Universities Council on Water Resources
Journal of Contemporary Water Research & Education
Issue 158, Pages 19-33, August 2016

Institutional Constraints to Collaborative Ecosystem Management within a Wetlands Conservation Partnership

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Abstract: Recent decades have seen an evolution in resource management paradigms from the multiple use and sustained yield toward ecosystem management. This ongoing paradigm shift has generated interest in collaborative decision-making as a more promising alternative to conventional top down institutions. While a collaborative approach to ecosystem management promises several benefits, including equity, efficiency, and sustainability, institutional constraints often impede the success of these initiatives. Using the Cache River Joint Venture Partnership in southern Illinois, USA as a case study, this study employed a qualitative research approach to understand how various institutional attributes influence prospects for conflict and cooperation in collaborative decision-making processes. We found that stakeholder motivation and capacity for cooperation with other partners in ecosystem management can be enabled or constrained by several institutional factors, including external policy and regulatory mandates, internal administrative and budget structures, institutional cultures, and approaches to science and decision-making criteria. We conclude with a suggestion that stakeholders in collaborative ecosystem management partnerships identify and address constraints for cooperative action during the early stages of the process.

Keywords: *adaptive management, adaptive governance, Cache River Joint Venture Partnership, collaboration, restoration, southern Illinois, sustainability, watershed*

The resource management paradigm is in a state of transition from the conventional sustained yield and multiple use management paradigm toward ecosystem management (Cortner and Moote 1999; Yaffee 1999; Chapin et al. 2010; Folke et al. 2011). The sustained yield and multiple use management paradigm was based on the view of humans as separate from nature and a belief in human mastery over nature (Cortner et al. 1998). This paradigm also relied on expert science and centralized institutions with the aim of enhancing efficiency and output maximization of economically valuable resources, including timber and water resources (Daniels and Walker 1996; Yaffee 1999). This over-emphasis on the predictable supply of commodity outputs has resulted in biodiversity crisis (Grumbine 1994; Chapin et al. 2010). Since the concept of sustainable development emerged in the 1980s, the paradigm of the ecosystem management has been gaining recognition as an alternative to the conventional paradigm (Cortner and Moote 1999). The turn toward ecosystem management in recent decades is a response to the biodiversity crises created by the narrow focus of conventional management approaches, as well as changing societal values, and new scientific insights from recent disciplines such as conservation biology and landscape ecology (Grumbine 1994; Cortner and Moote 1999).

Ecosystem management is a holistic approach to resource management that addresses the sustainability of human and ecological communities (Endter-Wada et al. 1998). In this regard, ecosystem management departs from the narrow focus of the conventional paradigm by emphasizing the pursuit of integrated management goals that cover social, ecological, and economic

dimensions (Keogh and Blahna 2005). As Stein and Gelburd (1998, 74) have succinctly stated, "The goal of the ecosystem approach is to restore and sustain the health, productivity, and biological diversity of ecosystems and the overall quality of life through a natural resource management approach that is fully integrated with social and economic goals." The ecosystem management paradigm considers humans an integral part of nature (Folke et al. 2011), and it recognizes the uncertainties that characterize the dynamic interaction between social and ecological systems (Yaffee 1996). In view of these uncertainties, ecosystem management highlights the need for interdisciplinary science and adaptive management processes (Cortner et al. 1998; Butler and Koontz 2005). Ecosystem management also emphasizes a bioregional approach that considers resource management issues across multiple political and administrative boundaries (Lee 1999). Examination of resource management goals across multiple spatial and temporal scales reveals significant conflicts and other organizational challenges that cannot be managed through conventional top-down institutional mechanisms (Daniels and Walker 1996; Bonnell and Koontz 2007). In this regard, collaborative decision-making is increasingly relied upon as a means of dealing with conflicts among the multiple stakeholders in ecosystem management (Imperial 1999; Wondolleck and Yaffee 2000; Keogh and Blahna 2005).

Besides the influence of the ecosystem management paradigm, the turn toward collaborative resource management is also fueled by the increasing devolution of decision-making authority and implementation responsibilities to state and non-state actors at lower administrative levels (Steel and Weber 2001). In this regard, co-management or collaboration can be seen as a form of governance (Carlsson and Berkes 2005), defined as "the whole of public as well as private interactions to solve societal problems and create societal opportunities" (Berkes 2010, 491). Collaborative decision-making entails the use of multiparty and multidisciplinary approaches to problem-solving (Yaffee 1996). Keogh and Blahna (2005) contend that collaboration goes beyond public involvement. Collaborative processes are characterized by inclusiveness, sharing of power and responsibilities, and joint decision-making among stakeholders, such as government representatives and resource users who interact as equals (Bonnell and Koontz 2007; Berkes 2010). The emergence of collaborative partnerships becomes the solution in natural systems requiring joint efforts to protect and enhance land and water resources at the landscape level (Wondolleck and Yaffee 2000). Collaboration may increase the impact of conservation and restoration practices beyond the capabilities of individual parties through the collective use of critical resources, including land, funding, personnel, or facilities (Burde et al. 1998; Carlsson and Berkes 2005). Additionally, collaborative partnerships improve the quality of resource management decisions through the integration of diverse perspectives and sources of knowledge among stakeholders (Margerum and Robinson 2015). Collaboration is also a promising mechanism for managing stakeholder conflicts, enhancing the efficiency of the decision-making process through reduced transaction costs, improving the legitimacy of decisions, and enhancing the sustainability of resources and livelihoods (Carlsson and Berkes 2005; Plummer and Armitage 2007; Cinner et al. 2012; Margerum and Robinson 2015).

While collaborative partnerships between governmental and non-governmental entities are essential for ecosystem management, several factors may inhibit their success. One legacy of the sustained yield and multiple use paradigm of resource management is the fragmentation of ownership and responsibilities for the management of ecosystems among land management organizations, such as the Forest Service, National Park Service, and the Bureau of Land Management (Yaffee 1997; Cortner and Moote 1999). Specifically, differences in mandates among the multiple land management organizations create conflicts and impede collaborative ecosystem management (Cortner et al. 1998; Haeuber 1998). Closely related to the constraints of differing legislative mandates, differences in budget structures and budget priorities among organizations are another constraint to collaboration (Stein and Gelburd 1998; Imperial 1999). Complexities inherent to watershed planning imply the need for flexibility within the planning process, but partnering

organizations may lack the pliancy in institutional policies and management operations needed to execute agreements or to accommodate unexpected changes in funding availability (Imperial 1999). This lack of flexibility may also stem from resistance to change by vested interests (Yaffee 1996) and the lack of reward for monitoring and experimentation (Butler and Koontz 2005). In view of these challenges, the literature does not yet adequately address institutional factors that influence cooperation among land management agencies, industries, and private landowners engaged in ecosystem management (Cortner et al. 1998; Imperial 1999).

The objective of this study is to understand how institutional characteristics impact land management decision-making and practices in collaborative ecosystem partnerships. Specifically, we explore the conditions underlying potential for conflicts and cooperation among institutional partners. We analyze these issues through a qualitative study of the Cache River Joint Venture Partnership (CRJVP), a land management partnership in the Cache River valley of southern Illinois, USA. The next section of the paper presents the context of the study area. Next, we present a description of methods for data collection and analysis. The subsequent section presents the results of the study, followed by a discussion of key findings. We then conclude with recommendations for institutions contemplating collaborative ecosystem partnerships in hydrologically complex watersheds.

Background

Forested wetlands in the mid-continental U.S. have been viewed as sources of timber, habitat for wildlife, impediments for row crop agriculture, assets for ecotourism development, and sinks for sediments and other pollutants. Extensive hydrologic alteration within these ecosystems has resulted in a variety of site conditions on landscapes held under multiple ownerships and managed for diverse objectives. Over the past century, state and federal natural resource agencies, non-profit organizations, and soil conservation programs for consumptive and non-consumptive recreation and resource management have emerged to address site specific management objectives on private and publicly held lands. More recently, coordination among landowning entities has created opportunities for management collaboration at multiple spatial scales. This cooperation is particularly important to address calls for restoring hydrologic connectivity, a key component for the renewed provision of some ecosystem services (Opperman et al. 2009).

The study was conducted within the Cache River watershed of southern Illinois (Figure 1). Renowned for its significant biological and cultural features including high value wetland habitats and unique landscape features, such as cypress-tupelo swamps, the Cache River watershed is recognized nationally and internationally with National Natural Landmarks and RAMSAR designations, respectively. Private land ownership with a focus on row crop agriculture is the primary land use across the watershed once dominated by forest cover and since transformed via land clearing and drainage (Durum et al. 2004). Concerns for hydrological and land use alterations prompted public land entities to actively explore opportunities for management interventions. The Cache River Joint Venture Partnership (CRJVP) was formed in 1991 with constituents including the Illinois Department of Natural Resources (IDNR), U.S. Fish and Wildlife Service (FWS), The Nature Conservancy (TNC), and Ducks Unlimited (DU). The USDA Natural Resource Conservation Service (NRCS) became a member of the CRJVP in 2008 to expand resource initiatives with conservation programs for private landowners within the watershed. The formation of the CRVJP was instrumental to addressing the scale and complexity of the efforts needed to protect and restore the Cache River watershed (Illinois Department of Natural Resources 2006). The primary goals of the CRJVP are: (1) forest and wetland habitat restoration; (2) reduction of sedimentation and streambank/bed erosion; and (3) managed reconnection of the Upper and Lower segments of the Cache River. The CRJVP currently controls or works within a 60,000 acre wetland corridor nearest the Cache River (Figure 1). While all members of the partnership work towards these broad goals, each partner approaches these goals through their own specific management objectives and actions.

Methods

This case study employed a qualitative research approach to gain an in-depth understanding of the institutional dimensions of the CRJVP from the perspectives of current, previous, and unofficial members of the partnership. Data for the study were generated using semi-structured interviews, observations, and document review (Creswell 2003). After gaining entry and establishing rapport with potential research participants, the chain referral method, or snowball method (Patton 1990) was used to purposively sample research participants (Baxter and Eyles 1997). Key informants were asked to identify other individuals who may provide a unique perspective of the CRJVP. Participants were chosen based on their membership status, knowledge, and experiences within the CRJVP. A total sample of twenty-five research participants were interviewed, including representatives of each of the member organizations of the CRJVP, as well as representatives of organizations working closely with the CRJVP, such as AmeriCorps and Friends of the Cache River Watershed. Most of these interviews were conducted in a one-on-one, face-to-face setting while a few were conducted via telephone. During the interviews, an interview guide was used to provide structure and consistency in questioning while permitting the flexibility for further probing to explore participants' unique experiences and perceptions (Patton 1990). The interviews explored participants' experiences in land and water resource management in the Cache River watershed as members of a particular organization and as partners in the collaborative initiatives of the CRJVP. Interviews averaged approximately one hour in length, ranging from thirty minutes

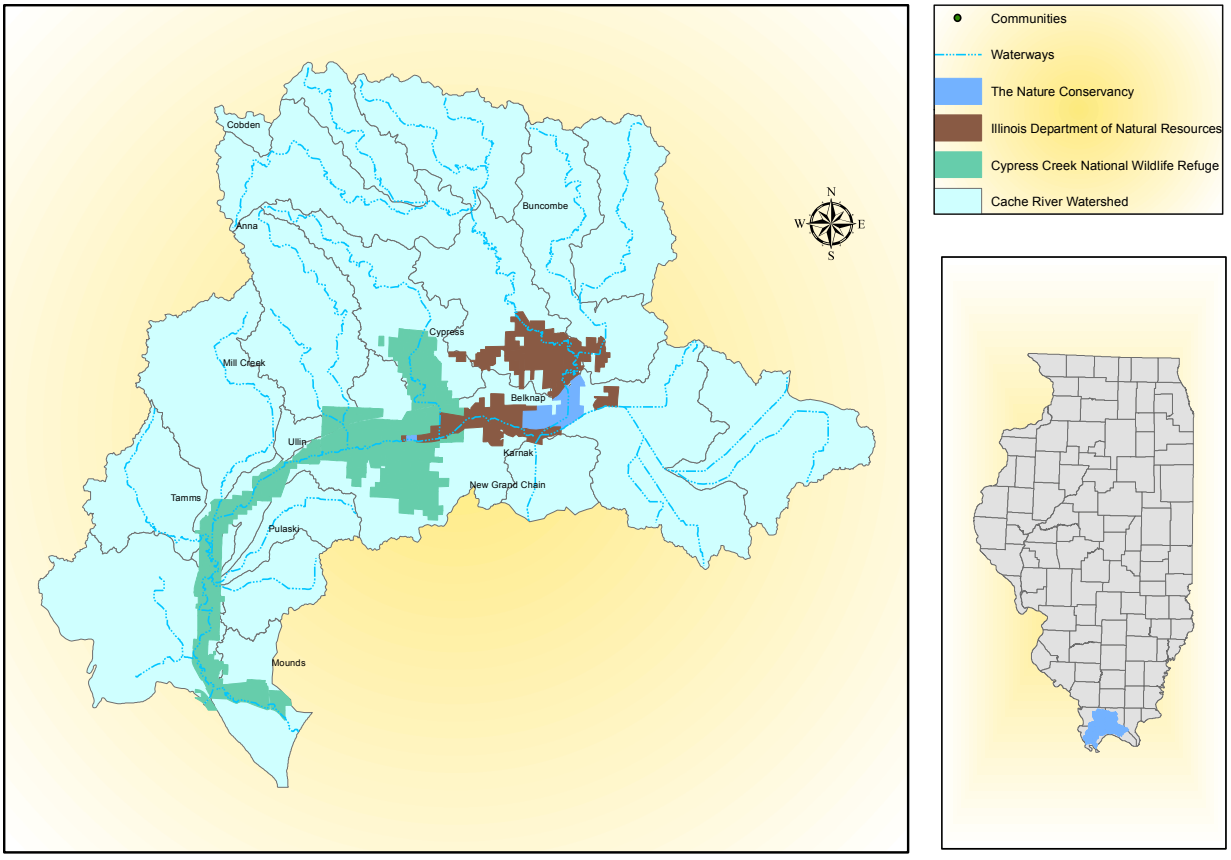

Figure 1. Study area. Public lands in the Cache River Watershed in southern Illinois (Source: Cache River Joint Venture Partnership).

to over two hours. All interviews were recorded using a digital voice recorder and transcribed post interview. The interviewer (JAB) took notes during the interview regarding initial observation of nuances, behaviors, emergent themes, and other commentary useful for collective assessment and future analysis. Reflexive reports were developed after each interview to document these initial reflections and impressions and to further identify thematic categories preceding coding (Shenton 2004).

In addition to interviews, participant observations at monthly meetings of the CRJVP were undertaken throughout the duration of the study, from March through October 2012. Additional observations were conducted at meetings where the CRJVP partners were involved, such as restoration committee meetings, the NRCS annual planning meeting, and the Friends of the Cache River Watershed monthly meetings. Observations were focused on discussion points of the meetings, current events, activities, concepts brought to the table for CRJVP discussion, and other issues requiring CRJVP attention. Data also were obtained from relevant documents including management plans, environmental studies, proposals, progress reports, articles, maps, institutional records, memoranda, and prior meeting minutes to gain in-depth knowledge on partnership history, goals and objectives, current practices, concerns and issues, and future outlooks.

Following the fieldwork, interview transcripts were imported into the Nvivo software to enhance data management. Data analysis and interpretation followed the guidelines of grounded theory principles (Strauss and Corbin 1998; Charmaz 2006). In grounded theory, the researcher seeks to derive a general explanation of a phenomenon of interest based on the views of the research participants (Creswell et al. 2007). Toward this end, the data were analyzed through coding to identify emerging themes from the data, as well as the relationships among these themes (Strauss and Corbin 1998). A number of measures were taken to enhance the rigor of the data analysis process, including the use of peer debriefing, and the triangulation of data from the interviews, document review, and participant observations (Creswell 2003).

Results

The following data analysis results are presented according to the major themes that emerged from the data: (1) policy mandates and regulatory ambiguities; (2) funding and budget mechanisms; (3) administrative structures and procedures; (4) institutional culture; and (5) science and decision-making criteria.

Policy mandates and regulatory ambiguities

The management of the Cache River watershed is divided among state and federal agencies, as well as the private entities that constitute the CRJVP. Each member of the partnership is bound by individual policy mandates that shape their authority and management priorities. The interviews indicated that these differences can lead to several challenges, including non-cooperation and limited implementation of the ecosystem management concept.

Differences in mandates among the CRJVP members seemed to explain the lack of interest of some partners in cooperating on some resource management projects. For instance, the IDNR is in a water structure agreement with an adjacent private landowner to control water levels. However, the structure has the potential to negatively impact other adjacent private lands. FWS is concerned that flooding private lands constitutes private property drainage which is inconsistent with the agency's mandate. As a result, FWS is unwilling to support other partners on projects that involve water level management as indicated by this interviewee:

"*There's a personal private property rights issue Fish and Wildlife Service has with the way IDNR is handling this private property issue and they're not supporting the way that IDNR is handling it. FWS has already said that if it [the issue] goes to court, that they're not going to be backing them and in many ways, they can't, because it does set a precedent that you're flooding somebody's land potentially that you know about and it's complicated and I don't see the partners coming together on these really big legal issues.*" (int. 22)

Key informants also mentioned that in instances where partners cooperate, unintended consequences may occur in partnership efforts as

a result of ambiguities in the multiple regulatory frameworks that may not be compatible among all parties. For instance, TNC enrolled their land in the Wetlands Reserve Program (WRP) administered by NRCS to enhance the protection of the land and to contribute to hydrologic reconnection efforts. WRP focuses on wetland restoration, protection, and enhancement, which is consistent with TNC's mission of enhancing the sustainability of land and water resource systems. However, additional regulations on flooding and changes in hydrology were enforced by the NRCS that could hinder the flexibility of TNC to undertake the management actions intended to promote reconnection.

"*Where we were proposing to divert the water was through a Wetland Reserve, WRP, and NRCS had some issues there. Can you really go into an easement and change the character of that easement, even if it's for reconnection?*" (int. 23)

While the problems discussed above are due to the multiple regulations by which members of the CRJVP must abide, conflicts have also arisen due to the lack of clear legal authorization of the landscape scale management actions required to achieve the goals of the CRJVP. In fact, some private landowners and the local Drainage District have obtained an injunction to halt IDNR water level management activities due to potential flooding impacts. As a result, IDNR cannot move forward with management until the lawsuits are resolved. Given the lack of authority of FWS to undertake management actions that impede drainage on private lands, the injunction against IDNR could delay or preclude the attainment of hydrologic reconnection goals.

Funding and budget mechanisms

Another theme that emerged from the interviews was the differences in funding sources and budget mechanisms among the CRJVP partners. These differences influence the priorities and capacity for each partner to contribute to the pursuit of common goals.

Interviews revealed that the CRJVP partners receive funding from private and public sources, and have differential levels of flexibility over the allocation of these funds. In the case of the FWS, the refuge manager has the flexibility to allocate budgets to specific on-site priorities. He also has the authority to transfer funds as needed from one project to the other.

"*It's kind of discretionary on [the] part of the refuge manager how much money they want to put towards biological stuff, visitor services, that type of thing. They're given categories of money for each of those things, like maintenance money or a general fund of money, but then it's kind of up to them on where they want that money to go... We are given an allotment, some money for each category, like maintenance, visitor services, but we can shuffle that money around. Nobody is stopping us from doing that. If the refuge manager wanted to say, take all the maintenance money and give it to biology, he could do that. He has the freedom and he's in charge of how we are going to spend our money basically.*" (int. 26)

The flexible budget mechanisms of the FWS differ radically from that of the IDNR which operates according to rigid budget structures that prohibit fund reallocation. Compared to IDNR, managers working for the privately-funded TNC have greater fiscal discretion. Besides managing their own properties, TNC even assists partners by providing additional funding for off-site restoration projects. However, projects that involve substantial funding require approval from the national level. Seeking funds at the national level is a lengthy process and can lead to delays in project implementation. These differences inhibit the implementation of CRJVP projects that require the pooling of resources among partners.

The interviews also established a relationship between funding sources and project priorities. Some CRJVP partners may be driven by funding availability to prioritize projects that may not always be consistent with the landscape scale goals being pursued by the CRJVP. The shortfalls of such project-driven management approaches are best illustrated in the case of the NRCS whose personnel concentrate their efforts primarily on private lands that are suitable for the various government-funded conservation projects administered by the agency. As a result, NRCS staff have few resources to actively participate in CRJVP projects that do not directly impact their private land owner constituents through the programs they administer.

Administrative structures and processes

Differences in the administrative structures of the members of the CRJVP were also highlighted by key informants. These differences have implications for the ability of partners to quickly respond to emerging resource management challenges. These differences are best illustrated in the contrast between the FWS and IDNR.

IDNR has a complex administrative structure that could potentially impede the flow of information, as well as decision-making at lower levels of the organization. The IDNR consists of several divisions, each of which has its own set of priorities focused on distinct resources, such as fisheries, forestry, natural heritage, and wildlife. District personnel work with the site superintendents and seek approval from them in order to carry out on-the-ground management actions. Regarding on-the-ground management, the staff members communicate between divisions to address site-specific needs. Communication also occurs between levels of hierarchy within individual divisions. For example, district forestry staff report to regional forestry supervisors and fisheries district staff report to their regional fisheries supervisors. At the apex of the chain of command is the overall director of IDNR, followed by the head of each of the divisions. This top-down approach to managing single resource categories may challenge the development of an enabling institutional framework for managing complex ecosystems.

The administrative structure of the FWS differs from that of IDNR. The refuge manager of the FWS possesses greater autonomy to make decisions on the ground as opposed to waiting for upper levels of administration to approve all management actions.

"*Refuge managers are god. They are given the control to make a decision on the ground, so the refuge managers do not have to call the regional office for every decision.*" (int. 23)

"*...let's say we've got a ditch that's plugged up somehow that's on us and a neighbor might feel it's a problem for them. The typical thing, we'd probably say yeah, we're gonna get to that. If [we] have neighbors that sometimes say, I'd like to go do that right now, we might give them a special use permit and say yeah, go ahead, you can do that.*" (int. 16)

In addition to differences in administrative structures of the CRJVP members, some key informants also mentioned the constraints associated with the procedural requirements of government agencies that distract from resource management activities.

"*It'd be nice if we were spending more time looking and thinking about ... resource management documents instead of more time on administrative stuff.*" (int. 16)

Institutional culture

Differences in the institutional cultures (i.e. the norms and traditions) of partner organizations of the CRJVP also emerged as an important source of disparities in the priorities and strategies of these organizations. These differences have implications for potential cooperation or non-cooperation on specific resource management initiatives.

The interviews revealed that the institutional members of the CRJVP focus on different scales in the analysis and management of resource management problems within the watershed, creating potential for conflicts. For instance, TNC defines its mission holistically and focuses on managing the entire watershed to recreate a sustainable, naturally flowing river system. As noted by one respondent, TNC aspires "...to actually protect, restore, and manage the significant natural character of the Cache River. So it involved more than just buying land..." (int. 18). Contrary to the landscape scale orientation of TNC, the traditional focus of NRCS is working with private landowners. The two most prevalent programs implemented in the Cache River watershed are the Environmental Quality Incentive Program (EQIP) and the Wetlands Reserve Program (WRP). Both programs provide financial incentives for landowners to implement best management practices that will benefit the landowners as well as support larger conservation efforts. These programs allow private landowners to retain their ownership rights while relinquishing some of their development rights.

"*In watersheds like the Cache, where we've had landowners that would have never sold their ground to Fish and Wildlife Service for part of the refuge, but yet as long as they can maintain ownership, we're willing to put it in the Wetland*

Reserve Program, and they maintain the ownership, but it's permanently enrolled in wetlands now and managed as a wetland restoration... The Wetland Reserve Program is tied nicely in that it's targeting some of those lands that never would have made it into federal ownership." (int. 12)

However, the unique relationship between NRCS and private landowners presents challenges for the pursuit of CRJVP goals. Private landowners are primarily concerned with sustaining agricultural production. While NRCS strives to meet the private landowners' needs while balancing best practices for natural resource conservation benefits, these two goals are not always compatible. In view of these conflicts between agricultural and conservation interests, representatives of the NRCS noted that their membership in the CRJVP sometimes threatens to erode the trust between the agency and private landowners.

"*Some of the conflicts the field office has are sometimes being pulled towards the interests of agriculture versus interests that the state and federal agencies have. So there's a delicate balance that the field offices try to maintain, especially when it comes to things like agricultural drainage or policy of how lands will be procured that are going to be federal lands, but there's a delicate balance of trust that we have between groups like the Drainage Districts, let's say. Our agency versus the Fish and Wildlife Service or IDNR, who they see as maybe a primary enemy of them in terms of drainage and stuff... we have to be a little careful there, when you're working with people… to do that in a way where it doesn't look like we're trying to take what some other agency wants to do and cram it down their throat. That's the hardest part and probably the toughest challenge. It's caused friction in the past.*" (int. 12)

"*Some of the landowners who don't agree with what the CRJVP's trying to do I actually saw it as a negative, because they didn't always want to work with us because we were in cahoots with the CRJVP. Down there, it was actually more of a disadvantage being a member of the [Cache River Joint Venture] Partnership.*" (int. 30)

Besides the conflicting scales of operation, many interviewees remarked that differences exist in the CRJVP members' fundamental assumptions about what constitutes a desirable ecosystem and what management interventions are needed to achieve that goal. Given the same piece of land, two partners may possess differing perspectives regarding the method of management and preferred management outcomes.

"*If [IDNR] buys a piece of land, [IDNR] looks at it, look at the public land survey notes, look at the adjacent habitat, [and] determine to the best of our ability what it would have looked like prior to human disturbance, and that's what we put back. Fish and Wildlife Service might look at the same piece of the land and if it's not high quality, they might say yeah, we want to put forest on here, but we have an opportunity to put three hundred acres of moist soil units, intensively managed unnatural system, that would provide benefits for waterfowl, which are, you know, part of their mandates, so they're going to do that.*" (int. 8)

These philosophical differences are best illustrated in the management of cypress-tupelo swamps, a natural community type that occurs on both state and federal lands in the watershed. One issue of contention is the desired health and appearance of cypress-tupelo trees in the watershed. Both IDNR and FWS recognize that current swamp water levels are producing stress on the trees. IDNR is managing the swamp for open, deep water habitat with the intent of imitating historical conditions (a mission for IDNR's Division of Natural Heritage and Cache River State Natural Area). For IDNR, a degree of tree stress is acceptable and a natural characteristic of pre-settlement conditions. On the other hand, FWS views tree stress as a problem, recognizing that static water affects tree health, regeneration potential, and primary productivity. They propose management to mimic drier conditions whereby the swamp is subject to seasonal variation, allowing dry periods between flood pulses instead of permanent, deeper water levels.

"*We're dealing with something like that in the Cache with the effects of water levels on cypress trees and what's the best way to maintain the cypress swamp and what state do we want to maintain a swamp in. Do you want to restore what was there historically or maybe there's a better use for that*

swamp now, something that's a little different than what was there a hundred or two hundred years ago, but because the landscape has changed or because things have disappeared other places and maybe pushing that in a little different direction would make more sense, and their arguments often times are on several sides of that issue. It can be difficult." (int. 27)

Several key informants noted that differences in partner strategies and goals in the management of the complex ecosystems in the watershed can lead to adverse transboundary impacts. For instance, IDNR's land is positioned upstream of the refuge and higher in the watershed, meaning that IDNR management decisions, especially water management, influence practices on the refuge.

"*You can't throw a rock in the Upper Cache [River] without something happening fifty miles downstream in the Lower Cache [River].*" (int. 5)

"*There's stuff [water structures and manipulating water levels] on the IDNR side that impacts refuge land, so yeah, that gets a little more challenging because those things are under one partner's control and they affect more than that one partner, so I'd say that does make it a little more challenging.*" (int. 16)

However, other respondents saw the differences in organizational cultures from a positive perspective, emphasizing the potential for more pragmatic solutions in spite of the philosophical differences.

"*There is disagreement about how to manage the water, but disagreement is okay as long as you can maintain the conversation.*" (int. 20)

"*When your common goals aren't fully aligned, that can be an issue, but sometimes it can also be a positive thing too, depending on how you look at it. I always think it's good. I like to be not only questioned by partners, but by constituents, and opponents [to] make sure we're always doing the right thing.*" (int. 17)

Similarly, several key informants expressed optimism that collective action towards the pursuit of common interests among CRJVP members could be triggered by the window of opportunity created by perceived social or ecological crisis.

"*Unfortunately, a lot of times, collaboration doesn't happen until [there is] some emergency. There's gotta be a real need, not just, well, someday we're going to do this, and then we keep doing what we do. A lot of times, real collaboration comes out of an immediate need, an emergency. It doesn't always have to be a natural disaster, but so many times, we rise to be our best after a natural disaster. That's when all the agency labels are put aside. Somebody sets up this command incident system ... and you are part of the team.*" (int. 13)

Science and decision-making criteria

Another theme emerging from key informant interviews was how differences in preferred scientific methods and decision-making styles influenced stakeholder positions and approaches to various CRJVP goals. The interviews revealed that partner organizations in the CRJVP differ in their positions on what constitutes adequate scientific evidence for informing program implementation. In some instances, agencies have differed in their interpretation of when baseline research should partially give way to actual implementation. Some respondents expressed frustration about the delays caused by failure to translate the science into program implementation.

"*We're kind of at the point where we're saturated with so much science on the ground that we really need to move with getting stuff done on the ground, ... I think there are things that I think we can move forward on now. We have these management plans and we have the science and we should be utilizing that to do more on the ground.*" (int. 22)

On the other hand, other respondents highlighted the inadequacy of current understanding about the ecosystem and the need for more rigorous scientific research before management interventions.

"*There's a lot of grey area out there, and even taking lessons learned in one spot or one site, and trying to transfer them to another site, all of a sudden, it's gray. It's not exactly the same situation, the critters are a little different, the landscape is a little different, the key players or the stakeholders are a little bit different, so there's a lot of grey out there and everyone isn't entitled to their own science, but everyone is entitled to their own opinion, and a lot of these things, when decisions*

are being based, and when you don't have the best science to base stuff and a lot is just professional opinion, then that can get kind of difficult, and it's just hard to get to an answer because you can't prove that one opinion is right or wrong or better than the other, so that can be difficult." (int. 27)

The goal of reconnecting the lower and upper sections of the Cache River is one area where the research versus implementation conundrum is best illustrated. Over the past thirty years, CRJVP partners have contributed resources towards modeling reconnection locations, studied biological and ecological effects of reconnection, analyzed potential impacts on private lands, addressed legal proceedings with adjacent private landowners, and examined flooding potential and long-term effects of hydrologic connectivity. IDNR and TNC matched funds to hire a restoration coordinator to oversee the process of gathering information from various stakeholders, including agencies, local community members, and researchers conducting studies to map reconnection effects. The Illinois State Water Survey also updates inventories and provides the latest on-the-ground observations. However, the reconnection still has not occurred. As a result, TNC has been losing interest in supporting a goal that it perceives may never be achieved.

"*We can't continue to pour resources and money into science when we're not implementing things and we're not using it and then actually doing stuff on the ground… Restoring the hydrology is huge and that is really one of the main reasons why The Nature Conservancy is here, so it's hard for us to really be involved when that is all at a standstill.*" (int. 22)

Slow progress towards the goal of reconnection, compounded by financial challenges, has caused TNC to shift focus towards the larger population centers where most donors live and to pursue management actions showing evident and quantifiable outcomes. As a result, TNC has been backing away from active participation in CRJVP and taking the position of a silent partner.

Despite the aforementioned challenges, several key informants were of the view that the perceived lack of progress may be due to a narrow definition of success, suggesting the need for the development of methods and comprehensive criteria for evaluating the impacts of the CRJVP.

"*We've been so focused on reconnection, even though we've been doing a lot of other things, it can kind of look like, well, you've just been focused on reconnection for twenty years and it hasn't happened. So it kind of looks like a failure in a way, or not much success, whereas I would argue, well, we've still been planting trees, we've still been buying land, we've still been doing outreach, we've been doing other things. It's just that we really don't talk about them very much. And reconnection may never happen. That just might be the reality… I always think that there's a danger on, if you're focused just on this great big holy grail that could take a long time, it's not a way to really encourage people being involved, because a lot of people just won't have the patience or whatever. So I think you need to think about what are the other things we're also doing that will be successful to move us forward.*" (int. 16)

Discussion

In recent decades, collaborative approaches to ecosystem management have received attention among resource management science and policy researchers in the U.S. and elsewhere. Yet the institutional dimensions of ecosystem management remain less understood. In this paper, we have examined how the institutional attributes of the CRJVP members influence prospects for cooperation or non-cooperation toward realization of landscape scale conservation goals. The results reveal that characteristic institutional differences, such as policy mandates, administrative structures and budget mechanisms, institutional cultures, and approaches to science and decision-making influence the motivation and capacity for collaboration among the CRJVP members. These key findings from the study are discussed below in the context of the relevant literature.

Policy mandates and regulatory ambiguities

Collaborative decision-making provides a framework for harmonizing the efforts of different types of institutions, including states, markets, and communities toward the realization of common goals at the bioregional level. However,

such processes are likely to be constrained by conflicting policy guidelines that shape the priorities and mandates of individual participants (Butler and Koontz 2005), as well as the lack of clear legal guidelines authorizing such regional level initiatives, often characterized by multiple jurisdictions and land ownership types (Cortner and Moote 1999). These issues can hamper partners' motivation and capacity for cooperation.

Analysis revealed areas of consensus and disagreement within the policy frameworks guiding the activities of each CRJVP partner. All members of the partnership agree on general goals regarding the protection, conservation, and restoration of land and water resources in the watershed. However, important differences exist across management actions each partner is mandated to implement, leading to non-cooperation on specific projects or initiatives. For instance, the FWS is unwilling to participate in some of IDNR water level management activities because the potential flooding of private lands violates the FWS mandate. Additionally, a lawsuit by the local Drainage District and private landowners seeking to halt the IDNR actions also highlights the challenges associated with the lack of clarity regarding the legal basis for these ecosystem management activities, especially when organizational policies impact private property.

Administrative and budget structures

In addition to the effect of the external regulatory environment discussed earlier, collaborative ecosystem management processes can be constrained by differences in the internal organizational structures and budget mechanisms of participating organizations (Imperial 1999). Most agencies have traditionally operated with a top-down decision-making approach that is inconsistent with the need for adaptable institutions in ecosystem management processes (Cortner and Moote 1999; Bonnell and Koontz 2007). Similarly, rigid budget structures targeting a narrow set of resource management priorities can constitute an impediment to the mobilization of resources for pursuing long term and holistic ecosystem management goals (Cortner et al. 1998; Stein and Gelburd 1998).

Consistent with these issues, analysis of the CRJVP revealed that partners differed in their organizational structures for budgeting and decision-making. Some partners, such as the FWS, granted autonomy for decision-making and implementation at lower levels of the organization. This autonomy included the flexibility to allocate funds and transfer them to appropriate projects as needed, enhancing the responsiveness of the FWS to emerging resource management challenges. In contrast, the IDNR operated according to a more rigid, top-down structure, constraining opportunities for flexible decision-making and funding allocation at lower levels of the organization. Funding availability also appeared to shape the project priorities of partner organizations, thus potentially diverting their focus from CRJVP goals. For instance, NRCS is strongly program-driven and requires that personnel concentrate their efforts on only those private tracts that fit within guidelines of programs currently funded. A weakened regional economy and dwindling capital resources constitute a double-edged sword further threatening the efficacy of the CRJVP. While the literature on collaboration suggests that limited budgets may encourage increased reliance on partnerships to meet long-term goals (Wondolleck and Yaffee 2000), the view expressed by key informants is that institutions tend to prioritize internal needs over common partnership goals when capacity levels diminish due to shrinking staffing and budgets. These issues impede the overall resourcefulness and adaptability of the CRJVP.

Institutional culture

One of the major constraints to the implementation of collaborative ecosystem management is the path-dependency effect caused by the norms that shaped past management practices of each involved organization (Yaffee 1996; Cortner et al. 1998). These differences in institutional cultures manifest themselves in the meanings that different groups associate with ecosystem management, ranging from anthropocentric to eco-centric interpretations (Endter-Wada et al. 1998; Yaffee 1999). In line with this diversity of institutional cultures, our analysis of the CRJVP revealed differences in the resource management philosophies and preferred scales of management intervention by the partners. This

presents various challenges as well as opportunities for cooperation.

The preferred scales of management intervention for CRJVP partners range from the level of the farm to the entire watershed. Conflicts sometimes erupt among the different interests being pursued at the various scales within the watershed. For instance, TNC defines their mission holistically with a focus on managing the entire watershed to create a sustainable, naturally flowing river system. TNC policies concerning hydrological processes and other issues are consistent with those governing the broader ecosystem management concerns of the CRJVP. On the other hand, the NRCS primarily focuses at the farm level to provide services to private landowners through conservation programs under their administration. NRCS staff has access to private landowners' properties through contractual conservation easements. This arrangement allows private landowners to retain land ownership rights while also receiving the benefits of conservation programs. However, the primarily agricultural focus of private land owners within the Cache River watershed poses a particular challenge to the agencies whose focus is on managing publicly owned lands near the Cache River channel and wetlands. These conflicts between agricultural and conservation interests threaten to compromise the trust between the NRCS and private landowners.

Members of the CRJVP also differ in their perspectives toward land management and these differences shape their variable goals and solutions to common problems in the watershed. For instance, both the IDNR and the FWS agree that current water levels in the cypress-tupelo swamps of the Cache River watershed have adverse effects on the health of the trees. However, the two agencies differ on the desired future condition of the ecosystem, as well as the strategies for achieving those goals. The IDNR appears to be guided by an ecocentric or biocentric philosophy that posits that the maintenance of ecological integrity is the primary goal of ecosystem management, and that human interventions in ecosystems are detrimental (Endter-Wada et al. 1998). As such, IDNR management proposals focus on returning the ecosystem to pre-settlement conditions that are assumed to be natural. On the other hand, the FWS appears to be guided by an anthropocentric philosophy that emphasizes the usefulness of ecosystems to meeting human needs, as well as the resilience of ecosystems to human use (Endter-Wada et al. 1998). As such, the agency's proposals aim at maintaining the ecological conditions needed to enhance the productivity of the ecosystem rather than returning it to some natural pre-settlement condition. The issue is compounded by the fact that upstream-downstream relationships within the watershed mean that actions taken by one agency have transboundary impacts on others.

Science and decision-making criteria

Effective ecosystem management requires holistic and integrated science-based decision making criteria (Cortner and Moote 1999). Much of the ecological research that informed conventional resource management was conducted at fine scales inadequate for understanding complex ecosystem processes at larger scales (Stein and Gelburd 1998). Given the shortcomings associated with the dominance of ecological experts in conventional resource management, multidisciplinary approaches that integrate knowledge from the social and ecological sciences are essential for meeting the knowledge requirements of the ecosystem management paradigm (Endter-Wada et al. 1998; Keogh and Blahna 2005). Adaptive management is also considered an important strategy for dealing with the knowledge inadequacies in ecosystem management, as it emphasizes the need for learning to deal with uncertainties in the resource management process through monitoring and experimentation (Allen et al. 2011). However, new knowledge may not always be integrated into subsequent decision-making processes as required (Allen and Gunderson 2011), and the methods and indicators for evaluating success may not be well-developed. These challenges at the science-policy interface were encountered in our analysis of the CRJVP.

The interviews revealed that CRJVP members differed on the question of what constitutes adequate science for informing management actions. The goal of hydrologic connectivity of the Lower and Upper Cache Rivers highlighted this tension among partners. Since the formation of the partnership in the early 1990s, significant research has been conducted by TNC, IDNR, and

other partners to gain a deeper understanding of the issue. However, little of the science has been translated into management actions. While some respondents expressed frustration over the lack of progress in project implementation, others favored a more cautious approach so as to clarify knowledge gaps and system uncertainties. Key informants also differed in terms of their criteria for judging the success of the CRJVP. While some saw the partnership as a failure due to the lack of progress toward realizing the goal of hydrologic connectivity, others suggested the need for broader evaluation criteria that included the other projects being implemented by the partnership agencies. In the absence of such criteria, the perceived lack of progress, combined with declining resources, has resulted in a loss of motivation by some partners, notably TNC, to actively contribute to the CRJVP efforts.

Conclusion

The emergence of the ecosystem management paradigm over the last few decades has heightened awareness and interest regarding the benefits of collaborative decision-making. Unlike conventional top-down institutional practices, collaboration offers opportunities for engaging diverse stakeholders in consensus-based decision-making processes. The effective implementation of broad-based collaborative processes could enhance the sustainability of ecosystems and human communities while contributing to principles of good governance, such as equity, legitimacy, and participation. While collaborative partnerships build upon synergistic relationships to pursue common interests, they often fall short of expectations by failing to foresee inherent limitations (Cortner et al. 1998; Imperial 1999).

In this paper, we employed a qualitative research approach in exploring how various institutional characteristics influence prospects for conflict and cooperation among members of the CRJVP in southern Illinois. Our results revealed that institutional attributes, such as differences in policy mandates and regulations, administrative and budget structures, institutional cultures, as well as approaches to science and decision-making interact to influence the motivation and capacity for actors to cooperate. Based on these results, we suggest that the successful management of the Cache River watershed calls for an adaptive governance approach to managing conflicts and dealing with uncertainties (Dietz et al. 2003; Folke et al. 2005; Akamani et al. 2016). Adaptive governance moves beyond public involvement in collaborative processes (Akamani and Wilson 2011) to explicitly address the need for dealing with uncertainties through adaptive management, as well as harnessing a diversity of knowledge systems and institutions across multiple scales to promote ecosystem management (Folke et al. 2005; Gunderson and Light 2006). In the Cache River watershed, such an adaptive governance approach will call for an expanded membership of the CRJVP to include local representatives, the explicit integration of social science and non-scientific knowledge, prioritization of adaptive management, and investing in the capacity to manage conflicts in stakeholder values and interests. We conclude that such flexible multi-level partnerships stand a better chance of achieving success if potential challenges are identified prior to entering agreements. If all parties openly discuss potentially conflicting land management policies and their own institutional limitations as early in the emerging partnership process as possible, greater resiliency may be attained and more realistic goals achieved.

Acknowledgements

This research was funded by the McIntire-Stennis Cooperative Forestry Research Program. The authors gratefully acknowledge E. Seekamp and J. Zaczek who provided helpful suggestions throughout the study and reviewed an earlier version of this manuscript.

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