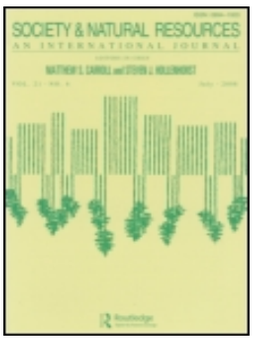

Society & Natural Resources

ISSN: 0894-1920 (Print) 1521-0723 (Online) Journal homepage: https://www.tandfonline.com/loi/usnr20

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To cite this article: Robert Manning, William Valliere, Ben Minteer (1999) Values, Ethics, and Attitudes Toward National Forest Management: An Empirical Study, Society & Natural Resources, 12:5, 421-436, DOI: 10.1080/089419299279515

To link to this article: https://doi.org/10.1080/089419299279515

Values, Ethics, and Attitudes Toward National Forest Management: An Empirical Study

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This study measures environmental values and ethics and explores their relationships to attitudes toward national forest management. The principal research methods were literature review and a survey of Vermont residents concerning management of the Green Mountain National Forest. Descriptive findings suggest respondents (1) favor nonmaterial values of national forests, (2) subscribe to a diversity of environmental ethics, including anthropocentric and bio-/ecocentric, and (3) support emerging concepts of ecosystem management. Environmental values and ethics explain approximately 60% of the variation in attitudes toward national forest management.

Keywords environmental ethics, environmental values, national forests

Management of the national forests constitutes an important public policy issue in the environmental arena. Specific national forest management issues are highly diverse and include clearcutting, preservation of endangered species and biodiversity, wilderness designation and management, sustainability, timber salvage, and tradeoffs among competing uses. In many cases, these issues are highly controversial.

Information on public attitudes toward such issues can be useful in helping to guide appropriate national forest management (Heberlein 1989). In fact, it is becoming increasingly apparent that many such issues cannot be resolved without this type of information. Many national forest management issues- perhaps most- cannot be addressed solely through science or technical expertise because such issues have important value or ethical components which must be addressed (Bengston 1994). However, scientific and technical approaches can be brought to bear on environmental values and ethics.

A recent example of a study of public attitudes toward national forest management is provided by Shindler, Steel, and List (Shindler et al. 1993; Steel et al. 1994). Using sampling frames from Oregon and the nation as a whole, this study found broad public support for a more ecologically oriented, multivalued, and publicly influenced approach to federal forest management. These principles are at the heart of the emerging concept of ecosystem management, which is designed to "integrate scientific knowledge of ecological relationships within a complex socio-political and values framework toward the general goal of protecting native ecosystem integrity

Received 13 October 1997; accepted 23 July 1998.

This study was supported by the USDA Forest Service, North Central Forest Experiment Station, and the McIntire-Stennis Forestry Research Program.

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Society & Natural Resources, 12: 421–436, 1999

0894-1920/99 $12.00 + .00

over the long term" (Grumbine 1994, 31). The authors conclude that the evolution of national forest policy toward ecosystem management-related principles is strongly supported by the public and that these management strategies should be implemented more quickly in response to this evolving public opinion.

While information on public attitudes toward national forest management is useful, we believe it may be equally useful to explore the underlying ideas that drive such attitudes. This would allow managers and policymakers to more fully understand public attitudes and how such attitudes might change over time. We think the environmentally related values and ethics of the general public may help explain attitudes toward national forest management. The purpose of this study, then, is to measure environmental values and environmental ethics, and determine how these measures influence attitudes toward national forest management.

Values, Ethics, and Attitudes

National Forest Values

As might be expected, human values have been the subject of considerable attention across a variety of academic disciplines (Rokeach 1973; Andrews and Waits 1980; Brown 1984; Bengston 1994; Kempton et al. 1995). While several theoretical dimensions of value have been identified, this study focuses on preference-based held values. Held values have been defined as "an enduring conception of the preferable which influences choice and action" (Brown 1984, 232). Applied to forests, Bengston (1994, 520) defines a held value more specifically as "an enduring concept of the good related to forests and forest ecosystems." The preference-based component of this concept of value signifies that value is assigned through human preference as opposed to social obligation (e.g., societal norms that suggest what people should value) or physical/biological function (e.g., the ecological dependence of tree growth on soil nutrients). Recent commentary suggests that preference-based held values are the appropriate focus of forest values research (Bengston 1994; Hetherington et al. 1994). As used in this study, values are specific notions that define "an enduring concept of the good" as applied to a specific national forest.

Several classifications of forest and related environmental values have been proposed (Rolston 1988; Rolston and Coufal 1991; Manning 1989; Kellert 1985). Based on this literature, 11 potential values of national forests were identified as shown in Table 1. This set of environmental values was designed to be as comprehensive as possible based on review of the literature.

Environmental Ethics

Ethics have likewise received considerable academic attention, particularly in the discipline of philosophy. Ethics can be defined as the "study or discipline which concerns itself with judgements of approval and disapproval, judgements as to the rightness or wrongness, goodness or badness, virtue or vice, desirability or wisdom of actions, disposition, ends, objects, or states of affairs" (Runes 1983, 113).

Environmental ethics deal more specifically with human conduct toward the natural environment. It is inevitable that humans interact with the natural environment. But what ideas govern or structure this interaction? What is the appropriate relationship between humans and the natural environment? For purposes of this study, environmental ethics are defined as the diversity of ideas that drive human relationships with the natural environment. Examples include stewardship of nature

TABLE 1 National Forest Values

Value	Statement	Average importance rating*	Coefficient of variation (%)
Aesthetic	The opportunity to enjoy the beauty of nature	4.97a**	21
Ecological	The opportunity to protect nature in order to ensure human well-being and survival	4.95a	21
Recreation	The opportunity to camp, hike, and participate in other recreation activities in nature	4.83b	30
Education	The opportunity to learn more about nature	4.68c	31
Moral/ethical	The opportunity to exercise a moral and ethical obligation to respect and protect nature and other living things	4.53d	21
Historical/cultural	The opportunity to see and experience nature as our ancestors did	4.40e	46
Therapeutic	The opportunity to maintain or regain physical health or mental well-being through contact with nature	4.35e	24
Scientific	The opportunity to scientists to study nature and ecology	4.30e	38
Intellectual	The opportunity to think creatively and be inspired by nature	3.93f	30
Spiritual	The opportunity to get closer to God or obtain other spiritual meaning through contact with nature	3.81g	48
Economic	The opportunity to get timber, minerals, and other natural resources from nature	2.98h	29

* 1 = "not at all important;" 6 = "extremely important."
** Letters indicate statistically significant difference using paired students' t-tests.

TABLE 2 Environmental Ethics

Environmental ethics		
Category	Ethic	Representative statement
Anti-environment	Threat to survival	Nature is a threat to human survival
	Spiritual evil	Nature is evil
Benign indifference	Storehouse of raw materials	Nature is a valuable storehouse of raw materials
	Religious dualism	Humans were created as fundamentally different from the rest of nature
	Intellectual dualism	The ability to think makes humans fundamentally different from the rest of nature
Utilitarian conservation	Anthropocentric humanism	Human cruelty toward animals is wrong because it could lead to cruelty toward other humans
	Efficiency	Humans should manage nature as efficiently as possible
	Quality of life	Nature is important because it adds to the quality of our lives
	Ecological survival	Protecting ecological processes is important to human survival

Table 2- Continued

Stewardship	Religious/spiritual duty	It is our religious/spiritual duty to take care of nature
	Future generations	Nature should be protected for future generations
	God's creation	Humans should protect nature because it is God's creation
	Mysticism	Nature should be protected because it is sacred
Radical environmentalism	Humanitarianism	Humans should not cause needless pain and suffering to animals
	Animism/organicism	Nature should be protected because all living things are interconnected
	Pantheism	All living things have a spirit
	Liberalism/natural rights	Nature should be protected because all living things have a right to exist

as a religious duty and intrinsic rights of nature. As used in this study, environmental ethics are broader and more abstract constructs than values as they apply to human–environment relationships generally rather than national forests specifically.

There is a rich literature in history, philosophy, and other environmentally related fields of study regarding environmental ethics. Much of this literature is reviewed in contemporary texts, including Bailes (1985), Callicott (1995), Des Jardins (1993), Elliot and Gare (1983), Hargrove (1989), Merchant (1993), Nash (1989), Taylor (1986), Rolston (1988), Van DerVeer and Pierce (1994), Worster (1977; 1993), and Zimmerman (1993). Based on the literature, 17 environmental ethics were identified as shown in Table 2. This set of environmental ethics was designed to be as comprehensive as possible based on review of the literature. The 17 environmental ethics were further classified into 5 broad categories based on conceptual similarities.

Attitudes Toward National Forest Management

Research on attitudes has been a long standing focus of sociology and psychology. In general terms, attitudes are measures of how people feel about issues. More specifically, an attitude can be defined as "an orientation toward certain objects or situations that is emotionally toned and relatively persistent. An attitude is learned and may be regarded as a more specific expression of a value or belief in that an attitude results from the application of a general value to concrete objects or situations" (Theodorson and Theodorson 1969, 19).

A considerable amount of research has been conducted on attitudes toward environmental issues in general (a recent review of this research is presented in Dunlap 1992), and some of these studies have focused on national forest management (Shindler et al. 1993; Steel et al. 1994; Bengston 1994; Bengston and Xu 1995; Bengston and Xu 1996). This study builds on this literature by focusing specifically on public attitudes toward the issues of material versus nonmaterial uses of national forests and dominant use versus integrated forest management.

Study Methods

The study was conducted by means of a survey of Vermont residents. Batteries of questions were developed to measure the three study variables: national forest values, environmental ethics, and attitudes toward national forest management.

National forest values were measured by a battery of statements describing 11 potential values of the Green Mountain National Forest in Vermont (see Table 1). Respondents were asked to rate the degree of importance they attached to the Green Mountain National Forest as a place to attain these values. A six-point response scale was used, ranging from "not at all important" to "extremely important."

Environmental ethics were measured by a battery of statements that attempted to capture alternative dimensions of each of the 17 environmental ethics. Two components of support for each statement were measured. The first measured the extent to which respondents agreed with the statement. An 11-point response scale was used, anchored at "strongly agree" and "strongly disagree." The second component measured the importance respondents placed on each statement in influencing their attitudes toward natural resource and environmental issues. A six-point response scale was used, anchored at "not at all important" and "extremely important." An

TABLE 3 Attitudes Toward Management of the Green Mountain National Forest

Statement	Mean score*	Coefficient of variation (%)
1. Management of the Green Mountain Forest should emphasize production of timber and lumber products[1]	3.28	47
2. Clearcutting should be banned on the Green Mountain National Forest[2]	1.77	62
3. Mineral exploration and extraction should be encouraged on the Green Mountain National Forest[1]	3.76	48
4. Greater protection should be given to fish and wildlife habitats on the Green Mountain National Forest[2]	1.86	52
5. Some existing wilderness areas on the Green Mountain National Forest should be open to logging[1]	3.37	37
6. Greater efforts should be made to protect the remaining undisturbed forests on the Green Mountain National Forest[2]	1.83	55
7. Endangered species laws should be set aside on the Green Mountain National Forest to preserve jobs[1]	3.87	29
8. More wilderness areas should be established on the Green Mountain National Forest[2]	2.37	43

Table 3- Continued

9. The economic well-being of timber workers and their families is more important than preservation of undisturbed forests on the Green Mountain National Forest[1]	3.81	27
10. Management of the Green Mountain National Forest should emphasize a wide range of benefits and issues rather than timber and wood products alone[2]	1.84	45
11. The economic vitality of local communities should be given highest priority when making Green Mountain National Forest decisions[1]	3.24	35
12. Management of the Green Mountain National Forest should focus on the forest as a whole and not on its individual parts (such as bears and trees)[2]	2.20	45
13. Logging on the Green Mountain National Forest should not be allowed to disrupt the habitats of animals such as bears[2]	2.18	48
14. Logging on the Green Mountain National Forest should be allowed even if it diminishes the scenic beauty of the area[1]	4.07	25
15. Ski areas should be allowed to withdraw water from streams on the Green Mountain National Forest even if there are some ecological impacts[1]	3.73	29

* 1 = "strongly agree;" 5 = "strongly disagree."
[1] Statements reflecting dominant use, materially-oriented forest policy.
[2] Statements reflecting integrated, nonmaterially-oriented forest policy.

initial battery of 104 statements was pretested on a group of 150 undergraduate students, who were asked to comment on any problems, ambiguities, or other difficulties in interpreting and responding to the statements. Based on this pretest, 42 statements were retained. Each environmental ethic was measured using two to four statements. Representative statements are shown in Table 2 and help illuminate the fundamental idea underlying each environmental ethic.

Attitudes toward national forest management were measured by a battery of statements describing alternative management policies for the Green Mountain National Forest. Twelve statements were adopted (with minor wording variations where necessary) from Shindler et al. (1993), and three statements were added that addressed issues more specific to the Green Mountain National Forest. The 15 statements concerned trade-offs between material and nonmaterial benefits of the Green Mountain National Forest and the extent to which the forest should be managed for a dominant or single use (such as timber or minerals) versus a more integrated or holistic management approach. These issues are broadly reflective of some of the basic issues or principles of the evolving concept of ecosystem management, as noted earlier. Respondents were asked the extent to which they agreed or disagreed with each statement. A five-point response scale was used, anchored at "strongly agree" and "strongly disagree." The 15 statements are shown in Table 3.

The draft questionnaire was pretested using a focus group session. The focus group was comprised of seven people representing a variety of non-natural resources-related employees at the University of Vermont. Focus group participants completed the questionnaire and then described any difficulties they encountered when reading and answering questions. Focus group comments were incorporated wherever possible in the final questionnaire. The final questionnaire contained three major, independent sections, each containing a battery of items addressing environmental values, environmental ethics, and attitudes toward national forest management, respectively.

The study questionnaire was administered by mail to a representative sample of 1500 Vermont households with listed telephone service. The sampling frame consisted of all telephone directories covering the state. From this sampling frame, 1500 residential listings were randomly chosen. The questionnaire was administered in the spring of 1995 following procedures recommended by Dillman (1978). Initial mailing of the questionnaire and cover letter was followed 1 week later by a postcard reminder to complete and return the questionnaire. If completed questionnaires had not been returned within 3 weeks of the initial mailing, a second questionnaire and cover letter was sent. Two hundred and seventy-two questionnaires were returned as undeliverable, reducing the sample size to 1228. Six hundred and twelve completed questionnaires were returned, yielding a response rate of 50%.

A telephone survey of a random sample of 25 nonrespondents was conducted to test for nonresponse bias. Thirty-four study variables, including a number of national forest values, environmental ethics, and forest policy items, were included in this survey. On only three items was there a statistically significant difference between respondents and nonrespondents. This suggests that there is little nonresponse bias.

Study Findings

National Forest Values

Most values of the Green Mountain National Forest were judged relatively important by respondents (Table 1). In fact, 8 of the 11 values received an average rating

of at least "moderately" important (a value of 4 on a 6-point scale). However, there were statistically significant differences among most of the values. Aesthetic and ecological values were rated as most important while economic values were rated as least important.

Environmental Ethics

Most environmental ethics received some degree of support (Figure 1) and importance (Figure 2) from respondents. Nearly all ethics elicited mean agreement responses on the positive end of the scale, and most drew at least "moderate" importance ratings. There is an apparent tendency for measures of agreement and impor-

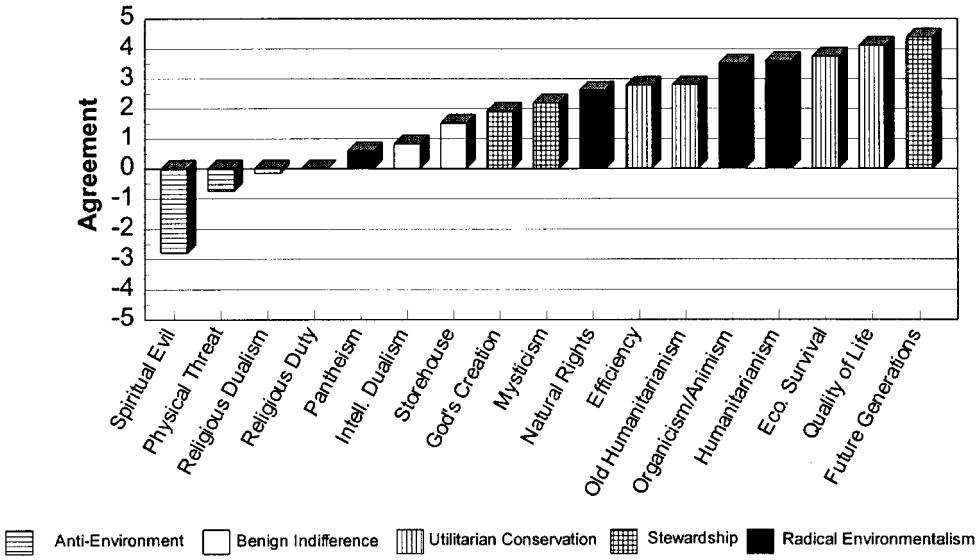

FIGURE 1 Environmental ethics (agreement).

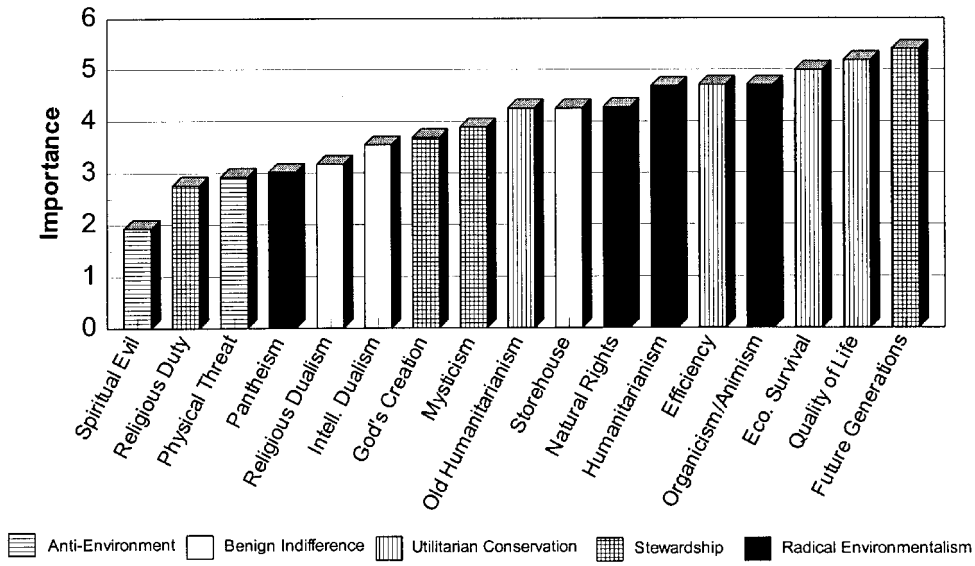

FIGURE 2 Environmental ethics (importance).

tance to covary. That is, when an ethical proposition is supported, there is a tendency for it to be considered important as well, and vice versa.

Clearly, some environmental ethics enjoy relatively high levels of agreement and importance. All four environmental ethics in the utilitarian conservation category received high mean agreement and importance ratings. Stewardship ethics were also widely embraced by respondents, with three of the four ethics in this category receiving strong support. In addition, three environmental ethics in the radical environmental category enjoyed high mean agreement and importance scores. Respondents tended to be largely equivocal toward environmental ethics in the benign indifference category, as evidenced by relatively low agreement scores associated with these three environmental ethics. Lastly, environmental ethics constituting the anti-environment category were generally rejected by respondents and considered relatively unimportant in influencing respondents' attitudes toward natural resource policy.

Attitudes Toward Management of the Green Mountain National Forest

A consistent majority of respondents expressed attitudes toward management of the Green Mountain National Forest that are in keeping with concepts of ecosystem management (Table 3). Most respondents did not favor managing the forest for a dominant or single use (such as timber or minerals) and favored management of the forest for nonmaterial benefits, including protection of ecological integrity. The first 12 items in Table 3 are the statements adopted from Shindler et al. (1993), and findings are strikingly similar.

Relationships Between Forest Values, Environmental Ethics, and Attitudes Toward National Forest Management

The primary objective of this study was to analyze the relationships among national forest values, environmental ethics, and attitudes toward national forest management. This required three statistical operations. First, respondent scores on the 15 statements measuring attitudes toward national forest management were aggregated into a composite index, reverse coding some statements where appropriate. Respondents received an overall index score ranging from 1 to 5, with 1 representing an attitude strongly favoring dominant-use, materially oriented forest management and 5 representing an attitude strongly favoring integrated, nonmaterially oriented forest management.

Second, a factor analysis was performed on the environmental ethics data. As a data reduction technique, this permitted identification of a relatively small number of variables that could be used in multiple regression analysis. It also facilitated identification of underlying relationships among the environmental ethics statements that might not otherwise have been directly observable. This was important as it provided a statistical test of the validity of the classification of environmental ethics upon which this portion of the study was conducted.

Responses on the agreement and importance scales for each of the 42 environmental ethics items were multiplied and the products were subjected to factor analysis using alpha extraction and Varimax rotation (Nie et al. 1975). Items with a rotated loading score of .35 or greater were considered significant and determined to be a part of the resulting factors.

Ten environmental ethics factors were produced from the 42 scale items. In general, factor analysis of scale item statements produced environmental ethics

similar to those constructed through literature review and described earlier in this article. There were, however, a number of differences. Figure 3 presents the resulting environmental ethics factors, with revised titles, and their relationships to the originally conceptualized environmental ethics. Mean index scores for the resulting environmental ethics were created through averaging the scores for each statement

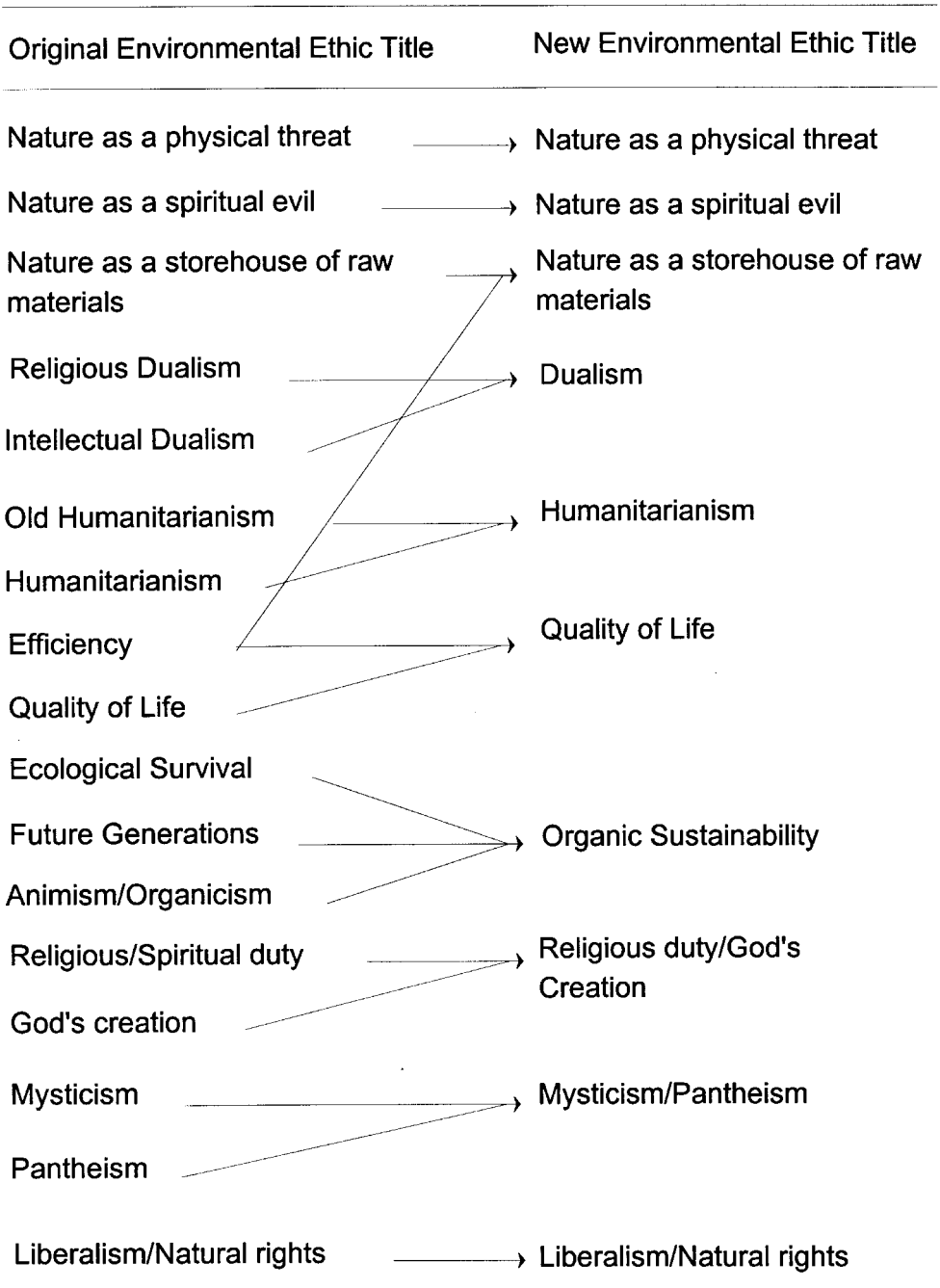

FIGURE 3 Environmental ethics: revised titles from factor analysis.

contained within each environmental ethic factor. This index score ranged from −30 to 30, following the multiplication of the original agreement (−5 to 5) and importance (1 to 6) scales.

Third, a series of three regression analyses was performed. These analyses were conducted to determine the amount of variation in attitudes toward national forest management (dependent variable) explained by national forest values and environmental ethics (independent variables). Multiple regression was used employing backward elimination with an alpha level of .05. Backward elimination starts with all independent variables in the equation and sequentially removes them based on the specified alpha level. Results are presented in Table 4.

The first part of Table 4 presents the results of the multiple regression analysis for attitudes toward national forest management and forest values. Six forest values

TABLE 4 Relationships Among National Forest Values, Environmental Ethics, and Attitudes Toward National Forest Management

Independent variables	*B*
Regression analysis between forest values and attitudes toward national forest management	
Ecological value	−.1130
Aesthetic value	−.0578
Spiritual value	−.0282
Moral/ethical value	−.0452
Economic value	.1883
Scientific value	−.0399
$R^2 = .4896$	
Regression analysis between environmental ethics and attitudes toward national forest management	
Liberalism/natural rights	−.0039
Dualism	.0053
Religious duty	.0056
Organic sustainability	−.0240
Storehouse	.0211
Quality of life	−.0129
$R^2 = .4664$	
Regression analysis between forest values, environmental ethics, and attitudes toward national forest management	
Ecological value	−.0758
Spiritual value	−.0367
Moral/ethical value	−.0431
Economic value	.1315
Dualism	.0038
Religious duty	.0065
Organic sustainability	−.0148
Storehouse	.0105
Quality of life	−.0098
$R^2 = .5999$	

entered into the regression equation at a statistically significant level. These six values produced an R^2 of .4896, indicating that they explained approximately 49% of the variation in attitudes toward national forest management. Respondents who rated ecological, aesthetic, moral/ethical, scientific, and spiritual values highly were significantly more likely to favor integrated, nonmaterially oriented forest management, while those who rated economic value highly were more likely to favor dominant-use, materially oriented management.

The second part of Table 4 presents the results of the multiple regression analysis for attitudes toward national forest management and environmental ethics. Six environmental ethics entered into the multiple regression analysis at a statistically significant level. Moreover, these 6 environmental ethics produced an R^2 of .4664, explaining approximately 47% of the variation in attitudes toward national forest management. Respondents who rated "organic sustainability," "quality of life," and "liberalism/natural rights" ethics highly were significantly more likely to favor integrated, nonmaterially oriented forest management, while those who rated "storehouse," "religious duty," and "dualism" ethics highly were more likely to favor dominant-use, materially oriented management.

The third part of Table 4 presents the results of the regression analysis for attitudes toward national forest management and forest values and environmental ethics. Four forest values and five environmental ethics entered into the analysis at a statistically significant level. These 9 independent variables produced an R^2 of .5999, explaining approximately 60% of the variation in attitudes toward national forest management. These nine independent variables were the same as those described in the preceding paragraphs.

Conclusions

Several conclusions can be drawn from this study. First, it is apparent that forest values and environmental ethics can be isolated and measured. Traditionally, such environmentally related values and ethics are treated primarily at a conceptual level. However, these intellectual notions can be defined more explicitly, classified, and measured through scale development and associated survey and statistical techniques. While the values- and ethics-related classification systems and measurement scales are certainly subject to continued refinement, they suggest that an empirical approach to these issues can be potentially productive and useful.

Second, descriptive study findings provide some direct insights into forest-related values and environmental ethics of the public, and how these values and ethics apply to at least one national forest. Respondents value the Green Mountain National Forest for many reasons, although nonmaterial values clearly predominate. Direct or individually related values, such as recreation and aesthetics, are generally rated as most important. Less direct or more societally oriented values, as well as more abstract values, such as ecological protection and expression of moral/ethical obligations to nature, are also rated as important. The public also subscribes to a diversity of environmental ethics, including those that might be generally described as anthropocentric (including utilitarian and stewardship ethics) and bio-/ecocentric (including radical environmental ethics). These findings suggest that national forests should be managed to support multiple benefits, especially those that are nonmaterially oriented. Moreover, many of the values and ethics supported by respondents are highly dependent upon the protection of ecological integrity.

Third, descriptive findings also provide insight into public attitudes toward management of the Green Mountain National Forest. Respondents tend to favor nonmaterial benefits, including protection of ecological integrity, over material benefits, and tend to favor management for multiple benefits rather than a single, dominant benefit. These findings are consistent with the values and ethics described earlier, and with evolving principles of ecosystem management, and are generally supported by other recent research (Shindler et al. 1993; Steel et al. 1994; Bengston 1994; Bengston and Xu 1995; Bengston and Xu 1996; Hays 1988; Brown and Harris 1992).

Finally, the analytical findings from this study provide insights into the relationships between forest values, environmental ethics, and national forest management. Taken together, values and ethics explain approximately 60% of the variation in respondent scores on the overall national forest management scale. These statistical relationships suggest that beliefs in selected forest values and environmental ethics are associated with certain attitudes toward national forest management. These types of relationships may help establish an empirical basis for comprehensive national forest management. For example, some national forests (or areas within national forests) might (because of biophysical or geographical considerations) emphasize selected values and ethics and adopt associated management policies. This approach may allow national forest managers, at the forest, regional, or national level, to more effectively meet the diverse and sometimes competing values and ethics of the public while avoiding potential conflicts.

An obvious limitation of this study is that it is representative of only one state (Vermont) and one national forest (Green Mountain National Forest). Replication of this study on a regional and national basis is clearly warranted. However, as noted earlier, findings from the study are generally consistent with other recent research (Shindler et al. 1993; Steel et al. 1994; Bengston 1994; Bengston and Xu 1995; Bengston and Xu 1996; Hays 1988; Brown and Harris 1992).

A second potential limitation of this research concerns the attitudinal nature of study variables. Research suggests that the relationship between attitudes and behavior can vary according to context and other variables (Ajzen and Fishbein 1980; Manfredo and Shelby 1988). Research on behavioral measures of environmental values and ethics may help test the validity of the measurement approaches developed and used in this study.

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