



The US Forest Service: Whither the new resource management paradigm?

G. Brown*[†] and C. C. Harris[‡]

The concept of a resource management paradigm was developed and operationalized in a nationwide study of US Forest Service employees in 1990. The results suggested that the attitudes and values of one particular segment of Forest Service employees, the Association of Forest Service Employees for Environmental Ethics, represent an alternative resource management paradigm that differs significantly from the dominant management paradigm held by the majority of US Forest Service employees. The study also found a significant segment of non-Association of Forest Service Employees for the Environmental Ethics employees eager to embrace non-consumptive forest policy changes. In 1996, the nationwide study of the US Forest Service was replicated to re-examine what changes had occurred. The results indicate that: (1) An alternative resource management paradigm continues to exist in the agency but that Association of Forest Service Employees for the Environmental Ethics' role as a catalyst has changed due to a potential decline in association membership, its perceived effectiveness among other agency employees, actual changes in agency resource management, and other more pressing external threats. (2) The agency has shifted more toward embracing the new resource management paradigm between 1990–1996, thus narrowing the perceived bureaucratic performance gap between employee preferences and resource management outcomes. (3) The production of commodities is viewed as more favorable in 1996 than in 1990, perhaps as a result of the shift in agency resource orientation toward ecosystem management and less production of forest goods. It is argued that the pendulum has swung too far toward non-commodities along a commodity/non-commodity continuum in the minds of forest service employees. We argue that this trend is part of an international phenomenon. Further, the kind of longitudinal and institutional analysis presented here could be applied to resource management agencies in national and provincial governments of other countries.

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Introduction

In a 1990 nationwide study of employees of the US Forest Service (USFS), Brown and Harris (1992a) developed and operationalized the concept of a 'resource management paradigm'. A paradigm is a dominant belief structure that organizes the way people perceive and interpret the functioning of the world around them (Milbrath, 1984). A 'resource management paradigm' is the set of common values, beliefs, and shared wisdom that collectively provide the lens through which individuals in resource management professions form attitudes and upon which they base their actions (Brown and Harris, 1992a, p. 232). This paradigm encompasses

the biophysical forest system, the social system, and the system of management governing the resource system. An agency's paradigm conditions its employees' goals and expectations, establishing a structure of social and physical rewards for professionals for various types of behavior and fostering organizational harmony through shared incentives and sanctions.

Each resource management organization has a dominant paradigm which is, in part, the result of a social learning process, whereby dysfunctional values and beliefs are discarded in favor of those more suited to the collective survival of the organization as it interacts with its social and political environment. The values, beliefs, norms, roles, and institutions that characterize

* Corresponding author

Environmental Science
Department, Alaska Pacific
University, Anchorage, AK,
99508, USA

Department of Resource
Recreation and Tourism,
University of Idaho,
Moscow, ID 83844-1139,
USA

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professionals such as foresters serve to maintain the dominant paradigm.¹ Important dimensions of the dominant resource management paradigm, such as values and beliefs, are often shown to change because they become interwoven in the fabric of organizational culture, professionalism, and bureaucracy. Relevant dimensions of a resource management paradigm may include values and beliefs regarding the resource management decision process (participatory vs. expert determination), economic ideology (efficiency through benefit maximization vs. equity through benefit distribution), and social valuation of forest lands (production of commodities vs. provision of amenities).

At any point in time, one or more competing paradigms may challenge the major value and belief structures of the dominant resource management paradigm and change the management philosophies and activities of a resource management agency. These kinds of changes are occurring around the world, in as diverse countries as:

- Russia, where more traditional, hands-off and caretaker management of some natural reserves is being replaced with more active management;
- Costa Rica, where a multiplicity of resource management agencies with a diversity of management missions has been consolidated into one agency for managing all of the nation's natural areas;
- Australia, where provincial park agencies that traditionally have been male organizations increasingly are opening their ranks to female employees, particularly in the hiring of women in ranger positions.

In the case of resource management in the US, one instance of this kind of shift occurred at the end of the twentieth century. The exploitationist paradigm, which assumed an unlimited abundance of natural resources, was replaced by a conservationist paradigm that assumed that only proper management and wise use of the nation's natural resources

¹ While many foresters and range managers are changing their worldviews *vis a vis* resource management and hold a variety of views that may not be easily captured by a set of items comprising a 'paradigm', recent research indicates that both kinds of managers do identify more closely with commodity production than do other kinds of resource-management professionals (Brown and Harris, 1998).

would ensure their sustainability over the long-term. In recent decades, the USFS has experienced equally significant changes. In the late 1980s, two controversial 'Letters to the Chief' from forest supervisors were published that questioned the agency's commitment to true land stewardship. At about this same time, an organization of current and retired USFS employees was formed that called itself the Association of Forest Service Employees for Environmental Ethics (AFSEEE). This association was founded out of frustration with existing resource management policies and practices in the agency. At its inception, the AFSEEE's primary goal was to change the traditional, commodity-oriented management paradigm of the National Forest System to one placing greater emphasis on ecologically sound management of national forest resources, as well as meeting societal needs for multiple resource uses and healthy local economies.

Developments like these suggest that the dominant resource management paradigm held by the USFS continues to change in ways that mirror a changing social paradigm in the US, as well as around the globe. This emerging paradigm reflects growing concerns over environmental degradation, greater desires for more effective and efficient management agencies—as well as ones that manage for both environmental and social justice—and the increasing importance placed on proactive management actions that promote both healthy ecosystems and sustainable production of forest commodities.

One approach to understanding the potential directions and magnitude of this kind of social and organizational change is to identify and examine the kinds of individuals or groups of individuals advocating an alternative perspective or paradigm (Milbrath, 1984). At the forefront of any major social change, a particular group is dedicated to creating a new social, political, and economic order based on new and different value and belief structures. While not necessarily homogeneous or highly visible, these individuals nonetheless share a common vision of the future. Milbrath called this group of individuals the 'vanguard'. In the case of the USFS, AFSEEE might be viewed as one such vanguard.

By examining the characteristics of the members of a vanguard like AFSEEE, its

nature and role in an organization's change processes can be better understood. In a series of articles, Brown and Harris (1992a,b, 1993) described the results of a survey of USFS employees conducted in 1990 that examined the values and beliefs of members of AFSEEE and compared them with those of non-AFSEEE agency employees. That research sought to better understand AFSEEE's role as a grass-roots organization and vanguard of agency change.

This paper reports the results of a second nationwide survey of the values and attitudes of USFS employees in 1996 repeating and updating the 1990 survey. In light of a rapidly changing political and social environment for the USFS, a second survey collecting longitudinal and panel data on the resource management values and beliefs of USFS employees was deemed useful for assessing new agency directions, perceptions and attitudes after a 6-year period of significant organizational change. Much of the organizational research and analysis of resource agencies like the USFS and their policies and management activities has been cross-sectional and non-cumulative. This research approach limits the ability of research to explore and explain organizational change dynamics, given its inability to track organizational perturbations and developments through time. The results of the 1996 survey of AFSEEE members and USFS employees supplements the initial study with a longitudinal research design that can increase understanding of the life-cycle of reform and change within government bureaucracies.

The present paper examines temporal changes in resource management attitudes and values to examine mechanisms of change in the public administration of natural resources in the US. The purpose here is not to test theory *per se*. Rather, the paper provides an inductive exploration of changing agency values beliefs and perceptions, and suggests the implications of these changes for current organizational development theory and future resource management. While the research discussed here focuses on the lead forestry agency in the US, by extension, this institutional analysis raises research questions and suggests management implications for other nations around the world.

The paper addresses several specific questions: What has happened to the internal

reform movement represented by AFSEEE since 1990? To what extent have agency employees embraced the alternative resource management paradigm represented by AFSEEE? How effective has AFSEEE been in promoting its organizational goals? Has the agency performance gap (that is, the difference between the preferences of employees and their perceptions of where the agency is positioned on resource management issues) narrowed or widened? What do the answers to these questions suggest for future forest management in the US and elsewhere?

A review of relevant literature

Based on the findings of the 1990 survey of USFS employees, Brown and Harris (1992a) concluded that AFSEEE's position did indeed represent a *new resource management paradigm* emphasizing citizen participation, a balanced concern for providing amenity and other non-commodity forest values, and managing nature to protect ecosystem functions and processes and maintain biodiversity, as opposed to producing goods and services. Table 1 contrasts the major positions of the new resource management paradigm and those of the dominant resource management paradigm.²

Brown and Harris concluded that, while the new resource management paradigm represented by AFSEEE had yet to be adopted agency-wide, the attitudes of employees within the agency (particularly line officers) had indeed shifted during the decade since 1981 toward a greater focus of national-forest management on non-commodity resource outputs (Brown and Harris, 1992b). However, Brown and Harris recognized the difficulty of forecasting the extent to which AFSEEE, along with like-minded people in and outside the USFS, would be successful in moving the agency's values and actions in the directions represented by the new resource management paradigm. Because AFSEEE represented a 'bottom-up' change movement,

² These paradigms are 'ideal types' in that few, if any, individuals completely embrace all the principles of a given paradigm. The ideal types presented by Brown and Harris (1992a) were based on interviews of agency employees as well as on the work of scholars such as Behan (1990a,b) and Milbrath (1984) and other writing.

Table 1. Contrast between major positions of two forest service resource management paradigms

New resource management paradigm	Dominant resource management paradigm
Amenity outputs have primary importance	Amenities are coincident to commodity production
Nature for its own sake	Nature to produce goods and services
Environmental protection over commodity outputs	Commodity outputs over environmental protection
Primary concerns for current and future generations	Primary concern for current generation
Less intensive forest management, e.g. 'new forestry', less herbicides and slash burning	Intensive forest management—clearcutting, herbicides, and slash burning
Limits to resource growth: emphasis on conservation for long-term sustainability	No resource shortages: emphasis on short-term production and consumption
Consultive and participatory decision-making	Decision-making by experts
Decentralized decision authority	Centralized decision authority

in an organization in which few AFSEEE members held formal positions of authority, realization of major tenets of the new resource management paradigm would likely be limited without external pressures on the agency and major changes within it.

Brown and Harris (1992a) posited that the concept of a *performance gap* might be a potentially useful one for gauging the role of changing paradigms as influences on the policies and actions of a resource-management agency like the USFS. This concept was first described by Downs (1967), who noted that the impetus for change in bureaucracies is often the result of perceived gaps between what individuals believe an organization is doing and what they believe it ought to be doing. The findings of Brown and Harris (1992a,b), as well as other recent researchers (e.g. Mohai *et al.*, 1994; Kennedy *et al.*, 1993), supported this proposition. They noted that, although this gap between employee expectations and the USFS's actual performance had been narrowing, differences persisted between that agency's current orientation and the orientation employees believed that agency policies and actions ought to reflect.

The 1990 study of AFSEEE and the USFS by Brown and Harris provided descriptive information about the antecedent conditions that gave rise to the well-publicized, 'bottom-up' reform movement represented by AFSEEE. It found the presence of a large bureaucratic performance gap based on an ethical dimension, the presence of strong leadership, and an effective communication channel. But the conditions for initiating a bottom-up organizational reform movement

are not necessarily those that will sustain a reform movement. Snow (1992) observed that conservation and environmental organizations continually face the paradox of striving to maintain the spirit and vigor of volunteerism even as they become increasingly professional. A significant limitation of the initial study of AFSEEE and the USFS was its inability to examine the long-term impacts of the reform movement; AFSEEE had been in existence for only a year at the time of the initial study in 1990. What has happened to AFSEEE and the internal reform movement since 1990?

Several of the key conditions that led to the formation of AFSEEE in 1989 no longer exist today. With the agency's recent emphasis on ecosystem management, it could be argued that the performance gap so crucial to the bottom-up reform movement has narrowed significantly and the concerns of the organizational reformers addressed. At the same time, the relative quiescence of AFSEEE since 1990 could be a result of any number of internal AFSEEE organizational factors, such as increasing professionalism, that have little to do with the agency's decreased performance gap. Since the initial Brown and Harris survey was conducted, a number of empirical studies have documented additional changes in the USFS and its management of national forests (Farnham, 1995; Farnham & Mohai, 1995; Farnham *et al.*, 1995; Jones & Mohai, 1995; Jones & Taylor, 1995). They include the findings that AFSEEE was one of the most significant internal change forces within the USFS, the decreasing agency focus on

commodity production and increased emphasis on non-commodity forest uses, and changes in the agency's program priorities due to budgetary processes, Congressional appropriations, court decisions, and the administrative appeals process. In addition, a number of significant events have occurred since 1990 that mirror the kinds of changes occurring in other countries, including a change in agency leadership (with the appointment of Michael Dombeck as the new USFS Chief), the hiring of more non-forester professionals and women and minorities (resulting a younger, more diverse workforce), and most recently a significant reduction in the agency's workforce (Brown and Harris, 1993).

An additional theoretical perspective on AFSEEE is provided by Sabatier *et al.* (1994) who, in their analysis of agency planning decisions, have proposed an alternative model to the Progressive Reform Model for understanding USFS decision-making. Their alternative model, the 'Advocacy Coalition Framework' (ACF), depicts resource decision-making as part of a long-standing struggle among at least three coalitions or policy-issue networks: (1) A 'Scientific Management Coalition' representing USFS professionals who embrace the Progressive Reform ideas of sound management based on the findings of science; (2) A 'Commodity Coalition' composed of individuals and groups seeking to maximize commodity outputs, including timber companies, ranchers, local government officials, mill workers, many foresters within the agency, and some members of Congress; (3) An 'Amenity Coalition' composed of environmental non-governmental groups (NGOs), water-quality agencies, fish and game departments, fishermen, some members of Congress and, increasingly, non-foresters within the USFS concerned with reducing the adverse effects of commodity production. From the perspective of the ACF model, professional bureaucrats are not 'neutral' agency officials with uniform values. Rather, different factions within an agency tend to align with external interest groups and legislators sharing their core policy beliefs.

To test the proposition that AFSEEE represents a different resource management paradigm in the US, and perhaps a shift in the resource management coalitions influencing the USFS, the values and attitudes

of AFSEEE members were compared with those of two other groups of agency employees, Staff and Line. Members of AFSEEE, as proponents of the new resource management paradigm, were theorized to hold distinctly different value positions along the proposed resource management paradigm items from non-AFSEEE individuals, who were theorized to be proponents of the dominant resource management paradigm. It was further theorized that AFSEEE members would have significantly different perceptions than non-AFSEEE members of the current position of the agency *vis a vis* the resource management paradigm items.

Methods

To test the above propositions, four groups of USFS employees were surveyed with a mail questionnaire during the summer of 1996. One group consisted of a random sample of 850 AFSEEE members. The other three groups consisted of nationwide samples of USFS employees who were not members of AFSEEE. Namely:

- A 'panel' of agency employees who participated in the 1990 nationwide study of the agency. This 1990/1996 Panel group consisted of 704 individuals, including 216 Line Officers who responded in 1990 ('Line Group'). Line Officers are individuals who have decision-making responsibility for USFS units. The panel also included 488 staff employees who responded in 1990 ('Staff Group'). Staff employees are those who provide technical support and expertise for agency decision-making, but do not have direct decision-making authority for management units. To remain consistent with the analysis methodology followed in 1990, findings related to the panel group as a unique subsample will be reported elsewhere.
- A group of 246 1996 Line Officers in the USFS that included a sample of 158 randomly selected district rangers, not part of the 1990/1996 panel, 72 forest supervisors, five regional foresters, four research station directors, and the chief and seven deputy chiefs.
- A group consisting of a sample of 495 1996 staff employees in the agency, randomly

drawn from a comprehensive list of full-time USFS nonline employees. The staff/line distinction among non-AFSEEE individuals was made to minimize job-related bias since it was known *a priori* that AFSEEE contained few line officers.

Questionnaires with cover letters were mailed to each individual using Dillman's (1978) mail survey techniques. AFSEEE personnel administered the mailing of AFSEEE questionnaires and follow-ups to ensure their members' anonymity. Non-AFSEEE personnel were selected from a comprehensive list of full-time USFS employees supplied by the agency's Washington Office. Table 2 shows the number of survey respondents in each of the three analysis groups and lists some of the respondent characteristics.

For analysis purposes, the responses from the three analysis groups were compared across multiple questionnaire items, both cross-sectionally (1996) and longitudinally (1990–1996). The questionnaire included a wide range of questions in different sections. One section posed socio-demographic questions about the respondent's age, years of experience with the USFS, gender, level of education, current position, job title and professional affiliation. Another section of the questionnaire contained items focusing on characteristics theorized to represent the new resource management paradigm. These characteristics were identified as having potential for differentiating members of AFSEEE from non-AFSEEE personnel, based on interviews with AFSEEE members and USFS employees, AFSEEE newsletters, media and external USFS communications (Brown and Harris, 1992a). Each item consisted of a seven-point bi-polar scale with opposing value positions located at each end. For example, one item contained two statements at opposite ends of the scale: 'An agency that emphasizes non-commodity resources such as recreation and wildlife in national forest management' US. 'An agency that emphasizes commodity resources such as timber and grazing in national forest management'.

The new resource management paradigm scale used in the 1990 analysis consisted of five items. In the portion of the 1996 questionnaire replicating this scale, one of the five items was dropped and two were added for a total of six scale items. For each of the six items comprising the new resource

management paradigm scale, respondents were asked to choose a point on two response scales with the following statement: 'The following are contrasting statements about emphases or directions the agency could be taking. Please circle the number indicating (1) the strength of your preference and (2) what you believe to be the current position of the agency'. A response in the middle of the scale indicated a neutral or balanced value position.

Results and discussion

Based on the results of the above methodology, the research addressed a variety of questions: What has happened to the internal reform movement represented by AFSEEE since 1990? To what extent have USFS employees embraced the alternative resource management paradigm represented by AFSEEE? How effective has AFSEEE been in promoting its organizational goals? Has the agency performance gap (that is, the difference between the preferences of employees and their perceptions of where the agency is positioned on resource management issues) narrowed or widened? What are the implications of the answers to these questions for future national forest management?

Response to surveys

The survey response rate in 1996 across the three USFS groups was 62%, and the 1996 AFSEEE response rate is estimated at between 60 and 65%.³

Sample representativeness

Table 2 lists respondent characteristics in 1990 and 1996 for the three analysis groups.

³ AFSEEE membership is confidential. The mailing of questionnaires was handled by AFSEEE staff with direction from the researchers. A total of 850 questionnaires were mailed by AFSEEE in an attempt to reach the estimated 400–450 AFSEEE members who are full-time forest service employees. The estimated response rate of 60 is based on the estimate of the number of full-time forest service employees who are AFSEEE members and responded to the 1996 survey.

Table 2. Forest service respondent characteristics (1990/1996)

	AFSEEE				Staff				Line		
	1990 (N=569)	1996 (N=246)	1990 (N=750)	1996 (N=252)	1990 (N=331)	1996 (N=149)	1990 (N=331)	1996 (N=252)	1990 (N=331)	1996 (N=149)	
Age (mean)	39	42	41	43	46	46	46	46	46	46	
Years of experience (mean)	12	13.6	16	16	22	22	22	22	22	22	
Gender (%)	60 Male 40 Female	61 Male 39 Female	80 Male 20 Female	59 Male 41 Female	90 Male 10 Female	77 Male 23 Female	90 Male 10 Female	59 Male 41 Female	90 Male 10 Female	77 Male 23 Female	
Education (college deg. or higher) (%)	87	88	86	79	100	97	100	79	100	97	
GS grade (mean)	9.4	9.5	10.3	10.2	12.6	13.7	12.6	10.2	12.6	13.7	
Region	6 (35%) 5 (19%) 1 (12%) 4 (8%) 3 (6%) 9 (5%) 2 (5%) 8 (4%) 10 (4%) WO (1%)	6 (23%) 5 (20%) 4 (12%) 1 (8%) 8 (7%) 10 (7%) 3 (6%) 9 (6%) 2 (5%) WO (2%)	6 (22%) 5 (17%) 8 (14%) 9 (10%) 1 (9%) 4 (9%) 2 (8%) 3 (6%) 10 (3%) WO (3%)	6 (18%) 5 (16%) 1 (14%) 9 (16%) 2 (9%) 8 (9%) 3 (9%) 4 (5%) 10 (3%) WO (2%)	8 (18%) 4 (14%) 6 (13%) 9 (12%) 1 (11%) 3 (11%) 5 (10%) 2 (9%) 10 (2%) WO (1%)	9 (18%) 4 (14%) 5 (11%) 1 (11%) 2 (12%) 6 (11%) 8 (12%) 3 (9%) 10 (1%) WO (1%)	9 (18%) 4 (14%) 5 (11%) 1 (11%) 2 (12%) 6 (11%) 8 (12%) 3 (9%) 10 (1%) WO (1%)	8 (18%) 4 (14%) 6 (13%) 9 (12%) 1 (11%) 3 (11%) 5 (10%) 2 (9%) 10 (2%) WO (1%)	8 (18%) 4 (14%) 6 (13%) 9 (12%) 1 (11%) 3 (11%) 5 (10%) 2 (9%) 10 (2%) WO (1%)	9 (18%) 4 (14%) 5 (11%) 1 (11%) 2 (12%) 6 (11%) 8 (12%) 3 (9%) 10 (1%) WO (1%)	9 (18%) 4 (14%) 5 (11%) 1 (11%) 2 (12%) 6 (11%) 8 (12%) 3 (9%) 10 (1%) WO (1%)
Professional identity	Forestry (23.3%) Wildlife/Fisheries biology (21.4%) Recreation (14.1%) Engineering (5.7%) Administration (4.1%) Planning (3.9%) Hydrology (3.5%) Soil science (3.4%) Range (2.1%)	Forestry (11.8%) Wildlife/Fisheries biology (16.9%) Recreation (8.6%) Engineering (1.6%) Administration (1.2%) Planning (2.9%) Hydrology (6.2%) Soil science (1.2%) Range (1.6%) Ecology (16.9%) Fire mgmt (6.6%) Archeology (7.4%)	Forestry (40.5%) Wildlife/Fisheries biology (11.3%) Recreation (9.3%) Engineering (9.5%) Administration (3.6%) Planning (3.1%) Hydrology (2.7%) Soil science (2.8%) Range (3.2%)	Forestry (18.8%) Wildlife/Fisheries biology (13.2%) Recreation (5.6%) Engineering (5.2%) Administration (6.4%) Planning (1.6%) Hydrology (6.4%) Soil science (2.0%) Range (3.6%) Ecology (6.0%) Fire mgmt (4.0%) Archeology (0.8%)	Forestry (43.3%) Wildlife/Fisheries biology (5.2%) Recreation (6.7%) Engineering (1.5%) Administration (17.8%) Planning (2.1%) Hydrology (0.6%) Soil science (0.3%) Range (11%)	Forestry (32.6%) Wildlife/Fisheries biology (6.9%) Recreation (6.3%) Engineering (2.1%) Administration (11.1%) Planning (2.8%) Hydrology (1.4%) Soil science (<1%) Range (6.9%) Ecology (6.3%) Fire mgmt (1.4%) Archeology (<1%)	Forestry (32.6%) Wildlife/Fisheries biology (6.9%) Recreation (6.3%) Engineering (2.1%) Administration (11.1%) Planning (2.8%) Hydrology (1.4%) Soil science (<1%) Range (6.9%) Ecology (6.3%) Fire mgmt (1.4%) Archeology (<1%)	Forestry (18.8%) Wildlife/Fisheries biology (13.2%) Recreation (5.6%) Engineering (5.2%) Administration (6.4%) Planning (1.6%) Hydrology (6.4%) Soil science (2.0%) Range (3.6%) Ecology (6.0%) Fire mgmt (4.0%) Archeology (0.8%)	Forestry (43.3%) Wildlife/Fisheries biology (5.2%) Recreation (6.7%) Engineering (1.5%) Administration (17.8%) Planning (2.1%) Hydrology (0.6%) Soil science (0.3%) Range (11%)	Forestry (32.6%) Wildlife/Fisheries biology (6.9%) Recreation (6.3%) Engineering (2.1%) Administration (11.1%) Planning (2.8%) Hydrology (1.4%) Soil science (<1%) Range (6.9%) Ecology (6.3%) Fire mgmt (1.4%) Archeology (<1%)	Forestry (32.6%) Wildlife/Fisheries biology (6.9%) Recreation (6.3%) Engineering (2.1%) Administration (11.1%) Planning (2.8%) Hydrology (1.4%) Soil science (<1%) Range (6.9%) Ecology (6.3%) Fire mgmt (1.4%) Archeology (<1%)

The similarity of the age, experience, amount of education, and to a lesser extent, regional representation, support the comparability of the 1990 and 1996 respondents. Respondent characteristics of particular interest include gender, work experience, and professional identification, given that these variables were found to be potentially important influences based on the 1990 study results (Brown and Harris, 1993).

A visual check of respondent characteristics indicates differences between 1990 and 1996 on the gender and professional identification variables in the staff and line groups. However, while the procedures for sample selection in 1996 were the same as those used in 1990, *within-group* differences in sample characteristics between 1990 and 1996 may reflect sampling error, or alternatively, actual changes in the group characteristics. A key question here is: which of these factors underlies the differences in workforce composition?

The differences in professional identification responses—in particular, the decline in identification with the forestry profession—may be partially attributed to changes in closed-ended response categories provided on the 1990 and 1996 questionnaires, as well as actual changes in the agency's workforce. In 1996, the list of response categories was expanded to include the professions of ecology and fire management, among others. Despite this change in the number and range of closed-ended response categories, which could affect the distribution of responses, the shift in professional identification also reflects an actual increase in non-forestry professions at the expense of timber-related occupations between 1990 and 1996 (Martin, 1997).

The shift in gender proportions between 1990 and 1996, particularly in the 1996 Staff group, appears to better reflect the actual composition of the USFS workforce. The Forest Service Workforce Data Book 1992–1993, the last such comprehensive description of workforce characteristics prepared by the agency, indicated the actual proportion of female employees was 40%. As of 1996, women still constituted 39.5 percent of the agency's workforce (USDA, 1997, p. 109).

Other characteristics of the Staff sample in 1996 are reasonably close to the last

reported attributes of the workforce in 1993. For example, the average age of the workforce was 42.6 years old in 1993 vs. the average 1996 Staff sample age of 43 years. The average number of years of experience reported in 1993 was 14.8 years vs. the Staff sample attribute of 16. Thus, while some sampling error is likely present in both the 1990 and 1996 cross-sectional samples of the three groups, an examination of differences in group characteristics does not suggest serious threats to the comparability of the sample results between 1990 and 1996.

The existence of an alternative resource management paradigm

The 1996 responses of AFSEEE members were compared with those of the other two groups, Line and Staff, on the six items for the new resource management paradigm scale. Table 3 reports the mean, standard deviation, and a test of the statistical difference between group means for each item. The six-item scale also provides a statistically reliable measure of the resource management paradigm for these groups (Cronbach's $\alpha=0.76$).

The results indicate relatively large, consistent, and statistically significant differences ($P<0.05$) in both individual preferences and perceptions of agency position between AFSEEE and the non-AFSEEE Staff and Line groups on all six resource paradigm items. A total of 24 of 24 paired comparisons between AFSEEE and the Line and Staff groups in 1996 were statistically significant (t-test, $P<0.05$). These differences between the AFSEEE and the Staff and Line groups are easily identified graphically in Figures 1 and 2, which show the frequency distributions for two items; these distributions are representative of those for the other four scale items. The differences in responses between the Staff and Line groups, while statistically significant on six of 12 items, are much smaller.

These results confirm that AFSEEE members continue to express forest management values distinct from and more preservation-oriented than those of a random cross-section of USFS employees—whether represented by either Staff or Line positions of hierarchical decision authority.

Table 3. Responses to new resource management paradigm scale items by the Association of Forest Service Employees for Environmental Ethics (AFSEEE), Forest Service staff employees (Staff), and Forest Service line officers (Line), with means, standard deviations, and pairwise comparisons between AFSEEE, staff, and line responses in 1996

Dimension	Group	Preference 1990				Position 1990				Preference 1996				Position 1996				1996 individual preference pairwise comparisons (t-test, $P < 0.05$) ^a				1996 position of agency pairwise comparisons (t-test, $P < 0.05$) ^a								
		Mean		SD		Mean		SD		Mean		SD		Mean		SD		A/S		A/L		S/L		A/S		A/L		S/L		
Non-commodity vs. commodity orientation	AFSEEE	1.94	1.04	6.18	0.88	2.43	1.37	5.77	1.22																					
	Staff	3.15	1.48	5.36	1.41	3.60	1.52	4.74	1.58	*	*																		*	
	Line	3.12	1.17	5.18	1.32	3.85	1.08	4.66	1.19																					
Preservation of ecological integrity vs. production of goods/services	AFSEEE	1.88	1.20	6.27	0.83	1.98	1.21	5.65	1.27																					
	Staff	3.60	1.76	5.45	1.34	3.25	1.67	4.50	1.63	*	*																		*	
	Line	3.88	1.66	5.46	1.22	3.75	1.54	4.17	1.50																					
Benefit future generations vs. benefit present generation	AFSEEE	1.55	0.82	5.84	1.14	1.81	0.93	5.42	1.40																					
	Staff	2.52	1.40	4.48	1.71	2.34	1.21	3.97	1.73	*	*																		*	
	Line	2.61	1.38	3.99	1.60	2.34	1.08	3.26	1.41																					
New forestry vs. traditional silviculture ^b	AFSEEE	1.75	1.09	5.77	1.31																									
	Staff	2.87	1.58	4.72	1.60																									
	Line	2.59	1.46	4.37	1.68																									
Shared decision making vs. public input only	AFSEEE	2.24	1.48	5.33	1.56	2.69	1.58	5.17	1.53																				*	
	Staff	3.46	1.87	4.05	1.82	3.62	1.88	3.83	1.85	*	*																			
	Line	3.10	1.90	3.78	1.82	3.35	1.83	3.42	1.62																					
Potential decline in rural communities to achieve sustainability vs. continuous supply of resources regardless of ecological integrity ^c	AFSEEE																													
	Staff					2.46	1.36	5.18	1.53																					*
	Line					3.58	1.56	4.18	1.66																					*
Hands-off, nature knows best vs. intensive management and intervention to achieve forest health ^c	AFSEEE																													
	Staff					3.23	1.57	6.04	1.06																					*
	Line					4.74	1.45	5.37	1.43																					*

^aAn asterisk indicates statistically significant difference in mean score, $P < 0.05$.

^bThis question not asked in 1996.

^cThese questions not asked in 1990.

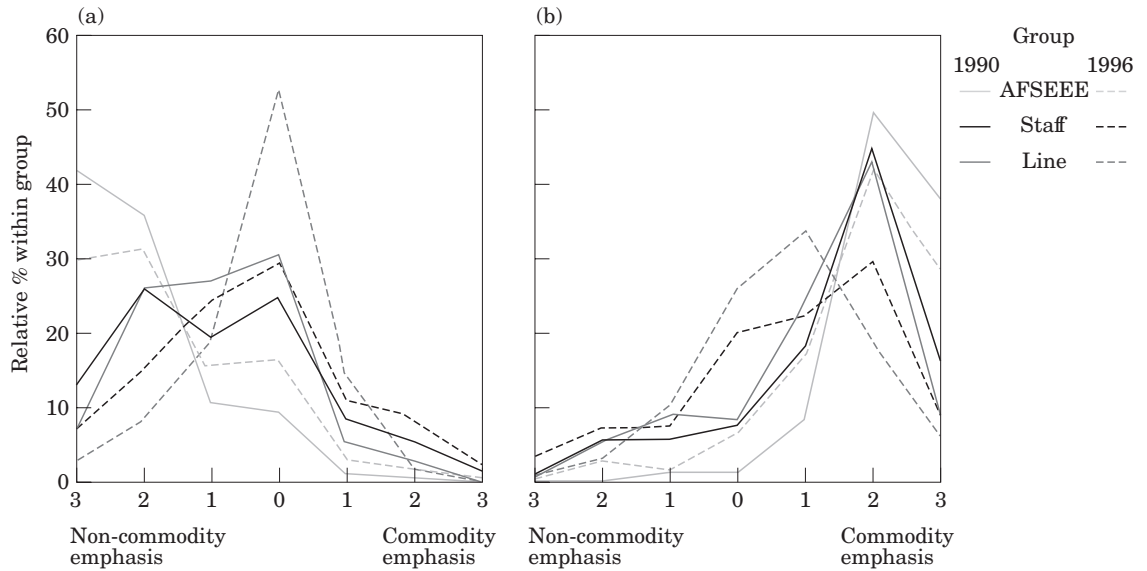


Figure 1. Non-Commodity vs. commodity emphasis in the Forest Service (1990–1996). Each of three groups (AFSEEE, Staff, Line) is plotted based on proportion of respondents within a given group that marked a position on a scale containing opposing value statements located at each end.

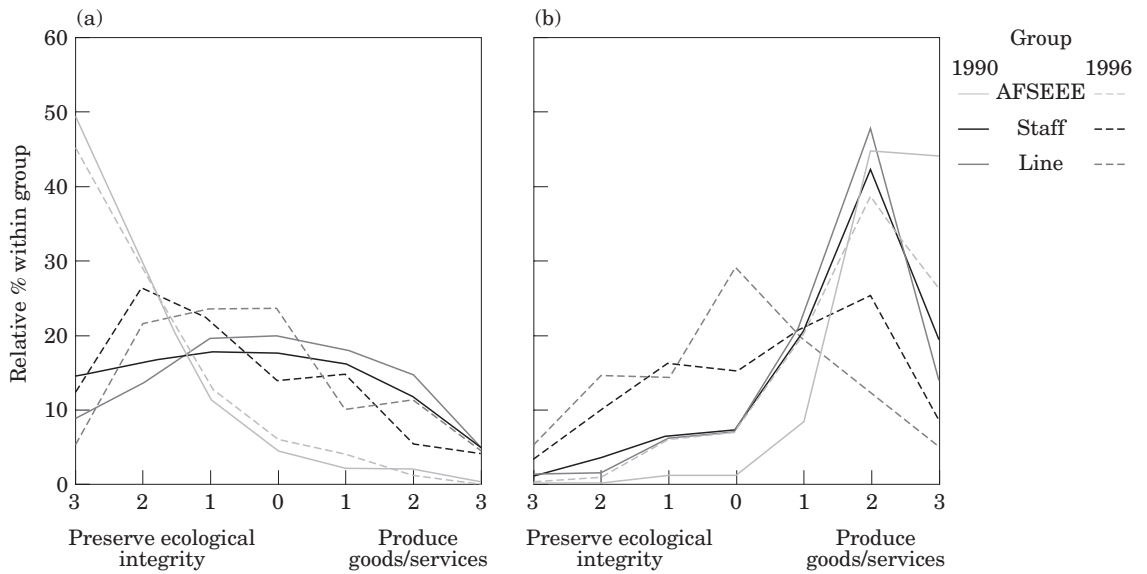


Figure 2. Preservation of ecological integrity vs. production of goods/services in the Forest Service (1990–1996). Each of three groups (AFSEEE, Staff, Line) is plotted based on proportion of respondents within a given group that marked a position on a scale containing opposing value statements located at each end. (a) Individual preference; (b) Position of agency.

Preferred position for the USFS in adopting the new resource management paradigm in 1996

Large differences have persisted since 1990 between the AFSEEE and non-AFSEEE groups in their responses to all six resource management paradigm items pertaining to

employee’s preferences for agency direction in national forest management. On the non-commodity vs. commodity individual preference item, 77% of AFSEEE members preferred a greater degree of non-commodity orientation in USFS management, compared to 47% for the Staff Group and 30% for the line group. On the preserve ecological

integrity vs. produce goods item, 88% of AFSEEE members preferred an agency emphasis on preserving ecological integrity as opposed to producing goods/services; in comparison, 61% of the Staff group and 51% of the Line group indicated this position. On the human intervention intensive management vs. 'hands off, nature knows best' item, 65% of AFSEEE members preferred the latter philosophy compared to only 22% for the Staff group and 6% for the Line group. The significant disparity in individual preferences among these three groups is representative of the other resource management paradigm items as well.⁴

Perceived position of the USFS in adopting the new resource management paradigm in 1996

In the set of questions about employees perceptions of the current position of the agency, responses to all six items were significantly different ($P < 0.05$; see Table 3) between the AFSEEE and non-AFSEEE groups. AFSEEE members consistently perceived the agency as being positioned opposite their stated preferences for the new resource management paradigm items. General agreement on the position of the agency was found between the AFSEEE and non-AFSEEE groups on four out of six item responses. In general, AFSEEE perceptions of agency position tend to be unambiguous, while the perceptions of the Staff and line groups vary greatly. On the non-commodity vs. commodity item, 88% of AFSEEE members perceived the agency to be commodity-orientated, as compared to 62% for staff group and 59% for the line group. On the preserve ecological integrity vs. produce goods item, 85% of AFSEEE members perceived the agency to emphasize production of goods/services at the expense of preserving ecological integrity,

⁴It would be misleading to suggest that the non-AFSEEE respondents represent a wholly homogenous group; they do not. Each group examined in this research represents a diversity of wide-ranging views. Nonetheless, the differences between AFSEEE and non-AFSEEE respondents are generally significantly greater than those between the staff and line groups comparison of the non-AFSEEE respondents; and the between-group differences are, of course (as required of statistical tests of significance), greater than the variation within the groups on scalar measurements.

while 55% of Staff and 37% of the line group held this perception. This general trend of AFSEEE members perceiving the agency as positioned further from the new resource management paradigm scale than the other two groups also applies to the other four scale items.

Shifts in the resource management paradigm 1990–1996

Because the same kinds of groups (AFSEEE, Staff, Line) participated in both the 1990 and 1996 studies, responses of these groups to the new resource management paradigm items from 1990 can be compared to those provided by the same groups in 1996 to assess shifts in values and perceptions among USFS employees.⁵ The results indicate that the perceived position of the USFS shifted toward the new resource management paradigm between 1990 and 1996. The agency is perceived as less commodity-oriented in 1996 than in 1990, although mean scores indicate that the USFS is still considered commodity-oriented by its employees. For example, a mean score greater than 4.0 would indicate a general commodity orientation, while a mean score less than 4.0 would indicate a general non-commodity orientation (see Table 3). The strength of the resource orientation on a particular item would be indicated by the distance from the midpoint. Between 1990 and 1996, the agency was perceived to have shifted in three ways: toward preserving ecological integrity, considering the needs of future generations, and sharing of decision-making. These perceptions were shared by all three groups of individuals.

The results also indicate that the individual preferences of agency employees for forest resource management have shifted during this 6-year period. Table 4 presents changes in the responses of the three groups between 1990 and 1996 on four items common to both studies.

⁵This is a comparison of different individuals in the three groups in 1990 and 1996—and is *not* a panel. A panel would include the same individuals in the same groups in 1990 and 1996. Preliminary analysis of the panel groups, however, indicates the same longitudinal trends that are reported here.

Table 4. Shifts in the resource management paradigm questions 1990–1996

Resource management paradigm item (individual preference)	AFSEEE change		Staff change		Line change	
	1996 Preference	Shift from 1990 ^a	1996 Preference	Shift from 1990 ^a	1996 Preference	Shift from 1990 ^a
Non-commodity vs. commodity orientation	Non-commodity	Toward commodity	Non-commodity	Toward commodity	Non-commodity	Toward commodity
Preservation of ecological integrity vs. Production of Goods/Services	Ecological integrity	No change	Ecological integrity	Toward ecological integrity	Ecological integrity	No change
Benefit future generations vs. benefit present generation	Future generations	Toward present generation	Future generations	No change	Future generations	Toward future generations
Shared decision making vs. makes decisions itself	Shared decision making	Toward makes decisions itself	Shared decision making	No change	Shared decision making	No change

^aShifts in position from 1990, if reported, are statistically significant (t-test, $P < 0.05$).

The AFSEEE group showed a consistent shift toward traditional resource management values, while the responses of the other two groups split between attitudes representing the dominant resource management paradigm and those representing the new resource management paradigm. All three agency groups preferred a greater emphasis on commodity production in 1996 (t-test, $P < 0.05$) and reserving resource management decisions for agency decision makers (although only the AFSEEE shift was statistically significant, $P < 0.05$).

Changes in responses to other questions 1990–1996

The 1996 study included fourteen additional questions from the 1990 questionnaire (see Table 5). Of particular interest is a shift in general environmental attitudes away from environmental protection toward economic growth, and a shift toward greater emphasis on wood production. As Table 5 shows, line officers as a group actually changed position on several key questions measured by the mean score on the question: on average, 1996 line officers favored increased wood production and increased forage development, while in 1990 they did not. Line officers also agreed that timber harvests levels are compatible with ecological integrity and that the value system that presently dominates the agency is not in need of immediate change.

The narrowing of the performance gap 1990–1996

The difference between individual preference and perceived agency position may reflect a 'performance gap' or the difference between an organization's natural resource policies and actions and individual expectations for those policies and actions. Table 6 shows the performance gaps reflected by individual items for the three agency groups. The responses of the AFSEEE members indicate that they perceived the largest performance gaps, often exceeding a factor of two, relative to the gaps represented by the staff and line groups' responses on individual paradigm items. This result is consistent with

AFSEEE's reason for existing—to change and 'reform' USFS management actions. A key finding from the 1996 data is the consistent narrowing or closing of the performance gap between 1990 and 1996 among all three groups. Among Line officers, the performance gap has narrowed in 1996 to less than one-scale point, on average, while the performance gap perceived by AFSEEE members remained greater than three-scale points.

The narrowing of the performance gap on all item responses between 1990 and 1996 can be attributed either to changes in the value preferences of individuals, or to changes in perception of agency performance, or to both in combination. The greatest narrowing of the performance gap occurred on the commodity/non-commodity emphasis item. An analysis of change in the performance gaps on the four items indicates that perceived shifts in agency position generally contributed more to a decreased performance gap than did changes in individual preferences.

Conclusions

The present research suggests that the performance gap that spawned AFSEEE as an internal reform movement within the agency, narrowed over the 6 years between the surveys in 1990 and 1996, particularly in terms of the perceptions of agency line officers. Indeed, this performance gap, which in 1990 was indicated by significant differences between the personal values of agency employees and their perceptions of the agency's position on the various dimensions of the resource management paradigm, had narrowed by 1996 even in the minds of AFSEEE members. Analysis of the basis for this narrowing reveals that actual changes in both the level of commodity production (represented by agency position in the questionnaire) and individual preferences for greater commodity production were involved.

One probable reason for this decrease is the perception of many USFS employees in 1996 that decreases in forest commodity production had gone too far in the US during the late 1980s and early 1990s. With the significant reduction in the goods and services produced

Table 5. Shifts in attitudinal measures and other scale items by the Association of Forest Service Employees for Environmental Ethics sample (AFSEEE), Forest Service staff employees sample (Staff), and Forest Service line officers sample (Line), with means, standard deviations, and statistical significance of within group differences

Question	AFSEEE change		Staff change		Line change	
	1996 Position	Shift from 1990 ^a	1996 Position	Shift from 1990 ^a	1996 Position	Shift from 1990 ^a
Production of wood	Unfavorable	More favorable	Unfavorable	More favorable	Favorable ^b	More favorable
Use of herbicides	Unfavorable	No change	Unfavorable	Less favorable	Favorable ^b	No change
Use of pesticides	Unfavorable	Less favorable	Unfavorable ^b	Less favorable	Favorable	No change
Recreation development	Favorable	Less favorable	Favorable	Less favorable	Favorable	Less favorable
Livestock forage	Unfavorable	Less favorable	Unfavorable	No change	Favorable ^b	More favorable
Energy development	Unfavorable	Less favorable	Unfavorable	No change	Favorable	No change
Benefit future generations vs. present generation (country)	Future generations	No change	Future generations	No change	Future generations	More benefit future generations
Protect environment vs. economic growth (country)	Protect environment	More economic growth (0.034)	Protect environment	More economic growth	Protect environment	More economic growth
Preserve nature vs. produce goods (country)	Preserve nature	No change	Preserve nature	No change	Use nature	No change
Enough land for wilderness	Disagree	Greater agreement	Agree	Less agreement	Agree	No change
Generally meets NEPA, NFMA, ESA	Disagree	Greater agreement	Agree	Greater agreement	Agree	Greater agreement
Harvest levels compatible with ecological integrity	Disagree	Greater agreement	Disagree	Greater agreement	Agree ^b	Greater agreement
Value system in need of immediate change	Agree	Less agreement	Agree	Less agreement	Disagree ^b	Less agreement
Achieving mission	4-2 (10 point scale)	Doing better	5-8 (10 point scale)	No change	6-9 (10 point scale)	No change

^aShifts in position from 1990, if reported, are statistically significant (t-test, $P < 0.05$).

^bIndicates a change in position from 1990 based on the mean score of the scale item crossing the midpoint. This change may or may not be statistically significant.

Table 6. Analysis of change in new resource management paradigm scale items 1990–1996

Dimension	Group	Performance gap ^a 1990	Performance gap ^a 1996	Difference in performance gap 1990–1996	GAP reduction attributable to change in individual preference	GAP reduction attributable to change in agency position
Non-commodity vs. commodity orientation	AFSEEE	4.24	3.34	-0.9	54%	46%
	Staff	2.21	1.14	-1.07	42%	58%
	Line	2.06	0.81	-1.25	58%	42%
Preservation of ecological integrity vs. production of goods/services	AFSEEE	4.39	3.67	-0.72	14%	86%
	Staff	1.85	1.25	-0.6	0%	100%
	Line	1.58	0.42	-1.38	0%	100%
Benefit future generations vs. benefit present generation	AFSEEE	4.29	3.61	-0.68	38%	62%
	Staff	1.96	1.63	-0.33	0%	100%
	Line	1.38	0.92	-0.46	0%	100%
Shared decision making vs. public input only	AFSEEE	3.09	2.48	-0.61	74%	26%
	Staff	0.59	0.21	-0.38	42%	58%
	Line	0.68	0.07	-0.68	37%	63%

^aThe Performance Gap represents the mathematical difference between mean preference and perception scores for each group in the year indicated.

on national forests during this period—most clearly seen in the decline of the amount of timber harvested from 12.7 billion board feet 1987 to 3.9 billion board feet in 1995 (USDA, 1996)—the commodity/non-commodity pendulum representing the preferences of USFS employees had begun to swing back toward commodity production, at the same time that agency employees were increasingly embracing the importance of protecting the ecological integrity of national forest lands. It is important to note that this decline in harvest levels resulted from a combination of factors, including court appeals of specific timber sales and the assessment by some USFS managers that some of its forests did not have the amount of timber available for harvest once standards for other forest values were properly considered (e.g. water quality and stream buffers, wildlife habitat, etc.)

Nonetheless, a key factor in this decline was the support given to managers by agency leaders to implement the protection of the forests' ecological integrity, rather than the past practice of sacrificing it to 'getting out the cut', no matter the cost. This development is significant, given Thompson's (1967) premise that the impetus for most organizational change originates at the institutional (top management) level of an organization, because this level usually represents the interface between an organization and its environment. Organizational leaders devote

a significant portion of their time scanning the organizational environment for potential problems and opportunities. Until recently, the leadership of the USFS was preoccupied with operating in the highly politicized environment of special interest groups, to the extent that its scanning function for other important organizational environment variables—of which perhaps the most critical is social change—was less than effective.

It is significant that sensitivity and response to changing social and cultural values appeared to be relegated to lower levels in the agency. The forest planning process in the US, which was required by national legislation and resulted in increased public involvement and interdisciplinary planning teams, contributed to bottom-up change by creating an important cadre of lower-level USFS employees more in tune with the organization's changing social as well as natural environment. Previous research by Brown and Harris (1992a,b) found that change in the USFS was being driven from what Thompson (1967) called the 'technical' (lower management) level of the organization, reflecting its proximity both to on-the-ground forestry operations and to public involvement in forest planning. Downs (1967) suggested that the difficulty of change in the structure and functioning of an organization is directly related to the depth of change in that organization, with change

becoming more difficult at broader levels of agency functioning—from changing everyday agency actions, to changing rules, to changing an organization's rule-making structure, to changing the social function of the organization. The original purposes of AFSEEE were to give a voice to individuals in lower management and technical levels of the organization and, through them, to advance change in the broader, social function of the agency—from the predominantly utilitarian, commodity-oriented agency of the past to a predominantly multiresource-protection agency placing a high priority on managing for healthy, sustainable ecosystems.

The current research indicates that the internal USFS reform movement represented by AFSEEE has changed as it has matured and the agency it sought to change also evolved. Six years after the initial research by Brown and Harris (1992a), AFSEEE found its resource-advocacy role reduced as decreases in commodity outputs from national forest land dampened the zeal for agency overhaul. The recent appointment of Michael Dombeck, a wildlife biologist, as Chief to lead the agency's efforts in ecosystem management, and the recent downsizing of the agency's workforce, further muddied the reform waters; keeping one's job became as important as saving the environment (Stahl, 1996). At the same time the agency's traditional commodity orientation was tempered by its concern for the constraints posed by other resource values. These changes, combined with the ongoing perception that AFSEEE membership was detrimental to a USFS career in certain parts of the country, suggest the wisdom of AFSEEE embracing a less confrontational and more professional style of resource advocacy.

How much of the shift in the agency's resource management paradigm and reduction in bureaucratic performance gap between 1990 and 1996 can be attributed to the internal reform movement represented by AFSEEE? Empirical results from the present research suggest that external organizational change forces—in particular, the growth in public concern about national forest management fueled by environmental advocacy groups—exerted a much stronger influence on USFS policy outcomes than internal factors such as AFSEEE. Arguably, AFSEEE was never an exclusively internal reform

movement; rather, it reflected increased public concern over environmental stewardship, as evidenced by the tremendous growth between 1990 and 1996 in AFSEEE's non-agency membership.

Significantly, AFSEEE's membership also may reflect recent and ongoing changes in the socio-demographic make-up of the USFS as it has acted to attain workforce diversification, whereby the proportions of agency employees who are female, non-white and non-foresters increased. Analyses by Brown and Harris (1993) indicated that workforce diversification in the agency was an important catalyst of change in the agency's resource-management values: women and all individuals working in the natural science professions, such as wildlife/fisheries biology, soil science, and hydrology, were found to more strongly favor protection of ecosystem health over resource consumption, while traditional USFS professionals in forest and range management were more commodity oriented. These findings suggest that, as the USFS has diversified its workforce—ethnically, professionally, and by gender—an important consequence has been greater support for alternative resource values in the agency that are oriented toward managing more for ecological integrity and biodiversity and less for commodity production.

This much-discussed organizational shift in agency culture could become increasingly significant in the future as line officers trained and hired after World War II near retirement—not only in the US but elsewhere in the world. Kennedy and Quigley (1989) found that, based on their analysis of a limited sample of USFS employees, recently appointed forest supervisors in the US were more environmentally oriented than more experienced ones, but not as much so as new employees. Recent analysis by Brown and Harris suggests that the developing pool of future resource managers available to fill the vacated ranks of retiring foresters will be increasingly characterized by diverse individuals (in terms of both gender and profession) whose value perspectives increasingly reflect the new resource management paradigm.

From the perspective of the Advocacy Coalition Framework (or AFC; Sabatier *et al.*, 1994), detractors of AFSEEE include USFS

professionals who identify with interests most represented by the Commodity Coalition. These USFS employees have consistently stated that AFSEEE is just another environmental group warranting no special consideration as an internal reform movement within the USFS. While AFSEEE is indeed sympathetic to the values of environmental groups, the results reported here suggest that a new resource management paradigm now exists within the USFS that is represented most strongly—but, significantly, not exclusively—by AFSEEE.

This trend suggests a change in resource decision-making underlying the USFS, with the balance of power in the struggle among different coalitions shifting away from an emphasis on commodities and the Commodity Coalition, to a more balanced one reflecting the increased influence of the Scientific Management Coalition (increasingly comprised of natural scientists and non-governmental organizations) and the Amenity Coalition. Using Milbrath's (1984) terminology, AFSEEE has served as a vanguard of this shift—although, as a bottom-up change movement in an agency in which few AFSEEE members held formal positions of authority, realization of the major tenets of the new resource management paradigm has necessarily been limited. Nonetheless, AFSEEE has served as one trigger of change helping advance the agency toward an evolving alternative management paradigm.

By the early 1990s, the AFC situation (Sabatier *et al.*, 1994) as it applied to national forest management was characterized by deadlock. Previous research results have affirmed the validity of Behan's (1990a,b) suggestion that 'the timber management bias in professional forestry has been scrutinized, found wanting, and is now in the process of fundamental change' (Behan, 1990a, p. 35) and that 'a different paradigm of forest management is required in a society where change is ubiquitous, rapid, and encouraged. . . [and] where the forest is appreciated for an array of commodity and amenity values' (Behan, 1990b, p. 13). The present research suggests that a segment of the USFS—most clearly, but not solely, represented by AFSEEE—scrutinized USFS actions, found them wanting, and planted the seeds for change. This segment was

significant not perhaps as much in terms of size as in terms of the new generation of resource managers it represented—and the reality that this new, better educated generation is a growing force throughout the world.

The present study suggests that, although a new resource management paradigm is being increasingly embraced by USFS employees in 1996, significant resistance to that new paradigm and frustration over forest management persists within the agency. Empirical results on recent employee values and beliefs indicate that frustration with the forest management deadlock has reached the point that the pendulum of employee preferences has begun to swing back, albeit slightly, toward commodity production and away from non-commodity values. Nonetheless, the research reported here suggests that the rank-and-file in the USFS is already adopting the values of a new resource management paradigm. A key issue is the extent to which leadership in the USFS and the US Congress is ready to actively promote changes in the USFS—ones that address the agency's original imbalance of a management orientation traditionally focused on commodity production (which has seemingly moderated in recognition of the importance of both market and non-market values)—while still supporting and acting on employees, growing allegiance to a new resource management paradigm. The retirement of the previous USFS Chief, Jack Ward Thomas, reflected his frustration with national forest policy and his conclusion that any significant change in USFS policy outcomes was unlikely without a major change in national forest legislation (Ghannam, 1996). Although recent efforts by current Chief Dombeck to implement ecosystem management and initiatives within the US Congress to change forest management policy are influencing the agency's organizational culture, time will tell if those influences will be manifested in significant and substantive changes in management priorities, funding and activities.

In conclusion, it now seems clear that change is occurring in forest management and within the USFS in the face of internal pressures from a more diversified workforce and external pressures from an increased diversity of policy coalitions. The research presented here suggests just how complex the

sources and mechanisms of this change can be, and the difficulty of assessing the extent to which this change is advanced by organizations like AFSEEE. Nonetheless, what is certain is that change in resource management will continue to occur as the internal and external environments of government agencies change, and also that vanguard organizations like AFSEEE will continue to play a role in increasing awareness of that change and its ramifications for management.

We would further posit that this trend is an international phenomenon (witness the interests represented at recent conferences on the environment in Rio and Kyoto), one that has the potential to change resource management organizations around the globe. Further, the kind of longitudinal and institutional analysis presented here could be applied to resource management agencies in national and provincial governments of other countries. While the analysis in this paper provides an example of just one case focused on a Federal agency in the US, the various theories examined, survey methods applied, and interpretation of the results presented here raise questions and suggest implications for resource management in other nations. Constructs such as management paradigms, vanguards of organizational change, performance gaps, and workforce diversification are applicable for examining and understanding changes in resource management in a diversity of countries, regardless of the differences in their histories, organizational structures and the trends unfolding in them.

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