

## ABSTRACT

MELBY, J. D. Intentions, attitude beliefs, social norm beliefs, and past behavior relationships based upon perceived environmental and health factors for participants involved in outdoor land-based trail recreation in Wisconsin. MS in Community Health Education, 1994, 48pp. (R. Duquette)

Ajzen and Fishbeins' Theory of Reasoned Action was used to measure the attitude beliefs, social norm beliefs, and intentions in predicting the correlates of participation in outdoor land-based trail recreation based upon perceived environmental and health factors. Additionally, Ajzen and Fishbeins' behavioral model was modified to include self-report past behavior as suggested by Manfredo and Shelby (1987). A sample of 75 members of the Wisconsin Wildlife Federation were questioned regarding their intentions to participate in nonmotorized trail recreation, their attitude beliefs regarding participation, the influence of important others in making decisions to participate, and their past behavior in either motorized or nonmotorized land-based trail recreation. It was found that the attitude and social norms accurately predicted intentions to participate in nonmotorized recreation ( $R = .91$ ). Standardized regression coefficients demonstrated that intentions were influenced more by attitudes ( $r = .92$ ,  $p < .01$ ) than by the influence of social references ( $r = .59$ ,  $p < .01$ ). The past behavior variable also indicated significant correlation to the attitude ( $r = .29$ ,  $p < .05$ ) and social norm ( $r = .26$ ,  $p < .05$ ) components within a modified model. This supports findings by Manfredo and Shelby (1987) on the validity of self-reported past behavior in studies of attitude-behavior relationships. Although significant differences using the intention and past behavior variables were found, further investigations using a larger sample size are needed. This study suggests that there are both natural environment and health needs factors which participants in outdoor trail use consider when determining motorized versus nonmotorized uses of land-based trail recreational sites.

INTENTIONS, ATTITUDE BELIEFS, SOCIAL NORM BELIEFS, AND PAST  
BEHAVIOR RELATIONSHIPS BASED UPON PERCEIVED ENVIRONMENTAL  
AND HEALTH FACTORS FOR PARTICIPANTS INVOLVED IN OUTDOOR  
LAND-BASED TRAIL RECREATION IN WISCONSIN

A MANUSCRIPT STYLE THESIS PRESENTED  
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This project is dedicated to my grandparents, each of whom were all very important to me and took genuine pride in my accomplishments.

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## Introduction

This study looked at human behavior concerning recreational habits in natural environment areas. The use of natural environment areas as recreational sites poses an important social dilemma regarding what actions humans should or should not perform in these areas. This dilemma is concerned with how human actions affect the natural world around them and, conversely, if the results of these actions upon the environment affect human health. Value differences between right and wrong, wise or unwise, fair or unfair uses produce disagreements over the extent of mankind's intervention and resulting effects. It is considered by many a challenging task to try to establish a consensus that balances the natural environment's preservation needs with human users needs.

Increasing human population and declining natural areas for recreational activities have placed greater demands on available sites and their specified uses. Thus, it is important to understand the environmental and health perceptions of individuals related to their choice of recreational pursuits. This will provide framework data for educators relative to informed interaction planning between

recreational activities and natural environment area use.

The assessment of recreational use upon wilderness areas has been well documented. Research by Stankey and Baden (1977) indicated the necessity of rationing wilderness use by employing guidelines. Absher and Lee (1978), Shelby and Heberlein (1986), and West (1981), among others, have studied factors concerning determination of optimum recreational and sociological "carrying capacities" in recreation setting management.

Carrying capacities, as defined by Shelby and Heberlein, are concerned with "determining the number of users that can be accommodated to a given area without loss in the quality of the natural environment and/or the visitor experience." They have also stated some significant management difficulties in establishing carrying capacities as noted by Schreyer (1976), Hendee, Stankey, & Lucas (1978), and other researchers.

Schreyer (1976) argued that because people have different wants, there are different carrying capacities for different experiences, while Hendee, et al. (1978) found that any use produces some change, and that it is difficult to tell just how much change is too much to sustain a natural environment areas preservation needs. Further carrying capacity studies by Cole (1983) emphasized that

even low amounts of recreational use can impact plant communities. Cole's evaluations were based upon his research assessing and monitoring changes on trail conditions in wilderness areas used by recreation participants.

Gladden's (1990) research of recreation and wilderness use looked at environmental values by examining the different beliefs, attitudes, and values that determined the preferences of two groups that utilized wilderness areas. Specifically he documented the arguments between motorized and nonmotorized recreation participants in the Boundary Waters Canoe Area located in northern Minnesota. His research followed the active political debate regarding the designation of the area as a total wilderness and what forms of recreation would then be suitable within its boundaries.

He found that differences in respective recreational tastes led to conflicts. One underlying assumption involved in the conflicts was that motorized vehicles caused some significant environmental impacts. Opponents of motorized recreation also argued that traveling by motorized means was incompatible with wilderness values. Supporters of motorized recreation wanted their rights to continue travel as they were accustomed to and to protect their economic interests.

The policy issue from his research thus becomes the psychological aspect of wilderness as an experience, rather than a policy of concern for how human actions actually affect the environment. Each side debated the concept of 'wilderness' although there is no complete agreement on what it is or how to measure it. Gladden summarized that the arguments that rested on each side stemmed from philosophical differences and resulting political compromise would be difficult. This study emerged out of this debate.

### The Study

This study was developed to be used as an initial research tool for future investigations utilizing the guidelines from Ajzen and Fishbeins' (1980) Theory of Reasoned Action. The purpose of this study was to assess whether human behavior toward participation in recreational activities in natural areas in Wisconsin is based upon perceived environmental and health factors. Specifically, it looked at the belief and attitude differences between those intending to participate in nonmotorized outdoor land-based recreational trail activities, and those not intending to participate.

The Theory of Reasoned Action focuses on a developed Behavior Intention Model. The model (see Figure 1) specifies that intentions

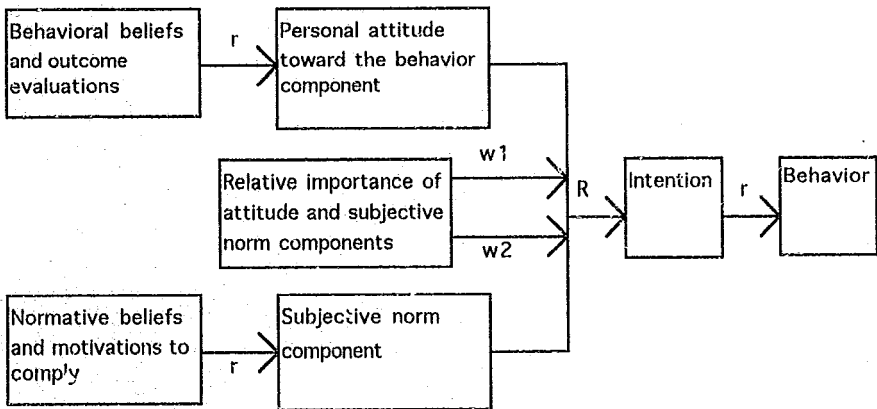


Figure 1. Relations among beliefs, attitude, subjective norm, intention, and behavior using the Theory of Reasoned Action. Ajzen and Fishbein (1980)

to perform a given behavior can be depicted as a linear combination, or weighted sum, of personal attitudes toward the behavior, and subjective norm attitudes toward the behavior. According to the model and theory, intentions are stated as the most reliable predictors of actual behavior, noting that attitudes affect behavior only as mediated by behavioral intentions. The model further shows that attitudes are influenced by salient beliefs and by the evaluation of these beliefs. The salient beliefs, evaluation of beliefs, attitudinal component, and subjective norm component are then all correlated to determine the relationship strength to intention.

This study using the Theory of Reasoned Action also went beyond the Ajzen and Fishbein model by including self-reported data on past behavior. This modification has empirical support in a number of studies. Bentler and Speckart (1979) found that self-report measures had a direct affect on attitudes, suggesting that intentions do not mediate altogether the relationship between attitudes and behavior. They stated support for the use of the past behavior variable as an additional indicator of behavior advancing beyond the original Ajzen and Fishbein proposal.

Challenges have been made however to self-reported past behavior measures that question whether self-reports are accurate indicators of actual past behavior. Bagozzi (1981) used actual past behavior measures and found no direct attitude-behavior relationship, thus returning to agreement with Ajzen and Fishbein that the attitude-behavior effect was mediated by behavioral intentions.

Manfredo and Shelby (1987) then looked further for comparative correlations between attitudes and self-reported past behavior, and attitudes and actual behavior. They found that self-reports were reasonably accurate, but they produced results different from actual behavior in attitude-behavior tests.

Self-reports were shown to have effects on attitude and behavioral intention measures independent of actual behavior. They concluded that self-reports should be measured, tested, and modeled separately when examining attitude-behavior relationships to strengthen the assessment of behavior.

### Methods

#### Procedure

Preliminary survey. A preliminary independent mail sample survey utilizing open-ended questions was designed and sent to representative individuals involved in motorized outdoor trail activities, and to those involved in nonmotorized activities. Magazine, newsletter, and other resources related to the specific activities were used to gather contact names of individuals who were involved in these activities. Respondents were asked to state their beliefs regarding participating in nonmotorized forms of outdoor trail activities in Wisconsin in the next 2 years.

The use of open-ended questions was to ensure that the beliefs for the attitude component, and referent groups for the subjective norm component, were salient for the behavior being examined. The salient beliefs were selected by asking the respondents to identify positive and negative consequences of participating in nonmotorized

recreational activities. The specific wording of the attitude and referent group questions instructed respondents to list, in their opinion, the advantages and disadvantages of participation, and who would approve or disapprove of their participation. The data gathered from the preliminary survey was then used in formulating the final survey questions.

Final survey. The final survey consisted of 54 questions including demographic, rating scale, and belief questions that were measured on a 7 point Likert-type scale. The belief questions followed the guidelines for Ajzen and Fishbeins' Intention Model and were phrased at identical levels of specificity with respect to action (participation), target (nonmotorized recreational activities), context (on outdoor land-based trails in Wisconsin), and time (within the next 2 years). According to Fishbein and Ajzen's (1975) stipulations, these 4 factors are critical to the model.

Since the self-reported past behavior variable in the study was measured separately from the behavior intention variable, the survey contained questions regarding past recreational behavior. By answering question 2 of the survey, respondents stated whether they preferred motorized or nonmotorized activities. Question 3 asked the respondents to indicate the outdoor trail recreational site



activities they had participated in. The data from questions 2 and 3 provided a method to categorize and delineate the total sample's motorized recreational trail activity respondents from the nonmotorized respondents.

### Final Survey Sample

The population sampled were members of the Wisconsin Wildlife Federation. This association was chosen based upon member involvement in outdoor recreational trail activities in Wisconsin. A six page, self-administered, mail-back questionnaire was sent to 250 members of the Wisconsin Wildlife Federation around December 1, 1993. Due to confidentiality of mailing list information, all surveys were sent to the organization and distributed by them to the members. Therefore, no followup mailings or reminders were sent to nonrespondents.

### Subjects

The population sampled showed various demographic information. Among the respondents, 93% were male and 7% were female. The average age was 51 years with the range from 23 to 79 years. Eighty three percent stated that they did participate in outdoor trail recreation while 17% said they did not. Regarding the subjects level of environmental issues concern, 1.4% stated

environmental issues were not important, 2.8% stated they were of some importance, 7% stated they were of fair importance, 22.5% stated they were quite important, and 66.2% stated environmental issues were very important.

### Results

The final survey return rate received for this single mailing was 29% ( $n = 75$ ). All of the respondents were categorized as either intending or not intending to participate in nonmotorized recreational activities in the future. The delineation for the intention variable showed a population sample of 91% who intended to participate, and only 9% who did not intend to participate. This showed the majority to be nonmotorized activity participants if based upon their intended behavior. Therefore, a very low number ( $n = 6$ ) did not intend to participate in nonmotorized recreational activities.

A large difference was found between what respondents indicated as intended behavior, and their past behavior. All respondents were categorized as either nonmotorized or motorized from their indications of self-reported past behavior. The delineation for the past behavior variable was 63% nonmotorized participants, and 37% motorized participants.

Clearly, the respondents' intentions to participate in nonmotorized outdoor trail recreational activities differed from their reported past participation in nonmotorized activities. For this reason, self-reported past behavior was further determined to have useful value as an additional measurement indicator for comparison to intention when using the Behavior Intention Model.

#### Importance of Behavior Intention Model Main Components

The research focus of the relationship between intention, the attitude component, subjective norm component, and underlying beliefs (Ajzen & Fishbein, 1980) is important. The two major components of the model can be used to predict intentions of participation in nonmotorized recreation. The multiple correlation coefficient between behavioral intention and the attitude toward participation and subjective norm was .91 ( $p < .01$ ) (see Figure 2).

According to the model, the Beta weights of the main components, attitude and subjective norms, in a multiple regression equation indicate the relative importance of these on intentions. Analyzing all the subjects together, the attitudinal component had a higher standardized regression coefficient ( $r = .92$ ,  $p < .01$ ) than the subjective norm ( $r = .59$ ,  $p < .01$ ) indicating that respondents' attitudes toward participation in nonmotorized recreation had more

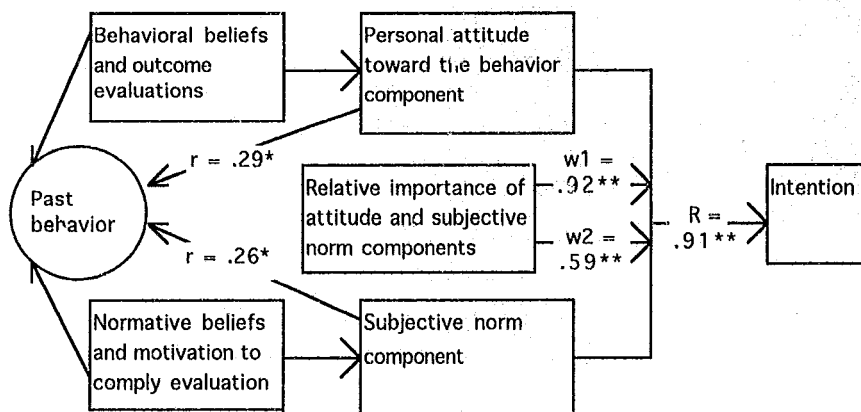


Figure 2. Correlation coefficients of the attitude component and subjective norm component to the intention and past behavior variables.

influence on their intentions than did the influence of referent groups who are important to them (see Figure 2). Both Beta weights were high, however, suggesting that the influence of personal attitudes and the influence of “important others” are strong factors for intention decisions to participate in nonmotorized recreation.

The past behavior variable, based upon what type of recreation respondents had participated in, was analyzed in addition to the intention variable. The correlations of the personal attitudinal ( $r = .29$ ,  $p < .05$ ), and subjective norm ( $r = .26$ ,  $p < .05$ ) components to the past behavior variable were also significant (see Figure 2).

Again, there was greater influence of personal attitudes than the influence of "important others" related to past recreational activity behavior.

The correlations for the past behavior variable were not, however, as statistically significant as the personal attitude and subjective norm components were to intention. It appeared that, for the entire sample, respondents' intentions to participate in nonmotorized recreational activities was of great importance, yet based upon their past behavior, participation in nonmotorized recreational activities was not as prominent.

#### Differences in Outcome Beliefs and Outcome Evaluations

Since the Ajzen and Fishbein model specifies a complete view of both personal attitudinal and normative components, these are each looked at in greater detail concerning the salient beliefs and evaluation of beliefs for the components.

Intention variable. The mean outcome belief strength, outcome evaluation, and product scores were analyzed and correlated to the personal attitude component for the relationship toward the intention variable. The outcome strength means and outcome evaluation means were multiplied together for a resulting product mean. The product means of each belief were summed. This sum

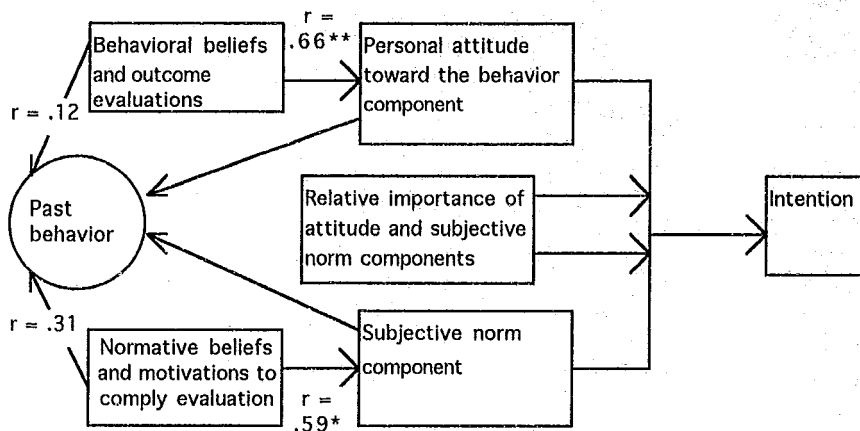


Figure 3. Correlation coefficients of the salient beliefs, and evaluations of beliefs for the intention and past behavior variables.

total was then correlated for the relationship to the intention variable. For the entire sample, the correlation ( $r = .66$ ,  $p < .01$ ) between the summed products of the outcome strength scores, the outcome evaluation scores, and the attitudinal component toward intention to participate was highly significant (see Figure 3).

Table 1 presents the mean outcome strength, outcome evaluation, and product scores for the intention variable. There were highly statistically significant individual outcome strength, outcome evaluation, and product mean differences between those intending to participate in nonmotorized recreational activities and

Table 1. Mean outcome belief strength, outcome evaluation, and product scores for respondents who do not intend to participate in nonmotorized recreational trail activities and those who intend to participate<sup>a</sup>.

	Mean outcome strength <sup>b</sup> (likely or unlikely)		Mean outcome evaluation <sup>c</sup> (good or bad)		Product Means	
	Non-Int n = 1	Intenders n = 35	Non-Int n = 1	Intenders n = 35	Non-Int n = 1	Intenders n = 35
Perceived Outcome (regarding participation in nonmotorized recreational trail activities)						
Solitude	7.00	1.86** <sup>d</sup>	2.00	1.26	14.00	2.40**
Limiting Fuel Use	7.00	1.86**	6.00	1.46**	42.00	2.94**
Enhance Exercise	7.00	1.54**	2.00	1.31	14.00	2.26**
Share trails with motorized	7.00	3.40	7.00	4.34	49.00	17.83
Share trails with non-motor	7.00	2.00**	5.00	1.83**	35.00	3.77**
Share trails with either user	7.00	3.00	7.00	3.60	49.00	13.51* <sup>e</sup>
Minimize trail impact	7.00	1.49**	6.00	1.31**	42.00	2.06**
Enjoy nature more	7.00	1.31**	2.00	1.14*	14.00	1.60**
Decrease trail repair	7.00	2.20**	5.00	2.23	35.00	7.09*

<sup>a</sup>Total N for both groups based upon survey results containing no missing data

<sup>b</sup>Strength score: Very Likely 1.0, Likely 2.0, Slightly Likely 3.0, Neither 4.0, Slightly Unlikely 5.0, Unlikely 6.0, Very Unlikely 7.0

<sup>c</sup>Evaluation score: Very Good 1.0, Good 2.0, Slightly Good 3.0, Neither 4.0, Slightly Bad 5.0, Bad 6.0, Very bad 7.0

<sup>d</sup>\*\*MANOVA tests showed mean scores statistically different at the .01 level

<sup>e</sup>\*MANOVA tests showed mean scores statistically different at the .05 level

those not intending to participate. Due to the low number ( $n = 1$ ) of nonintention responses however, comparisons of means for the outcome strengths, outcome evaluations, and products was impractical.

It was noted that those indicating intention ( $n = 35$ ) to participate in nonmotorized activities showed outcome strengths as more likely, and outcome evaluations as good, except for the sharing trails with motorized participants factor, and the sharing trails with either type of participant factor. For these 2 factors, intenders indicated the outcome strength less likely, and the outcome evaluation less good as compared to the other outcome factors. The product means for these two factors also reflected this indication.

Past behavior variable. For the attitudinal component, the correlation between the summed products of outcome strength scores, outcome evaluation scores, and the past behavior variable showed no overall significance (see Figure 3).

Table 2 presents the mean outcome strength, outcome evaluation, and product scores for the past behavior variable. For the individual outcome strength means, there were statistically significant mean differences shown for the sharing trails with



Table 2. Mean outcome belief strength, outcome evaluation, and product scores for respondents who self-reported past participation in motorized recreational trail activities, and those who self-reported past participation in nonmotorized trail activities<sup>a</sup>.

	Mean outcome strength <sup>b</sup> (likely or unlikely)		Mean outcome evaluation <sup>c</sup> (good or bad)		Product Means	
	Motor n = 13	Non-Motor n = 23	Motor n = 13	Non-Motor n = 23	Motor n = 13	Non-M n = 23
Perceived Outcome (regarding participation in nonmotorized recreational trail activities)						
Solitude	1.92	2.26	1.39	1.26	3.23	2.78
Limiting Fuel Use	2.15	1.87	2.00	1.44	6.31	2.78
Enhance Exercise	2.08	1.48	1.54	1.22	3.69	1.96
Share trails with motorized	2.46	4.17* <sup>d</sup>	3.39	5.09*	11.08	23.70*
Share trails with non-motor	2.00	2.09	1.85	2.17	5.15	4.52
Share trails with either	2.00	3.78*	2.31	4.61** <sup>e</sup>	6.69	19.57*
Minimize trail impact	2.08	1.44	1.54	1.48	5.00	2.35
Enjoy nature more	1.77	1.30	1.15	1.22	2.46	1.74
Decrease trail repair	2.85	2.26	2.54	2.48	10.85	8.22

<sup>a</sup>Total N for both groups based upon survey results containing no missing data.

<sup>b</sup>Strength score: Very Likely 1.0, Likely 2.0, Slightly Likely 3.0, Neither 4.0, Slightly Unlikely 5.0, Unlikely 6.0, Very Unlikely 7.0

<sup>c</sup>Evaluation score: Very Good 1.0, Good 2.0, Slightly Good 3.0, Neither 4.0, Slightly Bad 5.0, Bad 6.0, Very bad 7.0

<sup>d</sup>\*MANOVA tests showed mean scores statistically different at the .05 level

<sup>e</sup>\*\*MANOVA tests showed mean scores statistically different at the .01 level

motorized participants factor (mean difference = 1.71,  $p < .05$ ), and the sharing trails with either type of user factor (mean difference = 1.78,  $p < .05$ ). Generally, nonmotorized participants felt it would be slightly more likely there would be positive consequences to participating in nonmotorized recreation activities. Nonmotorized participants however felt it more unlikely that there would be positive consequences for the following factors; solitude, sharing trails with motorized users, sharing trails with other nonmotorized users, and sharing trails with either type of user.

Concerning the individual outcome evaluation factors, there were statistically significant mean differences for the sharing trails with motorized users factor (mean difference = 1.70,  $p < .05$ ), and the sharing trails with either type of user factor (mean difference = 2.30,  $p < .01$ ). Nonmotorized participants generally believed that the results to participating in nonmotorized recreation activities were good except for these two factors.

The product means for these two factors also displayed statistically significant mean differences between motorized and nonmotorized participants. Sharing trails with motorized users indicated a mean difference of 12.62 ( $p < .05$ ), and sharing trails with either type of user a mean difference of 12.88 ( $p < .05$ ).

### Differences in Normative Beliefs and Motivation to Comply

Intention variable. Using the same formula as the attitudinal component, the normative beliefs and motivation to comply means were multiplied together for a resulting product mean. The product means of each belief were summed. This sum total was then correlated to the subjective norm component for the relationship toward the intention variable. For the intention variable, the correlation ( $r = .59, p < .05$ ) between the summed products of the normative belief scores, the motivation to comply scores, and the subjective norm component was statistically significant (see Figure 3). There was however, no statistical analysis able to be performed for the individual referent normative beliefs, motivation to comply, and product means. This was again due to the small sample size and missing data.

Past behavior variable. Although the total number of responses for the referent questions was very low, analysis was performed for the normative beliefs, motivation to comply, and product means for the past behavior variable. Table 3 shows the mean normative belief, motivation to comply, and product scores for the past behavior variable. There was no statistically significant correlation between the summed products of normative belief

Table 3. Mean normative belief, motivation to comply, and product scores for respondents who self-reported past participation in motorized recreational trail activities, and those who self-reported past participation in nonmotorized recreational trail activities<sup>a</sup>

	Mean normative belief score <sup>b</sup> (Supportive or nonsupportive)		Mean motivation to comply score <sup>c</sup> (Likelihood to comply)		Product Means	
	Motorized n = 6	Non-M n = 7	Motorized n = 6	Non-M n = 7	Motorized n = 6	Non-M n = 7
Referent Group (regarding participation in nonmotorized recreational trail activities)						
Parents, family	1.33	1.71	1.50	3.00	2.17	4.71
Environmentalists	2.00	2.14	2.00	3.14	5.00	6.43
Friends	1.33	1.86	1.67	3.14	2.67	5.29
DNR	1.67	2.57	1.67	3.00	3.67	7.86
Bikers	2.17	2.14	2.17	3.00	5.67	6.29
Skiers	1.83	2.00	2.33	3.00	5.33	5.29
Health groups	1.50	2.29	2.33	3.71	4.33	8.57
Businesses	1.67	1.71	2.00	3.57	3.83	5.43
Hunters	2.17	1.86	2.17	2.86	6.17	4.71
Snow-mobilers	2.33	4.00	2.33	4.00	6.67	18.14
ATV riders	3.00	4.00	2.83	4.00	11.00	18.14
Horseback riders	2.33	3.43	2.83	4.00	9.17	16.71
Nearby landowners	2.00	2.86	2.00	2.29	5.00	8.00

<sup>a</sup>Total N for both groups based upon survey results containing no missing data

<sup>b</sup>Normative Belief score: Very Supportive 1, Supportive 2, Slightly Supportive 3, Neither 4, Slightly Non-Supportive 5, Non-Supportive 6, Very Non-Supportive 7

<sup>c</sup>Motivation to Comply score: Very Likely 1, Likely 2, Slightly Likely 3, Neither 4, Slightly Unlikely 5, Unlikely 6, Very Unlikely 7

scores, motivation to comply scores, and the past behavior variable (see Figure 3).

There were no statistically significant mean differences between motorized and nonmotorized participants for the individual normative beliefs. In general, the motorized responders showed slightly more support from the referent groups listed to participate in nonmotorized recreational activities than the nonmotorized participants. There were also no statistically significant mean differences for the motivation to comply evaluations. Motorized responses were noted as slightly more motivated to comply with the referent groups than the nonmotorized responses.

The product means concurred with the normative belief and motivation to comply means in displaying no significant differences. Nonmotorized participants generally indicated more support and greater motivation to comply from the referents with the exception of the hunters' referent. Nonmotorized participants were noted to have greater support from this referent to participate in nonmotorized recreation.

### Discussion

This study was designed to use Ajzen and Fishbeins' Theory of Reasoned Action in measuring the attitude beliefs, social norm

beliefs, and intentions to predict the correlates of participation in outdoor land-based trail recreation based upon perceived environmental and health factors. The salient beliefs for the attitude and subjective norm components are of primary importance when using the Behavior Intention Model.

The most severe limitation of this study was the response rate, although those responding did note some important factors they consider when defining recreational trail site use in natural areas. Most notable were attitude factors concerning who participants would or would not consider sharing trails with while participating in their preferred activities.

There were statistically significant differences between intenders and nonintenders for the individual underlying attitude belief factors evaluated. Due to a very low number of nonintenders however, comparisons between the groups was impractical. There were no statistically significant differences between intenders and nonintenders for the social norm belief factors.

Modifying the Behavior Intention Model by including a past behavior variable provided some important information pertaining to support for the use of this additional variable when assessing behavior. There were no statistically significant differences

between motorized and nonmotorized participants for subjective norm belief factors, yet differing from the intention variable, there were a few statistically significant differences between motorized and nonmotorized participants for the attitude belief factors.

The attitude belief factors considered the outcomes to participating in nonmotorized recreational activities in wilderness areas and these outcomes had either environmental or health implications to the individual. Health implications evaluated by the individual were either physical or affective.

Motorized and nonmotorized participants showed statistically significant affective differences when asked if they would consider sharing trails. Nonmotorized participants felt it would be less likely they would share trails with motorized users, or share trails with both types of users. (This pattern was similarly noted for those intending to participate in nonmotorized recreation). The indication appears that nonmotorized participants feel a need for exclusive trail use in a defined setting which provides important information for trail planners.

### Conclusions

Although this study found some significant differences using intention and past behavior measurements, the number of subjects

used was low. Additional research using a larger sample size is needed. It is also noted that modifications to the theory can further enhance the analysis to understanding behavior.

For this study, measuring the intention to participate in nonmotorized recreation was only partially sufficient in predicting future behavior. Because the respondents' intended behavior indications differed from their reported past behavior participation, the past behavior variable demonstrated some influence for predicting future behavior. Comparisons, therefore, between intentions of individuals and their past behavior can strengthen the use of the model. This finding adds support to Manfreda and Shelby (1987) who recommended using self-reported past behavior when examining attitude-behavior relationships.

Finally, this study provides additional information to the research of Gladden (1990) who noted some of the changes humans are making in their attitudes and beliefs toward the natural world. Changes in behavior regarding consideration of environmental quality needs and human recreational needs are crucial so that the balance between them may be better understood.



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## APPENDIX A

### DESCRIPTION OF THE BEHAVIOR INTENTION MODEL

### Description of Behavior Intention Model

The behavior intention model, developed by Fishbein, is designed for the prediction of behavioral intentions, not for the direct prediction of behavior. As reported by Page and Cole (1985), although the model is concerned primarily with the prediction of behavioral intentions, it has usefulness in understanding behavior because of the relationship between intentions and the actual behavior. According to Fishbein and Ajzen (1975), the greatest asset of the model is that it is simple to understand. The purpose of the model is to predict the intention to perform a particular behavior in a given situation. Within the conceptual framework of the theory, a person's specific behavior (B) is a function of his or her intention (BI) to perform the behavior. Behavioral intention (BI) is expected to account for most of the behavior (B) variance. Therefore, theoretically if a researcher can predict BI, B can also be predicted with only a slight deviation. Strong relationships between BI and B can only be obtained if the BI is appropriate for the particular behavior under study. Additionally, the less specific the

behavioral intention (BI) or the longer the time span between the statement of intention and the actual behavioral performance, the lower the correlation will tend to be between BI and B.

According to the model, behavioral intentions (BI) are determined by the combination of two major factors: the attitude toward performing the behavior ( $A_B$ ) and the subjective norm (SN).

The main equation of the theory is represented as follows:

$$B \approx BI = (A_B)w_1 + (SN)w_2 ;$$

where:

B = the behavior

BI = the behavior intention

$A_B$  = attitude toward the behavior

SN = the subjective norm

$w_1$  = empirically determined weight for the attitudinal component ( $A_B$ )

$w_2$  = empirically determined weight for the subjective norm component (SN)

Therefore, behavioral intention (BI), which is defined as the probability that a person will engage in the particular behavior, is a function of the weighted sum of the two variables:  $A_B$  and SN.

The attitude toward the behavior ( $A_B$ ) is a function of two subcomponents beliefs about the outcomes ( $b_i$ ) and the evaluation of those outcomes ( $e_i$ ). This is represented in the following manner:

$$A_B = \sum_{i=1}^n b_i e_i;$$

where:

$b$  = the belief that performing  $B$  will lead to outcome  $i$

$e$  = the evaluation of outcome  $i$

$n$  = the number of beliefs a person maintains about performing behavior  $B$

More simply, the attitude toward a behavior ( $A_B$ ) is the sum of the products of beliefs ( $b_i$ ) weighted by their respective evaluations ( $e_i$ ).

The subjective norm (SN) is concerned with the influence of the social environment on behavior. More specifically, it is a person's perception that most people who are important to him or her think he or she should or should not perform a specific behavior. The subjective norm (SN) is determined by two factors: normative beliefs ( $nb_i$ ), which are perceived expectations of specific referent groups or individuals, and an individual's motivation to comply ( $mc_i$ ) with these expectations. The formulation of this is as follows:

$$SN = \sum_{i=1}^n nb_i mc_i ;$$

where:

$nb_i$  = the normative belief

$mc_i$  = the motivation to comply with referent  $i$

$n$  = the number of relevant referents

Thus, the sum of the products of normative beliefs ( $nb_i$ ) weighted by a motivation to comply ( $mc_i$ ) represent the subjective norm (SN).

The empirical weights ( $w_1$  and  $w_2$ ) in equation 1 are determined through multiple regression analysis. The attitudinal and subjective norm components are given empirical weights in the equation, proportional to their relative importance in the prediction of behavioral intentions. Empirical weights will vary depending upon the type of behavior that is being predicted and the conditions under which the behavior is to be performed. Since the Fishbein model utilizes multiple regression techniques, standardized regression coefficients serve as empirical weights for the attitudinal ( $A_B$ ) and subjective norm (SN) components. The attitudinal ( $A_B$ ) and subjective norm (SN) components are the two predictors and the behavioral intention (BI) is the criterion variable.

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## APPENDIX B

### ADDITIONAL METHODS AND PROCEDURES

## Additional Methods and Procedures

### Preliminary survey selection of subjects

The selection of persons to respond to the preliminary questions was based upon involvement in the specified recreational activities either as an individual or as a member of an organization. Publications by representative organizations of either motorized (i.e., snowmobiling, off-road vehicle, etc.) or nonmotorized (i.e., cross-country skiing, hiking, etc.) recreational activities were obtained and used as information.

The publications contained names of individuals to contact regarding specific information on meetings, conventions, races, and other activities. These individuals were then called by telephone to ask if they would be interested in distributing a specified number (12 or less) of surveys to other persons also involved in the target activities. If these contact people agreed, copies of the preliminary survey along with a letter of explanation of the study and directions for completing the survey were sent. Followup to the contact person was then accomplished via telephone and mail.

The effect of using this method resulted in persons involved in a particular recreational activity answering the preliminary questionnaire, and then returning the self-addressed, postage paid responses back to the researcher.

Another method of procuring preliminary questionnaire responses was by noting Department of Natural Resources educational classes or courses scheduled statewide. Newspapers list these events making the information publicly available. Again, contact persons were called by telephone and with permission, the researcher would be allowed to attend a class on one occasion to briefly explain why the information was needed and to solicit responses to the survey. Respondents then would mail them to the researcher after completing the survey. Both methods demonstrated moderate to good success. See Appendix C for a copy of the preliminary survey.

#### Final survey selection of subjects

Following the preliminary survey completion, the final survey was formed utilizing results from the preliminary question responses. The determination of subjects to be used for the study was based upon the following considerations: involvement in either motorized or non-motorized outdoor land-based trail recreation

activities, and assumed basic knowledge of environmental and/or health issues in regards to either participation or nonparticipation in those activities.

In order that these considerations were met, research of a particular organization was then conducted by contacting a leading representative. It was important that the organization's members represent both motorized and nonmotorized activity involvement. When it was determined by the representative and the researcher that members were involved in both types of activities, permission to survey the subjects was then obtained.

For this study, permission was granted to gather data via mailed responses. To insure the mailing list confidentiality of this particular organization, all the surveys to be completed by the subjects were sent by the researcher to the organization who then mailed them as part of a regular correspondence to its members.

The distributed survey included specific written instructions for the subjects to follow while completing it, a brief explanation of the survey's purpose, and directions regarding returning it to the researcher. See Appendix D for a copy of the final survey.

## APPENDIX C

### PRELIMINARY SURVEY

**RESEARCH STUDY:****Outdoor recreational activity choices related to the environment.**

The following short questionnaire is part of a research study being conducted at the University of Wisconsin - La Crosse.

Information has indicated that there are two groups of outdoor trail recreation individuals: those who prefer "nonmotorized" forms of outdoor trail recreation (X-C skiing, hiking, snowshoeing, etc.) and those who prefer "motorized" forms of outdoor trail recreation (snowmobiling, ATVs, motorcycling, etc.).

This survey is to determine your thoughts regarding participation and/or nonparticipation in any of these specified outdoor land-based activities. Please answer each question carefully based upon what you feel and/or actually do. Thank you for your time in assisting with this research. Your answers will be held in strict confidence and your name anonymous.

1. Please list any types of outdoor trail activities you participate in (motorized or nonmotorized):

Note: For the following questions, the term "nonmotorized" was randomly selected. Please answer each as if nonmotorized were the primary choice for recreation participation.

2. In your opinion, what are **advantages** to participating in nonmotorized forms of outdoor trail activities in Wisconsin in the next two years?

3. In your opinion, what are **disadvantages** to participating in nonmotorized forms of outdoor trail activities in Wisconsin in the next two years?

4. What else do you associate with participating in nonmotorized forms of outdoor trail activities in Wisconsin in the next two years?

OVER

5. If you participated in nonmotorized forms of outdoor trail activities in Wisconsin in the next two years, are there people or groups who would likely **approve** of your participation? (Please give examples)

6. If you participated in nonmotorized forms of outdoor trail activities in Wisconsin in the next two years, are there people or groups who would likely **disapprove** of your participation? (Please give examples)

Thank you for your time in assisting with this research study.  
Please refold the survey, staple and mail to the address listed below.  
OPTIONAL: Please include name and return address.

Do not write below this line.

Jeff Melby  
632 Silver Lake Drive  
Portage, WI 53901

**APPENDIX D**  
**FINAL SURVEY**



Dear Wisconsin Wildlife Federation Member,

December 1993

The following survey is part of a research study being conducted at the University of Wisconsin - La Crosse and information gathered from the results will be used by natural resources professionals statewide. The purpose of the study is to examine personal lifestyle behaviors, attitudes, and beliefs related to recreational activity choice and the environment. As a select member of the Wisconsin Wildlife Federation, your response to this recreational trail use survey is vital.

There is fast becoming limited natural resource areas for recreational trail use in Wisconsin. Information has indicated that there are two groups of outdoor trail recreation participants: those who prefer "nonmotorized" outdoor trail recreation activities (X-C skiing, hiking, snowshoeing, etc.) and those who prefer "motorized" outdoor trail recreation activities (snowmobiling, ATVs, motorcycling, etc.). Whether you associate yourself with one or the other of these categories or both, please respond to every question by what you feel is a true personal indication for yourself and what you actually plan to do in the future.

**Important Note:** The term "nonmotorized" was randomly selected for use in many of the questions. This is NOT an indication that this study supports one type of recreation over another. It is important that you as a motorized and/or nonmotorized participant answer every question so that your ideas regarding recreational trail use in Wisconsin are known. Motorized or non-motorized participants not responding in this study may not benefit from the results.

Completion of the survey should only take a few minutes and provides valuable information. You will find upon completion that return postage is provided to the address on the bottom of the last page. Thank you for your time in completing this survey and hope that you respond by February 15, 1994.

Special thanks to the Wisconsin Wildlife Federation for making this survey possible.

Age \_\_\_\_\_

Sex: M F

1. Do you participate in any type of outdoor land-based trail recreation in Wisconsin?

Yes No

2. Do you prefer motorized or nonmotorized recreational activities?

\_\_\_ Motorized

\_\_\_ Nonmotorized

3. Please check any of the following you own and/or participate in:

Own

- \_\_\_ Motorcycle
- \_\_\_ ATV (all-terrain vehicle)
- \_\_\_ OHV (off-highway vehicle)
- \_\_\_ Snowmobile
- \_\_\_ X-C Skis
- \_\_\_ Hiking equipment
- \_\_\_ Running equipment
- \_\_\_ Snowshoes
- \_\_\_ Mountain Bike
- \_\_\_ Touring Bike
- \_\_\_ Horse (Riding)
- \_\_\_ Other \_\_\_\_\_

Outdoor land-based trail recreational activities which I regularly participate in:

- \_\_\_ Motorcycling
- \_\_\_ ATV riding
- \_\_\_ OHV riding
- \_\_\_ Snowmobiling
- \_\_\_ X-C Skiing
- \_\_\_ Hiking
- \_\_\_ Trail Running
- \_\_\_ Snowshoeing
- \_\_\_ Mountain Biking
- \_\_\_ Biking
- \_\_\_ Equestrian Activities
- \_\_\_ Other \_\_\_\_\_

4. What is your favorite outdoor land-based trail recreation pastime? \_\_\_\_\_

(OVER)

5. How do you most prefer to participate in your activity? ☐ Alone  
☐ With one other person  
☐ With 2 or more others  
☐ Any of the above

6. Please check the appropriate response for each of the following factors as to how it influences your participation in your choice of recreational activity:

	Not Very Important	Somewhat Important	Fairly Important	Quite Important	Very Important
Cost of recreation equipment	_____	_____	_____	_____	_____
Increasing tourism to an area	_____	_____	_____	_____	_____
Competition in preferred activity	_____	_____	_____	_____	_____
Fresh air	_____	_____	_____	_____	_____
Abundance of good trails	_____	_____	_____	_____	_____
Low competition/conflicts for land use	_____	_____	_____	_____	_____
Family togetherness	_____	_____	_____	_____	_____
Enjoyment of activity/fun	_____	_____	_____	_____	_____
Participating with others	_____	_____	_____	_____	_____
Courteous trail users	_____	_____	_____	_____	_____
Safety of activity	_____	_____	_____	_____	_____

7. Do you believe environmental issues are an important concern to you?

Not Very Important	Somewhat Important	Fairly Important	Quite Important	Very Important
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Please check the appropriate response for each question how you think other people would feel if you participated in **nonmotorized** outdoor land-based trail recreation activities on public lands in Wisconsin. Would the following people SUPPORT or NOT SUPPORT your participation in the next two years?

[illegible]

Next, with regards to participating in **nonmotorized** outdoor land-based trail recreation activities, how **LIKELY** or **UNLIKELY** would you be to follow the wishes of the following persons in the next two years?

	Very Likely	Quite Likely	Slightly Likely	Neither	Slightly Unlikely	Quite Unlikely	Very Unlikely
21. Parent(s)/Family	___	___	___	___	___	___	___
22. Environmentalists	___	___	___	___	___	___	___
23. Friends	___	___	___	___	___	___	___
24. State Govt. (DNR)	___	___	___	___	___	___	___
25. Bikers, bike groups	___	___	___	___	___	___	___
26. Skiers, ski groups	___	___	___	___	___	___	___
27. Health groups	___	___	___	___	___	___	___
28. Businesses	___	___	___	___	___	___	___
29. Hunters	___	___	___	___	___	___	___
30. Snowmobilers	___	___	___	___	___	___	___
31. ATV riders	___	___	___	___	___	___	___
32. Horseback riders	___	___	___	___	___	___	___
33. Nearby landowners	___	___	___	___	___	___	___

Please indicate in your opinion, how **GOOD** or **BAD** the following possible benefits or results would be from participating in **nonmotorized** outdoor land-based trail recreation activities:

	Very Good	Quite Good	Slightly Good	Neither	Slightly Bad	Quite Bad	Very Bad
34. Experiencing quietness or solitude while participating in nonmotorized trail recreation is:	___	___	___	___	___	___	___
	Very Good	Good	Sl. Good	Neither	Sl. Bad	Bad	Very Bad
35. Consuming little or no fossil fuel while participating in nonmotorized trail recreation is:	___	___	___	___	___	___	___
	Very Good	Good	Sl. Good	Neither	Sl. Bad	Bad	Very Bad
36. Enhancing fitness and exercise while participating in nonmotorized trail recreation is:	___	___	___	___	___	___	___
	Very Good	Good	Sl. Good	Neither	Sl. Bad	Bad	Very Bad
37. Sharing public areas with motorized recreation vehicles while participating in nonmotorized trail recreation is:	___	___	___	___	___	___	___

(OVER)

38. Sharing public areas with other nonmotorized recreation activities while participating in nonmotorized trail recreation is:

Very Good	Quite Good	Slightly Good	Neither	Slightly Bad	Quite Bad	Very Bad

Very Good	Good	Sl. Good	Neither	Sl. Bad	Bad	Very Bad
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39. Sharing public areas with *either* motorized or nonmotorized recreation activities while participating in nonmotorized trail recreation is:

Very Good	Good	Sl. Good	Neither	Sl. Bad	Bad	Very Bad
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40. Minimizing environmental impact to an area while participating in nonmotorized trail recreation is:

Very Good    Good    Sl. Good    Neither    Sl. Bad    Bad    Very Bad

41. Enjoying nature and wildlife while participating in nonmotorized trail recreation is:








Very Good    Good    Sl. Good    Neither    Sl. Bad    Bad    Very Bad

42. Decreasing the maintenance of trails from participating in nonmotorized trail recreation is:

Please indicate how **LiKeLy** or **UnLiKeLy** the following things are to occur from participating in **nonmotorized** outdoor land-based trail recreation activities within the next two years:

Very Likely	Quite Likely	Slightly Likely	Neither	Slightly Unlikely	Quite Unlikely	Very Unlikely
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43. My experiencing quietness or solitude while participating in nonmotorized trail recreation would be:

V-Likely   Likely   SI-Likely   Neither   SI-Unlikely   Unlikely   V-Unlikely

44. My consuming little or no fossil fuels while participating in nonmotorized trail recreation would be:

\_\_\_\_\_

	Very Likely	Quite Likely	Slightly Likely	Neither	Slightly Unlikely	Quite Unlikely	Very Unlikely
45. My enhancing my fitness and exercise while participating in nonmotorized trail recreation would be:	—	—	—	—	—	—	—
	V-Likely	Likely	SI-Likely	Neither	SI-Unlikely	Unlikely	V-Unlikely
46. My sharing public areas with motorized recreation vehicles while participating in nonmotorized trail recreation would be:	—	—	—	—	—	—	—
	V-Likely	Likely	SI-Likely	Neither	SI-Unlikely	Unlikely	V-Unlikely
47. My sharing public areas with other nonmotorized activities while participating in nonmotorized trail recreation would be:	—	—	—	—	—	—	—
	V-Likely	Likely	SI-Likely	Neither	SI-Unlikely	Unlikely	V-Unlikely
48. My sharing public areas with <i>either</i> motorized or nonmotorized recreation activities while participating in nonmotorized trail recreation would be:	—	—	—	—	—	—	—
	V-Likely	Likely	SI-Likely	Neither	SI-Unlikely	Unlikely	V-Unlikely
49. My minimizing the environmental impact to an area while participating in nonmotorized trail recreation would be:	—	—	—	—	—	—	—
	V-Likely	Likely	SI-Likely	Neither	SI-Unlikely	Unlikely	V-Unlikely
50. My enjoying wildlife and nature more while participating in nonmotorized trail recreation would be:	—	—	—	—	—	—	—
	V-Likely	Likely	SI-Likely	Neither	SI-Unlikely	Unlikely	V-Unlikely
51. My decreasing trail maintenance by participating in nonmotorized trail recreation would be:	—	—	—	—	—	—	—
	V-Likely	Likely	SI-Likely	Neither	SI-Unlikely	Unlikely	V-Unlikely

52. I intend to participate in **nonmotorized** outdoor land-based trail recreational activities in Wisconsin within the next two years:

Very Likely	Quite Likely	Slightly Likely	Neither	Slightly Unlikely	Quite Unlikely	Very Unlikely
_____	_____	_____	_____	_____	_____	_____

53. My participating in **nonmotorized** outdoor land-based trail recreational activities in Wisconsin within the next two years is:

Very Good Idea	Quite Good Idea	Slightly Good Idea	Neither	Slightly Bad Idea	Quite Bad Idea	Very Bad Idea
_____	_____	_____	_____	_____	_____	_____

Very Beneficial	Quite Beneficial	Slightly Beneficial	Neither	Slightly Harmful	Quite Harmful	Very Harmful
_____	_____	_____	_____	_____	_____	_____

Very Wise	Quite Wise	Slightly Wise	Neither	Slightly Unwise	Quite Unwise	Very Unwise
_____	_____	_____	_____	_____	_____	_____

54. Most people who are important to me are SUPPORTIVE or NONSUPPORTIVE of my participation in **nonmotorized** outdoor land-based trail recreational activities in Wisconsin in the next two years:

Very Supportive	Quite Supportive	Slightly Supportive	Neither	Slightly Non-Supportive	Quite Non-Supportive	Very Non-Supportive
_____	_____	_____	_____	_____	_____	_____

Thank you for your time in assisting with this research study.

Please recheck that all questions have been answered then refold the survey, staple and mail to the address indicated below.

Jeff Melby  
632 Silver Lake Drive  
Portage, WI 53901

## APPENDIX E

### JOURNAL FORMAT GUIDELINES

# THE JOURNAL OF ENVIRONMENTAL EDUCATION

## GUIDELINES FOR AUTHORS

*The Journal of Environmental Education* seeks unpublished articles on important research; reports on projects, programs, and initiatives; review articles; and critical essays/analyses on issues and policies. The Journal seeks to publish material that is designed to advance the instruction, theory, methods, and practice of environmental communication and education. It publishes articles dealing with environmental education at all levels, from primary through college and adult education. Subject areas include the sciences, social sciences, and humanities.

### Research Articles

A research article can be based on either qualitative or quantitative paradigms and must include the following components: abstract of 100 words, problem statement, review of the relevant literature, description of the research methodology, a report of results, discussion, and summary. In the summary, where conclusions are made, they must be supported by appropriate research methodology and documentation. Recommendations and/or conjecture are encouraged, as long as they are identified as such.

### Reports

Reports are sought on projects, programs, and initiatives that have led or will lead to innovative advances in the field. Articles should state goals and objectives, document what was done and the results, evaluate effectiveness where possible, and describe the relevance and implications for other practitioners. Anecdotal information that illustrates specific points is encouraged. These reports should describe what was done without making unsubstantiated claims.

### Essays and Analyses

Critical essays and analyses related to policy issues, philosophies, or historical perspectives on environmental education are invited.

### Reviews

Review articles can take a variety of forms, such as reviews of educational materials (books, films, videos, software, course designs, curricula) or re-

views of research project results or developments in research methodology.

### The Review Process

Manuscripts submitted as research articles are refereed and will be reviewed by at least two consulting editors whose expertise is in the field with which the manuscript deals. Manuscripts recommended for publication will be sent to our executive editors, who have the final authority on acceptance and rejections. Consulting editors may also suggest revisions; in this case, the manuscript will be returned with a copy of the editors' suggestions. Revised manuscripts will be subject to a second review. Manuscripts submitted for other categories are subject to a peer review process as appropriate to the nature and content of the articles.

### Manuscript and Submission Instructions

The Journal guidelines require that an article be clearly written, well organized, and up to 3,500 words in length. The *Publication Manual of the American Psychological Association*, 3rd edition, must be used as a style reference in the preparation of manuscripts. Citations normally are presented in a list of references. Explanatory notes should be avoided whenever possible. Essential notes should be identified with consecutive superscripts and listed in a section entitled NOTES at the end of the text.

Send *three copies* of each double-spaced manuscript to *The Journal of Environmental Education*, Heldref Publications, 1319 Eighteenth Street, NW, Washington, DC 20036-1802 (202-296-6267, fax 202-296-5149). Please do not send a diskette with your initial manuscript submission. Once the manuscript has been accepted for publication, authors are strongly encouraged to submit the manuscript on a computer diskette. Instructions for preparing the diskette will be enclosed with the acceptance letter. All contributors will receive two complimentary copies of the issue in which their articles appear. Keep a copy of your manuscript; if a question arises the editors can refer you to specific pages, paragraphs, or lines for clarification by letter.