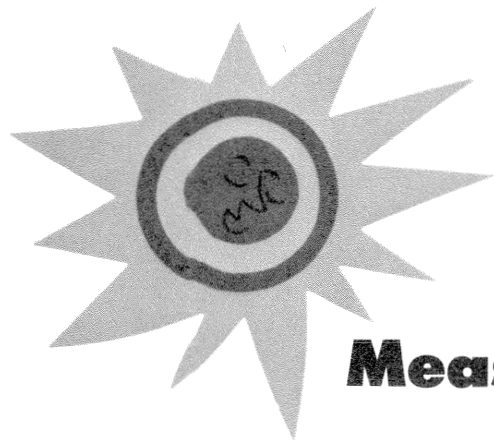
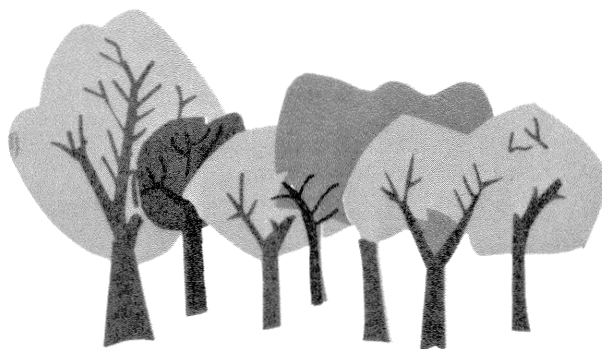
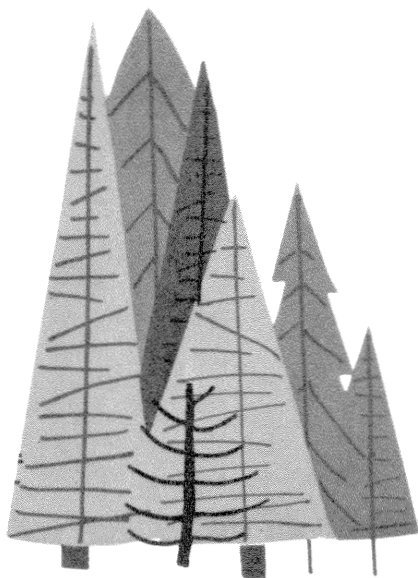




Measuring Perception of Elements in Outdoor Environments

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Measuring Perception of Elements in Outdoor Environments

ABSTRACT

The meanings of 10 concepts that describe elements of natural outdoor environments were measured with the semantic differential technique. Each concept was evaluated on three factors of meaning — evaluation, potency, and activity. Sixty recreationists were surveyed from each of three user groups — campers, picnickers, and wilderness hikers. Similarities and differences were found in the way in which the groups perceived each other and elements of recreation environments. Study results should contribute toward a better understanding of the way in which people relate to outdoor environments and what they expect from those environments.

SOME OF THE MOST challenging questions that resource planners and managers need answers to are: What do natural environments *mean* to people who use elements of those environments? How do these people perceive one another? And how do they relate to people who manage natural environments? The solution to these questions lies at the core of understanding how people relate to natural environments and what they expect from those environments. As Leopold pointed out in his *Sand County Almanac* (1966), "to promote perception (of nature) is the only truly creative part of recreational engineering."

The purpose of this study was to quantitatively describe how three groups of recreationists—auto campers, wilderness hikers, and picnickers—responded to these questions.

PERCEPTION AS MEANING

The scientific investigation of how people perceive natural environments, other people who use those environments, and resource managers is important to the resource-management process. Research approaches such as those by Lucas (1964), Wenger and Videback (1969), Hendee et al (1968), Shafer et al (1969), and Sonnenfeld (1969) have set the stage for continued research in this field. But the human perceptual process is still not understood. Osgood et al (1967) state that, even among psychologists, there is much confusion about what constitutes perception.

In our study, *perception* was considered to be synonymous with *meaning*. Perception and meaning are intimately related, as demonstrated by the following discussion on perception found in the *Dictionary of Philosophy and Psychology* (Baldwin 1960):

Perception is sensation only insofar as sensation conveys meaning. I perceive a tree that grows before my window; there is here an object which is perceived and an act of mind by which it is perceived. The object is made up of a trunk, branches, and leaves; but the act of the mind by which it is perceived has neither trunk, branches or leaves. I find nothing that resembles it so much as the remembrance of a tree, or the imagination of it.

It is this "act of the mind" that is ultimately important to the recreation experience. A wilderness hiker who imagines the expected

view from a mountain top may be spurred up the arduous mountain trail. Families spend weeks elaborately planning vacations and thereby enjoy a considerable portion of their vacation experience even before it occurs. The importance of memory and recall to total enjoyment of a recreation experience is adequately demonstrated by the universal inclusion of the camera as part of one's standard recreation gear and by the stories recreationists tell after they return from outdoor experiences.

Meaning may be denotative or connotative. Denotative meaning always specifies something to which one can point (e. g., a pencil). In contrast, connotative meaning is emotional, expresses a value or preference, and varies from person to person (e. g., wilderness). Our study was concerned with measuring the connotative meaning of general concepts that relate to natural recreation environments, managers, and recreationists.

PROCEDURE

The semantic differential technique, as developed by Osgood, was used in this study to measure the meanings of various concepts related to recreation experiences in natural environments. Osgood used factor analysis of 50 bi-polar adjective pairs to isolate three major factors or "dimensions" of meaning: *evaluation, potency, and activity*. The three factors can best be described by the adjective pairs that were most highly associated with them.

Osgood found that the adjective pairs most highly associated with the evaluation factor were: good-bad, beautiful-ugly, sweet-sour, clean-dirty, tasty-distasteful, valuable-worthless, kind-cruel, pleasant-unpleasant, sweet-bitter, happy-sad, sacred-profane, nice-awful, fragrant-foul, honest-dishonest, and fair-unfair. The nature of the potency factor was best defined by the adjective pairs: large-small, strong-weak, heavy-light, and thick-thin. The most distinct scales associated with the activity factor were: fast-slow, active-passive, and hot-cold.

Osgood pointed out that the three factors do not completely delineate the semantic

space because they accounted for only up to 50 percent of the total variance in the meaning of general concepts. He also found that the nature and magnitude of the factors varied with the concepts judged. His studies frequently showed variability in factor structures; often factors combined or did not appear consistently. Nevertheless, Osgood concluded that, "the existence of a large number of dimensions to the total semantic space is not disastrous as far as measurement is concerned"; this is because any additional factors account for a relatively small proportion of the total variance regardless of the concept studied.

The Concepts and Test Instrument

Ten general concepts were selected to describe major elements of recreation experiences and environments. The natural environment was represented by six concepts: national forest, wilderness, state park, lake, mountain, and wildlife. Concepts that represented recreationists were the three groups sampled in the study—auto camper, wilderness hiker, and picnicker. The recreation resource manager was represented by park ranger.

The 10 concepts are very general and do not describe specific aspects of recreation experiences and environments. Therefore results must be interpreted broadly and not related to specific situations. Once the technique has been more fully tested, studies can be undertaken to answer particular questions.

As Osgood pointed out, adjective pairs that have maximum loadings on one factor and minimum loadings on another factor should be used to construct a semantic differential test instrument. It would be most desirable to use one specific scale to represent each factor; however, individual scales are neither perfectly aligned with factors nor perfectly reliable. Therefore Osgood suggested that a small number of closely related scales be used to represent each factor and that an average factor score be derived from them.

The average factor score is assumed to be more representative and more reliable than factor scores that could be derived from indi-

vidual scales. Twelve bi-polar adjective pairs were selected from Osgood's results and used to construct the test instrument for this study. Three sets of four bi-polar adjective pairs—one set for each of the three factors—were selected to measure the meaning of the 10 concepts (table 1).

Table 1.—*Bi-polar adjective scales and associated factor loadings^a*

Bi-polar adjective scale	Scale factor loading		
	Evaluation (E)	Potency (P)	Activity (A)
Honest-dishonest	.85	.07	— .02
Pleasant-unpleasant	.82	— .05	.28
Valuable-worthless	.79	.04	.13
Relaxed-tense	.55	.12	— .37
Large-small	.06	.62	.34
Strong-weak	.19	.62	.20
Rugged-delicate	— .42	.60	.26
Wide-narrow	.26	.41	— .07
Fast-slow	.01	.00	.70
Active-passive	.14	.04	.59
Hot-cold	— .04	— .06	.46
Ferocious-peaceful ^b	— .69	.17	.41

^aScales and factor loadings were taken directly from Osgood, *et al.*, *The Measurement of Meaning*, p. 37. Underlines indicate the factor that each adjective scale was used to represent in the present study.

^bHeavily loaded on both the evaluation and activity scales.

The 12 adjective pairs were arranged randomly on individual sheets for each concept. Sheets were assembled into a 10-page test booklet. Respondents were asked to check one of seven scale positions for each bi-polar adjective scale. The position checked indicated how a respondent felt an adjective pair best described his feeling about a particular concept. The seven scale positions ranged from high (very pleasant) through neutral to low (very unpleasant).

Sampling Procedure

Recreationists were sampled at three areas: auto campers from campgrounds along the Allegheny Reservoir in northwestern Pennsylvania; wilderness hikers from the Adiron-

dack Mountains of northern New York State; and picnickers from Chittenango Falls State Park in central New York State.

The Allegheny Reservoir lies almost entirely within the Allegheny National Forest. Recreation use patterns are influenced strongly by modern campground facilities and related water-oriented recreation developments. Paved parking spurs, flush toilets, hot showers, and sewage-disposal stations attract campers with elaborate motordrawn camping equipment.

Auto campers were randomly selected from three developed campgrounds. Interviews were divided among campgrounds in proportion to their occupancy rate on a sampling day. A fixed-interval sampling procedure was used within campgrounds. If campers were not at their sites, repeat visits were made until they could be contacted. If two or more camper groups occupied a selected site, a random procedure was used to select the respondents.

The Mt. Marcy Wilderness lies in what is commonly called the High Peaks Region of the Adirondack Mountains of New York State. The primary attraction of the area is its wilderness character. Recreation use patterns are strongly governed by the lack of developed facilities.

Because wilderness hikers are usually busy making or breaking camp, cooking meals, and planning the next day's activities, interviews were conducted along hiking trails between 10:00 a.m. and 4:00 p.m. Estimates of the total number of visitors were not available; therefore sampling precision could not be specified. Interviews were conducted with every fifth wilderness hiker group encountered. Only those who had stayed in the area for at least one night were asked to take part in the study.

Chittenango Falls State Park is located midway between the Villages of Chittenango and Cazenovia in central New York State. The major park attraction is a 167-foot waterfall. Facilities include picnic tables, charcoal grills, swings, sand boxes, and play fields. Picnicking and viewing the waterfall are the major recreation activities.

Fifteen picnickers were interviewed on each of four sampling days at Chittenango Falls State Park. On each sample day, an estimate

was made of the number of families picnicking in the area, and respondents were selected by proportional random sampling from a list of occupied picnic tables.

Sixty interviews were conducted for each of the three recreationist groups. No campers or picnickers refused to participate in the study. Two wilderness hikers declined to be interviewed because of lack of time.

Sampling was conducted on weekends in August and September 1969. Only heads of recreationist groups were interviewed. The sampling procedure was subject to problems commonly encountered in sampling recreationists. For example, accurate use estimates could not be determined for wilderness hikers. The procedure may also be biased by length of stay because recreationists who stayed longer at a particular area were more likely to be included in the study. No attempt was made to evaluate the sources of bias inherent in the sampling procedure or to weight responses.

Interviewers outlined the study objectives and explained the procedure to be used in filling out test booklets. If problems in interpretation arose, the interviewer explained that he was interested in the respondent's own evaluation, even though a particular adjective pair did not seem to relate directly to the concept.

The groups were not entirely mutually exclusive. For example, campers had undoubtedly picnicked and hiked sometime in the past. The way in which this may have biased the study results cannot be determined precisely; however, it can be expected that this would reduce the variations in response between groups.

ANALYSIS

Scoring the Semantic Differential

The methods used to score the semantic differential test instrument and analyze data follow procedures outlined by Osgood. The seven ordinal-scale positions were assigned interval values ranging from -3 (very unpleasant) through 0 (neutral) to +3 (very

pleasant). In this way, for each adjective pair, a numerical score was obtained for each respondent on each concept. An individual's factor score for a concept was calculated by averaging the four adjective-pair scores for that factor. With this procedure, 30 factor scores were calculated for each respondent—one score on each of the three factors for each of the 10 concepts. Mean factor scores on all concepts were calculated by averaging the individual respondent factor scores by recreationist group.

Differences Between Groups

Simultaneous chi-square statistical tests were used to determine if the distribution of factor scores on each of the 10 concepts was the same between groups (table 2). Statisti-

Table 2.—Example chi-square test procedure used to determine statistically significant differences in distribution of factor scores between recreation user groups

Recreationist group	Distribution of individual factor scores ^a Concept: "Wilderness"— Factor: "Evaluation"			
	0 to .50	.51 to 1.49	1.50 to 2.49	2.50 to 3.00
Auto campers	10	18	21	11
Wilderness hikers	0	13	28	19
Picnickers	4	18	24	14

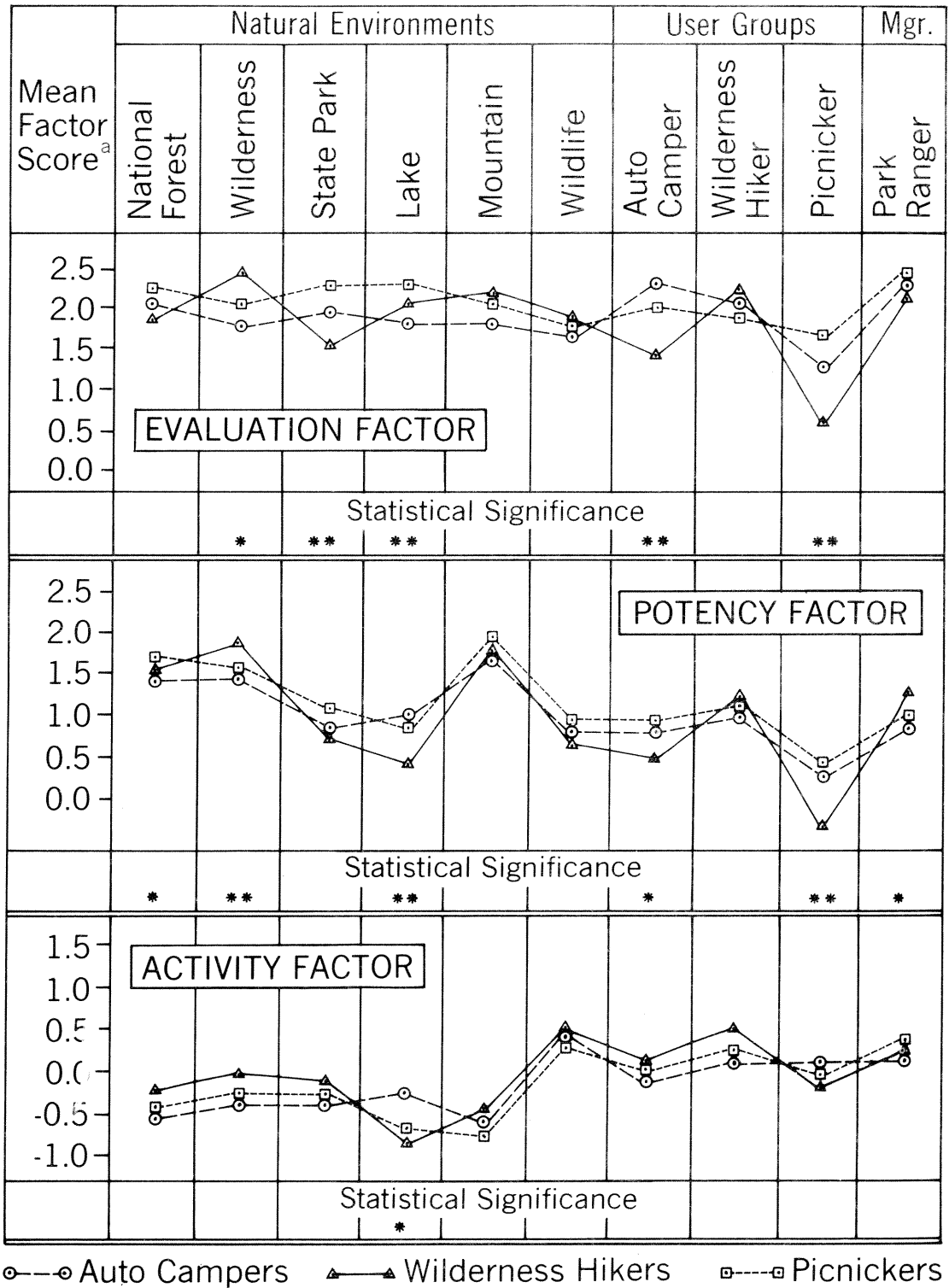
$\chi^2 = 15.1$, significant at .05 level.

^aThe contingency scale was expanded when negative factor scores were encountered.

cally significant differences were found between groups for 1 or more factors on 7 of the 10 concepts studied (figure 1).

Whenever chi-square tests revealed a difference in the distribution between the three groups, paired chi-square tests were used to test for differences in response distribution between any two of the three groups (table 3). Paired tests showed statistically significant factor score differences on six of the seven concepts for which differences had been found using the three-way tests.

Figure 1.—Mean factor score data profiles and chi-square test results for comparisons among recreationist groups.



^aMean factor scores theoretically range from +3 to -3.

*Significant difference at .05 level.

**Significant difference at .01 level.

Table 3.—Results of paired chi-square tests for comparisons of user group response scores

Concept	Recreation user groups ^b being compared	Factor ^c		
		Evaluation	Potency	Activity
Natural environments: ^a National forest	AC vs. WH	NT	*	NT
	WH vs. P	NT	*	NT
	AC vs. P	NT	ND	NT
Wilderness	AC vs. WH	**	ND	NT
	WH vs. P	ND	*	NT
	AC vs. P	ND	ND	NT
State park	AC vs. WH	ND	NT	NT
	WH vs. P	**	NT	NT
	AC vs. P	*	NT	NT
Lakes	AC vs. WH	ND	**	*
	WH vs. P	ND	ND	ND
	AC vs. P	ND	ND	**
Other user groups: Auto camper	AC vs. WH	**	ND	NT
	WH vs. P	**	ND	NT
	AC vs. P	ND	ND	NT
Picnicker	AC vs. WH	ND	**	NT
	WH vs. P	**	**	NT
	AC vs. P	ND	ND	NT
Resource manager: Park ranger	AC vs. WH	NT	ND	NT
	WH vs. P	NT	ND	NT
	AC vs. P	NT	ND	NT

^aPaired tests were conducted only for those concepts in Figure 1 for which significant differences were found among the three groups using the three-way chi-square test.

^bAC indicates auto campers; WH indicates wilderness hikers; P indicates picnickers.

^c* indicates significant difference between two groups at .05 level.

** indicates significant difference between two groups at .01 level.

NT indicates no test, because significant difference was not found using the three-way chi-square test (Fig. 1).

ND indicates no difference between the two groups.

RESULTS AND DISCUSSION

Perception of Natural Environments

As would be expected, study results suggested that the natural environment, taken as a wholistic entity, is viewed favorably by all recreationists. The three groups perceived the natural environment concepts—National Forest, Wilderness, State Park, Lake, Mountain, and Wildlife—as very valuable, moderately potent, and slightly inactive. Wildlife was perceived as slightly active rather than inactive (fig. 1).

Each group perceived its own recreation environment as being more valuable than other groups perceived it. For example, wilderness hikers rated Wilderness significantly more valuable than auto campers or picnickers did. Picnickers rated State Park as sig-

nificantly more valuable than either of the other groups rated the concept, and both picnickers and auto campers rated National Forest as more valuable than wilderness hikers did (fig. 1).

National Forest.—The concept National Forest was perceived as very valuable, slightly potent, and slightly inactive. The meaning of National Forest was consistent across groups except on the potency factor. National Forest was perceived as being significantly less potent (strong, large, rugged, and wide) by auto campers than by wilderness hikers.

Although the reasons for this are obscure, it is plausible that auto campers may feel that they have tamed the potency of the forest. Hot showers, flush toilets, and their elaborate camping vehicles enable auto campers to enjoy the forest in comfort. Recreation activities are centered within the campground, and social activity seems to be a major motivation among auto campers.

If auto campers had rated the forest as potent, they would have negated the value of their expensive motor-drawn recreation equipment. Wilderness hikers, in contrast, carry their equipment and seek to enjoy the "potent" forest in its primitive state. Picnickers' perception of the potent National Forest may be due to limited exposure to natural forest surroundings and lack of equipment with which to conquer the "potent" forest (table 3).

Wilderness.—Like National Forest, Wilderness was perceived as being quite valuable, slightly potent, and slightly inactive. As a group, wilderness hikers perceived Wilderness as being more valuable, more potent, and less active than National Forest.

Wilderness was rated significantly more valuable by wilderness hikers than by auto campers (table 3). It would not have been consistent for wilderness hikers to score Wilderness low on the evaluation factor and at the same time undertake the strenuous activities necessary to enjoy a wilderness experience.

Wilderness hikers rated Wilderness as significantly more potent than picnickers rated it (fig. 1). This result supports the notion that wilderness hikers may feel challenged by the potent natural forces of the wilderness and take pride in pitting themselves against those forces. Results further suggest that Wilderness is perceived as more exacting in terms of site requirements than other kinds of recreation environments.

State Park.—As with the other five concepts related to natural environments, State Park was seen as quite valuable. Except by picnickers, State Park was perceived as being slightly potent. All user groups perceived the concept State Park as being slightly inactive (fig. 1).

State Park was significantly more valuable to picnickers than to either of the other groups (table 3). Wilderness hikers scored State Park comparatively low on the evaluation factor, conceivably because they associate such parks with crowded campgrounds and picnic areas in an environment dominated by man—areas that are much less exacting than wilderness in their site requirements.

Lake.—The concept Lake was perceived as the second most valuable concept and as the least potent among the six natural environment concepts. Lakes were also perceived as slightly inactive. (fig. 1).

Auto campers perceived the concept Lake as being significantly more potent than wilderness hikers did and as significantly more active than the other two groups did (table 3). These findings, though puzzling at first, can be explained logically. Campers seldom spend all their time camping or viewing scenery, but spend much of their time participating in water-oriented activities. Therefore campers are likely to perceive a lake as being more active than wilderness hikers, who perceive wilderness lakes as serene, or picnickers, who less often experience lake-oriented recreation.

Mountain.—No significant differences were found in the way in which the three groups perceived the concept Mountain. Mountain was perceived by all groups as being quite valuable. Of the six concepts used to describe the natural environment, mountain was perceived as being the most potent and least active (fig. 1).

Wildlife.—No differences were found between the groups in the meaning of the concept Wildlife. Although perceived as being quite valuable, the concept was seen as the least valuable of the environmental concepts. It was rated low on the potency factor and was perceived as being the most active of all ten concepts, including the recreationists themselves (fig. 1).

Do different recreationists perceive natural environments in the same way? This question cannot be answered simply, but the foregoing discussion suggests that perception of elements in the natural surroundings depends on the kind of experience a particular recreationist group is seeking and the way in which elements of the natural surroundings enhance or detract from their experiences. Of the six concepts, only Mountain and Wildlife were perceived as being essentially the same by all groups.

Perception of Other Recreation Groups

Respondents were asked to rate three concepts—Camper, Wilderness Hiker, and Picnicker—to determine how they perceived their own group, as well as each of the other groups. With a few important exceptions, recreationists perceived themselves as being less valuable and less potent but more active than concepts related to natural environments (fig. 1).

Auto Camper.—All groups perceived the concept Auto Camper as being from slightly to quite valuable. Wilderness hikers perceived auto campers as significantly less valuable than themselves. Picnickers perceived auto campers as significantly more valuable than wilderness hikers did. Although the three-way chi-square test showed a significant difference in the potency factor ratings for Auto Camper, paired tests did not. Auto Camper was rated as neither active nor inactive. Auto campers saw their own group as significantly more valuable, but less potent and less active than they perceived wilderness hikers to be.

Wilderness Hiker.—All groups rated wilderness hikers as quite valuable, slightly potent, and slightly active. Wilderness hikers saw themselves as slightly more valuable and active than the other groups saw them (fig. 1). However, no significant differences were found in factor ratings for the concept. Of the three groups, wilderness hikers were seen in a consistently favorable way, not only by themselves, but by other groups as well.

Picnicker.—The concept Picnicker, when compared to Wilderness Hiker and Camper, was perceived as less valuable, less potent, and less active. Wilderness hikers rated picnickers as significantly less valuable than picnickers saw themselves. Wilderness hikers rated picnickers lower on potency than both picnickers and auto campers rated the concept (table 3).

Surprisingly, picnickers rated each of the other groups higher on all three factors than they rated themselves. In his study of recreationists in the Quetico-Superior Wilderness, Lucas (1964) discovered a one-way resentment against boaters by paddling canoeists.

Results of our study suggest the existence

of a one-way resentment against picnickers by wilderness hikers. Lucas also found that motoring canoeists preferred meeting paddling canoeists rather than their fellow motoring canoeists. Likewise, the picnickers interviewed in our study seemed to look more favorably upon both auto campers and wilderness hikers than on their fellow picnickers. The relatively low rating of picnickers by the three recreation groups may be due to the fact that the concept Picnicker conjures up thoughts of litter and untidiness, by a group of recreationists who are highly transient and are not viewed as a permanent part of natural recreation environments.

Could it be that the image of a recreation group is not determined by the nature of the activity or its influence on the natural environment, but by commonly recognized characteristics of the group? Socio-economic background data collected in our study suggest that this is not true. Wilderness hikers—the group with the most positive image—had more education and earned more money than either auto campers or picnickers. Picnickers, however, had more education and earned more money than auto campers, but were viewed in a relatively negative way. Thus, the image of a recreation group is apparently not determined as much by recognized characteristics of the group as by commonly held feelings about the nature of the activity in which the group is participating.

Perception of Recreation Managers

Park Ranger.—Managers of recreation environments were represented by the concept Park Ranger. Although the concept was rated significantly different on the potency factor when responses of the three groups were compared (fig. 1), paired chi-square tests showed no differences (table 3). The meaning of Park Ranger was consistent for all three groups. The concept appears to mean the same thing as Wilderness Hiker. But the wilderness hiker is seen as slightly more active and a little less valuable.

Do different groups of recreationists perceive each other in different ways? Study results indicate that not only do different

groups perceive other groups differently, but they also see themselves as "different". This result should be carefully considered in developing recreation resources that are intended to meet the needs of several groups at one time. More diversity and physical separation of groups would seem desirable where feelings of animosity exist; however, the exact magnitude and direction of feelings between groups should be more fully investigated before management prescriptions are issued.

Study results suggest that participation in a certain recreation activity conveys a particular group image. Some activities project a more positive or desirable image than others. Activities that require considerable physical effort, such as hiking a wilderness trail, seem to convey a positive image, while activities that involve mechanized travel and little physical effort seem to convey a negative image. Similarly, activities that require a minimum disruption to the natural environment in terms of permanence and facility requirements seem to project a favorable image.

CONCLUSIONS

This study demonstrated the use of the semantic differential technique to measure the meaning of various elements that influence perception of natural environments and experiences. However, results are tentative. The semantic differential technique must be tested more rigorously in carefully controlled situations before results can be applied to specific management or policy decisions.

The three general factors—evaluation, potency, and activity—should be defined more precisely, using sets of adjective pairs that relate more specifically to environmental concepts. Also, the concepts or elements of concern need to be defined more precisely. In our study, very general concepts were considered to demonstrate the approach. Future research should include base-line concepts—concepts

that people clearly understand—the meanings of which are already understood.

Study results do show the usefulness of the semantic differential as a tool for studying the complex process of environmental perception. Some of the more important and immediate questions that could be approached through use of the technique are:

How do people who use elements of natural environments perceive alternative management programs and policies? How do different interest groups perceive environmental issues? How compatible are the goals and expectations of various natural resource users?

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