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The Benson Surveys

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Preface

Jim Fields was the Forest Land Surveyor on the Shasta-Trinity National Forests in northern California, from 1979 until 1989. This area is in the heartland of the "barroom surveys" done by the Benson Syndicate to defraud the Government of money and land.

Jim's work over the years in trying to retrace and reestablish the often non-existent or grossly distorted boundaries included exhaustive historical and legal research on the Syndicate and the Government Land Office.

This article is a result of Jim's efforts. It is a condensed version of an essay that was originally published in the Annual American Congress on Surveying and Mapping Technical Papers.

Jim died in a motorcycle accident on June 27, 1989. His legacy to the surveying profession includes the results of his research on the Benson Syndicate and of his tireless efforts to resolve their long-lasting effects on the Forest Service and our neighboring communities.

Introduction

There are a substantial number of fraudulent original surveys, conducted between 1879 and 1886, that affect landownership in 10 western States. The owners and managers of these lands are unable to use them without fear of trespassers. A conspiracy of land surveyors, bankers, and attorneys was responsible for the fraud, described in the extensive archives of the people who exposed and attempted to prosecute the conspirators. These prosecutions failed because of corruption in the legal system and in Congress.

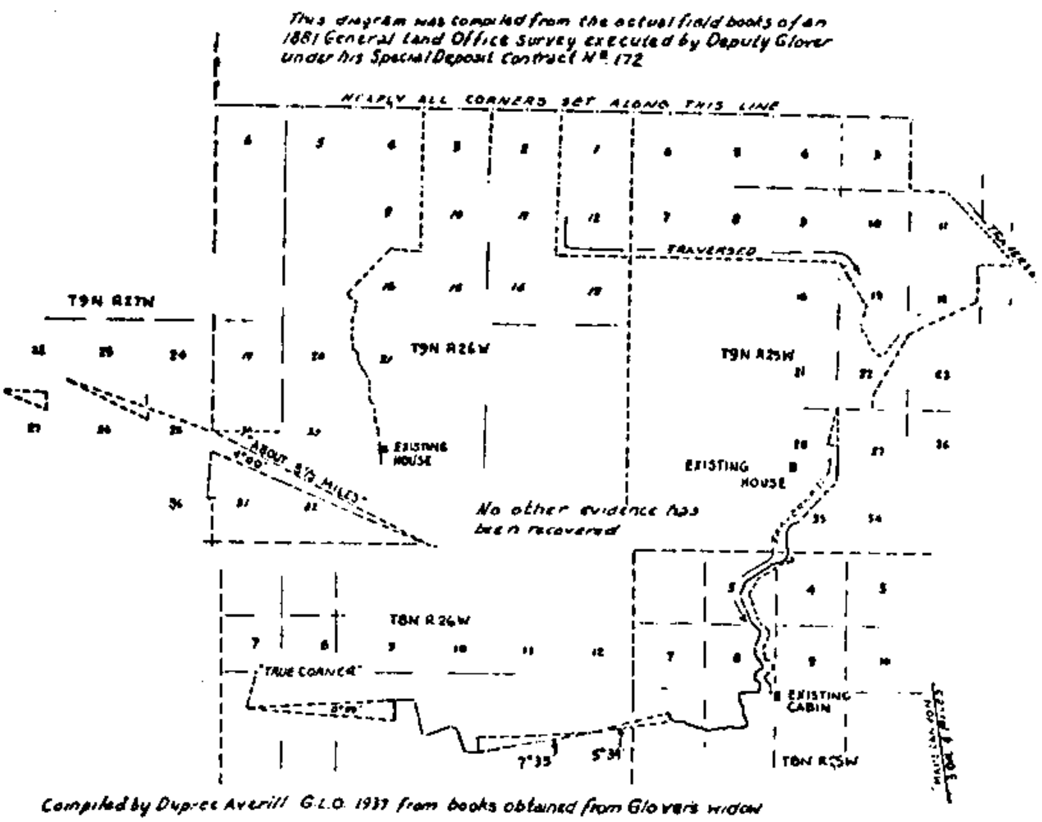
Because survey examinations began in 1885 and only involved surveys submitted but not yet approved, many of the special deposit surveys done between 1879 and 1885 are uncorrected. The confusion generated by these uncorrected surveys is becoming acute, and a rational and consistent method for addressing this confusion must be developed. The type of resurvey method chosen will significantly affect the cost of the correction. If costs are high, the work will be delayed further. Average dependent resurvey costs for a township are often in excess of $250,000.

The Problem

Many surveyors in the Western United States know that a substantial number of corner monuments for original rectangular surveys were not set. The general belief seems to be that the lack of land corners in these townships is the result of "barroom surveys" done by some "good ole boys" on what was, at the time of the surveys, useless land.

In fact, during the period between 1879 and 1886, a group of surveyors, attorneys, and bankers conspired to control all the special deposit surveys in Arizona, California, Colorado, Idaho, New Mexico, Nebraska, Oregon, Washington, and Wyoming. In California alone, the group was responsible for about 20 percent of the original surveys. This group was called the "Benson Syndicate" by the newspapers of the time.

A sample of work performed by the Benson group can be seen in a survey by Deputy J.R. Glover showing the actual work done in five townships (see figure 1). The original plats created by this skeletal work are still approved and still in effect, but any dependent resurveys using the corners actually set in these townships will result in extreme distortions and acreage inequalities. Also, a dependent resurvey in one of these or in similar townships will cost from $100,000 to more than $300,000. This dependent resurvey cost is not justified with this sort of original work.



Compiled by Dupree Averill G.L.O. 1937 from books obtained from Glover's widow

Figure 1.—Sample Benson group survey.

The ringleader of the Benson group was John A. Benson, who began his career in California in 1871 or 1873; contemporary accounts differ. At any rate, he was acting as a survey examiner in the aftermath of the Hardenburgh scandal of 1872. Hardenburgh was the surveyor-general of California and was dismissed for obtaining "kickbacks" from the deputy surveyors and for using the timing of plat approval to "claim jump" improved lands from the actual settlers.

Hardenburgh must have been an inspiration to Benson, but Hardenburgh's methods were small scale, crude, and too well known. Benson had to look for other ideas.

In 1871, the Homestead Act of 1862 was amended to allow settlers on unsurveyed lands to make cash deposits toward the cost of the necessary survey. The money also reduced the required residence time as well as the cost of the homestead.

On March 10, 1879, an additional amendment established the use of certificates of deposit as receipts for the settler's survey application. Unfortunately, the certificates were changed to allow them to be used in the purchase of any available land within the rectangular system. Worse yet, the certificates were as negotiable as cash. This was a critical point in the surveys that were to follow.

A scheme to take advantage of the 1879 amendment was evidently under way by November 1879. With the use of "dummy" settlers and false applications for surveys, control of much of the land sales was now possible. Although the maximum Government price was $2.50 per acre, even at this early time good agricultural land was worth in excess of $100 per acre. The Benson ring was to control over $6 million in land sales.

Basically, their scheme worked this way:

(1) Find an unsurveyed township. (This was not difficult, and because of the "Syndicate" surveys, it still is not.)

(2) Arrange for "dummy" settlers to apply for a survey.

(3) Make an extremely low estimate of the cost of the survey, thus reducing the deposit amount.

(4) Obtain the cost of the deposit from the Bank of Nevada, which was in collusion with the surveyors.

(5) Begin the survey, then "discover" that the initial estimate was too low and obtain additional money from regular survey appropriations.

(6) Perform only a skeletal or reconnaissance survey and submit the field notes to Benson, who would compose a complete set from the partial information.

(7) Use the special deposit certificates to purchase valuable agricultural or timbered lands under the Homestead Act.

The special deposits accelerated the surveys to a point defying natural laws. The number of contracts awarded in 1880 was twice that awarded in 1879. More miraculous yet, while a flat agricultural township survey had required from 3 weeks to a month to complete, the new township surveys in the steep brush-covered mountains were supposedly completed in only 5 to 10 days. The resulting plats were models of regularity, and some topography would be shifted more than a mile out of position. In one instance, Deputy Berdan lost 6 miles of the steamboat-carrying Sacramento River.

The Benson Syndicate abuses required that the graft be widespread, and there is evidence that some commissioners of the General Land Office were involved.

In 1885, however, an honest commissioner was appointed. When Commissioner Sparks took office, he was extremely upset at the corruption spread throughout the General Land Office. He began drastic reforms, one of which involved field examinations of surveys.

Budget restrictions limited Sparks to examining only those surveys that had been submitted as complete but had not yet been approved. A 3-year statute of limitations on bond recovery blocked any examination of previously approved work.

Before the end of 1885, Commissioner Sparks began sending survey examiners into the field. A few proved unreliable. Agent Pennybacker sent glowing reports of the Benson work. It was later reported that George Perrin, one of the Benson Syndicate, was bribing Pennybacker to stay away from the field. However, three additional agents proved to be very effective. Shortly after James Treadwell, George Pickett, and Charles Conrad arrived in California, their reports declaring the Benson Syndicate work to be fraudulent began arriving in Washington. (Treadwell, in addition to his survey work, was instrumental in the final exposure of the Redwoods Land Fraud, in which the McNee brothers, survey bondsmen for the Benson Syndicate, had bribed about 400 people to make agricultural homestead applications for 60,000 acres of virgin redwood lands.)

Although Treadwell's annual salary was $1,300 during the course of this investigation, he turned down a $5,000 bribe. His investigations stopped any further fraudulent survey work in northern California by the Benson deputies. However, congressional pressure was brought against him through Secretary of the Interior Lamar, and Commissioner Sparks was unable to keep Treadwell from being dismissed. There is little doubt that the Benson people were responsible. Shortly after Treadwell's dismissal, George Perrin threatened Agent Conrad with the statement: "We got rid of Treadwell, and we'll get rid of you as well."

Treadwell's reports show that even on base lines, only short traverses had been run through the easily surveyed areas.

Agent George Pickett was hired by the Government in his home State of Illinois and sent to California. He examined surveys primarily in the southern part of the State and found the skeletal or nonexistent survey to be normal for the Benson Work. Pickett's investigations alarmed Deputy Surveyor W.H. Norway, Benson's man in Santa Barbara. Norway visited Pickett's camp and hinted broadly at exposing the Benson operation. However, shortly after the visit was reported to the Washington office, and only 4 months into a new fiscal year, congressional pressure greatly reduced the already appropriated survey examination money, and Pickett was dismissed. Moreover, he was required to pay his own way back to Illinois.

Agent Charles Conrad had been a bit wiser than either Treadwell or Pickett. Before beginning his field examinations, he had carefully aligned himself with newspaper people in Sacramento and San Francisco.

During December 1886, Conrad sent Commissioner Sparks his first field examination report showing numerous skeletal surveys. By April 1887, a Federal grand jury had handed down 41 indictments for conspiracy to defraud the Government.

Conrad took full advantage of his press connections. The press coverage of his investigations sent the Benson deputy surveyors scurrying to him to protect themselves from prosecution. During the course of Conrad's meetings with the Benson deputies, he asked a number of the Benson men to answer 29 questions under oath. The sworn responses did not agree with the initial or final oaths as shown in the previously submitted field notes. Charles Holcomb stated that he had never been a deputy surveyor, although there were contracts in his name for over 70 townships. Henry Meyrick said that he knew that the work done under his signature was not done in the manner shown in the submitted field notes. C.P. Ragsdale said that his skeletal field notes were completed in John Benson's San Francisco office. There was other equally damaging testimony.

However, even with the above admissions, the Federal indictments were in trouble. The prosecuting U.S. Attorney, Henry S. Dibble, was "moonlighting" for the Bank of Nevada, Benson's bank. Inevitably, the indictments were rejected as being incorrectly made.

Even protected by Attorney Dibble's incredible conflict of interest, John Benson fled to Denmark in August 1887. While in Copenhagen, he was arrested by an English detective and was charged with being a terrorist dynamiter. After several months in a Danish jail, the U.S. began to look better. Benson managed to gain release through the American consul who held him until he was returned to the United States in 1889 in the hands of a marshal. Benson then faced new indictments, which had been sustained by the U.S. Supreme Court.

With the removal of Pickett and Treadwell, Agent Conrad was the chief prosecution witness against the Benson group. In early 1889, Conrad also was dismissed. His newspaper friends protested, and he was reinstated. On July 20, 1889, Secretary of the Interior Noble received a telegram from

Senators A.P. Jones, Leland Stanford, and William Stewart, and Representatives C.N. Felton, William Morrow, and T.J. Clunie urging Conrad's dismissal. The protesting Senator Stewart also was the primary defense attorney for the Benson group.

Agent Conrad was dismissed four times and rehired three times. By August 1889, he was gone and the Government had lost its prime prosecution witness.

U.S. District Attorney John Carey began the trials with the weakest indictment. Carey did not want to lose, but apparently was under direction to do so, for when he resigned he wrote a 30-page apology to his successor for questioning the integrity of the Benson surveys, disregarding the many reports by Treadwell, Pickett, and Conrad.

Carey's successor was attorney Charles Garter, whose lack of enthusiasm for the prosecution was even more pronounced. He told Special Agent Edwin Bruce to proceed carefully for "we do not want to convict anyone." Even with this attitude, Garter demanded an assistant. This assistant was F.S. Stratton, the son of the former surveyor-general of California who had approved, without field examination, 41 of the Benson township surveys.

On the day that the United States was to sum up the prosecution's case, U.S. Attorney Garter went to the horse races, leaving his assistant, who incidentally had a boil on his neck so large that he couldn't turn his head, to sum up. The assistant, boil or not, was at any rate cut off by the presiding judge halfway through his jury presentation.

The Benson group had thoroughly defeated the Government in the trial of the first indictment. The additional cases were scheduled for January 1893, then were delayed for a year. Before the defendants could be brought to trial, Benson's attorney in Washington, D.C., Colonel Hazleton, who was also a close personal friend of General Land Office Commissioner Lamoreux, offered the Government the infamous "1894 Compromise."

This compromise, fought bitterly by the honest attorneys and agents of the Justice Department, agreed to send the indicted deputies back into the field to "place in a perfect condition all surveys under their rejected contracts, said revisions to be subjected to a careful and rigid examination by a trusted employee of the Department of the Interior; provided if thereafter the Department of Justice would consent to allow said indictments to be dismissed and the (civil) suits (against the bondsmen) withdrawn."

This was an admission of guilt because the defense had been that the work had been faithfully done. The Benson group wished to get the prosecutions of the surveys away from the Justice Department and back into the General Land Office where Benson had nearly full control.

Special Agent H.L. Collier was directed to ensure the correctness of the resurveys. Collier went to California in July 1895 and immediately asked the deputy surveyors to bring their surveys into conformance. By December 1895, no work had begun, and Collier went to Benson and demanded that Benson use his influence to begin the revisions.

Benson began by bringing witnesses and affidavits asserting that the work in T.1S. R.1W. San Bernardino Meridian was done properly, but Special Agent Collier rejected these witnesses. Consequently, Benson, Glover, Perrin, Rielly, and "two full corps" of surveyors went into the township and began work. After a week of a "desperate" effort of trying to find a place to begin, they *gave up* and moved into another township 16 ranges west. In this township, they made no pretense of looking for original work and began totally new surveys. These resurveys completely repudiated the original notes, the plats, and all the affidavits and witnesses brought by Benson.

When Agent Collier found that Glover had completed his resurvey in T.22S., R.13E., Mt. Diablo Meridian, Collier wrote to the deputy and obtained a copy of his actual field notes to compare with the special agent's survey and the original notes. From Benson, Collier also received the official surveyor-general's copy of the field notes for the same work. There was little agreement between the Benson and the Glover notes, even though this time the field work had been done. Benson was still editing the notes.

Collier confronted Benson with both Glover and the two dissimilar field notes. Benson, with a fine mathematical concept of infinity, told the special agent, "I have three or four sets of notes for that township, and I am sure by combining them all, I can get up a set that will check your work." Benson, however, was unable to do so until he was furnished with a copy of the Government's checknotes.

But Agent Collier was in trouble. He was recalled to Washington, D.C., and was dismissed for having required too much time in getting the revisions done, notwithstanding that he was under orders to examine only work that was completely revised by the deputies.

In June 1897, an "Amended Stipulation" was added to the 1894 Compromise. This stipulation said that all of the rejected surveys would be accepted if the indicted deputies would not sue the Government for damages. So without further examination, the Government put forward $400,000 to the Bank of Nevada for the surveys.

The Benson Syndicate had beaten the Government soundly and, moreover, was back in the contract survey business. Benson's old friends Glover and Perrin were awarded new contracts involving 30 townships.

Though the townships involved in the indictments and the 1894 Compromise were finally rejected in 1911, there still remain in 10 Western States a large number of Benson surveys that were approved before the Sparks field examinations of 1885.

Conclusion

The skeletal work that was done makes the surveys worse than useless. Landowners either find no land boundary corners at all or find a few and attempt a protraction from these. Deeded land often cannot be located within thousands of feet.

A rational and equitable solution must be developed to rectify these conditions and to protect the public interest. The problem in California grows more complex each day as deeds are subdivided further.

The intent of the rectangular survey system was to set land corners in a way that would permit settlers to occupy their lands with confidence. Where the surveys were faithfully done, 80 to 90 percent of the corners can often be recovered even after 150 years have passed; with many of the Benson surveys, recovery runs from 0 to 10 percent on surveys that were done 50 years later.

The surviving and still approved Benson special deposit townships should be examined on at least seven counts:

(1) Are there ownership problems in the township?

(2) Has the township been subjected to a rigorous search by qualified people?

(3) Does the approved plat topography match the ground?

(4) Was the work done under the special deposit system?

(5) Was the work done between 1879 and 1886?

(6) Could the work have been done within the time shown on the approved notes?

(7) Does the pattern of combined ownership and found original corners warrant the use of an independent resurvey method?

The Benson surveys must be corrected.

Project Management in the Forest Service

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Introduction

History of Project Management

Project management is the application of analytical, scheduling, and network planning techniques to accomplish project tasks efficiently. With the evolution of systems theory in the 1950's, the Critical Path Method (CPM) was developed. CPM is a project-scheduling technique that determines the early and late dates for individual project tasks and the project as a whole.

In the past, the Forest Service has used CPM. When calculated by hand or on large mainframe computers, CPM was time consuming and difficult to use. Today, many commercial project management programs that use CPM are available for the personal computer. These programs are much more convenient and easy to use than the old hand and mainframe methods.

Definitions

Project management employs definitions unique to the profession. The following are some of the basic project management definitions:

Activity (task)—Any of the basic jobs that must be done to complete a project.

Dependencies—The relationships between activities in a project.

Float—The length of time a noncritical activity can be delayed before it affects the project finish.

Project—A set of activities related to the achievement of some planned objective.

Resource—Any person, piece of equipment, or material used to accomplish a project activity.

Applications in the Forest Service

Preconstruction Engineering

Logging road construction projects have features not found in other construction industries. Such projects usually take place in remote and difficult environments and with limited resources. For these reasons, resources must be adaptable to changing site conditions and operating procedures. Project management programs can schedule construction activities against limited resources while optimizing the time required.

In the past, Forest Service designers and cost estimators were liberal with time allowed for construction projects. Construction experience in other Federal agencies has shown that contracts that provide more time than is actually needed for a project may discourage innovative management or construction techniques, encourage contractors to bid more work than they can handle, and increase agency administration costs. On the other hand, contracts that specify less time than is necessary for completing the project can result in higher bid prices and the elimination of contractors with less efficient equipment. However, these contracts with inadequate time also can encourage efficient construction techniques and lower the administration costs.

When logging road construction projects with limited resources are analyzed in greater detail and scheduled using project management programs, an accurate estimate of their schedules and optimal contract times may be made. Project management gives the design engineer a device for planning construction schedules, but project management is receiving only a cursory evaluation at present.

Contract Administration

The traditional place for project management software has been in the construction industry. Scheduling construction projects, estimating costs, and administering contracts are common uses.

By using a project management package for contract administration, the Forest Service has a document to prove accountability in cases involving claims. These programs also track projects for inspection activities. Project management programs are valuable tools for evaluating contract changes and changes in contract times.

Work Load Scheduling

Through scheduling, managers may determine the resources needed for work projects and allocate those resources to keep projects on track. Supervisors in charge of several employees will find project management programs especially useful for work load scheduling.

Timber Sale Contract Preparation

Some National Forests are using project management to coordinate interdepartmental preparation of timber sale contracts. With project management scheduling, the various disciplines can better see how they fit into the total process. Project management also is being used to schedule the environmental assessment process.

Coordination of Forest Planning

Some National Forests are using project management software to coordinate the steps in preparing Forest Plans.

Road Maintenance Scheduling

Road maintenance scheduling with project management allows more efficient use of materials, labor, and equipment, with little down time or fluctuation in work load. This results in less time lost from waiting for materials, equipment, and instructions. The use of project management scheduling also encourages managers to better plan their projects.

Commercial Project Management Software Programs

Use of the Project Management Programs

The first step in using a project management program is to enter the project activities and the dependencies between activities. Resources are then assigned to each activity and leveled over the activities to eliminate resource conflicts. When this is completed, the schedule may be modified by changing the number of resources assigned to each activity and the activity's scheduled dates. When the desired project schedule is achieved, various reports and plots may be generated. The project management program can then be used to track the progress of the project and compare the forecasted schedule to the actual schedule.

Evaluation of the Programs

For the evaluation of commercial project management programs, a typical road construction project was scheduled with three packages: Symantec's TIME LINE, Computer Associates' Super Project Expert, and Microsoft's Project. All three programs run on a personal computer.

Versatility is the best characteristic of Symantec's TIME LINE. The ability to customize many of the features and reports in TIME LINE makes this a multipurpose program. The program is available for $435 from Government Technology Services, Seattle, Washington.

Super Project Expert is a very powerful program loaded with features. At $343 from Government Technology Services, it is one of the best project management packages for the money. It is difficult to learn, but it has the most features of the programs evaluated.

Project is an easy program to learn but has limited features. It may be considered a class below the other programs evaluated.

The time required to learn each program and schedule a road construction project gives a good indication of the user friendliness of each program. Table 1 summarizes the approximate time consumed using each of the programs.

Table 1.—Learning time by program (in hours).

Category	*Project*	*TIME LINE*	*SPE*
Tutorial	3.5	3.0	1.0
Learning features	8.0	16.0	28.0
Entering data	4.0	3.0	3.0
Manipulating data	10.0*	4.0	4.0
Total	25.5	26.0	36.0

*Project takes longer to manipulate data because of its limited resource-leveling features.

Questionnaire to Project Managers

A questionnaire was prepared and sent to Forest Service employees to find out what project management programs were being used.

One respondent had used three packages: Harvard Total Project Manager, TIME LINE, and Super Project Expert. Of the three, the respondent recommended TIME LINE and Super Project Expert and suggested that: "TIME LINE is perhaps the simpler to use of the two recommended," and "The Harvard Program was the most difficult to learn and use of the three programs."

Another respondent noted that project management scheduling is mandatory in engineering consulting firms. From experience, the respondent stated, "Private firms coordinate, design, and schedule projects more efficiently than the Forest Service because they use project management."

Conclusion

Of the programs evaluated, TIME LINE and Super Project Expert are very good programs; TIME LINE is the easier to learn and use.

Many Federal agencies require project management scheduling. They have found that accurate construction schedules encourage innovative management and construction techniques and also lower administrative costs. Private engineering firms also require project management because they have found that it allows them to coordinate, design, and complete projects efficiently and on schedule. The Forest Service can benefit from the use of project management programs.

Effects of Delineation on a Low-Volume Road

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This article is a synopsis of a research paper completed at Oregon State University by the author in the spring of 1990. Contact Westfornet for copies of the entire 80-page paper.

Introduction

The basic purpose of engineering is defined in the Oregon State Statutes as the protection of life, health, and property. Low volume road maintenance and design require resolving conflicts that develop from this basic purpose and involve balancing the costs and benefits of various design features. Current research has identified the elimination of continuous pavement markings as a way to reduce the cost of maintaining low-volume roads, with special treatment recommended for high-risk locations. The research paper described above investigated several methods to improve the safety performance of low-volume roads. These methods are alternative forms of delineation for the high-risk locations. The primary method of evaluation is comparison of spot speed distributions before and after treatment of the selected curves.

Object of Study

The purpose of this research was to analyze the effects of various delineation methods on the operational characteristics of noncommercial traffic at sharp curves on low-volume roads. The study was conducted on eight curves along a 10-mile section of Forest Service Road #33 on the Siskiyou National Forest. Six of the curves are each the site of at least one reported accident in the 5 years prior to the study. Two of the curves are comparable in design speed to the curves with reported accidents, but had no reported accidents. All six curves with accident histories were less than 200 feet in radius and had approach targets longer than 200 feet. Figure 1 shows the general arrangement of six of the study curves.

The research objectives were to document the differences in free speeds at sites near the study curves. Two different types of delineation were studied:

(1) Delineator posts, spaced in an approximation of the current Oregon Department of Transportation standard.

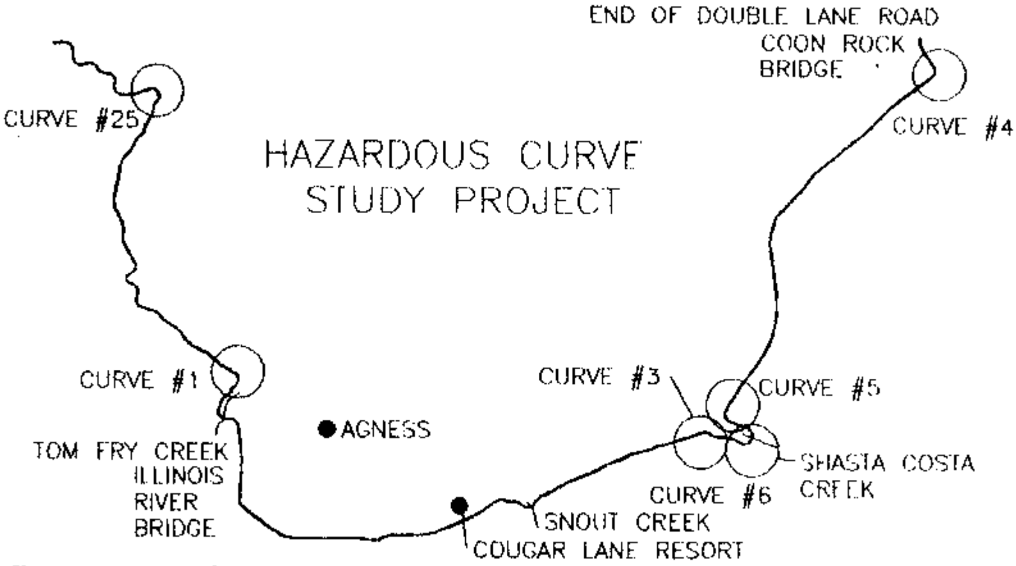

Figure 1.—Map of study area.

(2) Pavement markings, replacing old faded MUTCD standard 4-inch-width reflectorized painted pavement markings.

Study Approach

A literature review is included covering previous studies on curve speed, delineation methods, low-volume accident studies, and review of available design and accident records for Forest Service Road #33. The literature review on curve speed focused on the evolution in curve design speed policy from its beginnings in the 1930's to the current 1984 AASHTO design guide. Emphasis is provided on the current policy for maximum recommended side friction values. The delineation methods reviewed include pavement markings, post delineators, and traffic warning signs. Accident studies reviewed include data obtained from the Oregon State Highway Department and various studies performed on low-volume rural roads. The review of Forest Service Road #33 highlights the design description and accident records for the studied segment of roadway. Below is a description of the statistical analysis on the data.

Figure 2 shows the lane descriptions (outside and inside), the delineator pattern studied, and a typical section of Forest Service Road #33.

Equipment

Primary data was collected with a Kustom HR-4 hand-held traffic radar speed meter. The spot speeds were recorded to the nearest 1 mile per hour by the traffic radar and the observer. The delineator posts were installed with a standard carsonite post driver and a heavy-duty starting point to prepare the site.

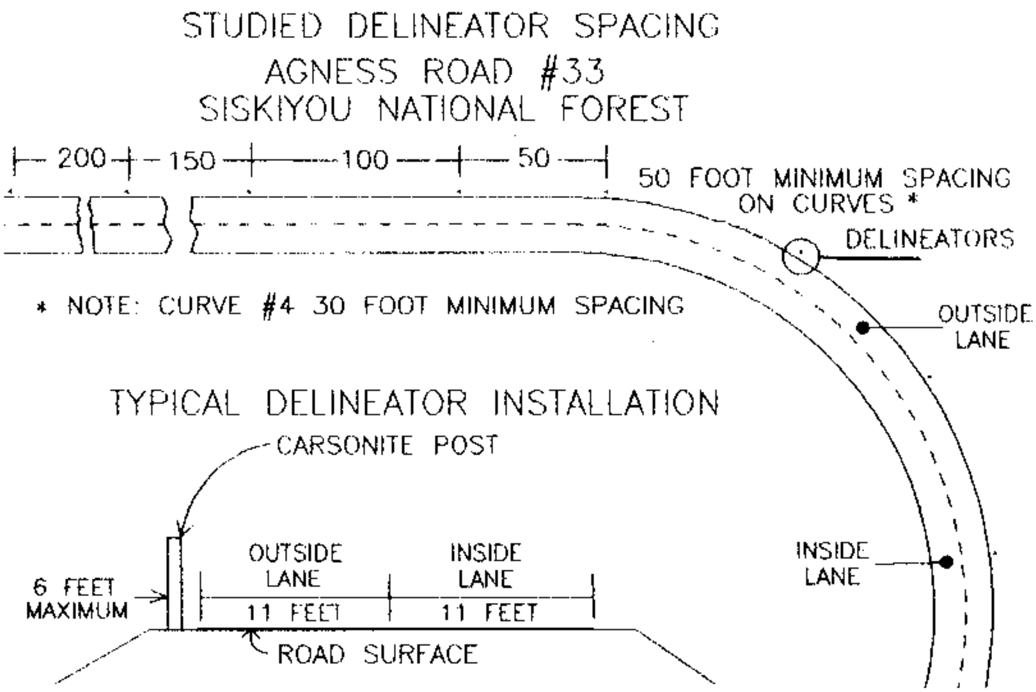

Figure 2.—Post delineator pattern.

Results

Spot speed distributions are compared for before and after the installation of delineator post reflectors and painted pavement markings at eight curves along a low-volume road. After post delineators were installed on four curves, significant reductions were observed in the outside lane mean speeds. No consistent changes were observed in the mean speed distributions after later installation of only the painted pavement markings for the other four curves. Table 1 shows the observed speed differences after installing only the post delineators on the roadway with old faded pavement markings.

A review of table 1 shows initially decreased mean speeds at all sites. All outside lane differences in mean speeds were statistically significant at the 90-percent confidence interval for a two-sample t-test procedure.

Table 1.—Mean speed reductions (in mph) observed after installing post delineators (existing speeds minus post delineator speeds).

Location	*Outside lane*	*Inside lane*
Curve #4	($\underline{1.8}$)	$\underline{1.6}$
Curve #1	$\underline{1.1}$	(0.6)
Curve #5	($\underline{3.0}$)	1.1
Curve #3	$\underline{3.4}$	(0.8)

( ) Group with an accident history.

____ Statistically significant at 90-percent confidence level.

Accident History & Record After Treatments

In the 12 months before treatment of the roadway, evidence of approximately 10 run-off-the-road-type accidents were found on the studied road segment. For the first 8 months (the first winter season) after treatment of the hazardous curve sections, only one run-off-the-road-type accident was reported. This accident occurred at a different location than the eight curves studied. For longer term accident results, contact the Siskiyou National Forest.

Sign Planning & Sign Sizing Aids

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Sign Plans

Sign plans come in many varieties, from card files showing photos of each sign and its site to complex computer aided drafting inventories. However it is compiled, a complete sign plan will include the existing signs, their condition, location, physical characteristics; and an action plan for proposed sign replacements and installations and the relative costs. To be effective, a sign plan should fully inventory all signs, but more importantly, it should be a tool to aid the Sign Coordinator in programming and planning all signing operations.

Data General FES Sign Plan

Dan Davis, District Sign Coordinator, with the aid of East Zone Engineer Don Mcguire and District Computer Technician Tina Thornton, developed a complete sign inventory on the Data General in the FES system. This system was selected because of the simplicity of operation for a user and the ability to sort by any of the valid entry fields.

This sign plan differs from many others in that it includes a 3-year action plan, an inventory for stockpiled signs, and a cost figure for each entry. These items help the Sign Coordinator plan and program budgets and work loads in signing for out-years.

Entry elements for the program are the following:

Record Number
Status
Sign Material
Last Maintenance
Year Installed
Support Size
Inst Responsibility
Funding Code
Number of Posts
District ID
Sign Type
Road Number
Mtce Responsibility
Reflective Sheeting
Sign Material Cost
Message (4 lines)
Number of Duplicates
Location Mile Post
Letter Type
Mtce Interval
Sign Condition
Sign Post Type
Sign Source
Remarks (2 lines)
Cost of Post(s)

With these inventory records (many are optional), one can sort by numerous fields. The standard reports allow a user to query the following:

EXHIBIT—A description of the sign plan and how it works. It aids the user who is unfamiliar with the system.

EXHIBIT A: INVENTORY OF EXISTING SIGNS—A complete listing of all signs, including the type of sign, condition, message, letter type, material, post type and size, year installed, and a maintenance record, which includes the responsible party, when it was last maintained, and when the next normal maintenance is needed.

EXHIBIT B: INVENTORY OF PLANNED SIGNS FOR 3 YEARS—This summarizes a 3-year plan for the anticipated signs, details for ordering, and the associated costs. It aids in establishing a proposed budget and work load for signing.

EXHIBIT C: INVENTORY OF WAREHOUSED SIGNS—A full inventory of all signs in stock, showing each sign's supplier, location (if applicable), and value.

EXHIBIT D: RECREATION SIGNS—Because Recreation funding is often different, and often a source for much of our signing, this report allows a quick summary of the recreation signs installed and in stock. Subreports also can query signs to be purchased.

EXHIBIT E: COST OF EXISTING SIGNS—This report gives the full cost of all signs. Its use is limited, but it could be beneficial in the long-term budgeting process.

EXHIBIT F: COST OF PLANNED SIGNS IN NEXT 3 YEARS—Three years is the traditional planning period for sign replacement on a routine basis; this query allows quick retrieval and estimating of future budget needs.

EXHIBIT G: COST OF ALL SIGNS INSTALLED—This is an inventoried cost of all signs in place and the appropriate function to which each sign is chargeable.

INPUT—This report lists all data in the system.

MTCE—A listing of all signs needing maintenance. This query is very useful in planning work for seasonal force account crews, as well as contracting sign maintenance. It lists all signs that have an identified maintenance need.

SIGNBYRD—This report is a handy paper copy of all signs by road. When planning to travel Forest roads, the Sign Coordinator and Zone Engineer often pull a report of signs by road for their planned route. Because the report prints this up in mile post sequence, quick visual inspections can be made as they travel down the road. Obvious deficiencies can be checked and noted on the paper copy. Returning to the office, the data can be loaded onto the inventory at the convenience of the computer operator or Sign Coordinator.

These standard reports cover most of the common needs of the Sign Coordinator and Zone Engineer. Additional needs are easily generated through custom reports in the FES.

Summary

Dan Davis has found that the maintenance report significantly reduced his planning time. He runs a copy of the MTCE exhibit, highlights the signs needing work, and uses the printout as a worklist for his maintenance crew. Additional work done by the crew is penciled in red and reentered into the inventory to serve as an accomplishment report. New signs can be ordered directly from the report and inventoried in the warehouse, thus assuring that work for the summer maintenance crew is always efficiently handled.

For more information on this sign plan or retrieval of the program, contact Dan Davis on the Medora Ranger District at (701) 225-5151, DG:R01F08D07A, or Earl Applekamp in the Regional Office at FTS 585-3410, DG:R01A.

Sign Sizing Program

Sign planning is a large part of the Sign Coordinator's responsibility, but another time-consuming job that seldom gets adequate attention is the sizing of signs. Current methods of sizing signs usually involve tables that approximate sign size based on the number of letters in the longest line on the sign. Little if any attention is paid to the "balance" of the sign or the efficiency of abbreviations in signing because of the difficulty and time it takes to size the face. As a result, many signs are off balance, too large, or inefficiently laid out. Because of this, and the tedious task of trying to exactly size a sign according to the Series "C" alphabet, Earl Williams developed a sign program that rapidly calculates areas.

SIGNRDTR Version 2.00. EB

This personal computer program was written to calculate the length, height, and area of a sign panel for road guide signs and trail directional signs, in both the standard and wilderness shapes (trail direction and TDW signs).

Upon entering the program, the prompt will ask you if you want to size a road sign or a trail sign. You make your selection, and if you select a road sign, you then enter the letter height. If you select a trail sign, you can choose a standard sign or a wilderness sign. All trail signs use 1-inch letters.

The computer then asks you how many lines the sign will contain. You make your entry, and then simply type in your message, including any directional arrows and mileages that are necessary.

After you enter each line, the program gives you the exact length of the message and the minimum sign panel required for that line. The size is based on the spacing guide set up specifically for each letter sequence in the Series "C" alphabet. This is much more exact than an approximate table.

After all lines have been entered, the program will display the length of each line and will allow you to decide whether the sign could be better balanced. If acceptable, you enter the desired sign width (round up to the nearest inch for contracting specifications), and it will calculate the actual square footage. Next, you can request a picture of the sign. This will show the approximate layout with the dimensions and default colors for guide signs. At this point, you can easily compare lines and experiment with abbreviations or layout to make a more attractive and more economical sign. This entire process takes about as long as it takes to read this portion of this article.

The program also checks for misuse of the arrow configuration or improper entries. It will not allow a novice to build a sign with the directional arrows in the improper sequence or at the wrong location in a line. This has proven handy for people who order signs infrequently and do not remember these rules.

Upon completion of the design, the sign can be stored, and another sign can be created. After all signs are designed, a printed copy can be generated. Forests in this Region use this printed picture on sign requisitions to save additional time in preparing the order.

Summary

The program has been written and compiled to work on all IBM-compatible computers.

The program will allow the user to—

(1) Concentrate on designing a concise, precise, and balanced sign.

(2) Rapidly rerun text changes.

(3) Shorten or lengthen the panel by changing the number of lines of text.

(4) Compare text line lengths to determine where abbreviations would shorten the panel length.

(5) See a picture of the sign.

(6) Add data to the picture of the sign.

(7) Print a picture of the designed sign panel.

(8) Convert instantly the dimensions of a rectangular trail direction sign to those for a TDW shape.

The program checks—

(1) The sequence of ahead, left, and right arrows.

(2) The placement of an arrow in a line of text.

The program does not—

(1) Check spelling.

(2) Verify abbreviations.

(3) Accept different letter sizes during a run.

The user can experiment and use the program to—

(1) Design a sign with different letter sizes, make separate runs for each letter size, use the longest length, hand-calculate the height, and use all text for the last run, entering the previously determined length and height.

(2) Size road signs for regulatory and warning signs and design the sign, but correct the calculated length and height dimensions to agree with the sign handbook's margin and interline dimensions.

(3) Provide hard copies of sign panel pictures. (These can be bound and used for sign plan reviews, as a sign package for formal contracts, and as a document for ordering manufacture of the signs.)

The sign sizing program is probably one of the first to use the computer for sign design. The program will probably be improved as more Forests use it. In fact, the sign sizing program has just been converted to use on the Data General System. This will make the program more accessible to Districts and units without access to a personal computer. The graphics are much better quality also. Copies of the converted program should be available at final printing of this publication from the contacts listed below.

For more information on this program or to obtain a copy of the disc or a paper run, contact Earl Williams at (406) 496-3413 (FTS 585-2413), DG:R01F09A, or Earl Applekamp in the Regional Office at (406) 329-3410 (FTS 585-3410), DG:R01A.

Getting There & Back—A New Perspective

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Preface

This article results from our realization that proactive effort is necessary to publicize the good values of forest access. We hope to get this concept approved as an emphasis by the Chief and Staff and thus to encourage all units to recognize the importance of the upkeep and management of existing roads and trails. Further, we hope that many new partnerships, both corporate and interest group, will be formed to assist the program. We invite all Forest Service employees to help us develop and nurture this effort. Please direct your thoughts to the authors and co-program leaders, Jerry Bowser and Ted Zealley, WO Engineering (W01A).

The Opportunity

Getting There and Back is part of "New Perspectives in Managing the National Forests," intended to accelerate responsible innovative environmental activity.

Getting There and Back will focus on the existing transport systems—roads and trails—their use, care, and upkeep. The access system is essential to the enjoyment and management of the National Forests, and this system must be managed for continued use.

Most activity on the National Forests depends on the transport system, which serves a variety of uses. Some of these uses are access to wildfire, access to wilderness trailheads and backcountry, motorized recreation of all types, access for grazing and mining, and access for fuel-wood gatherers and Christmas tree seekers. It is truly a multipurpose network.

Getting There and Back is also an internal adoption of the principle that the management of access and travel is every manager's responsibility. All Forest Service line and program managers need to think of road and trail care and upkeep as their responsibility, a natural, vital component of the total resource development or stewardship job—not a separate task left to specialists.

Contributors to the Program

In addition to Forest Service managers, especially District Rangers and Forest Supervisors, there are at least three groups that should contribute to the discussion of road management policies. These groups are:

(1) The customers—the people enjoying the bounties of their forests.

(2) The local communities—the people who serve visitors, who also enjoy the nearby forests; and the local governments who depend on the access routes as an extension of state and county systems. This group includes people whose living depends on forest resources.

(3) The professional and technical specialists—those who can find better ways to set levels of maintenance and upkeep that will prevent further system deterioration.

We seek open dialog, with any and all wishing to help us.

New Perspectives

Customer Satisfaction—Total Quality Management

We need to hear from people that seek enjoyment of the National Forests. Few activities on the forests can be done without using a forest road. Driving for pleasure is still the most popular recreation activity (in 1988 it amounted to more than 76 million visitor days). The Chief recognized the importance of this use when he announced the National Forest Scenic ByWays program.

Visitors spend more than 242 million visitor days a year pursuing favorite activities such as hunting, fishing, camping, and skiing on National Forests in 43 states. We don't know how the quantity or quality of access affects their enjoyment. How much access should we provide? Does road surface quality affect the choice of recreation or the decision to return? What level of safety do visitors expect on forest roads?

Rural Development—Grass Roots Support

In January 1990, the President directed the implementation of the recommendations of the Economic Policy Council Working Group on Rural Development. This initiative is intended to strengthen distressed non-agricultural rural economies.

National Forests are an integral part of rural America. Forest Plans were developed to reflect local needs as well as national needs. Visitations and management activities on the National Forests will continue to be major contributors to adjacent communities.

Tourism is increasing. It is important that National Forest management activities enhance visitors' enjoyment. This, in turn, will help maintain the local economic benefits derived from tourism. Enjoyment of the bounties of the National Forests includes a pleasing vehicle ride to and from the forest destination.

Since proximity to National Forests creates demand for services such as food, fuel, and lodging, and these resulting services diversify rural economies, we need to find out if visitation can be significantly affected by the quality and diversity of access experienced by the visitor. We also need to hear what importance is placed on the quality of access by local communities and political bodies.

Partnerships & Cost Sharing

The Forest Service has long cooperated with local governments and adjacent landowners on the management of the road systems. With the continuing pressures caused by the budget deficit, we should look for new and different opportunities to share the burden. We need to make certain that the old partnerships are still supported by the local government officials, and that they agree that this is a good method of stretching the limited dollars available to manage the local and forest access systems. They may suggest other approaches to our partnership agreements that would work even better, even partnerships with the private sector and appropriate interest groups. There may be untapped opportunities yet available with wildlife agencies and organized conservation organizations. It may be possible to further define policies and practices with respect to the requirements placed on commercial users to pay for their share of the development and maintenance costs of roads.

Economics

There still is not a consensus on the minimum maintenance expenditures that are required to avoid system deterioration. Inadequate maintenance raises the costs to users and the downstream cost of repair or reconstruction. Better scientific basis is needed to validate funding levels for maintenance that would avoid this situation.

We have historically claimed that an annual maintenance budget of 1 to 2 percent of the value of the existing investment is required to minimize degradation. Forest Service maintenance budgets have never attained that level of funding, possibly because of the credibility of the amount of need, and the recent emphasis on road development. We believe that it is time to seek additional thoughts or concepts relative to the "most economical" annual maintenance funding level. We look for help from the scientific community and transportation agencies to deal with this optimization.

Reconstruction is closely linked to a lack of maintenance. Increasing backlogs of reconstruction needs are frequently a result of insufficient levels of routine maintenance funding. These increasing backlog amounts are beginning to surface in the RPA outyear projections. We would hope to verify that there is a scientifically credible relationship between the lack of annual maintenance and an accumulating reconstruction need.

The Product

Figure 1 represents the product of New Perspectives.

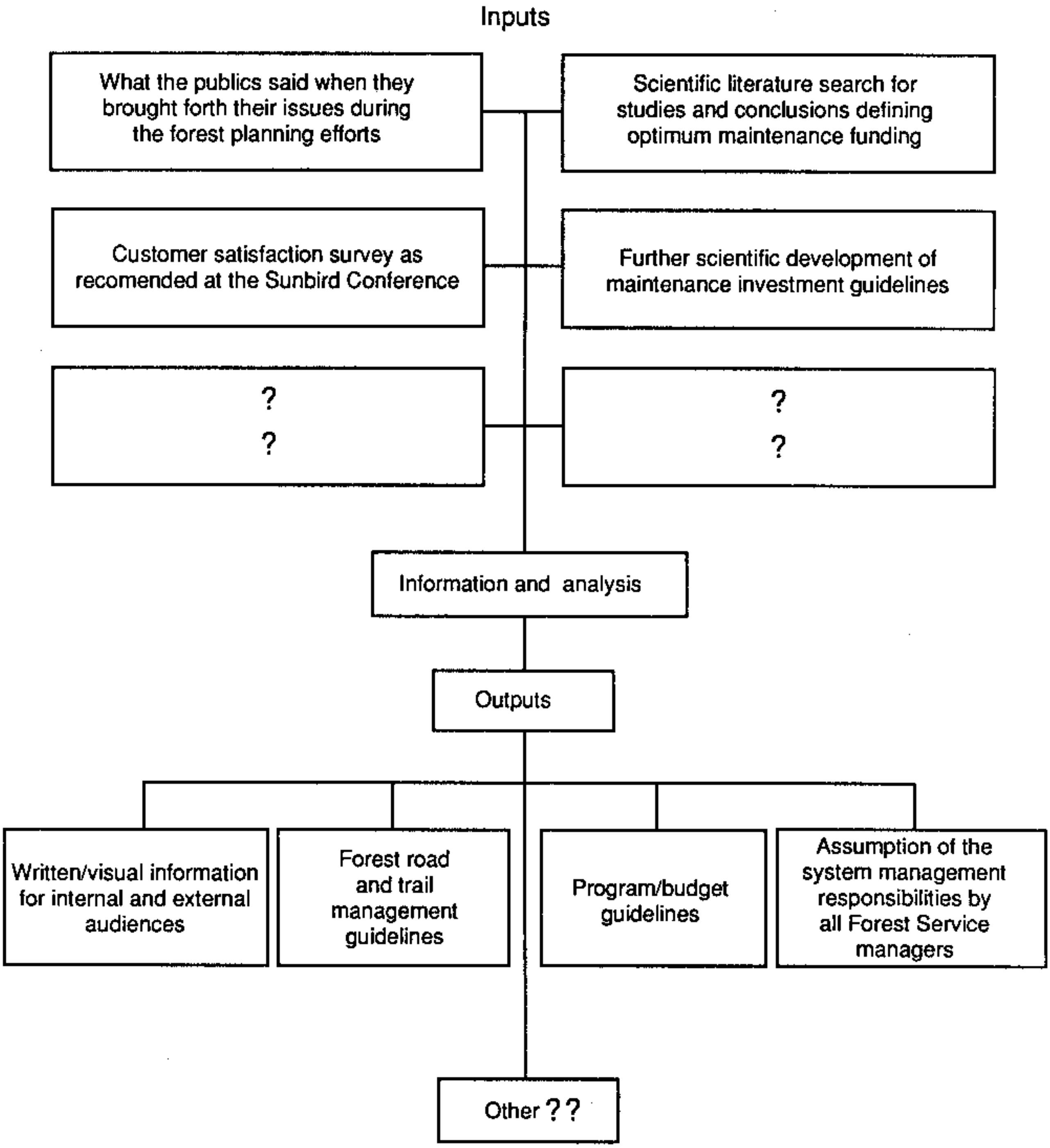

Figure 1.—New Perspectives.

Quality Service—The *Great* Expectation

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Region 5

The topic of providing quality service to the public at our developed recreation sites has been hotly debated in recent years. Quality service is something everyone supports, but few agree on what it means. The term *quality service* has been used to justify a wide variety of things, such as providing more camping units, changing vault toilets to water-borne systems, increasing maintenance, and establishing the number of times toilets are cleaned each day and the number of trips the host should make through the campground each day. Employee attitudes toward the user, the type of facilities located at a site, funding levels for developed site construction and maintenance, need for interpretive services at a site, and a number of other items have obscured the discussion because these also are known to affect the quality of service.

There has been at least one unsuccessful attempt to define quality service. Some folks have stated that it cannot be defined—it is in the eye of the beholder. In fact, it may be similar to what a Supreme Court judge once said about pornography: "I can't describe it, but I know it when I see it." This article is an attempt to clarify the situation and provide a basis for further discussion.

Quality Service Does Not Necessarily Mean "More Capital Improvements"

Providing paved rather than dirt roads in a campground or providing water-borne toilet facilities rather than vault toilets has nothing to do with the word *quality* as it relates to the developed recreation program. The amount and type of capital investments at a site determine the *level* of service (Recreation Opportunity Spectrum (ROS)) to be provided, not the *quality* of service to be provided. Regardless of whether a campground is constructed to a semi-primitive motorized level or to an urban level, neither of these standards is higher or better than the other—they are just different. To the individual wanting and expecting a semi-primitive motorized experience, arriving at a campground to discover that it is an urban level will be just as disappointing as if the converse had occurred.

A key to quality is to determine the desired ROS or development level for every campground. This should be accomplished through an integrated area planning process and should change only as a result of a subsequent planning process that has determined that a different ROS is needed. This planning process will establish the number and type of physical facilities needed at a site and create a base for determining the cost of bringing a site to that level. (The next step, of course, is to *do* whatever is necessary to create the desired ROS level.) This information will also provide a base from which to estimate maintenance and operating costs.

The Definitions of Quality Service & Whether It Is Achieved at any Particular Location Are Determined by the User

There are two factors that seem to confuse the issue when we try to define quality service: user expectations and user feedback.

First, if the provided service equals or exceeds that which is expected by the user, the user will conclude that we have provided "quality" service. The expectation of the user is the key here—how the expectation is established is therefore very important. The expectation is also made up of two subfactors: (1) the type of facilities (ROS) provided and (2) how the facilities are maintained and operated. For all practical purposes, the Forest Service has allowed the public to form its own expectations for a campground they are going to visit but have never visited before. These expectations are based on items such as images of all the other campgrounds they have visited and what friends have told them. The Forest Service could easily have controlled their expectation to a large degree if the ROS had been described on the map they used to get there. For example, if they had wanted an experience provided by an urban level site, they would have gone to one listed as such and not to one shown as a primitive level site. If the various experience levels are well publicized and explained, the user knows what to expect and is not disappointed. At least in this respect, they would have been satisfied users.

This also would produce a very good indication over time as to whether the correct mix of levels desired by the users in a particular area are being provided. For example, very high usage at an urban level site with low usage at a nearby semi-primitive motorized level site would indicate that the mix is probably wrong. Proper advertising of the ROS level for each site would help direct "user expectation" and allow the Forest Service to concentrate on appropriate levels of maintenance and operation.

Regardless of the maintenance and operation actions the Forest Service establishes to provide the desired quality service level, the application of these actions must be tied to the percentage of occupancy of a campground. To achieve the quality service level the agency wants to provide, the base amount of these actions must be established for an assumed minimum level of occupancy. As the percentage of occupancy increases above that level, the time and money expended on each of these jobs also must increase if the quality of service is to remain constant. No developed site should be operated if quality service cannot be provided at this predetermined, constant level. (Partial closure of a site also may be an alternative that should be considered.)

The second factor, user feedback, can be addressed by developing a method that can be uniformly used to determine whether users' expectations were not met, were met, or were exceeded at a particular site. There is currently no uniformly accepted method for determining whether quality service objectives are being met. Research is developing methods for determining customer satisfaction and is pilot testing these methods in 1990.

Summary

The following actions must be taken before quality service at developed recreation sites can be uniformly successful:

(1) Establish existing and planned ROS or development levels for all developed sites. Ensure that changing from existing to planned ROS levels is emphasized in the capital investment program as necessary.

(2) Provide all potential users with the existing ROS or development levels at all sites and a description of these levels.

(3) Define the minimum quality service for each developed site—that is, what maintenance and operation actions must take place and at what intervals for an assumed base occupancy at that site.

(4) Develop guidelines to determine the required increase in maintenance and operation actions to maintain constant quality service at a developed site as the percentage of occupancy increases from the base.

(5) Develop program budgeting policies and guidelines that will assist in ensuring that developed sites are operated only if quality service can be provided.

(6) Use research development methods to obtain information from the users on how well their expectations were met.

(7) Systematically check research results in interim years through fee envelope comments, host interaction, and so forth.

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