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short title: Public Participation in Watershed Planning

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ASSESSING PUBLIC PARTICIPATION IN U.S. WATERSHED PLANNING INITIATIVES

ABSTRACT

A mail survey of 126 federally funded watershed planning initiatives yielded valid responses from 64 watershed contacts. Quantitative analysis revealed wide variation among watershed initiatives in terms of population size and land area encompassed. Likewise, watershed organization and participation characteristics (agencies involved, frequency of meetings, and number of active participants) vary greatly. Qualitative analysis delineated the key issues of concern to watershed contacts: agricultural land use, stakeholder awareness, and interaction between local and federal entities. While specific situations vary by watershed, results indicate that door-to-door contact, public meetings, and information programs are the most useful methods for soliciting participation. Participation was perceived to be most helpful in the planning stages of outreach, identifying issues, and prioritizing issues. The perceived effects of participatory watershed planning include: increasing awareness of watershed conditions, heightening inter-agency coordination, reaching consensus on resource management plans, and lending legitimacy to final plans.

KEYWORDS: public participation, stakeholders, watershed management

Watershed planning addresses interrelationships among water quality and quantity, ground and surface waters, the land-water interface, biologic and habitat concerns, and the objectives of the user community (USEPA, 1995; Born and Sonzogni, 1995; Lee, 1992). Thus inter-agency coordination and dialogue among numerous stakeholders are necessary components in watershed management. Unfortunately, comprehensive watershed approaches have not been consistently employed in resource management (NRC, 1993, p. 9). Rather top-down management approaches often force administrative units to adopt uniform solutions for what are usually unique local situations (Rubin et al., 1993). Problems can be exacerbated by a lack of openness from the scientific community which reduces the public's trust in the work being conducted (Till, 1995). All too often, resource managers have relied on "expert" knowledge and government regulations, with little concern for community involvement (Goldfarb, 1994).

Public participation, however, is increasingly seen as a viable part of watershed management, particularly when addressing complex problems such as non-point source pollution. Recent state and federal legislation have mandated increased public involvement in resource planning, which according to the EPA, will help facilitate implementation of resource plans (USEPA, 1995; 1993). Although specific local conditions vary, effective participatory watershed planning is comprised of several common attributes. Comprehensive planning adopts a systems approach that acknowledges the dynamic processes among a variety of issues with wide stakeholder input (Ahern, 1985; Getches, 1993; NRLC, 1996). Some generic decisions may be made in advance, such as setting long-range goals, but specific plans are based on public opinions, agency regulations, and local conditions. Planning can focus on complex multiple

resource issues with the geographic scope of a “problem-shed” not a delineated political boundary (Allee, 1988).

Public participation is not a flawless solution to environmental planning dilemmas. Potential problems with public participation are related to time, money, and representation. Some managers question the value of participation because it demands increased allocation of financial resources, human resources, and time (Blahna and Yonts-Shepard, 1989). Others question whether the public is well informed or educated enough to participate (Sewell and Coppock, 1977). Another concern is that public participation may elicit a reactionary response to plans that leads to confrontation and ineffective results (Dzurik, 1990). Further, questions arise as to whether public participation should include the public “at large” (i.e., all potentially affected parties) or focus on a small group of people who express a desire to participate (i.e., special interest groups, individuals with a specific purpose) (Adler, 1995). Thus there is often a difference between who is “likely” to participate, versus who “should” participate.

These potential pitfalls can be addressed by managers in the planning process. Indeed, managers should acknowledge several principles when including participation in watershed planning (based on Cuthbertson, 1983). The purpose of participation is to enhance the quality of decision making by providing an opportunity for the public to contribute pertinent information. Efforts should be made to represent all segments of the general public, but this may not always succeed. Public participation is an integral part of a democratic decision making process and must be considered a valuable goal by watershed managers.

Given the recent regulatory and societal interest in public participation, it is time to describe and evaluate current watershed efforts. This research identified five key factors to consider when assessing public participation in watershed planning (Table 1). First is the type of

management approach selected. In the regulatory/bureaucratic approach, activities in a watershed are controlled by mandates from outside and local public participation is secondary. The collaborative/grassroots approach brings together concerned parties to reach a consensus on action for problem resolution (Yaffee, 1996; Ford et al., 1990). Second, public participation may be included throughout the planning process, or more selectively in any of 14 stages of watershed planning. It can be problematic if participation occurs only late in the planning process, when people become involved just in time to object to plans rather than assisting throughout the process (Allee, 1988). Third, it is important to consider how participation is solicited. One-way communications are written statements or information (e.g., newsletters, flyers, videos) and two-way communications include public hearings, door-to-door contact, and educational programs (Blahna and Yonts-Shepard, 1989). Fourth, participation may be included at indirect and direct levels, which vary in practical terms from voicing casual opinions to actual involvement in regulation implementation. Fifth, the impacts of participation must be assessed in terms of the agencies and organizations involved, the public, and the overall outcome of a situation. This includes the level of consensus reached, whether plan implementation was promoted, and the extent to which public participation helped improve ecological and social conditions in the watershed

The potential of public participation is great: community involvement in the planning process can change perceptions from “my neighbor’s problem” to “our watershed’s problem” (Doppelt et al., 1993; Osterman et al., 1989). While there are many potential benefits to public participation in watershed planning, the pragmatic question remains: how do resource managers assess the inclusion of public participation in watershed planning? This study investigated the

perceived effectiveness of public participation in federally supported, watershed planning initiatives.

ANALYSIS OF WATERSHED INITIATIVES

A one-time mail survey was sent to watershed project contacts to investigate public participation in their watershed management efforts. This research focused only on those projects that link federal initiatives and local participation. Thus a sample of 126 watershed projects that were initiated with 75% or more federal funding was identified by the "Know Your Watershed" program compiled by the Communication, Technology and Information Center (CTIC) at Purdue University.[1] Sixty-four watershed contacts returned valid surveys, yielding a return rate of 51%. Responses were received from 26 different states, with a Midwestern spatial concentration (Figure 1).

Employing both quantitative and qualitative data analysis provides a comprehensive view of any research topic (Miles and Huberman, 1994). The survey format included objective response questions, "scaled" questions, and sections for written responses. Basic descriptive statistics were used to summarize responses to each survey question. Relationships among the various watershed partnership characteristics were discovered through one-way analysis of variation (ANOVA) tests for continuous and categorical variables, and with correlation coefficients (Pearson's r) to test directional relationships between two continuous variables. In the following discussion, statistical significance is considered less than .05.

Written responses were coded and analyzed to provide elaboration on specific topics that were discovered through the statistical analysis. The survey focused on three aspects of the

watershed planning initiatives: watershed organization, watershed participation characteristics, and other key issues noted by watershed contacts.

Watershed Organization

The planning process is influenced by a watershed's population and land use characteristics. The size of surveyed watersheds ranged from 272 hectares to 2.23 million hectares (673 to 5.5 million acres) with a median of 29,935 hectares (73,968 acres). Human population encompassed in each watershed initiative varied from 15 people to 6 million people, with a median of 11,150. The regional context of the watersheds was 50% rural, 39% suburban, and 11% urban. We investigated whether these general characteristics influenced participation in each watershed partnership. There was no statistically significant relationship between acreage of the watershed, total population of the watershed, or the level of urbanization in terms of the perceived effectiveness of participation on the watershed initiative.

The contact person has a degree of influence over a given watershed plan, thus we investigated several characteristics in relation to these individuals (Table 2). The responding watershed contacts were most likely employed by the federal government (58%). Planning goals in individual watersheds are indicated by the function of the employing agencies, over half (53%) of which were agricultural management. Fewer than one-third (29%) of the contacts had positions based primarily on the watershed partnership. The vast majority (71%) of contacts performed a variety of other duties in addition to the watershed partnership. The academic backgrounds of watershed contacts varied widely.

The earliest watershed partnership was initiated in 1980 and the most recent in 1996. The majority (84%) were established between 1990-95. The partnerships were initiated through

various efforts to address several goals (Table 3). Most partnerships were initiated by the federal government (32%) or local government (22%) or a combination of government and non-governmental agencies (19%). Prior to the establishment of each watershed planning partnership, there was either combined federal/state/local governmental entities (51%) or no planning authorities in place (22%). Most partnerships (94%) targeted multiple objectives. The importance of non-point source pollution is apparent in the watershed initiatives' main goals: addressing agricultural practices, water quality, and habitat stabilization. This emphasis on agricultural land use is expected, given the spatial distribution of watershed initiatives concentrated in the Midwest. The partnerships were in various stages of the planning process, and nearly half were implementing an approved basin plan.

Watershed Participation Characteristics

Questions regarding participation illuminate the characteristics of the planning process. Stakeholders were defined as: government agencies (national, state and local levels), landowners, agricultural producers, residents, recreational users, non-governmental organizations, environmental activists, tribes, developers, schools, and mining interests. The number of people who are active in each partnership and the frequency of participatory planning meetings varies widely (Table 4). Types of participation were equally divided between indirect and direct. There is no statistically significant relationship between the frequency of partnership meetings and the perceived effectiveness of participation.

Watershed contacts indicated the methods they have used to solicit participation and the effectiveness of each method (Table 5). Newsletters, public meetings, and informational programs were used by 75% or more watersheds; pamphlets, door-to-door contact, surveys and

videos were employed to a lesser degree. The extent to which a specific method was used did not always reflect upon its utility, however, as door-to-door contact and informational programs were judged to be most effective in stimulating public participation. To better describe the effectiveness of these methods of solicitation, variables were combined to create categories of one-way (newsletters, pamphlets, videos) and two-way communication (meetings, programs, door-to-door contact, surveys) and calculated their correlation. There is a statistically significant difference between the perceived effectiveness of one-way versus two-way communication. Examining the data and written comments, it is apparent that partnerships tended to find two-way communications more effective than one-way methods although time, personnel, and money often dictated the use of one-way communication.

The solicitation and perceived utility of public participation varied by planning stages (Table 1). Participation was solicited by at least 75% of the watersheds in the following stages of the planning process: outreach, determining resource status, identifying issues, and prioritizing issues. Participation was considered useful by at least 75% of the watershed contacts in the following planning stages: identifying issues, outreach, and prioritizing issues. While some watershed contacts responded that participation was useful in all planning stages, fewer that 50% noted that participation was useful in clarifying the issues, selecting a planning approach, drafting a plan, review hearings, and updating a plan. We examined the relationship between how actively a partnership solicited participation and the perceived usefulness of that participation (in all planning stages) using subscale variables. There is a statistically significant relationship between the usefulness rating and the level to which participation was solicited. This implies that participation is of greater use to those who actively seek it.

Watershed contacts indicated that public participation had a positive effect on reaching consensus on goals and final plans, lending legitimacy to a final plan, and organizing the local community (Table 6). In addition, using the watershed as the planning unit had positive effects on public awareness of watershed concerns, inter-agency coordination, and data availability (Table 7). The positive effects of watershed planning are perceived to be greater than the positive effects of participation. Taking this analysis one step farther, there is a statistically significant relationship between the ratings for public participation and the effectiveness of using the watershed unit for planning. This implies that a link exists between the success of watershed planning and the use of public participation. On the other hand, no statistically significant relationship was found between the perceived effectiveness of watershed planning and the contact agency's primary goals. This indicates that the success of watershed planning does not depend on one specific structural or governmental support system. Rather, our analysis indicates that the success of participatory watershed planning is determined by the multi-faceted and complex nature of local issues, local/regional managers, various government agencies, individual stakeholders, and the level of participation solicited.

Other Key Issues in Watershed Initiatives

Surveys included open-ended questions regarding "the impact of watershed initiatives on residents" and "additional information that helps describe your watershed." Qualitative data reduction techniques reveal common topics of concern among survey participants (Miles and Huberman, 1994). Three main issues were found to be important to watershed contacts: stakeholders' awareness and ability to work together; agricultural land use in the watershed; and the interaction between local interests and state and federal agencies.

Awareness and Working Together:

Numerous written responses indicate that watershed initiatives led to heightened public awareness. Several written comments were similar to this: "The initiative increased awareness of the watershed as a healthy ecosystem and a unique natural area worthy of protection." Community involvement was described by watershed managers: "Success has generated the desire to work together to solve natural resource problems." In another region, "the watershed worked as a team. They understood the problem; did not point fingers at who caused the problem; realized they needed to do something and worked together to get it done."

Yet, several watershed contacts noted there are lingering issues: "If folks understand how and why their actions affect water quality, they are more likely to change their attitudes and behaviors than if regulations are forced upon them." Another contact noted variation in stakeholder groups: "Initiatives have improved watershed awareness among stakeholder groups like conservation and environmental organizations, but further outreach and education is needed to improve watershed awareness among the general public." Another discouraged manager wrote: "I'm sorry to say that we have not moved past the 'it's my neighbor's problem' in most cases. Where we have got conservation work done is where we were able to answer the question 'what's in it for me?'" One watershed initiative contact explained: "Awareness has improved substantially over 5 years, but there is still much to be done--continual work."

Agricultural Land Use:

Many of the watershed initiatives are located in agricultural regions of the US, and the majority of watershed plans dealt with non-point source pollution (Figure 1). Many watershed

initiative contacts noted a positive relationship developed among agricultural and non-agricultural residents: "The initiative has helped bring the ag and non-ag communities together. Farmers are more aware of what is leaving their fields." Another watershed contact noted: "Now residents are aware of the problems facing the farmers in the area; and that all persons have some runoff from chemicals even if they do not farm." Several comments mirrored what this watershed manager wrote: "Agriculture has changed from being the bad guy in the watershed to the good guy."

In other watershed initiatives, however, a more negative relationship developed between agricultural and non-agricultural entities due to various forces. "Farmers feel that they alone should not be held responsible for correcting the situation. If the general public wants change, then they should get involved physically as well as financially." Another initiative was not successful because "most of the drainage area was operated by tenant farmers but the incentives could only be paid to landowners. The landowners expected the tenants to compile the plan, but they wouldn't participate." In fact, several watershed initiatives were working to implement appropriate financial incentives.

Integration of Federal/State/Local Efforts

One watershed contact explained: "Our watershed project has been a series of several state, local, and federal programs." Indeed an integration of efforts is described fully by another watershed contact: "USDA FSA office in cooperation with local Conservation District assisted by the NRCS and Cooperative Extension Service got a WQIP grant for our watershed. NRCS provides technical assistance to producers with approved agreements and the FSA office administers the allocation." Several watershed managers had positive opinions regarding inter-

agency coordination. "Information gained from the watershed work has been shared in the rest of the county and across the state through various agencies involved." In another watershed, funding will shift from federal to local as "the program is being adopted by a local conservation group because it ends next year."

Several watershed managers noted they must be cautious when integrating local, state and federal efforts. One watershed contact noted that "the land owners and farmers only participated in the sense that they did not want federal involvement that would negatively impact their land or operation." One watershed integrates various levels of government, but is careful in how it presents itself to the public: "Our coalition is composed of local/state/federal agencies. Its goal is to reduce erosion and nutrient loading. We do not involve ourselves at all in any type of regulation, zoning discussions, or anything that would affect the local stakeholders' perceptions of being negatively affected."

DISCUSSION AND CONCLUSION

This analysis illuminates the unique nature of watershed initiatives, each of which is comprised of specific characteristics that influence individual management plans. For example, watershed acreage, population size, and planning agencies vary substantially. From these details, however, we can identify general factors that influence the success of participation in watershed planning (Table 1). First, while participation may begin with a bureaucratic approach mandated by law, if a collaborative approach is attained, the plans may have more long-term success. Second, while participation can be included in any stage, watershed contacts perceive it as most helpful in outreach and identifying/prioritizing issues. Watershed contacts judge that participation is least helpful in clarifying issues, selecting a planning approach, drafting a plan,

and in holding review hearings. Public hearings are often mandated by law, but contacts note they can lead to divisiveness rather than productive participation. This is especially the case if hearings are held late in the planning process, and there were few previous attempts to include the public. Third, two-way communication methods, while often requiring more time and money, were deemed most successful in soliciting participation. One-way communication methods were used more often, but were judged to be less successful in getting the public involved. Thus, partnerships must balance the resources allocated to soliciting participation with the actual amount of participation they hope to achieve. Fourth, public participation was equally used at indirect and direct levels. Depending on local goals, both types of participation are appropriate, according to watershed planning contacts. Lastly, data from survey questions and additional written comments indicate that participation tends to be beneficial to watershed planning, although the methods of contact and levels of participation vary from place to place.

Watershed contacts noted that the positive impacts of public participation include increased awareness of watershed issues (Table 1). This awareness encouraged cooperation among agricultural and non-agricultural land owners that brought consensus on final plans (Table 6). Inter-agency coordination was heightened through partnership efforts. Data dissemination increased somewhat, which could allow others to learn from current watershed planning initiatives. Perhaps participatory watershed planning will improve environmental and social conditions in watersheds, but that is not proven by this study. Rather, results show that public participation aided stakeholders in reaching a consensus on plan goals, which eventually increased the legitimacy of final plans. Further, the organizing capacity of some communities increased, which may bring about long-term solutions to complex watershed issues such as non-point source pollution.

Although regulations increasingly mandate the inclusion of public participation in natural resource management, there is a distinction between forced minimal inclusion and proactive beneficial inclusion of the general public. Based on this study, managers should see the advantages of participatory watershed-based planning, and should embrace it for several reasons. First, participatory perspectives encourage dialog among many stakeholders: rural residents, urban dwellers, environmental activists, farmers, agency personnel, and others. Integration of various viewpoints is necessary to achieve successful long-term resource plans, as noted by one watershed manager: "Public participation is essential!" Second, natural resources and particularly water are dynamic and cannot be adequately managed along political jurisdictions alone. Watershed contexts, which include the local population, provide better units from which to view ecological resources and to address spatially diffuse sources of degradation. Third, watershed approaches can provide a comprehensive social unit from which to manage resources. Social organizations and dissemination of technology tends to limit sustainable resource use, as does an inability to integrate human activities into ecosystems (Lee, 1992). A participatory watershed framework, however, strengthens planning efforts by coordinating local input, resource manager objectives, agencies of various governmental levels, and larger scale ecological and social issues (Montgomery et al., 1995).

While not a panacea for watershed problems, participatory watershed management can achieve local resource goals. As noted by a watershed manager: "Watershed planning has brought about an awareness of concerns that other people may not have thought about or recognized as a problem. Landowners become aware of what a watershed really is and that gets them thinking about others rather than just themselves." Although specific characteristics vary by watershed, participatory watershed management tends to stimulate inter-agency coordination

and local stakeholder involvement. This can lead to the formulation of realistic plans that address complex environmental concerns.

[1] CTIC is a nonprofit information center that promotes environmentally and economically beneficial natural resource systems by producing and circulating data; coordinating national initiatives; and sponsoring interactive meetings (CTIC, 1997). CTIC is perhaps the best source of information on current watershed organizing efforts in the United States. Comprehensive information on watershed organizations is difficult to obtain due to the extremely unique and local nature of their activities.

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Table 1. Factors in participatory watershed planning initiatives

1. APPROACHES TO MANAGEMENT
   a. bureaucratic/regulatory
   b. collaborative/grassroots

2. PLANNING STAGES THAT COULD INCLUDE PARTICIPATION

14 Stages:

1. public outreach	2. canvas for information
3. analyze information	4. clarify data
5. determine resource status	6. identify issues
7. define goals	8. prioritize issues
9. refine goals	10. select options
11. prepare draft plan	12. review/public hearing
13. implement approved plan	14. update plan

   a. Throughout
   b. Selectively

3. METHODS TO SOLICIT PARTICIPATION
   a. 1-way:newsletters, pamphlets, videos
   b. 2-way:public meetings, door to door contact, informational programs

4. LEVEL OF PARTICIPATION
   a. Direct: decision-making, regulation
   b. Indirect: advisory, representative

5. POTENTIAL POSITIVE IMPACTS OF PARTICIPATION ON WATERSHED
   a. citizen awareness of watershed issues
   b. inter-agency coordination
   c. data dissemination
   d. consensus on final plans
   e. improve environmental and social conditions

Table 2. Characteristics of watershed initiative contacts

Employment Agency:	
federal government	58%
state government	16%
local government	10%
other[1]	16%
Main Function of Employment Agency:	
agricultural management	53%
land use management	11%
water resource management	9%
other [2]	27%
Watershed as part of job duties:	
primary duty	29%
one of many duties	71%

[1] universities, regional government, non-profit organizations
[2] natural resource management, habitat planning, multiple categories

Table 3. Establishment and goals of watershed planning initiatives

Partnerships established by	
Federal government	32%
Local government	22%
State government	11%
Landowners	5%
Environmental activists	5%
Non-governmental organizations	5%
Tribes	2%
Combination of above	19%
Watershed planning prior to the partnership	
Combined governmental entities	51%
None	22%
Local government only	14%
Federal government only	13%
Goals	
address agricultural practices	48%
water quality issues	19%
habitat/living resource stabilization	15%
education/involvement of residents	9%
hydrologic stabilization	9%
Stage of planning process	
implementing approved basin plan	47%
preparing a draft watershed plan	9%
updating a plan	9%
prioritizing issues	8%
other stages[1]	27%

[1]analysis, evaluating options, combination

Table 4. Participation in watershed planning initiatives

Active participants		
	range	3-325
	mean	29
	median	15
Frequency of planning meetings		
	quarterly	37%
	monthly	25%
	annually	22%
	other frequency[1]	16%
Types of participation		
	indirect	45%
	direct	44%

[1]weekly meetings and irregularly scheduled meetings

Table 5. Use and perceived effectiveness of methods employed to solicit participation

Method	% of Watersheds Using Method	Effectiveness "Very"	Effectiveness "Somewhat"	Effectiveness "Not"
Newsletter	81%	35%	60%	6%
Public meeting	78%	20%	38%	42%
Information program	75%	44%	52%	4%
Pamphlet	58%	19%	60%	21%
Door to door contact	55%	66%	23%	11%
Survey	47%	23%	50%	20%
Video	33%	24%	47%	29%

Table 6. Perceived effect of public participation on watershed planning

Component	Effect		
	"Positive"	"None"	"Negative"
Reaching consensus on plan goals (N = 58)	62.1%	29.3%	8.6%
Reaching consensus on final plan (N = 53)	58.5%	35.8%	5.7%
Legitimacy of the final plan (N = 53)	58.5%	37.7%	3.8%
Organizing capacity of local community (N = 55)	56.4%	41.8%	1.8%
Empowerment of community organizations (N = 56)	50.0%	46.4%	3.6%
Data dissemination (N = 57)	47.4%	47.4%	5.3%
Establishment of community organizations (N = 56)	41.1%	51.8%	7.1%
Data availability (N = 58)	39.7%	55.2%	5.2%

Table 7. Perceived effect of watershed-based planning

Component	Effect		
	"Positive"	"None"	"Negative"
Public awareness of watershed concerns (N = 61)	88.1%	11.9%	0.0%
Inter-agency coordination (N = 59)	88.1%	10.2%	1.7%
Data availability (N = 59)	72.2%	27.1%	0.0%
Legitimacy of final plan (N = 54)	68.5%	29.6	1.9%
Reaching community consensus (N = 55)	67.3%	25.5%	7.2%
Data dissemination (N = 58)	65.5%	32.8%	1.7%
Organizing capacity of the community (N = 57)	36.8%	61.4%	1.8%

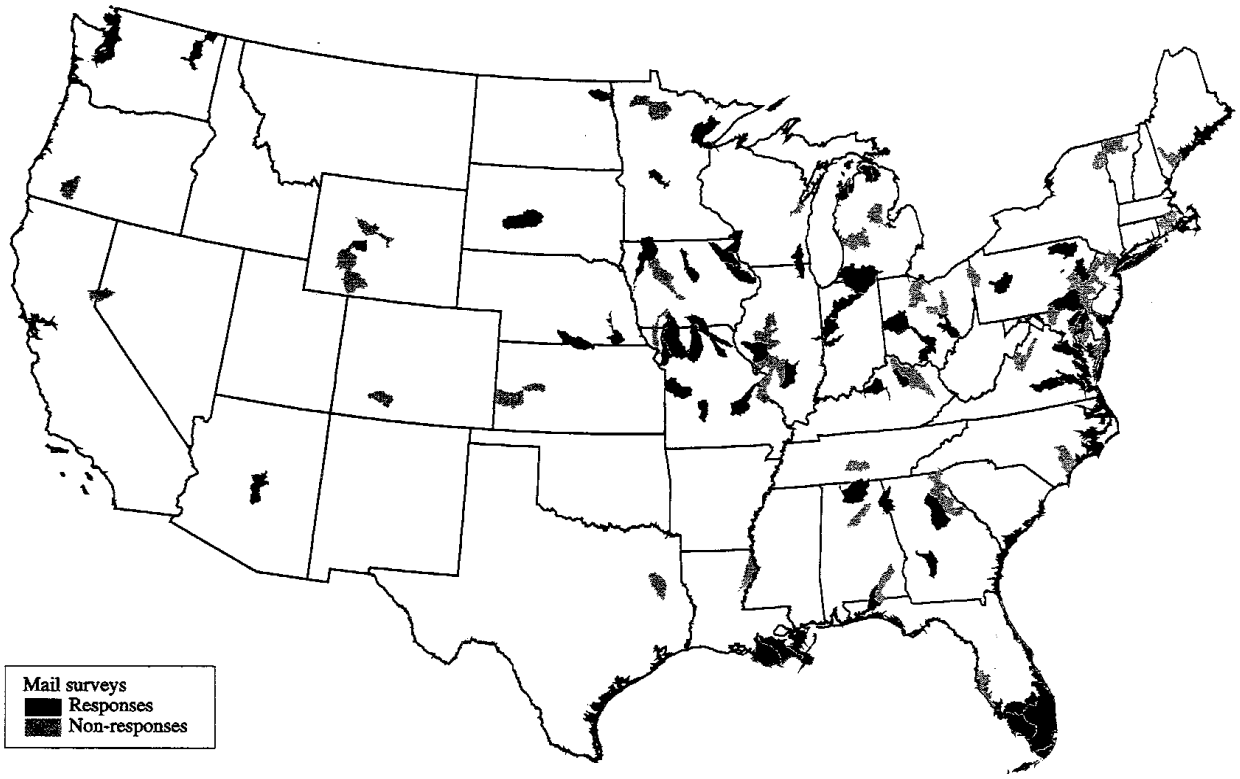

FIGURE 1 Watershed initiatives established with at least 75% federal funding.