

Adaptive Participation In Watershed Management.

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Much of the guidance on watershed management stresses the need for collaboration among a variety of interested parties. For example, the first principle of the Environmental Protection Agency's (EPA) framework document on watershed management states that people who are most affected by management decisions should be "involved throughout" and should "shape key decisions" (U.S. EPA 1996). Similarly, a recent National Research Council (NRC 1999) report stresses the need for watershed management to integrate science and deliberative process. Although there is some question whether such collaborative efforts can produce results (e.g., Goldfarb 1994; Napier 1998), other empirical research suggests that participation can in some instances improve outcomes in general (Chess and Purcell 1999; Yaffee et al. 1996), and watershed management in particular (e.g., Astrack et al. 1984; Kenney 1997; Kich 1980; Stuart 1993). The Natural Resources Law Center's (NRLC) research on seventy-six western watershed initiatives (1998), for example, found that despite complications associated with "broad and open" memberships, participation is one of the five qualities "instrumental to success in watershed initiatives," along with: leadership, resources, appropriate focus, and "credible and efficient processes of decision-making and action."

For collaboration to be effective, watershed management must have the "right participation" and "get the participation right," according to the NRC (1996, 1999). In other words, effective participation must engage the "right people" in the "right way." In this paper, we adopt the NRC'S framework to consider issues about the practice of stakeholder involvement in watershed management¹ and the need for adaptive approaches to participatory processes.

Getting the Right Participation

According to the Natural Resource Council (NRC), the definition of "right participation" means "sufficiently broad participation to ensure that the important, decision-relevant information enters the process, that the important perspectives are considered, and that the parties' legitimate concerns about inclusiveness and openness are met" (NRC 1996, 132).

The intent of such involvement, according to the NRC'S report and other analysts (e.g., Schueler 1996; Selin and Chavez 1995), is a more open decision-making process that takes into account a range of factors, including

socioeconomic ones usually not considered by federal agencies (NRC 1999). In practice, however, the picture is different, Schueler states, "Important stakeholders like developers, environmentalists, property owners, non-governmental organizations, and local state and federal agencies are often not included" (1996, 331). In addition, the representation of interest groups can also unintentionally reinforce existing societal inequities.

One study of participatory processes in communities concerned about environmental justice pointed out that interest group representatives on advisory committees often swamped the voices of affected residents near Superfund sites (Ashford and Rest 1999). Similarly, a case study of Hamilton, Ontario's program to develop a Remedial Action Plan (RAP) found that the stakeholder's group "was weighted heavily in favor of private economic interests and government ministries" (Gould 1992, 136).

This Noah's Ark approach to diversity--including representatives of each different interest group without sufficient regard to achieving a balance among those most affected--can also frustrate civic discourse by encouraging people to represent their own interests rather than focusing on a greater civic good, according to some analysts (e.g., English 1998). For example, one investigation of Remedial Action Plans found that 81% of these RAPs' agency coordinators described interaction among the stakeholders as negative, citing "conflict among participating parties or the uncompromising posture that particular parties assumed in the process" (Landre and Knuth 1993a, 161).

However, other studies point out that stakeholders rise above their narrow self-interest. For example, a study of four citizen advisory committees dealing with Great Lakes Remedial Action Plans (RAPs) found that most committee members perceived a greater understanding of the views of others in the community, and this capability was associated with win-win resolutions (Landre and Knuth 1993b). Extensive research on watershed initiatives in the West, while pointing out formidable barriers to problem solving, found a "highly pragmatic and creative focus has reinvigorated parties weary from years of unproductive and bitter interactions, and has created an environment conducive to trust-building and experimentation" (NRLC 1998, 65).

Hybridization of Selection

Discussions of collaborative approaches to watershed management will not resolve issues of representation that hundreds of years of arguments by theorists have not.

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However, hybridization of different approaches to representation may overcome the limitations of any single approach (Finnegan and Sexton 1999). We will illustrate these options with examples from ecosystem or watershed management.

Demographic diversity. As previously discussed, those from communities of color or low income areas can be under represented in stakeholder involvement processes (Ashford and Rest 1999). Therefore, it may be important to consider the extent to which participants are demographically representative of the community.

Geographic diversity. People living in different parts of a watershed may have different perspectives. For example, issues facing the South Platte watershed of Colorado include discharges from mines in the upper reaches of the river, preservation of whooping crane habitat in the Central Basin, and the construction of a proposed dam for a Denver metropolitan area (NRLC 1998).

Participants as positional or reputational representatives. Power is a fundamental variable in the success of any change effort, according to those who advocate representatives selected on the basis of community reputation or positions of authority. Getting a seat at the table is based on a participant's ability to facilitate or impede decisions to achieve certain outcomes (Finnegan and Sexton 1999).

Positional representatives are found through identifying key organizations and their formal leaders that wield power in a geographic area. However, this concept can overemphasize power based on economic status or formal authority without consideration of the other forces that shape the dynamics of a community. (Finnegan and Sexton 1999).

On the other hand, reputational representation involves those who actually have influence in a community, as opposed to those who are assumed to have influence based on their position. Because in contemporary America's political game of chutes and ladders, reputation can vary over time and place, care is needed in making such selections. Notwithstanding these limitations, reputational and positional representatives have been useful to water resources projects. One example is a study on flood control where the Army Corps of Engineers identified opinion leaders using both a positional and reputational approach (Astrack et al. 1984).

The positional approach identified those "occupying important official positions" in existing social structures in the communities affected by the study, such as the mayor, country board chairman, township superintendent, industry

official, bank president, etc. The Corps then used a survey to identify people with a reputation for being active on water issues. The reputational approach identified people "reputed to be most informed" with respect to those issues, such as city engineers, public works superintendents, and building and zoning superintendents. After this identification, the Corps selected 35 people for their panel based on residence (upland and lowland), involvement (position), and reputation. This panel of 35 was used as a source of feedback throughout the process, first by identifying problems and then by expressing views or suggesting options.

Disinterested parties. English (1998 14) advocates calling "upon people to serve as trustees for the long term interests of society and the environment, not as delegates simply representing their own concerns, but also of societal welfare." English suggests convening panels of "people who are selected because they are relatively disinterested yet committed to the concept of our joint responsibility of the common good." These disinterested citizens could be assembled through random selection, as suggested by advocates of citizen juries (Crosby et al. 1986) or by a small steering committee of people who are themselves recognized as civic-minded but disinterested in the issue at hand (English 1998).

However, planning and implementation for watershed management may require commitment over many years and even interested parties can lose interest over a protracted period of time. Disinterested citizens, with the exception of those who are members of disinterested civic groups (e.g., the League of Women Voters) may be inappropriate for watershed management. In fact, the literature on community based self-management (co-management) of fisheries stresses the need for momentum based on self-interest (Pinkerton 1994). Similarly, studies of watersheds in the west (NRLC 1998) found many initiatives can be traced to specific motivators, such as economic problems (e.g., sediment along the Feather River in California that affected energy production and concerns about loss of water rights on the Platte River), or the threat of intervention by outsiders (e.g., residents and irrigators along the Lehmi River in Idaho organized a watershed project to avoid intervention from regulators). Without such "problem-solving incentives" (Kenney and Lord 1999), watershed management may be less effective.

A hybrid approach to representation may overcome some of the limitations of traditional stakeholder approaches or any one of the approaches to representation we have discussed. A "community reconnaissance" approach to representation aims to "(1) analyze multiple aspects of community power; (2) discover different types of leaders,

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including those of underrepresented groups; and (3) reveal links among community leaders and groups involved in key community decision making positions" (Finnegan and Sexton 1999, 342). The key to this hybridization, or any mix of approaches, is an effort to understand and

profile an area (USEPA 1998). Therefore, dealing with complex issues of "appropriate" representation may require research just as other aspects of watershed characterization do.

Getting the "right participation" and the "participation right" may vary by watershed. In watersheds where planning and management do not raise controversial issues, less participation may be the right participation. In addition, the co-management literature suggests that if participants do not have sufficient incentives to work together, such as economic self-interest, development and implementation of effective plans may be unlikely (Pinkerton 1994). In such cases, interagency coordination may be sufficient for an effective watershed initiative. In other instances where value conflicts are great, solutions may require extensive participation, formal mediation, or may ultimately be intractable.

Getting the Participation Right

The tendency of stakeholder involvement to revolve around small task forces or advisory groups can exacerbate the problems described previously, such as reinforcing existing inequities and defining participants by their narrow self-interest. The time commitments required of a task force can narrow participation to only the most committed and interested--those with the greatest stakes. Over the life of a task force, representatives can also become isolated from their constituencies. Thus, other participatory mechanisms are essential to encourage the diverse participation suggested by the EPA and the NRC. Varying the types of participation, such as those listed below, may help to achieve meaningful participation.

Different forms of participation over time. Getting the "right participation" and "participation right" may be highly dependent on each other, requiring different participatory mechanisms at different stages of watershed management efforts.

For example, in the case of flood plain management described previously (Astrack et al. 1984), the Corps selected a core group of approximately 35 advisors based on position and reputation. The Corps also called a public meeting during the problem identification stage. Rather than meet as a large group, following a brief opening session, trained Corps personnel facilitated small groups in which people provided ideas and concerns in a 'round

robin' manner. A panel of people met to rate options, suggest others, and develop plans. This panel meeting was followed by a round of surveys in which the panel members were provided with additional information (e.g., costs) on each option and were then asked to rate them. Following this rating process, two workshops involved the public in detailed discussions and asked for the rating of options. This approach is appealing because of a structure that allows varying degrees of involvement by different groups of people--those in positions of power, those knowledgeable about water issues, and the general public. A sophisticated model of participation integrates opinions of interest groups and the general public at different stages of the process (Renn 1999).

Different participatory processes at the same time. The New Jersey Department of Environmental Protection developed water regulations by working with a stakeholder task force on a monthly basis and also holding meetings with interest groups. A more traditional outreach strategy to the general public was conducted through surveys and newsletters (Chess 1989). Rather than sequentially developing ideas with a task force, then with interest groups, and finally with outreach to the general public, the ideas of those with varying levels of commitment were solicited during the same time period. This allowed ideas to mature more rapidly and fully.

Participation in specific tasks and projects. In some cases, involvement of volunteers in monitoring can also broaden participation, develop a more scientifically literate citizenry, reduce resources needed for data collection, and promote implementation if collection and quality assurance are coordinated with government agencies. For example, in Puget Sound the cadre of volunteers helped create the political will that made habitat protection more effective (Pinkerton 1994). To ensure the usefulness of data, the Chesapeake Bay's program actively recruits volunteers to monitor at the same locations as state scientists, and they also have a quality assurance plan (Campbell and Ellett 1991).

Pinkerton (1994) notes the need to start with small projects with concrete results rather than merely developing grand, overly abstract plans that may sit on the shelf. In Montana, for example, a steering committee adopted three local projects as part of its master plan to "forestall flagging interests, build a broader constituency for the process, and test its ideas" (NAPA 1997, 117). Similarly, a study of collaborative watershed efforts in Australia noted a lack of "strategic direction" in many of the watershed efforts and observed two approaches for overcoming the problem: 1.) specifying priorities, developing action plans, and focusing on activities that groups are most capable of achieving; and 2.) bypassing the development of a written strategy

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and immediately focusing on a high profile issue (Margerum 1996).

Education to increase participation. A study of Great Lakes' RAPs found that "high levels of public awareness about water-quality problems and/or commitment to solving those problems has benefited the public involvement process (Landre and Knuth 1993a, 160). Until an information program was initiated in Wisconsin, "county watershed staff found it difficult to discuss anti-pollution contracts with landowners and to convince them to sign agreements" (Sorenson 1985). Some research suggests public outreach may be more effective when tied to outcomes rather than merely to information dissemination. For example, discussions at an annual conference in the Clear Creek watershed in Colorado have been a catalyst for field-level action "by subgroups that spontaneously emerge" (Kenney 1997, 27). Conversely, a well attended yearly forum on the South Platte watershed in Colorado might "yield greater on-the-ground benefits" if it evolved "into a more active and formal group with a clear problem-solving orientation" (Kenney 1997, 25).

Regardless, evaluation of information and educational approaches is essential to determine the effectiveness of changing behavior to reduce nonpoint source pollution. Research suggests that the transmission of information may have little relationship to changing behavior (e.g., Johnson 1993). A carefully conducted longitudinal study in one watershed showed that an intensive educational effort did not improve farmers' production practices (Napier 1998).

In addition, watershed initiatives may flounder when they seek to exert influence over private land. While government has influence over use of private land (e.g., zoning or environmental regulations), largely voluntary watershed management efforts may drown in values conflicts. A good example is the conflict between landowners along stream corridors and the proponents of "restoration" that was severe enough to cause failure of one watershed effort in California (Wooley and McGinnis 1999). While their resistance was unorganized and quiet, farmers in Ohio did not change their practices because "land owner operators will not adopt any production system that will not increase farm income" (Napier 1998, 303).

Thus, getting participation right may be far more complex than many guidance documents suggest. Other factors that have been mentioned as part of getting the participation right include: appropriate decision-making processes (e.g., Webler and Tuler 1999); a paid coordinator (e.g., Holland 1996; Pinkerton 1994), sufficient resources (e.g., NRLC 1998); effective leadership (Selin

and Chavez 1995; NAPA 1995; NRLC 1998; USEPA 1998); and formalized responsibilities (Pinkerton 1994). However, despite the best intentions, involvement may not happen. Even the optimal combination of factors may not overcome passivity, disinterest, distrust of government, or fundamental value conflicts. Consequently, collaborative approaches to watershed management are an approach--but not an answer--to dealing with a range of environmental problems.

Getting Scientific Participation Right

Critical to watershed management is getting the right science (science that matters to decision-making) and getting the science right (science that meets the highest standards) (NRC 1999). There is no one participatory model that provides the best approach for integrating science, which may include local knowledge (Webler and Tuler 1999) and values. The literature provides the following examples, but far more research is needed.

Technical teams serving larger policy groups. In the Willapa Bay, a policy team that included a range of representatives of diverse groups, identified problems and set goals (Nugent et al. 1994). Nugent explains that after developing a work plan and goals, the policy team selected a technical team "to develop the specifics of goals set by the policy team" (322) and to take responsibility for data collection, analysis, and interpretation. The technical team was interdisciplinary, representing different professions and fields rather than organizations. Analysis was not merely confined to data on ecological processes but also considered social and economic information. To maintain accountability to the goals of the larger group, the technical team periodically reported to the policy team. Because the results of this process were not known at the time of publication, it remains to be seen if the technical and policy elements of the process remained effectively linked.

Sequential involvement of scientists and policymakers. A two-phased process for resource assessment first focused on inventorying resources and then on synthesizing the data to provide a watershed scale perspective of cause and effect (Sullivan and Light 1995). This analysis was then submitted to decision makers. The authors report that Weyerhaeuser has used this process in 13 watersheds producing "consistent products and plans" that were endorsed "by the stakeholders who were involved" (275). However, the NRC (1996) stresses that time and resources can be wasted if data collection is initiated before problem identification defines the need for specific data.

Collaborative design and interpretation of research.

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Shared interpretations of the future are facilitated by "joint information search activities where participants mutually examine relevant data," according to a review of the application of collaboration to environmental planning (Selin and Chavez 1995, 192). An example of this is Montana where the steering committee of stakeholders and government officials "discussed, developed, and endorsed" two research projects, including one that was the "brainchild" of a rancher on the committee, "a homegrown expert on water management" (NAPA 1997, 117). Similarly, in one Massachusetts watershed a technical advisory group, composed of representatives of agencies, businesses, and concerned citizens, provided "education and technical assistance on the difficult, long standing problems of the watershed" (Michaels 1.999).

Getting Government Participation Right

The role played by an agency can have significant impact on the success of watershed planning and implementation (Astrack et al. 1984; Koch 1980; Selin and Chavez 1995; Yaffee et al. 1996;). Following are some roles government might play but which need not be mutually exclusive.

Supporting existing watershed initiatives. The Natural Resources Law Center (1998) notes that states have provided project funding or assistance in helping groups apply for funding from other sources. Agencies have also funded a neutral facilitator and/or provided in-kind services, technical assistance, and training. On the other hand, the Natural Resources Law Center (1998) notes that the government seal of approval may lead to disapproval from those opposed to government intrusion.

Starting watershed initiatives. Similarly, while there are successful cases of agency led efforts, in some cases, local concerns about interference have also limited government initiatives. One example occurred in 1991 when the EPA attempted to form a Clear Creek Coordinating Council. Local residents and an existing Denver intergovernmental council resented the influence of "outside" groups and instead decided to form a "highly informal" group solely to organize conferences (Kenney 1997).

The literature on comanagement that Focused on such economic resources as fisheries, suggests that "government cannot be both the sponsor and the convener, or the process will simply follow government's agenda and fail to invoke trust and commitment from all parties. If government is involved, what is needed is a process and a structure managed from outside government, within which parties can work with each other and government" (Pinkerton 1994, 14). Although it remains to be seen if this is true when economic pressures and

value conflicts are less acute, an analysis of watershed efforts over four states emphasized that state agency staffing of watershed management efforts is "the kiss of death" (Born and Geskow 1999).

Participating in watershed initiatives. Agency officials have played roles ranging from full participants to merely advisors of watershed efforts. In a successful case in Montana, the steering committee, facilitated by a skilled, neutral facilitator, consisted of representatives of stakeholder groups, two representatives of county government, three state officials, and an EPA official. "Permission" was granted by the state legislature that chartered the process, and two members of the legislature served on the committee to bring the legislative perspective to the table and to explain the recommendations of the committee to others in the legislature (NAPA 1997, 125). The National Academy of Public Administration cautions that, as with other participants in community based processes, state and federal officials must be prepared to consider the current positions of their agencies and to search for fresh ways to address local issues. However, as with other participants, state and federal officials come to the table with underlying issues they cannot abandon. To participate effectively, officials must be willing to think creatively and must have authorization from supervisors to do so (NAPA 1997).

Drowning watershed initiatives. The best documented watershed efforts are successful ones (arguably due to publication bias). However, the failures of government dominated participatory processes provide lessons for watershed initiatives (Chess and Purcell 1999). Such an example was the attempted development of a Remedial Action Plan that was stymied by the state of Michigan's development of RAPs without public input (Becker 1993). Overall, RAPs' failures to address key issues have been correlated with "failure to effectively pay attention to the public's concerns, their lack of experience with participatory planning, a lack of understanding and commitment to an ecosystem approach, and a series of other causal factors" (Becker 1993, 256).

Organizational factors may influence both the role the agency plays and how responsive the agency is to stakeholders (Chess 1999). In one region of California, the Forest Service's bureaucracy was too "centralized and unresponsive" to participate in watershed initiatives, in contrast to the Bureau of Land Management's decentralized organization which enabled the agency to participate in more constructive ways (Thomas 1999).

The Need for Adaptive Participation

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We recognize that getting the right participation and the participation right may not be sufficient for effective watershed planning and implementation. Other factors may be critical to success, such as effectiveness of institutional structures (Margerum 1996); sufficient resources for implementation (Margerum 1996; Scheuler 1996; Selin and Chavez 1995); manageable size of watershed or sub watershed (Scheuler 1996); sociopolitical factors (Nugent et al. 1996); and economics (Napier 1997, 1998). Even superb participatory efforts may not overcome any of these factors.

However, evidence suggests that some watershed management efforts benefit from effective participatory processes (e.g., NLRC 1998). In the absence of clear guidance from empirical research, we suggest that improving participation will depend on explicit experimentation and adjustment, just as improving the science of watershed management does. Because our understanding of ecosystems is imperfect, our interactions with nature should be experimental, according to the increasingly accepted concept of adaptive management. As Lee (1993) points out, "An adaptive policy is one that is designed from the outset to test clearly formulated hypotheses about the behavior of an ecosystem being changed by human use" (53).

If we assume that variables tied to participation in watershed management are at least as complex, uncertain, and poorly characterized as scientific ones, there will be a similar need for explicit experimentation, evaluation, and change of participatory processes. Hypotheses about conditions for successful involvement also need to be examined. For example, systematic analysis is essential to determine if economic motivation of stakeholders is key to development and implementation of watershed planning (Pinkerton 1994). Similarly, more research is needed to determine effective ways to encourage changes in behavior needed to reduce nonpoint source pollution. (e.g., modification of lawn care practices, animal waste management). At minimum, pretesting of key educational materials is essential to ensure they are meaningful to the intended audience (Morgan et al. 1992). Finally, research is needed to determine if some natural resource issues or situations better lend themselves to participatory processes.

Although evaluation is usually thought of as a retrospective analysis of whether a project has met its goals, at least two other forms of evaluation are needed to advance the participatory elements of watershed management initiatives: 1.) ongoing feedback for continuous improvement and mid course corrections (e.g., Napier 1998), and 2.) cross-sectional analysis to find trends across multiple cases, such as the seminal work of the

Natural Resources Law Center and efforts underway by the National Academy of Public Administration.

Participation is one approach to environmental problem solving, not a solution. Unfortunately, given the limited research on collaborative processes, it is easier to recognize poor science than unworkable participatory processes. However, that will change with more attempts, such as those cited in this article, to empirically evaluate participatory processes.

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ENDNOTES

(1.) We included some studies of collaborative processes tied to water resource and pollution issues, not strictly watershed management.

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