

Insights and Applications

Public Participation in Wildlife Management: What Do Stakeholders Want?

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As public participation in environmental decisions has increased, natural resource management agencies have been challenged to involve stakeholders constructively in the resolution of a variety of contentious issues. This research examines how evaluative criteria, initially derived from theory and literature and then refined based on input from agency staff and stakeholders, can provide natural resource agencies with guidance for designing context-specific stakeholder involvement strategies. To provide illustrations, we conducted inquiries in two communities experiencing wildlife management conflicts. Results suggest that quality stakeholder involvement processes use scientific information, have genuine influence on decisions, treat citizens fairly, and promote informative communication and learning.

Keywords environmental decisions, evaluative criteria, public participation, stakeholder involvement, wildlife management

Constructively involving stakeholders in the management of natural resources is a challenge for public managers in all sectors of government. Recent literature has

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focused on criteria for evaluating the success of public involvement processes after completion. Few formative evaluations appear in the literature, and lessons from reported evaluations infrequently translate into practical advice for natural resource management agencies attempting to design stakeholder involvement strategies for particular situations.

In this article, we examine how evaluative criteria may be used to improve design of stakeholder involvement processes. Based on literature and surveys of stakeholders in two communities experiencing wildlife problems, we developed criteria to aid design of public involvement strategies. Our research reveals that stakeholders' rankings of criteria have important design implications. We conclude by describing how an understanding of these rankings and associated trade-offs can contribute to both the theory and practice of citizen participation in environmental decisions.

Theoretical Background

As public involvement in natural resource management increased dramatically in the 1970s, researchers and practitioners called for systematic methods of evaluation to determine when and why various approaches to public involvement are effective (Sewell and Phillips 1979). More than two decades later, researchers and practitioners are still seeking better evaluation (Beierle and Komisky 2000; Renn et al. 1995). Although a uniform method of evaluation has not been adopted, an extensive body of literature identifies criteria useful for evaluating citizen participation in environmental decisions.

Evaluative criteria may be derived from theory, analyses of cases, or direct stakeholder elucidation (Chess and Purcell 1999). Typically, criteria are derived by examining cases and identifying characteristics apparently important for success. For example, Blahna and Yonts-Shepard (1989) completed a review of public participation literature and identified five criteria important to the quality of participation: (1) obtain input early in planning, (2) involve the public throughout the planning process, (3) obtain input representative of interested publics, (4) use personal and interactive methods, and (5) use input in development and evaluation of alternatives. Susskind and Cruikshank (1987) also developed criteria for effective public involvement, including fairness, efficiency, wisdom, and stability.

Developing criteria for effective public involvement that is grounded in theory, rather than based on analyses of cases, gained prominence in the 1990s. For example, Fiorino (1990) identified four criteria rooted in participation theory: (1) amateurs have direct participation in decisions, (2) citizens exercise some decision authority, (3) face-to-face discussion occurs, and (4) citizens participate on some basis of equality with administrative officials and technical experts. Laird (1993) built on Fiorino's analysis and included democratic criteria based on normative theories of both pluralism and direct participation. The criteria from these two theoretical perspectives have similarities: participants have some decision-making authority, and they become better informed through participation. The major difference is the emphasis on groups in pluralism compared with the emphasis on individuals in direct participation.

Renn et al. (1995) also derived normative criteria from democratic theory identifying two metacriteria: fairness and competence. Webler (1995) used Habermas' theory of communication to provide more precise definitions of these metacriteria and lay the foundation for a normative theory of "right" discourse in citizen participation. Criteria derived from theory, like those identified from cases in the

literature, are specified as qualities every participation process should embody. They do not account, however, for the variable nature of context-specific solutions.

Other studies focused exclusively on contextual concerns and elicited criteria from stakeholders. For example, U.S. Department of Energy Office of Environmental Management (DOE) researchers were interested in identifying attributes of success to be used in evaluating future public participation efforts. In contrast to criteria derived from theory and literature, Carnes et al. provided stakeholders with opportunities to identify criteria they considered most relevant. They implemented a study where recent participants in DOE decision-making activities were asked to rate and rank the importance of several attributes of successful public participation (Carnes et al. 1996). The attributes ranked highest were then used to develop performance-based indicators for evaluating public participation activities.

The three general approaches for deriving criteria described above can be used to complement each other. Indeed, methodological pluralism increasingly is becoming popular in evaluation research as a way to take advantage of the benefits of different approaches and overcome limitations inherent in any one approach (Chelimsky 1997). Lauber and Knuth (1999), for example, derived criteria from literature reviews and theory, and then refined those criteria based on feedback from citizens and agency staff. Among their conclusions was a suggested question for researchers to explore further (Lauber 1996, 292): "How much emphasis do different citizens place on different criteria in evaluating public policy decision-making procedures?"

Our study addresses that question with a focus on designing, rather than evaluating, public participation in environmental decisions. Using methodological pluralism, we initially derived criteria from theory and literature and later refined the criteria based on input from stakeholders and wildlife managers. This allowed us to use normative theories and case analyses in the literature as a foundation while still incorporating contextual concerns. The refined set of criteria was used as the basis for our questionnaire design. In the questionnaire, we asked stakeholders to rank the importance of each criterion on a scale of 1 to 5 where 1 indicated the criterion was "not at all important" and 5 meant the criterion was "very important." The rankings provided guidance for using evaluative criteria to design context-specific stakeholder involvement strategies.

Research Methods

We worked with state wildlife agencies to select two cases where controversies over management of suburban wildlife were emerging and agency staff were seeking guidance on how to constructively involve citizens in decisions.

Case 1: Elk Management in Evergreen, Colorado

Evergreen, CO, is a suburban community west of Denver that has been experiencing rapid growth of both human and elk (*Cervus elaphus*) populations. Evergreen's human population expanded from about 13,000 in 1980 to about 24,000 in 1998 (Evergreen Chamber of Commerce 1999). Over the same period, the elk population in the region including Evergreen and other nearby communities in the foothills of the Rocky Mountains increased by more than two-thirds. Growth in the elk herds did not occur in the expanses of national forest in the region; it was concentrated in suburban areas. At the time of this study, the Colorado Division of Wildlife (CDOW) was receiving unsolicited reports from Evergreen residents about elk damage to property and the risks of elk–auto accidents.

We selected elk management in Evergreen as a case study because the CDOW identified it as a situation where:

1. The issue of elk management is emerging and salient.
2. The traditional management method of hunting is likely infeasible or socially unacceptable.
3. Stakeholders have diverse wildlife values.
4. Local wildlife agency staff expressed interest in working with us to advance this research.

For comparison, we selected a study site in New York that has traits similar to the four just listed although the referent wildlife species is white-tailed deer (*Odocoileus virginianus*).

Case 2: Deer Management in Cayuga Heights, New York

The Village of Cayuga Heights is located in Tompkins County, New York. Cayuga Heights is a relatively affluent residential community that borders the city of Ithaca and Cornell University in the Finger Lakes Region of central New York State. The human population of about 4000 residents has not increased significantly in recent decades (U.S. Department of Commerce 1992). The white-tailed deer population, however, has flourished in an environment providing abundant nourishment from gardens and landscape plantings and low mortality because hunting is prohibited.

In 1998, a group of village residents conducted a petition drive to document concerns about deer in the village. Presented with these concerns, the village mayor appointed citizens to the Cayuga Heights Deer Committee in August 1998 with the charge of studying the deer situation in the village and developing recommendations for the mayor and village trustees.

We identified Cayuga Heights as a potential study site because the formation of the Deer Committee demonstrated that suburban deer management issues were emerging and salient. We learned from the New York State Department of Environmental Conservation (DEC) that traditional management methods are likely infeasible or socially unacceptable, and stakeholders had expressed diverse wildlife values. Cayuga Heights was selected as a case study when the DEC and the Deer Committee expressed interest in working with us to help them better understand how to involve stakeholders in deer management.

Comparison of Communities

Although Cayuga Heights is somewhat smaller than Evergreen in terms of geographic size and human population, the two communities share many similarities (U.S. Census Bureau 2002). Both are relatively affluent communities (median income of \$75,000–80,000) with a high percentage of white-collar workers (75–90%). More than two-thirds of the households in each community are married families. Evergreen has a higher percentage of owner-occupied dwellings (82%) than Cayuga Heights (53%). We believe this difference is attributable to a large number of undergraduate and graduate students from Cornell University who live in certain sections of Cayuga Heights. (This perception is supported by the fact that Cayuga Heights has twice the percentage of residents in the 18- to 29-year-old range than does Evergreen.) Our sampling strategy for Cayuga Heights focused on residential property owners, who we believe are more comparable to the population of Evergreen.

Data Collection

To help CDOW identify elk management alternatives for Evergreen, data from Evergreen residents were collected via a mail survey conducted from April to June 1998. A random sample of 500 households within the postal ZIP codes of 80437 and 80439 was computer generated for the initial mailing. Of the 500 questionnaires sent in the first mailing, 5% did not reach a resident of Evergreen. After three waves of follow-up mailings, we received 342 useable questionnaires before the cut-off date. The response rate, adjusted for undeliverable questionnaires, was 72%.

Social science survey literature reveals disagreement about acceptable response rates, but above 65% to 70% is often considered acceptable because at such high levels the response bias has little statistical significance (Dolsen and Machlis 1991; Goyder 1985). The impact of response bias, and thus the acceptable response rate, may be lower when the target population is homogenous (Goudy 1976), as in the case of a small community with similar demographic characteristics such as Evergreen. Thus, we did not conduct a follow-up study to assess the possible bias of omitting those who did not respond to the survey because of the combination of the high level of response and the relatively homogenous target population.

To help the village of Cayuga Heights set deer management policy, data from Cayuga Heights residents were collected using a similar mail survey conducted from November to December 1998. Questions concerning evaluative criteria were identical in both surveys. In Cayuga Heights, we sent questionnaires to 550 property owners randomly selected from a list of residential properties obtained through the Tompkins County Office of Real Property Tax Assessment. All properties identified were single- and two-family year-round residences in Cayuga Heights and were not owned by corporations or institutions. Names and addresses of residents of apartments and homeowner associations (e.g., a retirement residence complex) could not be clearly identified from the property tax roles, and they were not included in the sample. Of the 550 questionnaires sent in the first mailing, 3 were undeliverable. Like the Evergreen survey, nonrespondents received up to three additional mailings. We received 438 usable responses before the cut-off date. The response rate, adjusted for undeliverable questionnaires and nonresidents, was 81%. As discussed earlier for the Evergreen survey, a nonresponse follow-up study was considered unnecessary, given the high response rate and the relatively homogenous population.

Analysis and Discussion of Results

Data from both surveys were analyzed using SPSS 8.0 for Windows. Principal-components factor analysis with varimax rotation was used to categorize data concerning criteria for public involvement processes. The factor analysis revealed seven primary factors (or criteria) for both deer management in Cayuga Heights and elk management in Evergreen (Table 1). With the exception of the first item in the third factor, all of the statements load highly on only one factor, suggesting that the factors are distinct. The statement "considers all citizens' viewpoints" has a factor loading of 0.34 for Cayuga Heights; however, the factor loading for Evergreen is high at 0.73. Thus, the item is included in the scale because it fits conceptually, has a high loading for Evergreen, and does not significantly alter the factor analysis results for both Cayuga Heights and Evergreen whether omitted or included.

To confirm the validity of the factor analysis results, Cronbach's alpha was calculated for each of the seven factors (Table 2). With the exception of the factor

TABLE 1 Factors and Factor Loadings for Survey Items

Factors and statements	Factor loading, Cayuga Heights	Factor loading, Evergreen
The public involvement process uses scientific information		
Uses the best scientific information	0.84	0.88
Incorporates scientific facts	0.88	0.87
Relies on science	0.90	0.91
The public involvement process has genuine influence		
Genuinely influences the decision	0.83	0.85
Has a real effect on the decision	0.76	0.74
Significantly affects the decision	0.74	0.78
The public involvement process treats all citizens equally		
Considers all citizens' viewpoints	0.34	0.73
Treats all citizens equally	0.63	0.84
Does <i>not</i> deny anyone the right to be heard	0.81	0.76
Gives equal opportunity for all citizens to participate	0.79	0.78
The public involvement process promotes communication and learning		
Promotes communication between the agency and citizens	0.76	0.79
Educates citizens	0.76	0.76
Improves relationships between the agency and citizens	0.81	0.70
The public involvement process is time-effective		
Does <i>not</i> take too long	0.90	0.66
Reaches a decision quickly	0.89	0.79
The public involvement process is cost-effective		
Does <i>not</i> cost too much	0.81	0.88
Does <i>not</i> require spending public funds	0.84	0.87
The public involvement process weighs input		
Weights citizens' interests differently depending on their importance	0.74	0.82
Favors those with more at stake	0.82	0.84

Note. Both descriptive factor labels (in bold) and survey items composing each factor are listed. Respondents ranked the importance of each item on a scale of 1 to 5, where 1 indicated the item was "not at all important" and 5 indicated the item was "very important."

TABLE 2 Descriptive Statistics for Factors Formed From Survey Items

Factor	Location	Mean	Standard deviation	Cronbach's alpha	Eigen value
Uses scientific information	Evergreen	4.2	0.83	.87	2.7
	Cayuga Heights	4.3	0.87	.87	5.8
Has genuine influence	Evergreen	4.0	0.87	.83	2.2
	Cayuga Heights	4.2	0.81	.81	2.5
Treats all citizens equally	Evergreen	3.9	0.96	.87	5.9
	Cayuga Heights	4.1	0.85	.80	1.1
Promotes communication	Evergreen	4.4	0.69	.76	1.3
	Cayuga Heights	4.0	1.02	.83	2.0
Is time-effective	Evergreen	3.5	1.03	.86	1.1
	Cayuga Heights	3.9	1.09	.91	1.6
Is cost-effective	Evergreen	3.4	1.10	.81	1.0
	Cayuga Heights	3.3	1.14	.72	1.0
Weighs input	Evergreen	2.8	1.10	.59	0.8
	Cayuga Heights	3.1	1.14	.50	0.8

Note. 1 = not at all important, 5 = very important.

representing the importance of weighing stakeholder input, all alphas were high, indicating internal consistency within scales. The factor representing the importance of weighing stakeholder input is included because factor analysis consistently revealed it as a distinct factor, its loadings are high, and it is a theoretically important concept for this study. Means of each of the seven factors (criteria) are based on responses ranging from 1 = “not at all important” to 5 = “very important” (Table 2).

Respondents from both communities gave similar but not identical rankings to the importance of criteria for stakeholder involvement processes (Table 2). Four criteria identified by stakeholders as being most important for involvement processes were: using the best available scientific information, having a genuine influence on decisions, promoting communication and learning, and treating all citizens equally. Evergreen and Cayuga Heights respondents ranked the three least important criteria consistently: time-effectiveness, cost-effectiveness, and weighing input. In both communities, weighing input was ranked significantly lower than treating all citizens equally, suggesting that respondents may not be supportive initially of decision processes that explicitly differentiate between the importance of stakes. The relatively low ranking of cost-effectiveness suggests that stakeholders value high-quality public involvement processes and do not believe that costs should limit application of other, more important criteria.

Implications of Criteria on Designing Stakeholder Involvement Strategies

Ideally all criteria would be satisfied to the highest extent feasible, but tradeoffs among criteria are usually necessary. The relative importance of criteria has implications for the design of stakeholder involvement processes because different involvement methods emphasize different criteria. For example, prioritizing equal treatment of all citizens above weighing input from stakeholders suggests reliance on

techniques that accommodate inclusiveness. The rankings low, medium, and high in Table 3 indicate the authors' judgments, based on our experience with common involvement methods, of the potential of these methods to emphasize criteria. We deliberated about appropriate rankings for each method, and then asked others with expertise in stakeholder involvement to review the rankings.

By multiplying the means of criteria by the potential of public involvement methods to satisfy criteria (3 = high, 2 = medium, 1 = low from Table 3), we calculated numerical rankings of methods to predict which methods citizens would prefer. In both Evergreen and Cayuga Heights, task forces ranked the highest. Open meetings, surveys, closed meetings, and unsolicited input followed in descending order. Allowing no stakeholder input ranked lowest. These findings predict that stakeholders in both Evergreen and Cayuga Heights would prefer public involvement methods that allow for deliberation, debate, and broadly representative or open participation.

We then assessed whether these predicted process preferences, based on the characteristics of those processes and the importance of those characteristics to respondents, corresponded with the processes that respondents actually preferred. We asked respondents which of the public involvement methods listed in Table 3 they "most preferred." The results (Table 4) are similar, but not identical, to our predictions. Although we predicted that citizen task forces (CTFs) would be preferable to open meetings in both locations, the reverse was true. Surveys were preferred by far fewer in Cayuga Heights than expected. Closed meetings were preferred by fewer in Evergreen than expected.

We identified several possible explanations for the discrepancies between Tables 3 and 4.

1. People might lack information about the characteristics of some involvement methods. While these methods might meet their standards, they might not realize that they do.
2. Respondents might rely on "hidden" criteria to evaluate involvement methods that were not captured in our study.
3. Respondents may not have fully considered the trade-offs associated with each method, lacking what Yankelovich (1991) described as an extended period of

TABLE 3 Potential of Public Involvement Methods to Satisfy Criteria

Criteria	No input	Unsolicited comments	Closed meetings	Open meetings	Surveys	Task forces
Uses scientific information	High	High	High	High	High	High
Has genuine influence	Low	Medium	Medium	Medium	Medium	High
Treats all citizens equally	Low	Low	Low	Medium	High	Medium
Promotes communication	Low	Low	High	High	Medium	High
Is time-effective	High	High	Medium	Medium	Medium	Low
Is cost-effective	High	High	Medium	Medium	Low	Medium
Weighs input	Low	High	High	Medium	High	Medium

TABLE 4 “Most Preferred” Public Involvement Methods

Method	Predicted preference	Cayuga Heights		Evergreen	
		Percentage	Rank	Percentage	Rank
CTFs	1	29.1	2	29.5	2
Open meetings	2	37.3	1	34.8	1
Surveys	3	1.9	5	19.3	3
Closed meetings	4	26.2	3	2.3	6
Unsolicited comments	5	2.2	4	4.1	4
No input	6	0.7	6	3.8	5

Note. CTFs, citizen task forces. 1 = most preferred, 6 = least preferred.

“working through” that may be required before the public reaches a stable, considered judgment about policy alternatives.

4. Respondents might say one thing and mean another. For example, they might say they want involvement methods that treat all people equally, but find methods that treat people equally (e.g., surveys) undesirable because they weaken their own influence.
5. Respondents may have considered their personal time commitments and believed that attending a public meeting was more realistic given individual time constraints than the implied greater commitment of being a member of a CTF.

Discrepancies notwithstanding, the results in Tables 3 and 4 provide guidance for selecting involvement methods and presenting these methods to stakeholders. The rankings in Table 3 show which involvement methods may meet criteria important to stakeholders, while the stakeholders’ preferences for particular methods in Table 4 suggest that people may need to learn about the characteristics and trade-offs associated with different methods to understand how these methods satisfy their concerns.

Furthermore, methods must be implemented in ways that emphasize the criteria important to stakeholders to increase the likelihood that they will be acceptable. For example, results from both Evergreen and Cayuga Heights suggest that processes that do not incorporate scientific information will not be acceptable to many stakeholders. Fortunately, many involvement methods have the potential to introduce scientific information into the public discussion; it is the responsibility of those implementing public involvement processes to be sure that the methods effectively do so in practice.

An additional concern is that gathering valid scientific information may not be as challenging as convincing people of its validity. Gilovich (1991) has pointed out that what passes for credible scientific information varies among different people (even scientists), and that the trustworthiness of the science may be influenced as much or more by our preexisting expectations as by the quality of the evidence presented. Decision makers, therefore, may need to spend considerable time discussing the support (or lack thereof) for the scientific evidence being used to ground decisions if they seek public backing of decision making.

Conclusions

Our research reveals that stakeholders prefer certain characteristics of involvement processes in both Evergreen, CO and Cayuga Heights, NY. In both cases, results

suggest that respondents are more concerned with treating all citizens equally than with weighing input based on some assessment of the importance of stakes. That a stakeholder involvement process is quick and inexpensive is less important than the quality of the process. Specific quality attributes include: the process uses scientific information, has a genuine influence on the decision, treats all citizens equally, and promotes communication and learning. Several involvement methods have the potential to make these criteria operational. The practical challenge for agencies is to implement stakeholder involvement strategies such that they emphasize the criteria relevant in a specific context.

The similarities in the rankings of criteria between residents in Evergreen and Cayuga Heights have implications for broader theories regarding the design and evaluation of public involvement processes. Our research design emphasized contextual concerns over normative theories of democracy and participation, yet the consistency revealed in respondents' rankings of criteria indicates that an overarching theory of participation, such as that suggested by Fiorino (1990), may indeed supercede situational factors. At least in some cases, normative theories of democracy and participation may be reinforced by the preferences of stakeholders. Additional research to extend these methods to more cases can reveal whether criteria for quality stakeholder involvement processes are important only in certain contexts, or whether they are essential traits of citizen participation in any situation.

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