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Assessing Outputs, Outcomes, and Barriers in Collaborative Water Governance: A Case Study

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Abstract: As freshwater supplies become increasingly threatened by overuse, pollution, and changes in climate, governing bodies have begun to recognize the urgent need for flexible, sustainable solutions to water use and management. Collaborative governance of water resources has arisen as a widespread strategy to develop such solutions in a way that integrates diverse stakeholder needs and works to create consensus-driven management actions. Directly linking the outputs of collaborative processes to improved water sustainability is difficult even on a local scale. However, examining diverse collaborative governance processes, particularly the outputs and outcomes produced and barriers faced, is necessary as these processes continue to flourish at a multitude of scales and settings. In 2005, the state of Colorado initiated a collaborative governance process to assess its existing water resources and future water needs; the information gathered through this endeavor is now being used to inform the creation of Colorado's first statewide water plan. Using data from 28 in-depth interviews with key participants in this process, this paper highlights not only what outputs and outcomes may be produced through a high-stakes collaborative process, but also what barriers exist to producing desired outputs (and therefore, consequent outcomes). Gaining a better understanding of outputs, outcomes, and barriers within a statewide collaborative water governance process can provide insight into improving future decision-making processes and evaluations of those processes in a variety of natural resource arenas.

Keywords: *basin roundtables, Colorado, IBCC, process evaluation, water policy*

Numerous experiments in the collaborative governance of natural resources, particularly water resources, have emerged rapidly since the 1990s (Kenney et al. 2000), leading some scholars to characterize the 21st century as "the era of the collaborative state" (Koontz and Thomas 2006, 111). Broadly, collaborative governance processes bring together a wide variety of stakeholders in a decision-making context to "carry out a public purpose that could not otherwise by accomplished" (Emerson, Nabatchi, and Balog 2012, 2). These processes often include various governmental and public stakeholders, repeated face-to-face discussions among participants, and a mission to build consensus, typically within a new, locally-scaled forum initiated by a public agency (Ansell and Gash 2008).

Since their emergence, collaborative governance processes have been hailed as the panacea for failures associated with traditional, top-down modes of governance. Such failures may include high cost, politicization, and unsuccessful or incomplete implementation (Ansell and Gash 2008). Because collaborative processes attempt to promote mutual understanding, trust, and agreement among stakeholders, these processes may "have greater legitimacy than traditional approaches that rely on the legal authority provided bureaucracies by legislatures" (Sabatier et al. 2005, 6) and result in solutions that are more feasible to implement.

However, evaluating whether collaborative processes are truly more effective at promoting resource sustainability than traditional modes of governance is challenging for a variety of reasons. Collaborative groups face difficulty in defining resource boundaries, assembling appropriate decision-making bodies, and facilitating accountability among members who

share governance responsibilities (Bloomquist and Schlager 2005). Additionally, they often must work within a larger governance regime where the "existing norms of agency authority and administrative inflexibility act as the most critical obstacles to collaboration" (Ananda and Proctor 2013, 105). In other words, the actions of collaborative groups may be constrained by the pre-existing institutional structures in which they function, which may limit their potential for more effective governance. Finally, participants in collaborative processes often face difficulties collecting reliable, long-term environmental data that clearly demonstrate the causal effect of a process upon a resource, especially when management goals are vague or the process is poorly funded (Leach and Sabatier 2005). When a collaborative governance process sets out to deal with non-biophysical components of resource management such as resource allocation and policy change, measuring the process's effect on improved resource sustainability becomes particularly challenging.

In addition to these challenges about what can and should be evaluated, the question of *who* should be tasked with evaluating the effectiveness of collaborative processes is critical. While a third-party evaluator may be able to provide more objective feedback on a process by assessing it based on a priori benchmarks, some scholars argue for the importance of "participatory evaluation" by the process participants themselves or by an evaluator who has been thoroughly integrated into the process (Conley and Moote 2003). As a result, many studies that attempt to evaluate collaborative governance processes rely on "organizational outcomes," such as participants' *perceptions* of environmental change, as measures of success (see Leach and Sabatier 2005, and Koontz and Newig 2014, for examples). This reliance on perceptions, combined with the difficulties associated with collecting objective environmental data described above, can lead to an overemphasis on positive environmental impacts known as the "halo effect" (Leach and Sabatier 2005) and calls into question whether participants should both set and evaluate the benchmarks by which a process's success is determined. Despite these difficulties, relevant evaluations of how these time- and resource-intensive processes function and what outcomes actually arise from them are extremely important to participants, facilitators, policymakers, funders, advocates, and academics alike (Conley and Moote 2003). Without such evaluations, future collaborative processes cannot be improved, and currently effective processes may not be properly supported.

In their exploration of the difficulties associated with evaluating collaborative governance processes, Koontz and Thomas (2006) emphasize the importance of focusing on the outcomes, in addition to the outputs, of a collaborative process. Unfortunately, the inconsistent use of output and outcome measures, whether done purposefully or mistakenly, "undermines the effectiveness of performance management systems" (Koontz and Thomas 2012, 770), making it difficult to determine whether or not a process is truly effective at achieving its goals. Thus, carefully separating the outputs - the "plans, products, and other tangible items generated by collaborative efforts" - from their resulting outcomes - the "effects of outputs on environmental and social conditions" - can be a crucial first step in measuring the success of a collaborative process (Koontz and Thomas 2006, 113). In addition, closely examining the barriers that collaborative groups face when attempting to produce outputs (which then restrict the range of possible outcomes) can further inform a thorough study of how such processes can be evaluated.

This paper applies the ideas presented above concerning the evaluation of collaborative processes to a statewide collaborative water governance process currently underway in Colorado, USA, in order to investigate *what types of outputs and outcomes can be produced through a collaborative water governance process, and what barriers collaborative water governance processes face in producing desired outputs*. This research does not seek to evaluate whether the process in question is effective, but instead asks what opportunities and constraints exist in relation to this process, a necessary step in determining the benchmarks and methods by which the process can be evaluated. In the absence of valid and holistic environmental data associated with this process, the social and organizational outputs and outcomes of the collaborative process will be the focus of this paper. While these are not of primary concern in and of themselves, carefully identifying and analyzing

them can help to determine if they "create or contribute to on-the-ground problem solving" (Kenney 2000, 10).

While many of the findings are broadly applicable to collaborative processes that govern other natural resources, those who make decisions about water must take into account the unique aspects of collective action problems, resource connectivity, and a complicated history of legal allocations in many places, making it a particularly interesting area in which to examine collaborative governance and its evaluation. Furthermore, while an examination of the outputs, outcomes, and barriers in one collaborative water governance process is certainly not representative of all cases, the highly in-depth, qualitative nature of this case study lays the groundwork for further research by providing insight into important aspects of evaluation that can be examined across a broader range of collaborative governance processes in the future.

Case Study: Colorado's Basin Roundtables

Water in the state of Colorado is managed through a complex legal structure of water rights allocated under the prior appropriation doctrine to users who divert water for beneficial use. Following a severe drought in 2002 in which many water rights holders did not receive their full water allocations, Colorado's primary water management agency, the Colorado Water Conservation Board (CWCB), began a comprehensive analysis of the state's water supplies. As part of this analysis, a collaborative process was initiated in order to better understand water issues from the perspectives of a variety of stakeholders on a local scale. Basin Roundtables, groups of diverse stakeholders from each of the state's eight hydrologic river basins plus the Denver Metro area, were created to collaboratively assess each basin's water needs and devise consensus-based recommendations for water management in the face of uncertain changes in future climate and population growth. In addition to their advisory function, each Roundtable is authorized to grant state-provided money to entities proposing water-related projects that meet the Roundtable's goals, a process that occurs regularly at each Roundtable's monthly or bi-monthly, face-to-face meetings. Simultaneously, a second collaborative group called the Interbasin Compact Committee (IBCC) was established with the goal of facilitating discussion among the Roundtables concerning statewide water issues and future supply gaps (CWCB 2015). The analysis and recommendations derived from this process (referred to as the "Roundtable process" going forward) are currently being used to inform the development of Colorado's first statewide water plan, a large-scale effort to manage an increasingly scarce resource in a state that has an unparalleled impact on the rest of the western United States' water management.

Research Design and Methods

This research uses an exploratory case study approach (Yin 2003) to investigate the types of outputs, outcomes, and barriers that exist in a collaborative water governance process. The Roundtable process serves as the broader case study and each Roundtable serves as an individual unit of analysis in order to capture both the individuality of the Roundtables as well as their common set of rules and procedures. Along with extensive observations of IBCC and Roundtable meetings, 28 in-depth interviews (Rubin and Rubin 2005) were conducted with participants from a variety of stakeholder groups from each Roundtable in order to better understand the mechanisms underlying the Roundtable process as a whole, the inner-workings of each Roundtable individually, and the interactions among the Roundtables, the IBCC, and the CWCB. Interviewees were selected based on the stakeholder group and geographical location they represent (in order to ensure variety), as well as their roles as key participants in the process as observed by the researcher or mentioned specifically by other interviewees. Importantly, while the interviewees represent a wide variety of perspectives on the process, they do not definitively represent the views of other members on their Roundtables or in their stakeholder groups. However, selecting a diverse sample of interviewees and ensuring anonymity helped to reduce interviewee response bias associated with discussing the successes and challenges of the process. Information gathered from interviews was also supplemented by public process documents, such as financial reports or

notes from events hosted by the Roundtables.

The interviews were digitally recorded, transcribed verbatim, and coded using QSR NVivo 10 qualitative analysis software and an a priori codebook derived from the research question and important themes from the relevant literature on collaborative governance to provide greater focus. However, the researcher also remained open to emergent themes that appeared across interviews and coded for these as well. Detailed summaries of the coded information pertaining to individual Roundtables were then created and used by the researcher to examine patterns and themes across Roundtables. All interview quotes presented below are followed by an alphanumeric code that identifies the Roundtable in which the interviewee primarily participates alongside an arbitrary interview number that does not correlate to the interviewee's stakeholder group. Table 1 lists the Roundtable names and their corresponding codes, as well as the stakeholder groups of the interviewees. Importantly, although one interviewee may represent multiple stakeholder groups, that person is counted only once under his or her primary or formal stakeholder group association (e.g., a local government official may also own a farm, but is listed under "local government" rather than "agriculture").

Findings and Discussion

Interviewees were asked a series of questions about Roundtable activities and accomplishments, rapport-building among participants, and proposed policy and management alternatives in order to better understand the outputs and outcomes of the Roundtable process. Interviewees also mentioned outcomes, successes, or results of the process in a number of other areas of the interviews, including those that discussed goals, outreach to the community, and interactions with other stakeholder groups. Although not directly asked about factors that limited their ability to produce desired outputs, the vast majority of interviewees identified at least one barrier related to some aspect of the process. Importantly, interviewees were not asked to objectively assess the successes and challenges of the Roundtable process, but instead to narrate their experiences as participants.

Table 1. Interview Subjects by Basin and Stakeholder Group.

Basin Name	Basin Code	Agriculture	Environment/ Recreation	Industrial/ Water Provider	Local Government	Other	Basin Totals
Arkansas	AR		1		1	1	3
Colorado	CO		1	1	2		4
Gunnison	GN	1	1		1		3
Metro	MT		1	2		1	4
North Platte	NP	1	1		1		3
Rio Grande	RG	1	1	1			3
South Platte	SP	1	1		1		3
Southwest	SW		1	1	1		3
Yampa/White/Green	YWG	1	1			1	3
Stakeholder Totals		**5**	**9**	**5**	**7**	**3**	**29***

*Note: one interviewee refused to be recorded; thus, the interview could not be formally analyzed with the other 28.

Outputs

Table 2 lists the most common types of outputs of the Roundtable process, as identified by interviewees: funded projects, increased contact with the public (through forums such as town hall style meetings or the production of short "guidebooks" aimed at public education, for instance), and policy documents or tools (such as white papers). Outputs were distinguished from outcomes using Thomas and Koontz's (2006) definition of outputs as "plans, products, and other tangible items generated by collaborative efforts" (113).

While these outputs may seem fairly typical for many collaborative processes, two important nuances are worth exploring here. First, when interviewees discussed policy tools or documents as an output, they typically described not only the tool or document itself, but the impact that it has had or is expected to have on policy or society. In other words, Roundtable participants are consciously and strategically looking ahead to the outcomes that will ideally result from the outputs they produce. Second, while funded projects such as renovating a reservoir or installing a new diversion structure on a stream are clearly tangible outputs, the *process* of funding projects also served a secondary function within the collaborative process. The Roundtables are allotted funds by CWCB, which they then distribute to selected entities proposing projects or studies relevant to the Roundtable's goals. Participants across the Roundtables argue that the process of funding such projects is perhaps the most important incentive to keep participants actively committed to collaboration:

> Well, one thing that has kept this process alive not just in the Gunnison basin but throughout the state is this [funding process]. That gives the Roundtables an actual function… I'm sure it saved the [Roundtable] process statewide because it at least gave the Roundtables a specific purpose where they could take action and see things happen. (GN-01)

Moreover, the process of deciding which entities will receive funding and what criteria each Roundtable will use to make this decision, has created a forum for focused discussions on topics important to Roundtable members:

> Well, I think the grants…tend to drive some of what we do because we have to have discussion about the grants, so it gives us a way to focus on what our priorities and criteria [are]. (CO-03)

While the process of deciding which projects to fund is often lengthy and contentious, it provides participants with a productive forum for breaching

Table 2. Major Outputs Identified by Roundtable Participants.

Output	Roundtables that Identified Output	Relevant Quotation(s)
Funded Projects	All Roundtables	"We're good at spending money…and having a lot of projects in the pipeline" (RG-03). "So that's an example of where we took the [available] funding, initiated a [project]…that lead ultimately to legislation to try to solve a problem. So that goes directly to meeting our need" (AR-02).
Increased Public Contact through New Forums or Educational Materials	All Roundtables	"We've had some meetings with the general public just to let them know what the Roundtables are for, what we're doing and why we're doing them" (SP-02).
Policy Documents or Tools	AR, CO, GN, MT, SP, YWG	"So, the Metro has written white papers on conservation, reuse, and new supply" (MT-01). "Our nonconsumptive flow evaluation tool I think was really useful and unusual in the way we put it together" (CO-03).

difficult issues that otherwise may not have surfaced in a collaborative process driven by consensus rules, a topic that will be discussed further under the Barriers section below.

Outcomes

The most commonly identified outcomes - defined as the "effects of outputs on environmental and social conditions" (Koontz and Thomas 2006, 113) - are listed in Table 3. Importantly, these outcomes are multi-faceted, affecting both the social dynamics of the participants within the Roundtable process (e.g., community building, increased teamwork) as well as people outside of the Roundtable process (e.g., increased diversity of participants in dialogues about water, increased public knowledge). Some outcomes can be associated with specific outputs. For instance, Roundtables initiate local events such as community meetings (an output), providing new forums for public participation and education. These may directly contribute to the outcome of creating a public that is more knowledgeable about water issues, though it is likely not the only output leading to this outcome. Other outcomes, such as increased rapport and teamwork among Roundtable participants, may not be directly linked to a single output; however, they may be indirectly connected to the process of producing certain outputs such as funded projects in which Roundtable members must work together to arrive at a unified decision, as described above.

Importantly, the outcomes identified here are inherently linked to participant perception and recall. Because the outcomes that participants describe are often not objectively measured (impossible in some cases), it is important to remember that perception is not reality. For instance, a number of participants perceive a more educated public as an outcome of the Roundtable process. To objectively test this perception, pre- and post-surveys of public knowledge about Colorado's water issues that could somehow isolate the Roundtables' influence from other influences would be needed to determine if the Roundtable process was indeed responsible

Table 3. Major Outcomes Identified by Roundtable Participants.

Outcome	Roundtables that Identified Outcome	Relevant Quotation(s)
Community Building and Increased Rapport among Participants	CO, GN, MT, NP	"That was one of the biggest things with the Roundtables, was rather than special interest groups, we became people. Yeah, it literally, very much more, became a community" (CO-02). "I think that you spend this much time together, you get to know each other… when you develop trust between people even if they have different agendas and different goals, they tend to be able to have…a worthwhile civil discussion on how we meet those different agendas and goals" (MT-02).
Increased Diversity in Water Conversations	CO, SW, YWG	"I think that one success… has been to bring more people into the water conversation, and it has introduced environmental and recreational communities to the conversation…and it's put everybody in the same room" (CO-01).
Increased Public Knowledge	GN, NP, RG, SP	"I think the Basin Roundtable process around the state is invaluable for keeping people informed and educated about water…I think the people of the state of Colorado have become better aware and educated about water because of the Roundtable process" (NP-01).
Learning/Increased Teamwork among Stakeholder Groups	All Roundtables	"I think [the Roundtable has] really been successful in… understanding the perspectives of other individuals, whether it's [municipal and industrial], or ag[riculture], or nonconsumptive uses and how we have to coexist, and how we have to work together, and how can we best utilize the resource" (AR-03).

for an increase in public knowledge. Outcomes relating to changes in the physical environment as a result of Roundtable actions were not included here because they were not emphasized directly by study participants. Despite these issues, qualitatively investigating outcomes is necessary because it allows the researcher to understand the range of possible outcomes, as well as which ones are seen as most important by participants in the process.

Barriers

Interviewees stressed a number of barriers to producing desired outputs, which inherently restrict the range of possible outcomes stemming from a collaborative process (see Table 4). Some barriers, such as limited water supplies and compact obligations, pertain directly to the resource in question and the pre-existing policies governing that resource. For instance, if a basin is obligated by an interstate compact to provide a specific amount of water each year to another state, the basin's Roundtable is inherently limited in what it can do to change the use or management of that water without foregoing compact obligations. Other barriers, such as lack of information or underrepresentation of certain stakeholder groups, are more directly related to process function itself. For example, most Roundtables only have one to three participants who specifically represent nonconsumptive (environmental and recreational) water uses, whereas ten to twenty times that number of participants may advocate on behalf of consumptive interests (agriculture, industry, domestic supply). This underrepresentation of nonconsumptive interests

Table 4. Barriers to Outputs Identified by Roundtable Participants.

Barrier	Roundtables that Identified Barrier	Relevant Quotation
Bureaucratic/Political Issues	CO, GN, MT, SP, SW, YWG	"[Legislation requiring high efficiency water fixtures] seems to us like a no-brainer tiny baby step in a much more difficult progression of things we're going to have to do to meet the gap, and we can't even do that, right? So, why would we want to count on going down this path of huge amounts of progression on conservation without even taking the first steps?" (MT-01).
Lack of Information or Data	AR, RG, SP, SW, YWG	"If you don't know how much water you need, how can you say where you have a gap?" (SW-02).
Limited Water Supplies	AR, CO, GN, MT, RG, SP, SW	"Well, the whole basin is over-appropriated, so we're water poor basically as a rule… you know we're in a dry cycle and the climate… so that's it basically" (RG-03).
Low Participation (by Members or Important Stakeholder Groups)	CO, GN, MT, NP, RG, SP, YWG	"I'm a true believer in the transparency but I'm also a true believer that people have to get involved, you know? And they're pretty nonchalant about it … including you know, state senators and you know, elected officials, etc." (SP-03).
"Red Tape" or Permitting Issues	AR, SP, SW, YWG	"…actually accomplishing [a specific change in water management] will only occur when the parties involved are willing to change NEPA and the permitting process to where it is actually less burdensome" (YWG-02).
Underrepresentation of Certain Stakeholder Groups	AR, CO, GN, MT, NP, SW, SP, YWG	"I think the recreation and environmental stuff is an important need, but it's probably underrepresented… in other words, you have these two representatives from every jurisdiction and then you have the ten sort of 'at-large' reps, and there's one for the environment and one for recreation" (AR-02).
Water Law, Water Rights, and Compact Obligations	AR, CO, GN, NP, RG, SW, YWG	"…we don't want to be in a position of causing compact administration on the [Colorado] river, which would further target the demise of agriculture and…cause chaos" (CO-01).

may prevent certain outputs - policy statements on environmental flows, for example - and reduce outcomes that may eventually follow from these outputs, such as greater conservation priorities placed on nonconsumptive attributes by state-level policymakers. Similarly, Roundtable members, aware of the contentiousness of certain political issues, may avoid the risk of generating an output addressing said issues. For example, widespread resistance to legislation promoting high efficiency water fixtures may prevent participants from promoting said legislation (an output), undercutting the possibility of large-scale societal change in which this solution to excess water use is seen as socially and politically valuable (an outcome).

Two additional barriers were identified by interviewees specifically concerning the constraints associated with working in a *collaborative* process as opposed to a top-down resource governance process. Due to this distinction, they are not listed in Table 4 but will be discussed separately here. First, because many collaborative groups work within a multi-level governance structure of interconnected groups and agencies, there is often a question about the fundamental power that a collaborative group has to create desired outputs. To illustrate this, some Roundtable participants perceive their collaborative group authority as strong because of their ability to distribute funds that directly contribute to tangible outputs as discussed above. Other participants view the Roundtable groups as limited in their power because they have no legislative authority to actually build projects or pass laws:

> [T]he Roundtable has no legal authority to do anything except present nice plans, so that's been the disconnect from the very outset…you know, this is just an exercise in futility because even if you come up with the best plan, you still can't implement it - you have no authority. (GN-01)

This issue is particularly complicated for the Roundtables, who must work together with another collaborative group (the IBCC), as well as with a state agency (the CWCB) that may influence Roundtables' decision-making activities through provisions of certain funding and data.

An additional barrier that the Roundtables face in producing desired outputs through a collaborative process lies in the foundational concept that most collaborative governance processes rely primarily on consensus-based decision-making models (Kenney 2000). Ideally, consensus-based models foster the development of organizational attributes such as improved trust and social capital among stakeholders, which some scholars assume to have a "cause-and-effect relationship" with "on-the-ground success" (Kenney 2000, 39-40). Interestingly, all interviewees in this study described their Roundtable as typically reaching some sort of consensus, despite providing slightly varying definitions of consensus. However, these overarching claims about achieving consensus may be due in part to a belief held by the interviewees that consensus is appropriate and what *should* result from a collaborative process. In other words, "[c]onsensus, we are told, is not merely a logical and inevitable product of the search for truth, but is something with a strong social value" (Kenney 2000, 41). Aside from the fact that many of the most controversial issues are simply not taken up by collaborative groups working under consensus rules, a number of interviewees cited additional reasons for why their Roundtables typically reach consensus, such as the "weeding out" of controversial voices through a lengthy and often taxing process (consensus by attrition) and the lack of knowledge about the needs of different geographical areas represented by some Roundtables (consensus by lack of information). Thus, consensus rules may limit the variety of outputs produced in a process working under collaborative norms by reducing comprehensive, informed participation and hampering discussion of controversial subjects that may not easily lead to unified agreement on a specific management action or plan.

Conclusion

In the field of natural resource management, the implementation of collaborative governance processes has become a popular response to issues associated with traditional modes of governance and increasingly complex socio-environmental conditions. Through an in-depth, qualitative exploration of a collaborative water governance process currently underway in Colorado, a variety of social and political outputs and outcomes were identified. While this analysis did indeed rely on process participants' inherently subjective

perceptions and recall, examining the landscape of possible outputs and outcomes from a collaborative process, and differentiating outputs from outcomes, is a crucial step in creating more sophisticated evaluation tools and relevant benchmarks for process evaluation, whether one is using third-party or participatory evaluation methods.

Importantly, a number of barriers to producing desired outputs related to the resource, the decision-making process, and the norms associated with collaborative governance were identified. Accounting for the spectrum of barriers to desired outputs in a collaborative process, as done in this analysis, pushes evaluations of such processes beyond simple measures of goals achieved, to a recognition of the specific limitations to effectiveness faced in each collaborative process. Understanding such limitations, especially in the context of outputs and outcomes, can help agencies implementing collaborative processes and leaders within the processes devise ways to overcome them, evaluate process effectiveness, and ultimately implement more successful future governance processes that promote increased resource sustainability.

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