

RESPONSE OF VISITORS

to the

RAINBOW TRAIL:

an evaluation of an interpretive area in the
Lake Tahoe Basin, California

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ACKNOWLEDGMENTS

Special thanks are due to Alison Binder for her assistance in the conduct of the research; and to Nordstrom Whited, visitor information specialist, Recreation Staff, California Region, Forest Service, U.S. Department of Agriculture, San Francisco, and the Forest Service personnel at the Rainbow Trail for their cooperation.

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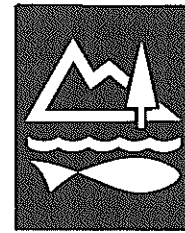
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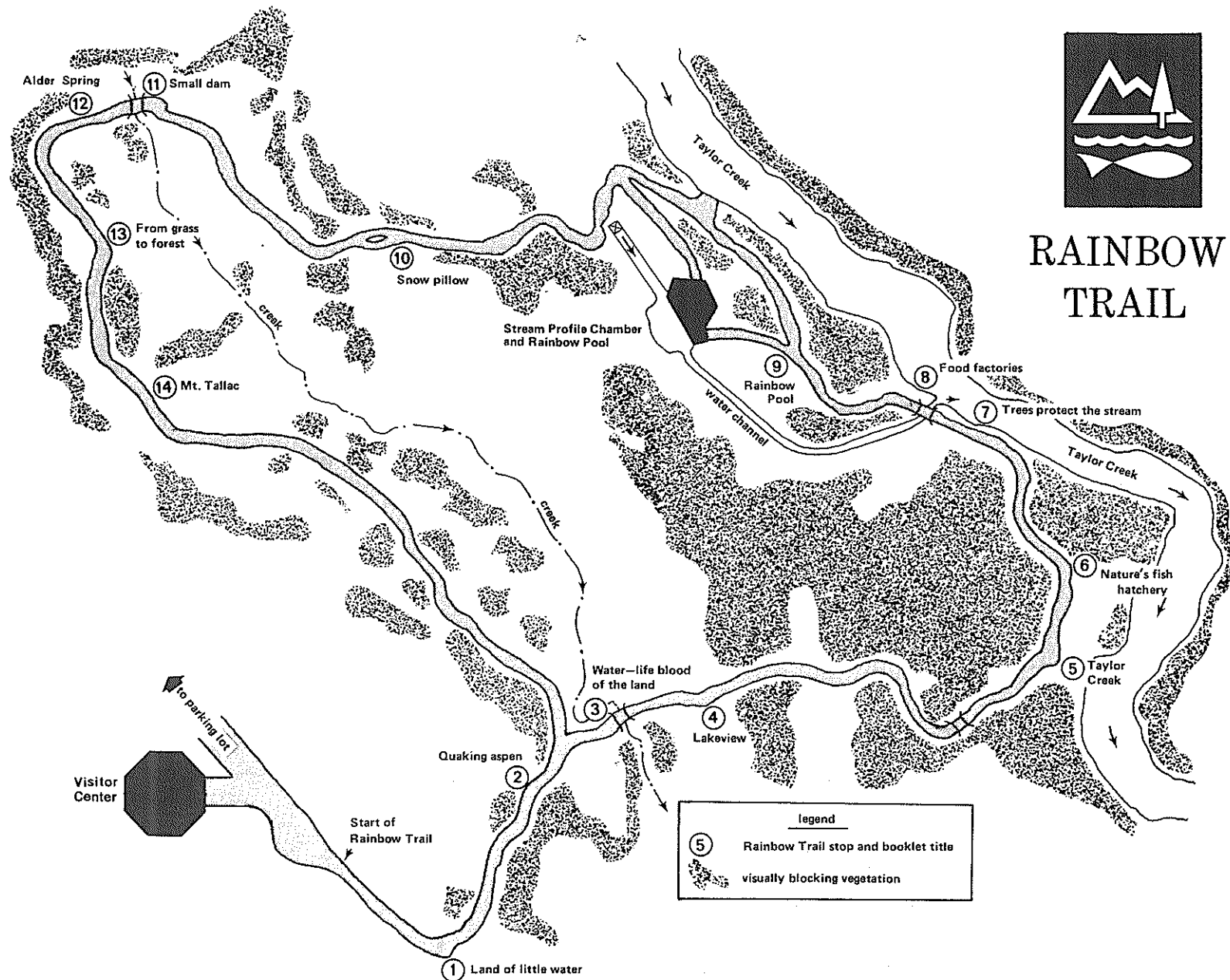
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**Pacific Southwest Forest and Range Experiment Station
P.O. Box 245
Berkeley, California 94701
1978**



RAINBOW TRAIL



IN BRIEF...

Kuehner, Richard A., and Gary H. Elsner

1978. **Response of visitors to the Rainbow Trail: an evaluation of an interpretive area in the Lake Tahoe Basin, California.** Res. Paper PSW-131, 17 p., illus. Pacific Southwest Forest and Range Exp. Stn., Forest Serv., U.S. Dep. Agric., Berkeley, Calif.

Oxford: 907.2(794).

Retrieval Terms: outdoor recreation, interpretive trails, visitor behavior, interview surveys, Rainbow Trail, Lake Tahoe Basin, systematic observation surveys.

The behavior of 234 randomly selected visitors to the Rainbow Trail, a Forest Service Interpretive Area in the Lake Tahoe Basin, was surveyed by observation and by interview during the summer of 1971. The object of the study was to evaluate the success of the program in promoting enjoyment and learning in relation to the facilities provided and their cost.

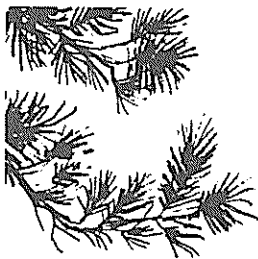
Visitors tended to be well-educated California urban dwellers in their 30's or 40's who were on short trips with their children and who preferred comfortable accommodations and sedentary or moderately active forms of recreation. Their behavior on the trail was leisurely and somewhat passive: they read the material furnished them but usually did not participate in suggested learning activities; few took pictures.

Groups generally stuck together on the trail but dispersed in the Stream Profile Chamber, which contained under-surface observation windows and other displays. This fact may be related to the higher rate of learning on the trail than in the chamber. Overall,

enjoyment was high, and learning, while only moderate, exceeded the expectations of trail officials. Learning was higher among the better educated, the more physically active, and those who participated in the suggested activities.

The popularity of facilities such as the Rainbow Trail with a certain segment of the outdoor recreation population seems assured, but more needs to be done to promote learning — one of the primary goals of such areas. In particular, learning may be increased by maintaining group integrity and by encouraging active participation in educational activities rather than passive reading of information.

The visitor center, despite its purpose of providing visitors with follow-up educational material, played very little part in education, being used more as a source of administrative information. The expensive Stream Profile Chamber is probably worth its expense — but more as an attraction than as an educational facility.



RAINBOW TRAIL



LAKE TAHOE VISITOR CENTER
ELDERADO National Forest

The numbered paragraphs in this leaflet correspond to numbered posts along the half-mile trail. Allow about one hour. Please help protect this meadow by staying on the trail.



1. LAND OF LITTLE WATER

Beneath your feet is a mass of gravel and boulders carried here by water from melting glaciers. Water from rain and snow quickly soaks through this rocky soil.

The plants that grow here are able to live in dry areas. As you walk along the trail notice the sudden dramatic change in the kinds of trailside plants.

2. QUAKING ASPEN

The graceful Quaking Aspen grows only where ample soil moisture is present. The leaves quiver in the slightest breeze.

The magic of water abundantly available in the shallow root zone has created the wildflower meadow just ahead.

3. WATER — LIFEBLOOD OF THE LAND

This small stream comes from springs in the meadow. The little dam was put across the stream to control soil erosion.

Each person in your home uses about sixty gallons of water every day. Would this stream supply the water your family needs?

Hold the gallon can under the stream of water flowing over the dam. How many gallons flow over the dam in one minute?

4. LAKEVIEW

To your right across the meadow the blue water of Lake Tahoe is visible.

Probably at one time this meadow was a shallow arm of the big lake.

5. TAYLOR CREEK

To your right is Taylor Creek, one of sixty-three streams which flow into Lake Tahoe. Water from snow and rain falling on more than twelve thousand acres of National Forest land flows past this point.

Stop 6 is to your right on the bank of the creek.

6. NATURE'S FISH HATCHERY

Trout and Salmon deposit their eggs in clean beds of gravel covered with a thin layer of pebbles. Water circulates between the pebbles carrying vital oxygen to each egg.

Notice the large pore spaces between the gravel particles in the sample attached to the post.

7. TREES PROTECT THE STREAM!

Look along the steep bank at your feet.

Notice how the roots bind the soil, holding it in place. When stream banks are washed away, mud and silt cover the gravel in the streambed.

Silt covered eggs will not produce fish!

8. FOOD FACTORIES IN THE STREAM

These white water riffles in Taylor Creek are the home for large numbers of water insects. Water insects are the most important source of trout food.

As you visit the Rainbow Pool at the next stop, you will see a cross-section of a stream the way it might look to a trout.

9. THE STREAM PROFILE CHAMBER

Displays inside the viewing chamber will tell the story of a trout stream and help you understand what you see through the windows.

10. SNOW PILLOW

The large pillow on the ground is filled with a non-freezing, poisonous liquid. The weight of the snow creates pressure on the pillow which is reflected in a measuring gauge indicating the amount of water the snow contains.

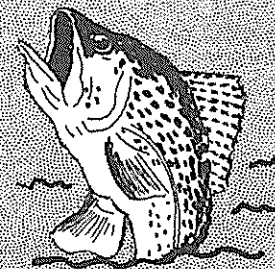
In the higher mountains most moisture falls as snow. The water snowpack is water stored for use the next summer. Information regarding the amount of water stored in the mountain snowpack is very important to predict the water available for the next summer.

11. This small dam helps keep the meadow green! Behind the dam water seeps out into the soil at grassroot level. Below the dam water in the soil is at a much lower level.

12. ALDER SPRING

The water that bubbles out of the ground here comes from rain and snow which fell on National Forest land nearby.

Loose, porous, forest soil permits water to soak into the ground and reappear here. This is more desirable than having the water run



rapidly down steep, bare slopes, carrying valuable topsoil into streams and lakes.

Jump hard on the path and feel the "solid" ground shake. As you jump, watch the water in the pool to your right.

A few inches under the surface the soil here is completely saturated with water.

13. FROM GRASS TO FOREST

The meadow is a temporary and fragile part of the mountain environment. As small streams running through the meadow cut deeper they lower the level of water in the soil. As the soil becomes drier, forest trees invade the meadow and finally the meadow becomes a part of the surrounding forest.

The small pine trees growing in the meadow grass to your left indicate that this process is taking place here.

14. MT. TALLAC — 9,735 FT.

The tallest peak to your left is Mt. Tallac. This is one of the best known landmarks in the Lake Tahoe Basin.

Water from melting snow on Mt. Tallac flows through Taylor Creek and into Lake Tahoe.

We hope that you have found your walk on the Rainbow Trail worthwhile.

The shimmering colors of the rainbow are produced when sunlight is reflected from raindrops. We seldom see a rainbow but water touches the daily lives of all of us in many different ways.

Keep this folder if you wish, or return it to the Visitor Center so that others may use it.

The Viewing Chamber is open 9 a.m. to 5 p.m. daily during the summer season.

It is open Wednesday through Sunday 10 a.m. to 4 p.m. during the Kokanee Salmon spawning season, October 15 to December 1.

The Rainbow Trail Booklet

In recent years, the Forest Service, the National Park Service, and other outdoor recreation agencies have developed several programs aimed at interpreting the natural environment to the public. These public information programs—guided and self-guided nature walks and displays in visitor centers, for example—have been successful in attracting increasing numbers of visitors, but not much has been determined about the success of the programs in expanding the visitor's knowledge or in providing him with a satisfying experience. In the absence of measurable data about the visitor's learning and enjoyment, it has been difficult to make confident judgments about the level of expenditure which is justified for such projects.

The survey that is summarized here is an attempt to supply such measurable data — to analyze a particular recreation population (visitors to the Rainbow Trail) much as a marketing analysis would size up a prospective consumer group. But instead of trying to find out what these consumers would buy, we have tried to discover what they learned, whether they enjoyed themselves, how both enjoyment and learning were affected by features of the recreation program, and whether its results justified its cost.

This survey is a combination of interview and surreptitious observation — a combination since neither method alone seemed likely to yield results that would be simultaneously detailed and objective. The second method is seldom undertaken since it re-

quires long hours of close but unobtrusive observation of subjects actually engaged in some activity. This means a high investment of time and money per subject compared to questionnaire or interview surveys, but it also means particularly detailed results.

This paper is a summary of those results. A limited number of copies of a detailed but preliminary report¹ on the study were distributed by the Forest Service to interested State and Federal agencies in 1972. Some inconclusive or purely procedural information, which may possibly be of interest to some readers, has been omitted from this paper, but may be obtained from the authors or from the original report, of which a few copies are still available. Most points of major interest or importance, however, are given here in sufficient detail.

The illustrations accompanying the text of this paper have been designed to provide an overall view of the trail and its features. Selected photographs are keyed to the map of the trail and the illustration of the booklet format.

¹Kuehner, Richard A. 1972. *Visitors behavior at the Lake Tahoe Visitor Center: a preliminary report of an observation and interview study of the activities of vacationers on a Forest Service, self-guided nature trail*. 172p. Unpublished report on file at Pacific Southwest Forest and Range Exp. St., Forest Serv., U.S. Dep. Agric., Berkeley, Calif. This research, designed and conducted by Richard A. Kuehner and analyzed by him and Gary H. Elsner, was part of a University of California, Davis study of the Tahoe Basin, financed by a grant from the National Science Foundation.



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METHODS

Information for this study was gathered by a combination of first-hand observation of visitors' behavior during the trail walk and interviews immediately following. These methods were intended to complement each other — the observations to record uninhibited behavior, the interviews to secure personal information and the impressions of the moment.

Subjects were randomly selected, alternately an adult male and an adult female, according to the order in which they crossed a certain line on the trail at certain times each day. By this method, about five visitors per day were surveyed on 42 days, equally divided among days of the week, throughout July and August of 1971, for a total of 234 visitors.

The observer was as unobtrusive as possible. Pretending to be a visitor, he followed the subject about, surreptitiously observing his behavior from a distance of 50 to 100 feet and making notes on the margins of a guide booklet, to be transferred to observation forms immediately after the walk. Behind his camera, the observer concealed a stop watch to determine the time the subject

spent at various stops. This procedure worked well and there was almost no danger of discovery. And since the visitor's name was unknown, his anonymity was protected.

As the subject neared the end of the trail, the interviewer, who had noted the visitor's appearance when he was selected, approached him and asked him to cooperate in a short (10- to 15-minute) interview. This personal request made it difficult for the subject to refuse: fewer than 10 percent of all subjects declined to be interviewed or left the area before they could be asked.

The interviewer worked from a set of prepared questions, asked in fixed order from the more general and open-ended to the more specific, and concluding with an invitation for suggestions. This order was designed to prevent the interviewer from influencing responses by indicating particular areas of concern prematurely. An effort was made, both in the wording of the questions and in the manner in which they were asked, to avoid betraying any personal point of view.

4. LAKEVIEW

To your right across the meadow the blue water of Lake Tahoe is visible.

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Notice the large pore spaces between the gravel particles in the sample attached to the post.



SITE

The Rainbow Trail is a part of the Lake Tahoe Interpretive Area — a Forest Service pilot study project located on the shores of Lake Tahoe. The trail winds through a meadow and along a perennial stream (Taylor Creek) in a loop six-tenths of a mile around (see p. ii). A visitor center at the entrance orients visitors to the theme of the trail — water quality and management — and provides them with guide booklets. These booklets are keyed to 14 numbered stops along the trail and give a brief summary of some educational point at each stop (see p. 2).

Midway around the trail is Rainbow Pool, with the Stream Profile Chamber (see p. 12). Here windows in an underground chamber permit observation of the life beneath the surface of the Rainbow Pool—observation which is augmented by recorded explanations of stream life through earphones located under the windows. Fourteen static displays provide additional information on the fish and their environment, on camera settings for photographing the fish, and on the various agencies that cooperate in the management of resources.



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In the higher mountains most moisture falls as snow. The water snow-pack is water stored for use the next summer. Information regarding the amount of water stored in the mountain snowpack is very important to predict the water available for the next summer.



RESULTS

Demographic Information

The typical visitor to the Rainbow Trail was an educated California urban dweller in his 30's or 40's who was on a short trip with his family and who preferred comfortable accommodations and sedentary or moderately active forms of recreation. Such a portrait, approximate as it is, suggests possible differences between trail visitors and the general population — even, perhaps, between trail visitors and other particular outdoor recreation populations.

The Rainbow Trail visitor was well educated. Nearly three-quarters had done some college work; nearly half had graduated (see p. 16). This is important because, as will be shown later, the well-educated learned more from the trail than the less-educated did.

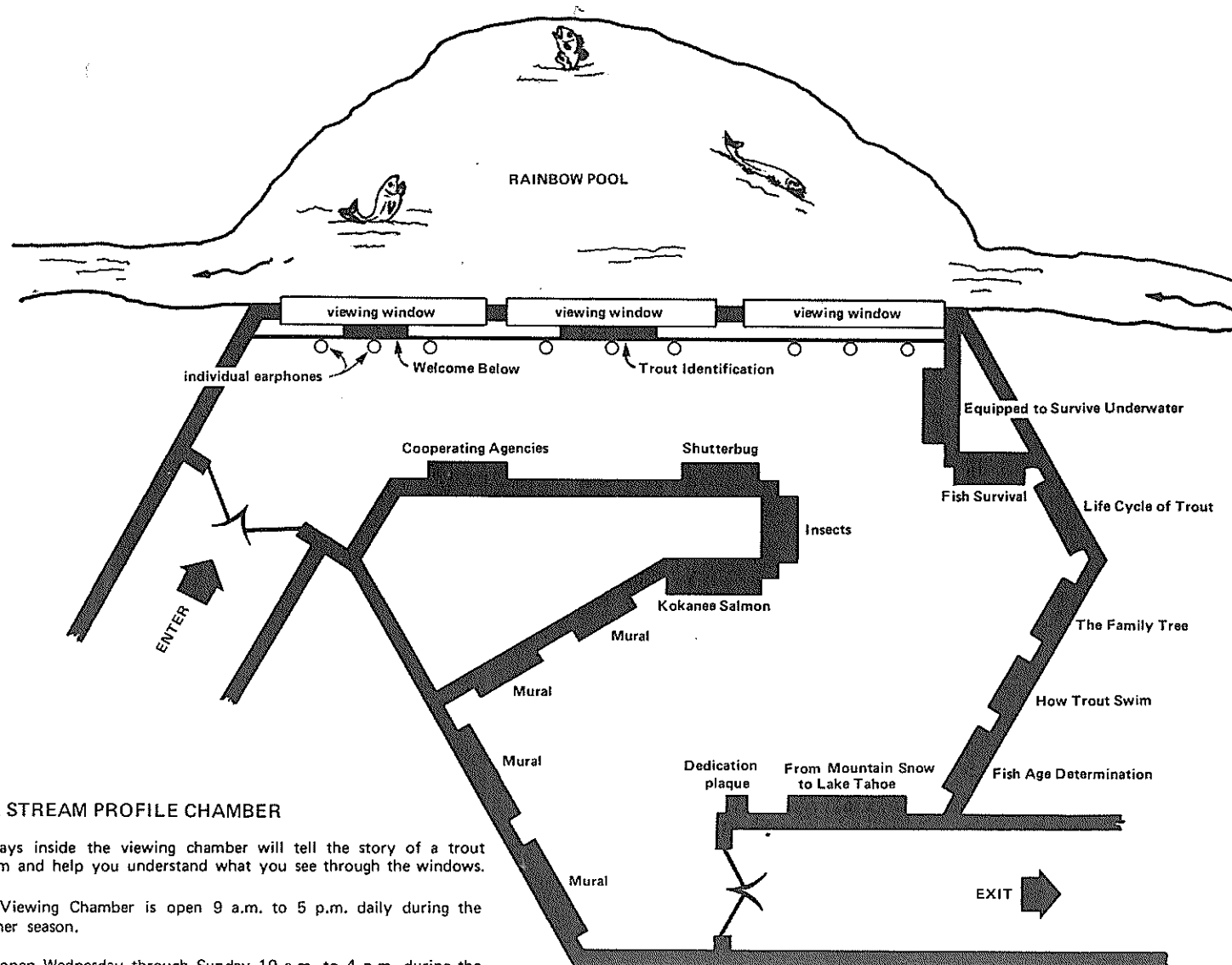
Eighty-three percent of visitors were Californians — even though the trail was located just a few miles from the Nevada border. Most were from the large urban areas in the Los Angeles Basin or around San Francisco Bay. Fifteen percent were relatively local residents — from El Dorado and adjacent counties.

Six out of ten visitors were between 31 and 50; two in ten were older and two were younger. This statistic does not include children, of course, since only adults were interviewed. But this age group would be expected to include parents of minor children, and, in fact, 63 percent of visitors were traveling with children — another fact with important implications about the desirable length, level of sophistication, and degree of stimulation of programs like the Rainbow Trail.

Almost all visitors were accompanied by someone else. Only 4 percent were traveling alone and more than half were traveling in groups of four or more. On the trail itself, most visitors were in groups; average group size was four. Apparently an interpretive walk is the sort of activity—like camping in public campgrounds—that derives some of its appeal from social contact.

On the other hand, interviews indicated the Rainbow Trail visitor's preference for more comfortable accommodations and relatively leisurely outdoor activity. When those who were staying in the Tahoe Basin (57 percent) were asked to specify their accommodations, six out of ten indicated hotels, motels, cabins, or houses, and two more indicated trailers or pickup campers. Only two out of ten camped. This might simply reflect the large number of comfortable accommodations and the relatively small number of campsites in the Tahoe area — but it might also mean that facilities like the Rainbow Trail attract many people who do not otherwise engage in outdoor activities. In either case, it is a significant finding, since trail officials had been aiming their advertising at nearby campgrounds.

When asked which other activities on our list they were participating in on this trip, most indicated “relaxing and sitting” and “sightseeing and driving for pleasure” (see p. 16). Though many were also hikers, campers, and fishermen, the most strenuous activity—backpacking—was the one least often indicated. An attempt to construct profiles of visitor groups according to the activities they engaged in proved inconclusive.



9. THE STREAM PROFILE CHAMBER

Displays inside the viewing chamber will tell the story of a trout stream and help you understand what you see through the windows.

The Viewing Chamber is open 9 a.m. to 5 p.m. daily during the summer season.

It is open Wednesday through Sunday 10 a.m. to 4 p.m. during the Kokanee Salmon spawning season, October 15 to December 1.

Trail Behavior

Use of the Guide Booklet

Seven out of eight groups picked up at least one guide booklet at the start of the trail. Two-thirds of all groups read the booklet at the indicated stops. In almost half the groups with children, an adult read portions of the book aloud. Occasionally this adult would editorialize — for example, by omitting the paragraph that suggested measuring stream flow (see booklet text, p. 2, item 3).

Reading of the booklet stayed at a fairly constant level throughout the 14-stop trail. Apparently this means that the trail was not too long to maintain interest and that the booklet itself was interesting and easy to read. There were, however, two sources of confusion in the booklet. The commentary on stop 5 said that stop 6 was located right — while actually it was to the left. Ten percent went right before discovering the mistake. The other problem was that part of the commentary on stop 12 — suggestion that visitors jump up and down on the trail and observe the effect upon the adjacent pool — was missed by some readers until too late because they did not follow the text from one page to another.

Time on the Trail

The average time spent on the trail was 30 minutes. As might have been expected, the largest proportion of time (7 minutes)

was spent in the Stream Profile Chamber, but if each of the 14 exhibit panels, 3 fish viewing windows, and 3 recorded messages is considered separately, then less time was spent per chamber exhibit than per trail stop.

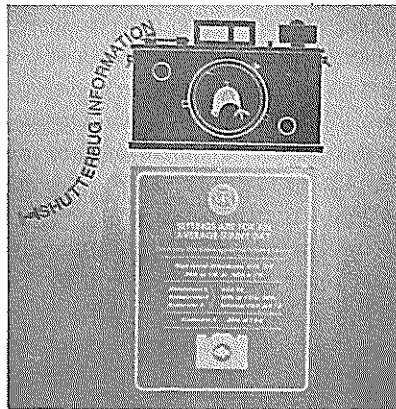
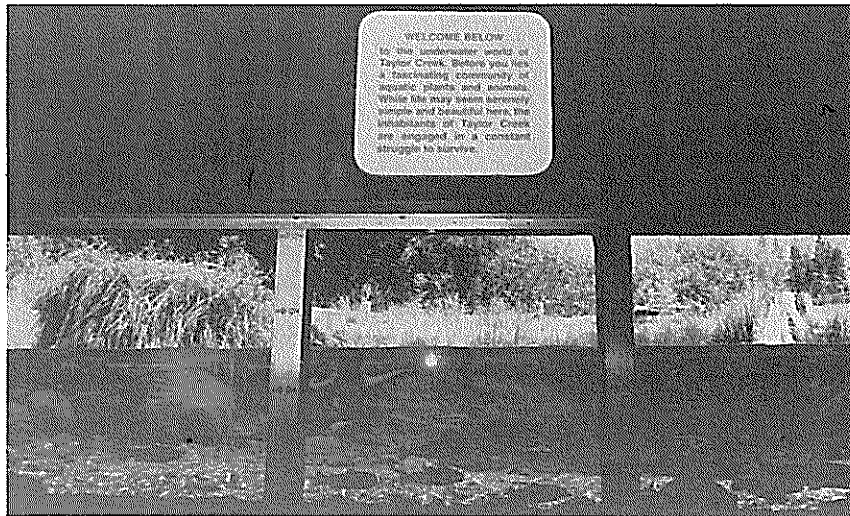
Use of the Stream Profile Chamber Displays

Most visitors (86 percent) listened to at least one of the recordings but few (17 percent) listened to all three. Observations and interviews suggested that the reasons for this sharp drop in interest in the recorded messages were occasional overcrowding at the limited number of earphones, the absence of any announcement that each bank of earphones offered a different message, and simple boredom (though each of the messages was less than 30 seconds long.)

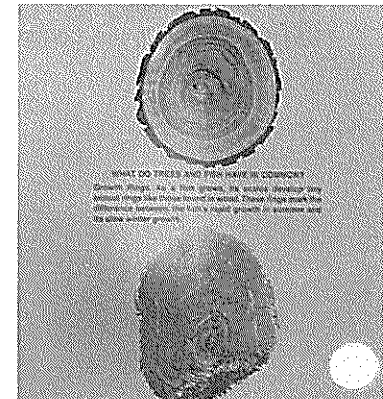
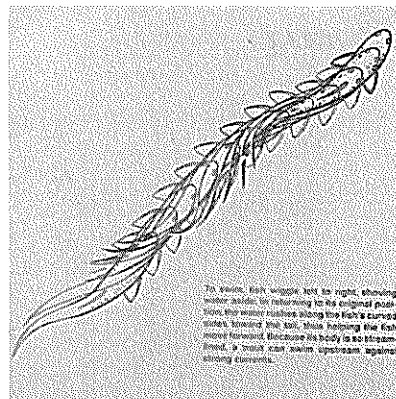
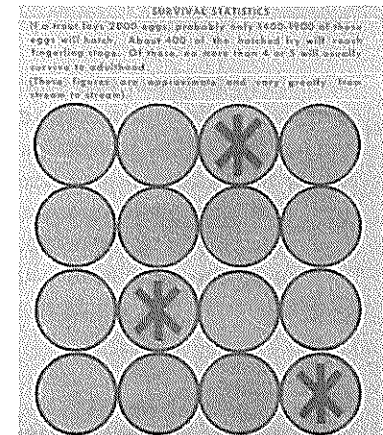
Visitor attention to the static displays was cursory and seemed to be related as much to the location of the display as to its content. Those that attracted least attention (shutterbug and agency displays) were directly across from the underground windows. Those that attracted most attention (insect and salmon displays) were along the shortest route out of the chamber.

Participation in Suggested Activities

Most visitors did not participate in the physical activities



Above, "Welcome Below" and "Trout Identification"
Left, "Shutterbug" and "How Trout Swim"
Right, "Fish Survival" and "The Family Tree"



suggested to them by the guide booklet. Only 37 percent of all groups had a member who accepted the invitation to jump at stop 12. Only 19 percent stooped to pick up and examine a display of a typical fish-spawning bed sealed in plastic.

Behavior at stop 3, where visitors were invited to measure stream flow using a gallon can, may provide an insight into the visitor's passivity. During the first month of the study, there was an old, rusty antifreeze can provided for this purpose. Only 14 percent of the visitors used it. But when it was replaced with a plastic sand pail, use increased to 26 percent. And when that in turn was replaced with a shiny steel bucket, use increased again to 35 percent. Apparently the steel bucket was more attractive, or less dangerous looking, or simply more visible than the rusty can.

Group Integrity

Along the trail itself, groups stayed together, reading the booklet or (occasionally) participating in suggested activities as a group. But when they entered the Stream Profile Chamber, groups larger than two tended to disperse, their members scattering to different windows or different displays and therefore keeping their observations to themselves. This dispersion increased when the chamber was crowded. Once back on the trail the groups reformed and continued as before.

Other Behavior Patterns

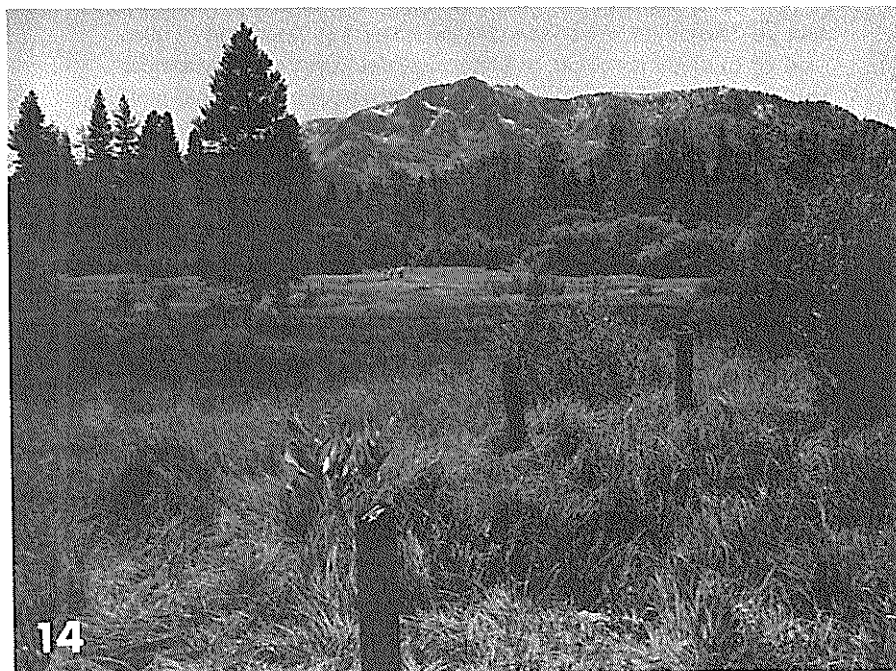
Use of Cameras — A third of all groups had at least one camera among them. But cameras were not used very much. Of those who carried cameras, about a third took no pictures on the trail and another third took only one. The rate of picture-taking inside the Stream Profile Chamber was even lower, despite the opportunity for taking close-up photos of live fish.

Vandalism—During the study, no vandalism and only two incidents of littering were observed.

Use of the Visitor Center — The visitor center was conceived by its designers as a place where visitors could get further information about subjects that they had become interested in through the displays or the guide booklet. But 90 percent of those who asked questions in the center asked questions unrelated to the theme of the trail — mostly about where they could camp or where the restrooms were.

Interview Responses

Thirty-nine percent of those interviewed said that some quality like "quiet" or "greenness" or "naturalness" was what they



12. ALDER SPRING

The water that bubbles out of the ground here comes from rain and snow which fell on National Forest land nearby.

Loose, porous, forest soil permits water to soak into the ground and reappear here. This is more desirable than having the water run rapidly down steep, bare slopes, carrying valuable topsoil into streams and lakes.

Jump hard on the path and feel the "solid" ground shake. As you jump, watch the water in the pool to your right.

A few inches under the surface the soil here is completely saturated with water.

13. FROM GRASS TO FOREST

The meadow is a temporary and fragile part of the mountain environment. As small streams running through the meadow cut deeper they lower the level of water in the soil. As the soil becomes drier, forest trees invade the meadow and finally the meadow becomes a part of the surrounding forest.

The small pine trees growing in the meadow grass to your left indicate that this process is taking place here.

14. MT. TALLAC - 9,735 FT.

The tallest peak to your left is Mt. Tallac. This is one of the best known landmarks in the Lake Tahoe Basin.

Water from melting snow on Mt. Tallac flows through Taylor Creek and into Lake Tahoe.

liked best about the trail. Three-quarters said the best feature about the Stream Profile Chamber was the fish. This seems to indicate that visitors were seeking some confrontation with live nature — not simply with displays of natural phenomena.

Over half of the visitors said that they had not learned anything from the Stream Profile Chamber. Of those who admitted learning something, most indicated that they had learned from the displays. In contrast, six out of ten said they had learned something on the trail — mostly from the guide booklet. The most frequently mentioned lesson was the working of the snow pillow. Also mentioned were the ways that meadows give way to forests and the identity and environment of the quaking aspen.

Learning

Visitors were asked seven questions to test their knowledge of facts and concepts taught along the trail or in the chamber. Questions 1 to 5 pertain to matters discussed in the trail booklet, 6 and 7 to Stream Profile Chamber displays. Questions 1, 4, 5, 6, and 7 covered matters unlikely to be common knowledge or to be learned at other facilities in the Tahoe area. The results were as follows:

Subject of question:	Correct
1. Daily consumption of water	52

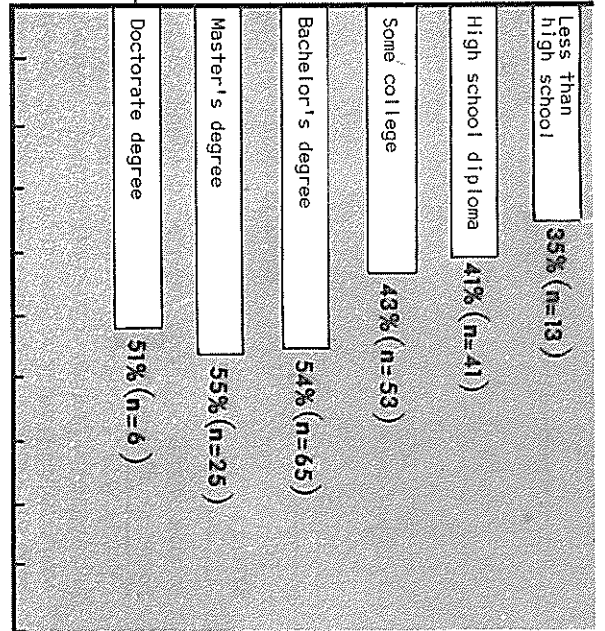
2. Identity of quaking aspen	81
3. Environment of quaking aspen	44
4. Purpose of the snow pillow	62
5. Effect of water quality on fish reproduction	18
6. Season of annual salmon run	36
7. Indicator of fish's age	47

These results surprised trail officials; they had not believed that visitors were learning this much.

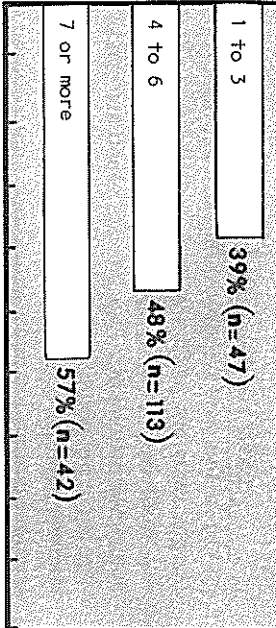
Results were cross-tabulated with other information gathered by observation or by interview (see p. 16). As might have been expected, learning (or, at any rate, knowledge) was generally greater for the more highly educated, for back-packers, for those who had engaged in many activities while in the Tahoe area, for those who took their time on the trail, and for those who participated in the suggested trail activities. Learning was relatively unaffected by age, by the density of visitors on the trail, or by the size of the visitor's group.

Other interview questions established that most visitors recognized the Forest Service as the managing agency of the Rainbow Trail and that the trail sells itself, word of mouth providing more effective advertising than the official publicity then in use.

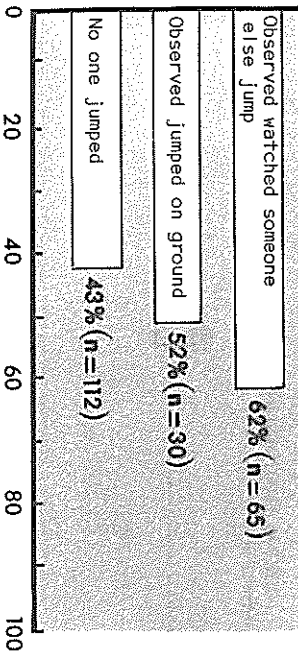
Education level



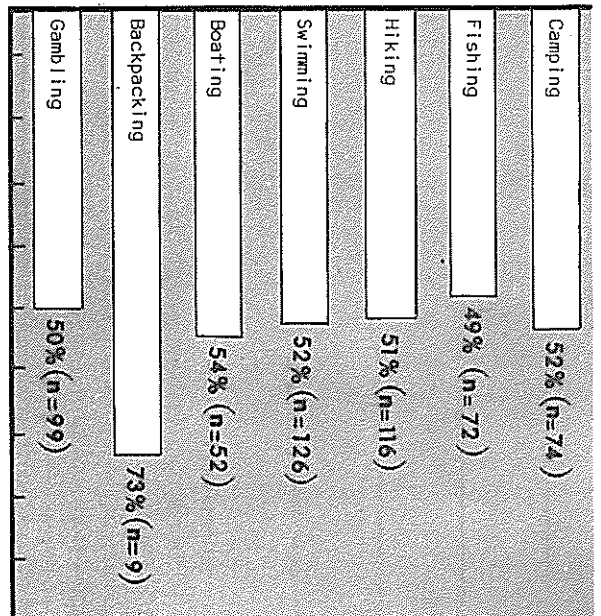
Number of recreation activities



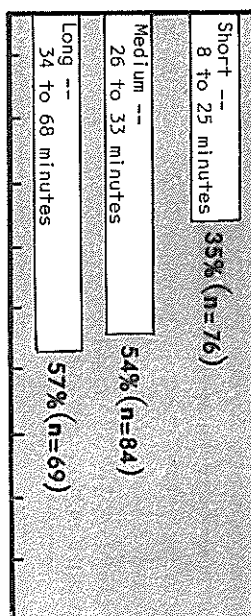
Physical activity level



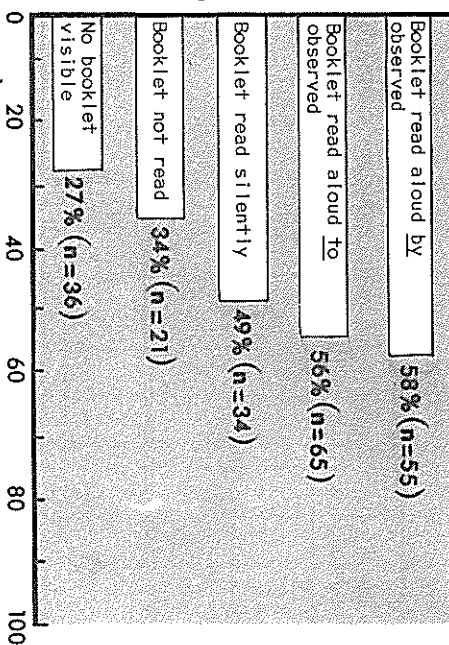
Recreation activities



Time around trail



Use of guide booklet



Learning index (percent)

CONCLUSIONS

Visitors were generally impressed with the Rainbow Trail. They made few criticisms and their cheerful cooperation in the interviews (on the whole) implied their satisfaction. Yet most seemed unable to pinpoint the source of their good feelings. Perhaps they were just happy about being on vacation and would have been equally content with almost any recreation facility. For whatever reasons, it would appear that action on the findings of this study is not crucial to the continued satisfaction of Rainbow Trail visitors. But it may be highly relevant to the satisfactory realization of the goals of the designers and managers of the Rainbow Trail.

Designers of facilities like the Rainbow Trail ought to take the characteristics of the typical visitor into account — particularly his education, his preference for leisurely activity, and the likelihood that he is traveling with children.

Although Forest Service Visitor Information Service managers have expressed surprise that visitors learned as much as they did, more could be done to promote learning — learning is, after all, one of the primary goals of interpretive areas. Since this study shows that visitors who participated in the suggested activities along the trail learned more than those who did not, every effort should be made to encourage such activity. The replacement of the rusty antifreeze can with the shiny bucket is a case in point. Or the trail might be redesigned to direct the visitor's attention toward an activity and to make it harder for him to pass it by. For example, a well-marked one-foot drop in the trail at the point where the visitor is supposed to jump up and down might make it easier for him to comply without feeling self-conscious. Another finding that is relevant here is that those who went slowly learned

more than those who rushed around the trail. More activities and more attractive activities might arrest the attention of the speedier visitor and slow him down so that he could learn something.

Visitors acquired facts (like the identity of the quaking aspen) much more readily than they did concepts (like the requirements of the quaking aspen's habitat). Yet the concept is, of course, the more valuable information. A method needs to be found for presenting the more abstract ideas in a more tangible way.

The most expensive feature of the Rainbow Trail is the Stream Profile Chamber. Yet, despite the pleasure it gave visitors and despite the time they spent in it, they did not learn as much from it as from the guide booklet and from the trail itself. This may be related to the fact that groups tended to disperse in the chamber; learning may have been increased by the exchanges of observations which group members generally engaged in on the trail. If so, future facilities might be designed to maintain group integrity and privacy — perhaps by making the activities in the chamber more group-oriented or by opening the chamber up to avoid the "public" atmosphere of a closed room shared with other groups.

On the other hand, the time spent in the Stream Profile Chamber suggests that it is the real focus of interest on the Rainbow Trail. The enthusiasm which people seem to feel when they enter the chamber may be one reason that their groups disperse and their rate of learning slackens at that point. Though this study did not specifically indicate it, it may well be that the chamber is the reason people had come to the Rainbow Trail in the first place. If so, it may well be worth its expense as an attraction, even if not as an educational tool.



The Forest Service of the U.S. Department of Agriculture

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The Pacific Southwest Forest and Range Experiment Station

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Oxford: 907.2(794).

Retrieval Terms: outdoor recreation, interpretive trails, visitor behavior, interview surveys, Rainbow Trail, Lake Tahoe Basin, systematic observation surveys.

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