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Public Participation and Natural Resource Decision-Making: The Case of the RARE II Decisions

ABSTRACT

The role of public participation on Forest Service decision-making is examined from contrasting perspectives presented in recent studies by Twight and Culhane. Twight argues that the agency's professional value orientation and organizational structure renders it unresponsive to public input. Culhane argues the opposite. The agency is responsive to diverse interest groups out of the desire to avoid conflict. And although it is the composition and activity of these groups that directly influence the agency, public participation is an important means of obtaining information about group concerns.

Causes for the differences in perspectives are examined. Using recent evidence from the Forest Service's RARE II decision process, the Twight-Culhane perspectives are reassessed. An analysis indicates that they complement more than contradict. Implications for natural resource decision-making are discussed.

The increased use of public participation programs since the late 1960's has led a number of observers to question the importance and usefulness of such programs in influencing government decision-making. Sewell and Phillips, for example, note that:

While most agency representatives would claim that increased citizen involvement has led to increased inputs by the public into the decision-making process, citizens and citizen groups remain skeptical that this has in fact occurred. Even when increased input is acknowledged, such individuals or groups are suspicious that inputs of other actors (such as bureaucrats, politicians or developers) are given much more weight in the final decision-making. In most instances the public is given no indication of whether its views were considered, and even if they were, how such views influenced the final outcome.1

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Although a number of opinions have emerged regarding the significance and importance of public input on decisions made by natural resource agencies, such as the Forest Service, perhaps the clearest contrasts are presented in recent studies by Twight and Culhane.

Twight argues that the Forest Service is very strongly committed to a professional ideology that is focused on sustained yield and utilitarian theories. This focus results in agency decisions which tend to favor resource development and use, especially timber, and are biased against preservationist objectives. The Forest Service's organizational structure reinforces commitment to its professional ideology and so closes it off from outside influences that the agency ignores or discounts views that run counter to this ideology. Twight claims this professional ideology is so tightly adhered to that at times the agency will make decisions that are ultimately detrimental to itself, even to the point where it may be threatened with a significant loss of political power. Twight therefore does not see public participation as exerting a significant influence on Forest Service decisions.

Culhane has quite a different view. Culhane sets out in his study to re-examine the capture-conformity debate over public land management. He analyzes the influence of interest groups on the Forest Service and the Bureau of Land Management after 1970 and concludes that neither position is a completely accurate portrayal of these agencies' mode of decision-making. He concludes that both agencies are highly responsive to clientele groups out of their desire to avoid conflict. This is the "rule of anticipated reactions." Thus these agencies are not as closed as conformity theory suggests, nor are they "captured" by any single group because of the diversity and strength of clientele groups. Although it is the composition and the activities of clientele groups that most directly influence the agency, according to Culhane, public participation is im-

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4. TWIGHT, supra note 2, at 21-28.
5. Id. at 23-28.
7. Id. at 9, 16, 21, 108-10, 116.
8. See generally CULHANE, supra note 3, at 1-29. See also, G. MCCONNELL, PRIVATE POWER AND AMERICAN DEMOCRACY (1966), for the basis of capture theory, and H. KAUFMAN, THE FOREST RANGER (1960), for the basis of conformity theory. "Capture" and "conformity" are defined at the notes and accompanying text, infra notes 9, 10.
9. CULHANE, supra, note 3 at 332.
10. CULHANE, supra, note 3 at 279-283.
11. See generally CULHANE, supra note 3, at 279-85. See also C. FRIEDRICH, CONSTITUTIONAL GOVERNMENT AND POLITICS, (1937).
12. CULHANE, supra note 3, at 332-34.
important because it provides a means of transmitting information about the nature of the interests of these clientele groups.¹³

Both studies are well-documented with supporting data and citations of previous works and both incorporate applicable social theories, yet the conclusions reached by these two investigators are quite different. Causes for those differences will be examined in this paper and implications for natural resources decision-making derived from these two perspectives will be discussed. Data taken from the Forest Service’s Second Roadless Area Review and Evaluation (RARE II)¹⁴ will be used as more recent evidence to test the ideas derived from these two perspectives. Special attention will be given to the role of public participation in influencing agency decisions.

**TWIGHT’S PERSPECTIVE**

Twight argues that Forest Service decision-making is strongly molded by its professional ideology.¹⁵ The Forest Service is relatively uninfluenced by public opinions differing with that ideology because of its relatively closed organizational structure.¹⁶ Twight asserts that the Forest Service value orientation is so strong that “agency members may make administrative decisions regardless of the consequences for the Forest Service.”¹⁷

Ashley Schiff was one of the first to recognize the importance of professional ideology on organizational behavior and decision-making.¹⁸ Like Twight, he analyzed the role of ideology on conservation agencies such as the Forest Service and the National Park Service.¹⁹ Schiff observed that conservationists’ beliefs about nature are transferred to beliefs about economic processes and beliefs about how organizations should be properly managed.²⁰ Schiff noted that the early conservationists had a difficult time dealing with catastrophic change in nature and saw nature as essentially in equilibrium.²¹ Conservationists viewed economic markets, on the other hand, as capricious and blamed them for desecrating of the land and threatening future resources.²² Such beliefs resulted in a strong ad-

¹³. *Id.* at 281.
¹⁶. *Id.* at 26-27 and 108-109.
¹⁷. *Id.* at 21.
¹⁹. *Id.* at 1-30.
²⁰. *Id.* at 24-28.
²¹. *Id.* at 7-8.
²². *Id.* at 19-20.
herence to the concept of sustained yield, a system of forest management in which no more timber is harvested than grows on an annual basis.

Schiff referred to sustained yield as the Forest Service's "sacrosanct guide to management," and stated that it was based on four "questionable" assumptions: "stability," "land scarcity," "certainty," and "a closed economy." These concepts are derived from Ernest Gould. Citing Gould, Schiff stated:

[stability assumes] "that a stable flow of forest products is required, ad infinitum. . . . Thus timber growth should ideally regulate wood use." The second hypothesis [land scarcity] "... takes the argument one step further and assumes that forest products are so scarce, relative to labor and capital, that land must be used with maximum efficiency. Growth should therefore be at or near the biological ceiling so that the largest amount of desirable products is grown on each acre. The certainty hypothesis states that production techniques, consumption patterns, and values are all known so that sustained yield can be planned five or ten decades in advance." . . . The hypothesis of a closed economy indicates that "it is desirable for each operating unit, region, and country to equate internal consumption and production and ignore the possibilities of an outside supply of forest products and alternative uses for land, labor, and capital."  

The forester's acceptance of the hypotheses of stability and certainty significantly affected the agency's philosophy and approach to managing its organization. Overemphasis on organizational efficiency has had the effect of shutting out new ideas, shutting off contact with the public, and stifling innovation. As a result, the Forest Service has been slow to respond to shifting social needs and to make corresponding changes.

Twick adopts Schiff's view and elaborates on it. He agrees that strong commitment to its special value orientation has influenced the way the agency manages its organization and its decision-making and has made the agency relatively unresponsive to changing public opinion. However, there are other factors which intensify the influence of this value orientation on Forest Service decision-making. First, to the forestry ideology of sustained yield Twight adds the ideology of utilitarian theory.

23. Id. at 20. Schiff describes sustained yield vaguely as "a cutting policy carefully adjusted to the life cycle of timber stands." Id. at 21.
24. TWIGHT, supra note 2, at 22.
25. Schiff, supra note 18, at 21.
27. Schiff, supra note 18, at 21-22 (citing Gould, supra note 26 at 3-4).
28. Schiff, supra note 18, at 24.
29. Id. at 27-28.
30. Id. at 28.
32. Id. at 23-25.
Second, whereas Schiff believes the organizational behavior of the Forest Service dulls the agency to innovation and new ideas, Twight asserts that the closed structure of the agency takes a more active role in reinforcing its professional ideology and consciously shutting it off from outside influences. Regarding utilitarian theory, Twight states:

The utilitarian theory was conceived in eighteenth- and early nineteenth-century Europe. Within this concept, things assume utility only in terms of how they may be used by man to pursue an interest, rather than as good in their own right. . . . Applied to forestry, utilitarian theory has the following components: 1) timber primacy, 2) telic forestry, 3) scientific elitism, and 4) technocracy.

Timber primacy asserts that "the first and foremost purpose of forest growth is to supply man with wood material." Telic forestry is socially planned forestry and asserts that "it is the social duty of the government to control the powers of nature to protect the water supply and regulate that balance of industries connected with woods and waters," and that the "stability of the wood industry and its output ought to be the primary goal irrespective of changes in tastes, technology, consumption, and other economic factors." Scientific elitism asserts that "a professional bureaucracy trained in science is best equipped to make policy decisions regarding natural resources." Technocracy asserts that "the application of professional expertise and scientific technology to natural resources, particularly forests, is best accomplished under the single and everlasting central authority of the state."

Boiled down to its essence, utilitarian theory recognizes timber as the most important output of the forest and claims that the authority to formulate natural resource management decisions and policy ought to reside with a professionally trained bureaucracy under the auspices of the state. A belief in this theory may easily justify the attitude that Forest Service professionals know what is best when making decisions concerning public lands. This attitude may also discount the need to consider or respond to the lay opinions of the public.

The above attitudes are reinforced by maintaining a relatively closed organization. Twight cites Kaufman to explain how the Forest Service has developed a number of structural mechanisms which protect employees from "capture" by local clientele groups and strengthen the em-

33. Id. at 26-27, 108-09, 113-14.
34. TWIGHT, supra note 2, at 23.
35. Id. at 23.
36. Id.
37. Id. at 23-24.
38. Id. at 24.
39. KAUFMAN, supra note 8.
ployees' loyalty to the agency. These same mechanisms also strengthen commitment to the professional value orientation focused on sustained yield and utilitarian theories. Such mechanisms include promotion from within, numerous inspections, reviews, and submissions of accounting reports, frequent transfers, and formalized operating procedures which Kaufman refers to as "preformed decisions." The Forest Service also has a policy of hiring recruits from forestry schools where they receive a common training and their first introduction to the norms of the profession.

Twight argues that the Forest Service is not apt to stray from its ideological orientation because it is so strongly held and because its organization insulates it from outside influences that might run counter to this ideology. As a result, he predicts that citizen participation will exert very little influence on Forest Service decision-making:

By reasoning from Kaufman's findings, one can argue that use of this closed-system organizational model in the Forest Service seemingly has reinforced the value orientation of the Service, preventing its existential values and premises from being effectively questioned by clients, and encouraging the use of categorized, preconceived decisions. This may explain why, despite massive public involvement efforts, feedback from clients and supportive groups is treated perfunctorily or has little apparent effect on organizational decisions. . . . These structural characteristics of the Forest Service appear to preclude adaptive negotiations or decisions made through citizen participation which might anticipate or avoid potential conflicts with the agency's social environment. This behavior is typical of closed-system organizations with a bias toward certainty.

Twight predicted that the Forest Service, faced with political pressures to execute a course of action that ran counter to its value orientation, would respond first by explaining its value orientation to the public and attempting to argue the correctness of its view. Secondly, faced with mounting political pressures and imminent defeat, it would behave "consolidatively." Twight states:

This type of decision making is characterized by attempts to dominate external forces for change 1) by negating or modifying them through public relations and capital expenditures and, if that fails, 2) by
reordering existing, well-established programs or by devising a new program that fits within the framework of existing organizational values and norms to the maximum possible extent.\textsuperscript{48}

Events surrounding the battle over the Olympic National Park during the early part of this century (1897 to 1938) provided the evidence Twight used to demonstrate his hypotheses.\textsuperscript{49} The value orientations of the key Forest Service leaders were documented from memoranda and letters contained in the agency’s archives.\textsuperscript{50} Twight demonstrates through the historical records that the Forest Service attempted to protect itself from losing Olympic National Forest lands to the Park Service by first educating the public about the need for sustained yield forestry.\textsuperscript{51} When pressures from preservationists, local constituents, and the Park Service mounted, the agency countered by first proposing the enlargement of the Olympic Primitive Area and then by drafting an Olympic Forest wilderness bill.\textsuperscript{52} Ultimately the Forest Service lost and the area became Olympic National Park.\textsuperscript{53}

Forest Service memoranda clearly revealed its value orientation during this episode.\textsuperscript{54} The views expressed went beyond the narrow issue of the Olympic Park controversy itself.\textsuperscript{55} For example, in a warning from Assistant Chief Forester Kneipp to Assistant Regional Forester Horton, Kneipp wrote:

\begin{quote}
We cannot very well afford to stage an open battle between the National Park Service and the Forest Service. Without any intent to wound your pride, I may say the Forester might not regard the dedication of another 300,000 acres of the Olympic National Forest to National Park purposes as nearly so serious as a defeat of the big objectives of sustained yield management toward which [Chief Forester Silcox] is directing his efforts and in the attainment of which interdepartmental accord will be more effective than discord.\textsuperscript{56}
\end{quote}

Giving up jurisdiction over some lands was thus considered a better alternative than compromising the agency’s principles.\textsuperscript{57}

Twight concluded that the evidence from his case study sustained his

\textsuperscript{48} Id. at 27, citing L. GAWTHROP, BUREAUCRATIC BEHAVIOR IN THE EXECUTIVE BRANCH 181 (1969).

\textsuperscript{49} See generally id. at 31-104.

\textsuperscript{50} Id. at 31.

\textsuperscript{51} See id. at 43, 52, 53, 62, 68, 69.

\textsuperscript{52} Id. at 78-79, 100-101.

\textsuperscript{53} Id. at 104.

\textsuperscript{54} See id. at 43, 76.

\textsuperscript{55} See id. at 43, 67.

\textsuperscript{56} Letter from Assistant Chief Forester Kneipp to Assistant Regional Forester Horton (Mar. 20, 1935), reprinted in TWIGHT, supra note 2, at 67.

\textsuperscript{57} Id. at 67, 101, 102, 110.
hypotheses. Attempts by the public to influence the agency did not have much impact because of the agency's strong value commitment and closed organizational structure. Change ultimately was brought about by direct intervention of the President and Congress. Twight predicted that further examination of Forest Service administrative behavior would reveal comparable cases.

CULHANE'S PERSPECTIVE

Culhane offers quite a different perspective from Twight. Unlike Twight, Culhane sees the Forest Service (and the Bureau of Land Management) as being quite responsive to public input. Culhane sets out in his study to reexamine the capture-conformity debate over public land management. Capture theory is clientelism interest group theory taken to its extreme. Clientelism theory argues that just as a business depends on satisfied customers for its survival, government agencies depend on the clientele groups that they serve for their support before the executive and the legislature. Thus there is a strong incentive for such agencies to cater to the wishes of these groups. According to Culhane, critics such as McConnell and Lowi believe this leads to the extreme of control or capture of the agencies by their constituency groups and derailment of the agencies from their proper mission. The adherents of capture theory cite Foss's study of the Bureau of Land Management as an example. Foss asserted the Bureau of Land Management was dominated by the livestock industry in a 1960 study.

Conformity theory is derived from Kaufman's study asserting that agencies avoid clientele group capture by maintaining mechanisms which instill loyalty in their employees and developing rules and procedures which ensure that employees make decisions which conform to agency policy. Culhane interprets Kaufman similarly to Twight. The primary difference between the two investigators involves their respective beliefs about the degree that Kaufman's conformity thesis operates on Forest

58. Id. at 109.
59. Id. at 108-10.
60. Id. at 102-04, 110.
61. Id. at 112.
63. Id. at 29.
64. Id. at 27.
65. G. McCONNELL, supra note 8.
67. See Lowi, supra note 66, at 31-41, 58-63, 271-313; CULHANE, supra note 3, at 28; McConnell, supra note 8, at 339-68.
69. Id. at 199-203.
70. CULHANE, supra note 3, at 29.
Service decision-making. Twight concludes that conformity is an important factor in Forest Service decision-making, tending to close it off from outside influences, especially those which run counter to its value orientation.\(^{71}\) In contrast, Culhane, although viewing Kaufman's thesis as important to the organization's behavior, concludes the Forest Service is neither so closed nor so conforming that it is unresponsive to diverse interest group influence.\(^{72}\)

Culhane explains that post-1970 conditions are different than those that existed during the periods observed by Foss and Kaufman.\(^{73}\) Culhane notes the increased recreational use of public lands, the rise of the influence of environmental groups, and the public participation mandates of the 1970's legislation.\(^{74}\) All of these events have helped ensure that public land management agencies are responsive to a broad set of interest groups.\(^{75}\) The presence and strength of environmental groups have given the Forest Service and Bureau of Land Management a balance to the influence of economic user groups such as the forest products and livestock industries.\(^{76}\) The strength of these multiple clientele groups along with their divergent interests preclude the possibility of capture by any one group.\(^{77}\) The Forest Service and Bureau of Land Management have become more open and receptive to the input of all groups out of the desire to avoid conflict.\(^{78}\) The phenomenon of anticipating conflict and making decisions in order to avoid conflict is referred to by Carl Friedrich as the "rule of anticipated reactions."\(^{79}\)

On the importance of anticipated reactions in agency decision-making, Culhane states the following:

A primary contemporary mechanism for group influence in agency policymaking is the intermingling of public participation with decision processes, such as comprehensive land use planning and very closely related functional planning, that result in fundamental allocations of public lands to specific uses. . . .

The second mechanism for integrating group interests into local administrators' decision making was based more on administrators' intuition and experience than on the direct articulation of group preferences in the planning process. . . . Administrators reported that they tried to consider group needs and preferences in their decision-

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\(^{71}\) Twight, supra note 2, at 19-28, 108-09.
\(^{72}\) Culhane, supra note 3, at 283-85, 310-13, 322-41.
\(^{73}\) Id. at 216.
\(^{74}\) Id. at 217, 232-33.
\(^{75}\) Id. at 215-18, 227-29, 232-33, 258-59.
\(^{76}\) Id. at 215-19.
\(^{77}\) Id. at 215-19, 226-29, 332-36.
\(^{78}\) See id. at 215-19, 233-34, 279-85.
\(^{79}\) Id. at 280 (referring to C. Friedrich, CONSTITUTIONAL GOVERNMENT AND POLITICS 16-18 (1937)).
making, based on their own intuition and experiential understanding of client group positions and interests. That is, interest groups influenced them through the mechanism that Carl Friedrich termed "the rule of anticipated reactions."

Decision making based on anticipated reactions stems from the very human desire to avoid conflict. 80

The conflicts and negative reactions that agency decision-makers try to avoid take on many forms, such as adverse stories in the media, congressional inquiries, litigation, and even arson. 81 Culhane observes that:

To use anticipated reactions in their decision making, administrators had to be able to accurately identify group preferences and predict what group reactions to their decisions would be. Every interaction between an agency official and a client could tell the official something about that client's views regarding public land management. . . . Public participation was a particularly useful learning forum for administrators who based their decisions on anticipated reactions. . . . Participation served to educate administrators about group preferences and how strongly groups felt about those preferences. . . . Administrators suggested that they relied primarily on their own experience, developed from their own and their colleague's past successes and failures, in anticipating group reactions. 82

Although he notes the important role of environmental groups since the 1960's and 1970's, 83 Culhane does not go into the history of the past conflicts that have presumably conditioned these agencies into anticipating such reactions. 84 However, he observes that before 1970 the Forest Service and the Bureau of Land Management had no buffer to counteract the demands of economic user groups to exploit the public lands, other than their strong professional commitment to protect the resource base and its future productivity. 85 Since 1970 both agencies have found environmental groups useful in fending off pressures that would tend to overexploit the public lands. 86 Likewise, these agencies have used the influence of consumptive user groups to counter excessive demands of environmental groups. 87 Culhane best sums up his assessment of the capture-conformity

80. Id. at 274-80.
81. Id. at 280.
82. Id. at 280-81.
83. Id. at 216-18.
84. This influence has in fact resulted from the magnitude and frequency of successful challenges made by such groups to the policies of these agencies during this period. See, e.g., S. DANA & S. FAIRFAX, FOREST AND RANGE POLICY: ITS DEVELOPMENT IN THE UNITED STATES chs. 8-11 (2d ed. 1980). This is alluded to in CULHANE, supra note 3, at 281, but he does not discuss the matter in any detail. These conflicts have often been bitter. See DANA & FAIRFAX, supra note 84; TWIGHT, supra note 2.
85. CULHANE, supra note 3, at 216.
86. Id. at 218.
87. Id. at 229, 336.
theories in the following: "Groups... do influence public lands managers, but because local constituencies are not composed solely of commodity users, as the capture thesis assumes, the resulting pattern of influence is quite different from that posited by thesis adherents. The service and the bureau are neither uniformly captured nor uncaptured, but variably captured." 88

As evidence to back up his assertions, extensive interviews with managers and decision-makers of both agencies are cited. 89 He also constructs an interest group influence model and tests the model with data taken from sample ranger districts and Bureau of Land Management resource areas using multiple regression methods. 90 On the basis of that evidence Culhane concludes that "the groups that were most affected by and interested in a particular policy output have the greatest relative influence on the level of that output." 91 He interprets these results as demonstrating that both agencies are, in fact, responsive to all diverse interest groups. 92

There are some important omissions in his analysis, however. For example, it is not clear how conflicts between the interests of the various groups are handled. In such cases does one interest group exert greater influence than another? What factors determine the greater influence? Are compromises made? How are they made? Culhane aggregates the data from his samples in such a way that it is not possible to determine how conflicts between interest groups were resolved. There is also no discussion of possible mechanisms for resolving such conflicts.

Nevertheless, Culhane views the desire to avoid conflicts (the rule of anticipated reactions) as being so strong that agency decision-makers are compelled to consider the wishes of the various interest groups. Public participation plays an important role by providing information about these wishes. The agencies are responsive to diverse interests. This is quite a different view from that of Twight.

CAUSES FOR THE DIFFERENCES IN PERSPECTIVES

Differences in perspectives can be traced to two basic causes. The first is related to the role that professional ideology takes in each of the perspectives. It is paramount in Twight's model while it takes quite a secondary role to the rule of anticipated reactions in Culhane's. In addition, the nature of that ideology is seen quite differently by the two, resulting in different expectations about its consequences for agency decision-making. The second cause for contrasting perspectives is that the

88. Id. at 334.
89. Id. at 30. See generally 208-88.
90. Id. at 31. See generally 289-318, 364-89.
91. Id. at 300.
92. Id. at 333, 334.
data and events used by Twight and Culhane as evidence to substantiate their views are drawn from differing historical periods.

Twight views Forest Service professional ideology as being centered on sustained yield, timber primacy, scientific elitism, telic forestry, and technocracy. All of these concepts, as indicated by Twight, revolve around the scientific and rational management of timber. Twight's connection of the historical orientation of the forestry profession and the Forest Service to timber is well-documented. In fact, many professional foresters still define or describe sustained yield forest management as a technique of timber management.

In contrast, Culhane views Forest Service ideology as being focused on multiple use. Culhane bases this assertion on the following: 1) his interpretation of Pinchot's maxim of "the greatest good for the greatest number in the long run," 2) Kaufman's observations of the Forest Service's professed commitment to multiple use, 3) Culhane's own observations of such professed commitment, 4) the Multiple-Use Sustained-Yield Act of 1960, and 5) the results of the statistical analysis of his interest group influence model. Culhane asserts the multiple use orientation of the Forest Service is more than just a recently acquired ideology: it originated as a basic philosophy of the progressive conservation movement itself.

This is clearly at odds with Twight's view. When one examines the sources cited by the two authors, however, and supplements those with additional histories of conservationism and public lands policy, the hat tips in favor of Twight; at least towards the point that multiple use management as a professional philosophy did not originate with the progressive conservation movement. Twight observes that multiple use philosophy has evolved rather gradually as a response to critics and preservationists:

The words "multiple use" did not appear in Forest Service rationale until the late 1930s and the concept was not prescribed by its manual until 1958. Indeed, the Service's adherence to utilitarian values had long been considered quite compatible with the crop production ide-

93. See supra notes 32-38 and accompanying text.
94. E.g., G. PINCHOT, THE FIGHT FOR CONSERVATION (1910); Gould, supra note 26, at 3-4; J. Bennett, Economics and the Folklore of Forestry, Ph.D. dissertation, Syracuse University (1968).
97. CULHANE, supra note 3, at 6, 69, 110, 332-36.
98. Id. at 6, 323.
ology of the Agriculture Department. The change to the multiple use concept, listing outdoor recreation first among the uses of national forests, seems to have been stimulated by Park Service competition. As Richard Polenberg has observed, however, before the 1960 Multiple Use Act, Pinchot’s followers seldom deviated from his pronouncement that “a forest is a crop, and forestry is uniformly classed as a branch of agriculture.”

Ironically, Culhane himself presents a number of quotes which support Twight’s contention:

1) Preservationists recall Pinchot’s utilitarian view of conservation (for example, his view of the forest as a “wood factory”), and allege a production orientation of modern forestry professionals to explain the service’s bias against wilderness. There is some truth to the preservationists’ criticism.

2) The service’s reluctant effort at [public] participation was reflected in one forest’s information and education (I&E) plan, a skimpy and uninspired document on the use of press releases. (The plan’s skimpiness was understandable; as the forest’s I&E officer put it, “I spend 110 percent of my time on timber management, and the rest on I&E).°

3) Some rangers noted that the environmentalist position was less likely to prevail when a polarized participation system allowed the service full flexibility because its policies, and its administrators’ professional values, favored more utilitarian decisions.

Culhane’s evidence for a multiple use orientation may be more convincing if one examines the present day Forest Service, rather than debating the historic nature of its value orientation. Regardless of whether Culhane is correct about the agency’s past, it is the agency’s present orientation which is most pertinent to understanding how current decisions and policies are made. Is the Forest Service’s professional value orientation still focused on sustained yield and timber primacy, while multiple use is proclaimed for defensive purposes, as Twight appears to suggest? Or is multiple use “the cornerstone of these agencies’ [Forest Service and Bureau of Land Management] policies and their officers’ professional beliefs,” as Culhane asserts? Expectations about the agency’s openness and responsiveness to public input are obviously related to the answers to these questions. If it has a strongly focused orientation emphasizing sustained yield timber production, it will likely resist inputs which seek

100. TWIGHT, supra note 2, at 111.
101. CULHANE, supra note 3, at 15.
102. Id. at 238.
103. Id. at 240.
104. Id. at 215.
to impede this goal. If the agency is multiple use oriented, it will more naturally be open to the inputs of diverse interests.

Noting that the two authors focus on data and events taken from different time periods leads to the second possible cause of differences in their perspectives. Namely, the differences observed by them may be the result of real historical changes that have occurred to and within the agency over the periods studied by them. Twight focuses on events of the first half of the century. Culhane analyzes data taken in the 1970's.

Culhane notes that a "change" occurred in the 1970's, although he sees this change more as a change in social and political events than a change within the agency. These changes included the enactment of key legislation (including the National Environmental Policy Act, the National Forest Management Act, and the Federal Land Policy and Management Act) and the rising influence of environmental groups. Culhane observes that many in the Forest Service viewed the increased interest and activities of environmental groups to be directly related to a concurrent increase in the recreational use of the public lands. In fact, many agency officials considered environmental conflicts to be synonymous with recreational conflicts. In any event, it was the increasing pressures from these groups and ensuing conflicts that led to the recognition that environmentalists (or "recreationists") formed an important and powerful constituency group, according to Culhane. Further, the desire to avoid intensified conflict (the rule of anticipated reactions) has made the Forest Service very much responsive to environmentalists as well as other constituency groups.

Twight's case study represents a detailed accounting of one such conflict with environmentalists. An anticipated response may have gradually developed over time as a result of such repeated episodes. Further, with the environmental legislation of the 1970's the potential and ability of environmental groups to intensify those conflicts has greatly increased.

Using pre-1970 events as evidence, Twight argues that the Forest Service does not anticipate change but instead responds to forces of change only under desperate circumstances and as a last resort because of its strong ideological commitment and closed organizational structure.
cusing on post-1970 data, Culhane concludes that the Forest Service is responsive to the forces of change and, in fact, attempts to anticipate them. Culhane asserts the agency does so precisely to avoid the types of conflict Twight describes.

It is on this historical point that the differences between the two perspectives may be explained: The writers may accurately be describing the Forest Service, but different Forest Services in different time periods. Thus the two views may actually complement rather than contradict each other. In fact, after the "change of 1970," the new Forest Service may be receptive to public participation and responsive to divergent constituency groups as asserted by Culhane. Nevertheless, its strong traditional value orientation and its well developed organizational structure may still exert a significant influence on the agency's decision-making as Twight argues.

Although Culhane made the testing of the capture-conformity spectrum the focus of his analysis, perhaps a more pertinent analysis would be focused on a spectrum dealing with agency openness to public influence versus agency commitment to a traditional value orientation. An analysis of such a spectrum is the purpose of this paper.

THE RARE II DECISIONS

Policy making processes are complex and factors influencing the outcomes are many. Although much has already been written, ideas about these processes keep changing as new data are acquired. When works as detailed and thought out as those by Twight and Culhane lead to contrasting pictures, it may be more logical to assume that each contains truths which represent important pieces of a puzzle than to conclude that each piece by itself represents the entire picture. As more pieces are filled in, a more complete picture may eventually emerge. The following data and analysis taken from the Forest Service's RARE II proceedings are intended to provide additional, and more recent, evidence for evaluating agency decision-making. Special attention is given to possible integration of findings and perspectives.

RARE II (the second Roadless Area Review and Evaluation), officially began in June of 1977 and continued through the issuance of its Final Environmental Statement of January, 1979. The purpose of RARE II was to identify the remaining National Forest lands that could be classified as "roadless." A "roadless area" was defined to be "an area exclusive of improved roads constructed or maintained for travel by means of

116. Id.
117. RARE II, supra note 14, at 99.
motorized vehicles intended for highway use." In addition, the project was intended to evaluate these areas for designation as "wilderness" or "nonwilderness" areas. A wilderness designation would preclude any alterations to the area affecting its natural condition. A nonwilderness designation would leave the area open to any other types of use, including management for timber, extraction of minerals, developed and motorized recreation, and any other activities allowed on nonwilderness National Forests consistent with existing plans and the National Forest Management Act of 1976. 

The efforts of RARE II resulted in the recommendations for wilderness classification presented to Congress in the Final Environmental Statement. Of the 62,036,904 acres under consideration, the Forest Service recommended that 15,088,838 acres be designated wilderness, 36,151,558 acres be designated nonwilderness, and 10,796,508 acres be set aside for further evaluation under the designation "further planning." 

These recommendations resulted in considerable controversy, the climax of which is best represented by the successful legal action mounted by environmentalists and the State of California in California v. Bergland. In that lawsuit Federal District Court Judge Lawrence K. Karlton ruled that the National Environmental Policy Act of 1969 had been violated by the RARE II Final Environmental Statement. He stated that site-specific data on the roadless areas were inadequate, particularly those related to wilderness criteria. Karlton was critical of RARE II on a number of other points, including the adequacy of the range of alternatives considered.

118. Id. at 6.
119. Id. at 7, 9.
121. RARE II, supra note 14, at 96.
125. Id. at 38-41.
128. Id. at 63.
129. Id.
130. Id. at 44-53.
RARE II DECISIONS

He ruled that this range was too skewed toward nonwilderness designation.\(^{131}\)

Although the events resulting from the political and legal controversy generated by RARE II might themselves be used as evidence to assess Forest Service decision-making, the approach taken in this paper is to conduct a systematic analysis of the decision process itself as revealed in the RARE II Final Environmental Statement. Specifically, a review of the Forest Service’s stated criteria for making wilderness/nonwilderness/further planning designations is made. Then by statistical analysis of roadless area site-specific data, the adherence to these criteria is tested. Results of this analysis reveal the extent to which the Forest Service achieved a model of rational decision-making and the extent to which public input apparently influenced the outcomes. These results shed light on the contrasting perspectives of Forest Service decision-making presented by Twight and Culhane and the agency’s responsiveness to interest group influence and public participation.

THE RARE II DATA

Each of the RARE II roadless areas were evaluated on a number of variables, including resource potential (both renewable and nonrenewable) and wilderness quality.\(^{132}\) The Forest Service’s stated purpose was to identify those areas that were best suited for wilderness designation and those best suited for nonwilderness designation.\(^{133}\) In addition to evaluating the physical attributes of each roadless area, the Forest Service sought input from the public in order to evaluate the demand for a wilderness or nonwilderness designation for each area.\(^{134}\) The Forest Service began by holding public hearings. It also solicited written comments and, as the Final Environmental Statement indicated, counted signatures for or against wilderness designation.\(^{135}\) The Forest Service outlined a “10-step decision process” indicating how the data were to be used and the order of importance of criteria.\(^{136}\) The following roadless area attributes

\(^{131}\) Id. at 51-52.

\(^{132}\) RARE II, supra note 14, at 21-22.

\(^{133}\) Id. at 95.

\(^{134}\) Id. at 22-23, 32-33.

\(^{135}\) Id. at 32-33, 99-100. The Draft Environmental Statement indicated that content of submitted comments, rather than the number of signatures on form letters, would be weighed in making final recommendations. RARE II, supra note 126. The Final Environmental Statement indicated that signature counts were in fact used as the primary public input variable. RARE II, supra note 14, at 32-33. Thus in evaluating the Forest Service’s openness to public influence, the issue of whether the agency deliberately misled environmental groups is an important one. Judge Karlton ruled in Bergland that environmental groups were indeed misled. If this was a deliberate attempt by the agency in order to avoid wilderness designations, then TWIGHT’s contention that the Forest Service has a utilitarian orientation which influences its decisions is supported.

\(^{136}\) Id.
were indicated as important in making the allocations: 1) renewable resource potential (timber, grazing, dispersed motorized recreation, and dispersed nonmotorized recreation), 2) nonrenewable resource potential (hard rock minerals, oil and gas, uranium, coal, geothermal energy, and low value bulk materials), 3) wilderness quality, and 4) public preference (measured by numbers of signatures for specific allocations to wilderness, nonwilderness, and further planning). These four criteria were referenced in steps 7, 6, 5, and 1 of the Forest Service's decision process. Since the 10-steps "were applied to the analysis base in reverse order of their import," this implies that renewable resource potential was the most important and influential roadless area attribute in making the allocations, followed by mineral potential, wilderness attribute, and public input, in that order. The remaining steps of the 10-step process dealt with non-site-specific attribute criteria, such as perceptions by the Regional Forester of public agreement (Step 2), and national issues involving impacts on housing starts, balance of trade, returns to the Treasury, inflation, and national employment (Step 10).

Table 1 summarizes the site-specific variables reported in the Final Environmental Statement for each roadless area and stated to be important in the 10-step decision process. In most cases the unit of measurement of each variable or attribute is self-explanatory. However, some need further explanation.

Development Opportunity Rating System (DORS) was a transformed benefit-cost ratio used as an overall evaluative measure of renewable resource potential. In computing DORS for a roadless area the benefits and costs of developing the following outputs were determined: a) saw-timber and other wood products, b) grazing, c) dispersed motorized and nonmotorized recreation, d) developed recreation, e) hunting and fishing, and f) nonhunting wildlife. Benefit values for each of the outputs were those to be used in the draft 1980 RPA Renewable Resources Program. Costs of producing these outputs included resource management, road building, and fire management. The flow of costs and benefits for the next 100-year period were discounted at 6 and $5/8$ percent per year to provide present value information. DORS was computed from the bene-

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137. Id.
138. Id.
139. Id.
140. Id.
141. Id. at W-1 to W-3.
142. Id.
144. RARE II, supra note 14, at W-2.
145. Id. at W-3.
TABLE 1
Site Specific Roadless Area Data by Attribute Categories

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential Timber Yield (MMBF)</td>
<td>Hard Rock Minerals</td>
<td>WARS\textsuperscript{3}</td>
<td>W-Signatures</td>
</tr>
<tr>
<td>Programmed Timber Harvest (MMBF)</td>
<td>Oil and Gas</td>
<td></td>
<td>WA-Signatures</td>
</tr>
<tr>
<td>Grazing (AUM)</td>
<td>Uranium</td>
<td></td>
<td>FP-Signatures</td>
</tr>
<tr>
<td>Disp. Motor. Rec. (MRVD)</td>
<td>Coal</td>
<td></td>
<td>FPA-Signatures</td>
</tr>
<tr>
<td>Disp. Non-motor Rec. (MRVD)</td>
<td>Geothermal</td>
<td></td>
<td>NW-Signatures</td>
</tr>
<tr>
<td>DORS Rating\textsuperscript{4}</td>
<td>Low Value Bulk Materials</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{1}Rating ranges between 0 and 15.
\textsuperscript{2}Ratings range between 0 and 100.
\textsuperscript{3}Rating ranges between 4 and 28.

Key: MMBF = Millions of board feet of timber
MRVD = Thousands of recreation visitor days
AUM = Animal unit months of forage
W = Wilderness
WA = Wilderness with adjustments to roadless area boundaries
FP = Further planning
FPA = Further planning with adjustments to roadless area boundaries
NW = Nonwilderness

The fit/cost ratio to produce a scale ranging from 0 to 15.\textsuperscript{146} DORS ratings under 5 indicate that costs exceed benefits; ratings over 5 indicate benefits exceed costs.\textsuperscript{147}

Wilderness Attribute Rating System (WARS) was an attempt to assign a quantitative measure of wilderness quality to each roadless area.\textsuperscript{148} Each area was judged by “an interdisciplinary team of Forest Service professionals to insure the most objective evaluation possible.”\textsuperscript{149} Four factors were used in the evaluation: 1) naturalness, 2) apparent naturalness, 3) opportunity for solitude, and 4) opportunity for a primitive recreation experience.\textsuperscript{150} Each factor was rated on a 7-point scale, resulting in a composite score ranging from 4 to 28, with 28 signifying highest wilderness quality.\textsuperscript{151}

Each mineral output was rated for its production potential on a scale ranging from 0 to 100, with 100 indicating the greatest potential.\textsuperscript{152}

\textsuperscript{146} Id.
\textsuperscript{147} Id. at W-3. By mathematical calculation anytime total benefits/total costs = 1, DORS = 5.
\textsuperscript{148} Id. at 21.
\textsuperscript{149} Id. at 22.
\textsuperscript{150} Id. at 21.
\textsuperscript{151} Id. at 21.
\textsuperscript{152} Id. at 22.
Public input was evaluated through the counting of signatures for a specific designation. As such, individually written letters and form letters were given equal weight.

THE ANALYSIS

The Forest Service’s 10-step decision process, with its emphasis on importance of site-specific attributes of the roadless areas (particularly economic ones) in making its designations, presents a rational model of decision-making similar to Allison’s Model I. If the Forest Service indeed applied and followed the 10-step decision process, then we would expect that variables listed would be significantly correlated with the type of designation made (that is, wilderness, nonwilderness, or further planning). Further, renewable resource measures would be most significantly related to designations while the public input variables would be least significantly related. Thus we would expect that, on the average, roadless areas that exhibited high resource potential would have a high probability of being designated nonwilderness. Those not exhibiting high resource potential would then be evaluated for wilderness potential and considered for that designation. All designations would be fine tuned via public input.

If Culhane is correct about the importance of the rule of anticipated reactions, we should find the public input variables significantly related to designations. Although he views rational planning processes as significant, he makes no statement concerning the relative importance of those processes to the “rule” on agency decision-making, concentrating his efforts instead on demonstrating the importance of the latter. Thus, correlating the roadless area variables with designation should also help to determine which factor exerted a greater influence. If rationality (as embodied in the 10-step process) prevails in the agency’s decision-making, we should find that the order of significance of the variables to the designations is that as described above. If public input is more significant we should expect to find that the signature count variables are more significantly related to the designations.

Twight asserts that the Forest Service’s strong utilitarian orientation, emphasizing sustained timber production, biases its decisions toward consumptive activities and away from preservationist objectives. Further, because of its relatively closed organizational structure the Forest Service is unresponsive to public input, especially when the demands conflict with its professional ideology. If Twight is correct, then we should find a tendency to designate areas as nonwilderness regardless of public input, and perhaps regardless of resource potential as well. Thus, we would not

153. Id. at 32-33.
expect the public input variables to be significantly correlated with designation, but a significant correlation between resource potential and designation would be a more logical expectation. Greater emphasis on nonwilderness designation would be anticipated since this designation would facilitate management of the National Forests under the tenets of sustained yield and timber primacy and would be more compatible with the agency's utilitarian orientation.

Stepwise discriminant analysis was employed to test the above relationships. The analysis was performed using the Statistical Package for the Social Sciences. A 0.05 level of significance was used for all tests. Discriminant analysis was employed because the dependent variable, wilderness/nonwilderness/further planning designation, is categorical, while the independent variables (WARS, DORS, mineral ratings, etc.) are assumed to be approximately normally distributed and possibly intercorrelated. An assumption that the independent variables were normally distributed affects how the results of this analysis were interpreted.

Analysis was focused on the four Rocky Mountain states of Montana, Wyoming, Colorado, and New Mexico. The analysis was conducted on a state by state basis because it was anticipated that varying resource potentials in different states would make certain variables more important than others in arriving at wilderness/nonwilderness/further planning designations. For example, it was expected that timber might be important in making designations in Montana but that it probably would not be important in New Mexico. Narrowing the study to four states allowed for an in-depth analysis while also taking into consideration variations that would result from differing data, resource potentials, public constituencies, and decision-making personnel.

Most roadless areas had missing values for at least one of the site-specific variables. The Final Environmental Statement asserts that: "A primary compelling reason for allocating an area to further planning was the need for gathering of additional data on which to base a decision." In spite of this statement, it was found that at least 90 percent of the roadless areas with missing data were classified either wilderness or nonwilderness. In analyzing the relationships of the site-specific data to the allocation made, a zero was assigned to each variable with missing values. Of three procedures tested, including assigning means to missing values or excluding cases with missing values, this method generally explained the greatest proportion of variance in the analysis.

156. NIE, supra note 155.
157. RARE II, supra note 14, at 96.
THE RESULTS

Table 2 summarizes the results of the stepwise discriminant analysis for the four states. Only those variables that were statistically significant in predicting wilderness/nonwilderness/further planning designation in the four states with their rank of relative importance are shown. The details of the analytic results are displayed in Tables 3 to 6.

Table 2 indicates that WARS was significant in making allocations in each state. Signatures (the public input variables) were significant in three of the states, and along with WARS, constituted the most important class of predictive variables in making the RARE II designations there; signature counts consistently occupied ranks 1 or 2. Resource variables, on the other hand, were not especially significant in any of the states. For no state was a resource variable ranked 1 or 2. In two of the states, resource potential appeared entirely unrelated to making nonwilderness designations. Generally, resource potential appeared more significantly related to further planning designation, and apparently occurred when there were conflicts with signature count results. In states where resource

### TABLE 2

<table>
<thead>
<tr>
<th>State</th>
<th>Wilderness Designation</th>
<th>Nonwilderness Designation</th>
<th>Further Planning Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montana</td>
<td>4: WARS</td>
<td>2: NW-Signatures</td>
<td>1: FP-Signatures</td>
</tr>
<tr>
<td></td>
<td>7: W-Signatures</td>
<td>5: Grazing</td>
<td>3: Uranium Potential</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6: Potential Timber Yield</td>
</tr>
<tr>
<td>Wyoming</td>
<td>1: WARS</td>
<td></td>
<td>2: NW-Signatures</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3: W-Signatures</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4: Programmed Timber Harvest</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5: Oil &amp; Gas Potential</td>
</tr>
<tr>
<td>Colorado</td>
<td>1: W-Signatures</td>
<td>5: Grazing</td>
<td>4: WA-Signatures</td>
</tr>
<tr>
<td></td>
<td>2: WARS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3: Non-motorized</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recreation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6: Geothermal Potential</td>
</tr>
<tr>
<td>New Mexico</td>
<td>1: WARS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number preceding variable indicates its rank of predictive importance in designating roadless area wilderness, nonwilderness, or further planning; "1" indicates highest rank.

Key:  
W = Wilderness
WA = Wilderness with adjustments to roadless area boundaries
FP = Further planning
FPA = Further planning with adjustments to roadless area boundaries
NW = Nonwilderness
variables were significant, they occupied low ranks. DORS (the benefit-cost measure) appeared irrelevant altogether in making allocations: it was not significant for any of the states. In fact, for those nonwilderness areas where DORS was computed, average scores were below 5 in two states (Table 7), indicating that costs would exceed the benefits of renewable resource development. In addition, average DORS ratings for wilderness areas were just as likely as not to exceed ratings for nonwilderness areas.

Details of the stepwise discriminant analysis for each state are given in Tables 3 to 6. Discriminant analysis produces as many discriminant

### TABLE 3

**Discriminant Analysis of Wilderness/Nonwilderness/Further Planning Designations for Montana**

<table>
<thead>
<tr>
<th>Standardized Discriminant Function Coefficients</th>
<th>Sum of Coefficients</th>
<th>% Variation</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1st Function</strong></td>
<td><strong>2nd Function</strong></td>
<td><strong>(Explained by Eigenvalue)</strong></td>
<td></td>
</tr>
<tr>
<td>WARS</td>
<td>0.16</td>
<td>-0.75</td>
<td>0.41</td>
</tr>
<tr>
<td>Grazing</td>
<td>-0.29</td>
<td>0.24</td>
<td>0.27</td>
</tr>
<tr>
<td>Potential Timber</td>
<td>0.26</td>
<td>0.21</td>
<td>0.24</td>
</tr>
<tr>
<td>Uranium</td>
<td>0.61</td>
<td>0.17</td>
<td>0.43</td>
</tr>
<tr>
<td>W-Signatures</td>
<td>0.12</td>
<td>-0.39</td>
<td>0.23</td>
</tr>
<tr>
<td>FP-Signatures</td>
<td>0.66</td>
<td>0.32</td>
<td>0.52</td>
</tr>
<tr>
<td>NW-Signatures</td>
<td>-0.64</td>
<td>0.28</td>
<td>0.49</td>
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</table>

**Discriminant Function**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>0.49</td>
<td>-1.35</td>
</tr>
<tr>
<td>NW</td>
<td>-0.41</td>
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<tr>
<td>FP</td>
<td>1.68</td>
<td>0.73</td>
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**Categories Distinguished by the Function**

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<tr>
<th></th>
<th>FP/NW</th>
<th>FP/W</th>
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</thead>
<tbody>
<tr>
<td>Canonical Correlations</td>
<td>0.58</td>
<td>0.53</td>
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</table>

**Significance Test of Eigenvalues**

<table>
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<tr>
<th>1st Function</th>
<th>2nd Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>58%*</td>
<td>42%</td>
</tr>
<tr>
<td>$X^2 = 159.8$</td>
<td>$X^2 = 69.8$</td>
</tr>
<tr>
<td>$p = 0.00$</td>
<td>$p = 0.00$</td>
</tr>
</tbody>
</table>

*Percent of Variance Explained by the Eigenvalue

**Key:**

- **W** = Wilderness
- **NW** = Nonwilderness
- **FP** = Further Planning
TABLE 4

Discriminant Analysis of Wilderness/Nonwilderness/Further Planning Designations for Wyoming

<table>
<thead>
<tr>
<th>Site</th>
<th>Specific</th>
<th>Variables</th>
<th>Discriminant Function</th>
<th>Category</th>
<th>Means</th>
</tr>
</thead>
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<tr>
<td></td>
<td></td>
<td></td>
<td>1st Function</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2nd Function</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WARS</td>
<td>Programmed</td>
<td>Timber Harvest</td>
<td>0.42</td>
<td>0.46</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-0.70</td>
<td>-0.14</td>
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<td>0.36</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2nd Function</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Specific</td>
<td>Oil &amp; Gas</td>
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<td>-0.10</td>
<td>0.52</td>
<td>0.23</td>
</tr>
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<td></td>
<td></td>
<td>0.23</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Variables</td>
<td>W-Signatures</td>
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<td>0.49</td>
<td>0.15</td>
<td>0.39</td>
</tr>
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<tr>
<td>Discriminant</td>
<td>W</td>
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</tr>
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<td>Means</td>
<td>FP</td>
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<td>2.87</td>
<td>1.44</td>
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<tr>
<td>Categories</td>
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<td>FP/NW</td>
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<td>Distinguished</td>
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<td>FP/W</td>
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<tr>
<td>by the Function</td>
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</table>

Canonical Correlations

<table>
<thead>
<tr>
<th>Sum of Coefficients</th>
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<tbody>
<tr>
<td>X</td>
</tr>
<tr>
<td>% Variation</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Standardized Discriminant Function Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum of Coefficients</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>% Variation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1st Function</th>
<th>2nd Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>70%*</td>
<td>30%</td>
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<tr>
<td>X² = 78.7</td>
<td>X² = 25.7</td>
</tr>
<tr>
<td>p = 0.00</td>
<td>p = 0.00</td>
</tr>
</tbody>
</table>

*Percent of Variance Explained by the Eigenvalue

Key: W = Wilderness
     NW = Nonwilderness
     FP = Further Planning
TABLE 5
Discriminant Analysis of Wilderness/Nonwilderness/Further Planning
Designations for Colorado

<table>
<thead>
<tr>
<th>Sum of Coefficients</th>
<th>Standardized Discriminant Function Coefficients</th>
<th>% Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1st Function</td>
<td>2nd Function</td>
</tr>
<tr>
<td>WARS</td>
<td>0.47</td>
<td>-0.46</td>
</tr>
<tr>
<td>Site Grazing</td>
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<td>Site Specific</td>
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<tr>
<td>Variables Geothermal</td>
<td>-0.26</td>
<td>-0.16</td>
</tr>
<tr>
<td>W-Signatures</td>
<td>0.85</td>
<td>-0.02</td>
</tr>
<tr>
<td>WA-Signatures</td>
<td>0.32</td>
<td>0.79</td>
</tr>
</tbody>
</table>

Discriminant Function
Category Mean

W/WN    NW    FP/W

Canonical
Correlations

0.59
0.22

Significance Test of Eigenvalues

<table>
<thead>
<tr>
<th></th>
<th>1st Function</th>
<th>2nd Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>91%*</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>$X^2$ = 143.5</td>
<td>$X^2$ = 15.7</td>
<td></td>
</tr>
<tr>
<td>p = 0.00</td>
<td>p = 0.00</td>
<td></td>
</tr>
</tbody>
</table>

*Percent of Variance Explained by the Eigenvalue

Key: W = Wilderness
NW = Nonwilderness
FP = Further Planning
WA = Wilderness with Adjustments to Roadless Area Boundaries
### Table 6

**Discriminant Analysis of Wilderness/Nonwilderness/Further Planning Designations for New Mexico**

<table>
<thead>
<tr>
<th>Site Specific Variables</th>
<th>Standardized Discriminant Function Coefficients</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARS</td>
<td>WARS</td>
<td>1.00</td>
</tr>
</tbody>
</table>

**Discriminant Function Category Mean Differences**

- **Means**
  - W: 0.25
  - NW: -0.20
  - FP: 0.64

**Distinguished by the Function**

- FP/NW

**Canonical Correlation**

- 0.31

---

- **Significance Test of Eigenvalues**
  - 100%*
  - \(X^2 = 9.6\)
  - \(p = 0.01\)

*Percent of Variance Explained by the Eigenvalue

- **Key:**
  - W = Wilderness
  - NW = Nonwilderness
  - FP = Further planning

---

Since only one variable in the stepwise discriminant analysis was found to be statistically significant, only one discriminant function was produced.

- **Results for Montana**

  The category means of the first discriminant function indicate that for Montana the first function distinguishes between further planning and...
nonwilderness (Table 3). Category means of the second function indicate that it distinguishes between further planning and wilderness. The signs in front of the means and the standardized discriminant function coefficients indicate that roadless areas with high numbers of signatures favoring nonwilderness designation and high grazing potential tended to be designated nonwilderness. Those areas with high WARS ratings and high numbers of signatures favoring wilderness designation tended to be designated wilderness. Roadless areas which scored high on potential timber yield, uranium potential, and signatures favoring a further planning designation tended to be designated further planning. Although it is not clear why areas high in potential timber yield and uranium should be designated further planning rather than nonwilderness, examination of Table 7 demonstrates that the average scores for these variables are indeed higher for further planning areas than for the other two categories. Average number of signatures favoring further planning designation is also highest for further planning areas. Thus it may be that high timber yield potential and high uranium potential were merely coincidental with the high number of signatures favoring further planning designation, which exerted the real influence on areas actually designated for further planning.

In addition to determining which site-specific variables are significantly related to designations, discriminant analysis can also be used to rank the variables in order of their predictive importance. This is because the standardized discriminant function coefficients can be interpreted similarly to standardized coefficients in linear regression. For example, the variable representing the number of signatures favoring further planning (coefficient of 0.66) has the greatest predictive significance in the first function, while WARS (coefficient of -0.75) has the greatest significance in the second. In order that the combined predictive strengths of each of the variables in the two functions could be ranked, the coefficients (ignoring signs) of each variable in the two functions were multiplied by the percent of variance explained by the respective eigenvalues and then summed. These weighted sums were then used to rank the overall predictive strength of each variable. The number of signatures favoring further planning was found to have the greatest overall predictive importance, followed by the number of signatures favoring nonwilderness status, uranium, WARS, grazing, potential timber, and the number of signatures favoring wilderness designation, in that order.

Results for Wyoming

Results for Wyoming can be interpreted similarly (Table 4). The first discriminant function distinguishes between further planning and non-
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pot. Timber (MMBF)</td>
<td>0.9</td>
<td>0.8</td>
<td>1.6</td>
<td>4.0</td>
<td>1.6</td>
<td>4.5</td>
<td>1.8</td>
<td>2.2</td>
<td>3.0</td>
<td>1.4</td>
</tr>
<tr>
<td>Prog Harvest (MMBF)</td>
<td>0.6</td>
<td>0.8</td>
<td>1.1</td>
<td>1.3</td>
<td>0.5</td>
<td>1.7</td>
<td>2.3</td>
<td>0.6</td>
<td>1.6</td>
<td>0.2</td>
</tr>
<tr>
<td>Renewable</td>
<td>Grazing (AUM)</td>
<td>1818</td>
<td>516.8</td>
<td>755.8</td>
<td>1799.8</td>
<td>4797.7</td>
<td>5930.8</td>
<td>1137.9</td>
<td>993.5</td>
<td>864.0</td>
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<tr>
<td></td>
<td>Disp. Motor Rec. (MRVD)</td>
<td>0.2</td>
<td>0.6</td>
<td>1.3</td>
<td>0.3</td>
<td>1.7</td>
<td>2.1</td>
<td>1.4</td>
<td>1.5</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>Disp. Non-Motor Rec. (MRVD)</td>
<td>2.0</td>
<td>1.7</td>
<td>4.4</td>
<td>8.0</td>
<td>2.9</td>
<td>7.7</td>
<td>18.0</td>
<td>4.8</td>
<td>16.8</td>
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<tr>
<td></td>
<td>DORS*</td>
<td>4.5</td>
<td>4.0</td>
<td>3.3</td>
<td>1.9</td>
<td>4.4</td>
<td>1.4</td>
<td>2.4</td>
<td>2.3</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>(Means excluding missing cases)</td>
<td>(4.5)</td>
<td>(4.0)</td>
<td>(3.5)</td>
<td>(4.4)</td>
<td>(5.5)</td>
<td>(5.7)</td>
<td>(3.2)</td>
<td>(2.6)</td>
<td>(3.1)</td>
</tr>
<tr>
<td>Hard Rock Minerals</td>
<td>398</td>
<td>54.0</td>
<td>60.6</td>
<td>50.1</td>
<td>49.5</td>
<td>61.8</td>
<td>522</td>
<td>47.6</td>
<td>40.0</td>
<td>62.9</td>
</tr>
<tr>
<td>Nonrenewable</td>
<td>Od &amp; Gas</td>
<td>27.3</td>
<td>23.4</td>
<td>36.5</td>
<td>32.2</td>
<td>47.3</td>
<td>58.4</td>
<td>15.6</td>
<td>33.1</td>
<td>0.0</td>
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<tr>
<td></td>
<td>Uranium</td>
<td>10.8</td>
<td>6.9</td>
<td>34.3</td>
<td>32.7</td>
<td>42.3</td>
<td>56.0</td>
<td>56.7</td>
<td>48.4</td>
<td>53.5</td>
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<tr>
<td></td>
<td>Coal</td>
<td>2.8</td>
<td>2.7</td>
<td>0.0</td>
<td>9.1</td>
<td>15.4</td>
<td>24.8</td>
<td>13.8</td>
<td>21.5</td>
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<tr>
<td></td>
<td>Geothermal</td>
<td>8.6</td>
<td>4.7</td>
<td>11.3</td>
<td>13.0</td>
<td>7.7</td>
<td>30.0</td>
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<td>19.0</td>
<td>0.0</td>
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<td>Low Value Bulk</td>
<td>25.1</td>
<td>28.0</td>
<td>26.5</td>
<td>9.7</td>
<td>7.5</td>
<td>23.0</td>
<td>0.0</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Wilderness W-Signatures</td>
<td>24.1</td>
<td>20.2</td>
<td>20.4</td>
<td>22.4</td>
<td>18.6</td>
<td>20.0</td>
<td>20.9</td>
<td>18.0</td>
<td>15.5</td>
<td>18.8</td>
</tr>
<tr>
<td></td>
<td>W-Signatures</td>
<td>1253.7</td>
<td>605.9</td>
<td>359.5</td>
<td>645.5</td>
<td>245.6</td>
<td>1961.4</td>
<td>2850.1</td>
<td>1145.7</td>
<td>2159.0</td>
</tr>
<tr>
<td></td>
<td>WA-Signatures</td>
<td>7.3</td>
<td>48.0</td>
<td>89.7</td>
<td>416.8</td>
<td>143.3</td>
<td>753.8</td>
<td>67.8</td>
<td>37.2</td>
<td>672.5</td>
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<tr>
<td></td>
<td>FP-Signatures</td>
<td>59.9</td>
<td>94.7</td>
<td>535.7</td>
<td>49.6</td>
<td>115.6</td>
<td>8.6</td>
<td>5.7</td>
<td>792.8</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td>FPA-Signatures</td>
<td>0.3</td>
<td>61.8</td>
<td>43.6</td>
<td>0.8</td>
<td>0.2</td>
<td>3.0</td>
<td>1.2</td>
<td>0.4</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>NW-Signatures</td>
<td>798.1</td>
<td>1213.6</td>
<td>715.1</td>
<td>454.9</td>
<td>428.7</td>
<td>4865.8</td>
<td>281.0</td>
<td>337.6</td>
<td>244.2</td>
</tr>
</tbody>
</table>

*Rating ranges between 0 and 15.
**Rating ranges between 0 and 100.
***Rating ranges between 4 and 28.

Key: MMBF = Millions of board feet of timber
MMBF = Millions of board feet of timber
AUM = Animal unit months of forage
W = Wilderness
WA = Wilderness with adjustments to roadless area boundaries
FP = Further planning
FPD = Further planning days
W = Wilderness
NW = Nonwilderness
wilderness. The second function distinguishes between further planning and wilderness. The direction of the signs indicate that variables having positive coefficients in both functions are predictive of further planning designation. These variables include the number of signatures favoring wilderness designation as well as the number favoring nonwilderness designation. Indeed, further planning areas in Wyoming had the highest average numbers of both types of signatures (Table 7). A likely interpretation of this result is that those roadless areas in Wyoming in which public opinion divided, as registered by signature counts, with strong support for both wilderness designation and nonwilderness designation were set aside for further evaluation.

Although the oil & gas rating has a negative coefficient in the first function, thus predicting a nonwilderness designation, its magnitude is exceedingly small (-0.10). Its magnitude in the second function reflecting further planning designation is considerably larger (0.52), indicating that high oil & gas ratings are predictive of further planning designation rather than nonwilderness designation. Confirming this interpretation, it can be seen that although the average oil & gas rating is higher for nonwilderness areas than for wilderness areas, this rating is the highest for further planning areas (Table 7). The concurrently high number of signatures favoring wilderness designation shown in Table 7 may account for why these areas were designated for further planning. Similar results were obtained for the variable representing programmed timber harvest. High values are predictive of further planning designation. An explanation for this, once again, is probably related to a concurrently high number of signatures favoring wilderness designation.

The remaining variable found significantly related to designations in Wyoming is WARS. Its largest coefficient is found in the second function (Table 4). Thus, high WARS values are predictive of wilderness designation. This interpretation is confirmed by the means listed in Table 7: areas designated as wilderness in Wyoming had the highest average WARS ratings.

The overall predictive strength of each of the variables, as for Montana, was evaluated by computing the weighted sum of the respective standardized discriminant function coefficients in both functions. The resulting ranks indicated WARS to be the most significant variable predicting designations, followed by the number of signatures favoring nonwilderness designation, the number of signatures favoring wilderness designation, programmed timber harvest, and oil & gas, in that order.

**Results for Colorado**

Results for Colorado indicate that the first discriminant function distinguishes between wilderness and nonwilderness areas and that the sec-
ond distinguishes between further planning and wilderness areas (Table 5). Direction of signs indicates that variables which have positive coefficients on the first function and negative coefficients on the second function are predictive of wilderness designation. These include WARS and the number of signatures favoring wilderness designation. Means listed in Table 7 verify this interpretation: areas designated as wilderness in Colorado have the highest average WARS rating and the highest average number of signatures favoring wilderness designation.

Coefficients for grazing and geothermal potential have larger magnitudes in the first function than in the second, indicating that these should be predictive of nonwilderness designation. Table 7 shows that average geothermal rating is highest for nonwilderness areas, as expected, but that average grazing potential for nonwilderness is second to that for wilderness. This ambiguous result may be why the magnitudes of the coefficients for these variables are rather small.

Finally, nonmotorized recreation has a larger coefficient in the first function than in the second, indicating that it is predictive of wilderness designation. The number of signatures favoring wilderness designation with adjustment to roadless area boundaries has a larger coefficient in the second function, indicating that it is predictive of further planning. Means in Table 7 verify this interpretation: areas designated as wilderness have the highest average number of visitor days of nonmotorized recreation while further planning areas have the highest average number of signatures favoring wilderness designation with adjustment to boundaries.

Computing the ranks of the predictive strengths of these variables indicates that the number of signatures favoring wilderness designation is the most significant factor in making designations, followed by WARS, nonmotorized recreation, the number of signatures favoring wilderness designation with adjustment to roadless area boundaries, grazing, and geothermal potential, in that order.

**Results for New Mexico**

WARS was found to be the only significant predictor of designations in New Mexico (Table 6). Category means (Table 6) indicate that WARS predicts further planning rather than wilderness. Indeed, further planning areas have the highest average WARS rating in New Mexico (Table 7). However, inspection of Table 7 reveals no clear pattern and leads to no obvious interpretation as to how RARE II decisions were arrived at in New Mexico. The results of the analysis for this state appear rather weak and inconclusive.

**DISCUSSION**

Taking the results of the analyses of the four states together, the following observations can be made:
1) WARS and the public input variables were the most predictive of RARE II designations.

2) Renewable and nonrenewable resource potential appeared to have little relationship to designations in general. Resource variables, as a group, ranked lowest in their predictive importance. DORS ratings indicated that, on the average, costs of renewable resource development would exceed benefits on nonwilderness designated areas for two of the four states. Further, DORS ratings for wilderness areas were as likely as not to exceed DORS ratings for nonwilderness areas.

3) Resource potential appeared to have little influence on nonwilderness designations in particular. This is evident from the above observations in 2) and the fact that average resource potentials for wilderness areas were often higher than for nonwilderness areas (Table 7).

4) In spite of little apparent regard for resource potential, as evidenced through analysis of the site-specific data, the majority of roadless areas were nevertheless classified as nonwilderness (Table 7). Nationwide only 24.3 percent of the 62 million acres of roadless area were designated wilderness, while 58.3 percent were designated nonwilderness and 17.4 percent were designated for further planning.\(^{159}\)

These results suggest a number of things. First, assertions made by the Forest Service concerning its 10-step decision process are discounted by the analysis. The Forest Service declared that site-specific attributes of the roadless areas would have the following order of importance in making designations: 1) renewable resource potential, 2) nonrenewable resource potential, 3) wilderness quality, and 4) public input. The results of this analysis indicate that the order of significance of these variables was more or less reversed. This tends to refute a model of perfect rationality in decision-making processes (Allison's Model I).

The most important findings, however, deal with the relevations this analysis makes concerning the differing perspectives of Twight and Culhane. The strong relationship found between the signature count variables and the actual designations provides positive evidence for Culhane’s view. The Forest Service did indeed appear to be responsive to public input, at least as measured by these signature count variables. What is more, public input appears to be more influential on agency decision-making than rational planning processes, a possibility Culhane did not test.\(^{160}\) Thus, Culhane’s assertion that the Forest Service is responsive to its constituency public is supported by the results of this analysis.

Is Twight therefore refuted? A further examination of the findings leads to another conclusion. First, although the use of signature counts provided visible evidence of the Forest Service’s consideration of public input,

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159. RARE II, supra note 14, at 96.

160. CULHANE states that rational planning and public input are both important in agency decision-making but makes no conclusions concerning their relative influences. CULHANE, supra note 3, at 274-85.
there were accusations that public input was used unfairly. The Draft Environmental Statement asserted that content letters would weigh more in the RARE II decisions than form letters and numbers of signatures. However, the Final Environmental Statement indicated that signature counts were in fact used in making the designations. The results of this analysis confirm that signature counts influenced the designations actually arrived at. Judge Karlton ruled that this contradiction violated the Administrative Procedure Act and misled environmental groups who concentrated their efforts on content letters. He observed that the majority of letters favoring wilderness designation were content letters while the majority of letters favoring nonwilderness designation were form letters. A decision by the Forest Service to weigh signatures rather than content after leading environmental groups to think otherwise provides substantial evidence of a utilitarian bias, as asserted by Twight.

Even when it is accepted that these signature counts constituted legitimate public input and that this type of public input was highly related to designations actually made, agency bias cannot be discounted. This is because wilderness designations were very much in the minority, suggesting the high predictive value of WARS ratings and signature counts with regard to wilderness designation may not be as meaningful as they initially appear. The majority of roadless areas were designated as nonwilderness, regardless of resource potential. While the Forest Service gave weight to WARS ratings and signature counts in determining which roadless areas to designate as wilderness, very few areas were actually designated as such. The result was to allow the majority of the roadless areas to remain subject to development and utilitarian values, once again supporting Twight's view. Thus environmentalists may have been allowed the "pick of the litter" so that most of the utilitarian values could be preserved.

CONCLUSIONS

This study attempted to evaluate the spectrum of contrasting perspectives offered by Twight and Culhane on Forest Service decision-making. Twight predicted that because of the Forest Service's strong professional ideology emphasizing sustained yield and utilitarian theories, and because of its closed organizational structure, the agency would be relatively unresponsive to public input. He suggested this would be especially true when public input ran counter to traditional Forest Service ideology, thus causing the agency to be particularly unresponsive to environmental group influence. Culhane, on the other hand, predicted the Forest Service would be responsive to public input because of the agency's desire to avoid

162. See supra notes 115-129 and accompanying text.
conflict ("the rule of anticipated reactions"). Environmental groups are as much a part of the Forest Service's constituency as consumptive user groups. Culhane suggested the Forest Service was likely to be as responsive to environmental groups as consumptive user groups because of the agency's multiple use philosophy.

The RARE II decisions provided an opportunity to evaluate these two perspectives with new evidence. The results of the analysis provide partial support for both views. That the agency was mindful of public opinion is apparent from the fact that signature counts were so highly correlated with designations. Signature counts appear to have been used to identify areas that would be acceptable to the public as designated wilderness. Nevertheless, the Forest Service apparently did not totally abandon a utilitarian focus. Two actions were effective in achieving utilitarian goals: 1) misleading environmental groups in their efforts to collect public input data, and 2) employing a "pick of the litter" strategy which allowed environmental groups to have a few "high quality" areas while preserving the majority of development options.

Thus, the evidence indicates that the Forest Service was acting between the two contrasting poles of the Twight-Culhane perspectives. Culhane's assertion that a change occurred in the 1970's causing the Forest Service to become more responsive to environmental groups out of its desire to avoid conflict appears to be correct. However, this change did not go so far as to change the professional ideology of the agency itself, which continues to exert a very important influence.

On the basis of these results it is not entirely clear how future policy decisions will manifest themselves. That will depend to a great degree on the issues involved. In the case of RARE II the dual influences of public input and professional ideology manifested themselves through "pick of the litter" allocations. Such an approach was practical in assigning designations where a sizeable collection of potential wilderness areas was available. In disputes involving a single land unit such an approach would not be possible and compromises would be difficult to make.

One could take the position that the RARE II decisions did not represent a true compromise or that the Forest Service did not respond to all its publics equitably. Such judgments are difficult to prove or disprove and depend very much on one's own value system. What is important to recognize is that the Forest Service is apparently influenced by public input, whether its response is equitable or not. The agency is also influenced by its professional ideology, whether that is rational or not or whether that serves the public interest. By recognizing how the pieces of the policy process puzzle fit together, we may begin to comprehend that process. By gaining a deeper understanding of that process we may be able to anticipate future resource policy directions and achieve some measure of control over them.