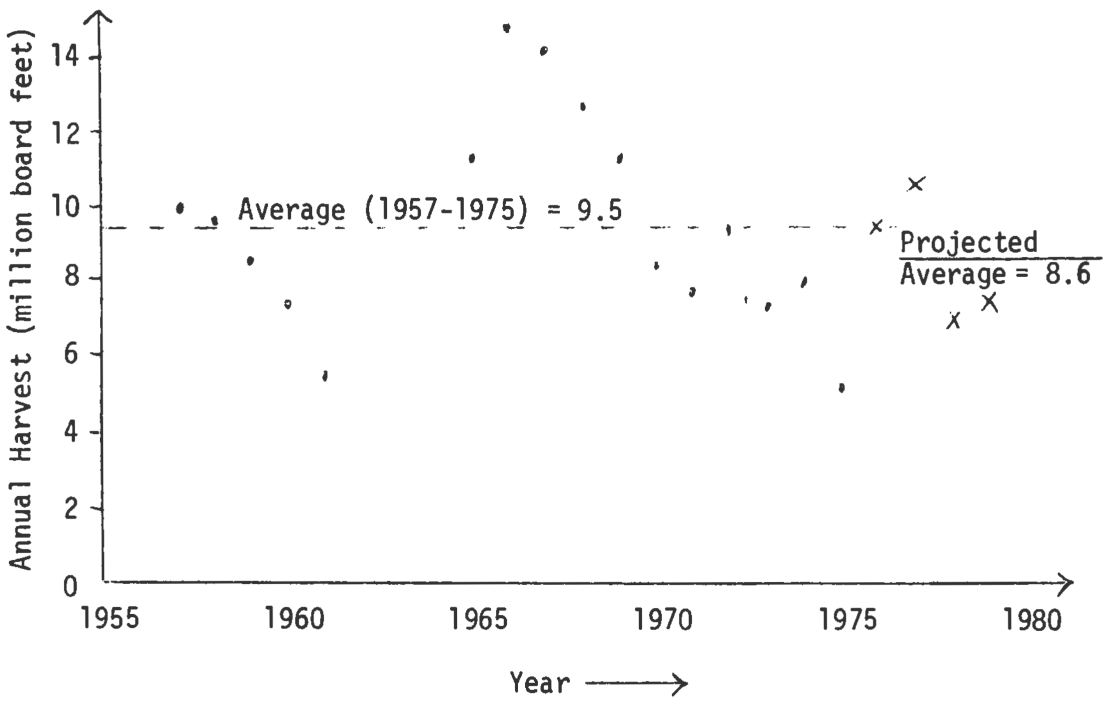


Figure 7-40 Timber Harvests in Roosevelt National Forest, Past and Projected. (Data taken from Forest Service files)

Currently all timber harvested in Roosevelt National Forest goes to small mills along the Front Range urban corridor. These mills only serve to satisfy the local demand for rough-cut lumber. Capacities of these mills are shown in Table 7-18. Although there is a mill in Walden it does not use timber from Roosevelt National Forest because the quality of timber is superior in Routt and Medicine Bow National Forests. For the same reason, the lumber mill in Laramie, Wyoming rarely utilizes timber from Roosevelt National Forest. Therefore, there is currently little movement of logs through the project area since there is adequate timber on the east slope to satisfy the small local demand while west slope mills secure their lumber from other, more productive forests.

Logging in the National Forest is supervised and managed by the Forest Service. This involves not only supervising the cutting, but also classifying of forest lands, planning of harvest locations and quantities, administering of bids, and constructing of access roads. The actual cutting and transporting of logs though is done by the actual purchaser of the timber. Most stands, except those of lodgepole pine, are selective cut while the latter are clear-cut in order to encourage regeneration.

Table 7-18 Mill Capacity in the Area Adjacent to Roosevelt National Forest and the Amount Supplied from the Forest

Year	Capacity	From Roosevelt N.F.
	(million board-feet per year)	
1961[1/]	16.0	5.6
1972[2/]	15.6[a/]	9.5

[1/] Roosevelt National Forest Timber Management Plan, 1961

[2/] Sonny Steiger, Timber and Fire Project Office, Roosevelt National Forest, personal communication, April 1976

[a/] Two mills in Fort Collins

Summary and prospects for the future - Logging activity is not at a high level in the area surrounding the Cameron Pass project. Timber harvest in the Colorado State Forest is currently restricted only to thinning operations. The trees here are thin and small and consequently have a poor market value. Dale Shaw, the State Forester, feels though that if thinning continues in twenty to thirty years many of the stands will reach the small sawlog size. Then it will be possible for logging activity to increase in the State Forest given proper market conditions.

The timber in Roosevelt National Forest is larger and healthier than that in the State Forest and accordingly harvesting is greater. Nevertheless, the quality and density of the stands are still lower than in adjacent national forests so that only a quarter to a third of the sustainable yield is being harvested. Thus, it appears that there is a large potential for increased logging.

On the other hand, though it is unlikely that much increase in harvesting will occur in the immediate area surrounding the Cameron Pass project. Much of this land is reserved or deferred, and little of the remaining land is easily harvestable. Therefore, an increase in logging in this part of the National Forest would only occur if the deferred lands were returned to the commercial forest and if the market for small logs would expand.

RECREATION

The magnificent mountains of Colorado form a vast playground, serving the needs not only of the state but of the entire nation. People flock to these natural surroundings to immerse themselves in a wide variety of pastimes. Some come to relax, refresh themselves, and escape from their daily pressures; while others travel into the mountains to challenge their bodies and sharpen their senses. But all can be satisfied for amongst the flowers, forest, streams, and peaks there is something for everyone.

Jackson and Larimer Counties are extremely well suited to offer recreational experiences. Highlights of the recreational resources of these two counties are listed in Table 7-19. Notice that over ninety percent of each county is open space. Water bodies, a focal point for many types of recreation, are plentiful and there are many developed sites for camping and picnicking. Of course, the figures shown in Table 7-19 are very general but they do highlight the tremendous potential for recreation in the area surrounding the Cameron Pass project.

Table 7-19 Key Recreational Resources in the Region Surrounding the Cameron Pass Project[1/]

	Larimer County	Jackson County
Total Population (1970)	89,900	1,811
Total Area (acres)	1,671,040	1,038,080
Open Space (acres)	1,580,035	956,885
Lakes & Reservoirs (acres)	8,695	2,901
Rivers and Streams (miles)	1,085	408
Fishing Streams (miles)	895	232
Swimming Streams (miles)	16	22
Trailer Camping Sites	4,901	81
Tent Camping Sites	540	6
Picnicking Sites	960	71

[1/] Colorado Division of Parks and Outdoor Recreation, Interim Comprehensive Outdoor Recreation Plan, 1974

It is the task of this section to describe in some detail the recreational activity in the impacted system and the infrastructure that has been built to support it. First the types of recreation and the level of activity will be described. Here spatial and temporal patterns in recreational use will be discussed. Next the infrastructure supporting recreation in the area will be described. This includes not only the physical facilities (e.g., campgrounds, picnic areas) but also the recreation management operating in the area and Colorado 14 and other county and Forest Service roads. Finally, a section will be included on past trends. Delineation of these trends can aid greatly overall understanding of the area which provides a better basis for forecasting future states.

The bulk of the data used in the following discussion was secured from internal files of the Roosevelt National Forest and, for the State Forest, the Colorado Division of Parks and Recreation. The U.S. Forest Service compiles and analyzes all of its information on recreational use in an extensive computer data bank, called the Recreation Information

Management (RIM). The earliest data stored in this system dates back to 1966. Recreational use information for the State Forest is far less developed. Monthly records of the intensity of recreation use, have been compiled by the Division of Parks and Outdoor Recreation since 1972. There is little concrete information upon which to base a description of recreation in North Park. Therefore, the discussion for this part of the impacted system must be more qualitative in character.

Recreational activity - The lands surrounding the Cameron Pass project offer a wide variety of recreational opportunities. Table 7-20 lists many of the recreational activities possible in the mountains of Colorado and displays the level of each activity in Roosevelt National Forest during 1975. Recreational use data is also included for the Red Feather and Poudre ranger districts which surround Colorado 14. The Cameron Pass project is located in the Red Feather District while the Cache La Poudre Canyon is in the Poudre district. A map, Figure 7-41 is included to show the exact boundaries.

In 1975 total recreational use in the Roosevelt National Forest was 2,120,400 visitor-days. Camping was by far the single most popular activity, accounting for almost a third of the total recreational use. Driving, either to reach a destination or simply for its own sake, was the next most popular pastime. As could be expected fishing, picnicking, and hiking were also popular in the forest.

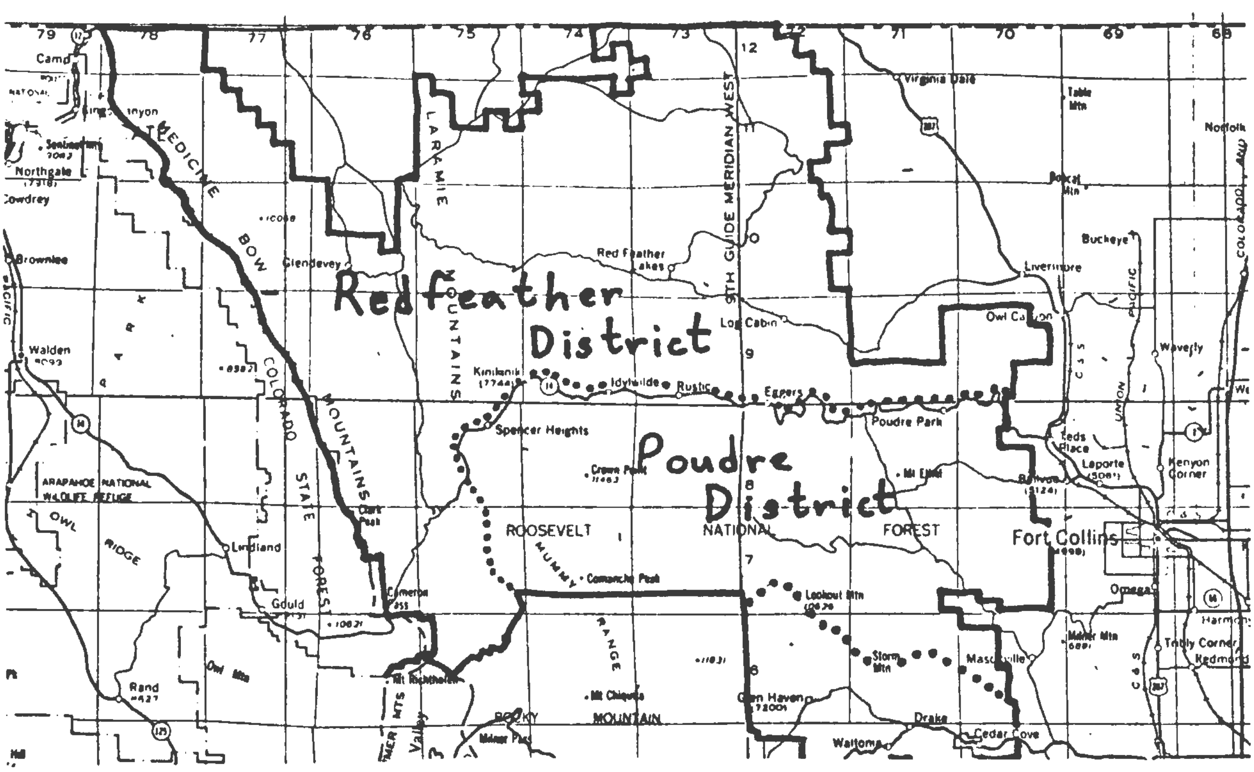


Figure 7-41 Boundaries of the Red Feather and Poudre Ranger Districts Within Roosevelt National Forest (from Forest Service files).

Table 7-20 Recreation Activity in Roosevelt National Forest, and in Two Ranger Districts Within the Forest, 1975[1/]

Activity	Roosevelt National Forest		Red Feather District		Poudre District	
	Visitor-Day Use[a/] (thousands)	Percent of total	Visitor-Day Use[a/] (thousands)	Percent of total	Visitor-Day Use[a/] (thousands)	Percent of total
Viewing Outstanding Scenery	22.5	1.1	1.2	0.3	0.4	0.1
Enjoy Unique/Unusual Environment	33.6	1.6	-	-	-	-
Auto Driving	454.5	21.4	46.3	11.8	44.4	11.7
Scooter-Motorcycle Driving	36.2	1.7	5.1	1.3	5.7	1.5
Ice-Snow Craft Driving	27.1	1.3	15.2	3.9	2.1	0.6
Power Boating	2.5	0.1	2.5	0.6	-	-
Hiking-Walking	164.7	7.8	20.1	5.1	17.4	4.6
Bicycling	1.8	0.1	-	-	0.6	0.2
Horseback Riding	46.5	2.2	3.0	0.8	3.1	0.8
Canoeing	2.7	0.1	2.2	0.6	0.7	0.2
Other Watercraft (Row, Drift, Raft)	2.4	0.1	0.5	0.1	0.1	0.0
Team Sports (Track-Field)	0.9	0.0	-	-	-	0.0
Games (Individual Competition)	0.4	0.0	-	-	-	-
Spectator (Sports-Activities)	2.0	0.1	-	-	-	-
Swimming - Bathing	4.0	0.2	2.1	0.5	0.8	0.2
Water-Skiing--Other Water Sports	0.3	0.0	0.3	0.1	-	-
Fishing, Cold Water	180.6	8.5	79.9	20.3	38.7	10.2
Fishing, Warm Water	0.3	0.0	-	-	-	-
Camping, General	268.4	12.7	75.0	19.1	42.8	11.2
Camping, Auto	109.3	5.2	50.3	12.8	19.6	5.1
Camping, Trailer	101.1	4.8	17.0	4.3	50.0	13.1
Camping, Tent	173.6	8.2	20.9	5.3	24.9	6.5
Organization Camping, General	10.8	0.5	-	-	-	-
Organization Camp, Lodging	5.1	0.2	-	-	-	-
Total Camping		31.6		41.5		35.9
Picnicking	169.8	8.0	17.4	4.4	63.2	16.6
Resort-Comm. Pub. Service, Gen.	3.2	0.2	-	-	-	-
Recreation Residence (Summer Homes)	42.1	2.0	1.8	0.5	17.0	4.5
Ice Skating	0.9	0.0	0.5	0.1	-	-
Skiing	86.2	4.1	4.2	1.1	7.8	2.0
Snow Play	24.8	1.2	2.5	0.6	13.5	3.5
Hunting, Big Game	43.8	2.1	11.3	2.9	15.9	4.2
Hunting, Small Game	18.0	0.8	2.6	0.7	3.5	0.9
Hunting, Upland Birds	2.4	0.1	0.5	0.1	0.4	0.1
Hunting, Waterfowl	0.6	0.0	-	-	0.3	0.1
Total Hunting		3.0		3.7		5.3
Nature Study	21.9	1.0	7.4	1.9	4.0	1.0
Gathering Forest Products	35.5	1.7	1.5	0.4	1.6	0.4
Acquire Gen. Knowledge-Understanding	1.8	0.1	1.8	0.5	-	-
Viewing Interpretive Exhibits	14.2	0.7	-	-	1.1	0.3
Attending Talks and Programs	1.7	0.1	-	-	-	-
Touring, Guided	0.2	0.0	-	-	0.1	0.0
Touring, Unguided	0.1	0.1	-	-	-	-
Walking, Unguided	0.5	0.0	-	-	0.3	0.1
Viewing Interpretive Signs	1.4	0.1	-	-	1.1	0.3
Total	2,120.4	100.0	393.1	100.0	381.1	100.0

[1/] Recreation Information Management (RIM) System, U.S. Forest Service

[a/] A visitor-day represents twelve hours of activity

A focus on the recreation activity in the Red Feather and Poudre ranger districts provides more specific information on the unique blend of recreation in the region surrounding the Cameron Pass project. Here again camping was the most popular activity, and even more so than in the other parts of the National Forest. Fishing was particularly important in the Red Feather district with its numerous high mountain lakes. In the Poudre district picnicking was very popular since the district encompasses the Poudre Canyon and other day-use areas close to the urban centers along the eastern edge of the mountains. Again, simply driving was a major activity in these districts although less than in other parts of the forest. Forty percent of all the summer home use in the entire National Forest was in the Poudre district, largely in the small retreats that line the Cache La Poudre river. The Poudre district was also more popular for hunting, particularly big game hunting, than other parts of the Forest.

Recreation activity in the Colorado State Forest is described in Table 7-21. In 1975 about 83,000 visitors came to enjoy the State Forest. Fishing was the most popular activity but camping and hunting also attracted many visitors. It is interesting to note that very little picnicking occurred in the State Forest. This shows that these parts of the mountains are now generally beyond the range of most day-users.

Table 7-21 Recreational Use in the Colorado State Forest During 1975[1/]

Type of User	Number in 1975
Total Visitors	82,879
Fishermen	21,625
Campers	14,291
Hunters	11,375
Rec. Vehicle Users	7,135
Sightseers	1,744
Boaters	1,730
Hikers	1,515
Picnickers	1,455
Snowmobiles	975
Horsebackers	290

[1/] Taken from records of the Colorado Division of Parks and Outdoor Recreation

Spatial aspects of recreation - regional heterogeneity - While Tables 7-20 and 7-21 highlight the general pattern of recreational activity in the Roosevelt National Forest and the State Forest there is value in focusing down to a finer scale. In Table 7-22 recreational use is broken down for five regions within the Red Feather ranger district in the National Forest. A major point arises out of a study of this table: each small region in the area has its own unique character and mixture of activities. This diversity in types of areas allow for a variety of recreational experiences. No one area can satisfy all types of recreational demands put upon the Forest. Many activities may be mutually exclusive, for example power boating and a wilderness experience. Therefore it is good policy to maintain heterogeneity of the area in order to allow for many types of recreational experiences.

Table 7-22 illustrates this idea of heterogeneity specifically for the Red Feather ranger district. The Red Feather Lakes region support the highest level of recreation. Road access, proximity to urban areas, large water areas, and developed campgrounds combine to produce an area with intense recreational activity centered around developed recreation site. A more moderate level of recreation occurs in the area immediately surrounding the project, the Chamber Lake-Long Draw and the Laramie River Valley regions. Here camping, driving, and winter sports are important. Finally there are those regions without direct road access, the Big South Poudre region and the Rawah Wilderness. These areas experience a much lower density of recreation. Here tent camping, fishing, hiking and other dispersed types of recreation are the main activities. While the Poudre Canyon area is not included in Table 7-22 it is important to mention here the mix of recreation it supports. The access provided by Highway 14 as it travels through the canyon, coupled with the scenery, the river, and many developed recreation sites, produces an area of intensive recreation activity. In addition to the driving, camping, and fishing the canyon is unique in providing for much day-use. The canyon is the gateway to the rest of the forest and many people find it unnecessary to travel any further.

Table 7-22 Recreation Activity Within Five Regions in the Red Feather District, Roosevelt National Forest, 1973[1/]

Region / Type of Activity	Chambers Lake-Long Draw		Red Feather Lakes		Laramie River Valley		Big South Poudre		Rawah Wilderness	
	Visitor-Day Use[a/] (thousands)	Percent of Total	Visitor-Day Use[a/] (thousands)	Percent of Total	Visitor-Day Use[a/] (thousands)	Percent of Total	Visitor-Day Use[a/] (thousands)	Percent of Total	Visitor-Day Use[a/] (thousands)	Percent of Total
Driving	16.0	24.1	13.7	11.0	15.1	34.4	0	0	0	0
Camping	26.8	40.4	53.7	43.1	17.5	39.9	2.7	36.9	8.3	36.8
Picnicking	3.1	4.7	2.6	2.1	1.6	3.6	2.6	35.6	0	0
Hiking & Horseback	3.8	5.7	1.3	1.0	2.4	5.5	.3	4.1	4.4	19.5
Water Related Activities	7.0	10.5	43.6	35.0	.5	1.1	.9	12.3	5.9	26.2
Hunting	1.4	2.1	2.0	1.6	1.0	2.3	.5	6.8	.1	.4
Winter Sports	6.6	9.9	6.0	4.8	3.6	8.2	.3	4.1	0	0
Other	1.7	2.6	1.6	1.3	2.2	5.0	0	0	3.8	16.9
Total	66.4	100	124.5	100	43.9	100	7.3	100	22.5	100

1/ Data from Recreation Information Management (RIM) Systems, U.S. Forest Service

a/ A visitor-day represents twelve hours at activity

Fishing-a case in point - A closer look at fishing in the area reveals that there is even regional variation in a single type of activity. Not all fishermen seek the same type of experience. Many may simply wish to catch a fish, even if it was raised in a hatchery and later planted into the water body. Yet other fishermen may only find satisfaction in catching a wild trout. In order to satisfy this range in demand, the fishery resource is managed by the Colorado Division of Wildlife to maintain a variety of types of fishing areas.

First there are the areas that experience very high fishing pressure. Examples would be the Red Feather Lakes area, stretches of the Cache La Poudre river adjacent to campgrounds and picnic areas, Chambers Lake, and the Ranger Lakes in the State Forest. These water bodies are maintained as "put and take" fisheries. Here catachable size trout are directly planted and little growth occurs afterwards. Fishing pressure in these areas is very high. For example during the 1972-73 season over twenty thousand fishermen came to 115 acre Dowdy Lake in the Red Feather Lakes area. To maintain the fishery in the lake it must be annually stocked with approximately 20,000 catchable size trout and 35,000 two inch fingerlings (W. D. Klein, Researcher, Colorado Division of Wildlife, personal communication).

On the other end of the spectrum are the "Quality" fishing areas. They are characterized by the absence of adjacent campgrounds, absence of stocking of catchable size trout, and fishing only with flies and lures. There are two stretches of "Quality" fishing water on the Cache La Poudre river with a combined length of 5.7 miles, roughly 10 percent of the length of the river between Chambers Lake and the mouth of the canyon. Several miles of the North Platte river in North Park was recently restricted to lure and fly fishing. Zimmerman Lake in the National Forest, and Lake Agnes, North Michigan Reservoir, Kelly Lake, and Ruby Jewel Lake in the State Forest are similarly classified. Fishermen on these waters are more interested in how they catch their fish than whether they catch a fish at all. In fact sometimes legal size trout are thrown back because the pleasure sought is only to catch the fish.

Of course most of the area's waters are somewhere between a put and take fishery and a wild fishing area. In these intermediate areas there is little or no stocking but bait can be used. Several sections of the Cache La Poudre fall in this class, along with most small mountain streams. There is essentially no stocking of the streams in North Park either. An increasingly popular approach is the put and grow fishery. Here fingerlings are stocked which grow utilizing the natural productivity of the stream.

Table 7-23 is included to reinforce the idea that there are distinct types of fishing areas in the region surrounding the project. Notice how the angling pressure varies between different type areas on the same river. While angling pressure is lowest on the quality fishing area it does not necessarily follow that proportionally less fishes are caught. In a study done by Klein (1974) 25 percent less fishermen were counted on a quality fishing stretch than on an intermediate stretch, yet the catch-per-man-hour was 44 percent greater in the quality stretch.

Table 7-23 Estimates of Total Annual Angling Pressure for Three Types of Fishing Areas on the Cache La Poudre River, 1972. (Data from Marshall, 1973)

Type of Fishing Area	Angling Pressure $\left(\frac{\text{Hours of fishing}}{\text{Kilometer}}\right)$	Angling Pressure $\left(\frac{\text{Anglers}}{\text{Kilometer}}\right)$
Heavy-Use (Near Campgrounds)	3,263	1,623
Intermediate (No restrictions no campgrounds)	2,113	1,221
Quality fishing (Flies & lures only)	1,357	714

In conclusion the significance of this heterogeneity of recreation sites is that one must be aware that the disruption of one small area may be the loss of a unique type of area that has fulfilled one segment of the recreation demand. Each section of the forest has its own special character which is balanced by other sections. The disturbance of one type of area can alter this equilibrium resulting in a wave of changes through the other interbalanced types of areas.

Temporal aspects of recreation - There are large weekely and seasonal fluctuations in recreation activity. An analysis of the patterns of occupancy in six campgrounds in the Red Feather district revealed that the ratio of weekend to weekday occupancy averaged 1.7 to 1 (RIM System, U.S. Forest Service). The same ratio for fishing on the Cache La Poudre, averaged 1.4 to 1 (Marshall, 1973). These weekly surges are very large when one realizes that there are only two days in a weekend compared to five in the week.

Figure 7-42 traces the seasonal changes in recreational use in the State Forest during 1975. Notice that 93 percent of all visitors use the the area during the five months the pass is open, June to October. Without road access there is very little winter use of the area.

The recreation infrastructure - Recreation is a major activity in the region surrounding the Cameron Pass porject and accordingly a large infrastructure has been built to facilitate this use. This infrastructure includes more than campground, picnic sites, and boat ramps. Also necessary is a management system for operating and maintaining these facilities and for planning new ones.

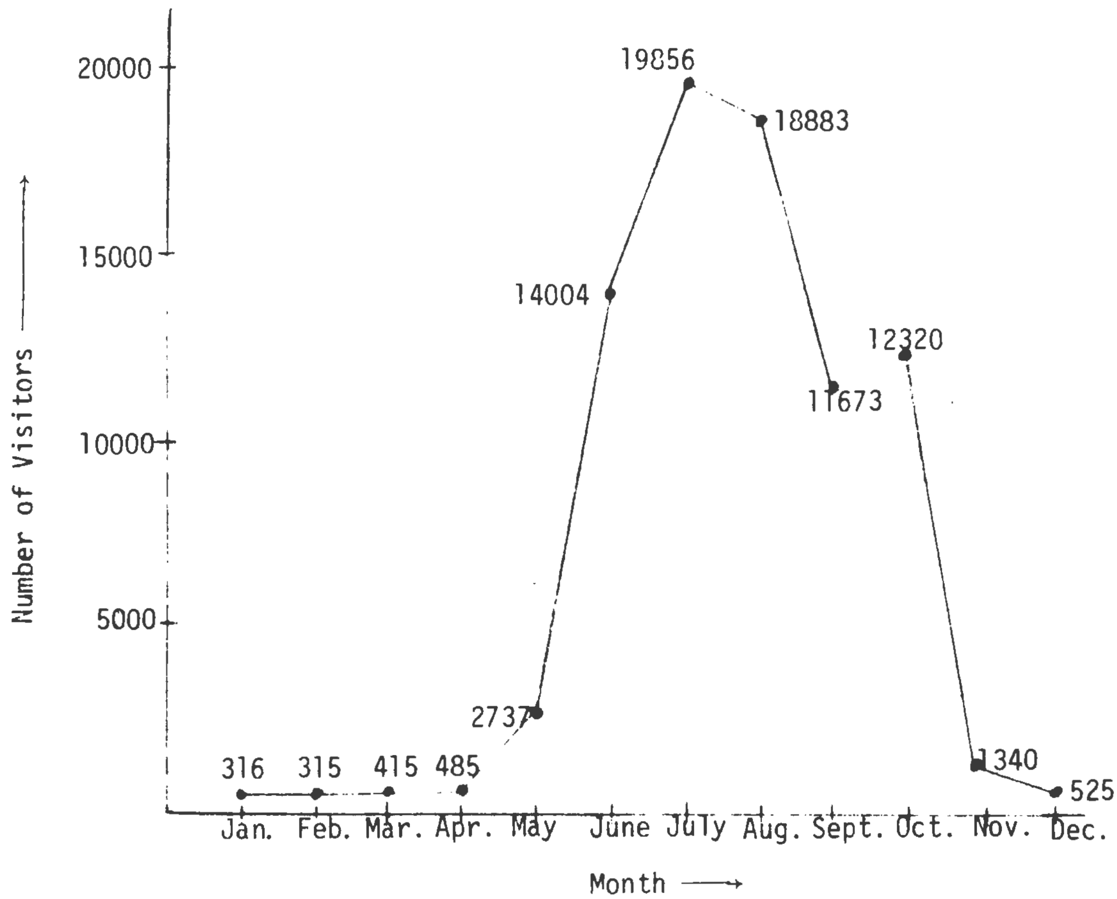


Figure 7-42 Seasonal Pattern of Visitor Use in the Colorado State Forest During 1975 (data from Colorado Division of Parks and Outdoor Recreation)

Facilities - The developed recreation sites in the mountains surrounding State Highway 14 are mapped in Figure 7-43 and described in Table 7-24. Of the twenty-seven developed sites listed, twenty-one are in Roosevelt National Forest, two sites are in Routt National Forest, another two are in the Colorado State Forest, and two are commercially operated on private land.

Table 7-25 highlights the distribution of developed recreation in the impacted area by aggregating the developed recreation sites into six regions. Notice that the Lower Canyon is the area with the highest concentration of development. Day-use (picnic) sites are particularly numerous here due to the area's proximity to the population centers along the Front Range. The developed recreation sites in the Upper Canyon are almost exclusively devoted to overnight use. The area around Red Feather Lakes is highly developed, providing for many types of activities. Sites are available for picnicking, boating and camping. In addition there are many private homes in the area which serve primarily as retreats for families living below on the plains. On the west side of Cameron Pass there are five campgrounds near the highway which provide a moderate capacity for overnight use of the area.

Table 7-24 Characteristics of Developed Recreation Sites in the Vicinity of the Cameron Pass Project[1]

Map No.[a]	Name[b]	Operated by[c]	Elevation	Capacity[d/2]	Camp units	Picnic units	Drinking water	Boat ramp	Travel trailers
1	Browns Park C.G.	Rvlt.	8,440	140	28	-	-	-	X
2	Deadman Lookout P.G.	Rvlt.	10,300	20	-	4	-	-	-
3	North Fork Poudre C.G.	Rvlt.	9,150	45	9	-	-	-	X
4	Bellaire Lake C.G.	Rvlt.	8,650	65	12	-	-	-	X
5	Creedmore Lakes C.G.	Rvlt.	8,300	30	6	-	-	-	-
6	West Lake C.G.	Rvlt.	8,200	150	29	-	-	X	X
7	Dowdy Lake R.A.	Rvlt.	8,140	395	52	4	-	X	X
8	KOA, Gould[3]	Private	8,750	125	25	-	X	-	X
9	Aspen, C.G.	Routt	8,900	35	7	-	X	-	X
10	Pines C.G.	Routt	9,200	50	10	-	X	-	X
11	No. Michigan Res. R.A.	Colo.	8,950	175	35	-	-	X	X
12	Ranger Lakes C.G.[4]	Colo.	9,250	125	25	-	X	-	X
13	Tunnel C.G.	Rvlt.	8,600	240	49	-	-	-	X
14	Chambers Lake R.A.	Rvlt.	9,200	395	53	4	X	X	X
15	Big South T.H.	Rvlt.	8,450	25	3	1	-	-	X
16	Sleeping Elephand C.G.	Rvlt.	7,850	75	15	-	-	-	X
17	Tom Bennett C.G.	Rvlt.	9,000	35	5	-	-	-	X
18	Fish Creek P.G.	Rvlt.	8,030	40	-	8	-	-	-
19	Bennett Creek P.G.	Rvlt.	7,550	20	-	4	-	-	-
20	Kelly Flats C.G.	Rvlt.	6,750	115	23	-	-	-	X
21	Mountain Park C.G.	Rvlt.	6,650	470	43	12	X	-	X
22	Narrows P.G.	Rvlt.	6,450	65	-	10	-	-	-
23	Ansel Watrous C.G.	Rvlt.	5,800	95	19	-	X	-	X
24	Diamond Rock P.G.	Rvlt.	5,750	50	-	7	-	-	-
25	Poudre Park P.G.	Rvlt.	5,750	45	-	2	-	-	-
26	Rist Canyon P.G.	Rvlt.	7,400	35	-	6	-	-	-
27	KOA, Bellvue[3]	Private	5,250	400	80	-	X	-	X
	Total[e]			3,460	528	62			

a/ Refers to Figure R-3

b/ C.G. - Campground
P.G. - Picnic Ground
R.A. - Recreation Area
T.H. - Trailhead

c/ Rvlt. - Roosevelt National Forest
Routt - Routt National Forest
Colo. - Colorado Division of Parks and Outdoor Recreation

d/ People at one time

e/ In addition there are thirty seven cabins owned by the Forest Service. These cabins are leased in the summer and have a capacity of 173 people at one time.

1/ Adapted from official map of Roosevelt National Forest, 1975

2/ Taken from RIM system, U.S. Forest Service, 1975

3/ Campground managers for the KOA Campground

4/ Files of the Colorado Division of Parks and Outdoor Recreation, Northeast Regional Office.

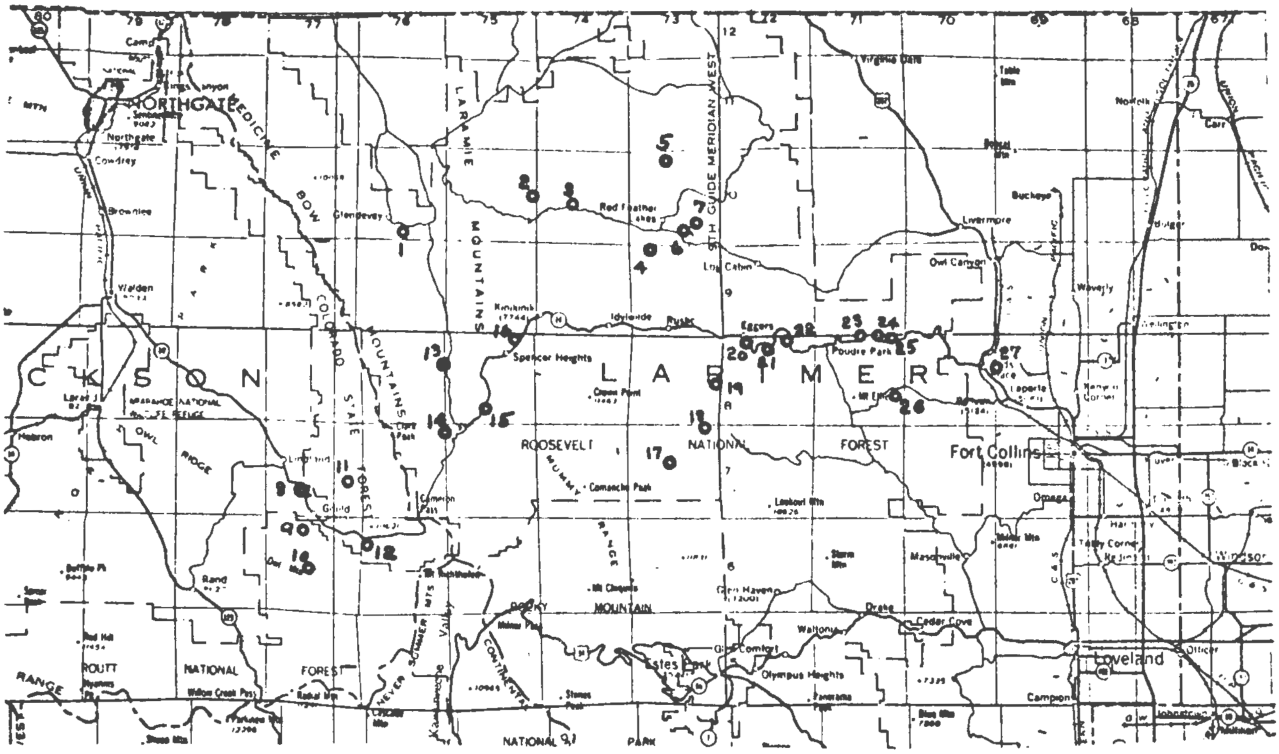


Figure 7-43 Developed Recreation Sites in the Vicinity of the Cameron Pass Project. (Table R-6 Serves as the Key to this Map)

Table 7-25 Summary of Developed Recreation Sites Surrounding State Highway 14[1/]

Region	Capacity (people at one time)	Number of Campsites	Number of Picnic sites
Lower Canyon	1240	165	31
Upper Canyon	735	120	5
Red Feather Lakes	705	108	8
West Slope	510	102	0
Laramie River Valley	140	5	0
South Fork Poudre	130	28	18

[1/] Data Taken from Table R-6

It is important to investigate the prospects for future development of recreation sites in the area. It appears unlikely that in the near future there will be much growth in recreational facilities in the Roosevelt National Forest. First of all there is a low stock of suitable sites, but the main constraint is budgetary. Recreation; unlike other activities in the forest such as logging, mining, or grazing; produces little, if any, revenue. Consequently it has been difficult to justify a larger budget for recreation despite the trend of increased use. The Forest Service now can only maintain existing facilities and has little money for capital improvements. It therefore feels incapable of meeting the rising demand for recreational sites. For this reason the Forest Service would encourage the establishment of private campgrounds in the Chambers Lake area and the Cache La Poudre and Laramie River Valleys. Concessions generally have not worked out well on Forest Service lands but there are 80,000 acres of private land in the Red Feather district alone. The Forest Service has no real control of these private lands and any proposed commerical campgrounds would have to be approved through county channels. One new campground, at Long Draw reservoir, will open in 1977. This facility will add 37 campsites to the Upper Canyon region and will boost capacity by 185 people. It is being built by the owners of the reservoir, the Water and Supply and Storage Company, and will be donated to the National Forest.

The number of campsites on the western side of Cameron Pass, in the State Forest, has grown rapidly in the last few years. In 1962 North Michigan reservoir was filled, adding a new recreational site. Development of this site is still in the initial stages. The first 35 campsites were built here in 1973 and there are plans for 100-250 campsites in the area (Colorado State Forest Service, 1971). Presently the Crags campground is being built by the Colorado Division of Parks and Recreation just off Highway 14, three miles east of Ranger Lakes. This new facility will have 30 campsites. A 100 acre reservoir has been proposed which would be located a short distance west of the lower Ranger Lakes. This site could be a new center for water-based recreation. One hundred to five hundred campsites have been projected for the site (Colorado State Forest Service, 1971).

Management - All recreation in the Roosevelt National Forest, other than hunting, fishing, and downhill skiing, is managed by the U.S. Forest Service. Hunting and fishing is controlled by the Colorado Division of Wildlife. Downhill skiing at Lake Eldora, at the southern end of the forest, is operated privately under permit from the Forest Service. Management of recreation involves more than the operation, maintenance, and construction of recreational facilities. In addition records are kept of the recreational activity in the forest which is compiled in the Recreation Information Management (RIM) system described earlier. Planning is also done by the Forest Service; a Wilderness Management Plan will be prepared in 1978. Through these plans and in other less formal ways policies are made.

Although the State Forest is technically administered by the State Board of Land Commissioners, recreation in the Forest is managed by the Colorado Division of Parks and Outdoor Recreation. The Board of Land Commissioners and the Division of Parks entered into a 25 year lease agreement in August of 1972 for the purpose of improving recreation and wildlife management. Rental is presently $25,000 per year and although the cost of permanent improvements will be credited to this amount. The program of the Division of Parks is now getting underway and involves much the same type of management performed by the Forest Service in the National Forest. Again, as in the National Forest, hunting and fishing is supervised by the Colorado Division of Wildlife. Present policy in the State Forest is to strive to strike a balance between maximum usage and minimum impact of the area (Robert Morris, Northeast Regional Supervisor, Colorado Division of Parks and Recreation, personal communication, August 1976).

Trends for recreation - The intensity of recreation and the patterns of activities in the area surrounding the Cameron Pass project has changed in the past and with little doubt will continue to change in the future. One way to project future states is to study the trends of the past. It is too simplistic though to merely extrapolate these trends into the future. Instead a trend provides a baseline which can then be modified in accordance with other circumstances and constraints relevant to the issue.

The first point that becomes apparent is that recreation has been rapidly increasing every year. The trend in recreational activity in Roosevelt National Forest is graphed in Figure 7-44. It shows that visitor-day use in the forest has increased 89 percent between 1970 and 1975, or 13.6 percent per year for that period. Recreation in the part of the National Forest near the project has not increased quite so rapidly though. Between 1970 and 1975 visitor use has increased at an average annual rate of 10.4 percent in the Red Feather district and 4.8 percent in the Poudre district.

Recreational activity in the State Forest has increased at a higher rate since the Colorado Division of Parks and Outdoor Recreation have taken over recreation management in the forest. Here visitor counts have more than tripled between 1972 and 1975, showing an average increase of 49 percent per year. This trend toward increasing in activity is shown in Figure 7-45.

The preceding values gain significance when compared with the growth rate of population in the surrounding region. Between 1970 to 1975 the population of Colorado grew at an annual rate of 3.3 percent (Colorado Division of Planning). Fort Collins and Larimer County increased at a rate of 5.2 percent and 5.7 percent per year during the same period. (Fort Collins Planning Office and U.S. Office of Management and Budget). Thus recreation is increasing at even a faster rate than the burgeoning urban areas at the foot of the mountains. Apparently people are finding they have more leisure time to go into the mountains, and that the area around the pass is being discovered by more and more recreationists.

The increase in hunting and fishing licenses is presented in Table 7-26. The increase in the number of hunting licenses issued both for large and small game, has essentially paralleled the change in Colorado's population. On the other hand, fishing licenses issuances increased at nearly twice that rate, at an average annual rate of 6.4 percent between 1968 and 1974.

The analysis of trends in recreation reveals not only that total activity is increasing but also that the patterns of recreation use are changing. Notice in Figure 7-46 that in 1969 42 percent of the recreation in the Red Feather ranger district took place on developed sites, the remainder on dispersed sites. Over the next six years, as total recreational

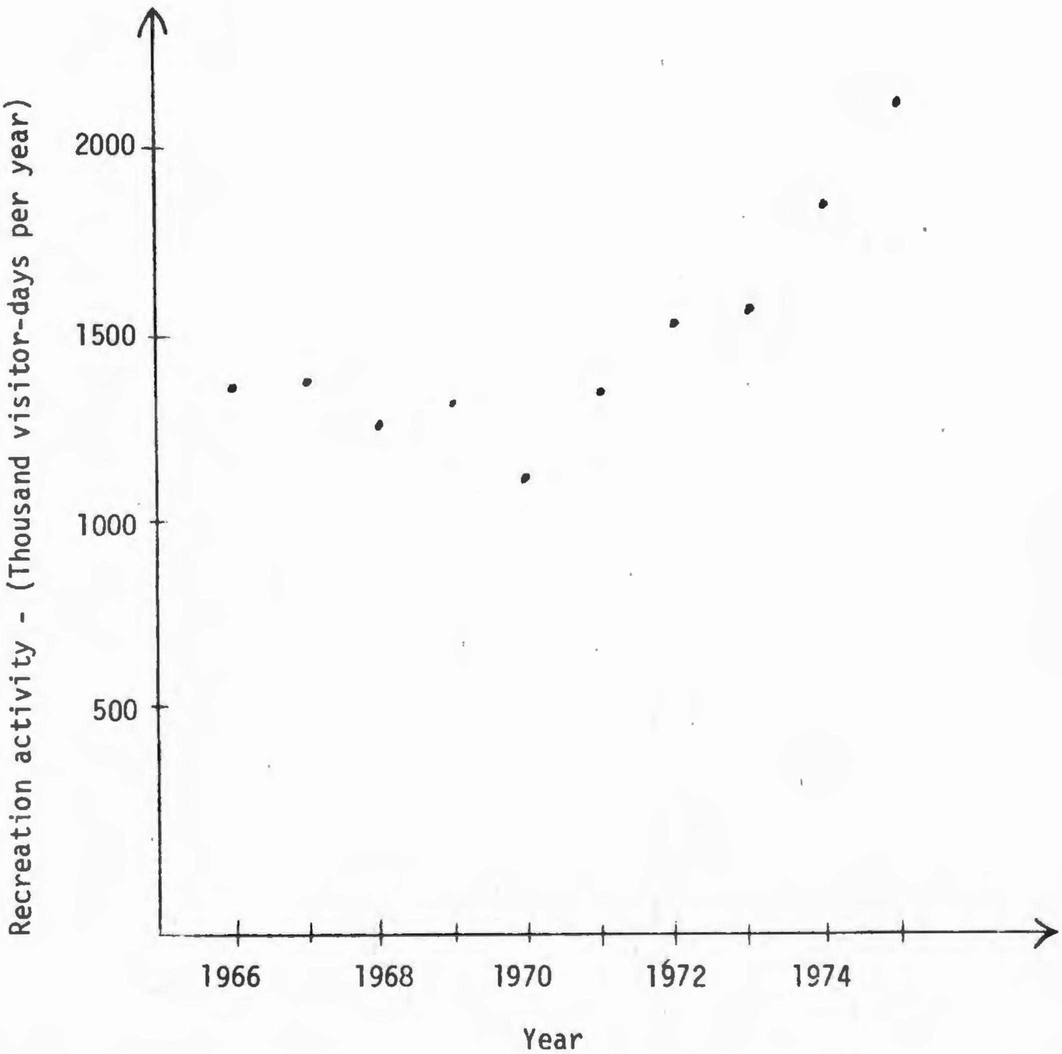


Figure 7-44 Total Recreation Activity in Roosevelt National Forest, 1966-1975. (data from RIM system, U.S. Forest Service)

activity nearly doubled, developed site use remained essentially constant so that by 1975 it accounted for only 31 percent of all recreation activity. The great increase was in the use of dispersed sites. As shown in Figure 7-47, developed site capacity did not expand so that all new recreational pressure was diverted to dispersed sites. In fact it is now the policy of the Forest Service to encourage dispersed recreation as the only feasible way to handle the increasing influx of recreational users (Gordon Seneff, Red Feather District Ranger, personal communication, October 1975). Use of dispersed sites is obviously much harder to manage and thus has a greater impact potential. Thus the significance of the shift to higher proportions of dispersed site recreation is that recreation is not only increasing but at an even faster rate it is becoming less manageable.

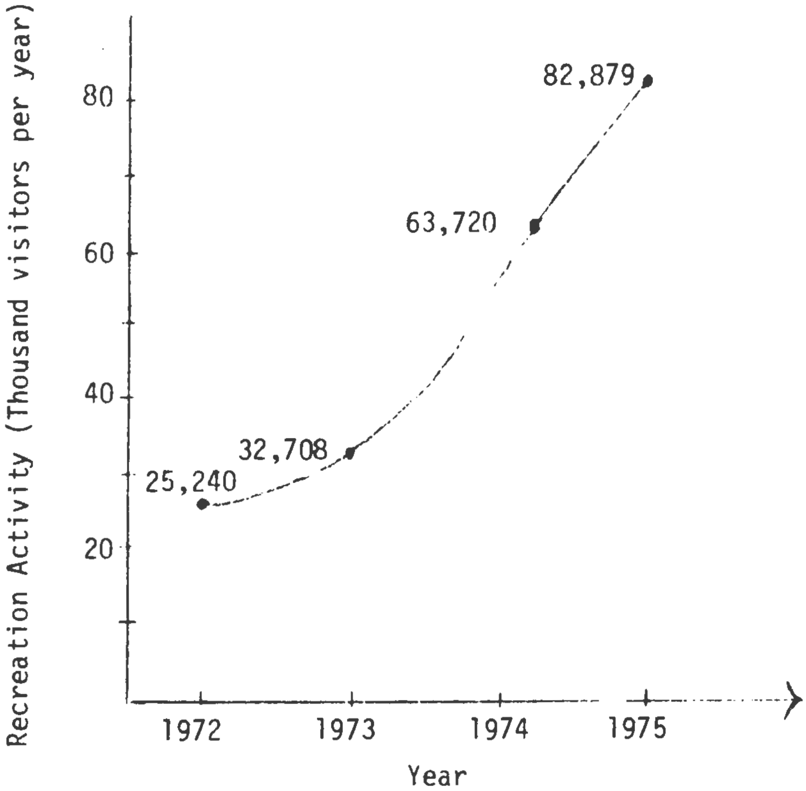
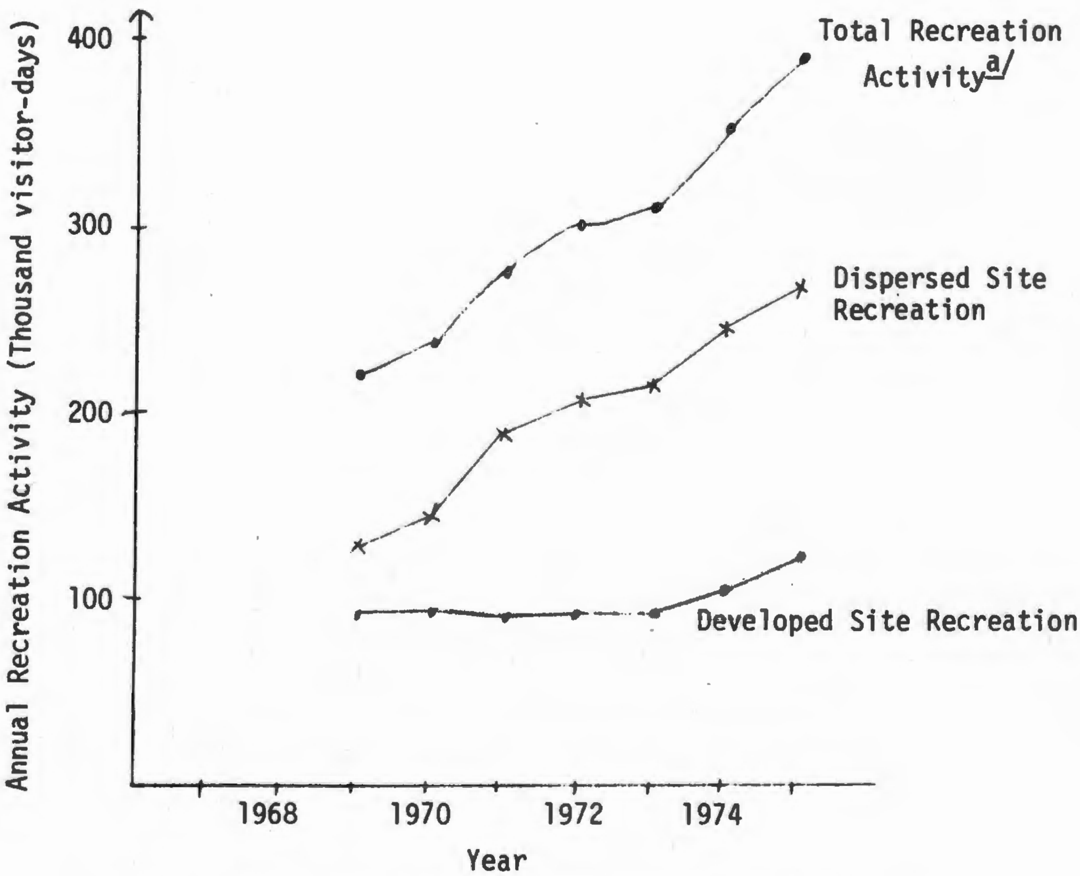


Figure 7-45 Total Recreation Activity in the Colorado State Forest, 1972-1975 (data from files of the Colorado Division of Parks and Outdoor Recreation)

Table 7-26 Trends in the Number of Hunting and Fishing Licenses Issued in the State of Colorado (taken from Colorado Big Game Harvest Record, Colorado Division of Wildlife)

Year	Type of License		
	Big Game	Small Game	Fishing
1968	247,441	337,216	404,903
1970	260,149	351,508	482,048
1972	238,336	338,237	547,518
1974	302,582	406,367	585,676
Average Annual Rate of Increase	3.4%	3.2%	6.4%



a/Sum of developed and dispersed site recreation

Figure 7-46 Changes in Developed Site and Dispersed Site Recreation in the Red Feather Range District, 1969-1975 (data from RIM system, U.S. Forest Service)

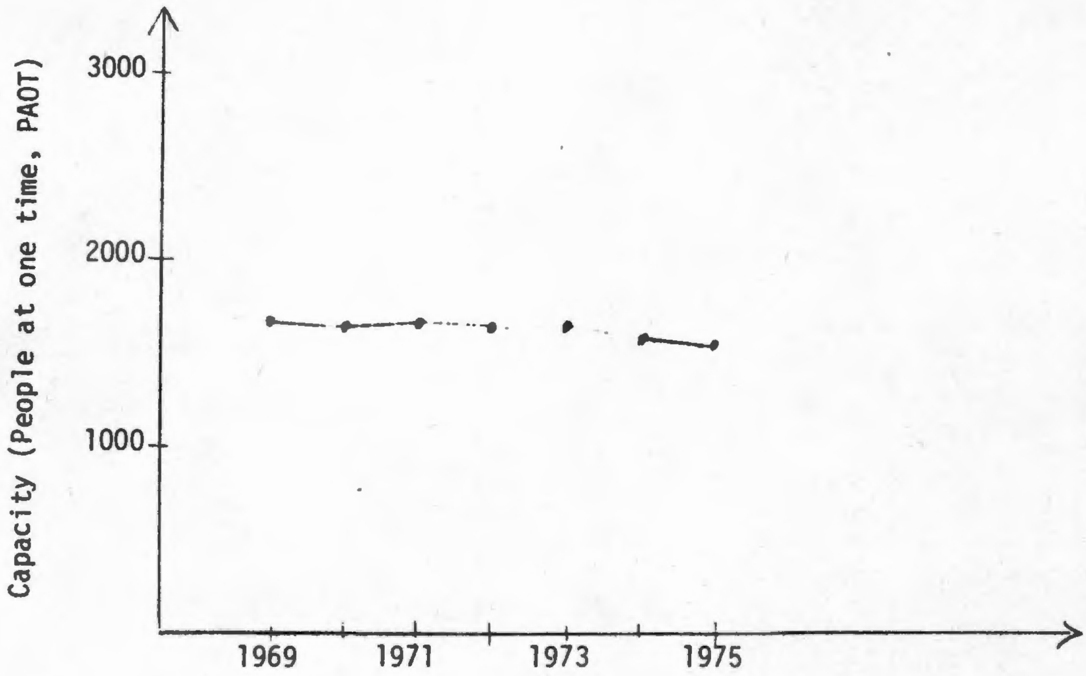


Figure 7-47 Capacity of the Developed Sites in the Red Feather Ranger District, 1969-1975 (data from RIM system, U.S. Forest Service)

7.3 Forecasting Project Effects

There are two main purposes for this section. The first is to delineate an approach, and to introduce a technique, for the determination of secondary impacts and consequences from the Cameron Pass project. The technique introduced is an *interaction matrix,* which has been developed for application to the Cameron Pass case. The inspiration for this technique has been the cross impact matrix and the input-output model, both described in Chapter 6.

The second purpose of this section is to describe the range of possible effects and consequences which could result from construction of the Cameron Pass project. The projections outlined are not comprehensive, being limited by the selective nature of the case study.

Also discussed is the role of policy in modifying the course of future events relative to the Cameron Pass project.

7.3.1 *The Interaction Matrix*

An *interaction matrix* is a table showing how different components of a given system mutually interact. Figure 7-48 is an interaction matrix tailored to the particular issues and the unique environment relevant to the case of the Cameron Pass project.

Structure - The three levels of headings of the matrix of Figure 7-48 are identical for both rows and columns; they represent the various participating subsystems. The three levels of headings are hierarchal levels representing: (1) *subsystems,* (2) *subsystem sectors,* and (3) *sector components* (these are arbitrary designations). The first two levels are based upon the taxonomy of Figure 7-33, which is not case specific. The sector components, on the other hand, are unique to the Cameron Pass case. These can be identified only by having an intimate knowledge of the case situation. From the sector components identified those considered most relevant to the secondary impacts are chosen for the matrix. Several iterations were required to develop the final matrix of Figure 7-48. The "critical issues," as described earlier in Tables 7-10, 7-11, and 7-12 formed the basis for the initial matrix. While the ideal is for the selections to be based upon professional judgements coupled with factual knowledge, value judgements inherently have an influence.

Mechanics of use - The interaction matrix suggests how the various subsystems may dynamically interact as a whole system. This may be accomplished by mapping the specific interactions between the sector components. When the *state* (or characteristics) of one of the sector components of the system is changed there are caused direct changes in many of the other sector components. For example, the "Condition of Highway 14," under the "Transportation" subsystem sector, will affect "Mobility," "Access to North Park," "Access to Mountains," "Traffic in Poudre Canyon," "Traffic over Cameron Pass," etc. The "Condition of Highway 14" is thus a "STIMULATING ENVIRONMENTAL COMPONENT;" a row in Figure 7-48. The affected sector components listed above are "AFFECTED ENVIRONMENTAL COMPONENTS," columns in Figure 7-48. Therefore, each row in the matrix maps the potential distribution of *effects produced* from each sector component; thus the sector component has a "vector" property (and it may be called a "vector"). Correspondingly, each column maps the potential distribution of

			CAMERON PASS PROJECT				ECOLOGICAL BASE								COMMUNITY COMPOSITION												COMMUNITY METABOLISM																	MANAGEMENT											
							Physical Environment					Biological Environment			Demography			Human Ecology					Values & Goals				Transportation					Recreation				Logging				Mining	Trade & Commerce			Agencies					Administrative Procedures				Policies		
STIMULATING ENVIRONMENTAL COMPONENT		AFFECTED ENVIRONMENTAL COMPONENT	Planning and design	Construction	Physical structure	Operation	Topography	Water and air quality	Noise	Climate	Aethetics	Vegetation	Wildlife - game species	Community structure	Population growth - Larimer County	Population growth - Jackson County	Proportion of natives - Jackson County	Employment characteristics	Income levels	Mobility	Land use patterns	Community services	Environmental attitudes - Front Range	Environmental attitudes - North Park	Life style preferences - Front Range	Life style preferences - North Park	Access to North Park	Access to the mountains	Condition of Highway 14	Traffic in Poudre Canyon	Traffic over Cameron Pass	Recreation activity	Quality of experience	Ski development - 7 Utes	Second home development	Harvest levels - Roosevelt N.F.	Harvest levels - Colorado State Forest	Sawmill capacity	Market for timber	Coal development - North Park	Tourism in Poudre Canyon	Tourism in Jackson County	Trade across the Front Range	Larimer County Commissioners	Jackson County Commissioners	U.S. Forest Service	Board of Land Commissioners	Colorado Highway Department	EIS process	Permits	Highway finding process	Other laws and regulations	Forest Service management policies	State Forest management policies	County land-use policies
CAMERON PASS PROJECT		Planning and design																																																				
		Construction																																																				
		Physical structure																																																				
		Operation																																																				
ECOLOGICAL BASE	Physical Environment	Topography																																																			
		Water and air quality																																																			
		Noise																																																			
		Climate																																																			
		Aethetics																																																			
	Biological Environment	Vegetation																																																			
		Wildlife - game species																																																			
		Community structure																																																			
COMMUNITY COMPOSITION	Demography	Population growth - Larimer County																																																		
		Population growth - Jackson County																																																		
		Proportion of natives - Jackson County																																																		
	Human Ecology	Employment characteristics																																																		
		Income levels																																																		
		Mobility																																																		
		Land use patterns																																																		
		Community services																																																		
	Values & Goals	Environmental attitudes - Front Range																																																		
		Environmental attitudes - North Park																																																		
		Life style preferences - Front Range																																																		
		Life style preferences - North Park																																																		
COMMUNITY METABOLISM	Transportation	Access to North Park																																																		
		Access to the mountains																																																		
		Condition of Highway 14																																																		
		Traffic in Poudre Canyon																																																		
		Traffic over Cameron Pass																																																		
	Recreation	Recreation activity																																																		
		Quality of experience																																																		
		Ski development - 7 Utes																																																		
		Second home development																																																		
	Logging	Harvest levels - Roosevelt N.F.																																																		
		Harvest levels - Colorado State Forest																																																		
		Sawmill capacity																																																		
		Market for timber																																																		
	Mining	Coal development - North Park																																																		
	Trade & Commerce	Tourism in Poudre Canyon																																																		
		Tourism in Jackson County																																																		
		Trade across the Front Range																																																		
MANAGEMENT	Agencies	Larimer County Commissioners																																																		
		Jackson County Commissioners																																																		
		U.S. Forest Service																																																		
		Board of Land Commissioners																																																		
		Colorado Highway Department																																																		
	Administrative Procedures	EIS process																																																		
		Permits																																																		
		Highway finding process																																																		
		Other laws and regulations																																																		
	Policies	Forest Service management policies																																																		
		State Forest management policies																																																		
		County land-use policies																																																		
AGGREGATE EFFECTS																																																					

Figure 7-48 Structure of an Interaction Matrix for the Cameron Pass Highway Improvement Project

effects received by each of the other sector components; the column too is a vector.

To determine the mapping of "effects produced" from each sector component, and to map them, three questions need to be asked in each element of each row in the matrix:

1) Is there any direct interaction? If there is none the element is left blank.
2) What is the strength of the interaction? An interaction *judged* "moderate" is represented by a diagonal line, ; an interaction *judged* strong is represented by a solid triangle, .
3) How do these components interact? This can be determined by a functional relationship, empirical determined correlations, or by a professional judgement based on factual information and experience. Most probably this functional relationship is either indeterminate, in a quantitative sense, or it is very expensive to determine.

While the limitations posed by the third question are very severe it means merely that judgement and experience are more important than "black boxes" (e.g., mathematical models).

The graphic mapping of interactions for the entire matrix then provides a systems interaction model in that it graphically displays all of the interactions within the overall system. Further, mapping shows for each row vector how each sector component distributes its effects to the other sector components. The "effects received" by each sector component are seen in the mapping shown in the respective columns. The "aggregate effect" for each column vector is the collective effect of all interactions in the column. It has conceptual meaning only. The AGGREGATIVE EFFECTS row is the proverbial "bottom line" in accounting. It should be stressed that the bottom line for this case is not quantifiable. However, it can have a qualitative meaning. Also extending the idea further, the *sum* of the aggregative effects is the cumulative effect of the project.

The matrix shows only direct interactions. However, consider the successive direct interactions B and D and then D and F as shown in Figure 7-49.

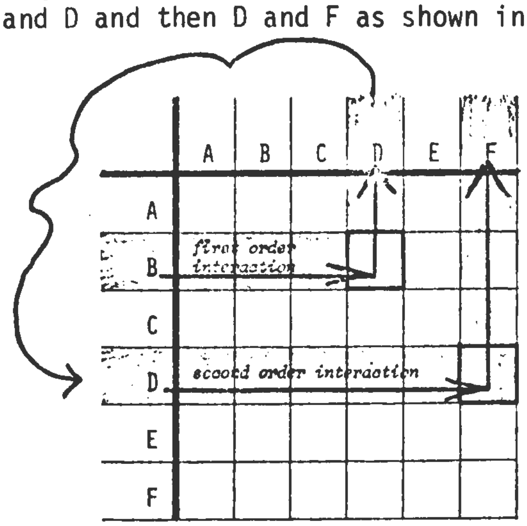


Figure 7-49 Illustration of How a First Order Interaction, B-D, Results in a Second Order Interaction, D-F, from B-D.

The interaction D-F is an indirect *second order* interaction from the stimulating factor B. If D has an effect on A, B, C, or E as well as on F these interactions all would be second order (or a secondary effect). However, if F had an effect on say E, caused originally by a change of B, the effect could be defined as *third order*. Also F could have a third order effect on B (i.e., a feedback loop). In this way the higher order effects and consequences of a contemplated action may be traced.

Construction of matrix display - The first step in constructing an interaction matrix is to map all of the direct interactions stimulated by the project. Figure 7-50 shows this for the sector components of the Cameron Pass project. All of the direct interactions produced are seen. These were judged by what is known about the project. Some second order effects are implicit in the first order effects in this particular illustration. For example, the "Physical Structure" of the 11.2 miles of highway improvement has a strong interaction with "Esthetics." However, "Planning and Design" will affect the "Physical Structure" which, in turn, will affect "Esthetics." The latter interaction was in fact mitigated by feedback to "PLanning and Design" which produced extensive landscape design shown in Figures 7-19, 7-20, and 7-21. Such feedback is a "secondary effect" on esthetics and is generally agreed to be a "positive effect." It could be shown better perhaps by adding another category, but if this was done extensively the matrix would become unwieldy.

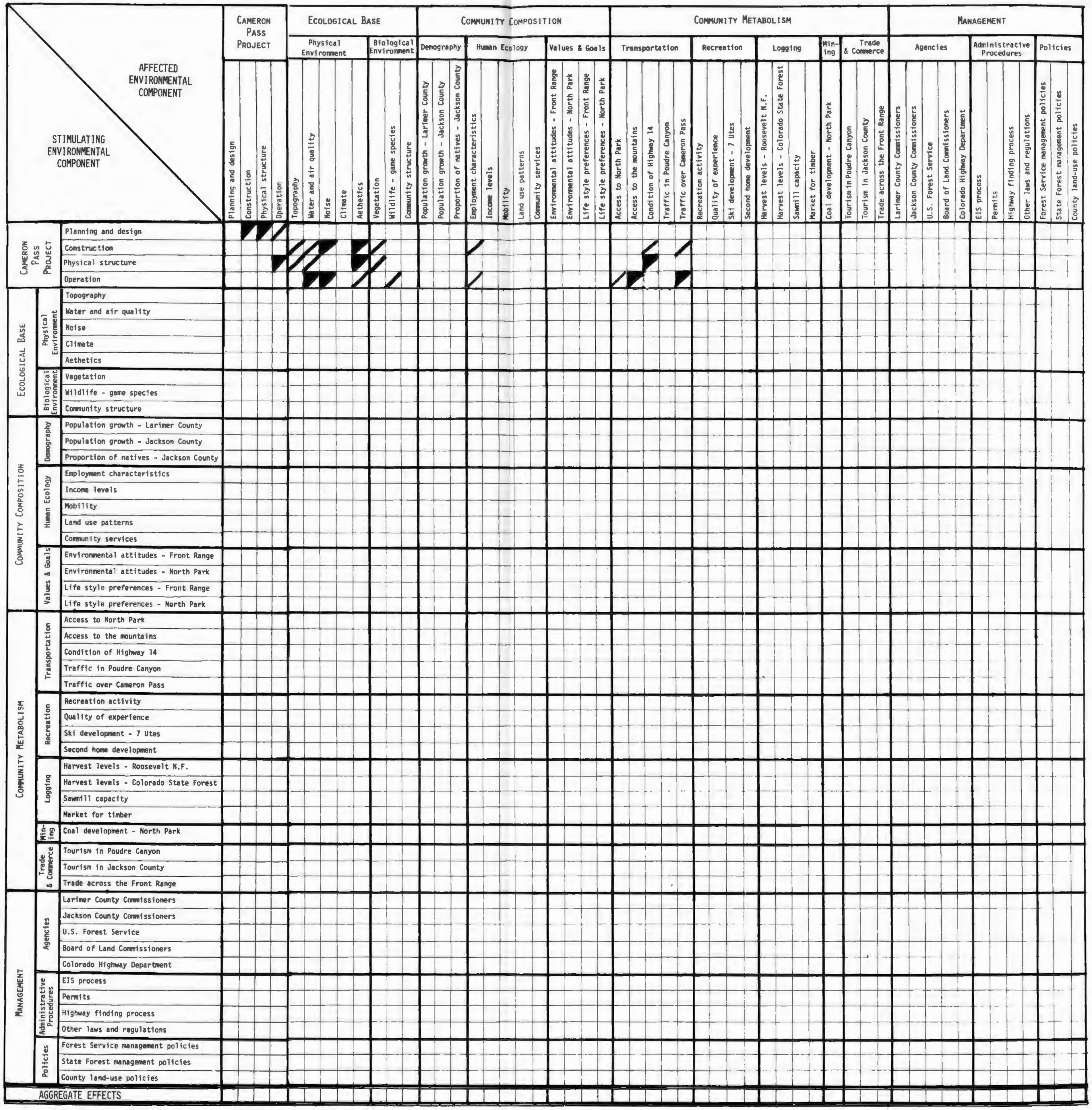
The second order interactions are determined as the next step. Figure 7-51 shows both first and second order interactions. The second order interactions can be determined only by having first determined the first order interactions.

The determination of third order interactions is the next step. These interactions are based upon the second order ones. Figure 7-52 shows the first, second, *and* third order interactions in one display. This is, of course, more complex. In fact, at this level there may be considerable feedback to some interactions which were originally first or second order; the graphics employed does not distinguish. The demonstration is stopped at the third order stage.

Use of the matrix - The tracing of an initial stimulus through its web of successive interactions can illustrate the possible "ripple effects" of a proposed action. However, it is important to be cognizant of both the merits and the limitations of the interaction matrix. Both categories are enumerated below.

What the matrix can do:

1) It systematically maps the web of interactions in the participating subsystems; it could represent the framework of a systems model.
2) It concisely displays and organizes a lot of information.
3) It provides a system for considering all interactions.
4) It permits one to grasp the idea of a whole system in a more articulate fashion than by description alone.
5) It graphically displays the key nodal points of the project interface with interacting subsystems.
6) It illustrates how first order effects can lead to a maze of higher order effects and thus possibly change the essential character of the initial system.
7) It provides a framework for discussion (e.g., by focusing arguments on critical areas).



LEGEND

Strong interaction

Moderate interaction

No interaction

Figure 7-50 First Order Interactions for Cameron Pass Highway Improvement Project

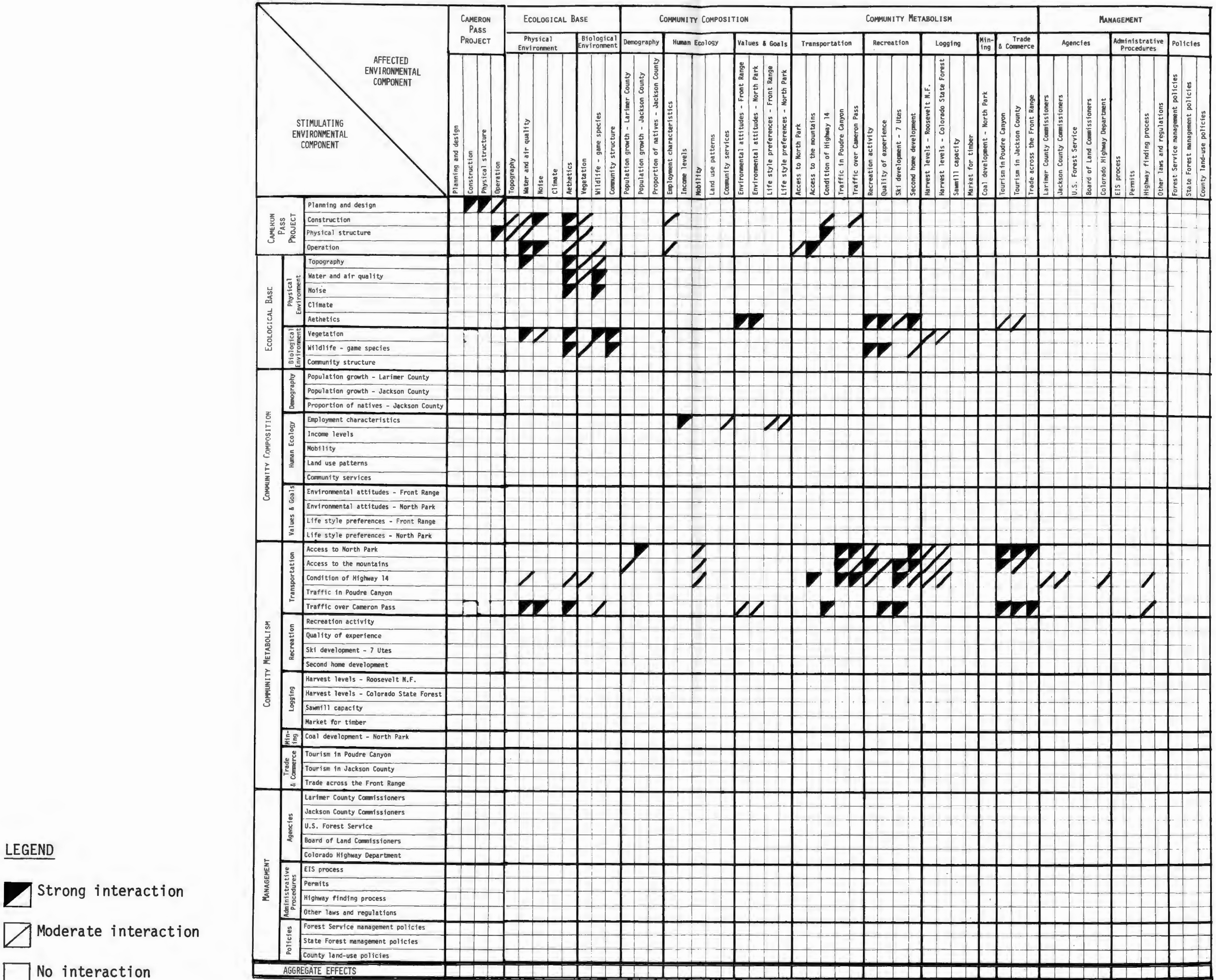


Figure 7-51 First and Second Order Interactions for the Cameron Pass Highway Improvement Project

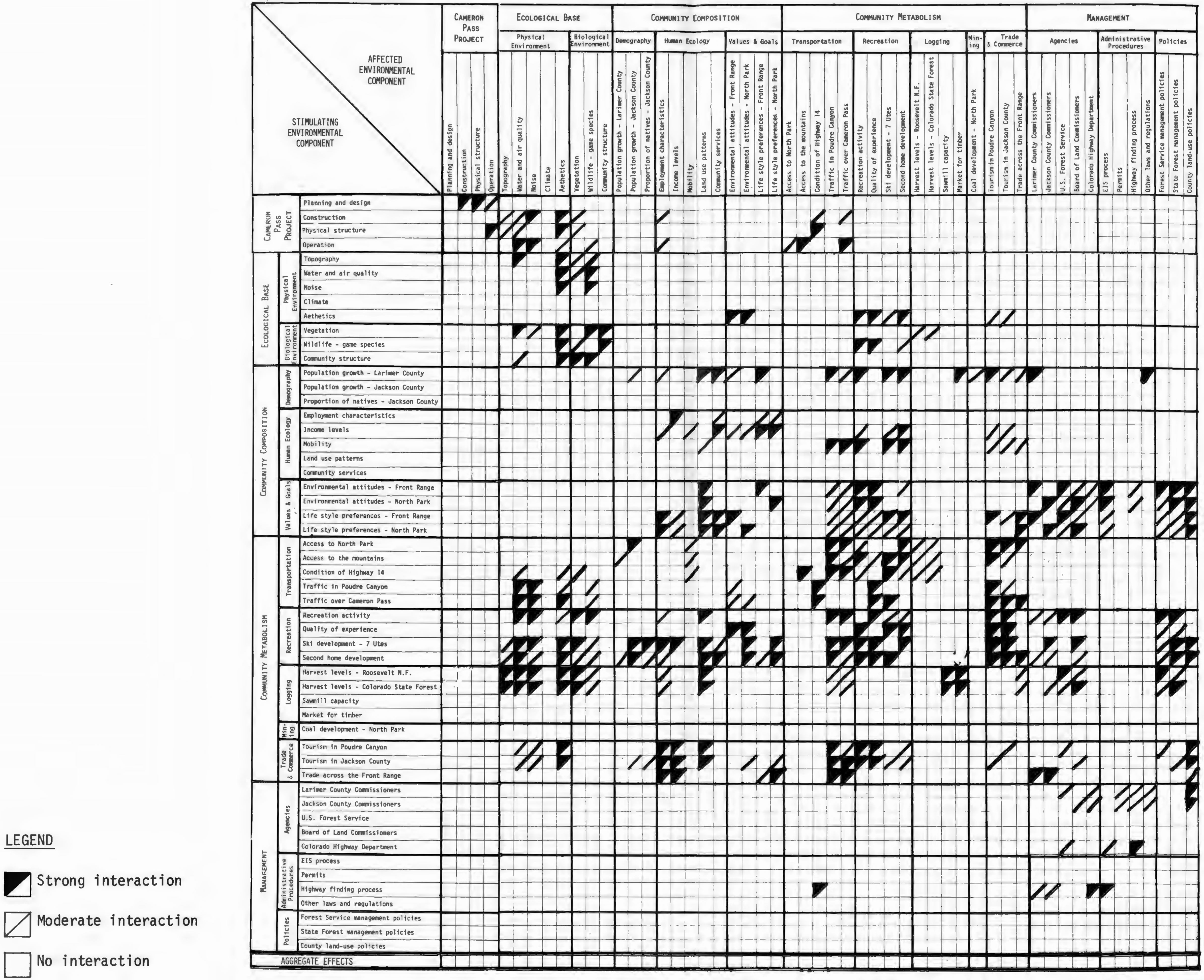


Figure 7-52 First, Second, and Third Order Interactions for the Cameron Pass Highway Improvement Project

8) It acts as a mechanism to systematically integrate the effects of many judgements about numerous individual interactions.

What the matrix cannot do:

1) It cannot show the interaction of subsystem components not listed in the headings of the matrix.
2) It cannot quantify anything.

One final note on the use of the interaction matrix. The interactions between subsystem components mostly represent functional relationships which are "soft" in nature (i.e., not quantifiable). A footnote in the matrix element with a cross reference to a narrative or more explanatory data would permit the interaction to be *judged*. To help articulate and document such judgements is perhaps the essence of "soft systems analysis."

7.3.2 *Assessment of Interactions*

The potential higher order interactions stimulated by the Cameron Pass project are almost interminable. Only some of the more significant interactions will be discussed here. The determination of the succession of interactions is based upon the use of Figures 7-49, 7-51, and 7-52 as an organizing tool and upon the documentation given in prior sections of this chapter combined with personal knowledge of the case situation. These combine to form the bases for judging the significance of the interactions.

First order interactions - The direct effects of the Cameron Pass highway project, as judged by these writers, are given in Figure 7-50. Figure 7-50 shows that there will not be many "first order" interactions. However, three of these interactions are judged (based upon subsequent analysis), especially significant relative to higher order effects and consequences. These are the: (1) Physical structure - Esthetics interaction, (2) Operation - Access to the mountains, and (3) Operation - Traffic over Cameron Pass. The first is judged significant because the *physical presence* of the highway improvement will visually dominate the mountain setting. This is seen in Figures 7-2, 7-15, and 7-16, which show the new construction relative to the mountain setting. Also Figures 7-17 and 7-18 compare cross sections of old and new highways; they indicate 50 foot roadbed compared to a roadbed for the present gravel road of about 30 feet. Similarly the cuts are major changes. However, the effect of the cuts will be mitigated by the landscape design shown in Figures 7-19, 7-20, and 7-21.

Transportation access is another major affected area. The winter access to North Park for skiing and the increased traffic over the summer as well are first order interactions having significant higher order consequences.

Second order interactions - This discussion is limited mostly to discussion of "Esthetics" and "Quality of Experience." The approach is to be systematic and to provide a documented discussion. To carry this to completeness for all sector interactions would be almost endless.

The Figure 7-51 matrix shows the Esthetics column is affected by numerous stimulating factors. Of these, in addition to "Physical structure" of the new highway, "Noise" and "Traffic over Cameron Pass" may be the most significant. The strength of the latter two interactions is difficult to judge. Trends in

ADT all along Colorado 14 are upward as seen in Table 7-7 and Figure 7-25, but how much the new road will increase the ADT count is not known. However, even without the traffic the esthetic quality of the area will be fundamentally altered by the physical presence to the new highway.

The *stimulating effect* produced by Esthetics is seen in Figure 7-51, which shows several environmental components affected by esthetics. One component very difficult to articulate but nevertheless an important reason why many persons go to the area is "Quality of experience." The nature of the interaction between "Esthetics" and "Quality of Experience" is highly personal. The present gravel road is well integrated into the surrounding environment and subordinate to it, as seen in Figures 7-12 and 7-13; it provides for vehicle transportation through the area albeit the trip is slow, bumpy and often dusty. The new highway dominates the environment by its straight alignment and its width though this has been mitigated by the landscape design. It will provide a faster, more comfortable smooth and dustless drive through the area; transportation will be the main "experience." Thus the "Quality of Experience" will be fundamentally different with respect to driving. Whether this difference is good or bad is basically a personal value judgement. The key concern of the analysis is to make sure that the critical issues are identified and are visible to decision makers (i.e., highway designers, politicians, the public). If the analysis appears "tilted," as the above well may appear to some, this is not so important as the exposure of the issue to discussion. The analysis should strive to identify critical issues, and to display the interactions and consequences. Whether these are good or bad are value judgements. What values are important to the decision maker or his constituency and how does the proposed action affect those values? The analysis hopefully will help to answer the second question.

Higher order interactions - Figure 7-52 traces the chain of interactions through the third order level where the analysis stops. It is important to realize that the interactions identified do not represent what *will* happen; rather they are interactions which *could* happen as determined by the judgement of these writers, (it should be emphasized again that this judgement is not casual; it is based upon data, personal knowledge of the case, and guidance from the writers' professional disciplines).

First it is seen that the project could set off a ripple of changes throughout the various other subsystems. The aggregate changes induced (the "bottom line") could well add up to an alteration in the fundamental character of the region. Presently one might characterize the Poudre Canyon and North Park areas as "lightly developed scenic mountain recreation" and "scenic western rural" respectively. They could be changed to "heavy developed scenic mountain recreation" and "scenic western developed," respectively (these characterizations are highly subjective descriptive terms chosen by the writers). Such changes in turn would have ripple effects throughout the local areas, the region, and even at the national level in terms of expectations, attitudes about the area, and in the type and quality of opportunity which the area affords.

Some of the affected environmental subsystems warrant special discussion. The logging subsystem will not be affected to any degree by the proposed highway improvement. Access is presently not a limiting factor.

The "Recreation" component, on the other hand, may be affected by numerous other induced changes on other subsystems. But, in addition, this component may produce effects throughout most subsystems. From Figure 7-51 it can be seen that "Transportation Access" is the main subsystem whose changes will in turn affect Recreation strongly. Thus "Transportation Access" seems to be a triggering factor for most of the third order effects seen in Figure 7-52.

Another important interaction is that the "Values and Goals" sector (the column) will be strongly affected by all of this. This in turn (as the row) will affect the "Management" subsystem (the column) which in turn (as the row) could exert influence on all other subsystems (which is not shown).

7.3.3 *Conclusions*

The proposed Colorado Highway 14 improvement could have far reaching and pervasive effects for the Poudre Canyon area and for North Park in several main areas:

1) The Colorado 14 does not have an important role in the regional transprotation network, but it is important as a local highway providing local access to the Cameron Pass area from both the Front Range and North Park.
2) The esthetic changes will change the type of recreational experience associated with the Cameron Pass area.
3) The road in providing better summer access and winter access to the North Park area will provide new opportunities which, if brought to fruition, will cause a sequence of other effects.
4) The fundamental character of the Poudre Canyon and the North Park areas could be changed toward more "developed" states.
5) The identification of critical choices by decision makers and the speed at which this is done will be more important since transportation access will no longer be a limiting factor for some activities, i.e., Seven Utes ski area. (Steps in this direction have already been taken in Jackson County. The County Commissioners are very concerned about the future. They have an active county planning office. In 1975 this office conducted an "attitudes survey" to help determine the values of the Jackson County residents. From this survey the Commissioners would formulate goals and policies).

   The Forest Service has both the management infrastructure and the expertise to handle recreation. However, they lack the capability to implement this because of lack of funding. The problems generated by recreation could get out of hand and accelerate a decline in recreation quality.
6) The higher order effects on other subsystems induced by the highway improvement will place a heavier decision making burden on the present management agencies. The changes could happen at a faster rate than these agencies are able to respond.

Selected Photographs

COLORADO HIGHWAY 14 BETWEEN FORT COLLINS AND WALDEN

The photographs following are intended to serve as a "picture essay" for Colorado Highway 14 between Fort Collins and Walden. Special emphasis is given to the 11.2 miles of improvement over Cameron Pass with photographs of the adjacent land, the present gravel road, and the new construction now in progress.

Figure 7P-1 Colorado Highway 14 Crosses Interstate 25 in the Vicinity of Fort Collins (June 1975)

Figure 7P-2 The City of Fort Collins with the Front Range Mountains in the Background

Figure 7P-3 Colorado 14 Enters the Canyon of the Cache la Poudre River near Ted's Place and U.S. 287 (June 1975)

Figure 7P-4 The Road Winds and Twists with the River near the Beginning of the Canyon (June 1975)

Figure 7P-5 The Narrows is One Reason the Early Cameron Pass Road Did Not Use this Portion of the Canyon (October 1974)

Figure 7P-6 Highway Scene in Poudre Canyon. The Sign Advising 25 Mile Speed Limit is Typical (October 1974)

Figure 7P-7 The Community of Poudre Park (June 1975)

Figure 7P-8 The Canyon often Widens; here the Cache la Poudre River Meanders through a Meadow Area (June 1975)

Figure 7P-9 Camping and Picnicking are Summertime Activities (June 1975)

Figure 7P-10 The Cache la Poudre is well known as a German Brown Trout Stream (June 1975)

Figure 7P-11 Rafting During the High Water Period (June 1975)

Figure 7P-12 The Business Activity is Presently Local Ownership and Modest in Scale (June 1975)

Figure 7P-13 Typical Scene in the Upper Reaches of the Canyon (June 1975)

Figure 7P-14 Upper Reaches of Canyon with Medicine Bow Range in Background (June 1975)

Figure 7P-15 Colorado 14 in the Upper Reaches Adjacent to the Cache la Poudre River (June 1976)

Figure 7P-16 Chambers Lake, used for Recreation and Irrigation Storage, at the Beginning of the 11.2 Miles of Highway Improvement (June 1976)

Figure 7P-17 Logging has been an Activity in the Area (June 1975)

Figure 7P-18 Cameron Pass Summit Area

Figure 7P-19 The Present Gravel Road on the West Side of Cameron Pass (June 1975)

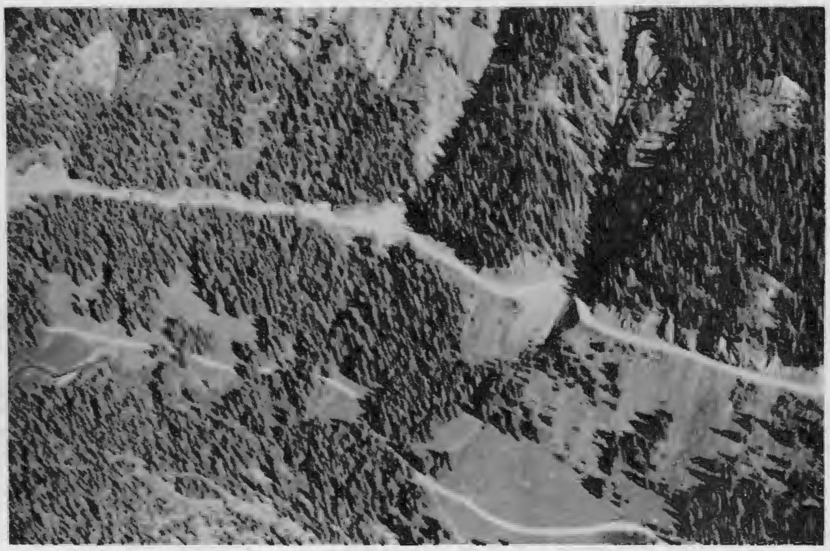


Figure 7P-20 The Present Gravel Road Descending toward Gould (June 1975)

Figure 7P-21 The Present Gravel Road Descending toward Gould (June 1976)

Figure 7P-22 Vicinity of Proposed Seven Utes Ski Area near Gould

Figure 7P-23 Ranch Scene in North Park looking toward Medicine Bow Range

Figure 7P-24 Walden and the North Park Area, looking toward Mt. Zirkel

Figure 7P-25 Colorado Highway 14 Improvement under Construction at Chambers Lake (beginning of 11.2 mile improvement). Present Gravel Road is Seen above the New Alignment

Figure 7P-26 Construction of Colorado Highway 14 Improvement beyond Chambers Lake, Showing also Present Gravel Road