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Abstract

Local watershed planning is an increasingly important component of environmental management. This article provides an overview of local watershed management efforts occurring across the U.S. and then focuses on one case study from southern Illinois. First, analysis of 1145 local watershed groups shows that government agencies, farmers, and rural residents are key stakeholders in local groups that primarily deal with regional environmental stressors in the form of soil erosion, nutrients, and agrichemicals. Second, the role of watershed partnerships in mediating the complex interactions among stakeholders and local water resources are investigated through a case study of one watershed group. The Cache River is located in the far-southern tip of Illinois and a watershed planning process was initiated there in the 1990s. An in-depth assessment of this watershed planning process was accomplished through participant interviews, stakeholder focus groups, and a regional telephone survey. This case study illuminates how different stakeholder groups have varying perceptions as to the efficacy and success of watershed management plans.

Keywords: *multiple-survey methodology, public participation, watershed management, wetlands*

Introduction

Watershed planning initiatives have increased rapidly in the last two decades. Variously called grassroots, integrated watershed management or other similar terms, these groups now number well over 1,000 and continue to increase. Groups exist throughout the United States (Sabatier et al 2005), with concentrations in the Pacific Northwest (Rieke and Kenney 1997), the

agricultural Midwest/lower Great Lakes, and the Mid-Atlantic (Duram and Brown 1998). Similar efforts to organize environmental management activities at the watershed level have also been implemented in Brazil (Porto et al. 1999), and Australia (Ewing 1999). New Zealand underwent a notable restructuring of environmental administration and their Resource Management Act of 1991, in fact, organizes that country's environmental management along watershed lines (Cocklin and Furuseth 1994; Ward et al. 2001). Overall, then, watershed-based planning provides an integrated geographical unit from which to manage natural resources within a complex social and ecological context.

Key issues for public participation in watershed management have emerged as representation, values, and approach. The National Research Council (1999: 241) report *New Strategies for America's Watersheds* states: "Collaborative planning involves diverse community interests within the watershed. There is no one leader and no outside expert telling people what is best for them. Rather, it is the collective effort to develop a vision and then make that vision become a reality." Yet there are variations in the extent to which stakeholder groups are represented which is complicated by the fact that it is often difficult to determine appropriate socio-economic measures in local watershed planning (Leach 2006; Morton and Padgitt 2005). Clearly, multiple approaches are needed to transcend traditional roles of administrators and citizens, acknowledge variations between rural and urban needs, and ensure broad representation of stakeholders (King et al. 1998; Chess et al. 2000; O'Neill 2005). Scientific data must be tailored to meet the local needs and expectations because successful watershed plans are built on accepted local values (Golden 1998; McGinnis et al. 1999; Rhoads et al. 1999; Webler 1999; Gregory 2000). The "bottom up" approach must be taken, where local stakeholders, rather than outside experts, decide the issues and discuss their options (National Research Council 1999).

Indeed the potential of local watershed planning is not only in obtaining socially acceptable results, but also is in its ability to initiate and maintain a long-term collaboration and adaptive planning process (Heathcote 1998; Chess 2000; Imperial 2005). Some even suggest that our current legal framework be altered to accommodate these watershed management efforts (Ruhl et al. 2003). Beyond these general recommendations for successful local participation, the actual characteristics of local watershed groups and their activities and goals have been given limited attention (see Born and Genskow 2001; Clark et al. 2005) and are not well understood.

This rapidly expanding movement provides an opportunity to investigate local responses to regional ecological change. This article answers the following research questions: What are the geographical patterns and key concerns addressed by watershed groups across the country? How do local groups come together to participate and attempt to balance diverse stakeholder interests in planning activities? What are stakeholder and citizen perceptions of these planning activities and how does this influence the plan's credibility? To answer these questions, this article takes a twofold approach. First, an analysis of a national database of local watershed groups obtained from the *Know Your Watershed* website provides an overview of the local watershed management movement that has developed across the U.S. Second, this article builds a case study of one watershed group, located in the Cache River region of southern Illinois, to outline key stakeholder and public participation themes that are applicable to other regions.

National Overview of Watershed Partnerships in the U.S.

While numerous watershed groups have formed across the country, very little generalizable information is available on these local groups. This study draws on data from one of the only sources of location-specific watershed data in the U.S.: the "Know Your Watershed"

website on local watershed partnerships was obtained from the Conservation Technology Information Center (CTIC) at Purdue University. This website displays information from the most comprehensive registry of watershed groups in this country, and is well known for its "click on" map with the capability to view information on individual watersheds (www.ctic.purdue.edu/KYW/ 2005). Because we where given access to the entire dataset, our analysis shows some of the only available information on the spatial distribution of watershed partnerships in the U.S. (Figure 1). Further, our analysis indicates that the watershed movement is clearly a modern one. Although a handful of partnerships began in the 1910s, as part of Bureau of Reclamation projects, there were only 124 groups by the late 1980s. The vast majority (77 percent) of watershed partnerships formed in the 1990s. In terms of ecological niche, nearly all partnership watersheds have a river or stream (83 percent); and there is a high occurrence of freshwater wetlands (49 percent), lakes (45 percent), aquifers (38 percent) and reservoirs (36 percent). Watershed partnership data identified the presence of certain environmental stressors, which most often took the form of non-point source pollutants such as sediment (82 percent), nitrogen (62 percent), phosphorus (55 percent), bacteria (52 percent), and pesticides (46 percent).

Our analysis shows the watershed partnerships are comprised of numerous stakeholders, with government representatives, agricultural interests, rural residents, conservationists, and urban residents playing key roles (Table 1). The fact that government agencies are well represented in the watershed partnerships is logical given the groups' sources of funding: Federal dollars account for 33 percent, state funds represent 25 percent, and local money comprises 20 percent, with less reliance on individuals, foundations, and other grassroots funding. This predominance of Federal and state funding suggests a complex relationship between localization of planning within the context of incoming federal/state funds (with or

without strings attached). The watershed partnerships vary in terms of meeting frequency, with most meeting monthly (42 percent) or quarterly (18 percent). This is a sign of the voluntary nature of many groups' members, who may find it difficult to gather on a more frequent basis.

Finally, analysis of the watershed partnerships reveals that they are pursuing a wide variety of goals (Table 2). Monitoring and assessment, partnership development, and information and education activities are nearly equally prominent, demonstrating the importance that the watershed movement plays in providing information to the community and getting various stakeholder groups to work together to gain new information. Indeed, 41 percent of the groups report being able to actually develop plans. This is a notable accomplishment in the context of complex, often multiple ownership landscapes. The majority of partnerships: 1) gather information to monitor natural resources, 2) assess the ecological impacts in their region, 3) build a consensus among stakeholders, and 4) educate the public on this newly acquired information. Data from these watershed groups indicate that this four step approach is important for accomplishing natural resource planning at the local level, given the complex ecological conditions and human driving forces at play.

This analysis of watershed group data provides a national overview of the current situation—but the process by which stakeholders come together and take action in one local area remains unclear. Turning to one specific example, we further investigate the complex local and regional interactions of the watershed management movement.

A Case Study: Cache River Illinois Watershed Group

The Cache River watershed encompasses 216,408 hectares (534,754 acres) located in five counties near the confluence of the Ohio and Mississippi Rivers in far southern Illinois

(Figure 2). The area contains a unique and diverse wetland ecosystem that includes cypress and tupelo swamps with over 100 state threatened and endangered species and two National Natural Landmarks designated by the National Park Service. The watershed provides important wildlife habitat, including breeding grounds for great egrets and great blue herons (Muir et al. 1995; USDA-NRCS 1999). These wetlands are so important to migratory waterfowl and shorebirds that since 1994, the Cache River/Cypress Creek Wetlands have been designated Wetlands of International Importance (Ramsar Convention on Wetlands 2002). In 1991, the U.S. Fish and Wildlife Service created the Cypress Creek National Wildlife Refuge in the watershed.

The uniqueness of this southern Illinois watershed also impacts agriculture and land use. The hilly topography and upland soil types are especially susceptible to erosion, while the bottomland soils are fertile, but have drainage and flooding problems. The number of farms in southern Illinois peaked in 1910 and declined rapidly after 1940 because large machinery was not well suited to hill farming in southern Illinois (Adams 1994). In the study area, many farmers went out of business and left the rural area, allowing other farms to expand. Today, cropland accounts for 49 percent of land use in the watershed, but agriculture has had a dramatic impact on the landscape over time (Cache River Watershed Resource Planning Committee 1995; Duram et al. 2004). The watershed is threatened by sedimentation, habitat fragmentation, stream channelization, diversion, and other impacts typical of multiple ownership watersheds (Kraft et al. 2002).

The Cache River watershed provides an excellent example of a multiple stakeholder watershed that must balance agricultural interests, recreational uses, and ecological integrity (Lant et al. 2001). In 1993, a group of people from various agencies (The Nature Conservancy, Illinois Department of Natural Resources, and U.S. Fish and Wildlife Service) working in the

Cache initiated the formation of a watershed planning process. The planning process, while explicitly aimed at creating a citizen-led plan to guide agency actions, also sought to shift people's often very negative and hostile perceptions of governmental actions. To this end, the group adopted a planning process which included establishment of a planning body, the Resource Planning Committee (RPC) made up of "stakeholders"—all landowners who were mostly farmers, but also hunters, and a few other citizens—and an advisory body, a Technical Committee made up of agency people and technical experts from Southern Illinois University at Carbondale. With a $125,000 grant from the Illinois Environmental Protection Agency, they hired a facilitator and compensated staff for time spent to implement the planning process. Technical Committee members provided information to answer specific questions raised by the RPC. The members of the RPC laid out their resource concerns and formally ranked these concerns. The group completed the Cache River Watershed Resource Plan in 1995, after more than two years of monthly meetings (Cache River Watershed Resource Planning Committee 1995). It has provided the basis for continued work by the various agencies. According to agency representatives, the planning process helped solidify the agencies' efforts, deepened the collaborative relationships among various agency personnel, and aided their requests for program support from their agencies. It seemed to be effective in creating an arena in which people with diverse interests could find common ground and achieve a high degree of consensus about needed action. That is, it appears to have been a successful watershed planning process.

Assessing the Planning Committee

Its long history, ecological importance, and tentative success in the face of highly complex circumstances, suggest that an analysis of the Cache River watershed planning process

may provide a better understanding of other comprehensive planning efforts (Kraft et al. 2002). Of particular concern is both the participants' and local populations' attitudes and perceptions of the planning effort. To assess the watershed planning process, a threefold approach was adopted. First, interviews with key participants in the planning process were conducted. Second, focus groups were held with local political leaders, farmers and rural non-farming residents in the area. Third, a telephone survey of the population in the region was conducted. In each case, our goal was to understand attitudes toward the planning process and assess the opinions surrounding the watershed plan.

1. Interviews with Planning Committee Members

An interview survey of 28 key participants in watershed planning was conducted. Interviews were conversational in format, but were based on questions relating to the individual, the planning group, and outside influences. The participants were representatives of the agencies and non-governmental organizations with interests in the watershed and in watershed planning (USFWS, IDNR, USDA-NRCS, Southern Illinois University, The Nature Conservancy, Citizens Committee to Save the Cache, Friends of the Cache); and farmers and landowners who participated in the formal planning process. The 1-2 hour interviews were transcribed and coded. The coding was used both as a discovery mechanism and as an analytic tool: we used a set of pre-defined categories to code for personal data and data concerning group processes and we used an open-ended set of analytic categories to permit interpretation of the specific data collected in the interviews.

We found, among the professional, agency people we interviewed, a high level of correspondence in their opinions and their understanding of the issues. Local people, they said,

were concerned about the establishment of the Refuge and IDNR land because of the economic loss to the tax base. While the federal government pays counties in lieu of taxes, the state does not. Further, the county board has full discretion in distributing the federal monies to the various taxing districts. Farmers, they reported, were concerned that practices on government land impacted their lands in a negative manner. Hunters feared they would not be allowed access to their accustomed hunting grounds. The agency people felt that much of the initial hostility had been defused as they established themselves as good neighbors. They saw the planning process as part of this acceptance.

Farmers did not contradict this perception, but they also expressed concerns not perceived of by the professionals. These concerns fell into two major categories: 1) unequal circumstances in the planning process; and 2) definition of concerns. First, the farmers felt that there was an uneven playing field between them and the agency personnel. Specifically, the agency people are paid to attend meetings, while farmers and other residents volunteered. Corresponding to this, farmers felt that the agencies had no intention of following their suggestions: "I've sensed that from the atmosphere of the meeting, that agencies thought: we'll give 'em the floor, we'll let 'em moan and groan, but when this thing's cut and dry we're gonna do what our boss tells us to do." And the farmers who did participate in the planning committee were not warmly received by their neighbors, who accused them of selling out to the government interests. "As a farmer – I caught a lot of flak from farmers for even being a part of the process. There's just a general distrust of the government and so those individuals would go out of their way to point out to me that I had become part of the problem."

Second, and equally important, was definition of terms. The group was established as a resource planning committee, and "resources" were seen to pertain to the natural, nonhuman

environment—the ecosystem made up of soil, water, and air. But farmers saw social concerns as resource issues. The farmers were not only concerned about the removal of land from the tax roles and about the impact of state management practices on adjoining farmlands; they also saw the state as competitor for a scarce and valued resource: farm land. Farmers feel that every acre removed permanently from production threatens their potential viability. Repeating a common sentiment among farmers, one farmer we interviewed stated that: "farmers are an endangered species." But the radical difference between the farmers and the agency people came regarding the *meaning* of the land. When the USFWS purchases land, farmers said, they level all existing buildings and bury them. They create a landscape devoid of obvious human habitation, but according to the farmers, the landscape includes culture. Land, to them, embodies the relationships among the people who used it. This contrasted sharply to what the farmers' saw among the agency personnel " . . . they are focused in on one thing and that's environment and they don't care about the people that live here." The farmers are concerned about the general decline in population and the related economic destruction that has occurred in this region. Towns have lost many services which makes life more difficult and erodes the community life that existed a generation ago. Southern Illinois is not unique. In this region, as in many others, governmental policies appear at least partly implicated. Government agencies are major landowners: USDA with Forest Service land, Department of the Interior with Fish and Wildlife Service land, and the state government with various parks. Some rural residents see a link between public land ownership and their agricultural decline, but agency representatives seem unaware that their land management actions are perceived to have a negative social impact.

2. Stakeholder Focus Groups

Building on information gained through the key informant interviews, focus groups were organized to investigate local knowledge and perceptions within the Cache River region. Focus groups were held with three types of stakeholders: elected officials, rural and small town residents, and farmers (not on the planning committee). Our approach followed the suggested focus group format (Morgan and Krueger 1997). Groups consisted of 3 to 11 people with similar backgrounds (identified by residence or occupation as noted above). For each focus group, it was necessary to identify participants through specific methods. Public officials were identified through public documents. Rural and small town residents were identified through a random sample of telephone numbers, listed in the telephone book by identified towns within the watershed. Farmers were identified by NRCS District Conservationists, and represented the counties in the watershed. Focus group meetings lasted 2 hours, during which participants were asked a set of 12 questions that were carefully worded to elicit discussion on natural resource topics. During the focus group sessions, key points were written on a large flip chart and sessions were also tape recorded and transcribed. The full text provided researchers with rich contextual information from each group, while the flip chart provides a concise overview of each focus groups' important discussion points.

Several key findings were discovered through the focus group sessions. First, important similarities were found among the three groups that indicate some common general perceptions within the watershed. There was little public awareness of the two years of public meetings of the Resource Planning Committee held five to six years earlier. A handful of people who did know of the meetings, expressed mostly negative opinions, as they doubted whether anything had really been accomplished. Another interesting similarity, was how people perceive "environment" versus "natural resources." Although a few people said the terms were

interchangeable, most participants noted that "environment" indicates more preservationist goals, "tree huggers" and an absolute control over resource use. The term "natural resources," on the other hand, was perceived as specific resources such as water, trees, coal, oil, etc. and the reasonable use of these resources.

Second, findings from the three focus groups indicated how different perceptions are held by the three types of Cache residents. For example the groups have very different ideas about regional environmental concerns. When asked to identify the key environmental issues in the region, public officials mentioned water contamination, pollution, and federal mandates; rural residents noted hunting, fishing, tourism, and preservation; while farmers stated that property rights, drainage, clearing, and the decline of agriculture were the key issues. Related to watershed administration, public officials noted that there were many water quality regulations; residents knew about pollution regulations and use rules (for fishing, parks, hunting, etc.); and farmers noted there was substantial regulation of wetland drainage, land clearing and agricultural chemical applications. Finally, the groups varied in their perceptions of what made resource planning acceptable: officials stated that such a plan must clearly describe why it is necessary; residents noted that the planning process must include public meetings; and farmers stated that planning must include farmer input and allow "zero land acquisition." This indicates that previous planning activities in the watershed are viewed very negatively by the farmers, although this was not necessarily articulated in their other responses.

3. Telephone Survey of the Population

Based on the key participant interviews and the focus group findings, we developed and conducted a telephone survey of the general population (a sample of 303 people) in the Cache

watershed. The rural character of the Cache region was obvious in our survey responses, as only 13 percent lived in a town with a population over 3,000. But these people were not in agricultural employment, in fact only 33 percent owned or rented cropland. These survey results show that the social concerns expressed by many of the Resource Planning Committee members were well founded. Twenty-two percent of the sampled population were retired, 52 percent were over the age of 50, and 59 percent of the households earned less than $40,000 per year. Only 50 percent of respondents worked within the 5 county Cache area and the majority of people did at least half of their shopping outside this region.

Sixty-three percent of those surveyed stated that they were not at all familiar with the Resource Planning Committee. This contrasted sharply to peoples' knowledge of other groups active in the region: 66 percent said they were familiar with the Army Corps of Engineers activities and 68 percent were familiar with NRCS work in the region. Those surveyed by phone held strong opinions as to the role of government in watershed management: 96 percent believe that the government should make free technical assistance available, 68 percent think that the government should provide substantial cost sharing to implement conservation actions, and 84 percent feel that the government has an obligation to assist in conservation efforts. Sixty-three percent of respondents noted that the government should pay to correct a resource problem; while 47 percent of people said that individuals should be responsible for correcting problems at their own expense. The majority of people (59 percent) believed that the government should purchase land for resource improvements, and 79 percent felt that natural resource policies should be implemented to enhance the wellbeing of citizens in the region.

Turning to broader regional goals, the majority of people did not want agriculture to expand in the region over the next five years: 17 percent said that agriculture should expand,

while 48 percent want a moderate to large expansion in recreation to occur. Linking this to the resource planning process, only 28 percent disagree that "only agricultural landowners should be active on resource planning committees" in the region. The majority of people (82 percent) have heard about government payments to farmers and 85 percent believe that farmers should be required to implement management plans. The citizens appeared to be accepting of the shift away from an agricultural based economy and toward more recreational land uses. They believed that the government should play an active role in conservation. People disagreed with the methods used in defining "stakeholders" for these planning meetings; rather a broader based constituency was favored. So, there was divergence between what the farmers stated as goals and what the public believed was best for the region.

Insights from the Case Study Findings

The Cache River Resource Planning Committee provided an opportunity through which to investigate an early effort in watershed management, which is now expanding across the US. In this case study, analysis of the interviews, focus groups, and telephone survey allowed for both an in-depth view of the planning process and a broader assessment of these efforts by the watershed population at large. Our analysis suggests several key findings, which may inform groups across the US:

1. **Outcome of the process**: The Watershed Plan provides clout for local agency personnel when they request support from higher levels of their agency. Virtually all agency (NRCS, FWS, IDNR) personnel noted that stakeholder inclusion in the planning process and resultant plan provided them with a powerful basis to leverage support for programs they initiated locally.

2. **Perceptions of the planning process**: The internal dynamics of the planning process were perceived very differently by the agency and the landowner members. The agencies felt that the process was fair and unprejudiced, but the farmers felt that the agencies had a pre-established agenda and the meetings were somewhat of a scam. Local watershed planning groups must be aware of these variations and work to increase the transparency in citizen stakeholder input, and the genuine inclusion of stakeholders' concerns.
3. **Defining "stakeholders"**: The planning process, which restricted its membership to rural property owners within the watershed, may have defined the stakeholders too narrowly. The degree to which the plan attains broader acceptance, and has the ability to influence local governing policies, was limited by the nature of the representatives. Careful consideration of who comprises the stakeholder groups must be accomplished prior to building a successful watershed partnership.
4. **Information and participation:** The general population knew relatively little about the watershed planning efforts that had occurred. Clearly, stakeholder groups vary in their resources concerns. The public knew relatively little about the ecological factors in the wetlands. Watershed groups need to educate citizens in the region and seek broader participation, in order to ensure acceptance of a final plan.
5. **Accepting landscape changes**: This case study clearly shows how varying perceptions of the regional importance of agriculture can impact citizens' interaction and support for environmental management efforts. It is important to inform local people as to the economic and social benefits of all types of activity (e.g., agriculture, recreation, development). Watershed groups must recognize the influence of historical landscape perceptions as they seek to make future plans.

6. **Future Recommendations**: More effective inclusion of all citizens in the planning effort and broader dissemination of watershed planning efforts must be accomplished in order for the planning process to achieve "ownership" by the people, rather than only the resource agencies.

Conclusion

The formation of watershed partnerships has been an increasingly important component of environmental management. Yet, this social response to ecological concerns is influenced by complex factors: social expectations, legal structures, environmental stressors, and community values. A fundamental consideration is in deciding who to include in the planning process; and once stakeholders are defined, they must be guaranteed a reliable means for providing input. In addition, many watershed groups seek analyses of watershed variables, which adds a scientific dimension to the complicated mix of stakeholders and advisors. If the analysis stage can be successfully maneuvered, there still exists the barrier of proceeding from analysis to planning, which depends upon institutional capacity. Implementation, as opposed to shelving of the plans, depends upon citizen acceptance, which is influenced by the perceived legitimacy of the planning process. Even if agency funding flows to the region due to a perceived grassroots planning effort, the true test for watershed groups' long-term effectiveness is in their ability to serve as a reliable forum for competing stakeholders. If a watershed planning process is considered legitimate, the plan could influence human actions and ecological systems. In the example of the Cache River Case Study, we see a good early attempt at watershed planning that mobilized agency efforts in the region, but this plan will not likely meet the expectations of future watershed management efforts that seek to fully include the local population and ensure

their trust in the planning process. Further research must be undertaken to better understand the process of building watershed plan legitimacy; such acceptance may require sound data from scientific analysis, or the inclusion of all perceived stakeholders, or the vague notion of public "trust" that is extremely difficult to define.

The modern watershed management movement represents numerous unique local efforts that, when seen as a national movement, seek to address ongoing problems with water quality and quantity, non-point source pollution, recreational demands, and aquatic ecosystem decline, in an era of increasing local participation in natural resource management. The extent to which partnerships can change the ecological and human conditions within the watershed is not yet proven because existing institutions have been slow to embrace this recent social phenomenon, but the potential for positive outcomes exists. While it is still too early to evaluate the long-term impact of this movement, it is clear that the planning efforts accomplished by these partnerships represent an important local process in human mitigation of environmental degradation. Diverse watershed groups with complex goals, seek to address the long-term sustainability of their local watersheds. The question is whether they will succeed in moving from the meeting room to the living room; and if the general population will accept local watershed planning efforts.

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Table 1. Various Stakeholders Participating in Watershed Groups

Stakeholder Type	% of Groups
1. Government (all)	76.5
Government (58.9)	
Municipalities (58.4)	
Natural Resources Cons. Service (30.1)	
Soil and Water Conservation Districts (24.6)	
2. Agriculture	74.5
3. Rural residents	66.0
4. Conservationists (all)	59.5
Recreationists (47.6)	
Environmental activists (41.7)	
5. Urban residents (all)	59.4
Urban residents (51.2)	
Suburban residents (42.7)	
6. Developers/Builders	51.9
7. Schools	49.6
8. Economic interests	47.8
Forestry (44.5)	
Mining (16.4)	

mean stakeholder groups per partnership: 7.1, min (1) - max (15)

Table 2. Goals and Accomplishments Pursued by Watershed Groups

Goal or Accomplishment	% of Groups
Monitoring and Assessment	77.6
Monitoring (62.3)	
Assessment (51.7)	
Water Data (40.5)	
Inventory report (23.3)	
Partnership Development	73.9
Issues identified (48.1)	
Stakeholders agree (42.0)	
Newsletter (40.6)	
Common vision (30.0)	
Annual report (29.4)	
Time frame (25.6)	
Information and Education	73.9
Planning	52.9
Plan development (41.1)	
Issues prioritized (36.7)	
Goals set (27.9)	

mean goals and accomplishments reported: 5.7

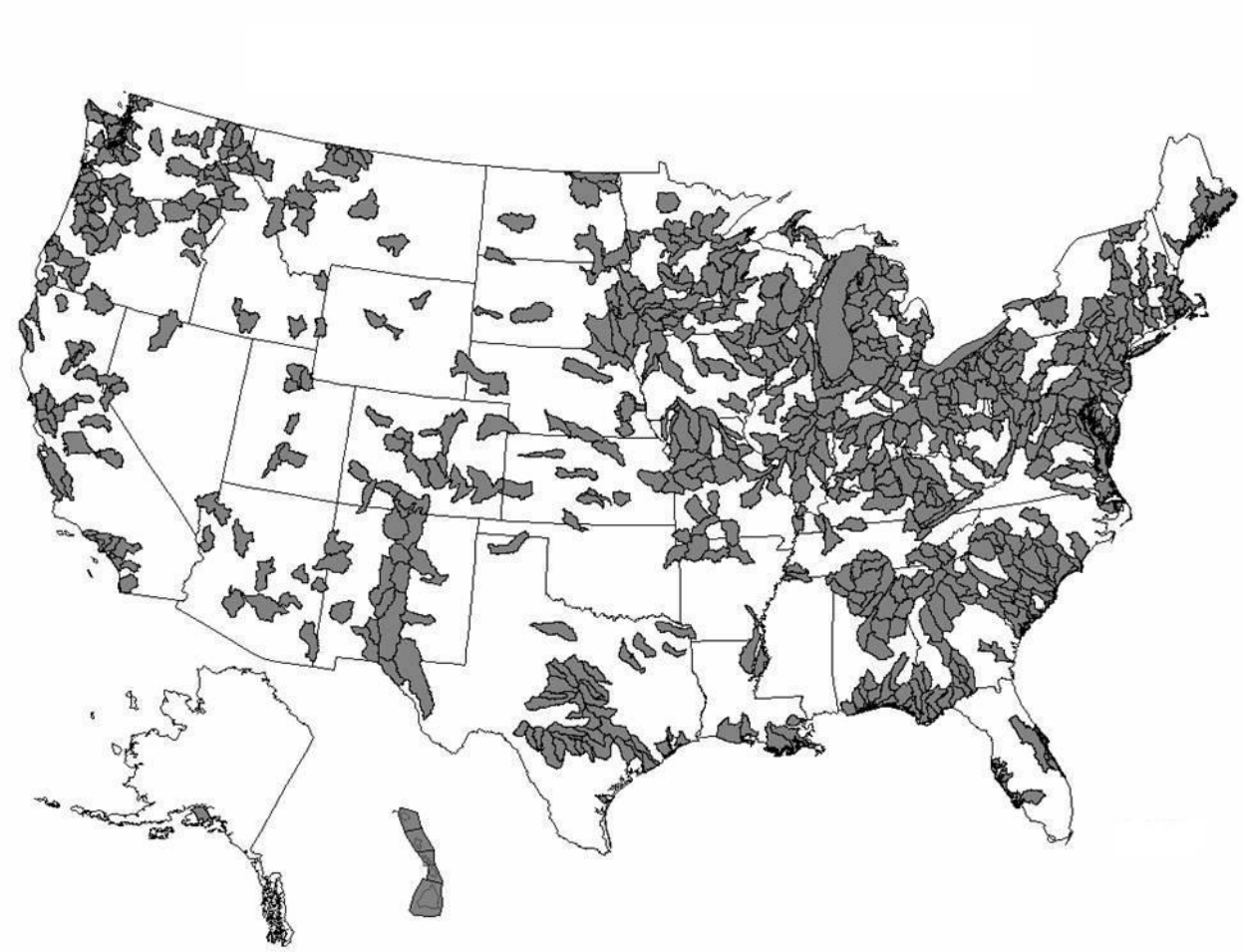

Figure 1. Watershed partnerships documented in the Conservation Technology Information Center Database.

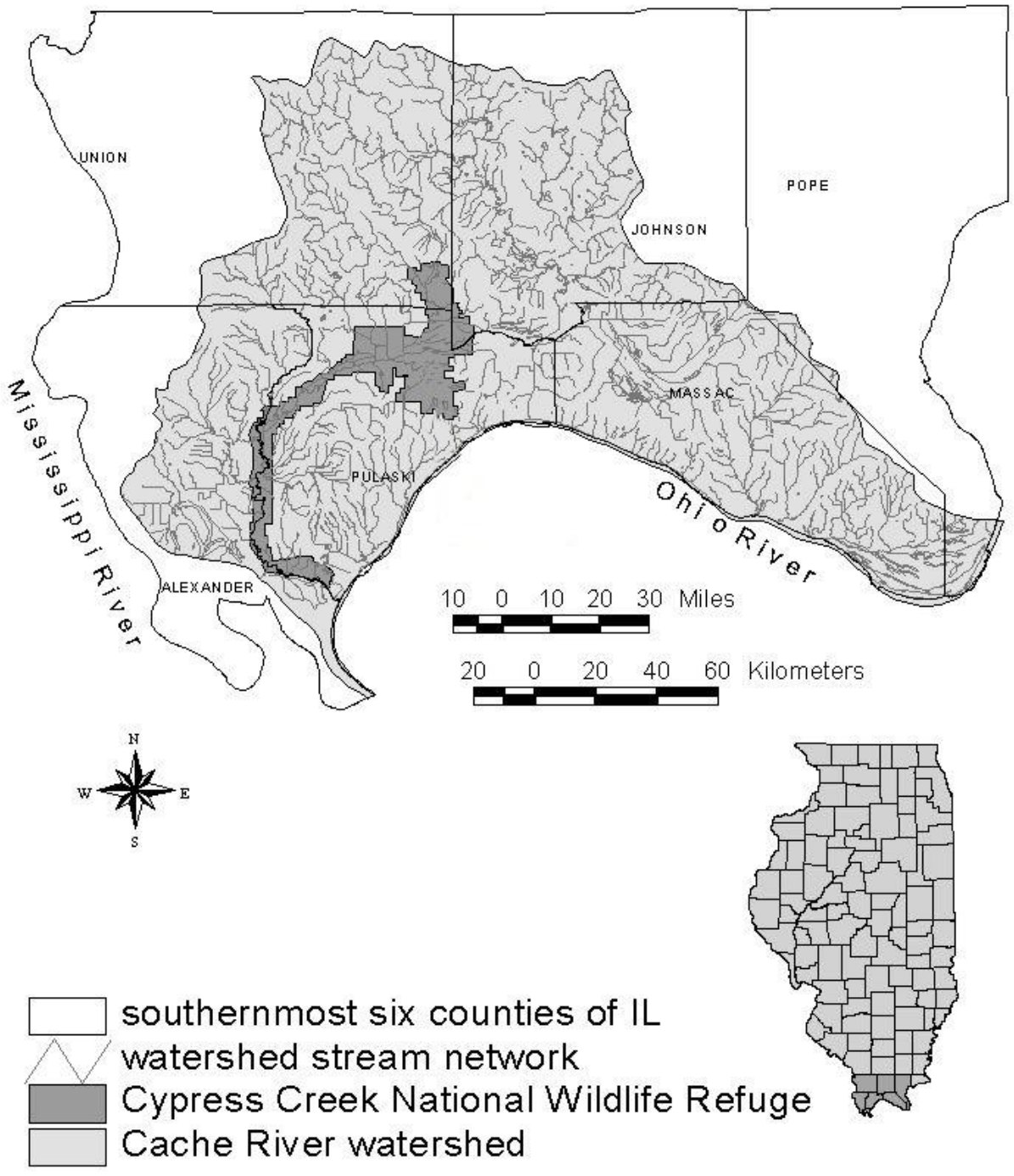

Figure 2: Cache River watershed in southern Illinois, USA.