Table of Contents

Tourism

The Perceived Impacts of Tourism: Economic, Environmental, and Sociocultural Influences of Tourism on the Host Community.
James Murdy, Andrew Yiannakis, and Josh Shuart 3

A Regional Analysis of the Consequences of Tourism Development From a Community Perspective.
Yooshik Yoon and Joseph S. Chen 11

An Evaluation of State Tourism Web Sites.
A. Leslie Burns and Robert A. Robertson 17

Sustainability Indicators Regarding Tourism Development and Coral Reef Conservation: A Case Study of Akumal, in the Mexican Caribbean.
Wendy J. Garpow 23

Developing a Culturally and Ecologically Sensitive Ecotourism in a Resource Extraction, Consumptive Recreation-Oriented Area.
Deborah Che 30

Virtual Tourism on the Internet.
Robert S. Bristow 35

Environmental Attitudes and Values

Environmentalism: A Study of Undergraduate Students.
Brijesh Thapa 41

Attitudes of Outdoor Recreationists Toward Environmental Issues.
Gene L. Theodori and A. E. Luloff 51

An Exploration of the Influence of Gender and Locality on Environmental Attitudes Using the New Ecological Paradigm (NEP) Scale.
Vinod Sasidharan and Brijesh Thapa 57

Recreational Use of Wetlands in Juneau, Alaska.
James F. Palmer 62

Environmental Education Needs Assessment: An Overview.
Anneliese Mueller, Robert A. Robertson, Eleanor Abrams, Scott Fletcher, Christine L. Schadler, and Dave L. Howell 67

Water Resource Issues in Recreation

Improving Recreational Customer Satisfaction: Focusing on Communication and Changes in Quality of Experience at US Army Corps of Engineers Reservoirs.
James D. Absher, Robert C. Burns, and Alan R. Graefe 73

Public Perception of the Connecticut River's Quality and Suitability as a Recreational Resource.
Jo Beth Mullens and Melissa McNally 78

A Holistic Approach to Maintaining Quality in Environmental Management and Visitor Experience.
Elery Hamilton-Smith 82

River of Promise: Community Based Conservation for the Cheat River Watershed in West Virginia.
Dave Bassage, Rick Buckley, Jeanne Kraje, Randy Robinson, and Steve Selin 86

Gender, Ethnicity, and Special Populations

Ethnicity and Recreation: Problems With Concepts and a Need For New Approaches.
Edwin Gomez

Similarities and Differences in the Outdoor Recreation Participation of Racial/Ethnic Groups: An Example from Illinois.
John F. Dwyer

Disabled Wildlife-Associated Recreation Participants.
Allan Marsinko

Visitor Experiences and Satisfaction

More on Conceptualizing and Measuring Leisure Involvement.
Gerard Kyle, Deborah Kerstetter, and Frank Guadagnolo

User Satisfactions and Perceptions of Crowding in Four Adirondack Wilderness Areas.
Chad Dawson, Peter Newman, and Cathy Fuller

Demographic Trends

Demographic Change in the 21st Century: The Impact on Recreation Participation.
Amy L. Sheaffer, Ken Cordell, and Joseph T. O'Leary

The New England Travel Market: An Update of Changing Demographics and Geographic Markets, 1980 to 1996.
Rod Warnick

Promoting In-State Tourism Using Travel Consumer Profiles.
Sotiris H. Avgoustis

The Relationship Between the Experiences of Organized Sports League and Leisure Attitude.
Seok-Pyo Hong

Recreation Planning and Management

Park Partnerships: A Case Study of Yosemite Institute and Yosemite National Park.
Siri Doble, Chad Dawson, and Robin Hoffman

The Importance of Environmental History in Natural Resources Management and Planning.
Karl Roenke

The Effect of Fees on Recreation Site Choice: Management/Agency Implications.
Allan Marsinko

Boosting Confidence In Importance-Performance Analysis: An Explanation and Application of An I/P Modification.
Erin K. Smith and Michael A. Tarrant

The Destruction of Wildlife Habitat by Suburban Sprawl and the Mitigating Effects of Land Use Planning.
Richard B. Nichols

Visitor Perceptions of Personal Security and Crime at Outdoor Recreation Areas: Contemporary Issues at US Army Corps of Engineers Lakes and Along the Appalachian Trail.
Robert C. Burns, Robert D. Lee Jr., and Alan R. Graefe

Weather Related Liability in Outdoor Recreation.
Bruce Hronek

Mountain Bicyclists' Behavior in Social Trail Etiquette Situations.
William W. Hendricks, Roy H. Ramthun, and Deborah J. Chavez

Distinctions Between Permitted and Non-permitted Registered Snowmobilers.
Joel A. Lynch and Charles M. Nelson 199

Historic Preservation in Recreation

Museums and Cultural Institutions in Michigan: Can They Be Viable Tourism Attractions and Tourism Industry Partners?
Gail A. Vander Stoep 205

Forest Resource Issues in Recreation

Aspects of Nonindustrial Forest Ownership That Influence Attaining Recreation and Other Nontimber Objectives.
Donald F. Dennis, Thomas H. Stevens, David B. Kittredge, and Mark G. Rickenbach 215

Recreationists' Attitudes Toward the Forest and Forest Management Policies.
Gene L. Theodori, A. E. Luloff, and Timothy A. Slack 219

Human Dimensions of Fisheries

Development and Verification of a Specialization Index for Angler Segmentation.
Ronald J. Salz and David K. Loomis 227

Testing Recreation Specialization: Application of a Specialization Index.
Kelly L. Finn and David K. Loomis 232

Assessment of Tourists' Attitudes Toward Marine Aquaculture - A Preliminary Investigation of UNH's Sea Grant Discovery Passengers
Torene Tango-Lowy and Robert A. Robertson 242

Economics of Outdoor Recreation and Tourism

Economic Impact of Elk Viewing in Rural Pennsylvania.
Bruce E. Lord, Charles H. Strauss, and Walter M. Tzilkowski 251

Fiscal Trends in America's State Parks: A Eight-Year Analysis.
Daniel D. McLean, Deborah Chavez, and Julie Knapp 257

Economic Impacts Of A Heritage Tourism System.
Charles H. Strauss and Bruce E. Lord 264

Spending Priorities for Outdoor Recreation Planning in New Hampshire: Implications for Managers.
Al Williams, Sam Lankford, and Robert A. Robertson 272

Determining Economic Impact Through Secondary Data.
Hans Vogelsong and Alan Graefe 275

Contemporary Issues in Recreation and the Environment

Information Search by Backpackers: A Qualitative Analysis of Planning Behaviors.
Roy Ramthun 285

Using Geographic Information Systems with Travel Cost Models: A Case Study.
William Zawacki and Allan Marsinko 287

Visitor Experiences and Participation

Five Good Reasons to Have Reservations About Benefits-Based Management.
Thomas A. More and Walter F. Kuentzel 295

Intensity and Extensity of Recreation Participation in Light of the Mean Scores on the Leisure Resourcefulness Scale.
Jerry L. Ricciardo 304

The Relationship Between Quiltmakers' Level of Development and Participation in Other Leisure Activities.
Sharon L. Todd 309

Self-Efficacy Perceptions Among Mid-Level Recreation Program Managers.
Julie S. Knapp and Daniel D. McLean 317

Place Attachment

Differences in Place Attachment Among Allegheny National Forest Users.
John J. Confer Jr., Alan Graefe, Jim Absher, and Brijesh Thapa 323

The Relationship Between Place Attachment and First Night Participants Views of Crowding, Overall Satisfaction and Future Attendance.
Thomas D. Wickham and Deborah L. Kerstetter 332

Relationships Between Place Attachment, Activity Involvement, Desired Experiences, and Frequency of Urban Park Use.
Andrew J. Mowen and Alan R. Graefe 336

Exploring Visitor Meanings of Place and Enriching Interpreter Knowledge of Audience in the National Capitol Parks.
Wei-Li Jasmine Chen, Theresa L. Wang, and David L. Larsen 340

Round Tables

A Roundtable: Discussion of Three Case Studies Involving Tourism and Wilderness Areas.
Stephen C. Bentley, Katharine C. Bloom, and Mark Gleason 347

Alternative Tourism: Gay and Lesbian Travelers - A Viable Hidden Market.
Kimberly Monk and Lisa Dingman 352

Poster Session

Use of Qualitative Data Analysis Tool to Understand the Relationship Between Recreational Fishing and Open Ocean Aquaculture Development.
Angela Wright and Robert A. Robertson 361

Estimating Tourism Impacts of Deer Hunting in New York State: A Case Study of 1997 Deer Take Data.
Russell W. Patterson, Aaron Alsheimer, James F. Booker, and Diana S. Sinton 366

Recreational Use of Industrial Forest Lands in New York State.
Sergio Capozzi, Rene Germain, and Chad Dawson 373

Competition for Common Property Space: New Hampshire's Recreational Fishers and Open Ocean Aquaculture Development.
Jody Grimes 378

Use of Qualitative Data Analysis to Demonstrate Three Approaches Taken by New Hampshire Recreational Fishers Toward Open Ocean Aquaculture Development
Nena F. Stracuzzi 384

The Use of GIS in Recreation Planning: An Application of Spatial Analysis to Find Suitable Locations for Recreational Trails.
Matthew Starr, Miklos Gratzer, and Allen Lewis 391

Storm Chasing: Risk Recreation for the Nineties.
Heather Cantillon, Jeremy Merriam, and Christopher Naughton 397

Who Owns the Ocean? A Qualitative Study Of Saltwater Recreational Fishers and Open Ocean Aquaculture in New Hampshire
Jody Grimes, Nena F. Stracuzzi, Robert Robertson, and Cynthia Duncan 400

Management Sessions

Maintaining the Quality of Park Resources and Visitor Experiences: An Overview of a New Handbook for Managers.
Theresa L. Wang, Dorothy H. Anderson, and David W. Lime 409

Founder's Forum

Reconceiving Recreation in an Era of Growing Social Inequality.
Thomas A. More 415

Keynote Address

Parks Have a Future - But it has More Problems than the Present.
Elery Hamilton-Smith 423

Index of Authors 426

Environmental Attitudes and Values

ENVIRONMENTALISM: A STUDY OF UNDERGRADUATE STUDENTS

Brijesh Thapa

Ph.D. Student in Leisure Studies
201 Mateer Building, The Pennsylvania State University, University Park, PA 16802

Abstract: Students have been instrumental in facilitating environmentally responsible changes within society and university settings. There have numerous studies of college students focusing on their environmental attitudes, intentions to practice environmentally responsible behaviors, and self-reported behaviors. To perpetuate this line of research, the purpose of this study was to analyze and compare environmental attitudes and behaviors of undergraduate students enrolled within various disciplines. Environmental attitudes were operationalized using the revised NEP scale, while proenvironmental behaviors were operationalized using the ERBI. Data were collected in late April 1998 at a major northeastern American University (N=540). Two classes in each of the three departments, Recreation & Park Management, Hotel, Restaurant & Institutional Management, and Science, Technology & Society were sampled. Overall, RPM students upheld more pro-environmental attitudes, and were more likely to participate in environmentally responsible behaviors when compared with students from HR&IM and STS departments, respectively.

Introduction

The contemporary environmental movement culminated during the late 1960s and reached its apex in 1970 with the initiation of Earth Day (April 22nd). Earth Day was a major catalyst in the amalgamation of traditional conservationist-preservationist, middle class, student, and urban environmental concerns into the mainstream modern environmental movement (Faber & O'Connor, 1989). Largely, the success of the *mobilization of awareness* efforts during and following the first Earth Day can be credited towards the environmental crusade led by college students across the nation. Students have been instrumental in facilitating environmentally responsible changes within society and university settings. Within university settings, student oriented programs are largely based upon activism behaviors (environmentally friendly behaviors) such as promoting recycling, conservation and energy efficiency. In fact, 80% of the universities in the United States have been involved in recycling programs largely due to students' influence and involvement (Mansfield III, 1998).

There have been number of studies of college students focusing on their environmental attitudes, intentions to practice environmentally responsible behaviors, and self-reported behaviors. Thompson and Gasteiger (1985) analyzed environmental attitude surveys of Cornell University's students in 1971 and 1981 in terms of sacrificing or willingness to give up various items that potentially may have an environmental impact. The study indicated that the preference for economic or materialistic lifestyle in the late 1970s & early 1980s was associated with less willingness to sacrifice material comforts for the cause of the environment. Similarly, Gigliotti (1992) analyzed whether students at Cornell University in 1990 had changed their attitudes. Analogous to the findings of Thompson and Gasteiger (1985), students in 1990 were more materialistic than the students of 1971 and 1981. On a similar note, a study by Krause (1993) of the environmental consciousness among undergraduate students enrolled in two different ecology classes revealed that students were willing to act environmentally responsibly in regard to the environment, but they were not ready to make sacrifices. However, unlike the findings Thomson and Gasteiger (1985) and Gigliotti (1992), a study conducted among business students at the University of British Columbia indicated that business students resonated strong pro-environmental attitudes (Shetzer, Stackman & Moore, 1991). Additionally, environmental concern was more likely to be demonstrated by students enrolled in programs leading towards a science degree, as they were likely to have increased knowledge about energy (Moore, 1981). Furthermore, at The Pennsylvania State University, McGuire (1992) noted a positive relationship in which, students who reported increased environmental concern were more likely to report environmentally responsible intentions.

Based on various empirical studies, environmentalism in the context of environmental attitudes and behaviors among college undergraduate students seem to oscillate between harboring favorable pro-environmental attitudes and intentions, and lacking environmentally responsible behaviors. To perpetuate this line of research about environmentalism, the *purpose* of this study was to analyze and compare environmental attitudes and behaviors of undergraduate students enrolled within various disciplines. To facilitate this study, *two research questions* were formulated:

1) Is there a difference in environmental attitudes between students enrolled within various disciplines?
2) Is there a difference in environmental behaviors between students enrolled within various disciplines?

Methods

Data were collected at a major northeastern American University located in a rural setting, in which, two classes in three departments (Recreation & Park Management; Hotel, Restaurant & Institutional Management; and Science, Technology & Society) were sampled during the last two weeks in April 1998. The questionnaires were administered during the class periods, and the time required to complete the survey was approximately 10-15 minutes. All students in attendance on the days the data were collected agreed to participate.

Operationalization of Environmental Attitudes and Environmentally Responsible Behaviors

Environmental Attitudes

The NEP scale has largely been used to assess general environmental concern. Also, the unidimensionality property (Dunlap & Van Liere, 1978) has been subjected to various criticisms as researchers have generally identified three factors: limits to growth, balance of nature and humans over nature. In fact, some researchers have even identified two factors (see Scott & Willits, 1994) and four factors (see Floyd & Noe, 1996). However, Dunlap, Van Liere, Mertig, Catton & Howell, (1992) advanced a revised version of the scale with 15 items that were on a 5-pt Likert format, ranging from Strongly Agree (1) to Strongly Disagree (5). The revised scale was conceptually based upon "five potential facets of an ecological worldview." The facets were: 1) reality of limits to growth, 2) anti-anthropocentrism, 3) fragility of nature's balance, 4) rejection of exemptionalism, and 5) possibility of an eco-crisis or ecological catastrophe (Dunlap et. al., 1992, p. 6). However the designers of the new scale (known as the revised *New Ecological Paradigm Scale*) still retain their unidimensionality argument, and note that based on their analysis the scale "exhibits a good deal of internal consistency" (p. 8). The revised NEP scale has not been widely used recently (except Floyd & Noe, 1996; Floyd & Noe, 1997), largely due to a plethora of research about it's predecessor, and also the availability of other established scales that measure environmental attitudes, concern and values. Since this revised version is not used extensively, this study employed the scale to confirm the dimensionality argument as well as renew interest in the New Ecological Paradigm ideology.

Environmentally Responsible Behaviors

The Environmentally Responsible Behavior Index (ERBI) was constructed by Smith-Sebasto (1995) to predict environmentally responsible behavior among undergraduate students. However, it should be noted that the ERBI is only one of the many component indexes developed by Smith-Sebasto (1995) to predict environmentally responsible behaviors, employing a sample of undergraduate students at a major mid-western university in the United States (see Sia, Hungerford & Tomera, 1985/86; Smith-Sebasto, 1995; Smith-Sebasto & D'Costa, 1995).

The ERBI consists of 24 items with a 5-point response format of 1 (Rarely), 2 (Occasionally), 3 (Sometimes), 4 (Frequently), and 5 (Usually). The index deals with self reported environmentally responsible behaviors and the opening question reads "How often have you...(items)." Also, as a guideline, *Rarely* is used to indicate "in less than 10% of the chances when I could have;" *Occasionally* is defined as "in about 30% of the chances when I could have;" similarly, *Sometimes* is defined as about 50% of the chances, *Frequently* as 70% of the chances, and *Usually* as about 90% of the chances.

According to N.J. Smith-Sebasto (personal communication, November 3rd, 1998), the scale is unidimensional in the sense that it was intended to measure self-report of performance of environmentally responsible behaviors. It was designed, however, to include at least one reference to each of the categories of ERB use: civic action (3 items), education action (5 items), financial action (7 items), legal action (2 items), persuasion action (1 item), and physical action (6 items). Based on this framework, the index was conceptually designed to determine various self-reported environmentally responsible behaviors. However, upon analysis, it was treated as a single construct, hence the term, "index." For this study, the conceptually designed idea within the index was explored empirically using factor analysis.

Results

Profile of Participants

From the six classes, a usable sample of 540 subjects were obtained in which, the gender ratio was almost even (males = 55% and females = 45%). The breakdown of the sample in accordance to the departments included 43% from the HR&IM dept, 29% from the STS dept, and 28% from the RPM dept, respectively. It should be noted that students enrolled in the STS classes comprised of those enrolled in various majors. However, due to the interdisciplinary nature of the STS department, those respondents enrolled in the two sampled STS classes were considered within the STS program. Finally, 29% were underclassmen (freshmen and sophomores) while 71% were upperclassmen (juniors and seniors).

Environmental Attitudes

The 15 items within the scale were initially subjected to basic frequency summary analysis. The analyses revealed a support and a sympathetic attitude towards the environment, however, the support (agree with pro-environment statements) was not overwhelming. There were only two items, "despite our special abilities humans are still subject to the laws of nature," and plants and animals have as much right as humans to exist" that received over 80% of support. However, between 66% and 76% supported the notion that humans were severely abusing the environment, and when human interfere with nature, it often produces disastrous consequences. Correspondingly, between 51% to 64% agreed to the idea of limit of the number of people that the earth can support, and if things continue on their present course we will soon experience a major ecological catastrophe. In terms of the spaceship metaphor about 54% expressed agreement, while 65% were in agreement with regards to the balance of nature is very delicate and easily upset (see Table 1).

TABLE 1. Frequency Distributions (in percentages) for College Students' Environmental Attitudes (Revised NEP Scale)

Questionnaire Statement**	SA	MA	U	MD	SD	# of Cases
If things continue on their present course we will soon experience a major ecological catastrophe	17.5	34.9	31.6	13.4	2.6	538
The earth is like a spaceship with very limited room and resources	16.7	36.8	21.0	22.1	3.3	538
Humans are severely abusing the environment	28.1	48.1	10.0	12.1	1.7	538
The balance of nature is very delicate and easily upset	20.6	44.3	20.0	12.4	2.6	539
We are approaching the limit of the number of people that the earth can support	16.9	34.0	27.0	15.1	7.1	538
When humans interfere with nature, if often produces disastrous consequences	21.0	45.9	14.7	16.5	1.9	538
The balance of nature is strong enough to cope with the impacts of modern industrial nations	3.5	14.6	27.6	37.5	16.8	536
The earth has plenty of natural resources if we just learn how to develop them	22.1	39.4	18.6	14.3	5.6	538
Human ingenuity will insure that we do not make the earth unlivable	4.5	24.6	38.2	25.2	7.5	536
Humans will eventually learn enough about how nature works to be able to control it	4.1	24.7	28.0	30.2	13.0	539
The so-called ecological crisis facing humankind has been greatly exaggerated	3.5	15.8	32.8	32.8	15.0	539
Humans have the right to modify the natural environment to suit their needs	7.4	27.9	20.1	32.7	11.9	538
Plants and animals have as much right as humans to exist	51.0	28.9	8.5	8.0	3.5	539
Humans were meant to rule over the rest of nature	9.2	17.5	17.1	30.5	25.8	532
Despite our special abilities humans are still subject to the laws of nature	42.4	42.9	12.3	1.7	0.7	538

**Coded on a 5-pt Likert type scale where: SA (1)=Strongly Agree, MA (2) =Moderately Agree, U (3)=Undecided, MD (4)=Moderately Disagree and SD (5)=Strongly Disagree

On the contrary, respondents expressed a certain degree of support towards the Cornucopian mentality. About 62% reported that the earth has plenty of natural resources if we just learn how to develop them. However, under 35% agreed to issues such as humans have the right to modify the natural environment to suit their needs; human ingenuity will insure that we do not make the earth unlivable, and that humans will eventually learn enough about how nature works to be able to control it. Respondents also acknowledged that the balance of nature is not strong enough to cope with the impacts of modern technology, and that the so-called ecological crisis has not been greatly exaggerated. Overall, respondents were in congruence and expressed support for the revised New Ecological Paradigm.

After the initial analysis (frequencies) was conducted, the NEP was subjected to a principal components analysis using Varimax rotation. However, before the analysis, 8 of the 15 items were reverse coded to maintain the consistent directionality of the items in which a higher value indicated more support for the NEP ideology. Contrary to the findings of designers of the NEP who argued the unidimensionality aspect of the scale, this study identified 3 specific factors. The identification of three factors have been fairly consistent in the literature; however, some researchers have identified two (Scott & Willits, 1994), and even four factors (Floyd & Noe, 1996). Nevertheless, it should be noted that an overwhelming majority of the NEP scale research, including Scott and Willits (1994) have employed the 12-item scale as opposed to Floyd & Noe's (1996) work, in which they utilized the revised 15-item version. The three factors along with their factor loadings and eigenvalues are illustrated in Table 2. Overall almost 49% of the total variance was explained, and the Cronbach's alpha values for the three factors were .79, .71, and .55. The mean values of the items within each factor were computed to devise a single composite index score for each factor.

The empirical results failed to identify the five conceptual facets (ecological worldview) as conceptualized by Dunlap et. al., (1992). However, due to the lack of more studies employing the new NEP scale, it may be premature to base any conclusions or generalizations about the revised scale. Nevertheless, the three demarcated factors demonstrated some resemblance to the factors of the old NEP scale (limits to growth, balance of nature and anthropocentrism). However, unlike previous research of factor names for the NEP, this researcher opted for different terminologies namely, *ecocentric, technocentric, and dualcentric*. The first factor was named as ecocentric as the items within this factor generally substantiate the claim that the environment is in a precarious position, and the impact of humans can be detrimental to the survival of humankind. The second factor was named technocentric, because the items within the factor represent a techno-fix mentality. Finally, the last factor was named as dualcentric as the items in the factor demonstrated a dual equality attitude. This wave of thinking pertains to symbiotic duality of both players, humans as well as the earth.

Environmentally Responsible Behaviors

Frequency distributions for the 24 items of the ERBI were also examined, and the results are illustrated in Table 3. Between 56%-71% of respondents indicated they had highly participated

(70%-90% of the time) in recycling (glass bottles, jars, aluminum cans, old newspaper), and separating trash (recyclable and non-recyclable). About 46% indicated high participation in purchasing products made from recycled material, and 39% noted that they avoided the purchase of products in aerosol containers. Also, 29% noted that they bought products because it was packaged in reusable or recyclable containers. Similarly, 35% said they had highly participated in watching TV programs about environmental issues, and 28% talked to other about environmental issues. In regards to low participation (10%-30% of the time), items that pertained to the political process (investigating and electing officials) received the lowest participation (81%-91%). Also, enrollment in a course for the sole purpose of learning more about environmental issues received low participation (73% or respondents). Overall, participation in various environmentally responsible behaviors was not overwhelmingly supportive except for recycling issues.

However, similar to the NEP, the scale was subjected to a principal components analysis using Varimax rotation. Four factors were identified and defined, which was two short of the original conceptually designed scale. However, it should be mentioned that three of the original conceptual dimensions had only 1, 2 and 3 items. The identified four factors explained approximately 62%of the total variance, while Cronbach's alpha values were .89, .83, .87, and .90 (see Table 4).

The first factor recorded 9 items; the second recorded 7 items; while the third and fourth had 5 and 3 items, respectively. The mean values of the items within each factor were computed to devise a single composite index score for each factor. The first factor was named *Consumerism behavior* as the items in the factor demonstrated various purchase behaviors. The second factor was called *Activism behavior*, as the items in the factor pertained to actions/activities that advocated environmentalism. The third factor was named *Educational behavior* because the items reflected ideas/action about environmental education. Finally, the last factor dealt with issues relating to recycling; hence, it was called *Recycling behavior*.

Environmental Attitudes and College Major

In order to investigate the first research question, the three (ecocentric, technocentric, dualcentric) attitudinal indexes were analyzed against student majors (RPM, HR&IM, STS) using one-way analysis of variance, significance measured at the 0.5 level (2-tail significance). On comparison of environmental attitudes between students enrolled in the three majors resulted in two out of three significant relationships (see Table 5).

TABLE 2. Factor Loadings for College Students' Environmental Attitudes (Revised NEP Scale)

Questionnaire Statement**	Factor 1[a]	Factor 2[b]	Factor 3[c]
The earth is like a spaceship with very limited room & resources*	0.711		
If things continue on their present course we will soon experience a major ecological catastrophe*	0.709		
We are approaching the limit of the number of people that the earth can support*	0.660		
The balance of nature is very delicate and easily upset*	0.652		
Humans are severely abusing the environment*	0.641		
When humans interfere with nature, if often produces disastrous consequences*	0.558		
Human ingenuity will insure that we do not make the earth unlivable		0.640	
The earth has plenty of natural resources if we just learn how to develop them		0.627	
The balance of nature is strong enough to cope with the impacts of modern industrial nations		0.625	
Humans will eventually learn enough about how nature works to be able to control it		0.571	
Humans have the right to modify the natural environment to suit their needs		0.525	
The so-called ecological crisis facing humankind has been greatly exaggerated		0.512	
Plants and animals have as much right as humans to exist*			0.761
Humans were meant to rule over the rest of nature			0.655
Despite our special abilities humans are still subject to the laws of nature*			0.553
# of Items	6	6	3
Alpha value	0.79	0.71	0.55
Eigenvalue	4.60	1.48	1.26
% Variance Explained	30.65%	9.87%	8.37%
Total % Variance Explained	**48.88%**		

* Reverse coded

**Orginally coded on a 5-pt Likert type scale where: SA (1)=Strongly Agree, MA (2) =Moderately Agree, U (3)=Undecided,
MD (4)=Moderately Disagree and SD (5)=Strongly Disagree

Factor 1[a] Ecocentric Attitude

Factor 2[b] Technocentric Attitude

Factor 3[c] Dualcentric Attitude

TABLE 3. Frequency Distributions (in percentages) for College Students' Environmentally Responsible Behaviors (ERB Scale)

Questionnaire Statement**	RA	OC	SM	FQ	US	# of Cases
HOW OFTEN HAVE YOU……..						
Used biodegradable, no phosphate soaps or detergents	36.9	18.7	22.7	14.2	7.5	534
Read labels on products to see if the contents were env. safe	36.6	22.1	21.7	14.2	5.4	535
Avoided buying products in aerosal containers	29.1	16.6	15.5	17.0	21.8	536
Purchased a product because it was packaged in reusable or recyclable containers	21.7	23.9	25.8	19.1	9.5	539
Switched from one brand to another due to concern for the environment	31.9	23.2	25.4	15.2	4.3	539
Stopped buying from a company which showed a disregard for the environment	38.3	23.6	23.6	10.6	3.7	538
Avoided restaurants that put take-out food in styrofoam containers	55.1	19.7	14.2	6.7	4.3	537
Bought products made from recycled material	9.5	14.1	30.3	26.6	19.5	538
Cut down on the use of your car by using public transportation, car pooling, etc	46.1	16.0	20.3	10.3	7.3	536
Written to your elected officials expressing your opinions on env. problems	83.8	7.6	4.8	1.9	1.9	538
Investigated your elected officials' voting record on env. issues	70.6	10.6	11.0	5.6	2.2	537
Used legal measures to stop events you thought would damage the environment	78.2	10.7	6.0	3.8	1.3	531
Reported environmental crimes to the proper authorities	72.2	14.3	7.7	3.6	2.3	533
Voted for a politician due to his/her record on protection the environment	64.2	13.1	14.0	6.2	2.4	534
Donated money or paid membership dues to a conservation org'n	54.7	13.9	17.8	8.7	4.8	539
Joined in community cleanup efforts	36.4	25.2	22.0	11.6	4.9	536
Watched TV programs about environmental problems	20.2	18.5	25.8	19.7	15.7	534
Talked to others about environmental issues	21.7	23.6	26.9	17.9	9.9	535
Read publication that focus on environmental issues	29.0	26.7	24.3	14.4	5.6	535
Tried to learn what you can do to help solve env. issues	28.4	28.0	22.6	15.2	5.8	539
Enrolled in a course for the sole purpose of learning more about env. issues	54.5	18.7	14.4	6.2	6.3	536
Recycled glass bottles or jars or aluminum cans	5.6	7.8	15.2	28.1	43.3	538
Recylced old newspapers	8.2	8.9	17.1	24.3	41.4	538
Sorted your trash to separate non-recyclable from recyclable material	12.1	12.5	18.5	24.1	32.7	535

**Coded on a 5-pt Likert type scale where: RA (1)=Rarely, in less than 10% of the chances when I could have; OC (2)=Occasionally, in about 30% of the chances when I could have; SM (3)=Sometimes, in about 50% of the chances when I could have; FQ (4)=Frequently, in about 70% of the chances when I could have; US (5)=Usually, in about 90% of the chances when I could have

TABLE 4. Factor Loadings for College Students' Environmentally Responsible Behaviors (ERB Scale)

Questionnaire Statement**	Factor 1[a]	Factor 2[b]	Factor 3[c]	Factor 4[d]
HOW OFTEN HAVE YOU.....				
Used biodegradable, no phosphate soaps or detergents	0.742			
Read labels on products to see if the contents were env. safe	0.729			
Avoided buying products in aerosal containers	0.712			
Purchased a product because it was packaged in reusable or recyclable containers	0.683			
Switched from one brand to another due to concern for the environment	0.665			
Stopped buying from a company which showed a disregard for the environment	0 652			
Avoided restaurants that put take-out food in styrofoam containers	0.577			
Bought products made from recycled material	0.536			
Cut down on the use of your car by using public transportation, car pooling, etc	0.507			
Written to your elected officials expressing your opinions on environmental problems		0.785		
Investigated your elected officials' voting record on env. issues		0.733		
Used legal measures to stop events you thought would damage the environment		0.695		
Reported environmental crimes to the proper authorities		0.652		
Voted for a politician due to his/her record on protecting the environment		0.640		
Donated money or paid membership dues to a conservation org'n		0.587		
Joined in community cleanup efforts		0.414		
Watched TV programs about environmental problems			0.786	
Talked to others about environmental issues			0.760	
Read publication that focus on environmental issues			0.724	
Tried to learn what you can do to help solve environmental issues			0.650	
Enrolled in a course for the sole purpose of learning more about environmental issues			0.625	
Recycled glass bottles or jars or aluminum cans				0.885
Recylced old newspapers				0.876
Sorted your trash to separate non-recyclable from recyclable material				0.829
# of Items	9	7	5	3
Alpha value	0.89	0.83	0.87	0.90
Eigenvalue	9.16	2.93	1.36	1.29
% Variance Explained	19.12%	15.63%	14.27%	12.29%
Total % Variance Explained	**61.32%**			

**Coded on a 5-pt Likert type scale where: RA (1)=Rarely, in less than 10% of the chances when I could have:
OC (2)=Occasionally, in about 30% of the chances when I could have; SM (3)=Sometimes, in about 50% of the chances when I could have; FQ (4)=Frequently, in about 70% of the chances when I could have; US (5)=Usually, in about 90% of the chances when I could have

Factor 1[a] Consumerism Behavior

Factor 2[b] Activism Behavior

Factor 3[c] Educational Behavior

Factor 4[d] Recycling Behavior

TABLE 5. Comparison of environmental attitudes between students of three different majors

Environmental Attitudinal Indexes	HR&IM[a] Mean (n)	RPM[b] Mean (n)	STS[c] Mean (n)	F value
Ecocentric	3.52 (261)	3.71 (174)	3.56 (95)	3.62*
Technocentric	3.09 (261)	3.24 (174)	3.04 (95)	3.83*
Dualcentric	3.89 (261)	4.05 (174)	3.94 (94)	2.10 n.s

*significant at .05 level (2-tail significance)

[a]Hotel, Restaurant & Institutional Management

[b]Recreation & Park Management

[c]Science, Technology & Society

The first significant relationship was between ecocentric attitudinal index and majors at the .05 level of significance. Among the three majors, students enrolled in the RPM department (Mean = 3.71) were most likely to harbor ecocentric attitudes, closely followed by students of STS (Mean = 3.56) and HR&IM (Mean = 3.52). Similarly, the second significant relationship (.05 level of significance) was between technocentric attitudinal index and majors. The mean values reflected 3.04 for students in the STS department, 3.09 for HR&IM, and 3.24 for RPM. Judging by the mean values, it was apparent that students in the STS department were most likely to anchor technocentric attitudes, followed closely by HR&IM students and then RPM students, respectively. The relationship of the final attitudinal index, dualcentric and majors failed to reach significance at the .05 level.

Environmentally Responsible Behaviors and College Major

In order to investigate the second research question, the four (consumerism, activism, educational, recycling) attitudinal indexes were analyzed against student majors (RPM, HR&IM, STS) employing one-way analysis of variance, significance measured at the 0.5 level (2-tail significance). On comparison of environmentally responsible behaviors between students among three majors resulted in three out of four significant relationships (see Table 6)

TABLE 6. Comparison of proenvironmental behaviors between students of three different majors

Proenvironmental Behaviorial Indexes[l]	HR&IM[a] Mean (n)	RPM[b] Mean (n)	STS[c] Mean (n)	F value
Consumerism	2.39 (261)	2.66 (174)	2.29 (95)	6.44**
Activism	1.83 (261)	2.05 (174)	1.83 (95)	3.92*
Educational	2.29 (261)	2.83 (174)	2.37 (95)	16.78***
Recycling	3.68 (261)	3.90 (174)	3.78 (95)	1.83 n.s.

*significant at .05 level (2-tail significance)

**significant at .01 level (2-tail significance)

***significant at .001 level (2-tail significance)

[a]Hotel, Restaurant & Institutional Management

[b]Recreation & Park Management

[c]Science, Technology & Society

[l]Composite index score computed as the mean of index statements coded on a 5-pt Likert type scale where: RA (1)=Rarely, in less than 10% of the chances when I could have; OC (2)=Occasionally, in about 30% of the chances when I could have; SM (3)=Sometimes, in about 50% of the chances when I could have; FQ (4)=Frequently, in about 70% of the chances when I could have; US (5)=Usually, in about 90% of the chances when I could have

The first significant relationship was between consumerism behavior index and majors at the .01 level. Among the three majors, students enrolled in the RPM department (Mean = 2.66) were most likely to engage in purchase behaviors that are environmentally friendly, closely followed by students of HR&IM (Mean = 2.39) and STS (Mean = 2.29). The second significant relationship (.05 level) was between activism behaviors and majors. Similarly, RPM students were most likely to participate in environmentally oriented activities, followed identically by students of HR&IM and STS. For the third significant relationship between educational behaviors and majors (.001 level), RPM students were most likely to engage in educational activities pertaining to environmental issues, followed by students of STS and HR&IM. The relationship of the final behavioral index (recycling) and majors failed to reach significance at the .05 level.

Conclusion

Overall, college students in this sample were sympathetic toward the environment; they supported the revised NEP ideology. With reference toward various levels of attitudes (ecocentric, technocentric and dualcentric) and the relationship between students enrolled in three different majors, the results were indicative of expectation. RPM students essentially upheld ecocentric attitudes as one would hope, as they will be the future custodians of the environment. Also, in comparison with students of other majors, RPM students have been exposed to environmental issues and concerns via classes as well as organizations. Similarly, in terms of technocentric attitudes, as expected, RPM students were least likely to harbor such attitudes. Nevertheless, RPM students were also the most likely group to engage in purchase of environmentally friendly products; participate in environmentally oriented activities, and engage in educational activities pertaining to environmental issues.

However, in regard to environmentally responsible behaviors, overall, students were not very participative. In fact, activism behaviors reflected the least participation, while recycling had the highest participation rate. A possible explanation to the recycling phenomenon could be the fact that the region has a very efficient system of collecting recyclable materials on a weekly basis. Residents in the region are provided an orange bin to be put out (with recyclable materials) at their main entrance once a week. Hence, it may a social norm to partake in this activity, and, because the system is in play, it may have become a normal routine for individuals to participate in recycling. Similar sentiments are echoed by Newhouse (1990), who wrote "if a social norm for responsible environmental behavior existed, more people might behave responsibly, even if they did not have strong attitudes about environmental protection" (p. 27). Correspondingly, Hallin (1995) noted that recycling implementation is dependent upon convenience, visible participation by others and remuneration. Remuneration has been a strong incentive for participation, and people may participate in this program regardless of environmental concern. However, recycling is one of the most participated environmentally responsible behaviors, and participation has increased over the years largely due to legislation (e.g., a bottle bill) as voluntary participation is limited (Roper Organization, 1990).

Since this study was about college undergraduates who are potential stewards or custodians of this planet, the bottom line rests as to how does one rectify the lack of participation? It is obvious in this study that contrary to popular belief, college undergraduates are not environmentally participative. Is it the lack of awareness, or is it that college students have adopted a carefree or passive stance? It seems apparent that being "eco-friendly" or harboring environmental consciousness seems to be growing trend as Dunlap and Scarce (1991) confirmed that majority of the public like to think of themselves as "environmentalists." However, it is the environmentally responsible behaviors (action-oriented) that really matter. Positive attitude may be instilled, but Krause (1993) indicated the superficiality among public attitudes that is notably influenced by 'self-interest' and personal gain. Furthermore, he indicated that the 'American environmental perspective' is in essence very technocentric. Shein and Shei (1995) concurred with Krause (1993) when they wrote "people may have knowledge of environmental problems, yet may never take action because their underlying political and economic values are not consistent with such behaviors (p. 563)." Therefore, an important element of study is whether proenvironmental attitudes lead to proenvironmental behaviors. This paper does not associate the attitude-behavior link, however (based on this data set) the reader is referred to Thapa (1999) for a comprehensive account.

Overall, this study identified that RPM students upheld more pro-environmental attitudes, and were more likely to participate in environmentally responsible behaviors when compared with students from HR&IM and STS departments, respectively.

References

Dunlap, R.E., & Scarce, R. (1991). The polls-poll trends: Environmental problems and protection. *Public Opinion Quarterly, 55*, 651-672.

Dunlap, R.E., & Van Liere, K.D. (1978). The "new environmental paradigm." *Journal of Environmental Education, 9*(4), 10-19.

Dunlap, R.E., Van Liere, K.D., Mertig, A.G., Catton, W.R., & Howell, R.E. (1992). *Measuring endorsement of an ecological worldview: A revised NEP scale.* Paper presented at the annual meeting of the Rural Sociological Society, The Pennsylvania State University, University Park, Pennsylvania (August, 1992), and at the Sixth Meeting of the Society for Human Ecology at Snowbird, Utah (October, 1992).

Faber, D., & O'Connor, J. (1989). The struggle for nature: Environmental crisis and the crisis of environmentalism in the United States. *Capitalism, Nature, Socialism, 4*(2), 12-39.

Floyd, M.F., & Noe, F.P. (1996). *An assessment of the revised new ecological paradigm scale among visitors at two National Park settings*. Paper presented at the Sixth International Symposium on Society and Resource Management, The Pennsylvania State University, University Park, PA.

Floyd, M.F., Jang, H., & Noe, F. (1997). The relationship between environmental concern and acceptability of environmental impacts among visitors to two U.S. National Park Settings. *Journal of Environmental Management*, 51, 391-412.

Gigliotti, L.M. (1992). Environmental attitudes: 20 years of change? *Journal of Environmental Education, 24*(1): 15-26.

Hallin, P.O. (1995). Environmental concern and environmental behavior in Foley, a small town in Minnesota. *Environment and Behavior, 27*(4), 558-578.

Krause, D. (1993). Environmental consciousness: An empirical study. *Environment and Behavior, 25*(1), 126-142.

Mansfield III, W.H. (1998, May/June 1998). Taking the university to task. *Worldwatch, 11*(3), 24-30.

McGuire, J.R. (1992). *An examination of environmental attitudes among college students*. Unpublished master's thesis. The Pennsylvania State University, University Park.

Moore, K.H. (1981). Energy related information-attitude measures of college-age students. *Journal of Environmental Education, 12*(4), 30-33.

Newhouse, N. (1990). Implications of attitude and behavior research for environmental conservation. *Journal of Environmental Education, 21*, 26-32.

Roper Organization. (1990). *The environment: Public attitudes and individual behavior* New York: The Roper Organization Inc.

Shetzer, L., Stackman, R.W., & Moore, L.F. (1991). Business-environment attitudes and the new environmental paradigm. *Journal of Environmental Education, 22*(4), 14-21.

Scott, D., & Willits, F.R. (1994). Environmental attitudes and behavior: A Pennsylvania survey. *Environment and Behavior, 26*(2), 239-260.

Shein, G. D., & Shei, T. (1995). The values of student environmentalists. *The Journal of Psychology, 129*(5), 559-564.

Sia, A.P., Hungerford, H.R., & Tomera, A.N. (1985/86). Selected predictions of responsible environmental behavior: An analysis. *Journal of Environmental Education, 17*(2): 31-40.

Smith-Sebasto, N.J. (1995). The effects of an environmental studies course on selected variables related to environmentally responsible behavior. *Journal of Environmental Education, 26*(4), 30-34.

Smith-Sebasto, N.J., & D'Costa, A. (1995). Designing a Likert-type scale to predict environmentally responsible behavior in undergraduate students: A multistep process. *Journal of Environmental Education, 27*(1), 14-20.

Thapa, B. (1999). Environmentalism: The relation of environmental attitudes and environmentally responsible behaviors among undergraduate students. *Bulletin of Science, Technology & Society, 19*(5), 432-444.

Thompson, J.C., & Gasteiger, E.L. (1985). Environmental attitude survey of university students: 1971 vs. 1981. *Journal of Environmental Education, 17*(1), 13-22.

ATTITUDES OF OUTDOOR RECREATIONISTS TOWARD ENVIRONMENTAL ISSUES[1]

Gene L. Theodori

Assistant/Associate Professor & Extension Specialist – Community Development, Texas Agricultural Extension Service, Department of Rural Sociology, Texas A&M University, Special Services Building, College Station, TX 77843

A.E. Luloff

Professor of Rural Sociology, Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University, Armsby Building, University Park, PA 16802

Abstract: Using data collected in a general population survey from a random sample of individuals in four communities in Pennsylvania, we explored the issue of whether outdoor recreationists with more favorable attitudes toward environmental issues were more likely than those with less favorable attitudes to engage in pro-environmental behaviors. Results indicated that the more favorable the environmental attitude, the more likely recreationists engaged in each of the pro-environmental behaviors. Implications for encouraging environmental protection are advanced.

Introduction

The study of the association between participation in outdoor recreation and environmental concern continues to be of interest to social and behavioral scientists alike. Since Dunlap and Heffernan (1975) first suggested a relationship between outdoor recreation and environmentalism, several researchers (Geisler et al., 1977; Jackson, 1986; Pinhey and Grimes, 1979; Van Liere and Noe, 1981) have examined the associations between outdoor recreation and environmental attitudes. The findings of these studies, overall, suggested that participation in outdoor recreation had only a weak effect on environmental attitudes.

More recently, Nord et al. (1998) and Theodori et al. (1998) investigated the associations of outdoor recreation with measures of environmental concern considered to be indicative of *pro-environmental behaviors*. These researchers posited that participation in outdoor recreational activities could lead to pro-environmental behaviors regardless of whether it lead to measurable environmental attitudes. Both Nord et al. (1998) and Theodori et al. (1998) concluded that participation in outdoor recreation was substantially associated with pro-environmental behaviors, and that such findings have practical and policy implications. Funding, promoting, and/or operating informational and educational programs in parks, game lands, and outdoor recreational facilities were offered as one strategy which might be effective in encouraging environmental protection (Theodori et al., 1998).

However, a gap remains in the outdoor recreation literature. Previous studies have focused on either the associations between participation in outdoor recreation and environmental attitudes (Dunlap and Heffernan, 1975; Geisler et al., 1977; Pinhey and Grimes, 1979; Van Liere and Noe, 1981; Jackson, 1986) or the associations between participation in outdoor activities and pro-environmental behaviors (Nord et al. 1998; Theodori et al., 1998). Equally relevant, though, is the extent to which recreationists' environmental attitudes are *predictors* of pro-environmental behaviors. Although several studies have explicitly addressed the association between environmental attitudes and behaviors (Weigel et al., 1974; Heberlein and Black, 1976; Dunlap and Van Liere, 1978; Borden and Schettino, 1979; Van Liere and Dunlap, 1983; Hines et al., 1987; Oskamp et al., 1991; Scott and Willits, 1994; Vogel, 1996), no research has empirically examined the nature and significance of the association of recreationists' environmental attitudes and pro-environmental behaviors. The present study addresses this issue. Specifically, it asks: Are outdoor recreationists with more favorable attitudes toward environmental issues more likely than those with less favorable attitudes to engage in pro-environmental behaviors? To explore this issue, we use data collected in a general population survey from a random sample of individuals in four communities in Pennsylvania.

Data

The data used for this paper were drawn from a study that focused on land-use issues at the rural-urban interface in Pennsylvania (Luloff et al., 1995). Study sites were selected based on an empirical classification of every municipality in the Commonwealth with respect to seven indicators. These included: Population size; population growth (1980-1990); migration rate (1980-1990); percent of housing unit change (1980-1990); percent of land in agriculture; percent urban population; and proportion employed in agricultural occupations. From these statistical rankings, four sites were chosen to represent a typology of increasing levels of urban presence and pressure in agricultural areas. The four sites selected were small portions of Snyder, Bedford, Crawford, and Lancaster counties.

In each of these areas, key and action informant interviews were conducted to help identify the major local issues related to land use, agriculture, development, and natural resources and environment issues. Following analyses of these key informant interviews, a household questionnaire was developed to investigate the responses of local citizens to the above issues as well as a variety of other concerns, including community attachment, ties, and participation, stress, and recreation. Following a modified Total Design Method (see Dillman, 1978; Luloff and Ilvento, 1981), data were gathered in the Snyder, Bedford, and Crawford sites using mail survey techniques. Data were collected via a questionnaire drop-off/pick-up procedure (Melbye et al.,

1999) in the Lancaster site due to the presence of a substantial number of Old Order Amish and Mennonites.[2] Overall, a response rate of 51% was achieved. This resulted in 1,491 completed questionnaires across the four sites.[3]

Measurement

Outdoor Recreational Participation

Outdoor recreational participation was assessed using a list of nine outdoor recreation activities. Respondents were asked if they engaged in: (1) picnicking; (2) camping; (3) birdwatching; (4) hiking/backpacking; (5) mountain biking; (6) skiing (downhill or cross-country); (7) fishing; (8) hunting; and/or (9) riding off-road vehicles. Of the 1,491 respondents, 88 percent (N = 1,312) indicated that they participated in at least one outdoor recreational activity. The following analyses are based upon these cases.

As shown in Table 1, the least popular outdoor activity was mountain biking, while picnicking tended to be the most popular. While approximately 10 percent of the recreationists had mountain biked within the previous year, almost 95 percent of the recreationists had picnicked.

Table 1. Participation in Outdoor Recreational Activities

	Percentage	
Outdoor Activity	Yes	No
Picnicking	94.5	5.5
Camping	50.1	49.9
Birdwatching	43.9	56.1
Hiking/backpacking	39.0	61.0
Mountain biking	10.1	89.9
Skiing (downhill or cross country)	19.5	80.5
Fishing	55.3	44.7
Hunting	43.1	56.9
Riding off-road vehicles	19.9	80.1

Attitude Toward the Environment

Attitude toward the environment was measured by asking respondents to indicate their position on environmental issues. Respondents were asked whether they maintained pro-active, sympathetic, neither sympathetic nor unsympathetic, unsympathetic, or oppositional attitudes toward environmental issues. Based on the results of preliminary crosstabulations with each of the pro-environmental behaviors (see below)[4], response categories were collapsed into "pro-active," "sympathetic," and "neither sympathetic or unsympathetic, unsympathetic, and oppositional." For ease of presentation, the categories are referred to as "pro-active," "sympathetic," and "unsympathetic." The percentages of recreationists indicating pro-active, sympathetic, and unsympathetic attitudes toward the environment were 5.6, 63.0, and 31.4, respectively.

Pro-environmental Behaviors

Respondents were presented with a list of seven items which asked if, during the previous year, they had engaged in any of the following behaviors: (1) contributed money or time to an environmental or wildlife conservation group; (2) stopped buying a product because it caused environmental problems; (3) attended a public hearing or meeting about the environment; (4) contacted a government agency to get information or complain about an environmental problem; (5) read a conservation or environmental magazine; (6) watched a television special on the environment; and (7) voted for or against a political candidate because of his/her position on the environment.[5] Each pro-environmental behavior was dummy coded (1 = yes).

Control Variables

Following earlier research (Dunlap and Heffernan, 1975; Jackson, 1986; Theodori et al., 1998), age, education, gender, income, and political ideology were included as control factors. Age was measured in years. Education was scored as follows: (1) less than high school; (2) high school equivalent; (3) some college; (4) college degree; and (5) training beyond college. Gender was dummy coded (1 = males). Income was coded: (1) less than $10,000; (2) $10,000 - $14,999; (3) $15,000 - $19,999; (4) $20,000 to $24,999; (5) $25,000 - $29,999; (6) $30,000 - $39,999; (7) $40,000 - $49,999; (8) $50,000 - $59,999; (9) $60,000 - $69,999; (10) $70,000 - $79,999; (11) $80,000 - $89,999; and (12) $90,000 or more. Political ideology was measured by the categories: (1) liberal; (2) moderate-liberal; (3) moderate; (4) moderate-conservative; and (5) conservative.

Analyses

Logistic regression was used to analyze the nature and significance of the association of recreationists' environmental attitudes and pro-environmental behaviors. The analysis was conducted in two phases. Table 2 reports the bivariate and net odds ratios for the effect of environmental attitude on pro-environmental behaviors when unsympathetic was treated as the reference category (Phase I).

Table 2. Logit Analysis of Environmental Attitude on Pro-environmental Behavior

		Bivariate		Multivariate[a]	
Pro-environmental Behaviors	N[b]	**Pro-active**	**Sympathetic**	**Pro-active**	**Sympathetic**
		Odds ratios			
Contributed time or money to an environmental or wildlife conservation group	910	18.78***	5.01***	15.09***	4.19***
Stopped buying a product because it caused environmental problems	906	5.97***	2.56***	5.99***	2.48***
Attended a public meeting or hearing about the environment	910	10.92***	1.53	10.88***	1.54
Contacted a government agency to get information about an environmental problem	908	9.92***	2.23**	8.34***	2.00**
Read a conservation or environmental magazine	907	9.55***	2.56***	7.50***	2.19***
Watched a television special on the environment	906	17.26***	3.74***	12.78***	3.08***
Voted for or against a political candidate because of his/her position on the environment	898	8.11***	2.00***	7.11***	1.88***

[a] Odds ratios computed controlling for age, education, gender, income, and political ideology.
[b] N's vary due to missing data.
** $p < 0.01$; *** $p < 0.001$.

Phase I

Bivariate Results

As shown in Table 2, the results indicated that pro-active recreationists were significantly ($p < 0.001$) more likely than unsympathetic recreationists to engage in all seven of the pro-environmental behaviors. The odds ratios ranged from 5.97 to 18.78. This indicated that while pro-active recreationists were approximately 6 times more likely than unsympathetic recreationists to stop buying a product because it caused environmental problems, they were almost 19 times more likely than unsympathetic recreationists to contribute money or time to an environmental or wildlife conservation group.

The results reported in Table 2 also indicated that sympathetic recreationists were more likely than unsympathetic recreationists to engage in pro-environmental behaviors. All but one of the odds ratios reached statistical significance at the conventional 0.05 level. Sympathetic recreationists did not differ significantly from unsympathetic recreationists in terms of their likelihood to attend a public meeting or hearing about the environment. Of the remaining six odds ratios, all but one was significant at the 0.001 level.

Multivariate Results

As in earlier research, controls for age, education, gender, income, and political ideology were then introduced into the model. As noted in Table 2, the results indicated that controlling for these variables had very little effect on the nature of the odds ratios for either pro-active or sympathetic recreationists. More importantly, adding the controls did not alter the significance levels.

Overall, based on the results reported in Table 2, recreationists who expressed either pro-active or sympathetic attitudes toward environmental issues were more likely than recreationists who expressed unsympathetic attitudes toward environmental issues to engage in pro-environmental behaviors. The likelihood of pro-active recreationists who engaged in each of the behaviors was stronger than that for sympathetic recreationists. Moreover, the odds ratios changed only slightly when the controls were added.

Phase II

Treating respondents who were unsympathetic to environmental issues as the reference category for the environmental attitude variable allowed us to test in Table 2 whether pro-active and sympathetic respondents differed significantly from unsympathetic respondents in terms of pro-environmental behaviors. What we could not test in Table 2 was whether pro-active respondents differed from sympathetic respondents in terms of their environmental behaviors. In order to do so, we recoded the environmental attitude variable. Table 3 reports the bivariate and net odds ratios for the effect of environmental attitude on pro-environmental behaviors when sympathetic was treated as the reference category (Phase II).

While the odds ratios for the sympathetic recreationists in Table 2 and the unsympathetic recreationists in Table 3 were different (due to treating one versus the other as the reference category), their resulting alpha values (or p-values) were identical in the bivariate and multivariate cases. Changing the reference category of the environmental attitude variable from unsympathetic in Table 2 to sympathetic in Table 3 then reestimating the model did not alter the significance levels.

Table 3. Logit Analysis of Environmental Attitude on Pro-environmental Behavior

		Bivariate		Multivariate[a]	
Pro-environmental Behaviors	N[b]	Pro-active	Unsympathetic	Pro-active	Unsympathetic
		Odds ratios			
Contributed time or money to an environmental or wildlife conservation group	910	3.75***	.20***	3.60***	.24***
Stopped buying a product because it caused environmental problems	906	2.33*	.39***	2.42*	.40***
Attended a public meeting or hearing about the environment	910	7.13***	.65	7.08***	.65
Contacted a government agency to get information about an environmental problem	908	4.44***	.45**	4.17***	.50**
Read a conservation or environmental magazine	907	3.73**	.39***	3.43**	.46***
Watched a television special on the environment	906	4.62*	.27***	4.15	.32***
Voted for or against a political candidate because of his/her position on the environment	898	4.06***	.50***	3.78***	.53***

[a] Odds ratios computed controlling for age, education, gender, income, and political ideology.
[b] N's vary due to missing data.
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Bivariate Results

As shown in Table 3, the results indicated that pro-active recreationists were more likely than sympathetic recreationists to engage in each of the pro-environmental behaviors. While pro-active recreationists were 2.33 times more likely than sympathetic recreationists to stop buying a product because it caused environmental problems, they were 7.13 times more likely than sympathetic recreationists to attend a public meeting or hearing about the environment. Each odds ratio reached statistical significance, indicating that the observed differences between recreationists who were pro-active in environmental issues and those who were sympathetic was real.

The results reported in Table 3 also indicated that unsympathetic recreationists were less likely than sympathetic recreationists to engage in each of the pro-environmental behaviors. With the exception of the likelihood of attending a pubic meeting or hearing about the environment, each of the odds ratios reached statistical significance.

Multivariate Results

With age, education, gender, income, and political ideology held constant, the results revealed comparable patterns in the nature of the odds ratios for both pro-active and unsympathetic recreationists, though one statistically significant odds ratio dropped to nonsignificance. After introducing the control variables, pro-active recreationists did not differ significantly from sympathetic recreationists in terms of their likelihood to watch a television special on the environment, despite the fact that they were 4.15 times more likely than sympathetic recreationists to do so. Taken together, the most interesting finding in Table 3 was that pro-active recreationists were more likely than sympathetic recreationists to engage in pro-environmental behaviors.

Examining the Control Variables

An examination of the control variables in Table 4 indicated that age consistently failed to reach statistical significance. Education was positively and significantly related to five of the pro-environmental behaviors. Higher educated recreationists were significantly more likely than those with lower education to contribute money or time to an environmental or wildlife conservation group, to contact a government agency to get information about an environmental problem, to read a conservation or environmental magazine, to watch a television special on the environment, and to vote for or against a political candidate because of his/her position on the environment. While males were significantly more likely than females to stop buying a product because it caused environmental problems, females were significantly more likely than males to attend a public meeting or hearing about the environment. Recreationists with higher incomes were significantly more likely than those with lower incomes to contribute money or time to an environmental or wildlife conservation group, and significantly less likely to vote for or against a political candidate because of his/her position on the environment. Political liberal recreationists were significantly more likely than their politically conservative counterparts to read a conservation or environmental magazine and watch a television special on the environment.

Table 4. Logit Analysis of Environmental Attitude on Pro-environmental Behavior

Pro-environmental Behaviors	N[a]	Age	Education	Gender	Income	Political ideology
		Logit coefficients[b]				
Contributed time or money to an environmental or wildlife conservation group	910	.00	.17*	.15	.11**	-.12
Stopped buying a product because it caused environmental problems	906	.01	-.04	.41**	-.00	-.10
Attended a public meeting or hearing about the environment	910	-.00	.13	-.85***	-.00	-.01
Contacted a government agency to get information about an environmental problem	908	.00	.17*	-.05	.02	-.06
Read a conservation or environmental magazine	907	.00	.27***	-.16	.05	-.13*
Watched a television special on the environment	906	-.00	.24**	-.07	.05	-.20*
Voted for or against a political candidate because of his/her position on the environment	898	.01	.29***	.00	-.09*	-.06

[a] N's vary due to missing data.
[b] Computed controlling for environmental attitude.
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Conclusions

This study examined the nature and significance of the association of recreationists' environmental attitudes and pro-environmental behaviors. The analysis was conducted in two phases. The results of Phase I indicated that, overall, recreationists who expressed either pro-active or sympathetic attitudes toward environmental issues were more likely than recreationists who expressed unsympathetic attitudes toward environmental issues to engage in pro-environmental behaviors. The likelihood of pro-active recreationists who engaged in each of the behaviors was stronger than that for sympathetic recreationists. The odds ratios changed only slightly when the controls were added. The findings from the second phase of the analysis revealed that, overall, pro-active recreationists were more likely than sympathetic recreationists to engage in the pro-environmental behaviors. Again, the odds ratios changed only slightly after the addition of the control variables. Moreover, an examination of variables which have been shown elsewhere to be associated with environmental concern (i.e., age, education, gender, income, and political ideology) produced findings consistent with previous literature. With the exception of age failing to reach statistical significance, the results were not surprising.

Although both pro-active and sympathetic recreationists engaged more frequently in pro-environmental behaviors than did unsympathetic recreationists, sympathetic recreationists engaged in these same behaviors less often than did recreationists who expressed pro-active environmental attitudes. Taken together, these findings have implications for encouraging environmental protection. To the extent that attitudes and behaviors covary, well designed environmentally-oriented educational and informational campaigns might be effective in changing existing ecological attitudes among outdoor recreationists and the general public.

References

Borden, R.J. and A.P. Schettino. 1979. "Determinants of Environmentally Responsible Behavior." *Journal of Environmental Education* 10: 35-39.

Dunlap, Riley E., and Robert Bruce Heffernan. 1975 "Outdoor Recreation and Environmental Concern: An Empirical Examination." *Rural Sociology* 40: 18-30.

Dunlap, Riley E. and Kent D. Van Liere. 1978. "The 'New Environmental Paradigm': A Proposed Instrument and Preliminary Results." *Journal of Environmental Education* 9:10-19.

Geisler, Charles C., Oscar B. Martinson, and Eugene A. Wilkening. 1977. "Outdoor Recreation and Environmental Concern: A Restudy." *Rural Sociology* 42: 241-249.

Heberlein, T.A. and J.S. Black. 1976. "Attitudinal Specificity and the Prediction of Behavior in a Field Setting." *Journal of Personality and Social Psychology* 33: 474-479.

Hines, J.M., H.R. Hungerford, and A.N. Tomera. 1987. "An Analysis and Synthesis of Research on Responsible Environmental Behavior: A Meta-Analysis." *Journal of Environmental Education* 18: 1-8.

Jackson, Edgar L. 1986. "Outdoor Recreation Participation and Attitudes to the Environment." *Leisure Studies* 5: 1-23.

Luloff, A.E., Lisa Bourke, Steve Jacob, and Sheila Seshan. 1995. *Farm and Non-Farm Interdependencies at the Rural-Urban Interface*. Final Project Report for the Pennsylvania Department of Agriculture. University Park, PA: The Pennsylvania State University.

Melbye, Jennifer, Lisa Bourke, A.E. Luloff, Pei-Shan Liao, Gene L. Theodori, and Richard S. Krannich. 1999. "The Drop-Off/Pick-Up Method for Household Survey Research." Paper presented at the annual meeting of the Rural Sociological Society. Chicago, IL.

Nord, Mark, A.E. Luloff, and Jeffrey C. Bridger. 1998. "The Association of Forest Recreation With Environmentalism." *Environment and Behavior* 30: 235-246.

Oskamp, Stuart, Maura J. Harrington, Todd C. Edwards, Deborah L. Sherwood, Shawn M. Okuda, and Deborah C. Swanson. 1991. "Factors Influencing Household Recycling Behavior." *Environment and Behavior* 23: 494-519.

Pinhey, Thomas K. and Michael D. Grimes. 1979. "Outdoor Recreation and Environmental Concern: A Reexamination of the Dunlap-Heffernan Thesis." *Leisure Sciences* 2: 1-11.

Scott, David and Fern K. Willits. 1994. "Environmental Attitudes and Behavior: A Pennsylvania Survey." *Environment and Behavior* 26: 239-260.

Theodori, Gene L., A.E. Luloff, and Fern K. Willits. 1998. "The Association of Outdoor Recreation and Environmental Concern: Reexamining the Dunlap-Heffernan Thesis." *Rural Sociology* 63: 94-108.

Van Liere, Kent D. and Francis P. Noe. 1980. "Outdoor Recreation and Environmental Attitudes: Further Examination of the Dunlap-Heffernan Thesis." *Rural Sociology* 46:505-513.

Van Liere, Kent D. and Riley E. Dunlap. 1983. "Cognitive Integration of Social and Environmental Beliefs." *Sociological Inquiry* 53: 333-341.

Vogel, Stefan. 1996. "Farmers' Environmental Attitudes and Behavior: A Case Study for Austria." *Environment and Behavior* 28: 591-613.

Weigel, Russell H., David T.A. Vernon, and Louis N. Tognacci. 1974. "Specificity of the Attitude as a Determinant of Attitude-Behavior Congruence." *Journal of Personality and Social Psychology* 30: 724-728.

Notes

[1] Support for this research was provided by the Pennsylvania Department of Agriculture (ME 442152) and the Pennsylvania Agricultural Experiment Station (Regional Project NE-173 and State Station Project 3548).

[2] No statistical differences in regard to the available sociodemographic characteristics were found between the Lancaster sample and those from Snyder, Bedford, and Crawford. The percentages of Old Order Amish and Mennonites from the Lancaster site totaled 12 and 5 respectively. The analysis and reported findings include data on both groups. Removal of the Amish and Mennonites from the sample did not change the results reported here.

[3] Using mail survey techniques, a response rate of about 51% was obtained, resulting in 370 completed questionnaires from Snyder, 343 from Bedford, and 385 from Crawford. Using the drop-off/pick-up technique, a response rate of 72% was achieved, resulting in 393 completed questionnaires from Lancaster.

[4] Results of these analyses are available upon request from the authors.

[5] In principal, three of the items could indicate anti- rather than pro-environmental behavior. Respondents could have attended a meeting, contacted a government agency, or voted for a candidate to prevent, rather than to promote, environmental protection. However, the correlation of these variables with unambiguously pro-environmental behaviors indicated that such intentions were rare.

AN EXPLORATION OF THE INFLUENCE OF GENDER AND LOCALITY ON ENVIRONMENTAL ATTITUDES USING THE NEW ECOLOGICAL PARADIGM (NEP) SCALE

Vinod Sasidharan
Ph.D. Candidate in Leisure Studies,
201 Mateer Building, The Pennsylvania State University,
University Park, PA 16802-1307

Brijesh Thapa
Ph.D. Student in Leisure Studies,
201 Mateer Building, The Pennsylvania State University,
University Park, PA 16802-1307

Abstract: The purpose of this study was to explore the role of gender and locality in relationship to environmental attitudes. Data were collected in April 1998 via self-administered questionnaires distributed to a total of 540 students in various classes at a major university located in the northeastern United States. Environmental attitudes were operationalized employing the New Ecological Paradigm Scale (NEP) developed by Dunlap et al. (1992) which consisted of fifteen items (5-pt Likert-type scale). Overall, findings indicated that females were more likely than males to have higher environmental attitudes and that respondents from urban/metropolitan areas were more likely than respondents from other areas to harbor technocentric attitudes.

Introduction

The public's attitudes about the environment and natural resources in the United States have undergone dramatic changes in the past century, with unprecedented decline in utilization valuations of environmental resources as well as decrease in indifference towards such resources (Poresky and Cable, 1994). Exemplified by the 1990 Earth Day, environmental concerns among the general population of the United States have evidently reached unparalleled levels (Steel, 1996). Additionally, public surveys conducted in the last ten years indicate a strong support for environmental protection and the environmental movement both, in the United States and in other countries (e.g., Gallup Report, 1989; Gallup International, 1992). Understanding the attitudes of the general public towards the environment is important because environmental attitudes may have a direct influence on people's environmentally related actions and behavior (Stern and Oskamp, 1987). Traditionally, research on environmental attitudes have focused on the extent to which humans concerned and/or associated with the environment view the world in ways that are different from those who are less concerned with the environment (Stern et al., 1993).

The literature on environmental attitudes that has accumulated over the last two decades can be divided into two major streams: studies focused on sociodemographic factors associated with environmental attitudes and studies of values, beliefs and other social psychological constructs related to environmental attitudes (Dietz et al., 1998). Researchers have linked indicators of environmental attitudes to standard social-structural (sociodemographic) categories such as age (Mohai and Twight, 1987), gender (Stern et al., 1993; Mohai, 1992), race/ethnicity (Caro and Ewert, 1995; Mohai, 1990), and religion (Shaiko, 1987; Kanagy and Willits, 1993). Separately, numerous social scientists (Schultz and Zelezny, 1998; Steel, 1996; Stern et al., 1995; Dunlap et al., 1993; Jones and Dunlap, 1992; Black et al., 1985; Van Liere and Dunlap, 1980) have examined the associations between environmental concern and social psychological factors, including attitudes, beliefs, values, and worldviews (Stern et al., 1995; Dunlap et al, 1992; Dunlap and Van Liere, 1978; Schwartz, 1977). Several studies (e.g., Burger et al., 1998; Tarrant and Cordell, 1997; Davidson and Freudenberg, 1996; Steel, 1996; Cary, 1993; Arcury et al., 1987) have attempted to link the social psychological correlates of environmental attitudes specifically to gender and locality. Overall, it may be noted that environmental attitudes are shaped by social context and sociodemographic variables influence environmentally relevant behavior.

Past studies that have examined the relationship between gender and environmental attitudes indicate that pro-environmental attitudes are more prevalent among women than with men. According to Davidson and Freudberg (1996), women tend to express higher levels of site-specific concern towards the environment than do men. Burger et al's (1998) study indicated that women were more likely to rank the severity of environmental problems than were men and women were more willing than men to have the government pay to solve environmental problems. Findings from Stern et al's (1993) study suggested that women were more likely than men to perceive environmental quality to have consequences for personal well being, social welfare, and health of the planet. Contrary to recent findings, Arcury et al's (1987) study of Kentucky residents concluded that men were modestly more concerned and knowledgeable about environmental problems than were women. Studies on the relationships between locality and environmental concern have by and large identified positive correlations between proximity to urban areas and pro-environmental attitudes, with individuals from urban areas being more concerned about environmental problems than those from rural places of residence (Robertson and Burdge, 1998). From a survey of environmental attitudes and opinions of Istanbul's residents, Furman (1998) noted that environmental knowledge of the residents were positively correlated with their environmental concern and this relationship was most noticeable for ecological knowledge within a broader geographical range of reference and almost negligible for knowledge about local environmental problems. According to Cary's (1993) Australian study, decreasing proximity to the location of an environmental problem increased the instability of the public's perceptions of the problem. Grieshop and Stiles (1989) observed that the

extent of environmental awareness was more pronounced if people could actually see or feel the threatening situation.

Overall, past research indicate that females are more likely than males to have higher environmental attitudes and that respondents from urban/metropolitan areas are more likely than respondents from other areas to have lower environmental attitudes. Gender and locality may shape environmental attitudes through indirect effects on general as well as specific beliefs, attitudes, and values. The *purpose* of this study was to explore the role of gender and locality in relationship to environmental attitudes by employing the New Ecological Paradigm Scale (NEP) developed by Dunlap et al. (1992). Specifically, this study attempted to answer the following two research questions:

1) Is there a difference in environmental attitudes with respect to gender?
2) Is there a difference in environmental attitudes with respect to locality?

Methodology

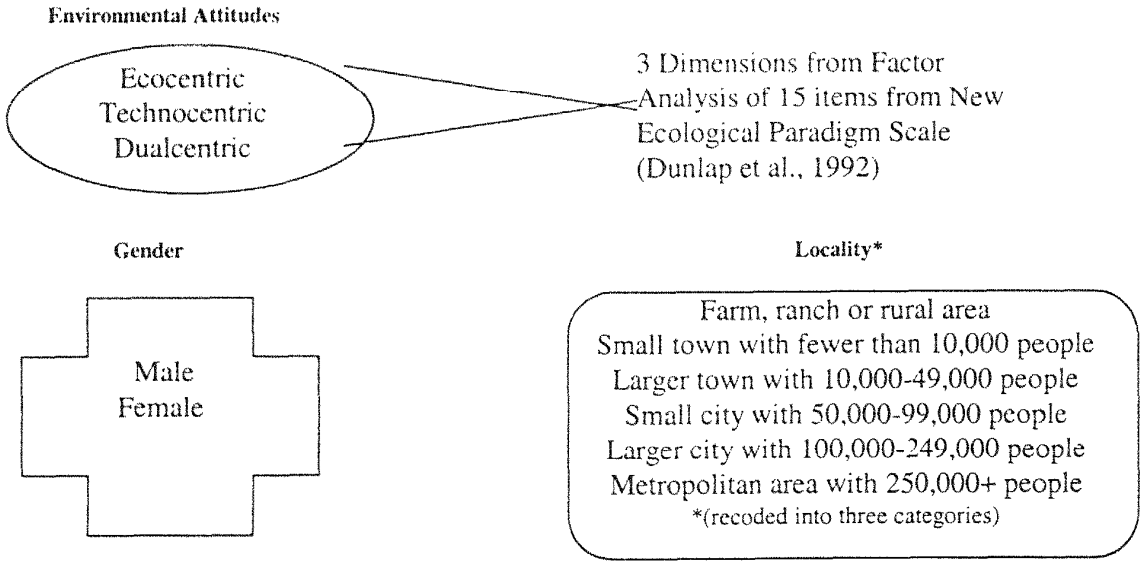
Sampling

Data were collected near the end of the academic year, that is, the last two weeks in April 1998 at a major university located in a rural setting in the northeastern region of the United States. Undergraduate students in six classes (2 classes in each department) were sampled to provide a diversity of thinking and action among students in three different departments, namely, Recreation & Park Management; Hotel, Restaurant & Institutional Management; and Science, Technology & Society. All students in attendance on the days the data were collected agreed to participate.

Operationalization of Environmental Attitudes

Environmental attitudes were operationalized by employing the revised New Ecological Paradigm Scale (NEP) developed by Dunlap et al. (1992). The scale consisted of 15 items (5-point Likert-type format), which ranged from 1 (strongly agree) to 5 (strongly disagree). This scale is conceptually based on "five potential facets of an ecological worldview " (a) reality of limits to growth (3 items), (b) anti-anthropocentrism (3 items), (c) fragility of nature's balance (3 items), (d) rejection of exemptionalism (3 items), and (e) possibility of an eco-crisis or ecological catastrophe (3 items) (Dunlap et al., 1992, p. 6). However, based on their empirical results (internal consistency of the items), the designers of the scale noted it to have a unidimensional property. Based on this undimensionality argument, this study employed the scale to verify the findings. (See figure 1 for operationalization of all variables used in the data analyses).

Figure 1: Operationalization of Variables



Results

Sample

A usable sample of 540 subjects was obtained, in which 45% were females and 55% were males. The average age was 21 years, however, a small percentage (less than 5%) were returning adult students. A majority (74%) of the students were from the state of Pennsylvania, 7% were from New Jersey, and 5% were from New York. The other 14% were from other neighboring states such as Virginia, Ohio, and Connecticut. In terms of locality, the variable was originally coded into the following categories: a) farm,

ranch or rural area; b) small town with fewer than 9,999 people; c) larger town with 10,000-49,999 people; d) small city with 50,000-99,999 people; e) larger city with 100,000-249,999 people; and f) metropolitan area with 250,000+ people. However, the categories were recoded to provide a better frequency distribution. Following recoding, 29% of the sampled population indicated their hometown to be a rural area/small town; about 52% indicated a large town/small city, while 19% reported urban/metropolitan area.

NEP Scale

The 15 items within the revised NEP scale were initially subjected to basic frequency summary analysis that followed with a principal component analysis employing Varimax rotation. The frequencies revealed a supportive and a sympathetic attitude towards the environment; however, the support (agree with pro-environment statements) was not overwhelming. (For an itemized frequency breakdown and factor loadings, the reader is referred to Thapa's article found in this issue of the proceedings). However, prior to the factor analysis, 8 of the 15 items were reverse coded to maintain consistent directionality, in which higher values were associative with greater support for the environment. The factor analysis identified three factors that were inconsistent with Dunlap et al's (1992) unidimensionality argument for the scale. However, this result was in congruence with Floyd et al's (1997) analyses, in which four factors were identified for the Cape Lookout National Seashore sample, and similarly, three factors emerged for the Moores Creek National Battlefield sample. Nevertheless, the results of this study identified three factors. The labels and descriptions for the three factors are as follows:

Factor1. *Ecocentric*: Items within this factor encapsulated the claim that the fate of the environment is uncertain and that mundane activities and impacts of such activities can be detrimental to the survival of mankind.

Factor2. *Technocentric*: Items within this factor encapsulated the notion that technology can be utilized to solve/overcome environmental problems.

Factor3. *Dualcentric*: Items within this factor illustrated a dual equality mode, one that emphasizes the symbiotic compatibility between humans and other living earthly entities.

Each factor illustrated a contrast and the new given terms were reflective of the items (factors). The mean values of the items within each factor were computed to devise a single composite index score for each factor.

Environmental Attitudes: The relationship to gender and locality

Gender

For the first research question, in order to determine the relationship of environmental attitudes and gender, the 3 indices (ecocentric, technocentric and dualcentric) were analyzed against gender employing one-way analysis of variance, with significance measured at the 0.05 level (2-tail significance). On comparison of environmental attitudes between gender groups, three significant relationships surfaced in which, females were more likely than males to harbor ecocentric and dualcentric attitudes, while males were more likely to associate with technocentric attitudes (see Table 1).

Table1. Comparison of Environmental Attitudes By Gender

Environmental Attitude Indices	Male Mean (n)	Female Mean (n)	F-value
Ecocentric	3.49 (289)	3.70 (241)	11.36**
Technocentric	3.04 (289)	3.21 (241)	8.60**
Dualcentric	3.80 (285)	4.11 (238)	19.96***

Significant at 0.01** level, 0.001*** level (2-tail significance)

Locality

Similarly, for the second research question, in order to determine the relationship of environmental attitudes and locality, the 3 attitudinal indices were analyzed against the three recoded locality categories, employing one-way analysis of variance (significance measured at the 0.05 level). Unlike the previous analysis, only two of the three relationships were significant. For the first significant relationship, those who lived in urban/metropolitan areas (population: over 100,000) were most likely to reflect a technocentric orientation, followed by those who lived in rural/small town areas (population: under 9,999), and then by residents of large town/small city areas (population: 10,000-99,999). Likewise, for the second significant relationship, those who lived in large town/small city areas (population: 10,000-99,999) were most likely to express dualcentric attitudes (which indicated the dual compatibility/symbiosis of humans and the environment), followed closely by those who lived in rural/small town areas and urban/metropolitan areas. The relationship between ecocentric attitudes and locality failed to reach significance at the 0.05 level (see Table 2.)

Table 2. Comparison of Environmental Attitudes By Locality

Environmental Attitude Indices	Rural Area / Small Town Mean (n)	Large Town / Small City Mean (n)	Urban Area / Metropolitan Area Mean (n)	F-value
Ecocentric	3.59 (153)	3.60 (278)	3.51 (97)	0.73n.s.
Technocentric	3.16 (153)	3.18 (278)	2.93 (97)	4.58*
Dualcentric	3.97 (151)	4.01 (275)	3.75 (95)	3.76**

Significant at 0.05* level, 0.01** level (2-tail significance)

Conclusion and Limitations

The environmental attitudes of the student population surveyed in this study differed noticeably by gender and locality. Consistent with prior studies that examined environmental attitudes and gender (Burger et al. 1998; Davidson and Freudberg, 1996; Stern et al. 1993), the findings of this study indicated that with regard to gender, females were more likely than males to have pro-environmental attitudes. Female students were also more likely than male students to 'express' concern about potential environmental risks. Compared to men, women expressed a more sympathetic attitude toward the environment than did men, and their environmental attitudes reflected the concern that human activities and the impacts of such activities could lead to environmental imbalance thereby jeopardizing the survival of humans on earth (ecocentric attitude). Additionally, women were more likely than men to hold the attitude that humans are capable of and should strive to exist in a compatible manner with other living entities (dualcentric attitude). The environmental attitudes of the male students surveyed in the study reflected the notion that human technological innovations and technology itself can be utilized to solve and/or overcome the environmental problems threatening the planet (technocentric attitude), whereas the female students were less indicative of this type of attitude.

Prior studies that analyzed the relationship between environmental attitudes and place of residence (e.g., Robertson and Burdge, 1998) indicated that residents of urban/metropolitan areas were less likely than respondents from other areas to have pro-environmental attitudes. The findings from this study exhibited consistency with past research findings by indicating that with regard to place of residence, residents of urban/metropolitan areas were most likely to hold technocentric attitudes followed by rural/small town and large town/small city residents. Furthermore, urban residents were also least indicative of dualcentric and ecocentric attitudes compared to residents from other areas.

The student population surveyed in this study does not necessarily represent the general US population. Hence, the generalizability of the findings of this study pertaining to public's environmental attitudes need to be treated with due consideration, caution and thought until further investigation has been conducted. Future research investigating the environmental attitudes of students' over a broader geographical scale (e.g., inter-university, inter-state, international campuses) may provide a better understanding of emerging nationwide environmental attitudes. The study respondents consisted purely of university undergraduates who are likely to be involved in the consumption, appropriation and maintenance of America's natural resources in the future. Based on the findings of the study, one may conclude that it may be necessary to generate a greater degree of environmental awareness through environmental education and orientation among specific demographic factions of the university student population. Finally, the findings of this study may help shed some light on the environmental attitudes of potential 'stewards' and 'custodians' of the country's depleting natural resources.

References

Arcury, T. A., Scollay, S. J., and Johnson, T. P. (1987). Sex Differences in Environmental Concern and Knowledge: The Case of Acid Rain. *Sex Roles, 16*: 463-472.

Black, J. S., Stern, P. S. and Elworth, J. T. (1985). Personal and Contextual Influences on Household Energy Adaptations. *Journal of Applied Psychology, 70*: 3-21.

Burger, J., Sanchez, J., J. W., and Gochfeld, M. (1998). Gender Differences in Recreational Use, Environmental Attitudes, and Perceptions of Future Land Use at the Savannah River Site.
Environment and Behavior, 30: 472-486.

Cary, J. (1993). The Nature of Symbolic Beliefs and Environmental Behavior in a Rural Setting. *Environment and Behavior, 25*: 555-576.

Caro, V. and Ewert, A. (1995). The Influence of Acculturation on Environmental Concerns: An Exploratory Study. *Journal of Environmental Education, 26*: 13-21.

Davidson, D. J. and Freudenburg, W. R. (1996). Gender and Environmental Risk Concerns. *Environment and Behavior, 28*: 302-339.

Dietz, T., Stern, P. C. and Guagnano, G. A. (1998). Social Structural and Social Psychological Bases of Environmental Concern. *Environment and Behavior, 30*: 450-471.

Dunlap, R. E., Gallup, G. H., Jr., and Gallup, A. M. (1993). Of Global Concern: Results of the Health of the Planet Survey. *Environment, 35*: 7-15, 33-39.

Dunlap, R. E., Van Liere, K. D., Mertig, A. G., Catton, W. R., Jr., and Howell, R. E. (1992). *Measuring Endorsement of an Ecological Worldview: A Revised NEP Scale*. Paper presented at the 1992 Meeting of the Rural Sociological Society, State College, Pennsylvania.

Dunlap, R. E. and Van Liere, K. D. (1978). The "New Environmental Paradigm": A Proposed Measuring Instrument and Preliminary Results. *Journal of Environmental Education, 9*: 10-19.

Floyd, M. F. Jang, H., and Noe, F. (1997). The Relationship Between Environmental Concern and Acceptability of Environmental Impacts Among Visitors to Two U. S. National Park Settings. *Journal of Environmental Management, 51*: 391-412.

Furman, A. (1998). A Note on Environmental Concern In A Developing Country. *Environment and Behavior, 30*: 520-534.

Gallup International (1992). *The Health of the Planet Survey*. Preliminary report prepared by Riley Dunlap, George Gallup, Jr. and Alec Gallup. Princeton, New Jersey: George Gallup International Institute.

Gallup Report (1989). *The Environment*. Gallup Report No. 285. Princeton, New Jersey: George Gallup International Institute.

Grieshop, J. I. and Stiles, M. C. (1989). Risk and Home-Pesticide Users. *Environment and Behavior, 21*: 699-716.

Jones, R. E. and Dunlap, R. E. (1992). The Social Bases of Environmental Concern. *Rural Sociology, 57*: 57-71.

Kanagy, C. L. and Willits, F. K. (1993). A "Greening" of Religion? Some Evidence from a Pennsylvania Sample. *Social Science Quarterly, 74*: 674-683.

Mohai, P. (1990). Black Environmentalism. *Social Science Quarterly, 71*: 744-765.

Mohai, P. (1992). Men, Women and the Environment: An Examination of the Gender Gap in Environmental Concern and Activism. *Society and Natural Resources, 5*: 1-19.

Mohai, P. and Twight, B. W. (1987). Age and Environmentalism: An Elaboration of the Buttel Model Using National Survey Evidence. *Social Science Quarterly, 68*: 798-815.

Poresky, R. H. and Cable, T. (1994). The Kansas Wildlife Scales: Development, Reliability, and Validity. *Perceptual and Motor Skills, 78*: 1345-1346.

Robertson, R. A. and Burdge, R. J. (1998). *Size Of Place Of Residence and Encounters With The Adverse Consequences Of and Support For Commercial/Industrial Development*. In: Proceedings, 1998 Northeastern Recreation Research Symposium, 1998 April 5-7, General Technical Report NE-255. Radnor PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station: 81-85.

Schultz, P. W. and Zelezny, L. C. (1998). Values and Proenvironmental Behavior: A Five-Country Survey. *Journal of Cross-Cultural Psychology, 29*: 540-558.

Schwartz, S. H. (1977). *Normative Influences on Altruism*. In L. Berkowitz (Ed.)., Advances in Experimental Social Psychology (Vol. 10). New York: Academic Press.

Shaiko, R. G. (1987). Religion, Politics and Environmental Concern: A Powerful Mix of Passions. *Social Science Quarterly, 68*: 244-262.

Steel, B. (1996). Thinking Globally and Acting Locally? Environmental Attitudes, Behavior and Activism. *Journal of Environmental Management, 47*: 27-36.

Stern, P. C., Dietz, T. and Guagnano, G. A. (1995). The New Ecological Paradigm in Social-Psychological Context. *Environment and Behavior, 27*: 723-743.

Stern, P. C., Dietz, T. and Kalof, L. (1993). Value Orientations, Gender and Environmental Concern. *Environment and Behavior, 25*: 322-348.

Stern, P. C. and Oskamp, S. (1987). *Managing Scarce Environmental Resources*. In D. Stokols & I. Altman (Eds.), Handbook of Environmental Psychology (Vol. 2) (pp.1043-1088). New York: John Wiley.

Tarrant, M. A. and Cordell, H. K. (1997). The Effect of Respondent Characteristics on General Environmental Attitude-Behavior Correspondence. *Environment and Behavior, 29*: 618-637.

Van Liere, K. D. and Dunlap, R. E. (1980). The Social Bases of Environmental Concern: A Review of Hypotheses, Explanations and Empirical Evidence. *Public Opinion Quarterly, 44*: 181-199.

RECREATIONAL USE OF WETLANDS IN JUNEAU, ALASKA.

James F. Palmer

Associate Professor of Landscape Architecture, SUNY ESF, Syracuse, NY 16827

Abstract: Wetlands are an important source of open space used for many sorts of outdoor recreation activities. However, there is a paucity of published literature documenting the use of wetlands for recreation purposes. This case study reports how wetlands were used for a wide range of recreation activities in Juneau, Alaska. The relation of recreation use to the perceived importance of wetlands for various purposes is investigated.

Introduction

Water related resources are the basis for many of our most popular types of recreation and other leisure pursuits (Cordell, et al. 1999). There exist well-documented and tested approaches to assessing the capacity of water resources to provide recreation benefits (e.g., Water Resources Council 1983). However, the focus of these procedures has been on open water rather than wetlands, and large natural areas rather than urban settings.

Dahl (1990) estimates that approximately 11.6% of the land area in what is now the lower 48 states was wetlands during the colonial era. Approximately half of these wetlands were lost by 1980. Most of the remaining wetlands are in state, local or private ownership. The 1992 Natural Resources Inventory determined that 10.6 % of the non-Federal land area in the U.S. was wetlands (USDA 1994). While these two studies are not in exact agreement over the current acreage of wetlands, it does appear that wetland loss is proceeding at a much slower rate than during the previous 200 years.

Wetlands provide any number of significant benefits to society, including water supply, flood storage, wildlife habitat, and fish hatcheries. Wetlands are also an important source of open space, and are often available to the public for outdoor recreation. To preserve these and other benefits, wetlands are extensively protected and regulated by the Federal and state governments (Kusler & Opheim 1996). While there is an extensive literature on the natural processes and the related benefits associated with wetlands, the many important human-use values of wetlands that are typically overlooked by this research. The results reported in this paper are from a study of recreation and other human-use benefits of wetlands in Juneau, Alaska.

This paper first demonstrates the apparent lack of published research on the recreational use of wetlands. It then outlines the methods used to determine how Juneau residents value wetlands. The perceived importance of a wide range of wetland functions are compared. Recreation use of wetland sites in Juneau is reported. The relation between recreation use and how wetlands are evaluated is investigated.

Wetlands Recreation Literature

Since wetlands provide important open space, it seems reasonable to expect a fairly extensive wetland recreation literature to exist. However, an investigation of several searchable indices suggests that this is virgin territory for young recreation scholars. Five online literature search services were used:

1. ArticleFirst from FirstSearch covers 18,000 articles since 1990 in science, technology, social science, humanities, and popular culture journals.
2. Social Science Abstracts from FirstSearch covers 595,000 journal articles since 1983 in the social sciences.
3. SPORTDiscus from Dialog@CARL covers all aspects of sports, leisure, and physical fitness, Monographs and theses are indexed back to 1949, and 2000 journals back to 1975. It includes 21 journals with "recreation" in their title.
4. Expanded Academic ASAP from INFOTRAC Search Bank indexes 3,841,876 articles covering psychology, sociology, general sciences and current events, among other subjects.
5. Agricola is the National Agriculture Library's index, accessed through FirstSearch. It indexes 3,500,000 documents on all topics related to agriculture.
6. Dissertations Abstracts Online by University Microfilm International was accessed through from FirstSearch. It indexes 1,569,000 dissertations and theses on all academic subjects going back to 1861, including full abstracts since 1980.

The results in table 1 show that wetlands and recreation are each topics extensively covered by references in these databases, but that there are only a handful of citations that have both wetlands and recreation in their subject keywords or abstract. Those articles that were discovered to include both wetlands and recreation can be identified as one of four types: (1) articles about ecotourism outside of the US, (2) economic valuation studies of wetlands benefits, (3) articles focusing on hunting and fishing rather than a full range of possible outdoor recreation activities, and (4) government reports such as EISs or SCORPs.

Table 1. Number of Citations Found from Subject and Abstract Searches.

	Subject Search		
Database	Wetland+	Recreation	Wet. & Rec.
ArticleFirst	2,726	1,192	4
Soc. Sci. Abs.	156	624	4
SPORTDiscus	31	17,710	11
ASAP	442	1,429	1
Agricola	5,371	3,834	95
Dissertation Abs.	1,093	6,771	16
	Abstract Search		
ArticleFirst	200	213	0
Soc. Sci. Abs.	37	222	0
SPORTDiscus	2	2,721	2
ASAP	657	992	4
Agricola	583	475	41
Dissertation Abs.	940	1,913	10

Methods

Scoping workshops were convened in Juneau, Alaska during June 1987 to better understand the public's perception of the issues associated with the human-use of wetlands. In addition, site visits were made to the major wetland areas and a photographic inventory compiled. Based on the workshop results, a survey was prepared to assess public perceptions of (1) special issues and concerns, (2) the importance of wetland functions and attributes, (3) recreation use, and (4) wetland scenic quality. This paper focuses on recreation uses and the importance of wetland functions. Readers are referred elsewhere concerning the public's perceptions of wetland issues (Palmer & Smardon 1989a) and scenic quality assessments (Palmer & Smardon 1989b).

During October 1986, questionnaires were mailed to 1560 residences that were randomly identified from the Juneau City Directory (Polk 1985). A second mailing was made in December to all those who had not responded by that time. Of these, 197 were returned because there was no mail receptacle at the address. These were replaced by 199 randomly sampled residential postal boxes. An additional 568 questionnaires were returned by the Postal Service for other reasons. A total of 431 responses were received out of a possible 994 households, for a total response rate of 43 percent.

Findings

Importance of wetlands. Respondents were asked to evaluate the importance of 20 human-use functions that may be provided by wetlands. These evaluations were based on a standard of 100 points being assigned to open space. Respondents were instructed "to decide how much more or less important than open space the remaining attributes are. For instance, if you think that flood protection is half as important as open space, then write 50 in the space next to Flood Protection. If it is three times as important write 300 in the space. If it is equal in importance to open space, write 100 in the space."

The mean evaluations are shown in Table 2. Ecological functions, such as wildlife and fisheries habitat, water condition, and undisturbed (i.e., natural) areas, received the highest importance evaluations. However, high evaluations are also given functions associated with recreation, such as scenic features, solitude, fishing, bird watching, and nature walks. Wetlands were least important as places for economic or residential development.

Table 2. Importance of Wetland Functions to Juneau Residents.

Wetland Functions	Mean	Std. Err.
Being free of litter	224.9	9.8
Wildlife habitat	222.4	8.6
Fisheries habitat	210.8	8.0
Water condition (clarity, color, etc.)	189.6	7.7
Scenic features	175.3	6.7
Undisturbed areas of wetlands	170.1	7.8
Public ownership of select wetland	159.9	9.1
Opportunities for solitude	145.4	6.8
Opportunities to fish	140.4	6.0
Opportunities for passive recreation like bird watching	136.0	6.4
Opportunities for nature walks	130.5	5.6
Opportunities to hunt	108.0	6.1
Flood Protection	107.8	5.3
Accessibility of wetlands	107.0	4.8
Area for children to play	105.6	5.6
Open space (standard value)	100.0	- -
Having wetlands near to home	96.0	5.7
Food gathering opportunities	88.5	5.1
Area for economic development	75.5	5.8
Area for residential development	69.9	4.8

Recreation use of wetlands. Respondents were given a list of 20 recreational activities and asked to "indicate how frequently you participate in these activities in wetlands: (0) never, (1) once a year, (2) once a season, (3) every other month, (4) monthly, (5) every other week, (6) weekly, (7) twice a week, or (8) daily. The percent of the surveyed population that participated in each activity is shown in

Table 3. The mean number of days per year participants spend in each activity are estimated by interpreting the response values as 0, 1, 2, 4, 8, 16, 32, 64, 256 days respectively.

Table 3. Recreation Use of Wetlands in Juneau, Alaska.

Activity	% Participate	Mean Days / Yr
Walk or hike	88.9	49.9
Bird watch	62.0	63.0
Skate	35.5	10.6
Jog	29.3	59.1
Ski [cross-country]	47.6	20.2
Bike ride	45.2	19.1
Fish	63	17.6
Hunt	41.4	11.2
Gather food	42.7	5.9
Collect non-edible plants	24.2	12.3
Exercise a dog	34.4	97.5
Observe wildlife	76.1	81.7
Watch the glacier	85.1	35.5
Picnic	62.7	11.2
Camp	30.1	6.5
Canoe or kayak	25.7	10.4
Boating (sail or motor)	50.9	30.0
Nature walk	59.9	24.7
Education	28.8	40.4
Seek solitude	58.9	47.6

Notes: n = 427. Only participants are used to calculate mean days per year.

Patterns of recreation participation. People tend to engage in clusters of recreation activities that express their personal interests and skills. A cluster analysis is conducted with the recreation participation responses using Ward's method (SAS 1994). The results in Figure 1 show four clear groups of affiliated wetland recreation activities. Prey sports involve "the hunt" or searching. Outdoor fitness includes sports we general practice for exercise and health, as well as enjoyment. Campcraft activities involve applying nature skills. Contemplative activities are more reflective and involve nature study.

Palmer (1999) found similar clusters among forest recreation activities. However, the forest recreations study included a group of motorized activities, not represented in wetlands. Similarly, the wetlands activities include a fitness cluster that was not represented among the forest activities.

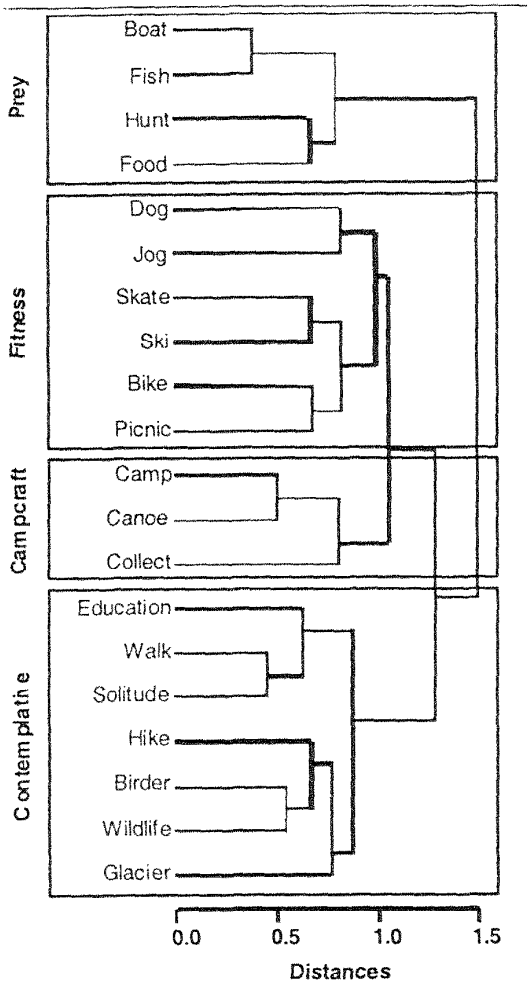


Figure 1. Recreation Activities Clusters Based On Frequency of Participation.

Importance of wetlands to recreationists. If the wetland recreation clusters are an expression of personal interest and skills, then one would expect recreation participants to evaluate the importance of wetlands differently than non-participants. For the purposes of this analysis, prey recreationists must have hunted or fished in a wetland at least one day during the past year. Outdoor fitness recreationists must have either jogged, skied or biked in a wetland during the past year. Campcraft recreationists either camped, collected non-edible plants, canoed or kayaked in a wetland during the past year. Contemplative recreationists sought solitude, watched the glacier, or watched wildlife from a wetland at least once during the past year. These indicator activities were selected because they were relatively common and also represented the diversity of participation within each cluster.

Analysis of variance is used to determine whether participants in each of the four wetland recreation clusters evaluate the importance of wetlands differently than non-participants. Only results where significant differences ($p < .10$) occurred between participants and non-participants are reported in the following tables.

Importance to prey recreationists. Table 4 shows that prey recreationists value wetlands more highly than non-prey recreations as places to engage in their sport. Wetlands are significantly more important to them for the opportunities to fish, hunt and gather food. While they are more valued for fisheries habitat, they are not significantly more valued for wildlife habitat, as undisturbed areas, or for their accessibility.

Table 4. Importance of Wetland Functions to Prey Participants and Non-Participants.

Wetland Functions	Part.	Non-part.	F (p)
Opportunities to fish	162	100	25.3 (<.0001)
Opportunities to hunt	129	68	24.3 (<.0001)
Food gathering opportunities	97	73	5.2 (.024)
Fisheries habitat	221	192	3.1 (.081)

Importance to outdoor fitness recreationists. Table 5 shows that non-participants in outdoor fitness recreation are significantly more likely to value wetlands for their development potential than participants. Participants are more likely to find wetlands an important place for solitude. There is no significant difference between participants and non-participants concerning having wetlands near to home, or the accessibility of wetlands.

Table 5. Importance of Wetland Functions to Outdoor Fitness Participants And Non-Participants.

Wetland Functions	Part.	Non-part.	F (p)
Area for residential development	59	86	7.7 (.006)
Area for economic development	64	92	5.9 (.016)
Opportunities for solitude	156	131	3.3 (.070)

Importance to campcraft recreationists. Table 6 indicates that campcraft recreationists evaluate wetlands quite differently than non-participants. They place significantly higher importance on a number of wetland benefits, including nearness to their home, wildlife habitat, scenic features, and opportunities for solitude, nature walks, food gathering, and passive recreation. They are also more likely to value the undisturbed character of wetlands, their importance as fisheries habitat, and wetlands accessibility.

Table 6. Importance of Wetland Functions to Campcraft Participants and Non-Participants.

Wetland Functions	Part.	Non-part.	F (p)
Opportunities for solitude	173	125	12.5 (.0005)
Wildlife habitat	247	204	6.0 (.015)
Scenic features	194	161	5.9 (.016)
Opportunities for nature walks	146	119	5.4 (.021)
Opportunities for passive recreation like bird watching	153	124	5.0 (.026)
Opportunities for food gathering	101	79	4.4 (.037)
Having some wetlands near to your home	110	86	4.1 (.043)
Undisturbed areas of wetlands	187	158	3.5 (.062)
Fisheries habitat	228	198	3.5 (.061)
Accessibility of wetlands	117	100	3.3 (.071)

Importance to contemplative recreationists. Contemplative recreationists are significantly more likely to find wetlands an important source of scenic features. Table 7 also indicates that they are significantly less likely to value wetlands as an important area for economic or residential development.

Table 7. Importance of Wetland Functions to Contemplative Participants and Non-Participants.

Wetland Functions	Part.	Non-part.	F (p)
Area for economic development	67	137	17.0 (<.0001)
Area for residential development	63	118	14.6 (.0002)
Scenic features	180	146	2.8 (.097)

Conclusions

This paper reports results from a study of human-use values associated with wetlands in Juneau, Alaska. It demonstrates that wetlands support extensive recreation activities. The absence of wetland-related recreation

studies in the literature suggest a need for research in this area.

A cluster analysis of the recreation participation data suggests there are four distinct ways that people use wetlands for recreation: prey sports, outdoor fitness, campcraft, and contemplative activities. How participants and non-participants in each of these four types of activities evaluate the importance of wetlands is evaluated. Significant differences are found in each case that might help wetland planners and managers better serve the recreating public.

References

Community Development Department. 1997. Juneau Wetlands Management Plan. Juneau, AK: City and Borough of Juneau.

Cordell, H.K., C.J. Bowker, D.B.K. English, S.H. Mou, J.C. Bergstrom, R.J. Teasley, M..A. Tarrant, and J. Loomis. 1999. Outdoor Recreation in American Life: A National Assessment of Demand and Supply Trends. Champaign, IL: Sagamore Publishing. 449 pp.

Dahl, Thomas E. 1990. Wetlands losses in the United States 1780's to 1980's. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. http://www.npwrc.usgs.gov/resource/othrdata/wetloss/wetloss.htm (Version 16JUL97).

Kusler, J.A. and T. Opheim. 1996. Our National Wetland Heritage: A Protection Guide. 2nd Edition. Washington, DC: Environmental Law Institute. 152 pp.

Palmer, J.F. 1999. Recreation participation and scenic value assessments. *In* Vogelsong, H.G. (ed.) Proceedings of the 1998 Northeastern Recreation Research Symposium. Gen. Tech. Rep. NE-255. Radnor, PA: USDA, Forest Service, Northeastern Forest Experiment Station. pp. 199-203.

Palmer, J.F. and R.C. Smardon. 1989a. Measuring human values associate with wetlands. *In* L. Kriesberg, T. Northrup and S. Thorson (eds.) Intractable Conflicts and Their Transformation. Syracuse, New York: Syracuse University Press. pp. 156–179.

Palmer, J.F. and R.C. Smardon. 1989b. Visual amenity value of wetlands: an assessment in Juneau, Alaska. In J. Kusler, S. Daly and G. Brooks (ed.) Urban Wetlands. Berne, NY: Association of State Wetland Managers. pp. 104–107.

Polk, R.L. 1985. Juneau City Directory. Boston, MA: R.L. Polk & Co.

SAS Institute. 1994. JMP Statistics and Graphics Guide. Version 3. Cary, NC: SAS Institute.

U.S. Department of Agriculture, Natural Resource Conservation Service. 1994. 1992 National Resources Inventory. Internet document at http://www.nhq.nrcs.usda.gov/NRI/intro.html

Water Resources Council. 1983. Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. Washington, DC: U.S. Government Printing Office.

ENVIRONMENTAL EDUCATION NEEDS ASSESSMENT: AN OVERVIEW

Anneliese Mueller

Ph.D. Student, University of New Hampshire, Department of Education, Morrill Hall, Durham, NH 03824

Rob Robertson

Assistant Professor, Department of Resource Economics and Development, James hall, Durham, NH 03824

Eleanor Abrams and Scott Fletcher

Assistant Professor, Department of Education, Morrill Hall, Durham, NH 03824

Christine Schadler

Subject Field Teacher, University of New Hampshire, Durham, NH 03824

Dave Howell

Professor in Adult and Occupational Education, University of New Hampshire, Durham, NH 03824

Abstract: Presents results from the Environmental Education Needs Assessment, which was completed by 318 New Hampshire teachers. The purpose of the study was to provide opportunity for public school teachers to be involved in the development of new graduate degree program at UNH. It is also a measure of potential demand for a new and potentially innovative program.

Introduction

Research indicates that the most effective way to teach environmental education (EE) is through long term integration and infusion of EE throughout the public school's curriculum (Hungerford &Volk, 1990; Keen, 1991; Gillett et.al., 1991; Ramsey, 1989; Disinger, 1993). The main reason teachers do not infuse environmental education concepts in their curriculum is lack of training (Lane & Wilke, 1994; Lane & Wilke, 1996; Smith-Sebasto, 1998). In response to the need of increased EE training for schoolteachers, the University of New Hampshire has worked to develop a new masters program in EE.

A steering committee at the University of New Hampshire conducted an EE needs assessment survey on public school teachers (n=318). The first objective of the study was to identify what in-service teachers consider important environmental education topics and concerns regarding environmental education. Secondly, it measured teacher's perception of who serves as resource support for environmental education. Third, it offered insight to where teacher's find out about degree programs. The study also assessed potential interest in specific course offerings and documented potential demand for degree and certificate programs.

Methods

A mail questionnaire was administered to public school teachers in New Hampshire. Schools were randomly selected to be representative of both primary and secondary levels in three regions across the state of New Hampshire. In an effort to diversify the sample, the school's principals were asked to implement the survey to teachers who are not inclined to teach environmental education. 318 schoolteachers have completed the questionnaire (incentives were provided to the school).

The Participants

Of the 318 participants, 41.1 percent teach elementary, 16.8 teach middle school and 37.7 percent teach high school. The majority of teachers heave either taught for 21-30, years, 16-20 years or 0-5 years. Of the teachers, 70 percent are female and 30 percent are male. Most of teachers had completed their master's degrees.

In this sample population, only 25.9 percent belong to environmental organizations, while 83 percent reported that they commonly participate in outdoor recreation.

Results

Teachers were asked to rate environmental education topics as important with regards to the future of both the environment and their students. There were eleven items listed for the teachers to indicate what topics they felt are important to teach. The table has listed the most important and least important topics, determined by their mean score.

Table 1. Environmental Education Topics: Mean Score on Importance Scale

Environmental Education Topics	Mean
Most important	
Air Pollution (i.e., sulfur dioxides, acid rain)	2.51
Food Contamination (i.e., lead, pesticides, etc.)	2.4
Resource Depletion (e.g., deforestation, soil erosion)	2.36
Least important	
Non-native organisms in water and on land	1.69
Non-point source pollution (e.g., agricultural runoff)	2.11
Climate Change	2.13

Issues and Concerns with EE

The teachers were asked to report what they personally agreed with in regards to teaching environmental education in their classroom. When asked whether they would like to integrate environmental issues into their classes, 76 percent of the teachers agreed, however, only 34 percent of the

teachers felt prepared to do so.

Environmental education is purported to be most effective when it is integrated throughout the curriculum. Teachers were asked where they thought students should learn environmental education. Above 60 % of the participants felt that EE can be best learned in science classes as well as all other classes. Concurrently, over 70 % of the teachers agreed that their school supports interdisciplinary curriculum.

The majority of the participants agreed that they need support to effectively integrate EE into their classes. The support they are looking for includes additional handout materials and lesson plans, audio-visual materials, and more identified guest speakers.

The study identified what state agencies teachers found to be a significant resource for EE. Out of 32 listed agencies and organizations, only the top and lowest five are listed in Table 2.

Table 2. Top Five and Lowest Five Resources by Percentages and Means

Agency And Organizations	Not a Resource	Somewhat of a Resource	Important Resources	Don't Know
Top Five resources				
NH Fish and Game Dept. Project Wild Mean 1.65, n=293	4.8	16.4	51.9	26.9
Science Center of NH at Squam lake Mean 1.63, n=296	5.1	17.2	52.2	26
Audubon Society of NH Mean 1.61, n=294	3.1	23.5	48.9	24.5
Christa McAuliffe Planetarium Mean 1.49, n=293	6.8	24.2	43.7	25.3
Sea Coast Science Center Mean 1.46, n=294	9.5	12.9	36.7	40.8
Lowest Five				
Keene State College Mean .67, n=292	19.9	12.3	6.8	61
Antioch College Mean .84, n=292	17.5	10.3	11.3	61
Plymouth State College Mean .94, n=293	17.1	15.4	14.3	53.2
UNH- Department of Education Mean .95, n=293	18.4	12.9	16	52.6
High School Vocational Education Teachers 16.7 Mean .95, n=293	13.3	13.7	56.3	

Sources of Information

Since one of the primary objectives of this study was to help develop a new masters program, teachers were asked how they learn about new degree and certificate programs. Word of mouth is the most widely used form of communication, followed by direct mail and brochures. The majority of the teachers appeared to not use professional journals and the World Wide Web as a source of information

Interest in Degree Programs

In an attempt to identify the potential demand for an EE program, teachers were asked to state what type of programs they would consider taking. 4.8% said they would or probably would enroll in Masters Degree program in Environmental Education, 6% said they would or probably would enroll in M.Ed. Degree Program with an emphasis on Environmental Education, and 7.3% said they would or probably would enroll in MS or Ph.D. Program in Natural Resources with emphasis in Environmental Education.

The teachers then were asked to reports on what type of certificate programs and EE courses they would be interested in. 19% said they would or probably would enroll in Certificate Program, 32% said they would or probably would enroll in courses for UNH credit not part of degree program, and 37% said they would or probably would enroll in courses for CEU credit.

Teachers were asked to indicate their level of interest in thirty potential course offerings. The courses were divided into three categories, education courses, field courses, and social/environmental courses. Although the mean scores were generally similar, they indicated that the teachers were overall most interested in taking field courses. However, among the top five desired courses, three were education courses: Classroom technology, experiential outdoor education, and project based instructional methods. The field course that teachers were most interested in was

the Wildlife Ecology course. Of the social/environmental courses, teachers were most interested in the environmental ethics course.

Table 3. Interest in Potential Courses

Course	Not Interested	Interested	Very Interested
Top Five			
Classroom Use in Technology Mean 1.87, n=302	12.6	56.6	30.8
Experiential Education Or Outdoor Education Mean 1.59, n=301	22.6	52.5	24.9
Wildlife Ecology Mean 1.57, n=304	23.4	52	24.7
Project Based Instructional Methods Mean 1.56, n=301	22.3	51.8	25.9
Seasonal Ecology Courses Mean 1.51, n=302	27.5	49.3	23.2
Lowest Five			
Analysis of Educational Policy Mean .75, n=297	48.8	46.4	4.7
Food and fiber in the Third World Mean .80, n= 301	47.8	47.5	4.7
Human Dimensions of Fisheries and Wildlife Mean .86, n=301	41.9	53.8	4.3
Environmental History Mean .86, n=302	44.4	49.5	6
Rural Development Mean .89, n=301	40.9	54.9	4.3

The three most important attributes of a program that teachers consider when deciding whether or not take enroll in a program or course are: location of course offerings, relevance of courses to classroom, and cost of course offerings.

Conclusion

From the information gathered in the Needs Assessment Survey, the steering committee at University of New Hampshire developed a masters degree program in environmental education. The interdisciplinary program is offered jointly by the College of Liberal Arts and the College of Life Sciences and Agriculture.

The three focus areas of the program are:

- *Pedagogy:* an understanding of teaching as a critical, self-reflective, and inquiry-based activity
- *Environmental Science:* an understanding of the physical and biological processes and relationships that constitute ecosystems
- *Human Patterns and Environmental Transformations*: an understanding of social and ethical dimensions of environmental policy.

The program is set up so students can either attend full time or part time. The full time program would be two summers and 1 year. Part Time students would attend two summers and take night courses throughout the years they enrolled.

The program begins with an intensive summer institute. The summer institute is divided into five separate strands that integrate throughout the course:

- Systems Thinking
- Methods and Fieldwork
- Curriculum and Pedagogy
- Learning Community
- Sense of Place

The program ends with a summer practicum.

References

Disinger, J. (1993). Environment in the K-12 curriculum: An overview, in: R. Wilke (ed.) Environmental Education Teacher Resource Handbook Milkwood. New York: Kraus International; Publications.

Gillett. Douglas, Thomas, Paul, Skok, Richard, & McLaughlin, T.F. (1991). The effects of wilderness camping and hiking on self concept and the environmental attitudes and knowledge of twelfth graders. The Journal of Environmental Education, 22, (3), 33-43.

Hundergford, Harold R. & Trudi Volk (1990). Changing learning behavior through environmental education. Journal of Environmental Education, 21, (3), 8-21.

Keen, Meg (1991). The effect of Sunship Earth program on knowledge and attitude development. The Journal of Environmental Education, 22, (3), 28-32.

Lane, Jennie & Richard Wilke, (1994). Environmental education in Wisconsin: a teacher survey. The Journal of Environmental Education, 25, (4), 9-18.

Lane, Jennie & Richard Wilke, (1996). Wisconsin EE mandates: The bad news and the good news. Journal of Environmental Education, 27, (2), 33-40.

Ramsey, John M. (1989). A study of the effects of issue investigation and action behavior on characteristics associated with environmental behavior in seventh grade students. Dissertation Abstracts International, 49, 1254.

Smith-Sebasto, N.J., (1998). Environmental Education in the University of Illinois Cooperative Extension Service: An educator Survey. The Journal of Environmental Eduaction,29, (2), 21-30.

WATER RESOURCE ISSUES IN RECREATION

IMPROVING RECREATIONAL CUSTOMER SATISFACTION: FOCUSING ON COMMUNICATION AND CHANGES IN QUALITY OF EXPERIENCE AT US ARMY CORPS OF ENGINEERS RESERVOIRS

James D. Absher

Research Social Scientist, USDA Forest Service, Pacific Southwest Research Station, 4955 Canyon Crest Drive, Riverside, CA 92507

Robert C. Burns

Doctoral Candidate, Leisure Studies Program, Penn State University, 201 Mateer Building, University Park, PA 16802

Alan R. Graefe

Associate Professor, Leisure Studies Program, Penn State University, 201 Mateer Building, University Park, PA 16802

Abstract: Visitors to US Army Corps of Engineers' (ACOE) reservoirs were queried about their on site experiences and their propensity to inform either recreation agency staff members or family members and/or friends if they had a negative experience at the recreation area. Based on previous work to establish customer service attributes for ACOE recreation, four basic domain measures were calculated representing facilities, services, information, and recreation experience. In turn, these domain level performance measures were related to primary site use, changes in experience over time (disconfirmation), and communication about the disconfirmation. Overall satisfaction and experiential disconfirmation were found to be related to the customer service domains. Nonetheless, only about six percent of visitors noted that the quality of their experience had worsened, and they were disproportionately ramp users or day use site visitors. Communication of their disconfirmation is similar across groups and follows known patterns of telling friends and family before staff. Implications for recreation management are discussed.

Introduction

As a result of President Clinton and Vice-President Gore's 1993 customer service initiative (Executive Order 128620; Clinton, 1993) all federal agencies were required to implement customer service plans with the overarching goal of improving customer service for American consumers. For ACOE recreation managers, the research literature suggests that their customer service approach should be informed by a concern for quality recreation *facilities*, a high level of staff *services*, timely and accurate *information*, and, without fail, a quality *recreation experience* (Absher, Howat, Crilley and Milne, 1996; Titre, Burns and Vogel, 1997; Absher, 1998; Burns, Graefe, Absher & Titre, 1999). An important aspect of this effort is research to better understand customer service as an outcome; i.e., work is needed to better understand the ways in which visitors evaluate, recall and communicate about their reservoir recreation experiences, and how this might be linked to measures of customer satisfaction.

The broad customer service literature for settings such as banking or car rentals has promoted the use of the SERVQUAL model (Parasuraman, Zeithaml, and Berry 1985, 1988) to measure the experiential quality. A similar model for recreation services, named REQUAL, has been proposed (MacKay and Crompton 1998, 1990). But neither of these is specific to outdoor recreation or reservoir recreation. The "facilities, services, information and experience" (FSIE) model cited above is used in this paper and serves the same theoretical purpose as the SERVQUAL/REQUAL models. The FSIE model is robust in that it suggests the key attributes or benefits that are sought by participants/consumers under study and is based on reservoir recreation conditions.

This paper focuses on communication, experiential change and satisfaction relationships within the customer service model. The broad customer service literature suggests the use of the expectancy/disconfirmation construct to partially explain observed levels of customer satisfaction (Zeithaml and Bitner, 1996; Howat, Murray and Crilley, 1999). Two key processes are associated with the expectancy/disconfirmation paradigm (Oliver and DeSarbo 1988): the formation of expectations and the confirmation or disconfirmation of those expectations. This paper focuses on the latter by investigating the impact of *actual recreation experiences*, and particularly the role of visitors' perceptions of the *change (for better or worse) over time* and subsequent *communication* about their experience(s) to others.

Study Procedures

The US Army Corps of Engineers is one of the nation's largest providers of water-based outdoor recreation opportunities, and is responsible for the management of 460 lakes in 40 states across the United States. Recreation areas at ten of the US Army Corps of Engineers' water-based projects, located in ten different states, were selected for this study. These projects were selected because of their dispersed geographical locations, their relatively high usage rates by recreationists, and their overall representativeness of the diverse population of Corps recreation users in the United States. The overall goal was to measure the importance and satisfaction levels of campers, day users and boaters at several of the recreation areas under the operational control of the project manager.

On-site interviews were employed to gather data from users at the ten different water-based recreation areas. A stratified random sample of users was contacted by Corps personnel and asked to participate in the survey. Interviewers were provided with a sampling plan and were in regular telephone communication with Penn State

University researchers to ensure that data were collected in a systematic and consistent way, in order to achieve a representative sample of the particular market segments at each of the ten lakes. Completed surveys were mailed to the US Army Corps of Engineers Waterways Experiment Station in Vicksburg, MS, on a weekly basis, and subsequently analyzed by Penn State University researchers.

Interviewers at each of the ten lakes attempted to collect data from 300 lake users during the summer 1997 recreation season. Approximately 100 boaters (boat ramp users), 100 day users, and 100 campers were surveyed at each lake. A stratified sampling plan was devised to ensure that weekdays, weekend/holidays, as well as various times of the day were appropriately represented. The 300 surveys were split evenly between weekdays and weekend/holidays. Only persons eighteen years old and older were included in the sample, and no users were interviewed more than once. Altogether at the 10 lakes a total of 2,933 respondents completed the survey. Visitors were interviewed in face-to-face, on-site interviews at each of the ten lakes. Nineteen customer service quality items (performance-based attributes) were asked under four domains (FSIE) as outlined by Burns, et al (1999). In addition questions about satisfaction, experiential changes, and communication with others about their experiences were included.

Most of us have heard the statement that when customers experience great service they tell four people, and conversely, when customers experience poor service, they tell 12 people. Research in other service-based industries has shown this to have an empirical basis (Zeithaml & Bitner, 1996). Applied to recreation use, if customers decide to talk to someone about an experience of great, ordinary, or poor service, they have at least two potential audiences: their own family and/or friends, or the staff of the managing agency such as a ranger or receptionist.

In this study, respondents were asked if their experience had improved, stayed the same, or become worse since they had first visited the recreation area. This forms the disconfirmation measure. If the respondents reported that their experience had worsened, they were asked if they had informed a staff member or family members and/or friends about their negative experiences at the reservoir.

Overall, about 54% of all respondents indicated that their experience had improved, 40% noted that their experience had stayed the same, and just 6% of visitors (146 people) noted that the quality of their experience had worsened. This six percent is a small but important group, as understanding *dissatisfaction* is central to both individual customer satisfaction and overall levels of customer satisfaction. Accordingly, it makes sense that managers understand why six percent of visitors reported that their experience had *worsened*, what specifically prompted that segment of the population to perceive a worsened experience, and whether they informed anyone about their negative experience. It's also important to know whether recreation customers are more likely to inform agency staff or their family and/or friends about their experiences, and whether they are more likely to inform others about excellent or poor experiences, and to what degree. Finally, it is valuable to understand the differences in perceptions of different user groups, or market segments, thus enabling mangers to target specific services or remediations toward a specific user group.

Results

In order to understand the relationship of different levels of satisfaction for each of the four domains, four customer service performance indexes were created (Table 1). Quality in each domain is calculated on five point scale where 5 is the highest and 1 is the lowest level of performance. These four indexes are crosstabulated against an overall 10-point satisfaction scale where 10 is the highest and 1 is the lowest. For this analysis respondents were grouped into three satisfaction levels based on this 10-point scale: very high (9-10), high (6-8), and low to moderate (1-5).

Table 1 shows the relationship between the service quality ratings and the satisfaction groupings by domain. For each of the four FSIE domains, satisfaction is related to performance scores. More highly satisfied visitors tend to rate any, and all, quality domains higher. Although this is an expected finding, it is important to note that this relationship is strongly evidenced for each domain. No single domain is left out, and none show a statistically weak relationship. Simply put, satisfaction climbs with increases in performance ratings.

Table 1 Quality ratings for each customer service domain by satisfaction groups.

Satisfaction Group		Quality of facilities	Quality of services	Quality of information	Quality of experience
Low to moderate	Mean	3.68	3.63	3.74	3.80
	n	161	156	151	159
High	Mean	4.04	3.96	3.83	4.25
	n	1180	1167	1144	1177
Very high	Mean	4.42	4.37	4.25	4.54
	n	1481	1468	1457	1472
	Mean	4.22	4.15	4.05	4.38
	n	2822	2791	2752	2808
	F=	125.6	137.9	96.8	130.3
	p =	< .0001	< .0001	< .0001	< .0001

The second test examines the pattern seen in the FSIE domains relative to changes in a repeat visitor's quality of experience. Did one or two of the FSIE domains contribute more to a visitor's perception of *change* in their experience, whether that change is considered "good" or "bad?" In this scenario, each of the FSIE domains has a significant relationship to reported changes in the quality of experience over time. Once again, for each of the FSIE domains higher scores are reported by visitors who feel that things had improved, while those visitors who felt that things had worsened over time were naturally more likely to rate the site's performance lower.

Table 2. Mean scores on customer service domains by experience quality change

Quality of experience n=	Facilities	Services	Information	Experience
	2360	2340	2311	2350
Improved n=1254	4.32	4.27	4.14	4.45
Same n=960	4.10	4.02	3.95	4.29
Worse n=146	3.66	3.68	3.71	3.95
All	4.19	4.13	4.04	4.36
F=	54.9	52.2	26.7	41.9
p < .001 for each				

Thus, table 2 shows a clear downward trend in domain-level attribute ratings with disconfirmation. That is, independent of the domain, respondents who have experienced disconfirmation rated attributes significantly lower throughout. The implication is that a disconfirmation experience leads to a lower rating of some, if not all, attributes. This causal influence is not certain however, and item analysis would be required to better establish the causal mechanisms involved. Nonetheless, the results suggest a lack of discrimination may occur after the fact. People who feel they have been treated poorly may tend to let that affect their judgements in other domains on subsequent trips. This is an important issue for managers who find inconsistencies in visitors' reactions across time without apparent immediate site quality changes.

Table 3 focuses on disconfirmation across the three user groups/market segments (ramp users, campers, or day users). In particular, were the perceived changes in conditions the same for each group. The results show that the disconfirmation experience is differentially distributed. Campers are more likely to report that conditions had improved over time, and conversely, least likely to indicate that things had worsened over time. Day users stand out as being slightly more likely to indicate that conditions had stayed the same over time, while being least likely to indicate that things had improved over time. Ramp users were between the other two groups on the first two categories, and contained the highest percentage who said conditions had become worse. Thus, for reservoir-based recreation disconfirmation occurs differentially across known user segments.

Table 3. Disconfirmation across user groups

	Ramp	Camp	Day use	Total, %
Improved	337	396	347	1080
	54.4%	61.7%	52.3%	56.1%
Same	238	228	283	749
	38.4%	35.5%	42.7%	38.9%
Worse	45	18	33	96
	7.3%	2.8%	5.0%	5.0%
All	620	642	663	1925
	100.1%	100%	100%	100.0%

Chi-square = 22.50, p < .001

A core issue for this paper is to look at how disconfirmation is communicated. Here we focus on just those who experienced disconfirmation (n= 146). The results in Table 4 shows results for 96 of the 146 who could be cross-classified by site use. In general, over two-thirds (68%) of users communicated their disconfirmation experience. About 48 percent of users told their family and friends and about 20 percent informed staff. When examining this result by the different user groups, the campers are quite different than the ramp users and day users regarding who they told about the disconfirmation. The campers were more likely to tell staff than the ramp users or day users, and less likely to tell family. Again, user segments appear to differentially respond to site conditions.

Table 4. Communicating disconfirmation by user group

Told:	Ramp	Camp	Day use	Total
No one	12	7	12	31
	26.7%	38.9%	36.4%	32.3%
Family/ friends	25	5	16	46
	55.6%	27.8%	48.5%	47.9%
Staff	8	6	5	19
	17.8%	33.6%	15.2%	19.8%
All	45	18	33	96
	100.0%	100.0%	100.0%	100.0%

Chi-square = 5.05, p= .283

Although tempting to report this as a real effect, it is not statistically significant, in part due to the low number of respondents in some categories (Chi-square = 5.05, p = .283). Finally, note that overall about 32 percent of users said nothing even though they experienced disconfirmation, and the ratio of those who told staff against those who didn't is about 4:1 (80.2% vs. 19.8%). Although we present no data on the medium of communication it suggests that any "staff" mechanism, (e.g., comment cards, staff on duty, email), is not particularly efficient if it captures only one-fifth of all problems.

Table 5. Communicating disconfirmation by customer service domains

Told:	Facilities	Services	Information	Experience	n=
No one	4.24	3.97	3.95	4.02	41
Family/friends	3.59	3.64	3.54	4.02	61
Staff	3.21	3.41	3.69	3.75	41
F, sig.	8.91, p<.001	3.11, p=.048	1.98, p=.141	.894, p=.411	143

Lastly, Table 5 shows that there is some relationship between communicating disconfirmation and customer service domains. Those visitors who experienced disconfirmation also report low facilities and services ratings, and are also more likely to be the same people that inform the staff. This result suggests that facility problems are more likely to be reported, perhaps because the visitor feels that an immediate action by staff can rectify the problem. Problems with services, information, or experiential problems are less likely to be reported, perhaps

because these domains focus on more intangible items than those in the facilities domain. Again some caution must be exercised not to discount non-significant findings in this table, as the total sample size at this point is relatively small (n= 143). Other significant results may occur with a larger or different sample.

Conclusions and implications

The four customer service domains are linked to some expressions of dissatisfaction and changes in quality of experience. Each of the four (FSIE) domains showed a statistically significant relationship with the overall satisfaction rating, validating their impact on overall satisfaction. Also, each of the four domains was linked to users' perceptions of changes in experience quality over time, with lower domain satisfaction scores reported by those who had perceived negative changes since they had first visited. The quality of experience, especially disconfirmation, varies by user group, with the ramp users, and to a lesser degree day users, showing distinctly higher levels of disconfirmation. The campers, conversely, reported less disconfirmation, and were much more likely to report that conditions had improved at the site since they first visited the recreation area.

Campers are also different in the way they communicate about their experiences. In general, communicating about disappointing experiences is hierarchical: most likely they will tell no one, then comes family and friends, and then staff least often. The campers, while least likely to indicate that conditions had worsened, were more likely to communicate their disconfirmation to staff members. This is perhaps precipitated by the availability of someone who is regarded as responsible for the site. Many campgrounds have an on site presence in the form of a campground host or maintenance/cleaning staff that may serve as a convenient outlet for expressing dissatisfaction. We also noted that visitors expressing disconfirmation with facilities were more likely to communicate their experience with family or staff, perhaps because of the tangibility of facility-related problems.

Perhaps what is learned through this analysis is how difficult it is for a manager to understand disconfirmation communication process in outdoor recreation settings. Visitors clearly will communicate their disconfirmation with some aspects of the recreation area. However, there are many intangibles inherent in the pursuit of a recreation experience, including services and information that are (or are not) provided, and the actual quality of the experience itself. This research effort underscores the need for managers to understand their users as intimately as possible, going beyond merely understanding the demographic makeup of their users to assess the role of different outcomes, user segments, and communication channels. For instance, ramp users and day users, two user groups whose experiences are often not dependent on any interaction with staff, may need to express their dissatisfaction to a staff member. This possibility lends credence to the notion of ensuring that all employees in an agency, from rangers to maintenance personnel, are keenly aware of their potential role in positively or negatively impacting recreationists' quality of experience. And furthermore, managers are admonished to ensure their customer service quality tracking mechanisms take into account disconfirmation and communication issues.

References

Absher, J.D. (1998). Customer Service Measures for National Forest Service Recreation. *Journal of Park and Recreation Administration, 16*(3), 31-42.

Absher, J.D., Howat, G., Crilley, G., & Milne, I. (1996). Toward customer service: Market segment differences for sports and leisure centres. *Australian Leisure, 7*(1), 25-28

Burns, R.C., Graefe, A.R., Absher, J.D. &. Titre, J. (1999). Attributes and domains: Links to visitor satisfaction at US Army Corps of Engineers Reservoirs. Paper presented at the 1999 International Symposium on Society and Resource Management, Brisbane, Australia, July 7-10, 1999.

Clinton, W.J. (1993). Executive order #128620: Setting customer service standards. Washington, D.C.: Government Printing Office

Howat, G., Murray, D. & Crilley, G., (1999). The relationship between service problems and perceptions of service quality, satisfaction, and behavioral intentions of Australian public sports and leisure center customers. *Journal of Park and Recreation Administration, 17*(2), 42-64.

Parasuraman, A., Zeithaml, V.A., & Berry, L.L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing, 64*, 12-40.

Parasuraman, A., Zeithaml, V.A., & Berry, L.L. (1985) A conceptual model of service quality and its implications for further research. *Journal of Marketing, 49*, 41-50

Mackay, K.J., & Crompton, J.L. (1990). Measuring the quality of recreation services. *Journal of Park and Recreation Administration, 8* (3), 47-56.

Mackay, K.J., & Crompton, J.L. (1988). A conceptual model of consumer evaluation of recreation service quality. *Leisure Studies, 7*, 41-49.

Oliver, R.L., & DeSarbo, W.S. (1988). Response determinants in satisfaction judgments. *Journal of Consumer Research, 14*, 495-507.

Titre, J., Burns, R.C & Vogel, J. J.. (1997). Developing a road map to address customer needs. In US Army Corps of Engineers RECNOTES, Vicksburg, MS., Vol. R-97-1, pp. 5-8.

Zeithaml, V.A. & Bitner, M.J. (1996). *Services Marketing*. New York: McGraw-Hill.

PUBLIC PERCEPTION OF THE CONNECTICUT RIVER'S QUALITY AND SUITABILITY AS A RECREATIONAL RESOURCE

Jo Beth Mullens

Assistant Professor

Departments of Geographyand Environmental Studies
Keene State College
Keene, NH 03435

Melissa B. McNally

Undergraduate Student
Department of Geography
Keene State College
Keene, NH 03435

Abstract: New England's Connecticut River is an important regional as well as national resource indicated by its recent Presidential designation as one of the first American Heritage Rivers. Once referred to as America's best landscaped sewer, the Connecticut's quality has improved dramatically over the last few decades. Improved conditions have resulted in an increased number of recreators using the resource. While the River is clearly of greater recreational value today, it is unclear whether the public believes the River's quality is safe for recreational activities which involve direct contact. This paper presents the results of a survey designed to assess the public's perceptions regarding the Connecticut's past and current river quality, and its suitability for supporting various recreational activities. The survey was administered to individuals along the Connecticut River in southern Vermont and New Hampshire. The results suggest that most individuals perceive this area of the Connecticut to be safe for primary contact activities. Additionally, it was found that the majority of individuals who have recreated on the River for 20 years or more have perceived a significant improvement in its overall quality.

Introduction

The Connecticut River has become an increasingly important recreational resource in New England. Its recent designation as an American Heritage River attests to its historic value, as well as to the region's commitment to restoring and protecting its quality. The importance of recreation and tourism on the Connecticut River has been highlighted by organizations working to protect the River and its riparian corridor (Francis and Mulligan, 1997; Ewald, 1995). Additionally, a recent report found that water-based recreation in the Connecticut has been linked to a growing source of jobs and revenue for communities located along the River (Gilbert, 1996).

Only 25 years ago, the Connecticut was of poor quality and greatly limited as a recreational resource. In the early 1970's, the River was perceived as foully polluted and reportedly ran different colors depending upon the color of dyes used by paper mills in the Connecticut Valley. Conniff (1990) reported that boaters had to hold their noses and scrape greenish-brown scum from their waterlines as the River was used primarily to transport industrial and municipal waste. It was during this period that the Connecticut earned the title "the nation's most beautifully landscaped sewer (Scheinder, 1997)."

With the passage of the 1972 Federal Clean Water Act, a national commitment was made to restoring and protecting the quality of rivers such as the Connecticut. A recent article entitled "The Comeback Connecticut" highlights the improvements in the River's quality in the decades following the Clean Water Act (Levin, 1996). Today, both New Hampshire and Vermont classify the entire mainstem of the Connecticut River along their border as a Class B River (Kline and Flanders, 1994). This status indicates that the River is acceptable for fishing and swimming (NEIWPCC, 1996).

The dramatic transformation in the River's quality is reflected in the activities pursued in and along it. Where the River was viewed primarily as a waste carriage 25 years ago, today, the Connecticut River is alive with people pursuing all types of water-based recreational activities. As improvements have been made and water quality at least partially restored, it becomes important to examine the public's perceptions about the Connecticut's suitability as a recreational resource. It is still unclear whether the Connecticut's past poor water quality conditions continue to linger in the perceptions of the public. This paper presents the results of a survey designed to examine the perceptions individuals hold regarding the safety and suitability of the Connecticut River between southern Vermont and New Hampshire for supporting various recreational activities. More specifically, it explores how individuals view the overall quality of the Connecticut River in the study area today, and how their perceptions of quality have changed overtime.

Methodology

This research effort was designed to gather information about various recreational activities pursued in the Connecticut River between southern Vermont and New Hampshire; measure recreators' perceptions of the Connecticut River's suitability for primary contact recreational activities; and determine whether individuals have perceived an improvement in the Connecticut River's quality since they have used the resource.

The study area was an approximate 30 mile stretch of the River between two mainstem dams, the Bellows Falls Dam and Vernon Dam. A fifteen question survey was administered to 132 recreators during late summer of 1998 and early spring of 1999. The surveys were administered at several recreational sites along the River and within the

community of Brattleboro, Vermont. The sites were chosen for the variety of recreational opportunities they provide as well as the volume of recreators using them.

Results

The survey results indicated that swimming, motor boating, canoeing, and fishing were the most commonly pursued activities in the River. Hiking along the River was also noted as an important recreational activity. After recreators identified activities they pursued in the River, they were then asked to identify any recreational activities which they felt were inappropriate or unsuitable for the River in the study area (Figure 1).

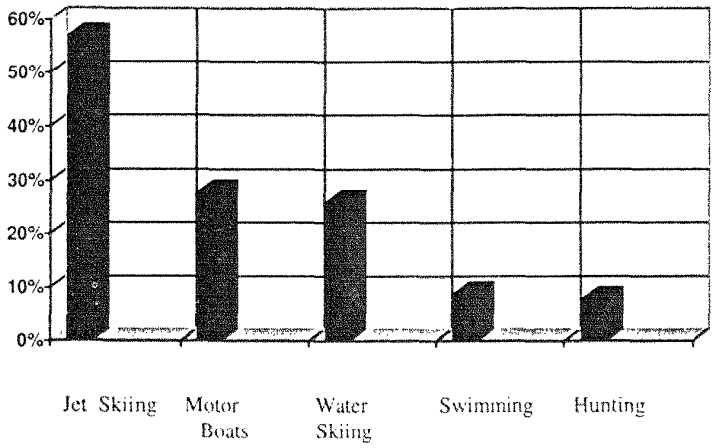


Figure 1. Activities Perceived as Inappropriate for the Connecticut River in the study area.

Fifty-seven percent of the respondents identified jet skiing as the most inappropriate activity in the study area. Noise, speed, and a lack of courtesy from the operators were mentioned as the primary issues of concern for this activity. The second and third least acceptable activities were motor boating and water skiing. These activities were mentioned by 28% (boating) and 26% (water skiing) of the respondents. Concerns noted by respondents included the river channel being too narrow in the study area for these activities, and that boat wakes upset fishing lines and non-motorized boating. A fourth activity which was noted by 9% of the respondents was swimming, primarily for safety reasons. Respondents noted that safety was a primary concern here and some stated that they felt the River's quality was simply not high enough to support this primary contact activity. Lastly, hunting was identified by 8% of the respondents. Concerns over the perceived incompatibility and safety of hunting in close proximity to other recreational pursuits was the primary concern.

Those surveyed were then asked to rate the overall quality of the Connecticut River for supporting recreation. In attempting to answer this question many respondents admitted that they were not confident in their knowledge of the Connecticut's quality. Indeed, past research has highlighted the fact that water quality is only meaningful to recreators when it is perceived through the senses, primarily visually and then secondarily through smell and touch (Land and Mullens, 1991). Despite this, a majority of the respondents or 56% indicated that they perceived the River to be of good quality (Figure 2). Thirty percent felt it was of fair quality, 11% excellent quality, and only 3% indicated that they felt the River was of poor quality.

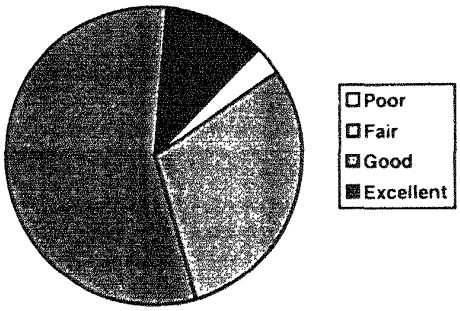


Figure 2. Rating of the Quality of the Connecticut For Supporting Recreational Activities

Recreators were then asked if they believed the River was of high enough quality for recreational activities that involved significant contact with the water. The results of this question were that an overwhelming majority of the respondents, 70%, did believe the water was safe for primary contact activities. As noted for the previous question, some of the respondents were hesitant to give an answer when asked whether they believed the Connecticut to be safe for direct contact activities, and often questioned the researchers about the "actual" quality level. It was clear that these "questioning" respondents recognized their own lack of knowledge on this issue and the fact that they had a limited ability to judge the River's water quality.

Another question involved whether or not respondents noticed changes in the Connecticut's quality since they had been recreating in or along the River. Out of the responses, 38% of the respondents had perceived an improvement in quality, only 8% a decline, and 54% did not perceive any change. However, when the results from this question were cross-tabulated with how long each respondent had been engaging in recreation in or along the River, it became clear that the vast majority of those who have been on the River for many years have perceived a positive change in the quality (Table 1). Respondents who had contact with the River prior to the last two decades often recounted vivid memories of a polluted and degraded resource.

Table 1. Perceptions of Changes of the Connecticut's Quality based on Length of Time Respondents have Recreated on the River.

Length of time Recreating on River	Improvement in Quality	Decline in Quality	No Change	% of Total that Perceived Improvement
Less than 20 years	18	7	62	21%
20 years or more	32	4	9	71%

To consider current concerns, respondents were asked to identify the most significant problem that exists on or along the Connecticut River in the study area. Responses varied; however, the most commonly identified issue respondents noted was pollution. Some respondents who noted pollution as a problem on the River also mentioned issues such as agricultural and residential runoff, paper mill pollution, and indiscriminate dumping. A second issue identified was that of inadequate access to the River. Individuals wanting to pursue recreational boating activities on the River in particular felt limited by too few put-ins, and further, some were concerned about the state of existing ramps. The limited number of boat launch sites in the study area was mentioned in a 1994 water quality assessment report (USBOR 1994). The results from this survey indicate that this is still a problem today for recreators. A third problem which was frequently mentioned was that of safety concerns over the use of motor boats and jet skis in narrow sections of the River.

Conclusion

The results of this research indicate that individuals surveyed did perceive the Connecticut River to be a recreational resource of good to fair quality. Additionally, the vast majority of recreators felt the River's quality was safe for activities which involved direct contact with the water. The majority of individuals who have observed or

recreated in and along the Connecticut River for twenty years or more have indeed noticed an improvement in quality. The marked improvement indicates that significant strides have been made in meeting some of the goals of the Clean Water Act and that these improvements have been registered in the minds of recreators. Still, when questioned about resource problems, individuals continue to have concerns about various pollutants entering the River. While most respondents noting pollution as a current problem were not specific enough to allow for interpretation regarding what sources of pollution were the greatest concern, many stated they were concerned about floating debris in the water as well as "invisible" runoff from the riverbank.

As more individuals are recreating in the Connecticut, crowding and recreational activities in conflict become issues needing increased attention. At the current level of use in the study area, many respondents already noted concerns over crowding, motorized boat speed, and courtesy. More signage at boat launches may be helpful in facilitating courtesy among all recreators sharing the Connecticut. The issue of greater access to the River also needs to be addressed and viable solutions devised. The Connecticut River in the study area truly appears to be a resource which has made a comeback in terms of its actual and perceived quality for recreation. Individuals who once did not consider the River an option for recreation are now increasingly looking to this resource to partially meet their water-based recreational demands.

Literature Cited

Conniff, R. 1990. The Transformation of a River from "Sewer" to "Suburbs" in 20 years. *The Smithsonian* 21:71- 75.

Ewald, R. 1995. *Cultural Landscape of the Connecticut River in New Hampshire and Vermont.* Report to the National Park Service. Charlestown: Connecticut River Joint Commissions.

Francis, S.F., and A.D. Mulligan. 1997. *Connecticut River Corridor Management Plan.* Charlestown: Connecticut River Joint Commission.

Gilbert, A. 1996. The Value of River Protection in Vermont. *Proceedings of Watershed 1996.* Terrene Institute.

Kline, M. and R.A. Flanders. 1994. *Connecticut River Water Quality Assessment Report.* Charlestown: Connecticut River Joint Commissions.

Lant, C.L., and J.B. Mullens. 1991. Lake and River Quality for Recreation Management and Contingent Valuation. *Water Resources Bulletin.* 27(3):453-460.

Levin, T. 1996. The Comeback Connecticut. *Sierra* 81(2):78-79.

New England Interstate Water Pollution Control Commission (NEIWPCC). 1996. *Pathways to understanding water quality in the Connecticut River Watershed: An overview of 305(b) reports, water quality standards and classifications.*

Schneider, P. 1997. Clear Progress: 25 Years of the Clean Water Act. *Audubon* 99:36-47.

United States Bureau of Outdoor Recreation (USBOR). 1994. *Along the northern Connecticut River: An inventory of significant in-stream features.* Charlestown: Connecticut River Joint Commission.

A HOLISTIC APPROACH TO MAINTAINING QUALITY IN ENVIRONMENTAL MANAGEMENT AND VISITOR EXPERIENCE.

Elery Hamilton-Smith.

Managing Director, Rethink Consulting P/L, P.O. Box 36, Carlton South, Victoria 3053, Australia.

Abstract: A diversity of planning tools and frameworks for outdoors recreation and resource management have been developed in North America over the last 25 years. Recent work in Australia, developed from and based in these has made a number of innovations, including an explicit focus upon questions rather than actions, threatening processes rather than visitor impacts, and an expanded trip cycle. Current barriers to effective planning are also discussed.

Introduction

Park planners and managers have long been concerned with issues of environment quality, and more recently with the interrelationship between quality of environment and quality of visitor experience. This concern fuelled the development of planning tools in both the United States and Canada, including the Recreation Opportunity Spectrum or ROS (Clark & Stankey 1979), Visitor Activity Management Process or VAMP (e.g., Tayler 1981), Limits of Acceptable Change or LAC (Stankey et al 1985), Visitor Impact Management or VIM (Graefe 1990), Appropriate Activity Assessment (Parks Canada 1994) and Visitor Experience and Resource Protection or VERP (Belnap et al, 1997).

In the last few years, the author has been centrally involved in the Social and Environmental (SEM) program of the Jenolan Caves Trust and in the development of a recommended Recreation Planning Process for the Alpine National Parks. Both projects have been based in the thinking of the North American models, owe a considerable debt to these models and still rely heavily upon them. A forthcoming manual will summarise this experience as a working guide for planners and managers.

The purpose of this paper is to describe some distinctive characteristics of the Australian experience and to discuss some of the current continuing problems which still impede effectiveness in planning.

Aspects of the Australian Approach

1. Holism

Although the integrated consideration of both environmental and social aspects of the outdoor experience has been a feature of most of the North American work, this is given particular emphasis in Australian approaches. It is recognised that the perception of environmental quality by visitors is crucial in defining environmental objectives and establishing effective planning for environmental quality; concurrently, the meaning of visitor experience must be closely related to the sustainability of environmental quality.

At the same time, it is recognised that this integrated and holistic approach demands more than simply carrying out related monitoring and assessment of both dimensions - it means developing a clearly enunciated relationship and common understanding between the very different theoretical and conceptual bases of the natural and social sciences.

2. Questions rather than Answers

One of the apparently simple but very important developments, especially in the Alpine project, has been to establish a series of questions to be answered rather than a series of steps to be taken. Those familiar with the North American Models will recognise that each prescribes a progressive series of actions. Each of course, is the selected answer to an implied question, while we are now moving to make the questions explicit and the core of the process. Hopefully, this will ensure a greater flexibility and hence greater capacity for application to a wider range of environmental conditions.

For instance, the well-known Recreation Opportunity Spectrum process is based upon defining a series of Recreational Opportunity Classes and allocating areas of the land resource to them. This has all too often been applied as a recipe rather than a set of principles. However, if we start by asking how we might best partition the resource for management purposes, it opens up a choice of responses, potentially including land resource units, recreation opportunity classes, environmental management units, conservation priority zones, scenic quality units, etc. Sometimes it may prove useful to use two systems in an integrated way as in the Southern Appalachians Study in the U.S. (Southern Appalachian Man and the Biosphere 1996) which brought together both recreational opportunity and scenic conditions.

To further illustrate this, the following questions are raised in the Alpine recreation planning project:

- What opportunities should be provided where?
- Who are the visitors and what do they seek/need?
- How well do the opportunities and visitor demands match?
- Where should we focus management resources?
- How can we best define local objectives or issues?
- How can we best assess (monitor) quality of both visitor experience and environment?
- How can we best respond to any revealed problems?
- How can we report in the most accessible, transparent and effective way?

3. Threatening Processes rather than Visitor Impacts

Most planning models for natural areas have focussed strongly upon visitor impacts. In fact, the most damaging impacts upon environmental quality are only sometimes related to the direct impacts of visitors. Certainly in Australia, the most ubiquitous and ultimately damaging impacts are derived from invasive species, including weeds, pathogens and feral animals. Park managers (often through past actions, but sometimes even in today's practices) have also caused much more damage than is usually a result of visitor impacts. Examples of this commonly include inappropriate location or inadequate design and construction of pathways and campsites.

4. An expanded trip cycle

Although the idea of the trip cycle is often referred to, it is generally seen as comprising only a few simple stages, such as anticipation, the journey to the destination, activities at the destination, journey home and recollection. We have found that effective planning for information or interpretation services and sound research design demands a more complex segmentation of the visitor experience. We commonly distinguish between:

- Awareness (for many people, their awareness of the Jenolan Caves goes back to their primary school learning, or to being told about their parent's, or even grandparent's, honeymoon)
- Interest (the key stage for delivery of motivational messages and the beginning of interpretation)
- Decision to visit
- Anticipation of visit (a need for information rather than motivation)
- Travel to site
- Reception (which always occurs, whether planned or not)
- On-site experience
- Departure
- Travel home
- Recollection
- Reflection (a key stage for research on the visitor experience as it is the reflections which shape any repeat visits and the stories told to friends)

5. Identification of Objectives and Indicators

Many of the models appear to assume that it is a relatively easy task to define specific and precise objectives. In fact, both can only be done effectively with a good understanding of the social and natural systems, and at least in Australia, we often lack an adequate basis for doing this.

At the same time, there has also been a long debate about the appropriateness or otherwise of insisting upon clearly defined objectives. Wholey et al (1975) and many others argue that evaluation is impossible without clearly defined and measurable objectives; Nienaber and Wildavsky (1973: 11) present a powerful critique of the objective-based approach. They argue that: *objectives are not just out there, like ripe fruit waiting to be plucked: they are man-made, artificial, imposed on a recalcitrant world. Inevitably they do violence to reality by emphasising certain activities (and hence organisational elements) over others.* Thus, in endeavouring to capture the less tangible characteristics of the recreational experience and to recognise the role of the recreating person in individually shaping that experience, while maintaining fidelity to the reality of experience, an insistence on precise definition of objectives may prove truly troublesome. Scriven (1972, 1993) presents a similar argument, together with a clearly defined conceptual approach to goal-free evaluation which has since been further developed by many others.

Our approach has been that, where necessary, rather than striving to delineate objectives (which are all too likely to be flawed), we define issues for concern, monitor the state of these issues (which in itself may assist to develop an adequate understanding for the definition of objectives) and at the same time, encourage basic research upon the issue concerned. There is special problem in the social arena, where managers generally only define their objectives for visitor experience in terms of providing opportunities and rarely define even the range of opportunities in clear terms. Although there is a well-developed technology for defining 'customer satisfaction' and other characteristics of the visitor experience, this is only useful at the broad level, and only makes a limited contribution to the kind of understanding of visitor experience which is desirable. We continue to pursue the continuing investigation of this dilemma. One of the more difficult aspects is the paradox that what might be seen as bad experience at the time becomes much more highly valued following the passage of time and subsequent reflection. The further paradox is that these are often visits when something went badly wrong, but the participants managed to confront the challenges involved and overcome them, yet contemporary management strives to eliminate most challenge in outdoor recreation because it might lead to legal action !

6. Structure and Process of Quality Maintenance

It has long been recognised that the application of results from research or monitoring to the solution of practice problems is all too often neglected. A number of texts (e.g., Patton 1978), research studies (e.g., Wholey et al (1975), Weiss & Bucuvalas 1980, Louis & Corwin 1982, Driver & Koch 1981, Rappert 1997) and consulting practices (e.g., Connor 1999) have examined this problem. It seems clear that the basis of better practice in all these areas must at least include:

- effective communication, understanding, respect and trust between researchers and managers
- agreement between researchers and managers upon the goals and issue(s) to be pursued
- quality of the research concerned
- involvement of all relevant parties
- broad and effective communication, both directly and indirectly impinging upon decision-makers

Each of these have been given attention at Jenolan Caves. The caves protected areas are under the control of a Trust, which reports directly to the responsible Minister of the state government. The trust board appoints a conservation sub-committee, and this sub-committee in turn is responsible for the monitoring program. Further, a separate committee (without any board members amongst its number) known as the Social and Environmental Monitoring (SEM) committee of 10 social and natural scientists has been appointed with direct responsibility for the oversight and reporting of the monitoring program. Liaison and communication is however enhanced by the chair of the conservation sub-committee attending all meetings of the SEM Committee.

The initial state of establishing the program involved a think-tank, managed on behalf of the trust by a consultant group (Manidis Roberts 1995). This served to clarify and develop understanding of the program. The members of the SEM committee were then selected by the Trust, and through the close liaison between that group and the conservation subcommittee, communication and understanding has been developed and maintained. There has been a considerable effort to involve those who are potentially interested, and communication, particularly with on-ground staff has been furthered through personal contact, a regular newsletter and publication of 'fact-sheet' summaries of work in progress.

The roles of the SEM committee embrace both the oversight and maintenance of quality in the monitoring program and the annual preparation of an independent State of the Environment Report which is published within the formal annual report of the Trust. This provides not only a readily accessible report, but amounts to an independent audit and so enhances the transparency of the trust's administration of its responsibilities.

Continuing Problems

Inevitably, there will be problems in any system of park or natural area planning; if there were no problems, there would be no need for planning! However, those process problems which inhibit or prevent planning in itself demand a brief comment here. At this stage, they have largely been overcome in the programs described in this paper, but if not confronted, may well prevent adoption of similar programs elsewhere. These include:

1. Different understandings of the planning process

A very recent paper by Dant and Francis (1998) has drawn attention to the contrast between the rational and contingent concepts and perceptions of the planning process. The rational perspective sees planning as a prescriptive process which is based in a rational set of 'facts'; the contingent perspective sees planning as a way of optimising on-going decision-making, given that even the 'facts' are inevitably contested. Thus, although decision-making may be illuminated by the planning process, it is not dictated by it. In reality, neither of these extreme positions is totally true. Planning must be seen as practical and situated activity which emerges out of an interactive process.

But there will be those, often stakeholders advocating a specific position, who will adopt a rationalistic position and fail to recognise that their viewpoint does not correspond with the nature of the planning process. At the other extreme, there are those, often politically motivated stakeholders or even board members, who are driven by specific ideological perspectives which lead them to dismiss the planning process itself. These extreme positions thus mitigate against effective balance in the planning process.

2. Entrenched but inappropriate planning practices

At least part of the intellectual evolution of natural area planning has grown out of urban planning practice. Some aspects of this heritage which may impede effective practice include the way in which the planning process and planning documents are structured, an insistence upon traditional zoning concepts, and the idea that planning boundaries must be rigorously defined in cadastral rather than natural terms.

3. Fragmentation of planning and management processes

All too commonly, the planning and management processes are bureaucratically fragmented. Even planning may become so ritualised as to be isolated from on-ground management. Environmental management may be separated from visitor services management; interpretation may well be separated from marketing; and so on. One of the major contemporary challenges to natural area managers is to achieve a holistic and integrated approach.

4. The new managerialism and downsizing

The new emphasis upon management for its own sake and on short-term efficiencies mitigates against depth and quality in research and monitoring. It demands simple and immediate answers to questions, and regrettably, there is a ready availability of simple answers - the problem is that they are wrong. Effective research always is based in the concept that no phenomenon ever has a single cause, and no action ever has a single effect. Sound management would also recognise this principle, but current managerial ideology seems to reject it.

Hand-in-hand with this conceptual problem, governments are currently committed to 'downsizing' - and quality in planning and management is all too often a victim, simply because there are inadequate resources to do the job which should be done.

5. Continuing and cyclic instability in governmental policies

As a simple example, after ten years of an effective control program directed towards a specific weed species, the

species concerned was approaching total elimination and only a relatively modest maintenance program was required. However, even that modest program was eliminated by a newly appointed minister, and the species is now returned to its status at the beginning of the ten-year program, and a new program of control has had to be instituted! The continuing changes of departmental names are not only a source of confusion for all, but carry with them a continuing discontinuity in management practices which has eroded expertise and reduced quality of outcomes. Above all else, natural area management needs a balance between the continuing improvement of practice and maintenance of continuity and consistency.

Of course, any programs may well fall victim to this very problem.. Thus, we see it as important that we maximise learning from the programs described here; either may well not survive the turbulence of current political and socio-economic change. However, both are developing experience which can help us to develop creative responses to future opportunities.

References

Belnap, J et al, 1997. *VERP: The Visitor Experience and Resource Protection Framework: A Handbook for Planners and Managers.* USDI National Park Service, Denver Service Center.

Connor, Des 1999 *Connor Development Services Ltd.* <http://www.islandnet.com/connor/>

Clark, Roger N & Stankey, George H 1979 *The Recreation Opportunity Spectrum : A Framework for Planning, Management and Research,* USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, General Technical Report PNW-98.

Dant, T & Francis, D 1998 Planning in Organisations: Rational Control or Contingent Activity? *Sociological Research Online* (3) 2. <http://www.socresonline.org.uk/socresonline/3/2/4.html>

Driver, BL & Koch, NE 1981. Conditions which nurture the application of forest recreation research results. *Journal of Technology Transfer,* 6 (1): 33-40.

Graefe, Alan R, Fred R Kuss & Jerry J Vaske 1990 *Visitor Impact Management : The Planning Framework.* National Parks and Conservation Association, Washington, DC.

Louis, KS & Corwin, RG 1982 Policy research in a policy vacuum. In Corwin, RG (Ed.) *Research in Sociology of Education and Socialisation,* 3: 121-149. JSI Press, Greenwich CT.

Manidis Roberts Consultants 1995. *Determining an environmental and social carrying capacity for Jenolan Caves Reserve.* Jenolan Caves Reserve Trust.

Nienaber, J and Wildavsky, A 1973 *The budgeting and evaluation of federal recreation programs.* Basic Books.

Parks Canada 1994 *A proposed framework for assessing the appropriateness of recreation activities in protected heritage areas.* Parks Canada, Ottawa.

Patton, MQ 1978 *Utilization-Focused Evaluation,* Beverly Hills, CA : Sage.

Rappert, B 1997 Users and Social Science Research: Policy, Problems & Possibilities. *Sociological Research on Line* 2(3): <http://www.socresonline.org.uk/socresonline/2/3/10.html.

Scriven, M 1972 Pros and cons about goal-free evaluation. *Evaluation Comment,* 3(4): 1-7.

Scriven, M 1993 *Hard-won lessons in program evaluation. New Directions for Program Evaluation, 58.* Jossey-Bass Publishers.

Southern Appalachian Man and the Biosphere (SAMAB) 1996 *The Southern Appalachian Assessment Social/Cultural/Economic Technical Report.* USDA Forest Service Southern Region, Atlanta, GA.

Stankey, George H, David N Cole, Robert C Lucas, Margaret E Petersen & Sidney S Frissell. 1985 *The Limits of Acceptable Change (LAC) System for Wilderness Planning.* USDA Forest Service, Intermountain Forest and Range Experiment Station, General Technical Report INT-176.

Tayler, G 1981 *A Management Process for National Parks Visitor Activities.* Parks Canada, Ottawa

Weiss, CH with MJ Bucuvalas 1980 *Social Science Research and Decision-making.* Columbia University Press, New York, NY.

Wholey, JS, Nay, JN, Scanlon, JW, and Schmidt, RE 1975 If you don't care where you get to, then it doesn't matter which way you go, in GM Lyons, (ed.), *Social research and public policies: The Dartmouth OECD Conference.* Dartmouth College. pp. 175-197.

RIVER OF PROMISE: COMMUNITY BASED CONSERVATION FOR THE CHEAT RIVER WATERSHED IN WEST VIRGINIA

Dave Bassage

Friends of the Cheat
119 S.Price St. Suite 206, Kingwood, WV 26537
e-mail: <dave@cheat.org>
phone: (304)-329-3621

Rick Buckley

Office of Surface Mining
603 Morris Street Charleston, WV 25301
e-mail: <rbuckley@osmre.gov>
phone: (304)-347-7158

Jeanne Kraje

West Virginia University -Division of Forestry
PO Box 6125, Morgantown, WV 26506-6125
e-mail: <jkraje@wvu.edu>
phone: (304)-293-2941 x 2442

Randy Robinson

West Virginia University - Ruralnet Project
PO Box 6122, 609 Allen Hall
Morgantown, WV 26506-6122
e-mail: <rrr@wvu.edu>
phone: (304)-293-5913 x 1817

Steve Selin

West Virginia University -Division of Forestry
PO Box 6125, Morgantown, WV 26506-6125
e-mail: <sselin@wvu.edu>
phone: (304)-293-2941 x 2442

Abstract: The Cheat River watershed in north central West Virginia has severe environmental impact resulting from acidic mine drainage (amd). Though nationally known for the challenging whitewater of the Cheat Canyon, this section of the river is diminished as an environmental and recreational resource because of amd. This NERR roundtable discussed the work of Friends of the Cheat, the River of Promise task force, and the environmental restoration efforts now underway.

The Problem

Acid mine drainage (amd) flowing from abandoned coal mines has caused pollution so severe that plant and animal life in streams cannot survive. The Environmental Protection Agency has singled out drainage from abandoned coalmines as the number one water quality problem in Appalachia. Many of these problems originated many years ago and resulted from coal production that helped build America's strong industrial base and fueled our war efforts during World War I and II.

Acid drainage is water containing acidity, iron, manganese, aluminum, and other metals. It is caused by exposing coal and bedrock high in pyrite (iron-sulfide) to oxygen and moisture as a result of surface or underground mining operations. If produced in sufficient quantity, iron hydroxide and sulfuric acid, a result of chemical and biological reaction, may contaminate surface and ground water. President Carter signed the Surface Mining Control and Reclamation Act in 1977.

One of the main reasons the new law was needed was to prevent future coal mining from creating acid drainage problems. Another was to clean up abandon mine land problems from past mining. Today, thousands of miles of streams are so badly polluted with acid drainage that all plant and animal life has been destroyed. Acid drainage problems exist in Pennsylvania, West Virginia, Ohio, Kentucky, Maryland, Indiana, Illinois, Oklahoma, Iowa, Missouri, Kansas, Tennessee, Virginia, Alabama, and Georgia. Some of the worst pollution is from decades-old abandoned mines in Pennsylvania and West Virginia.

Eliminating Acid Drainage

Cleaning up the acid drainage produced from abandoned coalmines is very difficult and expensive. Approximately 10 percent of acid drainage come from abandoned surface mines. Preventing acid drainage from surface mines requires the elimination of water movement through the acid material. Limestone rock drains may also be used to neutralize the acid drainage on these mines.

Unfortunately, most acid drainage originates in abandoned underground coalmines and flows in surface or ground water into nearby streams (oxidation of new pyritic material, exposed through slow collapsing of mine roofs and walls, can continue for hundreds of years). Some success has been achieved by filling or grouting mine voids with alkaline material that is a by product of coal-fired power plants; however filling or sealing the old shafts and tunnels to eliminate acid production is expensive, and results are inconsistent. For this reason, water treatment has been the most practical solution to the problem.

Methods of water treatment used to eliminate acid drainage from abandoned underground mines can be grouped into two types. The most common method is chemical treatment. Called "active" treatment because it requires constant maintenance, this method usually involves neutralizing acid-polluted water with hydrated lime or crushed limestone. This treatment reduces acidity and significantly decreases iron and other metals. However, it is expensive to construct and operate and is considered a temporary measure because the acid drainage problem has not been permanently eliminated.

The second treatment method is called biological, or "passive" control. This technology involves the construction of a treatment system that is permanent and requires little or no maintenance. Passive control measures involve the use of anoxic drains, limestone rock channels, alkaline recharge of ground water, and diversion of drainage through man-made wetlands or other settling

structures. Passive treatment systems are relatively inexpensive to construct and have been very successful on small discharges of acid drainage. However, these are new technologies and, although they have significant potential, they are considered experimental because their long-term effectiveness has not been proven.

Appalachian Clean Streams Initiative

For decades, the problem of stream pollution from acid drainage has been recognized as a major problem in the eastern United States. Over the years, many programs have had great success, but despite the severity of the problem there had not been a coordinated effort with the primary focus of eliminating acid drainage until the Appalachian Clean Streams Initiative was introduced in the fall of 1994.

The Appalachian Clean Streams Initiative began as a broad-based program to eliminate acid drainage from abandoned coalmines. Today the program is more focused, with a clear goal of cleaning up acid drainage problems using a combination of private and government resources.

The mission of the Appalachian Clean Streams Initiative is to facilitate and coordinate citizen groups, university researchers, the coal industry, corporations, the environmental community, and local, state, and federal government agencies that are involved in cleaning up streams polluted by acid drainage. The initiative responds to all major interests in this endeavor. Although eliminating acid drainage is now a federal government priority, the problem is so widespread and costly to solve that it can be eliminated only through combined public and private efforts.

A major goal of the clean-up plan is to increase the exchange of information and eliminate duplicate efforts among local, state, and federal government agencies working on acid drainage projects. Clean-up technology must be described in terms of cost, effectiveness, and applicability so all can benefit. Existing funding sources are being identified, and new sources are being developed. Those sources include combinations of local, state, and federal government agencies, plus private, matching, and in-kind services for clean-up projects. The success of cooperative solutions to acid drainage problems has been building the grassroots level in recent years. Watershed associations, community groups, and recreation associations are working together, with funding from government and private sources. This cooperative approach supports greater efficiency and gets better results from the expenditure of public funds. The Appalachian Clean Stream Initiative is an opportunity for a partnership to solve one of the major environmental problems facing the regional ecosystems of the coalfields.

Source: US Dept. of the Interior, Office of Surface Mining
Appalachian Clean Streams Initiative web site
http://www.osmre.gov//acsiplan.htm

Friends of the Cheat and the River of Promise

From the Cheat River's source in the Monongahela National Forest of West Virginia to its confluence with the Monongahela River in Pennsylvania the Cheat River drains a magnificent 1400 square mile watershed: the largest free-flowing watershed in the Eastern United States. The remote and pristine headwaters, white water canyons, scenic vistas, and proximity to eastern metropolitan centers make the Cheat River a natural, historic, recreational and economic resource of national significance.

Our national heritage was built upon the hard work and perseverance of the people who logged the timber and mined the coal that became the building blocks for the Industrial Revolution in America. Coal and coke would later fuel the steel industry and enable the United States and Allies to be victorious in two World Wars. The true costs of this nation building have not been evenly shared. Sections of the Cheat River watershed suffered severe environmental degradation from the exploitation of timber and coal. Acidic mine drainage (amd) has polluted more than 2,000 miles of waterways in WV and more than 3,000 miles in PA Many decades later these scars are still not healed, but positive changes are underway.

Today the Cheat River watershed can be viewed as a national example of what individuals, communities, schools, businesses, local governments and state agencies, can achieve by working together. Friends of the Cheat River (FOC) is a grassroots conservation organization located in Preston County, West Virginia. FOC is comprised of citizens from diverse backgrounds: hunters and fishermen, government employees, coal company owners, miners, loggers, river guides, and boaters. We have in common a fundamental belief that clean water is essential to our quality of life, and that together we can reclaim polluted streams in the watershed and protect those that are still pristine.

Friends of the Cheat mission: To Restore, Preserve, and Promote the Outstanding Natural Qualities of the Cheat River Watershed.

Residents of the Cheat watershed have much to be proud of. Our cost of living and crime rate are low, you can't find nicer neighbors anywhere, and we've got our beautiful mountains, streams and rivers to enjoy every day. Whether you hike, bike, paddle, ride, ski, hunt, fish, or just admire the view, it's hard not to feel lucky to be surrounded by such incredible natural beauty.

That sense of pride fades quickly when we look closer at some of the problems facing the watershed. Half of the streams in Preston County are unable to support healthy insect life, much less fish. Illegal dumps and streamside litter abounds. There are still folks living in the watershed who remember when our streams teemed with fish. With enough hard work and coordinated effort the businesses, individuals, and organizations that comprise Friends of the Cheat are determined to help create a better future that includes the best of today and the past.

It's been five years since 30 inspired people first met to form Friends of the Cheat. In that short time we've made major strides towards fostering a sense of shared pride and responsibility in a diverse group of watershed stakeholders and inspired over 12 million dollars worth of reclamation projects to start the long process of restoring our beautiful streams to a clean and healthy state. And that's just a couple of highlights from our brief history.

What we've done so far:

- Formed the River of Promise Task Force, a coalition of state and federal agencies, government, conservation groups, and industry that coordinates the massive effort to reclaim eight major tributaries: (Pringle, Lick, Heather, Morgan, Greens, and Bull Runs as well as Muddy Creek and the Big Sandy) and the lower mainstem Cheat River. These streams have all been rendered virtually sterile from acid mine drainage created by over a century of coal mining.

- Hosted five highly successful Cheat River Festivals that increased awareness of our issues, raised much needed funds, and were a lot of fun, to boot!

- Organized river cleanups on different sections of the Cheat to remove trash brought in by high water.

- Convinced the Corps of Engineers to focus their vast resources on our acid mine drainage problem.

- Fostered the Cheat River Watershed Association, Friends of Laurel Mountain, and Shavers Fork Coalition, in keeping with our philosophy of supporting locally driven management of local issues within the watershed.
- Helped fund the most comprehensive county wide study in the state of stream health that produced a valuable color coded map essential for pinpointing streams that need help and those that need protection.

- Hosted an acclaimed gathering of watershed interests in Kingwood.

- Organized a cleanup of Cornwell Cave, deep in the Cheat Canyon and best accessed by raft.

- Cosponsored a stream assessment workshop in Elkins.

- Organized a hike through the Cheat Canyon with concerned citizens and a representative from Allegheny Power to discuss their land management plans.

- Initiated work on a three part documentary series on the Cheat, to air in late '99, that will provide an in depth look at the beauty and issues facing the watershed, with emphasis on our promising future.

- Completed our own reclamation projects on Sovern Run and Beaver Creek that are the first steps in a shared effort to restore Sovern Run, Beaver Creek, and the Lower Big Sandy to fishable quality in the next two years. This was the first time in West Virginia that the EPA directly funded a citizen's group to do reclamation work. We are honored by their confidence and proud of our results.

- Hosted a summer music festival to complement our spring festival, with emphasis on attracting watershed residents, raising awareness, and having fun.

- Purchased the property that our festival is held on, symbolically located at the point where Muddy Creek puts the deathblow on the Cheat River. We are currently putting together plans for development of these twelve acres of floodplain consistent with five goals: be good environmental stewards, educate the public, provide recreational access to the river and trails, raise funds, and provide a focal point for acid mine drainage reclamation efforts in the watershed.

Cheat River Interpretive Project

When Friends of the Cheat purchased our 12-acre Cheat River Festival Site we were excited about the new opportunities this land presented. Since our inception nearly five years ago, FOC and the River of Promise task force have striven to involve the local community and schools in outreach and education projects. Now, with riverside land at the confluence of Muddy Creek and the Cheat we have opportunity to create a confluence of effort toward restoring the Cheat watershed.

One of our major goals for the festival site is to develop an interpretive trail, exhibits and outdoor pavilion that will help explain watershed restoration efforts and the river / riparian ecosystem. Eventually, we would like to extend the interpretive trail along Muddy Creek to the historic "Old Virginia" Iron Furnace. This 1.5 mile section would help interpret the importance of iron and coal to the industrial revolution in America along with associated environmental impacts. Ultimately, we hope to develop a Cheat River Environmental Learning Center where school groups and families can come to enjoy the beautiful natural area, learn about their environment and understand efforts to improve water quality in the Cheat and its tributaries.

During the winter and spring of 1999, students and faculty in the WVU College of Agriculture, Forestry and Consumer Sciences are helping Friends of the Cheat to achieve these goals of interpretation and environmental education.

Professor Steve McBride's Landscape Architecture students are using aerial photos and surveys to draw a base map which will be helpful in developing a master plan for the festival site and interpretive area. As part of their junior design studio, landscape architecture students will develop concept plans for facilities and trails at the Cheat River festival site.

Students enrolled in Environmental, Historical and Cultural Interpretation (RcPk 242) are utilizing the festival site to develop their skills in communication and thematic

interpretation while helping to develop interpretive trail information and exhibits. Dr. Theresa Wang and Randy Robinson designed this class to use an "active learning" approach that enabled small groups of students to develop their own interpretive products. Involving students in a real "on the ground" project with tangible results benefits both students and the public who use the interpretive area.

Preparation for these projects involved much reading and research on the natural and human history of the Cheat River watershed. Learning about Native Americans, early settlers, and the industries of iron, logging and coal set the stage for understanding the watershed today. Class discussions also involved comparing the technique and style of various interpretive writers. David Larsen of the National Park Service's Stephen T. Mather Training Center in Harpers Ferry, WV visited WVU to help students learn principles and techniques for effective thematic interpretation.

Four field trips allowed WVU students to gain first hand knowledge of the interpretive area and the lower Cheat River watershed thanks to three WVU faculty members who provided slide shows and discussions for the field trips.

Dr. Ken Carvell, Professor Emeritus of Forestry at WVU, discussed the early iron and logging industries in the area and helped identify the various trees and plants on site.

Dr. Michael Workman from the Institute for the History of Technology and Industrial Archeology discussed the history and methods of mining coal in the Appalachian region.

Dr. Jeff Skousen, WVU Extension Specialist in land reclamation, discussed the environmental impacts of acid mine drainage and methods for controlling these problems.

Class assignments included: research and collection of archival photographs and articles relating to the Cheat watershed, developing a site resource inventory and map, and the planning of interpretive talks and exhibits. The culminating project was to give an interpretive talk on some aspect of the trail or a developed exhibit. These talks and exhibits were presented during the afternoon at the Cheat River Festival on Sat. May 1, 1999.

Because the environmental restoration of the lower Cheat watershed is a long-term project, it is important for young people to understand all that is involved in such an endeavor. Scientific research along with the partnerships of state & federal agencies and citizen groups are necessary to get this very complex clean up job done. This is a large scale, perhaps unprecedented, effort in environmental restoration.

This research and reclamation work creates learning opportunities in many subject areas. Friends of the Cheat invite teachers and community volunteers to develop their own teaching lessons or interpretive project ideas.

We face the next year full of energy and enthusiasm. We anticipate spending directly at least another $50,000 on reclamation work and finishing our documentary. We will be hosting our second music festival, doing more cleanups, placing interpretive signs at all the reclamation sites in the county, implementing our management plan for our property, and continuing to build our membership from its current level of 560 businesses, individuals, and organizations.

To join, volunteer, get information, or arrange for a presentation at your school, organization or business, contact:

Friends of the Cheat
119 S. Price St., Suite 206
Kingwood, WV 26537
Phone: 304-329-3621
E-mail: foc@cheat.org
Internet: www.Cheat.org