

THE VALUE OF THE ANALYTIC-DELIBERATIVE  
FRAMEWORK IN ENVIRONMENTAL  
DECISIONMAKING:  
THE CASE OF OKLAHOMA WATER PLANNING

By

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## CHAPTER I

### INTRODUCTION

#### A. The Controversial Nature of Natural Resource Politics

The politics of natural resources have long been contentious. From battles with Native Americans in the colonial eastern North America to access to rivers and grazing lands in the West, Americans are particularly sensitive about who gets what (Lasswell, 1936) benefits from environmental assets. This is due in part to the fact that these issues touch areas of our lives that are dear to us, the raw materials from which we make our livings, the places in which we recreate, and the health of our families. It is also due to a lack of trust about how the government apportions and protects such resources. The environmental movement of the 1960s, the fight against nuclear power plants, and the resistance to drilling for oil in the Alaska National Wildlife Refuge are just a few examples of the intense concern ordinary citizens have regarding environmental and natural resource issues.



In fact, environmental problems have a particularly bad reputation. “Modern environmental policymaking has been described as beset by a group of ‘wicked problems,’ meaning ‘problems with no solutions or only temporary and imperfect resolutions’ for which there are no ‘narrowly defined technical definitions and solutions’ and no ‘clear-cut criteria to judge their resolution’” (Beierle and Cayford (2002, p.5) quoting Fischer (1993, pp. 172-173). “[These] intractable conflicts are messy. They are hard to pin down, manage, and analyze and extremely difficult to resolve. They are intense, frustrating, and complex, with no readily conceivable solutions...[but] intractability does not imply that a conflict is not resolvable” (Lewicki, Gray, & Elliott, 2003, p. 37).

Environmental issues are particularly difficult because they occur at the intersection of several issues. As Brewer and Stern put it:

Decisions affecting environmental processes, however, are among the most challenging facing humanity because of the following collection of attributes that environmental choices usually share: structural complexity; multiple, conflicting, and uncertain values; long time horizons; open-access structure; incomplete and uncertain knowledge; high stakes; time pressure; and the linked nature of environmental processes and environmental decision across time scales, physical scales, and institutional scales. (Brewer & Stern, 2005, p. 24)

#### B. Natural Resource Conflicts as Moral Dilemmas

Many recalcitrant conflicts, especially those concerning the natural environment, are at their core disagreements over fundamental values or morals. Deeply held values such as justice, autonomy, and tradeoffs between economic development and natural preservation (Kapoor, 2001) are at issue. Such fundamental values are not easily compromised.

Furthermore, “Value conflict is at the heart of environmental conflict”(Smith, 2003, p. 1). The environmental movement was triggered by a conflict over the importance of the

natural environment and the importance of unbridled economic growth. Although debate continues on the nature of the relationship between these two views (Is it truly a zero-sum game or a matter of finding alternatives that benefit both sides? (Watson, 2009)), both are clearly values of modern society that at times seem to be in conflict.

Although visions of the future often include a benevolent society that provides for all, it is not clear that abundance will eliminate political conflicts. As Gutmann and Thompson point out in “Democracy and Disagreement,” moral disagreement is a part of the human condition and is here to stay. Some, including Hume (Hume, Selby-Bigge, & Nidditch, 1978), have argued that moral disagreements would cease in conditions of great abundance. If everyone had enough to satisfy their wildest dreams, then there would be no reason for argument; no reason would exist for pursuing greater personal wealth. However, because no such utopian society exists, abundant motivation remains for making moral arguments that would favor one’s own material acquisition. Given this lack of abundance, Hume argues that it is still possible that all moral disagreement could be eliminated if men and women were unendingly generous. If thoughts of self did not limit one’s giving, all needs and wants of others could also be met through the combined generosity of society (Gutmann & Thompson, 1996).

But as Gutmann and Thompson argue, scarcity and selfishness are not the only causes of moral argument. Even in a utopian society where all needs are immediately met by abundance and generosity, moral disagreements can still arise. For example, the morality of allowing abortions or alcohol sales could be legitimately debated in such a society and

citizens could hold widely differing opinions<sup>1</sup>. In addition, disagreements could arise over the distribution of resources. Hence, Hume developed a list of “circumstances of justice” to which Gutmann and Thompson added “incompatible views and incomplete understandings” (Gutmann & Thompson, 1996, p. 22). They argue that scarcity and selfishness are not the only causes of moral disagreement; for even when these two causes are eliminated, incompatible views or limited understanding could still lead to moral conflict.

Many citizens and politicians follow Hume in viewing moral disagreement as a conflict between people who pursue different ends: propertied versus propertyless, rich versus poor, the self-interested versus the moderately public-spirited. The implication of this view is that moral conflicts could be eliminated were people better motivated or social resources less limited. This suggestion seriously understates the difficulty, and distorts the nature, of moral conflict in modern politics. The problem of moral conflict originates not only between *persons* but also between the moral *values* themselves. (Gutmann & Thompson, 1996, p. 23) [emphasis in original]

Morals or values themselves can conflict irreducibly. The societies in which we are raised play a major role in the development of our values. Societies differ greatly in what they hold dear. For example, the Japanese value conformity and acceptance of duty to society while Americans value independence and the struggle to shape one’s own destiny. Such differing values alone could lead to significant moral disagreements.

On the other hand, incompatible moral beliefs (values) do not necessarily lead to conflicts. With our limited understanding, we cannot rule out the possibility of a solution that will satisfy all sides. “We do not know whether, if we enjoyed perfect understanding, we would discover uniquely correct resolutions to problems of incompatible values...” (Gutmann & Thompson, 1996, p. 25).

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<sup>1</sup> Certainly, abundance could alleviate much suffering and greatly reduce the need for such procedures as abortion by providing all the needs and wants of the parents and child, but circumstances could still arise in which an abortion was desirable to one or both parents. This could lead to moral arguments about permitting the procedure. A fundamental conflict exists between the freedom of the parents and the life of the fetus.

Whatever their causes, value conflicts including those regarding natural resources are pervasive. Democratic societies have developed various means of dealing with environmental conflicts. Approaches including command and control regulations, market-driven economic incentives, and information dissemination campaigns have all met with limited success and new approaches capable of addressing “existing and emerging [environment and natural resource] challenges, choices, and opportunities” are needed (Durant, O’leary, & Fiorino, 2004).

### C. Deliberation as a Method for Resolving Moral Disagreement

Since the 1970s, there has been a growing realization that the “bureaucratic, prescriptive, and adversarial” (Durant et al. (2004), p.644) first generation of environmental regulations was not sufficient to deal with environmental and natural resource issues. Recently, a plurality of interests (Bohman & Rehg, 1997; Dryzek, 2000; Durant, Fiorino, & O’leary, 2004; Fishkin, 1991; Klein, 2010; Ruckelshaus, 2010 and others) have called for a new approach to environmental governance: one that reconceptualizes environmental management, reconnects with stakeholders, and redefines administrative rationality. Despite calls for a new approach from diverse corners, the reforms made thus far are “best appreciated...as an effort to graft flexibility onto parts of an inflexible whole” (Durant, Chun, et al., 2004, p. 648).

One reason for the lack of progress is “the highly pluralistic (even hyperpluralistic) and conflict-ridden political context that has characterized [environment and natural resource] management over the last quarter of the 20<sup>th</sup> century” (Durant, Chun, et al., 2004, p. 648). Another reason is the culture of environmental regulation that began in the 1970s. Contemporary culture tends to approach environmental protection by passing regulations to

punish violators. This adversarial mindset pits environmental regulators and environmentalists against developers, business, and industry. Certainly, there is something very satisfying about forcing an adversary to comply, but such a mentality has not led to more creative, innovative, and mutually beneficial approaches.

Citizens have been largely dissatisfied with how governments manage the environment and have demanded new mechanisms to give them a greater voice in decisions. Political theorists, sensitive to the need for a better approach to resolving moral disputes, called for a more deliberative form of democracy (Benhabib, 1994; Dryzek, 1987a; Fishkin, 1991; Gutmann & Thompson, 1996). These efforts converged in the 1990s (Rosenberg, 2007) with the development of a number of citizen-focused, alternative decision processes for natural resources (Baber & Bartlett, 2005; Beierle & Cayford, 2002; Crosby, Kelly, & Schaefer, 1986; Dryzek, 2000; Durant, Chun, et al., 2004; Durant, Fiorino, et al., 2004; Fishkin, 1991; Fishkin & Laslett, 2005; Gutmann & Thompson, 1996; O'leary, Nabatchi, & Bingham, 2004; Smith, 2003; Walsh, 2007). Various referred to as deliberative democracy, collaborative governance, and grassroots democracy, these mechanisms allowed participants' values to be considered (at least) in the development of policy. Included in this category are deliberative opinion polls, regulatory negotiations, citizen advisory groups, and stakeholder round tables among others.

Many of these mechanisms involve deliberation, which allows participants to educate each other on the issues, reach a mutual understanding of each other's perspectives, and explore alternative solutions. In theory, such processes should lead to better policy outcomes. However, few studies have explored the value of deliberation in collaborative governance to enhance policy.

Deliberation is more than just a way to improve the quality of decisions; it is a moral means of addressing moral arguments (Gutmann & Thompson, 1996). Deliberative democracy is moral because it is based on moral foundations. As with other concepts of democracy, citizens are regarded as moral agents who each deserve an equal opportunity to participate in government. Deliberative democracy seeks to go beyond just providing equal opportunity by rectifying past injustices and giving voice to those who have been marginalized.

Simply creating more deliberative forums can bring previously excluded voices into politics. This expanded deliberation can lead to intensified conflict as a result of including these diverse perspectives. But the positive face of this risk is that deliberation also brings into the open legitimate moral dissatisfactions that would be suppressed by other ways of dealing with disagreement. (Gutmann & Thompson, 1996, p. 42)

Furthermore, deliberative democracy is moral in its outcomes. By seeking policies that are acceptable to all, this approach seeks the greatest good for all. “Deliberative democracy seeks not consensus for its own sake but rather a morally justified consensus” (Gutmann & Thompson, 1996, p. 42).

Not only does deliberative democracy include moral justification in its foundations and outcomes, as do other democratic theories, but it also brings a moral approach to the “middle democracy.” Other democratic theorists agree with deliberative democrats that democratic procedures should rest on fundamental ideals and are justified if they produce morally acceptable results. The theories (beginnings) and outputs (ends) of democratic procedures must be morally justified. But they largely ignore the middle of democracy; “the ongoing process of everyday politics” Deliberation brings moral solutions to middle democracy. “It offers a moral response to moral conflict” (Gutmann & Thompson, 1996, pp. 40-41).

#### D. Lack of Empirical Comparisons of Deliberative and Non-Deliberative Outcomes

A survey of the literature regarding public participation in environmental decision making reveals a lack of empirical evaluation of these decision processes. Although participatory processes are increasingly popular, only a few studies have been conducted on which to base informed decisions about the design of these processes.

Many government agencies around the globe have begun using participatory processes to make or support environmental policy decisions. These include the U.S. EPA's Project XL and Common Sense Initiative, the U.S. Department of Energy's (DOE) advisory committees for contaminated site cleanup, the U.S. Department of the Interior's advisory councils for resource management, the German city of Wuppertal (Claus, 1995), and the Netherlands which conducted "study groups" as part of a nationwide energy policy debate (Mumpower, 1995).

The quality of these decisions is only beginning to be evaluated and the knowledge base for selecting the best processes for a specific decision type remains weak. By the late 1990s, it was possible to demonstrate the potential of analytic deliberation to identify some of the factors likely to affect its success and to show that the best process depends on decision context. (Brewer & Stern, 2005)

In his book *Deliberative Democracy and the Environment*, Graham Smith points out that the field remains in its initial, theoretical stage.

It is a fair criticism of the deliberative democracy literature that it generally remains a highly abstract and theoretical endeavor – that it fails to systematically engage in the 'messy' and more detailed task of institutional design. In particular, there has been a lack of detailed analysis of institutions that would allow for the political engagement of citizens in the decision-making process...there is generally little sense of how the deliberations from within civil society are to be transmitted to the more formal arena of political decision making. (Smith, 2003, p. 79)

The existing comparative studies (e.g. Beierle & Cayford, 2002; Branch & Bradbury, 2006; Leach, Pelkey, & Sabatier, 2002; Renn, Webler, & Wiedemann, 1995) have identified some broad principles for guiding participatory process design but more specific guidelines are needed. Given the breadth of issues addressed by deliberative democracy and the complex social contexts in which they occur, it is unlikely, perhaps even undesirable, that one will be developed. Thus, the state of the art for planning a deliberative process is to involve “experienced practitioners and extrapolation from available case studies” (Brewer & Stern, 2005, p. 37).

Even the few how-to manuals that purport to be step-by-step guides to watershed protection lack concrete guidance for optimizing the public’s involvement. For example, in the U.S. EPA’s (2008, pp. 3-7) *Handbook for Developing Watershed Plans to Restore and Protect Our Waters*, planners are admonished to “provide a structure to facilitate stakeholder participation” but are given no specific guidance for doing so. The agency suggests that “The method you choose will likely depend on the makeup of the stakeholders willing to participate, the time and financial resources available, and your capabilities...” and provides three examples of levels of stakeholder involvement.

The EPA handbook is not an isolated case. In their article *Crafting Better Urban Watershed Protection Plans*, the Center for Watershed Protection includes stakeholder involvement as one of their "Twelve Elements of an Effective Subwatershed Management Plan." Based on interviews of environmental planners, municipal officials, consultants, watershed scientists and others about the effectiveness of local watershed management plans" the authors recommend that watershed planners "actively engage stakeholders and include the public early and often." They suggest that “roles of stakeholders should be well-defined,



meaningful, and wide-ranging” but provide no advice on how to structure the interactions with the public.

Neither of these handbooks contains research-based guidance for the design of a participation process that is well-adapted to a particular decision context. Webler reviewed three handbooks of public participation, and found that they all “base advice on the experience of seasoned practitioners” but exhibit “substantial differences of opinion about how to put public participation into practice” (Wabler, 1997, p. 252).

#### E. Research Questions

One method for identifying characteristics that lead to more successful public participation processes is to compare cases that occurred in similar contexts but that employed different public participation processes. However, opportunities for such studies are rare because of the difficulty of matching decisionmaking cases along the many variables that could reasonably be expected to impact decision outcomes. Variables such as decision context (including type of decision, geographic location, political environment, and economic conditions) and process participants could vary greatly and complicate comparisons. One option for controlling all such variables is a contrived “laboratory-type” decision-making process in which two similar groups are asked to make identical decisions under similar circumstances and only the decision-making process varies. Although, such comparisons can be instructive if conducted well; they are frequently criticized as being unrealistic. Participants often lack any real stake in the outcome and so, may not be as motivated as in “real life” decision making.

Another approach is to look for situations in which similar decisions were made repeatedly and included public participation at least once. Such a situation can be found in Oklahoma's efforts to plan for the use and management of its water resources.

The first attempt at a statewide water plan for Oklahoma (known as the Oklahoma Comprehensive Water Plan or OCWP) was completed in two phases; the first in 1975 (OWRB, 1975) and the second in 1980 (OWRB, 1980). It was focused on developing infrastructure for intrastate water transfers from the relatively wet eastern to the arid central and western parts of the State. This was an engineering and economic feasibility study and involved no consultation with or input from the public; however, it did include considerable input from other agencies, municipalities, and organizations.

The second water planning effort for the state was largely an inventory of the State's water resources and a listing of the water-related issues facing Oklahoma (OWRB, 1997). This effort did involve a modest effort at public input. The process included input from a Citizens Advisory Committee and public meetings held across the State.

The most recent update to the State's Water Plan was initiated in 2006 and will conclude in 2012 (OWRB, 2007). This effort involved extensive public input. More than 80 meetings were held across the state over four and a half years to gather public. Each meeting was advertised through multiple media and was open to the public. This planning effort was modeled after the process known as the analytic-deliberative approach (Stern & Fineberg, 1996). This approach includes deliberants and analysts in separate roles. The deliberants frame the questions being asked and make the relevant policy choices. The analysts provide the information the deliberants need to answer those questions.

For simplicity, the 1975 Phase I and 1980 Phase II efforts will be referred to collectively as the *1980 Plan*. The 1995 revision will be referred to as the *1995 Update* and the 2012 revision will be referred to as the *2012 Update*. Although it could be argued that each of these represents a separate plan (and they are often referred to as such), they are referred to by the State as one plan that has been updated twice.

A comparison of these planning efforts forms the basis of this study. It is limited by some differences in the contexts of each effort, but benefits from the similarities of planning efforts conducted in the same geography, in similar cultures, under similar circumstances, and having similar decision goals. The comparison of water plans is supplemented by results from two other planning efforts conducted in northeastern Oklahoma that also were based on the A&D model. All of these efforts (referred to as *cases*) had as their decision goals the development of recommendations for improving the management of water resources in Oklahoma.

Comparing environmental decision processes involving public participation is not simple. Some have attempted to do so by developing models or frameworks based on an ideal situation (Beierle & Cayford, 2002; Renn, et al., 1995). The actual processes are then compared to these standards to evaluate their performance. However, it would be more valuable to compare the actual outcomes of the processes. Situations where this is possible can be difficult to find because it can take years for recommendations to be implemented and longer still for them to yield outcomes that can be evaluated. Furthermore, it would require some type of evaluation of the resource in question both before and after the intervention. This is not often done (Leach, et al., 2002).

Focht has proposed a set of substantive legitimacy criteria consisting of technical effectiveness, economic efficiency, administrative implementability, political feasibility, distributional justice, and social acceptability that could be used to evaluate the policy outputs of each of these processes (Focht, 2005; Focht, Langston, DeShong, Whitaker, & Wood, 2003). A comparison based on all of these criteria would be quite informative, but require considerable resources. Rather than addressing all of these legitimacy criteria, this study will focus only on comparisons of the social acceptability of the recommendations.

The choice of social acceptability over the other legitimacy criteria can be justified on two grounds. First, it is readily measured directly through surveys (Focht, et al., 2003). Assuming that the survey instrument is well constructed and that the sampling is random and sufficiently representative of the target population, the survey is a direct measure of the public's acceptance of the policy at hand. In other words, no calculation of indices or other interpretation is necessary. In contrast, other legitimacy criteria often require more indirect forms of measurement. For example, Focht et al. (2003) asked policymakers and stakeholders to provide their opinions of technical effectiveness and economic efficiency the policy recommendations on five point Likert scales. A more direct, but less practical, method would involve following the policies through implementation and conducting technical and economic assessments of these and comparable policies.

A second justification for the selection of social acceptability is one of the more prominent justifications for public participation. The NRC lists it as one of the five purposes for broadly based deliberation and indicates that it has the potential for increasing the public acceptability of both policies and their implementation (Stern & Fineberg, 1996, pp. 81-82).

Furthermore, it is intuitive that involving the public in decisionmaking will result in decisions that are more palatable to them. This has yet to be tested.

The principal question to be investigated in this study is:

*Compared to previous approaches to comprehensive water planning in Oklahoma, does the A&D approach result in recommendations that enjoy greater public acceptance?*

A related question will also be addressed:

*What is the relationship between the level of public participation in the planning process and public acceptance of its outcomes?*

## CHAPTER II

### LITERATURE REVIEW

#### A. Historical Context

The root of deliberative democracy can be traced to the beginnings of democracy itself. The citizens of ancient Athens participated in public decisionmaking through direct democracy. Public discussion was seen as essential to forming wise opinions about any proposal (Elster, 1998a). When democracy redeveloped in Western cultures, it did so in its representative form. Rather than function as delegates who have no authority to use their own judgment, the representatives were charged as trustees who debated issues and persuaded each other of the correctness of their positions. Thus, deliberation was still essential to democracy, but it became the responsibility of professional politicians.

Mindful of the difficulties of attempting a democracy in such a large country, the American Founders deliberately structured their democratic experiment in a way that allowed discussion and debate but among a limited number of representatives who could travel to a central meeting place (Fishkin, 1991). "In the eighteenth century it was generally believed that representative institutions could not function in a large, extended

state" (Fishkin, 1991, p. 15). Similar sentiments were expressed by Patrick Henry, John Adams, and Alexander Hamilton. This was based on the belief, which persisted since Aristotle, that democracies were best suited for small communities (less than 20,000 voting citizens). Aristotle believed that citizens must know each other's characters in order to make good choices for political office and political decisions (Fishkin, 1991).

Mid-nineteenth century political theories did not look favorably on public deliberation. These theories included the elitist theory of democracy (developed by Joseph Schumpeter) which "tended to emphasize stability at the expense of popular participation" and the economic theory of democracy (championed by Anthony Downs), which viewed citizens as passive consumers who exerted democratic control primarily through voting. Both theoretical traditions concluded that there was no common good which all citizens could agree on, and thus, deliberation among the citizenry would be pointless (Bohman & Rehg, 1997).

Yet it was during this period that the first piece of legislation in the U.S. to permit public involvement in administrative rulemaking was passed. The Administrative Procedures Act of 1946 (APA) proscribed the process by which federal agencies could promulgate regulations. It required public notification, divulging certain information on which the regulations are based, and the opportunity for public comment (Beierle & Cayford, 2002). Although the law did not immediately change the culture of agencies, which often jealously protected their power and merely went through the motions of complying only to ignore the public's input, the APA began the process of opening up bureaucracies.

It was not until the late 1960s that the competitive-pluralist theory began to fall out of favor as theorists began to question the earlier models. This was precipitated by "broad dissatisfaction with the debacles and anonymity of liberal government...and the perception that decision making in government was bureaucratic and beyond the control of citizens" (Bohman & Rehg, 1997, p. xii) This led to the passage of the Freedom of Information Act in 1966 which permitted citizens access to numerous government documents.

During the 1970s, the "environmental decade," the public's dissatisfaction with government in general was evident in their calls for greater environmental protection. Citizens impacted, both directly and indirectly, by environmental degradation were motivated to become more politically active. This atmosphere led to the passage of the open records laws, such as the Federal Advisory Committee Act (1972), which declared all administrative procedures and hearings to be open to the public and the Government in the Sunshine Act of 1976 (Beierle & Cayford, 2002). Furthermore, similar provisions were incorporated into the environmental legislation that characterized this decade; for example, the 1970 Clean Air and the National Environmental Protection Acts allow citizen suits and mandate citizen input in decision making.

Beierle and Cayford argue that the movement toward more public participation in government was a reaction "to the traditional management of government policy by experts in administrative agencies" (2002, p. 2). Government responsibilities grew dramatically during the early part of the twentieth century, leading to expansive bureaucracies to manage those responsibilities. Yet these bureaucrats were insulated



from the reach and scrutiny of the public. In response, government passed rules that made bureaucracies more accountable to the public.

Through the 1990s as the public's knowledge of public participation increased, their expectations also evolved. During previous decades, participation was primarily for the purpose of keeping government accountable. More recently, "The purpose of participation has shifted from merely providing accountability to developing the substance of policy" (Beierle & Cayford, 2002, p. 5). Public participation is now expected to provide superior solutions due either to the advantages afforded by local knowledge (Fischer, 2000) or because it brings together all sides in what are often regarded as intractable disputes bogged down in the mire of pluralist politics. "Public participation is being used not only to keep government accountable but also to help agencies make good decisions, help resolve long-standing problems of conflict and mistrust, and build capacity for solving the wicked problems of the future" (Beierle & Cayford, 2002, pp. 5-6).

## B. Theoretic Foundations

Also during the 1970s, the theoretical foundation for public participation was being firmed up by such social theorists as Jürgen Habermas, Robert Dahl, and Nelson Rosenbaum. Although, many writers contributed significantly to the philosophical and theoretical tradition of deliberative democracy, only a few pioneers will be reviewed here.

### 1. Habermas

The ideas of Jürgen Habermas have been some of the most influential on the development of theory behind putting deliberative democracy into practice

(Meadowcroft, 2004). Habermas was a German critical theorist who developed both philosophical and sociological theories that are often cited by those concerned with the development of fair and technically competent agreements via public participation (e.g. Bohman & Rehg, 1997; Dietz & Stern, 2008; Elster, 1998b; Meadowcroft, 2004; Renn, et al., 1995). The following summary of his contributions draws heavily from Webler (1995), which begins with a definition of selected terms, then describes two of his leading theories, and concludes with an application to public participation.

Habermas defines rationalization as the process by which we improve and invent “techniques and skills we use to make sense out of the world. He thinks of rationalization as occurring differently in three independent domains: science/technology, law/morality, and art/art criticism” (Webler, 1995, p. 40). Habermas sees the main problem with today’s societies as the reification of one form of rationality: science/technology. He prescribes developing the other two ways of knowing (law/morality and art/art criticism) and using all three to cooperatively reach decisions – a form of rationality he labels communicative rationality.

“Habermas is concerned that...increasing reliance on technological/scientific forms of rationality has led to mere token public involvement, consequently jeopardizing society” (Webler, 1995, p. 43). His solution is a revitalized public sphere that dialogues to reach agreement about values in order to solve sociopolitical or other problems. He has proposed an idealized form of discourse known as “the ideal speech situation” which allows participants to develop a rationally motivated agreement without the threat of coercion or manipulation. Those who participate in such discourse must meet certain prerequisites, which he lays out in a theory of ‘communicative competence.’ Taken

together these ideas constitute his approach to universal pragmatics or how language is used in everyday life.

Habermas's theories of the ideal speech situation and communicative competence are based on his specific description of speech acts known as communicative action. This description consists of four types of speech acts each of which makes a different validity claim or "warrant." Each different validity claim has an associated form of discourse in which its validity can be considered or "redeemed." A speech act is a type of assertion and inherent in it is "the unspoken promise of being able to offer convincing argument to anyone who challenges the assertion" (Webler, 1995, p. 44).

Habermas defines four types of speech act: communicative, constative, regulative, and representative. Inherent in communicative speech acts are claims to their comprehensibility. Constative speech acts claim to be true or correct depictions of reality. Regulative speech acts make normative claims. Representative speech acts claim to accurately represent one's own subjectivity. Habermas makes it clear that these components of speech acts are implicit within the statements and that every statement contains elements of all four validity claims, though one usually predominates.

Whether or not others accept a speech act as valid depends on fundamentally different criteria for each different type of act. Thus, each must be considered in its own type of discourse (Table 1). Communicative speech acts must be evaluated based on the language, terms, definitions and grammar used, in what is called an explicative discourse. Constative statements are considered within the realm of the objectified world of nature and society known as theoretical discourse. Regulative speech acts are redeemed through practical discourse which involves reference to social needs and appropriate interaction.

Finally, representative statements and their claims of authenticity or sincerity are validated only through their consideration in a therapeutic discourse which involves the subjectivity of the speaker.

Table 1

Summary of Habermas's Theory of Pragmatics, after Webler (1995, p. 45).

Speech Act	Validity Claims	Discourse
Communicative	Comprehensibility	Explicative
Constantive	True/correct	Theoretical
Regulative	Normatively right	Practical
Representative	Authentic/sincere	Therapeutic

Habermas defines communicative competence as the ability to use speech acts to develop understanding and agreement. This involves four areas: cognitive competence (the ability to master formal logic), speech competence (the ability to master linguistic rules), pragmatic competence (the ability to use speech acts to develop mutual understandings), and role competence (the ability to master the rules of interpersonal interaction).

In the context of deliberative democracy, all this comes together in Habermas's description of the ideal speech situation. In order to create an ideal speech situation, participants must enter with an open mind and be willing to reflect on and possibly alter their personal beliefs, values, and interests based on assertions by other participants. They also must be motivated to come to some mutual understanding or agreement. The ideal speech situation depends on all participants having the same opportunity to employ the four types of speech acts and to challenge and defend the assertions in those acts.

## 2. Dewey

Although not nearly as influential on deliberative democracy practice as Habermas, John Dewey had the foresight to identify a conflict that continues to this day. Standing at the beginning of the industrial society, he asked how citizens could contribute meaningfully to decisionmaking in a political system that was increasingly depended on experts. In the 1920s, industrialization had already changed everyday life. No longer did people provide their own food, transportation, dwellings, etc. As society became more complex and interdependent, citizens were increasingly distant from the sources of these goods and expertise became increasingly important. Dewey reasoned that given these circumstances, individual citizens could not easily comprehend the processes through which their daily needs were satisfied. As a consequence, “they could no longer be expected to easily determine their own interests” (Fischer, 2000, p. 6).

Dewey proposed a division of labor between citizens and experts. On the technical front, experts would analytically identify basic social needs and problems. On the political front, citizens could set a democratic agenda for pursuing these needs and troubles. To integrate the two processes, Dewey called for an improvement of the methods and conditions of debate, discussion, and persuasion...Debate would require the participation of experts but they would...analyze and interpret. (Fischer, 2000, p. 7)

Beginning about 1990, some democratic theorists sought to answer Dewey’s question by designing procedures, protocols, and processes that integrate both the values of citizens and the technical contributions of experts. These theorists argued that it is not voting or other methods of aggregating choice that is the essence of democratic legitimacy. Rather, it is “the ability of all individuals subject to a collective decision to engage in authentic deliberation about that decision” (Dryzek, 1990, p. v). Meadowcroft puts it well, “Deliberative democrats argue that it is not the act of casting a ballot that

represents the core of democratic decision making, but the reasoned argument and public reflection that should proceed voting” (Meadowcroft, 2004, p. 184).

### 3. Dryzek

One of the earliest and most influential works on deliberative democracy was John Dryzek’s *Discursive Democracy* (he prefers *discursive* democracy to *deliberative* democracy as he considers the former more inclusive (Dryzek, 2000, p. v)). Dryzek is a Habermasian critical theorist who formulated discursive democracy as a reaction to the hegemony of instrumental rationality (reason focused on the most efficient and cost effective means to some end), technocracy (rule by technology), and objectivism (basing choices solely on a set of objective standards) which he blames for much of the world’s problems (Dryzek, 1990). He describes instrumental rationality as antidemocratic, repressive, and too limited to address the increasingly complex world.

Drawing on Habermas’s communicative rationality and Benjamin Barber’s idea of strong democracy (a society that expects its citizens to participate in government and so govern themselves rather than depend on representation), Dryzek proposes discursively designed social institutions that are problem focused, consensus based, nonhierarchical, and free of formal rules. Here those with various ideologies, perspectives, and interests about the problem at hand could converge and participate in a public discourse that fits Habermas’s idea of communicative rationality. Dryzek argues that the appropriate place for this forum is civil society which defines as “all social interaction not subsumed by the state or the economy” (Dryzek, 2000, p. 23). Remaining outside the state allows participants to confront the state, an important function of these social institutions.

Dryzek sees discursive democracy as possibly “the most effective political means currently available to solve complex social problems, because it provides a means for coherent integration of the variety of different perspectives that are the hallmark of complexity” (Dryzek, 2000, p. 174). But, he does not see it as a solution to all of the world’s problems, recommending that it only be applied to the most important and intractable issues.

#### 4. Gutmann and Thompson

Other democratic theorists have sought to add to the concept of deliberative democracy guidelines concerning the substance of the deliberations. In contrast, those that advocated a purely procedural approach were concerned that restrictions on the content would preemptively exclude certain topics that should only be excluded by the participants’ mutual agreement. Those that advocate limits on the substance of those deliberations fear that decisions reached under Habermas’s communicative rationality could violate the basic principles on which modern democracy is founded: basic liberty (autonomy), basic opportunity (welfare), and fair opportunity (justice). They proposed that these three substantive norms be used to govern the content of deliberation (Gutmann & Thompson, 1996, 2002). Furthermore, they held that the basic the tenets of deliberative democracy can be derived from moral principles such as liberty and equality rather than the ideas put forth by Habermas and critical theory. Gutmann and Thompson (1996) proposed three conditions of deliberation each addressing a facet of the process of justifying claims. Reciprocity specifies a process in which citizens give reasons for their perspectives which could be accepted by other deliberants who are also motivated to find reasons that might be accepted by others. Their condition of publicity refers to the

premise that all public policy deliberations should take place in the public arena. The accountability condition stipulates that all public officials be held accountable by their constituents for their reasoning. Thus these theorists are concerned with the moral implications of deliberative democracy both substantive and procedural.

### C. Environmentalism and Deliberative Democracy

As these theories of deliberative democracy were taking shape, so did the idea that it was especially well suited for the difficulties presented by environmental problems. As these two streams of change—environmentalism and deliberative democracy—have evolved, they have remained tightly intertwined. As Meadowcroft notes,

Public participation has been a recurrent theme in environmental policy since the establishment of the institutions of modern environmental governance in the late 1960s and early 1970s....the participatory ideals of citizen activism and local empowerment long have stood in opposition to bureaucratic control by big government. (2004, p. 189)

In recent decades the use of public participation in environmental policy has increased as those in government realized that command-and-control regulation was not well received, that they must change their approach in order to avoid policy deadlock, and that the old approach was inadequate for addressing the new problems associated with sustainable development (Meadowcroft, 2004).

One of the early advocates of the adoption of deliberative democracy by environmentalists was John Dryzek. He argued that deliberative democracy is more ‘ecologically rational’ (Dryzek, 1987b) than other social decisionmaking processes because it can better handle the uncertainty, complexity, and problems of collective action (Smith, 2003). Dryzek argues that deliberative democracy can incorporate



negative feedback due to its openness to change or flexibility. In other words, it can escape the perils of bound rationality. By allowing multiple voices to participate, deliberation allows multiple sources of information to be considered. This aids participants in overcoming their own limited abilities and knowledge.

Furthermore, Dryzek believes that deliberation is particularly well suited for the green movement because it offers superior coordination of a movement's actions across different problems and different actors. Game theory has shown that participants who engage in discussions prior to making choices are more likely to work cooperatively throughout the process. In other words, they are less inclined to make choices that are merely in their own self-interest (e.g., tragedy of the commons (Hardin, 1968)). Dryzek concludes his book *Deliberative Democracy and Beyond* this way: "I have argued that discursive democracy may be the most effective political means currently available to solve complex social problems, because it provides a means for coherent integration of the variety of different perspectives that are the hallmark of complexity" (Dryzek, 2000, p. 174).

Another advantage of deliberative democracy for the environmentalist is that it allows for the evolution of participants opinions over time. Following Goodin (1992), Dryzek draws a contrast between liberal democracy and deliberative democracy in that liberal democracy assumes that each individual has already developed a well-formed and stable sense of what is in his/her own best interest. Deliberative democratic theory relies on the fact that these self-interests are constantly developing and deliberations allow for their refinement based on inputs from others. Thus deliberative democratic theory is

advantageous for emerging movements and for movements couched in a dynamic landscape because it allows for necessary changes.

Meadowcroft agrees with Dryzek that deliberative democracy is appealing to green theorists because it allows for the evolution of participants' opinions as they consider other's perspectives but adds that it also "provides a context in which citizens can reflect more deeply on the value of natural systems and processes and make decisions that more adequately acknowledge the needs of future generations and of the nonhuman natural world" (Meadowcroft, 2004, p. 187).

Dryzek emphasizes that deliberative democracy is distinct from the environmental movement. They are about two very different things. To be an environmentalist is to advocate certain values; while to be a deliberative democrat is to advocate for a particular procedure. The two can be wedded such that environmentalists choose deliberative democracy as their preferred form of decisionmaking, but they are not the same and may at times be in conflict (Dryzek, 2000).

Others, have touted the advantages of deliberative democracy for its ability to "temper the confrontational politics that typify environmental policy" (Beierle & Cayford, 2002, p. 5). Such conflicts are not suitable for the managerialism because of its "top down," expertise-driven approach.

Graham Smith argues that those who seek "a single, comprehensive and systematic theory that will eliminate indeterminacy and value conflict" in environmentalism (or any other philosophy) will never find it, not through deliberative democracy or any other approach to conflict resolution (Smith, 2003). While acknowledging the attractiveness of such a single ethic uniting all environmental values into one (known as *ethical monism*),

he argues that the diversity of values people hold toward the environment result from the myriad experiences they have with it. It is the nature of values to be incompatible and incommensurable. Given this reality environmentalists should embrace deliberative democracy for the opportunity it affords to bring together disparate values to seek greater understanding. “It is only through encountering other perspectives and values orientations that we are able to come to reflective judgments. No single individual will privately express the diversity of environmental values” (Smith, 2003, p. 25). Thus, as deliberants adopt what has been called an *enlarged mentality*, the suspension of privately held opinions in exchange for a way of thinking that seeks to understand the opinions of others (Arendt, 1982), they will be able to experience another’s perspective and their judgment will benefit from it. This is essential to environmentalism which not only seeks to convert others to its perspective but also to produce rational decisions based on a plurality of values (Smith, 2003).

#### D. The Need for Public Participation

Given the unprecedented influence of human development, it is imperative that mankind be cautious when making decisions that impact the environment upon which we depend (Brewer & Stern, 2005) (this is the basis of the Precautionary Principle). Poorly informed decisions could have unintended and significant consequences. But given the recalcitrant nature of environmental problems, improved decisionmaking processes are crucial (Brewer & Stern, 2005).

The difficulty comes in finding a format which effectively brings together both good information and the appropriate decision makers. “Elected representatives, who are normally entrusted with making value choices, rarely have sufficient expertise to make

well-informed decisions, but scientific and technical experts are not well suited or trusted to address the value issues” (Brewer & Stern, 2005, p. 25).

One approach would be to hold an open public debate informed by the latest information through various media followed by a national referendum on choices. The enormity of such a task would mean that it could be employed for only a few issues each year. Furthermore, it is doubtful that many voters would take the time to develop the understanding required by this approach.

It seems that neither direct votes nor Congress are well suited for environmental decision making. As Cook, Caprini, and Jacobs (2007, p. 28) put it, “In an era of great divisiveness over policy issues and partisan positions, the traditional tools of electoral and legislative avenues to collective decision making remain essential. But they have also become deadlocked or have alienated large parts of America. Public deliberation has emerged as a potentially valuable way of breaking (or at least sidestepping) this deadlock.”

#### E. Advantages of Deliberative Democracy

Deliberative democracy has numerous advantages over the status quo. As mentioned above it has been suggested that it can serve as a moral means for resolving moral conflicts (Gutmann & Thompson, 1996), provide a means for incorporating diverse values into the decision process (Smith, 2003), and improve public acceptance of outcomes (Stern & Fineberg, 1996). Others have suggested that public participation in

general<sup>2</sup> and deliberative democracy specifically have advantages that make it worth serious consideration for use in environmental decisionmaking and conflict management.

Public participation in environmental management has been described as a “participatory approach which is decentralized, community oriented and holistic in its view of the environment” in contrast to the mainstream approach which is “centralized and exclusionary and to take a narrow view of what constitutes the ‘environment’” (Kapoor, 2001).

At least three rationales for broad participation are cited regularly. First, the normative argument is that “government should obtain the consent of the governed [and] citizens have the right to participate meaningfully in public decision making and to be informed about the bases for government decisions” (Stern & Fineberg, 1996, p. 23). Gutmann and Thompson’s argument that when properly constrained, deliberative democracy is a moral means for dealing with moral conflicts is also a normative argument. They agree that including the voices of all affected parties is a moral obligation in a democracy. To this they add that because public deliberation involves justifying your reasoning to others, participants are discouraged from taking selfish positions that are justified only by their own personal gain, and encouraged to think broadly and consider the needs and perspective of others. Thus through its accountability, deliberative democracy leads participants to be more other-minded, and so it is morally superior to other approaches (Gutmann & Thompson, 1996).

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<sup>2</sup> The term public participation is used here to refer to the general idea of the public being included in administrative decisionmaking. It includes deliberative democracy, but is broader.

The second rationale for broad participation is the substantive improvement in the quality of decisions. As several writers have pointed out, broad participation expands the base from which information is drawn (Fischer, 2000; Kapoor, 2001; Meadowcroft, 2004; Stern & Fineberg, 1996). “Relevant wisdom is not limited to scientific specialists and public officials...participation by diverse groups and individuals will provide essential information and insights” (Stern & Fineberg, 1996, p. 23). Knowledge is not viewed as centrally concentrated but as dispersed throughout society (Fischer, 1993). Local knowledge can be critical to a successful environmental program, and a diverse group of stakeholders can increase the technical knowledge and creative thinking that are essential for developing meaningful solutions. By involving all relevant stakeholders, broad participation can help to “clarify and stabilize communication and power relations” (Kapoor, 2001, p. 272). In addition, with the use of iterative management schemes (such as adaptive management) for environmental resources, communication among the relevant actors can allow increased dynamic learning and potentially make programs more flexible (Kapoor, 2001).

And third is the instrumental rationale that through a well-run process, government agencies “may decrease conflict and increase acceptance of or trust in decisions” (Stern & Fineberg, 1996, p. 24). Also, broad “participation encourages local ownership, commitment, and accountability.” (Kapoor, 2001, p. 272). The argument goes that those who help make a decision are more likely to support it.

Participation can also serve as a means for educating citizens. Many citizens are only marginally informed about the environmental issues that touch their lives. The opportunity to inform them about the state of the science is invaluable to public officials

seeking support for their efforts. It is not just the efforts of experts that provide the information that educates participants but they also benefit from the knowledge of fellow participants. If the participants have low levels of trust for experts then the information from other participants may be a more effective means of education (Focht & Trachtenberg, 2005).

Furthermore, participation can lead to increased levels of trust of government and fellow citizens (Cook, et al., 2007; Focht, et al., 2003; Focht & Trachtenberg, 2005). As citizens experience other perspectives, they are more likely to come to appreciate that others have a valid point of view, even if they do not adopt it themselves.

#### F. Analytic – Deliberative Framework

The deliberative democratic framework proposed by the National Research Council's Committee on Risk Characterization (Stern & Fineberg, 1996) is designed to take advantage of all three rationales for broad participation. It is a multistep, recursive deliberation that is informed by experts from appropriate fields. This is referred to as the Analytic-Deliberative (A&D) process. The information gained from analysis is fed into the deliberations so that the discussions are well informed. In return, the questions generated by the deliberations serve as the focal points for the analysis.

Analysis uses rigorous, replicable methods developed by experts to arrive at answers to factual questions. Deliberation uses processes such as discussion, reflection, and persuasion to communicate, raise and collectively consider issues, increase understanding, and arrive at substantive decisions. Deliberation frames analysis and analysis informs deliberation. Thus, risk characterization is the output of a recursive process, not a linear one. Analysis brings new information into the process; deliberation brings new insights, questions, and problem formulations; and the two build on each other. The analytic-deliberative process needs input from the spectrum of interested and affected parties. (Stern & Fineberg, 1996, p. 20)

Although A&D was developed in the context of risk characterization, it has since been used to facilitate stakeholder decisions in other areas including transportation financing (Lowry, 2010), community planning (Wein, Journey, & Bernknopy, 2007), medical decisions (Burgess et al., 2007), and forest management (Webler, Tuler, & Krueger, 2001).

Not only is deliberation paramount in the A&D framework, but the process invites the widest possible array of deliberants to participate. A&D casts a broad net of inclusion when recruiting participants. The participants can be divided into three classes: (1) decision makers, such as public officials, (2) analytic experts, such as natural and social scientists, and (3) stakeholders (defined as interested and affected parties). The reasons for including decision makers and analytic experts are fairly obvious. In fact, these parties were often the only ones involved in risk characterizations fashioned after the process described in the NRC's previous guidebook widely referred to as the Red Book (NRC, 1983). "Many observers argue that risk decisions are best left to administrative officials in concert with scientific experts, acting under instructions from elected representatives, and consulting as necessary with interest groups representing aggregated "public" interests" (Fiorino, 1990, p. 227).

Stakeholders are included in A&D because in a democracy they are the ultimate source of political legitimacy. Each type of participant has a specific role: analytic experts uncover or relate facts to inform the deliberations, stakeholders contribute values (morals) and preferences that form the basis of the decisions, and policy leaders are responsible to make and implement decisions based on the information and preferences presented. (At times, especially when trust of government is low (Focht & Trachtenberg,



2005), it may be appropriate to have decision makers involved at the end of the process. Thus, they would receive recommendations from an A&D process that involves only stakeholders and experts.)

It may seem superfluous to expend so much effort to segregate those that provide factual information from those that provide value judgments; however, there is value in explicit assignment of roles<sup>3</sup>. Although decisions are never based on facts alone, some technocrats have tried to make it seem so. By claiming that their decisions are based solely on facts, they obfuscate their own value preferences. As the NRC's Panel on Social and Behavioral Science Research Priorities (PSBSRP) writes about other decision techniques, "Value choices are often hidden in the simplifying assumptions of analytic techniques, and the assumed values may not be universally shared" (Brewer & Stern, 2005, p. 25). Decisions are choices between alternatives that are informed by facts.

An example will serve to illustrate these points. The Arbuckle-Simpson aquifer in central Oklahoma serves as the drinking water source for several communities and feeds several economically-important springs and rivers. A community outside the area underlain by the aquifer made legal arrangements to purchase groundwater from the aquifer. The resulting controversy prompted in the Oklahoma legislature to pass a bill placing a moratorium on sales from any groundwater basin that serves as the sole source of drinking water for a municipality (as the Arbuckle-Simpson does) to another municipality outside that basin until the State completes a five-year study of the basin. The purpose of the study was "to obtain information necessary to determine how much water can be withdrawn from the aquifer while protecting springs and streams" (Osborn,

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<sup>3</sup> This is not to imply that facts and values can easily be separated. Rather the two are intertwined such that values help define facts and vice versa.

2009, p. 1). The study was completed and the report released in 2009, yet no decision has been made.

The pertinent facts are fairly certain. The study included extensive modeling of the groundwater hydrology. The agency has a good understanding of the impacts that various withdrawal rates will have on streams and springs, yet no maximum legal withdrawal rate has been set to date. Any withdrawal of groundwater sufficient to supply a municipality would have some impact on streams and springs. Selecting the appropriate level of impact is a value judgment that, thus far, no decision maker has been willing to make.

A&D is designed to involve stakeholders in every phase of the process (as opposed to getting reactions to decisions that have already been made). The process has been described as an interactive partnership among all participants who cooperate to reach a decision.

Furthermore, the NRC argues that the process should be open to all stakeholders (defined as any interested or affected party), including those who may not be aware that they will be affected, and so should be sought out and informed.

The NRC hesitates to prescribe an exact, formulaic approach to designing a participatory process because of the need to tailor the analysis and deliberation to specific contexts. Depending on the circumstances, some routine decisions may not require any deliberation or additional analysis, while others may need a significant investment of resources. Focht and Trachtenburg (2005) have suggested that the public's levels of trust of government officials and of other stakeholders be used to determine the appropriate blend of analysis and deliberation.

Focht and Trachtenburg (2005) present a slightly revised explanation of the A&D process. The process diagrammed by the NRC (Stern & Fineberg, 1996, p. 28) is not simple, rather the three main actor groups (public officials, natural and social scientists, and interested and affected parties) are shown to intertwine and overlap as they move through a somewhat linear process leading toward a risk decision. All the while, they interact recursively with a process labeled “learning and feedback” which is represented by an arrow that leads back to the beginning of the process. Focht and Trachtenburg have made the process conceptually less complex (Figure 1). This depiction loses none of the essential elements, while making the process easier to conceptualize.

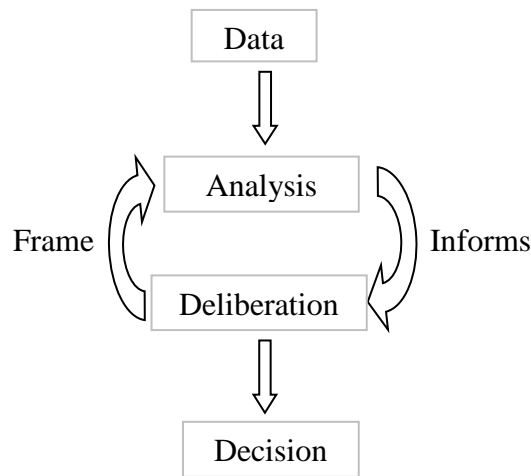


Figure 1. The analytic-deliberative framework simplified showing the recursive relationship between analysis and deliberation (after Focht and Trachtenburg 2005).

Although some might consider this a linear progression from data to analysis, to deliberation, and finally reaching a decision, this is generally not the case. Rather, this is intended to represent a recursive process between analysis and deliberation. Absent external constraints, such as deadlines, budgets, and loss of interest, the cycle of analysis

and deliberation can continue for as long as the deliberants deem necessary. Once they are comfortable that they have a sufficient understanding of relevant facts, values, and preferences, they can move toward a decision.

This depiction differs from the one presented by the NRC in that decision makers are not explicitly listed. This is partially due to the fact that the NRC process was specifically designed for the risk assessment context and partially because the participants are not listed here. The focus of Focht and Trachtenberg's framework is the process. The participants listed in this process would include the stakeholders who compose the deliberants and the experts who perform the analysis.

The A&D decision process has generally been described as oriented toward reaching a consensus; although alternatives (e.g., a simple majority determined through voting) are not precluded. Consensus is favored because by definition, consensus agreements will generally enjoy broader support, at least, among those present. The hope is that through deliberation participants will come to understand each other's perspectives on relevant issues. As Graham Smith (2003, p. 59) puts it, "Rather than consensus, democratic deliberation is best understood as being orientated towards mutual understanding, which does not mean that people will always agree, 'but rather that they are motivated to resolve conflicts by arguments rather than other means' (Warren, 1995, p. 181)."

Analysis and deliberation can occur simultaneously or sequentially. A simultaneous process typically involves experts meeting with deliberants to provide accurate information and answers to questions in real time. Experts can begin by explaining what they think is important to consider in discussions or provide initial

background information so that the deliberants all begin with a common knowledge base. Deliberants are then free to seek answers from the experts as questions arise. Meetings can be held continuously or occasionally.

A sequential process is similar but the expertise is not provided in real time. Questions are submitted to the experts who have time to compose answers or, in extreme cases, to conduct research to gather appropriate answers. The starting point in a sequential process can be determined based on the context and problem definition. In situations with a great deal of factual uncertainty, it may be most appropriate to begin with analysis. This may allow a clearer definition of the problem to emerge. In others, where pertinent information is more certain, deliberation may be the most appropriate first step, and the needed analysis will be determined by discussion.

#### G. Comparative studies:

As mentioned previously, this study is a comparison several public participation processes. Others have undertaken studies to compare participatory processes. These can be grouped into two categories: subjective assessments of participatory mechanisms and empirical evaluations.

##### 1. Subjective Assessments

In 1969, Sherry Arnstein founded the field of public participation evaluation when she published the *Ladder of Citizen Participation* (Arnstein, 1969). Up to that time public participation was utilized for the most part in only urban renewal projects. Her ladder is a typology of processes based on the power relationships that exist between the participants and those government agencies that sponsored the public participation

processes. The eight rungs of the ladder are grouped into three levels: *Non-Participation*, *Degrees of Tokenism*, and *degrees of Citizen Power* (Table 2).

Table 2

Arnstein's ladder of citizen participation summarized

Level	Rung	Description
Citizen Power	8 Citizen Control	Participants guaranteed power to govern a program or institution
	7 Delegated Power	Citizens have dominant decisionmaking authority over a plan or program
	6 Partnership	Citizens and power-holders negotiate decisionmaking responsibilities
Tokenism	5 Placation	A few hand-picked citizens are allowed very limited power
	4 Consultation	Citizen's opinions are solicited. Two-way exchange of information.
	3 Informing	Information flows from officials to citizens only
Non-Participation	2 Therapy	Experts subject the citizens to clinical group therapy
	1 Manipulation	Purpose is education of or engineering for participant support

*Note.* Adapted from Arnstein (1969).

The first rung is known as *Manipulation*. It provides citizens with the illusion of participating but is actually for the purpose of educating them or engineering their support for the decisions of the power holders. The second rung is the *Therapy* rung. This type of participation involves providing a group therapy type setting in which citizens are invited to vent frustrations but they have no power over any programs. These first two rungs comprise the Non-Participation level.

The third rung is termed *Informing*. Here citizens are informed of their “rights, responsibilities and options,” but not allowed to provide feedback. The *Consultation* rung is forth. It involves inviting the citizens’ to provide opinions but there is no assurance that they will be heeded. The fifth rung is *Placation*. This form of participation is evident when a few hand-picked citizens are allowed limited power. It represents the first level where citizen are afforded some measure of influence. These three rungs are grouped into the Tokenism level.

The three rungs of the Citizen Power level allow some level of power over decisions. The *Partnership* rung (sixth) means citizens and the agency personnel redistribute power is through negotiation. Participants share some decisionmaking responsibilities with the agency. In processes characterized as *Delegated Power*, seventh rung, citizens and power holders share power over a program, but the citizens dominate. The final rung is *Citizen Control*. Here citizens have a guarantee of power over a program or institution.

In another subjective assessment of processes, Smith (2003) provides an evaluation of three disparate mechanisms for deliberation: mediation, citizen forums, and initiatives and referendums. He chooses to evaluate them on four criteria:

- Inlusiveness: the degree to which all voices are heard
- Unconstrained Dialogue: the degree to which strategic actions by the powerful to limit deliberation are pre-empted
- A Just Decision: the type of decision rule employed
- Sensitivity to environmental values and conditions: the degree to which deliberations are “sensitive to the scope, scale, and complexity of environmental issues” (Smith, 2003, p. 81) and to the plurality of environmental values

In a mediation, different parties representing the interests of larger groups are brought together to resolve a conflict such that all parties are satisfied with the outcome.

A mediator plays a pivotal role in fostering the conditions for dispute resolution but have no authority to enforce decisions. Citizen forums involve bringing together a representative cross-section of the populace for a few days to discuss an issue at length. Citizens are exposed to a variety of information sources such as witnesses, experts, or candidates and are allowed to question them. Citizen initiatives and referendum collect the preferences of the populace through direct voting on policies. They have been used both to provide advisory input to law makers and to mandate recalls of elected officials and laws.

Smith finds that each mechanism has its strengths and weaknesses. Citizen initiatives and referendum excel at inclusiveness, but the discussions that precede them are subject to manipulation by powerful interests. These approaches use the preponderance of votes for making decisions but can be complicated if desired using sophisticated ballots and balloting. Finally, these approaches are not well suited for dealing with the subtleties of environmental values because deliberation is not included.

Citizen forums include only a part of the populace but succeed at providing an atmosphere favorable for unconstrained dialogue by enforcing a series of ground rules. The decision rules vary from consensus to majoritarian voting. The deliberative space thus created is particularly well adapted to consideration of environmental values.

Finally, mediation uses a few to represent the interests of larger organizations but a good mediator can ensure that all voices present are allowed to be heard and protect those who lack power. Decisions are reached by consensus with the added benefit that the participants are often those responsible for implementation. A well-run mediation



provides for sufficient reflection that participants can appreciate the diversity of environmental values.

Renn, Webler, and Weidemann (1995) developed a framework for evaluating models of deliberative democracy based on the ideal speech situation of Habermas. Their framework, Discursive Standard Criteria, includes four conditions each for evaluating both the fairness and competence of a model. Regarding the evaluation of the fairness of a process, they propose the following criteria (Webler, 1995, p. 51):

- Any interested or affected party must have an equal opportunity to attend and participate in the discourse.
- Every participant must have an equal opportunity “to make validity claims to comprehensibility, truth, normative rightness, and sincerity.”
- Every participant must have an equal opportunity “to challenge comprehensibility, truth, normative rightness, and sincerity validity claims made by others.”
- Every “participant must have an equal opportunity to influence the choice of how the final determination of validity will be made and to determine discourse closure.”

Regarding the competence of the process they propose a parallel set of criteria (Webler, 1995, p. 59):

- Every “participant must meet minimal societal standards for cognitive and lingual competence.”
- Every “participant must have access to the knowledge needed to make validity claims and criticize the claims of others.”
- Speakers must verify the results of the translations of their expressive claims.
- Evaluations of conflicting validity claims must be based on the best available science.

Focht (2005) conducted a qualitative evaluation of four models of stakeholder involvement in watershed governance. The models, advisory groups, taskforces, councils, and commissions, were then classified according to intended lifespan (short- and long-term) and the level of authority they have over management decisions.

Advisory groups are short-term informal advisory bodies. Taskforces are also short-term but have formal authoritative responsibilities. Both councils and commissions are long-term but councils serve an informal role and commissions serve a more formal authoritative role (Focht, 2005, p. 93).

Focht (2005) also proposed a three-dimensional, prescriptive framework for understanding the role of trust in public participation. The first dimension, trust of experts, is the degree to which stakeholders are willing to put their faith in the judgments of experts based “on their subject matter expertise, dispassionate objectivity, and scientific integrity” (Focht, 2005, p. 89). This dimension determines whether the participants are willing to trust the experts provided by the government or whether they prefer independent experts. The second dimension is trust of other stakeholders and determines whether participants are willing to cooperate with each other. The final dimension is trust of government. Participants are willing to trust government if they believe that government officials have their (stakeholders’) best interests in mind when they act.

Focht then classifies the four models according to the latter two dimensions of trust to prescribe which models best fit various situations. Advisory groups are best suited for situations where both government and other stakeholders are trusted. Task forces are well suited for contexts where stakeholders share trust among themselves but lack trust in government. Councils are best when government is trusted but other stakeholders are not. And finally, commissions are appropriate when neither government nor other stakeholders are trusted.

Focht and Trachtenberg (2005) developed a similar trust-based stakeholder participation framework that includes consideration of the stakeholder's level of trust of officials and other stakeholders. When both are low, a negotiation strategy in which both policy makers and stakeholders participate as equals. A neutral third party, acceptable to both parties should facilitate. Independent experts not associated with either group may also be necessary. When both types of trust are high confirmation strategy is appropriate. Here, policy officials take a lead role in decision making and "then seek confirmation from stakeholders that they share the need for policy , if not policy goals" (Focht & Trachtenberg, 2005, p. 96).

When official trust is low and but social trust is high, a consultation strategy is warranted. In this context, stakeholders do not need to negotiate with each other due to their trusting relationships. But their distrust of officials means the officials should consult with them to understand their desires before proceeding and again once policy proposals are developed. When trust of officials is high but social trust is low, a facilitative strategy is prescribed in which policy officials serve to facilitate stakeholder's negotiations.

## 2. Empirical Evaluations

Empirical comparisons of participatory models seek to uncover those characteristics that make these models successful by distinguishing the various traits of these models and comparing them on the basis of some measure of success. Few such studies exist. Two of the more frequently cited studies are reviewed here.

The first is the work of Beierle and Cayford in which they analyzed 239 cases found in the literature. Each case was rated on a three-point scale (high, medium, and low) for success based on five social goals (Beierle & Cayford, 2002, p. 6):

- Incorporating public values into decisions
- Improving the substantive quality of decisions
- Resolving conflict among competing interests
- Building trust in institutions
- Educating and informing the public

They also classified the model used in each case into one of four categories: public meetings and hearings, advisory committees not seeking consensus, advisory committees seeking consensus, and negotiations and mediations. Among many other findings, these researchers found that success was highly correlated with the intensity of the model. Those cases that were categorized as public meetings and hearings (least intensive) had high success levels in approximately 23% of the cases. For advisory committees not seeking consensus (the next higher level of intensity), approximately 55% of the cases had high levels of success and for those seeking consensus (considered more intensive), approximately 60% were highly successful. About 93% of the negotiations and mediations were rated as highly successful.

Beierle and Cayford point out that the more intensive models have some characteristics that may bias these results toward success. More intensive models tend to be less representative of the wider public, get less input from the wider public, and tend to reach consensus due to leaving out some participants or leaving out issues. They conclude that as processes become more intensive, the range of voices heard tends “to narrow to a small group of active participants” (Beierle & Cayford, 2002). The reduced

number of participants and organizations represented also diminishes the benefits that accrue to the broader public.

They also found that the responsiveness of the lead agency, the motivation of the participants, the quality of the deliberations, and the degree of public control in the case correlated highly with the success of the process. They conclude that the process (both the type of mechanism and its characteristics) is very strongly related to its success.

In another empirical study, Leach, Pelkey and Sabatier (2002) evaluated 44 watershed partnerships in California and Washington that were randomly selected from a population of 150. The authors chose six measures of success based on a review of similar work in the literature. These measures were the partnership's perceived effects on specific problems; perceived effects on human and social capital; extent of agreement among stakeholders; implementation of restoration projects; monitoring projects; and education and outreach projects. The first two of these measures were surrogates for measurements of real-world changes in the watersheds attributable to these partnerships. "The ultimate measure of success is a partnership's effects on physical, biological, or social aspects of watershed-related problems" (Leach, et al., 2002, p. 653) However, most of the partnerships did not conduct pre- and post-project monitoring to be used to evaluate the real world impacts. "Given the lack of available objective data on effects, this study relies upon a proxy measure—the respondents' perceptions of their partnership's actual effects" (Leach, et al., 2002, p. 653).

Based on an analysis of the characteristics of the most successful partnerships the authors conclude that age of the partnership was positively correlated with success. They also mention that most of the partnerships were perceived by their participants as making

a positive impact on their watershed and on the human and social capital in the watershed. The partnerships tended to have the greatest effect on the most serious problems in the watershed which they interpret to contradict “the often-expressed fear, based on theory and anecdotes, that consensus-based processes avoid important issues and result in ineffectual agreements” (Leach, et al., 2002, p. 665).

## CHAPTER III

### METHODS

This study will answer the research questions by comparing the recommendations contained in the three water resource planning efforts in Oklahoma and two additional Oklahoma water planning cases on the basis of their public acceptance. The planning efforts are described below.

#### A. Oklahoma's Comprehensive Water Plans

##### 1. 1980 – Phase I

###### *a Planning Process*

In 1973, the Oklahoma legislature passed Senate Bill 510, which required the Oklahoma Water Resources Board (OWRB) to develop a plan for the 33 southern counties that

shall include findings and conclusions for an investigation to determine the economic and engineering feasibility for the development of the land, water and related resources of all proposed projects, and shall be of sufficient detail to serve as a basic document for securing legislative authorization. For the balance of the State, the plan shall include office studies of existing data and sufficient

reconnaissance field surveys, to indicate whether further detailed investigations are justified, and if so, the scope of such investigations. (OWRB, 1975, pp. Summary-4).

The emphasis of this planning effort was to gather economic and engineering information to the exclusion of social and political implications. The plan's objective was "the orderly control, protection, conservation, development and utilization of the State's water resources" (OWRB, 1975, pp. Summary-5). The plan was intended as a means for optimizing development and utilization of water resources to meet agricultural, industrial, and municipal needs. The need for water conservation was not prominent. Rather, the plan was conceived by those who felt strongly that the state contained sufficient water to meet "all present and future needs" (OWRB, 1975, p. x). They believed that the State needed a massive infrastructure development project to move water from east to west. The two areas with the most immediate needs were Oklahoma City and the southwest.

Oklahoma does not have enough water in the right places to meet present or foreseeable needs. Water demands are increasing sharply throughout the State. The worldwide demand for food stuffs requires more and more water for food production. By year 1990, central Oklahoma will urgently need more water for municipal and industrial use. Increasing demands on ground water in western Oklahoma is rapidly depleting that resource. (OWRB, 1975, p. x)

Oklahoma is fortunate in having sufficient water within State boundaries to supply all its needs if properly managed. The problem is primarily one of management. Areas of surplus water supplies must be balanced with areas of depleting or short supplies. Redistribution of State waters should be made so that no areas are left water deficient. (OWRB, 1975, pp. Summary-2)

Following the tone set by the authorizing legislation (SB 510) and keeping with the existing state-of-the-art in planning, the OWRB conducted the process as an exercise in



engineering and economics. Although it did not involve the public directly, other agencies were involved. The Bureau of Reclamation, the Army Corps of Engineers (USACE), the Soil Conservation Service, and the U.S. Geological Survey all participated in the planning process. The plan does mention that interviews with municipal officials were conducted to ascertain “present water supply adequacy, foreseeable water related problems and if so, possible solutions to these problems” (OWRB, 1975, pp. Summary-7), although it does not state how many interviews took place.

Oklahoma is home to 39 federally recognized Native American tribal nations. The governments of many of these nations have asserted claims to some form of water rights stemming from treaties that established their reservations in the State. The 1975 OCWP does not indicate that any tribal governments were included in the planning process and only briefly mentions the tribes, stating that their water rights were given “full consideration” in the plan (OWRB, 1975, pp. Summary-8).

#### *b Outcomes*

The result was a plan that laid out the basic details of a water conveyance from the southeast to Oklahoma City and then on to the southwest. It proposed to pump water from four lakes in the southeast through canals to two “terminal reservoirs” in central Oklahoma. A turn-off south of Oklahoma City would convey water to seven terminal reservoirs in the southwest. In addition, canals would be constructed that could convey water to six other reservoirs in emergency situations. Of the 13 reservoirs directly involved, nine existed or were approved for construction, meaning that four were yet to be approved, designed, and constructed. The proposed integrated network of water infrastructure was dubbed the Interconnected System.

The plan called for the construction of 389 miles of canals and some 26 lift stations to raise the water a total of 1,653 feet. The system would move 1.3 million acre-feet of water annually. The construction cost was estimated at \$1.7 billion (in 1974 dollars). The construction could be completed sometime between 1985 and 1990. The design and cost estimates did not include the infrastructure to distribute the water from the terminal reservoirs to municipal treatment facilities and agricultural lands to be irrigated. However, the plan did make the recommendation that water suppliers and consumers form “special purpose districts” to distribute water once it was available.

The plan also included details for the management of 33 reservoirs outside the Interconnected System to meet area needs. Thirteen of these had yet to be built and were proposed in the 1975 OCWP.

Anticipating significant resistance from residents of southeast Oklahoma, the source of the water, the plan called for the transport of surplus water only. The authors of the plan made clear that the water needs of the southeast must be met before the needs of Oklahoma City and the southwest would be addressed.

The plan also included fourteen recommendations for the Governor and State legislature, local interests, and the federal government. Thirteen of these recommendations pertained directly to acceptance, funding, continuation and implementation of the plan. The other recommendation proposed the creation of a State revolving fund for low-interest loans to municipalities to fund water infrastructure. These recommendations were developed by the OWRB staff without public input.

## 2. 1980 – Phase II

### *a Planning Process*

The planning process used for Phase 2 of the OCWP was similar to that of Phase 1, which is reasonable considering that they have the same origin. Phase 2 added details about the Northern Conveyance System to the Interconnected Water Supply System, as the entire water infrastructure network was known. It also updated information about the Southern Conveyance System.

As before, there were no significant efforts to involve the public prior to drafting the plan in substantive ways despite that the last of the stated goals of the planning process was the “encouragement of and provision for public participation in water resource planning” (OWRB, 1980, p. 4).

Again, the study involved the same State and federal agencies in the engineering and economic aspects of the plan. One group of State agencies that was brought into the planning process during Phase 2 was the 11 substate planning districts (also known as the regional Councils of Governments, COGs). Each COG included the municipal governments within a several county area. Thus, they are often viewed as local agencies that are more attuned to the needs of local communities. They served as the only form of “local participation” in this planning process.

### *b Outcomes*

The final plan is similar to the 1975 OCWP but more detailed. The northern conveyance system would transport water from Lake Eufaula and the Robert S. Kerr Reservoir to nine terminal reservoirs in north central and northwestern Oklahoma for irrigation. When complete, the system would extend for 630 miles and move 1.2 million

acre-feet of water per year. (To put this in perspective, the plan notes that the estimated total of all uses of water in the State at the time was 2.4 million acre-feet annually.) The cost of the conveyance systems was estimated at \$5.3 billion for the northern and \$2.5 billion for the southern systems (both in 1978 dollars).

Providing for the water needs of the area of origin first was again a prominent theme of this plan. This plan also dealt with Native American water rights by declaring those claims were given due consideration in the process.

The plan included 12 recommendations for the Governor, State legislature, other state agencies, and the federal government. As with the 1975 planning effort, these recommendations were developed by the OWRB staff. The first three recommendations are that these three government bodies would adopt and follow the plan as the water resource guidance document for the State. Other recommendations included continuing the adoption of floodplain legislation so that Oklahoma could participate in the federal floodplain insurance program, promoting water conservation as a strategy for reducing demand, and educating citizens about water resources. Also included was a recommendation to continue and expand the state's financial assistance fund for municipalities – a recommendation of the 1975 OCWP that was begun in 1979.

According to the 1995 Update of the OCWP (OWRB, 1997), the State legislature failed to act on the 1975 OCWP; instead instructing the OWRB to prepare the 1980 plan. Several recommendations of the 1980 OCWP were adopted by the State. Floodplain management legislation passed by the State allowed Oklahoma communities to participate in the federal floodplain insurance program. In 1982, the legislature established the Statewide Water Development Revolving Fund and appropriated \$25

million as seed money for it. This continued the financial assistance program as recommended.

### 3. 1995 Update

#### *a Planning Process*

In 1992, the State legislature passed HB 2036, which directed the OWRB to update the OCWP every ten years. The OWRB began the update soon thereafter by forming two advisory committees. The first was the Citizens Advisory Committee comprised of citizens “interested in the status and future of Oklahoma’s water resources” (OWRB, 1997, p. 7). Minutes of the seven committee meetings held over thirteen months (January 1994 – February 1995) indicate that 23 people were recruited to the committee by the OWRB staff after “considerable thought....[Each member was chosen because of their background in water issues and their ability to provide a citizens’ perspective to the OCWP planning process” (OWRB, 1994b). They came from areas across the State and represented a wide range of organizations and industries (OWRB, 1994a).

The goals of this update were to not significantly alter the existing OCWP but rather to update the plan “to reflect changing water resource philosophies and trends of water use” (OWRB, 1997, p. 5). One of the most important changes was the new attitude in the federal government that financing major public works entirely with federal money was no longer possible. Another was the need to involve the public in environmental decision making.

The second committee was the Technical Advisory Sub-Committee, which consisted of State and federal agencies with expertise needed for the update. Nineteen

agencies were listed as participating, which is similar (given that several agencies were either split, joined, or created in the interim) to the list included in the 1980 OCWP.

In addition to involving citizens in the advisory committee, the OWRB held public meetings around the State. The plan did not report the number of meetings or how many citizens participated. The comments were taken into consideration in projecting State water needs and crafting policy recommendations.

As much as the Phase I study was conceived as an engineering and economics feasibility study, this update was envisioned as a policy document. Recommendations were developed for each of several water issues by “assessing general needs, identifying problem areas and opportunities, establishing objectives, and recommending specific and appropriate policy choices to achieve desired goals” (OWRB, 1997, p. 5).

#### *b Outcomes*

The final result of this planning process was a document that surveyed the water landscape in Oklahoma. The first six sections of the plan covered the evolution of the OCWP, water law, a history of water resource development, water use projections, inventory of water supplies, and a list of various water-related issues facing the State. Other than presenting information in one place, there was little that was novel. The final section includes recommendations for dealing with the issues. These are largely the work of the Citizens Advisory Committee and present some new directions for Oklahoma’s water resources management. The 125 recommendations are organized into categories corresponding to 31 water-related issues.

#### 4. 2012 Update

##### *a Analytic-Deliberative Process*

In 2006 the Oklahoma legislature funded the second update of the OCWP. The process consisted of two tracks of investigation: policy development and technical studies. The technical studies included an assessment of current water resources, projections of water demand to 2060, identification of areas where water resources will not keep pace with demand (gaps), and development of alternatives for meeting those gaps. Although not finalized, numerous maps of water resources, demand projections, and areas of expected shortfalls have been produced and made public (OWRB, 2011a, 2011b). This part of the planning process was contracted to a consulting firm and overseen by the USACE and the OWRB.

The policy development tract consists of a public involvement process based on the Analytic-Deliberative model (Stern & Fineberg, 1996). This process was designed to facilitate the development of recommendations by the public. These will be passed on to the OWRB for inclusion in the final update submitted to the legislature and Governor. The process was subcontracted to the Oklahoma Water Resources Research Institute (OWRRI) located at Oklahoma State University. The public participation effort was initiated in January 2007 and concluded in July 2011.

The public input process utilized was designed as a five-stage process (OWRRI, n.d.) summarized below:

**Issue identification (2007):** This phase consisted of 42 professionally-facilitated public meetings held throughout the State (known as Local Input Meetings, LIMs). Meetings included a brief presentation about the planning process and some of the

water issues facing the State followed by a public comment session in which comments were transcribed into a computer worksheet that was simultaneously displayed on a screen for review and confirmation by the commenter and the audience. All who wished to comment were allowed to do so. Comments were also received on anonymous comment cards and via a webpage. All comments were entered into a database that was accessible via the internet. Additional comments could be made in response to a previous comment. Comments in the database were not attributed to an individual, but were associated with the meeting at which the comments were received or on the Internet. More than 2,000 people participated in this phase and over 2,500 comments were logged.

**Issue Consolidation and Prioritization (2008):** This phase featured 11 public meetings (termed Regional Input Meetings, RIMs) held in each of the substate planning districts. These facilitated meetings were open to the public and consisted of two parts. The first involved approximately 32 discussants, nominated beforehand by the public, who reviewed and prioritized the issues for their region. Thus at each meeting, discussants worked to develop a list of high and low priority issues for their region (OWRRI, 2008). (Rather than present the discussants with all 2,500 comments, the staff of the OWRRI consolidated the comments into 54 issue categories.) The second part of the meeting consisted of a public comment session. Commenters were asked to limit their remarks to comments about the prioritized list of issues developed earlier. The list was displayed on a screen, which the public had observed the first part to the meeting and were familiar with the discussions that



produced it. Once again, comments were captured on a computer and displayed on a screen.

**Management Alternatives (2009):** After attending two 1.5 day seminars on water policy and water science, RIM participants were invited to attend three half-day planning workshops held in central Oklahoma throughout the summer of 2009. The number of workshop participants dropped from approximately 350 who participated in RIM meetings to 236 due to attrition. Each workshop was dedicated to 10 water resource management themes developed by OWRI based on 54 issue categories developed in the RIM meetings. Each participant was assigned to one of the ten thematic workgroups based on their requests. On each meeting date, five workgroups met concurrently in the morning and five more in the afternoon. Each workgroup session was led by two trained facilitators. Also present at each workgroup session were two experts who acted as a resource to answer participants factual questions. Questions that required some time to answer were recorded and the experts provided written answers at the next workshop. Thus, the three workshops were scheduled ten weeks apart. The workgroups were charged with producing management strategies for dealing with their assigned themes. The strategies were considered to be alternatives rather than being complementary and many conflicted with each other.

**Consensus Recommendation Development (2010):** A 2.5-day town hall meeting was held in central Oklahoma in May 2010. One hundred eighty participants were divided into six panels of 30 each. Before the meeting, participants were asked to read a background document that included the proposed management alternatives and to attend a strategy seminar to familiarize them with the alternatives developed in the

workshops. Town hall participants were instructed to develop recommendations for each of 11 topic areas that would be put to a vote. The recommendations could be based on the management alternatives from the workshops or developed de novo. Each panel voted on whether to include each recommendation to be forwarded for consideration by the entire town hall. The recommendations of the panels were then presented to the entire town hall in a plenary session on the last day; majority votes produced recommendations that would be included in the final Town Hall Report.

**Reaction Gathering (2011):** The OWRB released a draft of the its recommendations for the OCWP update in April 2011 based on the Town Hall Report (OWRB, 2011c). Subsequently, the OWRRI held 13 regional Feedback and Implementation Meetings (FIMs) across the State to solicit the public’s comments about the proposals and implementation suggestions contained in the draft water plan. Comments were also solicited via email and a website.

*b Recommendations*

Because the final version of the draft 2012 OCWP update has not yet been released, it is not certain how many recommendations will be included. Altogether, the process produced 74 recommendations that were presented to the OWRB in October 2010, which were considered by the OWRB in preparing its preliminary draft OCWP that was the topic of the FIMs.

This analysis will consider these 74 recommendations, which were produced from the A&D process. The recommendations included in the final plan update will emerge from OWRB’s effort to integrate the technical study results with the input from the public participation process. Because OWRB is a State agency, the final decisions on which

recommendations to include and the form that they take may be influenced by extraneous factors such as political and economic realities. Thus, the recommendations in the final water plan update will be one step removed from the A&D process and may not reflect its influence fully.

The 74 recommendations were developed from the outputs of two stages in the process: the workshops and the Town Hall. This was necessary because Town Hall participants were unable to fully consider all workshop alternatives (due to time constraints) and were allowed to develop recommendations de novo that were not considered in the workshops. In addition, limited time precluded the ability to formulate detailed recommendations (as had been the case in the workshops). To ensure that all relevant recommendations were passed on to the OWRB, pertinent workshop recommendations were added to the list of recommendations from the Town Hall.

## B. Additional Analytic – Deliberative Efforts

### 1. Illinois River Watershed Study

#### *a Introduction*

The Illinois River Watershed (IRW) in eastern Oklahoma is one of the State's designated scenic rivers. It is important to the state ecologically as a source of biodiversity, economically as a recreation destination for hundreds of thousands of visitors annually, and as a source of water. The river's drainage basin is also home to hundreds of poultry houses, cattle farms, and several wastewater treatment plants – all of which have contributed to its eutrophication over the past few decades. The river originates in western Arkansas and returns to Arkansas via the Arkansas River; the increasing eutrophication has led to significant tension between the States. Two lawsuits

have been filed by Oklahoma against Arkansas parties concerning the quality of the water in the Illinois.

To improve management of the river and reduce conflict, a research effort was conducted to develop a decision support system that would model the river's physical, biological, economic, and social systems (Meo et al., 2002). The sociopolitical assessment conducted as a part of this study included a protocol to develop management alternatives. This protocol was based on the analytic-deliberative model.

*b Analytic-Deliberative Process*

To inform the analytic-deliberative process with a thorough understanding of stakeholder concerns, preferences, and knowledge about social impacts, an extensive social impact assessment of the conflict over the basin was conducted (Meo, 2007). This included gathering demographic information and 330 interviews of stakeholders, interested parties, and policymakers. Results indicated a high level of tension between the public and policymakers, so the A&D process was designed to allow policymakers to meet separately from the public to reduce their need for engaging in strategic behavior such as remaining silent. This asynchronous policy dialogue was conducted in three rounds. Policymakers met first and developed policy proposals to address specific areas of concern as identified by the project team based on their findings from the interviews. These proposals were subsequently presented to the stakeholders in a separate meeting. Their reactions were recorded and conveyed to policymakers in a later meeting. This “shuttle diplomacy” continued for three rounds until a general consensus of agreement on three acceptable policy proposals was attained.

To understand how acceptable these proposals were to the public, a telephone survey of residents in the Illinois River Watershed was conducted. A random sample of 458 adult residents was asked 39 questions. Respondents were asked to rate their satisfaction with the three policies produced from the policy dialogue according to a four-point Likert scale (unacceptable, minimally acceptable, moderately acceptable, and highly acceptable).

### *c Results*

This protocol resulted in three multi-provision recommendations (Focht, et al., 2003). The three recommendations were divided into their component provisions so that respondents could rate each separately. This resulted in 17 questions about the individual provisions (there were also 22 demographic questions which are not considered in this study). The recommendations covered three topics: phosphorus management, riparian area protection, and alcohol use and behavior control of recreationists on the river.

The results of the survey are summarized in Table 3. The complete project results are available in Focht et al. (2003) and the recommendations listed in Appendix A. The shaded cells in Table 3 are the mode for that recommendation. By combining the percentages of the moderately and highly acceptable ratings we get some sense of the proportion of respondents that view the proposals favorably. By this measure, only two of the provisions enjoyed less than 69% support.

Table 3

Acceptability of policy recommendations developed using the analytic-deliberative process in the Illinois River Watershed Study

Abbreviated Recommendation	Don't Know	Un-acceptable	Minimally Acceptable	Moderately Acceptable	Highly Acceptable	<b>Mod. + Highly Acceptable</b>	n
Oklahoma & Arkansas jointly develop and enforce P standards	0%	2%	3%	10%	<b>86%</b>	96%	456
All sewage plants must comply with the P discharge limit	0%	3%	1%	9%	<b>87%</b>	96%	456
Technical assistance to poultry farmers about litter management	0%	4%	3%	13%	<b>79%</b>	93%	456
Determine whether current P limits and litter practices work	0%	4%	3%	15%	<b>78%</b>	93%	458
Phosphorus management - overall	0%	1%	4%	16%	<b>79%</b>	95%	458
Voluntary but compensated 30-year conservation easements	3%	7%	13%	<b>39%</b>	38%	78%	446
Landowner education about responsibility and assistance	1%	4%	10%	32%	<b>53%</b>	85%	453
OSRC ombudsman to assist dealing with regulatory agencies	1%	7%	8%	31%	<b>53%</b>	84%	453
Three-year review of effectiveness	0%	3%	4%	19%	<b>74%</b>	93%	456
Riparian area protection - overall	1%	2%	6%	34%	<b>57%</b>	91%	452
Increased surveillance of and fines for unruly behavior	0%	7%	6%	22%	<b>64%</b>	86%	458
River-side hotline phones connected to River Rangers	0%	6%	5%	21%	<b>67%</b>	88%	457
Assess floating fees by the person rather than by the craft	2%	16%	13%	30%	<b>40%</b>	69%	450
Encourage off-peak floating by doubling peak-time fees	1%	36%	14%	<b>26%</b>	23%	49%	452
Increase craft permit fees from \$5 to \$15-\$20 per year	2%	30%	19%	<b>29%</b>	21%	50%	450
Mandatory 8' video viewing about safety and behavior	0%	11%	11%	18%	<b>61%</b>	78%	458
Alcohol and behavior control - overall	0%	6%	9%	36%	<b>49%</b>	85%	458

Note. Numbers for n are individuals answering each question.

## 2. Eucha/Spavinaw Study

### *a Introduction*

The Eucha/Spavinaw Basin (E/S) is similar to the Illinois River Watershed in several ways. Both are located in western Arkansas and eastern Oklahoma; the E/S sits immediately north of the IRW. They both have their headwaters in Arkansas and have extensive agricultural operations within their borders. Both have become increasingly eutrophic over the past few decades and have been the focus of lawsuits between Oklahoma and Arkansas. Unlike the IRW, the E/S is not a major recreational area; rather, it serves as a major source of drinking water for the City of Tulsa. Eutrophication (due largely to increases in phosphorus) has led to an increase in taste and odor problems in Tulsa's drinking water, necessitating expensive treatment processes to be installed at increasing cost.

Similar to the Illinois River Watershed study, a research project was conducted to develop a decision support tool that modeled ecological, economic, physical, and social aspects of the river basin (Matlock et al., 2007). This model was made available to land managers to assist in decision making about nutrient management in the basin. The project included assembling a team of stakeholders to help guide the development of the model so that it would address issues and produce outputs that were relevant to them. This same team used the model and interacted with the research team in an A&D process designed to develop policy proposals that could then be submitted to appropriate state agencies.

To understand the issues in the basin, relevant experts were interviewed and an influence diagram (Eden & Ackermann, 1998) depicting the issues, their causes, and the

relationships between them was constructed. This diagram was verified through reviews by these same experts and others (n=10).

*b Analytic-Deliberative Process*

To understand the stakeholders' perspective on the issues and to assess their level of knowledge of these issues, 60 interviews were conducted (30 each in Oklahoma and Arkansas). Interviewees were selected to represent the diversity of perspectives on the issues in the basin. Interviews included open-ended questions about concerns regarding water quality in the basin. These were followed with probes designed to elicit concerns, whether salient or not, about the full range of issues in the basin. Following this, participants were asked to explain what they knew about ten general issues. Their responses were judged against the influence diagram. Using this information, an appraisal of their knowledge was developed and gaps in their knowledge identified.

The analytic-deliberative protocol used did not involve policymakers directly. Rather stakeholders met with the research team in four separate meetings. Participant stakeholders were chosen based on the interviews such that they represented the full range of perspectives encountered. An education program was developed for the stakeholders based on the gaps in their knowledge. This education program was presented to them during the first two meetings. During subsequent meetings, stakeholders deliberated and reached consensus on several preliminary policy alternatives. These were then tested by the research team using the decision support tool to estimate how much each alternative would reduce phosphorus inputs to the system and whether that would meet the group's chosen phosphorus reduction goal of 55%. This information was reported to the group at the next meeting and the policies were adjusted



accordingly. The fifth and final meeting resulted in five policy recommendations, which together met the phosphorus reduction goal.

As with the IRW study, these recommendations were the subject of a phone survey to assess their acceptability to the general public. Randomly selected adults (n=192) in the basin (both in Oklahoma and Arkansas) and in the Tulsa area were asked to rate the proposals based for acceptability using a three-point Likert scale (unacceptable, somewhat acceptable, highly acceptable).

For the purposes of the survey, the five recommendations were subdivided into their individual provisions. This was done to avoid forcing respondents to make only a single acceptance judgment for multiple provisions about which they may feel differently. After considering the component provisions individually, respondents were also asked to rate each recommendation overall (considering all of the provisions). This resulted in a total of 17 questions regarding the provisions (there were also five demographic questions which are not considered in the present study).

### *c Results*

The five recommendations resulting from this protocol addressed land management practices in the E/S basin. The proposals concerned reducing the amount of nutrients in runoff from row crop farming, reducing overgrazing of fields, identifying and repairing poorly performing septic systems, increasing the amount of protected riparian buffer zones through purchasing easements on private agricultural lands, and the formation of a watershed advisory commission for the basin. All of the policy recommendations can be found in Appendix A.

The results of the phone survey (Table 4) indicate a high level of acceptance of the proposals. The mode response for each provision (shaded in orange in Table 4) was at least “moderately acceptable” and for 65% of the provisions the mode rating was “highly acceptable.” If the “moderately acceptable” and “highly acceptable” ratings are combined (a measure that is the inverse of how many respondents would find it unacceptable and likely oppose the provision), the lowest combined total is 72% (Table 4). This means that at least 72% of the population of the areas surveyed could be expected to not oppose the proposal.

### C. Case Comparisons

The comparison of the five different cases considered here was based on the acceptability of recommendations to the public. This was assessed by asking a selected group of water elites to rate each recommendation based on their perception of its acceptability to the citizens of Oklahoma. Each case was also ranked by the researcher according to the level of public participation involved. The relationship between level of public participation and acceptance of recommendations was then analyzed.

Table 4

Acceptability of policy recommendations developed using the analytic-deliberative process in the Eucha/Spavinaw Study

Abbreviated Recommendation	Don't Know	Un-acceptable	Somewhat Acceptable	Highly Acceptable	<b>Mod. + High Acceptability</b>	n
State works with row crop farmers & provides economic incentives - overall	0%	8%	49%	43%	92%	189
Outreach program to reduce P fertilizers	0%	10%	39%	51%	90%	186
Financial assistance for changing farm practices	0%	12%	35%	54%	88%	188
Voluntary participation	0%	20%	30%	50%	80%	187
Reduce overgrazing through education and cost-share - overall	0%	13%	55%	33%	87%	187
County Extension or Conservation District personnel would implement	0%	21%	50%	29%	79%	184
Agents visit farms that show signs of overgrazing	0%	17%	41%	42%	83%	190
Voluntary participation	0%	15%	37%	48%	85%	187
Septic system inspection and repair - overall	0%	23%	39%	38%	77%	190
Mandatory septic system repairs at home owner's expense	0%	28%	35%	37%	72%	190
Half of land in buffers would be taken out of agricultural production	0%	28%	33%	39%	72%	188
Financial incentives for buffer protection	0%	11%	37%	53%	89%	190
Voluntary participation	0%	11%	38%	52%	89%	189
Watershed management commission of OK and AR citizens -overall	0%	12%	46%	43%	88%	190
Representative from all interested groups	0%	12%	36%	51%	88%	187
Require landowners to implement BMPs	0%	12%	43%	45%	88%	191
Riparian Area Enhancement along Spavinaw Creek - overall	0%	13%	45%	42%	87%	191

Note. Numbers for n are individuals answering each question.

## 1. Recommendation Preparation

### *a Recommendation Identification*

To compare the cases, the three water plan cases (1980 OCWP, 1995 Update, and 2012 Update) were reviewed and individual recommendations were compiled (Appendix A). The individual recommendations from the IRW and E/S cases were clearly identified by the participants in those processes, so no further review is necessary.

In addition to the recommendations identified in each water plan, recommendations embedded in the text of the documents were identified. For example, the first chapter of 1980 OCWP – Phase II document contains the statement, “The policies of the State regarding area of origin protection and utilization of surplus water were major considerations in the development of the Oklahoma Comprehensive Water Plan. The Plan presupposes that no transfer of water from any area will be considered unless and until all the reasonably foreseeable future water needs of such areas are assured” (OWRB, 1980, p. 5). Clearly, this is a statement of policy and was considered a policy recommendation for the purposes of the comparisons made in the present study.

### *b Recommendation Filtering*

To reduce the list to only those recommendations that could potentially reveal differences between the cases, four filters were applied to the data (Figure 2). First, those recommendations that are context-dependent were identified and removed. As mentioned previously, careful consideration of the context in which a recommendation was developed is important to understanding whether it can be compared to other recommendations. For example, a recommendation about the management of a specific water body would not readily compare to a recommendation developed for a whole state.

Applying this filter, the recommendation regarding the specific water body would be eliminated because it is dependent on the geographical context considered. The recommendation for the whole State is not context-dependent as it would apply anywhere in Oklahoma.

In addition to having limited geographic application, a recommendation was considered context-dependent if it was restricted to a particular time period. For example, the 1980 OCWP contains a recommendation concerning the management of weather modification efforts. These efforts (including cloud seeding) have largely fallen out of favor as research has demonstrated that they are largely ineffective. Thus, this was an appropriate recommendation for its time, but would enjoy little support today, and so, was filtered out.

The second filter is whether a recommendation's acceptability could be influenced by the deliberative process. Some recommendations may be so strongly associated with stable values that they would be accepted (or rejected) under almost any process. For example, a recommendation that the State government accept financial aid from the federal government would see little, if any, opposition regardless of whether A&D was used or not.

Third, very similar recommendations that occur in multiple cases were filtered out. This was necessary because recommendations that occur in more than one case should receive similar acceptability ratings and would therefore reduce the discriminatory power of the analysis. Furthermore, these recommendations are clearly not dependent on the type of process used to develop them if they continue to recur in multiple plans. If one recommendation is similar to another, and in the researchers' opinion (informed by

knowledge of Oklahomans' views of water issues) the writers of the recommendation would not object to substituting one for the other, the two were considered to be the same recommendation occurring in different cases and were eliminated.

Finally, after recommendations were categorized by subject matter (see below), only those categories that had recommendations from two or more cases were considered. This was done because it was expected that higher degrees of public involvement would have greater impacts for some subject areas than others. Subject categories with recommendations from only one case would not have any variation in the degree of public involvement and so, would not lend themselves to within-category analysis. This filter may appear to be in opposition to the previous one that eliminated similar recommendations. However, the elimination of similar recommendations was applicable only in cases where the recommendations were essentially identical. Applying these two filters left only those recommendations that occurred in subject categories that had recommendations from multiple cases but were not identical.

### *c Recommendation Categorization*

In each of the five cases, some of the recommendations contain multiple provisions. As mentioned previously, the provisions were separated so that respondents could rate each provision individually. Although, the overall rating of each recommendation was considered the most important rating, it was anticipated that some respondents would believe that Oklahomans would accept some parts of a recommendation more readily than others. (The reason the overall rating was considered the most important is that the recommendation as a whole was chosen a priori as the unit of comparison. This decision

was based on the assumption that the stakeholders who crafted each recommendation developed it as an integrated whole.)

All recommendations were categorized according to their subject matter into the eleven topical categories used in the development of the recommendations during the 2012 OCWP Update. These themes are:

- Water Rights
- Water Quality
- Water and Wastewater Systems
- Reservoir Operations
- Water Marketing and Transfer
- Water Supply Augmentation
- Water Conservation
- Water Resource Planning
- Floodplain Management
- Problem Mediation/Arbitration
- Data Collection and Management

In preparation for using the recommendations in a survey instrument (see below), the recommendations were refined for clarity and brevity including combining related recommendations. Appendix B lists the original recommendations, the refined version used in the survey instrument, and the assigned category.

## 2. Acceptability Measurement

Once the list of recommendations was finalized, the social acceptability of the recommendations was estimated. To do this, public support for each recommendation was rated by elites who are knowledgeable about water and Oklahoma citizens' water concerns. These 22 water elites were all known to the researcher. Each was initially solicited via email and agreed to a face-to-face, confidential interview at a place of their choosing. [Although the selection process was convenience and not random sampling, it

would have been difficult to select such a panel of water elites (knowledgeable about both the issues in Oklahoma and the public's desires regarding solutions) who were entirely unknown to the researcher because of the researcher's experience with water policy elites in the state.]

Each participant was presented with a survey instrument containing 49 recommendations grouped into ten categories (see Appendix D) to be rated on five-point Likert scales according to how they believe "most" Oklahoma citizens would rate them<sup>4</sup>. Each recommendation had a Likert scale for rating it "overall" and some had additional scales for rating the individual provisions. The Likert scales were arranged 5-4-3-2-1 and were clearly labeled with "Most" over the "5" and "Least" over the "1." The ratings were listed in descending order because a higher number seems more intuitively associated with a higher rating. The recommendations were not identified with a particular plan on the instrument and they were listed in an arbitrary order within each subject category.

Participants were told to assume that the recommendation could be clearly explained to the public, rather than assume that the sometimes technical language of a recommendation could be an impediment to public acceptance. In other words, they were asked to rate the *ideas* contained in the recommendation rather than the specific language. Participants were also told that they were free to mark on and comment on the survey as they wished.

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<sup>4</sup> The entire procedure and the associated communications (emails, survey instrument, and informed consent form) were overseen and approved by the Institutional Review Board of Oklahoma State University. See Appendix E for Approval Form.



Participants were then asked to explain briefly their rating of the recommendations either on the form or verbally as they completed the document. Verbal comments were recorded in the interviewer's notes. No demographic information was gathered on the participants, as it was not their opinions of the recommendations that were being sought but rather their estimation of the public's opinions.

The instrument was first pilot-tested on two respondents. No significant revisions were warranted based on the pilot test. A student who was largely unfamiliar with the recommendations was able to complete the instrument in 50 minutes, and so, subsequent participants were told to expect a 60-90 minute interview.

Some participants were concerned about devoting so much time to the interview. These participants were provided with the instrument and instructions in advance. Some chose to merely familiarize themselves with the recommendations prior to the interview; others recorded their rating and the interview consisted of a discussion of their ratings. Providing the instrument before the interview also served to allay fears of some participants, especially public officials, about the topics to be covered and how their responses would be used (despite the initial contact email which explained the interview was confidential). One, an elected official, was so concerned about the time required, that he/she would only consent to a phone interview in which he/she read the recommendation ratings and provided explanations.

Participants were told that the most important rating to complete was the overall rating and that they did not need to mark the individual provision ratings unless they differed from the overall rating. For that reason, when entering rating data into a spreadsheet for analysis, unrated provisions were given the same rating as the overall

rating. For the less than 5% of the ratings where the overall rating was not marked but the provisions were, the median of provision ratings was used for the overall rating. Having the participant actually rate the recommendation overall was considered superior to a calculated value, because the latter did not take into account the differential weighting the participant might assign to the various provisions.

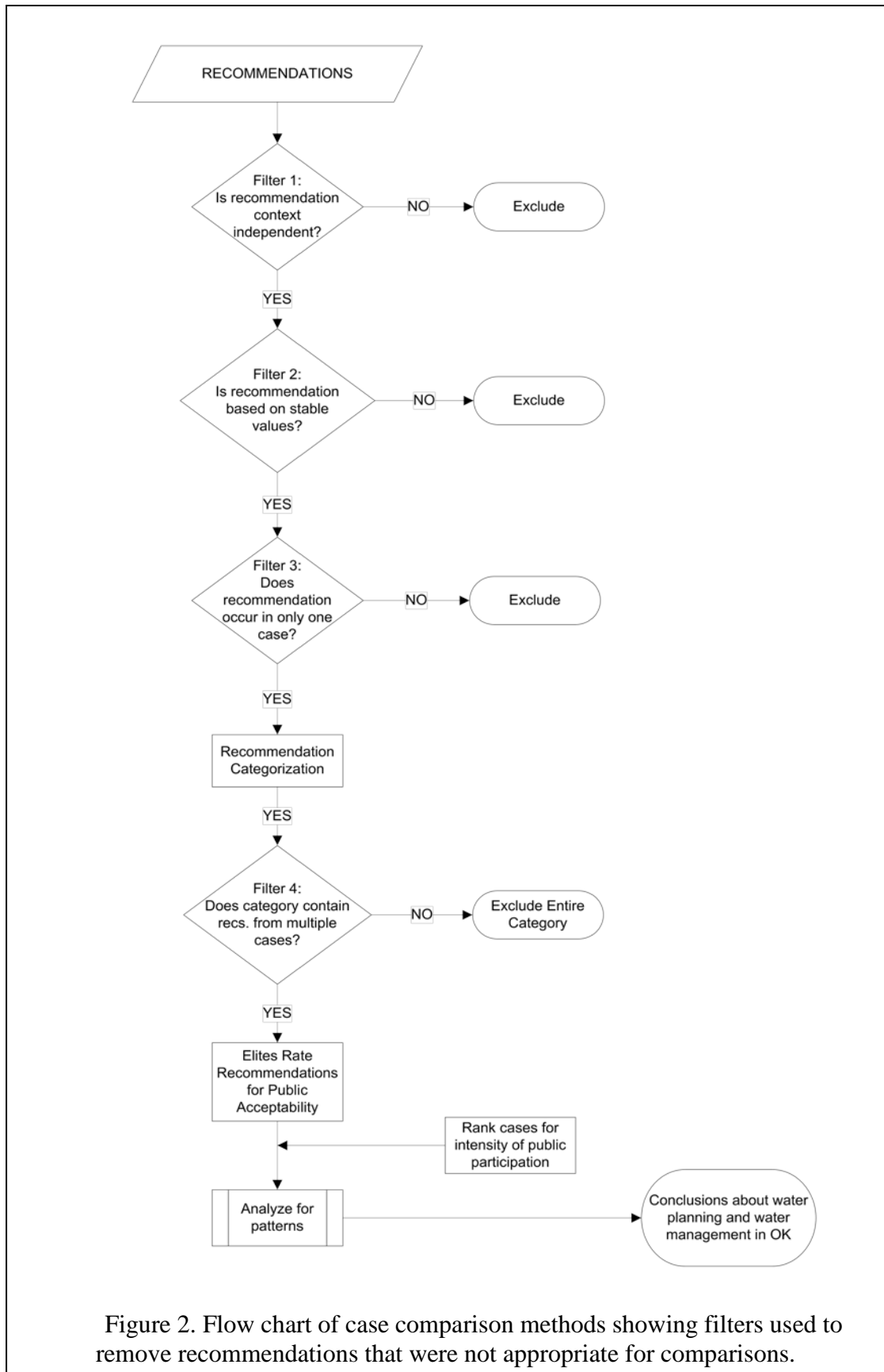


Figure 2. Flow chart of case comparison methods showing filters used to remove recommendations that were not appropriate for comparisons.

### 3. Robustness of Public Participation

The five cases were ranked according to their level of public participation.

Arnstein's seminal work, *A Ladder of Citizen Participation* (1969) and Beierle and Cayford's ranking of mechanisms according to intensity were used to inform this process. Arnstein's ladder is a framework for understanding the amount of power the citizens have over decisions. The more influence the participants had over the final recommendations, the higher the case was ranked. Thus, cases in which the citizen input was reported to agency staff or experts for their consideration in drafting plan provisions were considered to have a lower degree of public participation than cases in which citizens drafted the recommendations themselves. The considerations of intensity were based on the time and commitment required of the public participants. Together these assessments form a qualitative judgment by the researcher of the *robustness* of the process. These two facets could be correlated, but they are not necessarily so. For example, participants could be given complete control over a planning effort and yet choose to invest little of their time and resources in it.

Descriptions of the planning processes contained in the water plans were the main sources of information for characterizing robustness of the 1980 OCWP and the 1995 Update. These descriptions were augmented by conversations with the OWRB staff. For the other cases, the researcher was personally involved in each, although published descriptions could have been used.

In the Oklahoma water resource planning cases considered here, the citizens have no real control over resources or plan implementation, but they do have various degrees of control (power) over the recommendations included in each plan. The plans serve as

policy recommendations to the State legislature where the real power rests. Nonetheless, citizens have input into the shaping of each plan and the cases were ranked on this basis.

#### 4. Analysis

##### *a Acceptability vs. Public Participation*

###### *i Method validation*

As reported above, the social acceptability of the recommendations from E/S and IRW cases was measured previously through phone surveys. These results serve as a check on the accuracy of the methods of this study. Recommendations from the 1980 OCWP, the 1995 Update, and the 2012 were never presented to the general public for evaluation. The method of comparison was of modes and the aggregated positive ratings.

##### *b Statistical Analysis*

Recommendation ratings were compared to the public participation level rankings using five by five (ordinal by ordinal) contingency (crosstabs) tables in SPSS (IBM, 2009). The gamma statistic (Bohrstedt & Knoke, 1988) was used as a measure of the association along the two axes. Gamma ranges from -1 to 1; the larger the absolute value, the stronger the association between the two axes. If the value is positive it indicates that the axes vary directly; as one increases the other does also. A negative value indicates that they vary oppositionally; as one increases, the other decreases.

The contingency table analysis uses the null hypothesis that there is no association between the two axes. In this case the null hypothesis could be stated as:

$H_0 =$  No association exists between the level of public participation in planning and the rating of public acceptance of plan recommendations.

Analyses were conducted for both the overall recommendation ratings and the individual provisions within those ratings, and both combined. The analysis was conducted using all of the cases and using just the statewide planning efforts (1980 Plan, 1995 Update, and 2012 Update).

Furthermore, the contingency tables were constructed both with and without using the subject category as a layer variable for the level of public participation. Adding a layer variable causes the output to include analysis within each category. This was done to facilitate comparisons between those categories in which public participation produced a more acceptable result, if any, and those that did not. To contrast the value of the advisory committee mechanism used in the 1995 Update and the A&D-based mechanism used in the 2012 Update, the analysis was also conducted using only the data from these two plans.

## CHAPTER IV

### RESULTS

#### A. Recommendation Filtering

The filtering process resulted in a total of 49 recommendations to be rated. Due to the number of provisions contained in many of the recommendations there were 147 separate items to be rated on the survey instrument (Appendix D). Table 5 shows the number of recommendations that remained for each case after the filtering process along with the total number of provisions embedded in those recommendations.

#### B. Method Validation

The fact that the IRW and E/S cases included phone surveys to measure public acceptance of their recommendations affords an opportunity to check the validity of the methods used here to assess the public acceptability.

Concerns arise regarding the present method because it is one step further removed from a direct assessment of public acceptability. In an ideal situation, everyone in the population of interest would provide a rating of the recommendations. With approximately 3.6 million residents in Oklahoma, this is not possible.

Table 5

Number of recommendations and their embedded provisions remaining after the filtering process for five water policy development efforts in Oklahoma

Case	Recommendations	Provisions Only	Total
1980 OCWP	4	0	4
1995 Update	23	41	64
E/S	3	0	3
IRW	2	19	21
2012 Update	17	33	55
Total	49	98	147

*Note.* Cases are listed in order of level of public participant rank.

A survey of a significant portion of the population chosen at random is generally considered a valid substitute. There is a clear and statistical relationship between the rankings obtained through such a survey and those held by the entire population.

In this study, such a survey was not possible due to resource constraints. Asking a group of elites to provide estimates of the opinions of the general population is one step removed from a survey of at least some members of the target population. A similar approach was used by Leach et al. (2002) to assess the impact of watershed partnerships. The relationship between the interviews used here and the rankings by the public is not clear and must be tested.

Table 6 presents the results of the current survey as a frequency distribution of ratings of the recommendations for each case. When this distribution is compared to the results of the surveys presented above for the IRW and E/S cases, some differences emerge. The rating modes (shaded) for these two cases are lower than most of the mode ratings reported in the telephone surveys. For the IRW, only the modes of the first 10



recommendations should be compared to those for the same case in Table 4, as these were used in the survey instrument for the current study (the last seven recommendations pertain to recreationist behavior and were eliminated by the filters as being context-dependent). The mode below is for the second highest rating and the mode for the telephone survey was, in all cases but one, the highest category. However, if we look at the combined highest two ratings for each study (column labeled **4+5** in Table 6) the values are similar. The 80% value for the current study is comparable but lower than those from the phone survey.

A similar pattern emerges when considering the E/S study. Again, the mode and the percentages for combined two highest ratings are lower for the current study.

Table 6

Frequency distribution of acceptability ratings by case for recommendations from five water policy development efforts in Oklahoma

Case	Rank of Public Participation <sup>a</sup>	Acceptability Rating <sup>b</sup>						n <sup>c</sup>
		1	2	3	4	5	<b>4+5</b>	
1980 OCWP	1	13%	13%	34%	<b>17%</b>	24%	41%	88
1995 Update	2	5%	8%	22%	38%	<b>26%</b>	64%	374
IRW	3	2%	9%	9%	61%	<b>18%</b>	80%	44
E/S	4	0%	11%	24%	39%	<b>26%</b>	65%	66
2012 Update	5	6%	10%	19%	37%	<b>28%</b>	65%	506

<sup>a</sup> The highest rank is 5 and lowest is 1. <sup>b</sup> The least acceptable rating is 1 and the most acceptable is 5.

<sup>c</sup> n here is the number of rankings not the number of participants which is 22 for all cases.

This analysis indicates that the estimation technique for public acceptability employed here is likely not as accurate as an actual survey, but produces comparable, if more pessimistic, ratings. This could be explained by the fact that the elites interviewed here are more knowledgeable about the issues, and so, may be more skeptical about the

public's reaction to these recommendations. Also, they may not feel comfortable marking an extreme answer for someone else, while those who answer for themselves are comfortable marking the highest value. Another possible explanation is social desirability bias (Boyer, 2011; Loevinger, 1959) in which participants alter their answers about their own actions because of a desire to appear to conform to social norms. In this situation, the answers of respondents to the IRW and E/S study would have been biased by their desire to appear more approving of clean water. Thus, the proxy evaluations of public acceptability by elites would be more accurate.

It is also quite possible that the differences can be accounted for based on geography. The respondents to the telephone surveys were from the northeast part of the State only. While a few of the elites live in that area, most live in central Oklahoma. Finally, it is likely that the elites are not representative of the population as a whole. For this to bias the results, some would have had to complete the survey instrument based more on their own opinions than on their judgment of Oklahoman opinion generally.

A review of the notes taken during the interviews shows that some of the participants were answering for themselves, despite being asked not to. Statements such as "I don't like this one" or "I don't think this one will work" seem to indicate that they were rating the recommendations based on their own subjectivity. One's own experiences and belief's shape perceptions, so it is to be expected that the subjectivity of the interviewees would influence their estimates of how most Oklahoman's think. However, those who answered for themselves were reporting only their own subjectivity. This likely accounts for some of the bias.

It is not surprising that the results of the proxy method do not closely match the more direct phone survey results. Although it is important to keep this underestimate in mind when considering the results, it does not invalidate the method; rather it serves as one identified source of error.

### C. Case Ranking Based on Level of Public Participation

The five cases were ranked according to the level of public participation and the results appear in this section. Table 6 also lists the public participation level ranking for each case.

#### 1. 1980 OCWP

This plan was ranked at the lowest level of public participation because it did not involve a priori consulting of the public in any way. According to the publication, the two major contributors to the plan were the OWRB and the U.S. Army Corps of Engineers. No mention of input from the public is made in either of the two documents that make up this water plan.

According to some of the staff of the OWRB who were involved in this planning process, some meetings were held with citizens groups in various parts of the State after the decision had been made to design the water transport system. These anecdotes indicate that the public, especially those in the southeast portion of the State (the proposed source region), were quite unhappy with the proposal. The emphasis in both plans on protecting the source region from water shortfalls may be a response to the hostilities in these meetings (the 1980 – Phase I document even proposes a State constitutional amendment guaranteeing this protection).

## 2. 1995 Update

This case was judged at the second lowest level of public participation. Although this update did include the Citizen's Advisory Committee, and the staff did consider their comments and concerns when drafting the recommendations, this type of participation falls within the tokenism section of Arnstein's ladder. This seems to be a form of consultation (fourth rung) (Arnstein, 1969).

Several other factors were considered when ranking this process. First, the Water Board staff selected the participants. Thus, they were all known to the staff. This limited the pool of candidates; in fact the minutes indicate a preponderance of agency personnel, commercial and industrial water consumers, and former Water Board members. It is not clear that all of the important perspectives were represented. The minutes of the Committee meetings indicate that the members were asked to discuss the various issues facing the State. Disagreements among the members went unresolved. Finally, the minutes portray the meetings as a rather informal conversation between the Water Board staff and the members with the staff steering the conversation toward the various topics that need to be covered, and the members largely responding to statements by the staff.

Furthermore, the intensity of the participation was fairly low. Participants were only expected to attend seven meetings over the course of 13 months.

## 3. Illinois River Watershed

The Illinois River case was ranked at the third highest level of public participation. The initial recommendations were drafted by the policymakers, thus they initially framed the issues. Yet, they were responsive to the suggestions of the stakeholders. In fact, they initially ignored the strong concerns expressed in the interviews conducted by the

research team about the behavior of recreationists. The policymakers were informed of these concerns in a presentation at their first meeting, but chose not to draft a policy addressing it. The stakeholder group found this unacceptable and eventually persuaded the policymakers to address it (Focht, et al., 2003).

Other facets considered in determining this ranking were: (1) the research team assisted with drafting the recommendations by summarizing and consolidating the modifications suggested at each meeting; however, all changes were subsequently reviewed and approved by the policymakers and the stakeholders; (2) the stakeholders did not meet directly with the policymakers which limited deliberation; and (3) many of the stakeholders did not continue through the whole process and so had minimal time invested.

This could be seen as a partnership (within the citizen power section) on the ladder of public participation. Partnership is the third highest rung.

#### 4. Eucha/Spavinaw

The E/S case was ranked as the second highest of the cases; in addition to letting the participants draft the recommendations, the requirements for participation were greater than previous cases. Participants were required to attend five day-long meetings over a period of several months, read background material, listen to presentations about water quality issues in the basin, and work with researchers to develop a program that lowered nutrient inputs to the basin sufficiently to meet new state standards.

In addition, this case involved relatively high quality deliberation. Researchers engaged in a considerable participant recruitment effort. An initial open public meeting

was held to “kickoff” the project. The meeting was promoted in the local communities via extension agents in both States, made phone calls were made, and flyers were posted at prominent community locations. Those who attended were given the opportunity to sign up for an interview. From those initial interviewees, researchers recruited other interviewees through “snowballing” (Mertens, 1997, p. 263) for others with different perspectives. This technique and the 60 interviews allowed researchers to ensure that all perspectives were represented in the policy dialogues.

Because the participants and researchers collaborated to develop the recommendations, this would appear to represent a level of participation somewhere between a partnership and delegated power on the participation ladder.

#### 5. 2012 Update

Considering the level of commitment required of the participants, the 2012 Update ranked the highest of the cases in terms of public participation. Participants were asked to attend eight meetings (two of which lasted one day, one for two days, and three for three days) which required a minimum of 117 hours of their time. Three seminar meetings were also held.

Those who wished to participate were required to commit to attend the meetings and to complete the process, and most all did. Participants were provided with extensive background reading material on several occasions and other optional materials were made available via websites. Researchers ensured that all perspectives were represented by allowing large numbers to participate (the initial deliberative meetings had over 300 participants), opening the meetings to the public, and allowing anyone to participate.

#### D. Relationship between Public Acceptability and Public Participation

The results of the contingency table analysis are shown in Table 7 (complete contingency tables are shown in Appendix E). The analysis of the overall recommendation ratings shows a gamma of 0.073 which is significant at the 0.065 level. Thus, the null hypothesis that there is no relationship between these two axes is rejected. A positive association between the two axes is demonstrated (that public acceptability increases as public participation does); however, the small gamma statistic indicates that only a small portion of the standard error is explained by this association. In other words, the association between the two does not have much predictive power.

Eliminating the two non-statewide water planning cases (E/S and IRW) produced a slightly higher gamma (0.089) which was also significant. The higher gamma indicates that a larger portion of the standard error is explained by focusing on only the statewide water plans. Running the analysis with only the 1995 Update and 2011 Update did not yield a significant relationship.

In contrast, the same analysis using only overall recommendation ratings and the individual provisions did not provide a statistically significant gamma. Likewise, when the overall recommendation ratings were removed and only the provision ratings were used, a significant relationship between the axes was not found.

Adding the categories as a layer variable to the contingency table calculates the gamma statistic among these categories. This allows a determination of which categories exhibited a significant association between the cases included and the acceptability of their recommendations Table 8. The results indicate significant relationships for the categories Water Rights, Water Transfer, and Water Resource Planning. Those

categories for which no significant relationship was found are Nonpoint Source Pollution, Water Supply, Water Conservation, and Data Collection and Management.

Not only is the gamma for water rights, water transfer, and water resource planning significant, but they are also relatively large (Table 8). This means that they account for a larger portion of the standard error and that the level of public participation predicts the public acceptability more accurately in these comparisons.

The analysis was repeated for the recommendations from the two water plan updates (1995 and 2012) only, first without and then with categories as a layer variable. These serve as a comparison of an A&D-based process with one that only involved an advisory committee. The results of the analysis for all of the data (all categories) from these two plans, did not demonstrate a significant relationship ( $\gamma = 0.013$ ,  $p = 0.793$ ,  $n = 880$ ), and so the null hypothesis that there is no relationship between the type of public participation mechanism and the acceptability of the recommendations is not rejected. However, when the topic categories are added to this analysis a different picture emerges. These results are reported in Table 9. They indicate that only in the water rights category was there a significant difference.



Table 7

Results of contingency table analysis of public participation robustness and public acceptance for five Oklahoma water policy development efforts

Cases					Provisions	Overall	$\gamma$	Sig.
1980	1995	IRW	E/S	2012				
X	X	X	X	X		X	<b>0.039</b>	0.065
X	X			X		X	<b>0.098</b>	0.047
	X			X		X	0.013	0.793
X	X	X	X	X	X	X	-0.011	0.618
X	X	X	X	X	X		-0.013	0.605

Note. X indicates item was included in analysis. Bold values are considered significant.

Table 8

Results of contingency table analysis of public participation robustness and public acceptance for five Oklahoma water policy development efforts analyzed by recommendation category

Category	$\gamma$	Sig.
Water Rights	<b>.285</b>	.008
Nonpoint Source Pollution	-.064	.449
Water Transfer	<b>.189</b>	.027
Water Supply	.010	.970
Water Conservation	-.163	.125
Water Resource Planning	<b>.221</b>	.047
Data Collection and Management	-.071	.778

Note. Bold values are considered significant.

Table 9

Results of contingency table analysis of public participation robustness and public acceptance for 1995 and 2012 Updates only analyzed by recommendation categories

Category	$\gamma$	Sig.
Water Rights	<b>.285</b>	.008
Nonpoint Source Pollution	-.168	.235
Water Transfer	-.011	.926
Water Supply	.010	.970
Water Conservation	-.163	.125
Water Resource Planning	.032	.831
Data Collection and Management	-.071	.778

*Note.* Bold value is considered significant.

## CHAPTER V

### DISCUSSION AND FINDINGS

#### A. The Value of Public Participation

This section discusses the results regarding public participation in general. Therefore, it will focus on contrasting the 1980 OCWP, in which there was no public participation, with the 1995 and 2012 Updates. The A&D framework is discussed in a later section.

This study revealed a positive relationship between the robustness of public participation in water planning meetings and the acceptability of the resulting recommendations. The literature and common sense would predict that involving someone in a planning process in a meaningful way should make the outcomes more palatable to them (the instrumental rationale for engaging the public broadly in decisionmaking). Stern and Fineberg (1996, p. 24) indicate that increased acceptability may be one of the outcomes of a broadly participatory process. The results here confirm this in the context of water planning in Oklahoma.

Of course, there are other reasons for involving the public: education, building trust and a sense of efficacy, as well as improved decision quality (Beierle & Cayford, 2002; Gutmann & Thompson, 1996; Smith, 2003). This study adds to the growing literature that reports findings indicating the benefits of public participation (Beierle & Cayford, 2002; Leach, et al., 2002).

The relationship between the robustness of public participation and public acceptance was evident when the overall ratings were used but not when the individual provisions were included. This may be a result of the diluting effect of so many additional provisions. In other words, a recommendation that contained three separate provisions would have received four times as many ratings (one for each provision, plus one for the overall rating) as another recommendation with only one provision. Since the recommendations with multiple provisions were distributed throughout the cases, adding 2750 ratings to the 1078 overall recommendation ratings, any real effects may have been masked. In retrospect, it was probably not necessary to rate individual provisions within a recommendation. If a participant insisted on rating one provision differently, he/she could have circled it and written the rating in the margin of the form. It was the overall recommendation ratings that proved valuable in this study.

The fact that the relationship between the level of participation and outcome acceptability does not account for the majority of the error in the comparisons is not surprising. There are many factors that can influence acceptability, especially considering the proxy method used here. Among these factors are the variation among raters, variation within a single rater due to changes in mood or fatigue during the interview, problems associated with having someone speak for others, and judging the

acceptability of a recommendation that was developed in previous decades. A more refined method could have attempted some control over such factors and thus revealed a stronger relationship between participation level and recommendation acceptability.

This study assumes that differences in the robustness of the public participation in the cases account for the measured differences in acceptability. This is based on theory from the literature (Stern & Fineberg, 1996); however, it is also possible that other characteristics of the cases account for the differences. For example, the ranking of the cases by level of participation also corresponds to the chronological occurrence of the cases. This is at least partially due to improvements in the state of the art for public participation protocols and the increased openness of the public and government agencies to the idea. The present study did not attempt to identify the particular characteristics of the cases that led to more acceptable recommendations.

In addition it is not clear that developing more acceptable recommendations is always desirable. Some have suggested that public participation “waters down” recommendations to the point where everyone can accept them (Griffin, 1999). In situations that call for forceful action, this could be a hindrance. If consensus cannot be reached on more forceful actions, then the social context may not be ready for heavy-handed tactics in planning and plan implementation, which would likely have counterproductive and even disastrous results. In this sense, public involvement can serve as a check on government action.

An important relationship between participation robustness and public acceptability was established empirically in this study. This had not been previously reported, although it had been theorized. Two levels (public participation in general and

deliberative democracy in the form of an analytic-deliberative process) of this relationship were revealed to be useful for increasing social acceptability. In some policy areas (water resource planning and water sales and transfers), the public participation level was sufficient to raise acceptability and the additional effort of A&D did not have a significant effect. In another, more controversial policy area, water rights, A&D did have a significant and relatively strong impact on acceptability by the public.

Regarding the question of whether the increased effort of an A&D process is warranted, this shows that in some cases it may be. Of course, that question must ultimately be answered by the funder and is a judgment of the value of incremental improvements in decision quality versus time and expense. Social acceptability of planning outputs or policy recommendations is only one consideration. Other benefits of public participation including trust building, capacity building, reducing controversy, and improvements in decision quality are other important benefits of public participation that were not addressed in this study.

#### B. Variation within Categories

Several authors have offered prescriptions for the use of the numerous models of public participation (Beierle & Cayford, 2002; Focht, 2005; Focht & Trachtenberg, 2005; Meadowcroft, 2004; Renn, et al., 1995; Smith, 2003). Some of these are based on a theoretical framework and would benefit from empirical findings indicating which models work well in which contexts. This study was able to demonstrate that robustness of public participation had an impact on water planning for certain topic categories. Insights can be gained by exploring the characteristics of the recommendation categories which were responsive to the robustness of public participation.

## 1. Water Rights

One of these categories, water rights, is a controversial topic in Oklahoma. This category included recommendations that touched on two volatile topics: groundwater-surface water relationships and Native American water rights. Groundwater-surface water relationships are of particular concern to landowners such as agriculturalists in arid western Oklahoma who make their living using groundwater. Currently, Oklahoma laws treat ground and surface (or stream) water separately (groundwater is a property right, while stream water is owned by the State and rights are allocated by permit). In public meetings associated with the 2012 Update, many participants expressed concerns that changing water laws to recognize the hydrologic connection between ground and surface water would jeopardize their access to groundwater. This is the main cause of the opposition.

Oklahoma is home to 37 federally-recognized Native American tribes. Along with the granting of land for tribal reservations, federal courts have held that sufficient water rights to meet their needs were also granted (known as the Winters Doctrine). However in Oklahoma, the Dawes Act of 1887 allocated the reservations to the tribal members, most of whom sold their lands. Tribal governments, however, retained limited but non-exclusive jurisdiction over the original reservations.

Many of the tribal nations in Oklahoma have asserted that they still retain sovereign rights to the waters within their jurisdictions. The State of Oklahoma does not recognize these rights and instead exercises its jurisdiction over these waters. This issue has not been adjudicated but is widely considered to be headed to court in the near future. Several tribal governments have begun to assert their claims via television ads, real and

threatened lawsuits, and interstate water sales. Non-tribal sectors such as agriculture and oil and gas view tribal claims at worst as a threat to their rights and livelihood or at best as another layer of regulatory bureaucracy that will have to be navigated. If the involvement of the public in water planning could resolve disputes in these two areas, then the expense of a robust participation process would be easily justified.

A review of the Water Rights recommendations in the survey instrument (Appendix D) indicates that the recommendations from the 2012 Update tend to be voluntary and educational, whereas the 1995 Update recommendations are somewhat more administrative and coercive. For example, a 1995 Update recommendation (designated 5.1.1.1) emphasizes that the OWRB should implement “administrative fines, criminal charges, or compelling meter installation for failure to report water use or falsification of water report forms.” In stark contrast, the next recommendation in the instrument (1.1.1.4), which is from the 2012 Update, calls for an education program for water users regarding how to report their annual usage. In addition, the 1995 Update recommendations tend to be more threatening to private water rights. For example, a recommendation (designated 5.1.4.1) indicates that the OWRB should “identify the potential benefits of the joint management and conjunctive use of state stream and groundwater supplies.” In contrast, a recommendation from the 2012 Update (1.1.4.2), would recognize the relationship between ground and surface water, but make groundwater “a protected private property right.”

## 2. Water Transfers

Recommendations concerning an even more controversial topic were also influenced by the level of public participation: water transfers. Since about 2000,



Oklahoma has been embroiled in a controversy with Texas regarding water in the Red River Basin, which forms most of the border between the States. Due to the high demand for water in the rapidly expanding Dallas-Ft. Worth metropolitan area, the Tarrant Regional Water District has sought access to water in southern Oklahoma. Many in southern Oklahoma are threatened by this. They fear that a sale would limit their personal access to water for their livelihoods, negatively impact water levels in their lakes (which are an important recreational resource and tourist destination), and will cause a movement of jobs from Oklahoma to Texas. Others view this as an opportunity to improve water infrastructure in Oklahoma. They reason that since Texas is willing to pay millions of dollars for the water, Oklahoma should sell it and use the money to address important needs in Oklahoma. A means of reducing the controversy by developing a more socially acceptable solution than the courts would be welcomed by many.

This category contains recommendations that would be applicable to both intra- and inter-state water transfers. These include some from the 1995 and 2012 Updates that would protect the source region, and make use of untapped water sources. In contrast, the 1980 OCWP recommendations in this category concern the Interconnected Water Supply System. When these are removed from the analysis (Table 9), the relationship disappears. This indicates that for this topic category the difference came about with the inclusion of the public not with the move to an A&D model.

### 3. Water Resource Planning

A third category of recommendations also benefited from an increased level of public participation: water resource planning. This is not a controversial topic but it does touch on the idea of increased local control. A few of the recommendations in this

category would devolve some control to the local or regional level. These are popular ideas in a populist state like Oklahoma. If these particular recommendations led to the influence of public participation on this category, then perhaps it indicates that trust of government is low. Focht's prescriptive trust framework would indicate that either a taskforce or commission would best fit the situation (Focht, 2005).

#### 4. Categories without significant relationships

It is also important to consider the characteristics of the categories for which no significant relationship was found. The first is non-point source pollution. Although this can be a controversial topic, the particular recommendations included in this survey instrument such as reducing roadside erosion, streamlining the agencies responsible for water quality, and encouraging the federal government to soften some of its positions were not egregious to any group. During the 2012 Update process, conversations with numerous agriculturalists indicated that this topic is only controversial when coercive solutions that restrict the use of their land are attempted. The lack of any such problematic recommendations in these planning efforts may mean the landowners have successfully made their concerns known to the agency personnel through other means such as commodity or interest groups.

The second category is water supply. This is a non-controversial topic that includes recommendations for increasing the supply of drinking water by establishing guidelines for water reuse and developing new treatment technologies for lower quality waters. The third category is water conservation, which is another non-controversial topic that covers voluntary means of reducing water waste. The fourth and final category is data collection and management, which includes two recommendations that are rather similar. They

both suggest using computer technology to improve water resource management, although for different types of information.

Table 10

Participatory strategy prescriptions based on the level at which public participation effected acceptability and on the characteristics of the recommendation category

Recommendation Category	Level of Effect	Robustness of Participation	Participation Strategy <sup>a</sup>
Water Rights	A&D	High	Negotiation
Water Resource Planning	Public Participation	Moderate	Consultation
Water Transfer	Public Participation	Moderate	Consultation
Water Supply	None	Low	Consultation
Nonpoint Source Pollution	None	Low	Consultation
Data Collection & Management	None	Low	Confirmation
Water Conservation	None	Low	Confirmation

<sup>a</sup> After (Focht & Trachtenberg, 2005)

### C. Effects Attributable to the Analytic - Deliberative process

Considering that the contrast in acceptability between of the recommendations from the 1980 OCWP and the recommendations from the 1995 and 2012 Updates accounts for the significant gamma statistic for the categories of water transfers and water resource planning, it might be tempting to conclude that it also accounts for all of the significant findings here. However, the significant gamma in the water rights category did not include any recommendations from the 1980 OCWP. This relationship is entirely due to the difference in acceptability of the recommendations from the 1995 and 2012 Updates and is likely attributable to the use of the A&D process.

As discussed above, the water rights category includes two of the more controversial topics in water resource policy in Oklahoma today. Comments gathered during the 2012 planning process (OWRRI, 2007) from many stakeholders indicate low levels of trust of the government (especially OWRB) to handle this properly. Rather many believe that the agency intends to use the conjunctive management of groundwater and stream water as a means of restricting their water rights.

Given this level of distrust, agency personnel would do well to proceed with caution. This study indicates that a process for developing policies that includes a robust public participation component such as A&D is warranted. Focht and Trachtenberg's (2005) prescriptive model indicates a negotiation strategy (Table 10).

Table 10 lists appropriate levels of robustness for public participation strategies as prescribed by Focht and Trachtenberg (2005). These levels of robustness (high, moderate, low) were assigned based on the level (A&D, public participation of any kind, or no public participation) at which an effect, if any, was revealed in this study. The strategies (defined in the Subjective Assessments section of Chapter 2) were chosen after considering the characteristics of the recommendation category as described above and the level of effect. The robustness prescriptions serve to refine the strategies. Although the two are related, they are not the same. For example, one can conceive of a negotiation strategy that requires frequent (monthly) meetings and so is highly robust, and another in which the meetings take place twice each year and so is not as robust.

In the cases of water resource planning, water transfer, water supply, and nonpoint source pollution, a consultative strategy is prescribed. However in the first two cases because participation had an effect on recommendation acceptability, a moderately robust

participation process would seem appropriate. In the latter two categories, no effect was found but the characteristics of the issues indicate that some level of participation above minimal is wise, thus the consultation strategy.

#### D. Robustness of Public Participation

Both Arnstein's (1969) ladder of public participation and Beierle and Cayford's (2002) intensity of public participation are useful measures of different aspects of the quality of a public participation process. Theoretically, higher levels of either should contribute to increased effectiveness. Combining both into a qualitative measure of robustness resulted in a useful heuristic for this study. More formal frameworks for assessing the quality of processes, such as the discursive standard criteria developed by Webler (1995) from Habermas's communicative rationality would likely provide additional insights but may be more resource intensive.

#### E. Proxy Method Modification

The proxy method employed here to estimate public acceptance compared favorably with more direct methods of measurement. It appears, therefore, that using elites as proxies has value in situations in which surveys are not possible or practical. Proxy or surrogate measurements have previously been used to compare public participation models when more direct measures are not possible (Leach, et al., 2002).

The method was biased toward pessimism. A possible modification to the protocol that may facilitate correcting for all or part of this bias is to ask interviewees to mark the Likert scales for both themselves and others using separate marks. In fact, one participant chose to do so in this study. Because most of the interview was devoted to reading the instrument, adding another mark does not significantly increase the time

required to complete the survey. This would reinforce that they are to provide ratings that reflect the sentiments of most Oklahomans, and it could allow researchers to account for the bias introduced by the interviewees' own subjectivities.

#### F. Future Research

The finding of a significant relationship between participation robustness and public acceptability based on a proxy measurement of acceptability here suggest that a more direct measure and/or a larger sample size may reveal other similar relationships. In addition, investigations of whether public participation in general and A&D specifically resulted in improvements in the other substantive legitimacy criteria (economic efficiency, technical effectiveness, administrative implementability, and political feasibility) in water planning outcomes (real-world differences) are important to understanding whether these resource intensive efforts are justified.

Furthermore, the relationship found here between robustness (a measure of participation context) and social acceptability, and the relationship found by Focht and Trachtenberg between participation strategy (another measure of participation context) and trust is worthy of further investigation. It is possible that a relationship between social acceptability and trust may exist and shed further light on appropriate participation contexts.

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## APPENDICES

## APPENDIX A

This appendix lists the recommendations identified in the five cases studied. Each is shown with its associated abbreviated form and reference code for comparison with other tables. Reference codes designate the case from which the recommendations came. Codes beginning with 1975 are from Phase I of the 1980 Update, those beginning with 1980 are from Phase II of the 1980 Update, 1995 corresponds to the 1995 Update, and 2012 to the 2012 update. Those that begin with ES are from the Eucha/Spavinaw study and those beginning with IRW are from the Illinois River Watershed study.

Reference Code	Abbreviated Recommendation	Full Recommendation
1975.3.1.1	Development fund	Create a water development funding and loan program to provide assistance in the development of local and sub-state regional water distribution and storage projects throughout the State. A revolving fund of not less than \$100 million should be established with reimbursement to be made from user revenues.
1975.3.1.2	Form regional organizations	Local Interests: Examine the desirability of forming, and form where feasible, regional organizations or entities serving major metropolitan areas, or groups of cities or towns, for water distribution purposes. Funds for construction of required facilities could be supplied from a State fund to be repaid by user fees.
1975.5.3.1	Constitutional guarantee to protect source areas	Provide a constitutional guarantee to protect the areas of origin so they shall never be made water deficient as a result of transfer of water outside the area.
1975.5.1.3	Interconnected system	Development of an Interconnected System that will transport 1,308,000 acre-feet of water annually from southeastern Oklahoma. Of this, 487,000 acre-feet per year will be transported to central Oklahoma and the remainder diverted to southwestern Oklahoma. Initial construction cost will be approximately \$1.7 billion. Municipal and industrial water delivered to central Oklahoma will cost about 19 cents per thousand gallons. Municipal and industrial water delivered to southwestern Oklahoma will cost about 27 cents per thousand gallons.
1975.5.1.2	Meet local needs first	All necessary water from source reservoirs will be reserved to meet local and sub-state regional requirements.
1975.5.1.1	Protect source areas	It should be emphasized that the Oklahoma Comprehensive Water Plan does not advocate redistribution of surplus water to water deficient areas until and unless additional studies demonstrate the feasibility of such redistribution to the satisfaction of the Governor, the legislature and the citizens of Oklahoma. [derived from SB 510, the authorizing legislation]

Reference Code	Abbreviated Recommendation	Full Recommendation
1975.5.1.5	Redistribution of state waters	Oklahoma is fortunate in having sufficient water within State boundaries to supply all its needs if properly managed. The problem is primarily one of management. Areas of surplus water supplies must be balanced with areas of depleting or short supplies. Redistribution of State waters should be made so that no areas are left water deficient.
1975.5.1.4	Surplus water definition	The Board has defined "excess and surplus water" as that amount which would not result in deprivation of a prior right to water to any inhabitant or property owner within a major drainage system wherein water originates. Methodology as used for study purposes herein considers such prior right to extend for the ensuing 50 years.
1975.8.1.1	Special purpose districts	Encourage the formation of special purpose districts throughout the State as needed to purchase local and transported water, operate and maintain facilities and to properly manage the water available to the district...These districts would have adequate powers to contract with the State or federal Governments for water supply and other purposes, to raise revenue necessary to repay the reimbursable costs involved and to take other actions needed to put the water to beneficial use.
1975.8.1.2	Studies of local needs	Local Interests: Immediately undertake studies of the amounts and timing of needs for local and transported water, the points of delivery and the necessary legal and financial arrangements to assure capability of meeting contractual repayment obligations.
1975.8.6.5	Continue funding federal water agencies in OK	The Federal Government: Continue funding of programs for the Bureau of Reclamation, Corps of Engineers and Soil Conservation Service within their areas of responsibility within Oklahoma. Continue to fund the U.S. Geological Survey in its supporting role as required by the Plan.
1975.8.6.6	Fed. gov. recognize Plan as THE guide for OK	The Federal Government: Recognize the Oklahoma Comprehensive Water Plan and subsequent modifications as the general guide for future water resource development in Oklahoma.
1975.8.6.2	Plan should be flexible	That the Comprehensive State Water Plan become a flexible guide for future water resource development of the State; that modifications thereto be made as required by changing water requirements; and that the Legislature be notified of such changes on an annual basis.
1975.8.6.7	State water plans in national interest	The Federal Government: Establish policy as to the national interest in planning and development of viable State water plans.
1975.8.6.1	Federal construction of Interconnected System	The federal agencies should be encouraged to construct portions of the Plan which can be justified from a federal standpoint.

Reference Code	Abbreviated Recommendation	Full Recommendation
1975.8.6.3	Investigate methods of financing Interconnected System	Establish a Financial Study Group to investigate methods of financing the construction and operation of the Plan. Findings and recommendations to be made to the people of Oklahoma through the Governor and Legislature.
1975.8.6.4	State underwrite portions of Federal projects	That the State underwrite portions of the costs of federal projects which fail to meet economic justification by federal standards or which exceed the repayment capability of the irrigation users.
1980.9.1.1	Floodplain management legislation for fed insurance	that the legislature adopt floodplain management legislation adequate to insure every Oklahoma community can qualify for federally subsidized floodplain insurance.
1980.3.2.1	Continue and expand Financial Assistance Program	that the Governor and legislature support continuation and expansion of the state's water development financial assistance program.
1980.7.2.1	State sponsored education of citizens regarding water matters	that the Governor and legislature take appropriate measures to insure that the citizens of Oklahoma are educated and informed in all matters pertaining to water in order that the state's water resources are adequately protected and placed to maximum beneficial use.
1980.7.1.1	Promote water conservation to reduce impact of future demand	that the Governor and legislature take appropriate measures to promote water conservation in the state in order to lessen the impact of projected future shortages.
1980.5.3.2	US ACE continue feasibility study of water conveyance	that the U.S. Army Corps of Engineers resume currently suspended feasibility level investigations on the water conveyance portion of the Central Oklahoma Project (COP).
1980.8.5.1	Fed recognize primary authority and responsibility is the State's	that the Federal Government recognize that primary authority and responsibility for water resources planning, development and regulation in Oklahoma rest with the state.

Reference Code	Abbreviated Recommendation	Full Recommendation
1980.8.5.2	Gov'r & legislature support OWRB	that the Governor and legislature strengthen the state's water programs by supporting the Oklahoma Water Resources Board in carrying out its statutory duties and responsibilities.
1980.8.6.3	Fed recognize plan as establishing priorities for federal projects in OK	that the Federal Government recognize the Oklahoma Comprehensive Water Plan as a guide in establishing priorities for planning, authorizing and funding of federal projects in Oklahoma.
1980.8.6.1	Gov'r & Leg. accept as general guidance document	that the Governor and legislature accept the Oklahoma Comprehensive Water Plan as a general guidance document assuring the orderly control, protection and management of the water and related land resources of Oklahoma.
1980.8.6.2	State agencies cognizance of plan	that all state agencies and political subdivisions of the state involved in water-related activities take due cognizance of the Oklahoma Comprehensive Water Plan in carrying out their duties and responsibilities.
1980.6.4.1	Continue chloride control	that the Governor, the legislature and the Oklahoma Congressional delegation continue to support the Arkansas-Red River Basin Chloride Control projects as the most practical and economical means of achieving needed water quality improvements in Oklahoma.
1980.6.1.1	Develop a comprehensive weather modification program	that the Governor and legislature support the development and implementation of a comprehensive weather modification program for the State of Oklahoma.
1995.11.4.2	Education regarding MESONET	MESONET supporters should coordinate efforts to provide public education on the availability, use and access of the system.
1995.11.4.1	Expand MESONET	All appropriate state and federal water resource agencies and entities should work closely with MESONET project leaders to explore opportunities for additional data collection activities and value-added products applicable to water resource management activities. These agencies and entities should also identify measures to improve delivery and dissemination of Mesonet data.
1995.11.1.2	Continued financial support of stream gaging network	The State Legislature should continue financial support of current stream gaging programs so that agencies can better manage water resources, especially during periods of drought.



Reference Code	Abbreviated Recommendation	Full Recommendation
1995.11.1.1	Partnerships and defraying costs of stream gaging network	<p>The Oklahoma Water Resources Board, U.S. Geological Survey and other appropriate state and federal agencies, communities and individuals should seek to improve the efficiency and effectiveness of the state stream gaging program. This effort should include:</p> <ul style="list-style-type: none"> <li>-• identification and encouragement of partnerships and other measures to help defray costs associated with the state stream gaging network;</li> <li>-• identification of opportunities to improve education on the value of stream gage data and the benefits it provides to water resource managers and the general public; and</li> <li>-• a determination of the benefits of program expansion or potential integration into a state stream and groundwater quantity and quality monitoring network.</li> </ul>
1995.11.3.1	Fund water quality assessment of lakes	The Oklahoma Water Resources Board should identify and recommend to the State Legislature a mechanism -- which operates in concert with the federal Clean Lakes Program -- to fund water quality assessment of Oklahoma lakes.
1995.11.5.3	Establish a water quality and quantity data program	The OWRB should coordinate efforts of appropriate state and federal environmental and natural resource agencies, universities and organizations to establish a comprehensive state water quantity and quality data collection program to monitor the condition of Oklahoma's stream and groundwater resources.
1995.11.5.2	Water quality and quantity monitoring network	The OWRB should bring together appropriate state and federal environmental and natural resource agencies, state universities and other involved organizations to assess current state efforts related to the collection and dissemination of water resource data and determine the need for a centralized ambient stream and groundwater quantity and quality monitoring network in Oklahoma. The OWRB should then submit study findings and recommendations to the Governor and State Legislature.
1995.11.5.1	Water resource computer network	The Oklahoma Water Resources Board should form a committee consisting of representatives of the State Department of Environmental Quality, Oklahoma Conservation Commission, U.S. Geological Survey, Bureau of Reclamation, U.S. Army Corps of Engineers and other appropriate state and federal environmental and natural resource agencies to investigate options -- including possible use of the Internet system -- to create, fund and manage a coordinated water resource computer network and data bank that is compatible with the state Geographic Information System. This committee should also coordinate public education efforts related to availability and accessibility of water resource data.

Reference Code	Abbreviated Recommendation	Full Recommendation
1995.11.2.1	Restrict water well measurement network to wells with good data	The Oklahoma Water Resources Board and U.S. Geological Survey should: <ul style="list-style-type: none"> <li>-• update and restrict the state water well measurement network to those with known, reliable information on construction history, depth of completion and location;</li> <li>-• re-evaluate the distribution of wells included in the network and refine the network accordingly;</li> <li>•- refine measurement procedures to improve accuracy of the well measurement program, such as testing selected wells periodically to determine their response to water level changes; and</li> <li>-• ensure that all water well measurement information is readily available and published on a regular basis.</li> </ul>
1995.9.1.2	Enact a State Emergency Disaster Response and Recovery Act	The State Legislature should consider enactment of: <ul style="list-style-type: none"> <li>•- a state Emergency Disaster Response and Recovery Act to facilitate state response to major flooding and other natural disasters; and</li> <li>-• legislation to mitigate the effects of stormwater diversion projects on the regulatory floodplain, including damages to adjacent property resulting from diverted runoff.</li> </ul>
1995.9.1.3	Enact legislation to mitigate stormwater diversion impacts on adjacent land	The OWRB and Office of Civil Emergency Management should encourage Oklahoma communities to: <ul style="list-style-type: none"> <li>•- develop and maintain a priority list of eligible hazard mitigation projects;</li> <li>•- participate in pre-disaster planning efforts;</li> <li>•- create a training program, with state assistance, for community officials to educate their residents on flood disaster preparedness;</li> <li>•- develop local stormwater management plans;</li> <li>•- strengthen enforcement of local ordinances;</li> <li>•- develop and implement responsible flood alert systems; and</li> <li>•- consider, where possible, enactment of ordinances requiring an appropriate increase in local base-flood elevations.</li> </ul>
1995.9.1.1	Unified statewide flood control plan	The Oklahoma Water Resources Board and State Office of Civil Emergency Management should establish a committee -- including representatives of the Oklahoma Conservation Commission, Oklahoma Department of Environmental Quality, Office of the State Secretary of Environment and other appropriate agencies -- to consider the need for a unified statewide flood control plan that addresses such issues as National Flood Insurance Program community participation, Community Rating System participation, flood hazard mitigation, dam safety, floodplain mapping, wetlands protection, and related floodplain protection/preservation measures.

Reference Code	Abbreviated Recommendation	Full Recommendation
1995.10.3.1	Rely on interstate stream compacts to address problems	The State of Oklahoma should continue to utilize interstate stream compacts as a major vehicle to address and resolve interstate stream water problems with neighboring states. Specifically, the Oklahoma Water Resources Board should: <ul style="list-style-type: none"> <li>-• review the provisions of each of the four interstate stream compacts to ensure that they sufficiently respond to Oklahoma's water resource needs;</li> <li>-• explore the potential for addressing interstate environmental and water quality issues, including project construction, under the compacts; and</li> <li>-• propose necessary changes in the compacts to the appropriate state and federal legislative bodies.</li> </ul>
1995.10.3.2	Review current interstate stream compacts and propose updates	The State of Oklahoma should cooperate with neighboring states to investigate establishment of interstate groundwater compacts to resolve potential future disputes involving shared groundwater resources.
1995.10.2.1	Greater control of water resources by locals	The Oklahoma Water Resources Board should facilitate creation of a task force of citizens and appropriate agencies to reassess state, federal and local roles in water resource management to identify areas which could facilitate greater control of water resources by local entities and increased local input into state administration of Oklahoma's stream and groundwaters.
1995.10.2.2	Task force assessment of water programs	The State Secretary of Environment should form a citizens-based task force to assess the relative value and effectiveness of state and federal water quality and quantity management programs.
1995.10.1.1	Dispute resolution Training for state agencies	The Oklahoma Office of Personnel Management should develop and offer training in dispute resolution to all Environment Cabinet agencies.
1995.10.1.2	Identify impediments to dispute resolution techniques	The Office of the Secretary of Environment should: <ul style="list-style-type: none"> <li>•- evaluate the Administrative Procedures Act and other applicable Oklahoma laws to identify any impediments to the use of dispute resolution techniques in resolving water resource disputes; and</li> <li>•- direct all agencies under the Environment Cabinet to promulgate rules of procedure for alternative dispute resolution methods in their respective areas of jurisdiction.</li> </ul>

Reference Code	Abbreviated Recommendation	Full Recommendation
1995.8.1.2	Mechanism to implement modified system operating plans and dispute resolution	The OWRB, Corps of Engineers, Bureau of Reclamation, Natural Resources Conservation Service and other appropriate federal, state and local entities should develop a mechanism -- such as creation of advisory committees, consisting of representatives of appropriate water uses, or development of agency memorandums of understanding -- to facilitate the implementation of modified system operating plans, where needed, and address disputes related to reservoir operations.
1995.4.1.4	Non-consumptive use management and administration	The OWRB, Corps of Engineers and other appropriate state and federal agencies should study the potential for establishing a system to manage and administer important non-consumptive water uses, such as navigation, fish and wildlife and recreation. Consideration should be given to obtaining water rights or storage and entering into memoranda of agreement for these uses.
1995.4.1.2	Participation in the floodplain Hazard Mitigation Grant Program	Oklahoma communities should participate in floodplain management and flood prevention opportunities offered under the Hazard Mitigation Grant Program, including channel improvements, construction of dikes and other diversion structures, acquisition/relocation projects, and the return of land to the floodplain and/or its natural state.
1995.4.1.3	Reallocation of reservoir storage based on original costs	The Oklahoma Congressional Delegation should amend the Water Resources Development Act of 1986 so that reallocation of storage is based on original construction costs, as provided in the Water Supply Act of 1958.
1995.4.1.1	Reservoir operation re-evaluation	The Oklahoma Water Resources Board, Corps of Engineers, Bureau of Reclamation, Natural Resources Conservation Service and other appropriate federal, state and local entities, should initiate a cooperative effort to improve and enhance the various benefits of state reservoirs through: <ul style="list-style-type: none"> <li>-• evaluation of individual project operations in basins throughout the state to identify where system operating plans could be implemented or existing plans improved; and</li> <li>•- pursuit of cost-effective opportunities for storage reallocation in existing projects.</li> </ul>
1995.4.2.1	Identify candidate reservoirs for physical modification	The Oklahoma Water Resources Board, Corps of Engineers, Bureau of Reclamation, Natural Resources Conservation Service and other appropriate federal, state and local entities should undertake appropriate studies -- including preliminary cost/benefit estimates -- to identify potential reservoir candidates for physical modification.
1995.4.2.2	Support construction of Montgomery Point Lock and Dam	The OWRB, Oklahoma Department of Transportation, State Legislature and Oklahoma's Congressional Delegation should continue to support construction of Montgomery Point Lock and Dam by the U.S. Army Corps of Engineers with a scheduled completion date of September 2001.

Reference Code	Abbreviated Recommendation	Full Recommendation
1995.3.2.2	CDBGs prioritize water projects that address health and welfare issues	The Oklahoma Department of Commerce should ensure that the Community Development Block Grant program continues to provide priority funding to water and wastewater projects that pose a serious or immediate threat to the health or welfare of citizens.
1995.3.2.3	Fed funding and flexibility for Clean Water Act mandates	Oklahoma's Congressional Delegation should encourage the federal government to establish funding levels sufficient to satisfy upcoming Clean Water Act mandates and provide states with the maximum flexibility possible to administer state Revolving Fund programs.
1995.3.2.1	Increase SWDRF to meet water development needs	The State Legislature should capitalize the Statewide Water Development Revolving Fund to a level that enables the Fund to meet Oklahoma's annual recurring water development needs.
1995.3.1.2	Financial incentives for local involvement in regional planning	The Oklahoma Water Resources Board and State Department of Commerce should identify and implement incentives through which state financial assistance programs can encourage local interest and cooperation in regional planning projects.
1995.3.1.1	Increase SWDRF to provide for higher quality infrastructure	The State Legislature should capitalize the Statewide Water Development Revolving Fund to a level that will help ensure a continuing source of funding for water/wastewater system projects which will result in a higher quality infrastructure system for economic development and environmental protection activities.
1995.3.1.4	Promote private/public partnerships to reduce costs	The OWRB, Department of Environment Quality, State Department of Commerce and other appropriate state and federal environmental/financing agencies should initiate a cooperative effort to promote privatization opportunities and assist in establishment of private/public partnerships, where appropriate, that will minimize regulation and result in decreased costs for governmental services.
1995.3.1.3	Technical assistance to promote regionalization of treatment systems	The OWRB and State Department of Environmental Quality -- in cooperation with the Oklahoma Municipal League, Oklahoma Rural Water Association and other appropriate agencies and organizations -- should develop a coordinated technical assistance strategy to promote interest in regionalization among local water/wastewater systems and encourage cooperation among potential regional entities. The strategy should define appropriate state, local and federal roles in regional water system planning -- establishing the state as a facilitator of regional planning activities and as the primary source of information (especially through the updated Oklahoma Rural Water Survey and local needs assessments) on municipal and rural water/wastewater systems -- and emphasize improved education of local water system decision-makers.

Reference Code	Abbreviated Recommendation	Full Recommendation
1995.7.2.1	Public education regarding Oklahoma Leak Detection Program	The Oklahoma Water Resources Board and Oklahoma Rural Water Association should facilitate public education efforts to encourage participation in the Oklahoma Leak Detection Program by rural communities and water districts.
1995.7.1.3	Enforce conservation measures to prevent waste	The OWRB should, within current statutory guidelines and accounting for the inherent inefficiencies associated with the various types of water systems, provide for the proper enforcement of conservation measures where excessive waste takes place through leaks, evaporation or other problems occurring during the use and distribution of permitted water.
1995.7.1.5	Incentivize individual water systems conservation plans	The OWRB, Rural Development, Oklahoma Department of Commerce, Indian Health Service and other appropriate funding entities should consider incorporating incentives for development of individual water system conservation plans into their requirements for water/wastewater project financial assistance.
1995.7.1.6	Price structuring that encourages conservation	The OWRB should continue to promote information among water suppliers regarding price structuring options, including the increasing block rate structure, that promote conservation while recognizing the socioeconomic requirements of Oklahoma communities. This effort should be expanded to include improved public education regarding the factors that determine the “true” cost of water (i.e., costs associated with delivery, treatment, etc.).
1995.7.1.4	State water conservation plan	The State Secretary of Environment should appoint a task force of appropriate state agencies to develop a state water conservation plan that incorporates all aspects of public, agricultural and industrial water use. The plan should identify educational opportunities as well as potential incentives to encourage conservation.
1995.7.1.6	Technical assistance to industries regarding conservation measures	The OWRB and other appropriate state agencies should study establishment of a technical assistance program to assist industries in implementing water conservation measures.

Reference Code	Abbreviated Recommendation	Full Recommendation
1995.7.1.1	Water conservation programs	<p>The State Legislature should promote statewide water conservation by:</p> <ul style="list-style-type: none"> <li>-• encouraging cities, water supply districts and other entities to develop and implement water conservation programs that include the addition of water-saving plumbing fixtures and household appliances in new construction and as replacements for existing fixtures;</li> <li>-• incorporating water conservation policy goals into all appropriate activities and programs of state government;</li> <li>- all agencies responsible for constructing, leasing, or maintaining state facilities and property should be directed to use water-conserving plumbing fixtures and devices, water efficient landscape practices and other programs to maximize water use efficiency; and</li> <li>-• providing appropriate funding to affected state agencies to retrofit existing state facilities with water conserving devices.</li> </ul>
1995.7.1.2	Water conservation programs	<p>The Governor and State Legislature should create a permanent funding source to allow continuation of the Oklahoma Leak Detection Program.</p>
1995.5.3.1	Identify barriers to and facilitate water marketing	<p>The State Legislature and Oklahoma Water Resources Board should review existing water statutes and identify barriers to water marketing and measures that could be instituted to better facilitate voluntary water marketing and transfers and protect affected parties, including negotiations with the federal government to avoid purchasing reservoir storage at updated costs.</p>
1995.5.3.2	State water marketing and transfer policy	<p>The OWRB should develop a state water marketing and transfer policy, including guidelines to accomplish individual marketing projects. The policy should strongly consider problems and issues identified by the OWRB in its effort to lease surplus Kiamichi River Basin water, including:</p> <ul style="list-style-type: none"> <li>•- satisfying, to the greatest extent possible, public concerns on mitigating potential impacts on local economic development;</li> <li>-• protecting the most locally important uses of the transferred water; and</li> <li>-• providing compensation, such as payments in lieu of ad valorem taxes (existing statutes provide for this form of restitution), to the area of origin.</li> </ul>
1995.5.2.1	State water bank	<p>The OWRB should study the feasibility of creating a state water bank to:</p> <ul style="list-style-type: none"> <li>-• locate and purchase sources of available or surplus water rights and storage;</li> <li>-• evaluate all opportunities for water importation and transfer;</li> <li>•- coordinate the sale and/or loan of available supplies and water rights to prospective customers, including transfers through the establishment of regional systems; and</li> <li>-• coordinate efforts to educate the public on water transactions.</li> </ul>

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1995.5.1.3	Identify and utilize untapped water sources	The OWRB should identify and investigate methods to utilize untapped sources of usable water in Oklahoma through: <ul style="list-style-type: none"> <li>•- development of system operating plans;</li> <li>•- reallocation of reservoir storage;</li> <li>•- utilization of sediment storage;</li> <li>•- administrative actions, such as the cancellation and reduction of unused water rights;</li> <li>•- greater consideration of reservoir storage yield that will vary according to proposed use in the receiving area; and</li> <li>•- consideration of additional reservoir project construction.</li> </ul>
1995.2.1.1	Aquifer classification based on vulnerability to contamination	The Oklahoma Water Resources Board should initiate studies to establish individual aquifer classifications based upon each aquifers vulnerability to contamination.
1995.2.1.5	Communities relying on groundwater participate in groundwater protection programs	Appropriate state environmental and natural resource agencies should encourage state communities utilizing groundwater as a major water supply source to participate in voluntary state programs to protect local groundwater supplies.
1995.2.1.4	Comprehensive water quality and quantity data collection program	The OWRB should coordinate efforts of appropriate state and federal environmental and natural resource agencies, universities and organizations to establish a comprehensive state water quantity and quality data collection program to monitor the condition of Oklahoma's stream and groundwater resources.
1995.2.1.2	Groundwater utilization plan including priorities and property rights protection	Appropriate state environmental and natural resource agencies should adopt and implement a flexible, comprehensive state groundwater utilization plan that: <ul style="list-style-type: none"> <li>-• prioritizes groundwater protection/utilization programs and activities; and</li> <li>•- avoids regulations which unduly infringe upon individual property rights while protecting legitimate public interests.</li> </ul>
1995.2.1.3	Risk assessment for groundwater protection & cleanup	Appropriate state environmental and natural resource agencies should evaluate the use of risk assessment methodology as a groundwater protection and cleanup tool.



Reference Code	Abbreviated Recommendation	Full Recommendation
1995.2.2.1	Groundwater quality standards	<p>The Oklahoma Water Resources Board, through the Water Quality Standards process, should further develop &amp; upgrade Oklahoma's groundwater quality standards as both a protection and cleanup tool. Consideration should be given to:</p> <ul style="list-style-type: none"> <li>-• development and implementation of numeric groundwater quality standards;</li> <li>-• development of a narrative standards statement prohibiting discharges of pollutants which result in contamination that could impair human health;</li> <li>-• use of risk assessment methodology;</li> <li>-• development and implementation of realistic, site-specific cleanup criteria to guide remediation of polluted groundwaters;</li> <li>-• further development of the groundwater classification system through adoption of a vulnerability mapping program utilizing DRASTIC or other appropriate methodology;</li> <li>-• creation of an organizational framework allowing the OWRB to separately administer stream and groundwater quality standards;</li> <li>-• the quality/quantity relationship and interaction between stream and groundwater resources; and</li> <li>-• adoption of a specific groundwater protection policy statement that indicates what type of protection (i.e., non-degradation, limited degradation and differential protection policy statements) the state will implement or achieve.</li> </ul>
1995.2.3.1	Nonpoint source pollution management practices	<p>The State Secretary of Environment should:</p> <ul style="list-style-type: none"> <li>-• encourage implementation of innovative nonpoint source reduction and management practices while also stressing use of proven measures;</li> <li>-• assure that state programs incorporate an adequate level of watershed planning, best management practice design, water quality monitoring and assessment of progress;</li> <li>-• assure that state projects are focused on identified nonpoint source priority areas;</li> <li>-• study implementation of a comprehensive state program that accentuates voluntary nonpoint source control measures through development and implementation of appropriate management plans for operations which manage nonpoint pollution sources; and</li> <li>-• encourage development of technical assistance programs that promote establishment of pollution prevention plans by landowners.</li> </ul>
1995.2.4.3	Continue refinement of TMDLs	Oklahoma's Congressional Delegation should encourage the federal government to continue refinement of the Total Maximum Daily Loads concept.
1995.2.4.4	Field validation of discharge permits	Oklahoma's Congressional Delegation should encourage the federal government to• require water quality standards implementation procedures that consider not only criteria and permit development, but also field validation of discharge permits which protect human health and aquatic life.

Reference Code	Abbreviated Recommendation	Full Recommendation
1995.2.4.1	Stream water quality standards	<p>The Oklahoma Water Resources Board should:</p> <ul style="list-style-type: none"> <li>•- increase efforts to implement water quality standards, especially biological criteria and total maximum daily loads, on a watershed basis, including additional protection for Outstanding Resource Waters; and</li> <li>•- utilize the input of appropriate environmental and natural resource agencies to evaluate the use of risk assessment methodology as a water resource protection and cleanup tool.</li> </ul>
1995.2.4.2	Water quality standards at the state not federal level	<p>Oklahoma's Congressional Delegation should encourage the federal government to limit federally mandated actions and promote promulgation of water quality standards by individual states to allow states greater flexibility in addressing state-identified priorities and regional and/or local standards issues.</p>
1995.8.1.1	Planning and management based on watershed boundaries	<p>All appropriate state and federal water resource agencies should develop and implement watershed planning and management strategies by:</p> <ul style="list-style-type: none"> <li>•- delineating uniform, manageable watershed planning boundaries, such as those currently recognized by the U.S. Geological Survey, that incorporate distinct hydrologic units of both stream and groundwater resources;</li> <li>-• identifying and incorporating methodologies that facilitate the evolution of local, state and federal water resource programs to a watershed management approach;</li> <li>-•• studying creation of local watershed management organizations for problem-solving and issue resolution; and</li> <li>•-• coordinating implementation of Geographical Information System technology at the local, state and federal level.</li> </ul>
1995.8.2.1	State Water Resource Drought Coordinator	<p>The Secretary of Environment should appoint a State Water Resource Drought Coordinator to coordinate federal, state and local drought response efforts in Oklahoma. The State Drought Coordinator should be charged with developing a comprehensive drought preparedness plan for mitigating the effects of drought episodes in Oklahoma. Such an effort should include the investigation of:</p> <ul style="list-style-type: none"> <li>•- a monitoring/early warning system -- including the development and implementation of drought indices that signal the onset and/or varying stages of drought -- to provide information about the timing and severity of drought episodes;</li> <li>-• techniques to assess the probable impacts of prospective drought episodes;</li> <li>-• approaches to coordinating governmental activities including information exchange and drought declaration/ revocation criteria and procedures;</li> <li>-• assistance programs with pre-determined eligibility and implementation criteria;</li> <li>-• financial/research resources needed to implement drought assessment and response activities; and</li> <li>-• educational programs designed to promote drought mitigation/ preparedness among the economic sectors most impacted by drought.</li> </ul>

Reference Code	Abbreviated Recommendation	Full Recommendation
1995.8.4.3	Improved agency coordination during assessment of water project impacts on T&E sp.	The Oklahoma Department of Wildlife Conservation and other appropriate state and federal environmental and natural resource agencies should improve coordination, during the planning stages, in assessing the effect of existing and potential water resource development on the state's endangered and threatened species. This effort should include identification of the status of rare, threatened and endangered species in proposed project areas and development of measures to avoid potential adverse impacts.
1995.8.4.1	Increased public involvement in the Endangered Species Act	Appropriate state and federal environmental and natural resource agencies should facilitate increased public involvement in the Endangered Species Act administration and decision-making process.
1995.8.4.2	Water quality standards revisions balance protection of T&E spp. and economy	The Oklahoma Water Resources Board should ensure that future state water quality standards revisions consider the comments and policies of other state and federal environmental and natural resource agencies to achieve a reasonable and environmentally-sensitive balance between protection of endangered and threatened species, economic concerns, consumptive water uses and related considerations.
1995.8.3.1	Comprehensive wetlands protection and management strategy	State and federal environmental and natural resource agencies should continue efforts to develop a state comprehensive wetlands protection and management strategy that includes: <ul style="list-style-type: none"> <li>•• defining wetlands;</li> <li>•• designating beneficial uses of wetlands;</li> <li>•• identifying and inventorying wetlands within Oklahoma;</li> <li>•• identifying measures to mitigate losses of wetlands, protect wetlands and manage them on a watershed or hydrologic unit basis;</li> <li>•• developing standards for critical wetlands;</li> <li>•• recommending measures to ensure the protection of landowner property rights while protecting legitimate public interests; and</li> <li>•• defining the roles of appropriate state agencies in wetlands protection and management.</li> </ul>
1995.1.4.2	Complete and update hydrologic surveys	The OWRB should complete and provide for continuous update of hydrologic surveys to accurately determine the amount of water available in Oklahoma's rivers and streams.

Reference Code	Abbreviated Recommendation	Full Recommendation
1995.1.4.1	Identify and quantify impacts of groundwater stream water interaction	The Oklahoma Water Resources Board should: <ul style="list-style-type: none"> <li>-• identify and quantify impacts that can result from the interaction between groundwaters and stream waters, especially the quality and quantity effects of groundwater withdrawal on stream water base flow;</li> <li>-• identify the potential benefits of the joint management and conjunctive use of state stream and groundwater supplies and develop potential management schemes which consider opportunities for watershed planning; and</li> <li>-• identify specific areas or watersheds/basins that could potentially benefit from conjunctive management and promote the formation of local advisory committees to guide management programs.</li> </ul>
1995.1.2.1	Instream flow protection for scenic rivers	The Oklahoma Water Resources Board should work with other appropriate state and federal environmental and natural resource agencies to develop an implementation strategy that provides instream flow protection for the state's designated scenic rivers.
1995.1.2.2	Manage reservoir releases to protect downstream aquatic life and recreation	The OWRB and Oklahoma Department of Wildlife Conservation should work with the U.S. Army Corps of Engineers, Bureau of Reclamation and Grand River Dam Authority to ensure that existing and modified reservoir releases are managed to provide dissolved oxygen concentrations that maintain or improve downstream conditions for aquatic life and recreation.
1995.1.3.2	Appointment of Indian reps to appropriate state boards	The State Legislature should consider appointing qualified Indian representatives to appropriate boards, commissions and other governing bodies of the State of Oklahoma.
1995.1.3.1	Permanent Committee to address Indian water rights issues	The Oklahoma Water Resources Board should request the Oklahoma Water Law Advisory Committee and selected tribal representatives to explore Indian water rights and quality issues in Oklahoma. Specifically, the group should: <ul style="list-style-type: none"> <li>-• study formation of a permanent committee consisting of local, state, federal and Indian representatives to address appropriate water rights issues;</li> <li>•- develop a mutually acceptable negotiation system or process to fairly resolve current and future water rights issues; and</li> <li>•- identify water resource projects warranting cooperative action.</li> </ul>
1995.1.1.4	Administrative fines for permit violations	The Oklahoma Water Law Advisory Committee should explore potential OWRB rule revisions and/or statutory amendments that would provide for <ul style="list-style-type: none"> <li>• assessment of administrative fines for flagrant or repeated violations of permit limits.</li> </ul>

Reference Code	Abbreviated Recommendation	Full Recommendation
1995.1.1.5	Checks on accuracy of water use reports	The OWRB should implement a system to periodically check the accuracy of reported water use and consider the implementation of requirements to emphasize accountability for water, perhaps through threat of perjury (including potential development of affidavit report forms) or initiation of water use metering for right holders who knowingly falsify or consistently fail to file reports of water use.
1995.1.1.6	Education of permit holders on use and conservation	The OWRB should improve education of permit holders regarding water use and conservation through agency sponsored public workshops and related efforts involving direct interaction with the public.
1995.1.1.3	More realistic and fair determinations of "beneficial use" and "present or future need"	The Oklahoma Water Law Advisory Committee should explore potential OWRB rule revisions and/or statutory amendments that would provide for• more realistic and fair determinations of “beneficial use” and “present or future need” in cases of water rights adjudications.
1995.1.1.1	Permit suspension period for marketing rights	The Oklahoma Water Resources Board should, within current statutory guidelines, seek to emphasize conservation and efficient use of stream water resources through improvement of the current system of water rights forfeiture/reduction and schedule of use. The OWRB should consider: <ul style="list-style-type: none"> <li>•- allowances for a permit suspension period, rather than actual cancellation of water rights, if a concerted effort is demonstrated to market the rights;</li> <li>•- forfeiture exemptions for conserved water, perhaps through allowing water users to use, sell or lease the water they conserve;</li> <li>•- establishment of more stringent limitations on the state's schedule of use provision, unless a significant investment is made, to prevent delays in putting water to beneficial use; and</li> <li>-• implementation of administrative fines for failure to report water use or falsification of water report forms.</li> </ul>
1995.1.1.2	Permitting that accounts for seasonal availability	The OWRB should study the implementation of a permitting system to account for seasonal changes in water availability, including development of guidelines for seasonal or monthly allocations and withdrawals that could free-up additional sources of water.
1995.6.4.1	No support for Red River Chloride Control Project	Until potential environmental impacts are resolved, Congress should not support full implementation of the Red River Chloride Control Project, as presently designed.

Reference Code	Abbreviated Recommendation	Full Recommendation
1995.6.2.2	Address water rights and quality considerations of artificial recharge	The OWRB, through the Water Law Advisory Committee, should review state water rights and water quality laws to determine what, if any, additional legislation is needed to address the various water rights and quality considerations of artificial recharge.
1995.6.2.1	Identify artificial recharge areas	The Oklahoma Water Resources Board should initiate a comprehensive study to identify additional potential artificial recharge areas in the state, including a detailed assessment of the Blaine Recharge Demonstration Project.
1995.6.3.2	Conservation plans that include return flows and treated effluent	The Oklahoma Water Resources Board should develop measures to encourage water suppliers and individual permit holders to implement conservation/management plans -- including consideration and use of return flows and treated effluent -- to reduce consumptive use of stream and groundwaters.
1995.6.3.1	Guidelines for use of recycled wastewater	The State Department of Health and/or Department of Environmental Quality should take an active role in establishing guidelines for the safe and authorized use of recycled wastewater, identifying programs where reuse should be automatically considered as an alternative, investigating technological opportunities for efficient water reuse and examining the effects of an expanded reuse program which considers the effects of water withdrawals on downstream users.
1995.6.1.1	Cloud seeding demonstration program	The Governor and State Legislature should identify the state's need for (and subsequent role in) a carefully focused, multi-year cloud seeding demonstration program to determine the ultimate utility of weather modification as a water resource management tool.

Reference Code	Abbreviated Recommendation	Full Recommendation
2012.11.1.1	Decision Support System	<p>To ensure supply and demand remain balanced over the long term, technical analyses of water quality and quantity must be conducted, by watershed, on all of the State’s surface and ground waters. The analyses should consider water demand changes in, but not limited to, population growth, industrial growth, agriculture uses and practices, recreation, and tourism and wildlife. A decision support tool should be developed, with proper peer review, to perform these analyses. The tool should be flexible enough to allow decision makers to allocate water efficiently and effectively. It should be able to run varying scenarios incorporating changes in water supply and demand. Examples of scenarios could include retaining additional water within a region, supplementing surface water with groundwater during dry times and then recharging during wet periods, importing water from other regions or out-of-state, increasing the use of treated wastewater, and increasing the use of marginal waters. The tool also should be flexible enough to allow for decreases in demands through conservation, improved efficiencies and technologies, and economic development restrictions. The tool should be used to prioritize the development of infrastructure to meet the demand for present and future use on a regional and statewide basis.</p> <p>The Oklahoma H2O tool appears to meet these objectives. Scientists and economists from diverse fields should ensure that information input into the tool is accurate and that geographic information systems (GIS) is used to link water demand and availability over time and area. Water uses and availability should be monitored to help inform the input data. To keep the output from the Oklahoma H2O tool accurate, periodic review of the input data is necessary. These reviews should be done in-between water plans or when significant change happens. As technology advances, the tool should be updated.</p>
2012.10.3.1	Interstate committees for regional water planning	<p>Oklahoma is planning for its water future by looking at both supply and demand; however, one thing Oklahoma may not be able to predict accurately is how much water flows into the State from other states. Other states have the same concern with how much water Oklahoma lets flow out-of-state through major rivers. While the current system of interstate compacts helps provide a sense of security as to how much water enters and leaves Oklahoma, it does not solve all the problems that can occur when multiple states share water resources. To be proactive in avoiding additional water conflicts and issues, the Oklahoma Water Resources Board should take a facilitative role in discussing the establishment of interstate committees for regional water planning through the State’s existing interstate compacts. These committees should be created under the compacts through a rule-change that would not require Congressional approval. However, if compact states do not agree to conduct joint water planning via the compacts, then the OWRB should encourage the creation of committees outside of the compacts. (For example, a conference could be convened that would bring together either the Governors or key legislators of compact states to discuss regional water planning.) In either case, the states should look at ways to improve deliberations.</p>

Reference Code	Abbreviated Recommendation	Full Recommendation
2012.10.3.2	Surface-groundwater interactions at state borders	The State should explore the establishment of an interstate compact commission that would have the ability to gather data pertaining to surface and groundwater relationships where these waters cross state lines. Oklahoma should enter into compact discussions with other states regarding our shared aquifers.
2012.10.1.1	State creates a Water Conflict Resolution Center	It is unclear how and where water conflicts are settled currently. It can be very expensive when a conflict elevates to the point it has to be settled in court. As water-related conflicts become more frequent and more complex, it will be important for the parties to have easy, low-cost access to conflict resolution services before going to court. To accomplish this, the State should establish a conflict resolution center. The Center should provide the public easily understood information on various water laws. The Center also should provide trained independent mediators. If mediation fails, then administrative hearings, using independent hearing examiners, would be held. The administrative hearing rules of the agency under whose jurisdiction the issue falls would be used. As part of the administrative hearing process, a cost/benefit analysis of the economic impact should be considered for all parties. If the losing party of the administrative hearing is not satisfied, then the option remains to file suit in the appropriate district court.
2012.4.2.2	Increased Water Storage	a) The State and Federal government should work together to rehabilitate existing water supplies and flood control structures to provide additional water storage, irrigation supply, and flood control. b) The State should develop a water banking system to store excess water.
2012.3.3.1	System Interconnections	The State should develop long-term regional plans to ensure adequate supplies of water are available for future needs. An important aspect of any water plan is to ensure that water can get where it is needed when it is needed. For this to be possible, regional water supply systems should be connected and economically feasible transportation systems developed to move excess water to areas of need in times of emergency. A water grid could be developed, possibly using the Grand River Dam Authority as a model. (GRDA supplies electricity throughout central and eastern Oklahoma through a series of transmission lines and two transmission service centers.) Regional agreements should be established to connect water supply systems and manage these transfers, and management plans should be developed to control sharing and environmental issues associated with this movement of water.



Reference Code	Abbreviated Recommendation	Full Recommendation
2012.7.2.4	Education Concerning Conservation and the Value of Water	<p>Citizens need to create a new norm: make conservation effortless because that is the normal way to live. Education can play a large role in getting people to change their behavior and should be targeted towards everyone – young and old.</p> <p>1. Conservation education of the State’s youth should start at a very young age and continue through high school. Summer camps should be developed that provide students, kindergarten through 12th grade, the experience of water usage in the 21st century. The students could experience hauling water to the house, storing and using the water without modern technology. This will increase students’ awareness of the value of water.</p> <p>In addition, the OWRB in conjunction with the Oklahoma Academy of Sciences, Noble Foundation, Kerr Center and others, could support science fairs that promote education about the State’s water resources and award scholarships. Funding for this project could come from fines and penalties levied on water use violations.</p> <p>2. Education programs similar to the EPA’s “WaterSense” program should be used or new programs developed that educate people about the true value of water and the use and misuse of it. This can lead to more efficient use of water and could encourage people to install water efficient fixtures.</p> <p>Three measures to improve water efficiencies are use of environmental quality incentives programs (EQUIP) targeted at large-scale users, implementation of a conservation rate system that charges higher fees for greater use, and provision of discounts for wise use.</p> <p>3. Working with local conservation districts is an avenue to get landowners to practice water conservation. The State, through OSU Cooperative Extension and others, should develop educational materials about conservation methods that include public media such as the Internet, with easy access by consumers. Municipal and rural water providers should include bill inserts that contain information regarding the cost of water use, cost of water waste, and conservation tips. It is important to make sure that water conservation educators, including organizations have the resources, are successful.</p> <p>Education about water capture systems should not be limited to home and business owners but also include local officials through organizations such as the Association of County Commissioners of Oklahoma and the Oklahoma Municipal League.</p> <p>4. Demonstration projects should be developed across the state and funded through an added fee on water bills. One avenue for education through demonstration is at the State Capital. Faucets and toilets should be updated as a first step to show citizens that the State government is committed to conservation.</p> <p>5. As with most changes, education will be essential to success. Education should be implemented through a number of existing entities such as the Conservation Commission, local conservation districts, the OWRB, OWRRI, rural water districts, USDA, Kerr Center for Sustainable Agriculture, and OSU Cooperative Extension. Education should also be offered on the benefits of soil building utilizing compost (made by diverting organic waste from landfills). It should be targeted to everyone including city, county and state officials, children, and agriculture producers.</p> <p>6. Funding for education does not have to come from the State’s budget; it can come through increased water costs especially since water suppliers can easily inform the public about conservation measures. The Oklahoma Conservation Commission through Clean Water Act funds is another option for education funding.</p>

Reference Code	Abbreviated Recommendation	Full Recommendation
2012.7.2.2	Education Coordinator	The Oklahoma Conservation Commission's education coordinator could be the main source for materials and information; however, the coordinator's role should be expanded to include water availability and conservation. Educators from other agencies and entities would also need to be included. Duties should consist of developing core education and communication curricula. The water information office should also promote and conduct continuing education workshops and develop advertisements, websites, email lists and social networks, such as Twitter and Facebook.
2012.8.1.4	Emergency Communication	Informing citizens can be difficult, especially during an emergency. Therefore, Oklahoma could adopt a program similar to Colorado's reverse 911 program. This program should be used to notify and encourage citizens to take appropriate action during an emergency. An Amber Alert-type system using multimedia communications should be established for use by municipalities, television stations, schools and others, keeping in mind that parts of the State receive their news from bordering states.
2012.7.2.1	Water Information Office	The State should establish a water information office to develop and implement a comprehensive education program concerning water availability during shortages, and conservation. Education should be targeted to the public, schools, municipalities, county governments, and rural water districts. The programs administered by the water information office should be reviewed periodically to assure that initial goals are being achieved. Results of these reviews should be reported to the State Legislature. Office operations could be funded from a voluntary check-off option on water bills.

Reference Code	Abbreviated Recommendation	Full Recommendation
2012.7.1.3	Adaptive Crop Selection and Xeriscaping	<p>The State should promote beneficial uses of stormwater runoff. For example, stormwater runoff can be collected and used for non-potable uses for both municipal and industrial entities. In addition, reducing stormwater runoff through landscaping, rainwater capture, and implementation of best management practices will decrease water pollution. Municipalities can return water to the soil by allowing the water to percolate through covered surfaces. To promote changing how communities manage runoff, incentives should be developed through various local funding sources. Also, enforcement may be required to ensure communities begin using runoff controls.</p> <p>a) Proper land management can result in efficient use of water. The State should encourage matching the use of the land to the various soil types, landscapes, and climate of the area for more efficient use of water. Some government policies encourage overuse of water by subsidizing the growth of crops not sustained by the natural weather conditions of an area. These subsidies could be discontinued to promote change and encourage crop selection that is adapted to natural weather conditions. While this may seem controversial, it will be acceptable if subsidies are replaced with education.</p> <p>b) Home and business owners should utilize water efficient plants when landscaping. This practice is commonly referred to as xeriscaping and should be encouraged by the State and local governments. Incentives such as tax credits should be offered for changing landscaping from one that requires a large amount of water to one that is more native and adapted to the climate.</p> <p>c) The continued promotion of no-till farming is important as it helps promote soil building and minimizes negative impacts on streams. While education and incentives are currently provided that encourage no-till farming, more research should be conducted to make no-till more successful for agriculture producers. The research should focus on ways to reduce chemical applications to protect water quality.</p> <p>d) Research funds should be made available to universities and private companies to identify and promote the growth of drought resistant crops. The information should be made available to families, independent growers, and small diverse agriculture producers – not just large-scale producers.</p>
2012.7.1.7	Agricultural Reuse	<p>Agriculture and agribusiness is another area where treated waste or gray water can be used. Agribusiness can maximize the secondary use of water by recharging groundwater with treated clean effluent, or collecting water and then reusing it for all types of irrigation (not just crops). This can be encouraged through tax credits.</p>
2012.7.1.14	Evaluation of Water Conservation Measures	<p>No matter what water conservation practices are adopted, research should be conducted to evaluate the outcomes of what conservation programs. The findings should be communicated to the public and State officials. Also, conservation measures and information should remain current; new resources should be researched.</p>

Reference Code	Abbreviated Recommendation	Full Recommendation
2012.7.1.12	Incentivize Conservation	People are resistant to change. To get them to act, incentives should be used. Monetary incentives can be designed as either tax credits to make plumbing more conservation friendly, or incremental increases to water rates to nudge water users and public water suppliers to comply with water conservation requirements. However, other types of incentives can result in success as well. For example, recognizing those who act as “good” citizens can encourage a change in behavior. The incentive can be as simple as identifying the most water efficient lawn of the month.
2012.7.1.8	Infrastructure Maintenance	Leaky pipes and fixtures result in a large amount of water loss. These leaks happen not only in homes and business but in the infrastructure designed to deliver water. Repair and update of water infrastructure is important and funding should be provided to small communities that cannot afford to make the necessary repairs. Funding should be made available for them to purchase equipment to monitor their systems to avoid additional water losses. Citizens should be educated on the cost of water lost through leaks. Assistance should be provided to low-income water users to fix leaky pipes and fixtures. Transferring water through open, unlined ditches can result in water loss through seepage and evaporation. Water users who use this type of water conveyance system should update their systems to reduce water loss.
2012.7.1.5	Local Food Promotion	Growing local food (food that is adapted to the region) uses less water and thus conserves resources for other needs. The sale of local foods could be promoted through farmer’s markets, farm-to-school programs, and local grocery retailers.
2012.7.1.2	Management of Stormwater Runoff- Green Roofs	a) A green roof is one that is partially or completely covered with soil or other growth medium, vegetation, and drainage system. Green roofs have many benefits including reducing stormwater runoff and filtering pollutants and heavy metals out of rainwater. b) Constructed rainwater capture systems such as cisterns provide water for non-potable uses like irrigation, laundry, and toilets – as well as drinking water, if filtered. Captured water could also be used to recharge groundwater. Water capture should be done only on a local scale; large-scale water capture projects could affect water stream flows and impoundment storage. Review of and changes to building codes may be required.
2012.7.1.2	Management of Stormwater Runoff- Soil Amendments	c) Soil can also be used as a water capture system. If soil is properly managed, it can hold water to allow for infiltration. Ways to help the soil retain more moisture include adding organic matter (through composting and/or cover cropping), terracing and other land contouring, and sculpting city lots to reduce or prevent runoff. Better management of concrete and street surfaces should be done by using permeable surfaces to allow lawn-watering runoff and pool drainage to seep into the soil instead of running down the street.

Reference Code	Abbreviated Recommendation	Full Recommendation
2012.7.1.4	Municipal Irrigation Regulation	Some local governments are implementing a permitting program for citizen water systems such as lawn irrigation systems. This program should be encouraged and continued. Local governments should also require soil moisture monitoring through a program like the Mesonet’s Simple Irrigation Plan (SIP) program to help ensure that watering is based upon soil moisture needs. Further, local governments should mandate that citizens be allowed only to water between dusk and dawn to reduce evaporation.
2012.7.1.6	Urban Water Reuse	<p>Water can be used efficiently in several ways. Using water multiple times prior to discharge maximizes the use of the water and conserves fresh water sources. The State should encourage the increased use of treated wastewater and gray water. To encourage this:</p> <ol style="list-style-type: none"> <li>1. State and city codes should be reviewed and updated. Education of city officials on new technologies and reuse possibilities should be done.</li> <li>2. Municipalities should use treated wastewater to water municipal properties such as parks and golf courses.</li> <li>3. Water reuse should be encouraged in the industrial and business sectors through the use of reclaimed water in landscape irrigation, cooling systems, and car washes.</li> <li>4. Cities should encourage businesses and industries to reuse water by implementing a rate structure that bases charges on the amount of wastewater generated above what is considered normal for that particular industry or business.</li> <li>5. Neighborhoods should be retrofitted with a purple pipe network (purple pipes are the standard pipe used to designate recycled water) to increase gray and treated wastewater use.</li> <li>6. Promote personal reuse by encouraging re-piping of homes to use gray water for outdoor non-potable use and for toilet flushing.</li> <li>7. Incentives, such as tax credits, should be made available to improve conservation infrastructure. For example, existing buildings should be retrofitted incrementally, beginning with installation of low flow faucets. This should be done before regulated changes are mandated. Water savings should be monitored by determining the amount of water that should be used and then metering to ensure the targeted amount is not exceeded. New buildings should be required to have water recycling/reuse systems. This should be encouraged not only through tax credits but also through a cost-sharing program to make reuse more feasible (information on the cost savings of recycled versus potable water for all uses should be provided). Changes in infrastructure could allow one business to use the treated wastewater/gray water of another business and then return the water to its source for use downstream.</li> </ol>
2012.7.1.1	Water Capture Systems	Water capture is a form of water conservation that reduces the impact of water use and allows for the use of non-potable water where appropriate. Three ways to capture rainwater are the installation of green roofs, constructed rainwater capture systems, and soil infiltration.

Reference Code	Abbreviated Recommendation	Full Recommendation
2012.7.1.13	Water Pricing	To encourage further the efficient use of water, realistic pricing should be instituted. Most water suppliers do not charge for the actual value of the water they deliver. The State should mandate and then enforce public water suppliers to develop a realistic pricing structure. State funding for improvement projects should be tied to the mandate to help with enforcement. Education and outreach to customers should be done so they understand why water rates are rising.
2012.7.1.9	Well Metering	Since most wells are not currently monitored, the State does not have accurate records of water use and therefore cannot accurately estimate water supply. To remedy this, the State should monitor water use and supply; meters should be installed on all wells, both domestic and non-domestic. Metering will promote honesty and efficiency in water usage. Implementation of a well metering program should be phased-in. Meters must be installed anytime property changes ownership, otherwise owners could have between five and ten years to install a meter. The program could be funded through rates and fees paid by end users.
2012.2.5.1	BMP Czar	A statewide coordinator (“czar” type position) should be established with sufficient authority to encourage collaborative, comprehensive planning and avoid duplication of efforts in implementing best management practices. To achieve this, the coordinator should work with watershed coalitions and appropriate state agency personnel, which may include cabinet level secretaries, to coordinate best management practices and facilitate the work of the state agencies to address the issues and recommendations from the coalitions. Watershed coalitions should submit their action plans and annual reports to the coordinator for dissemination to the appropriate agencies.
2012.2.5.1	Minimum BMP for development and education	City and county governments should be authorized to develop, implement and enforce land use practices based on a set of statewide minimum standards for development best management practices. The standards should be centered on appropriate outcomes, which can provide a baseline from which to establish regulations and develop education programs for builders and other land users. Implementation of BMPs may include incentives, enforcement provisions, and education through training programs. The education programs should cover sedimentation, pollution, and related areas to be developed by agencies and organizations such as EPA, ODEQ, OWRB, OSU, NRCS, and Corps of Engineers.
2012.8.6.1	Coordinating committee plans transition to single agency	All of the duties outlined in the coordination approach should be carried out with one additional duty: the coordination committee should plan the transition to a single consolidated agency.
2012.8.6.4	Single agency develops stakeholder groups	The agency should facilitate the development of regional stakeholder-based groups.

Reference Code	Abbreviated Recommendation	Full Recommendation
2012.8.6.3	Single agency improves customer service	The agency should provide more convenient customer service. It is important that regional offices with regulation and enforcement capabilities be maintained to keep a local presence. The agency should also develop a website that provides easy access to forms, information and eventually allows applications to be filed online.
2012.8.6.2	Single agency rewrites rules	Water agencies' rules should be reviewed and possibly rewritten by the single agency.
2012.8.1.1	Basin (intergovernmental) advisory committees	<p>The State should create basin (intergovernmental) advisory committees that funnel water issues of concern to those basin governmental entities and recommendations to the OWRB, the Governor, and the Legislature. The advisory committees should be comprised of representatives from State, municipal, county, and tribal governments – as appointed by their respective governing bodies. Federal agency representatives may be asked to serve on the committees, as appropriate, as ex officio representatives. The advisory committees could be based on either the 13 established basins or the 5 OWRB field areas.</p> <p>A three-level arrangement of advisory groups should be established: local, regional, and statewide. Membership on these groups should include, but not be limited to, representatives from local organizations, tribal nations, industry, municipalities, rural water districts, tourism, recreation and individuals based on watersheds, aquifers, or both. These groups should be grassroots driven and all inclusive.</p> <p>Local groups should be established initially. One or more local organizations should be identified that could serve as host to provide administrative support. These local groups should then select representatives to serve on regional groups based on 13 major watersheds in Oklahoma. Citizens selected for the 13 regional groups should be representative of stakeholders in the area, and some, if not all, should be elected to prevent the process from being politically hijacked. Finally, a State advisory board should be formed with representatives selected by the regional watershed groups. The diagram below depicts the three-level arrangement.</p> <p>The groups should serve various roles. One role should be to formulate policy advice, funneled through the state group, to the State government on water issues such as water use permits, land use practices, water planning, and water quality protection. Another role, especially of local groups, should be to make decisions to resolve zoning and planning conflicts with an appeals process to the appropriate adjudicative agency. Regional conflicts and trans-local water issues such as infrastructure and water sales and transfers could be mitigated using the regional groups, working through the state group, with the appropriate State agencies or regulatory authorities. A third role should be to participate in educational programs to keep citizens informed about water issues, encourage conservation, and help land users employ best management practices to reduce pollution.</p>

Reference Code	Abbreviated Recommendation	Full Recommendation
2012.8.1.4	Coordinated Planning Policy	The State should encourage public policy that incentivizes and funds planning assistance, technical assistance, and regional cooperation. The goal of the policy should be to encourage conservation, reduce inefficiencies, prevent duplications, and eliminate inconsistent government. Planning should also provide consistency to meet current and future needs for population growth and economic development. The policy should provide opportunity for water providers, users and other entities to develop cooperatively their own water resources to prepare and adapt for the future.
2012.8.1.3	Incentives for Regional Cooperation in Conservation and Storage	Incentives and rules should support “organic” associations (bottom-up) built on mutual interest to develop coordinated, cost-efficient water management. Lending and granting agencies should coordinate to avoid funding at cross-purposes. The OWRB should facilitate and incentivize regional cooperation for building water storage and encouraging conservation. Incentives for conservation are necessary; conservation is not just a matter of storing or providing more water but also using less water.
2012.8.1.5	OWRB Assistance and Review	OWRB should be the source for information, technical assistance, and reviewer of local/regional plans. The review should prevent duplication of effort by encouraging coordinated, cost-efficient water management. The local/regional plans should be included in future statewide plans. In addition, the State legislature should enact a set of well-defined rules that require OWRB to operate with transparency and without political pressure.
2012.8.1.2	State develops a template for planning	The State should facilitate the establishment of local and regional planning processes. A template or model for these plans should be developed. This template should be based on existing state frameworks. The State should provide technical assistance and funding that will encourage local and regional cooperation, efficiency, and consistency to meet current and future needs for population growth and economic development. The plans should include provisions that provide adequate service for population growth and economic development including anticipating uniform density-based requirements that address inadequate fire protection, sub-standard distribution systems, and inconsistent standards. The plans should include recommendations of how regional cooperation in anticipation of regulations will occur, as well as regional cooperation in addressing supply versus demand. Water systems should review water treatment and distribution systems to ensure that they are efficient. These local and regional plans should be included in future statewide planning.



Reference Code	Abbreviated Recommendation	Full Recommendation
2012.8.2.2	Contents of the Plan	<p>The Plan should:</p> <ul style="list-style-type: none"> <li>a) Include provisions for legal, financial, and technical assistance to develop local water emergency management plans</li> <li>b) Respect local control and seek to protect people, businesses and municipalities against liabilities during water shortages</li> <li>c) Include incentives for cooperation and mutual aid during water shortage that encourage private water owners to (a) share in times of water shortage, (b) interconnect water systems, and (c) develop back-up water supplies. Incentives should also be given to develop reciprocity agreements so that the transfer of water during an emergency will be easier to accomplish</li> <li>d) Address how these incentives should be funded [For example, a mechanism to pay for water use such as a coordinated fee structure, or system supply reimbursement are possibilities. Funding to encourage mutual aid could be provided through tax credits. Funding for back-up water supplies could be secured by public water suppliers setting aside a portion of their revenues or add on a fee, implemented by legislation, that goes into a restricted fund. Funds should be distributed at the local level and not go into a statewide fund]</li> <li>e) Provide access to grants and resources in times of shortage</li> </ul>
2012.8.2.1	Drought Management Plan Update	<p>The Oklahoma Drought Management Plan was developed in response to the 1995-1996 drought. Though the State has experienced severe droughts since that time, the plan has not been updated. The Plan should be strengthened and updated every five years, with final approval by the Legislature and Governor. Consistent funding should be provided for plan updates and administrative costs of the plan should be minimized. Plan administrators should submit annual reports to the Legislature and the public for accountability. The State should also consider renaming the plan as the Oklahoma Water Emergency Management Plan or the Oklahoma Water Disaster Management Plan to make clear that floods, terrorism, and contamination are other emergencies that should be considered.</p>
2012.8.2.3	State Water Emergency Management Coordinator	<p>A State Water Emergency Management Coordinator should be given authority to implement the plan and should have clear power to act when needed as well as designate lines of authority among agencies. The Coordinator should also designate a central place for people to contact when there is a water emergency.</p>
2012.8.5.1	Establishment of Coordination Committee	<p>A coordination committee should be established that includes representatives from all agencies having jurisdiction over water. Agency representatives should be the department or division heads from the sections of the agencies that have authority over water. Relevant federal agency personnel should also be included on the committee. The committee should work with regional stakeholder-based water resource management groups to help meet its goals. To help the agencies facilitate cooperation and to allow for ease of public access, agencies should be relocated in close proximity to each other.</p>

Reference Code	Abbreviated Recommendation	Full Recommendation
2012.8.5.2	Cabinet-level Advisor	The State should appoint a cabinet-level advisor to work with the agencies to develop and implement a memorandum of understanding that coordinates all water quantity and quality issues and the comprehensive water plan. Legislation should be developed to provide the necessary authority so that the committee can achieve its goals and be held accountable.
2012.8.5.3	Meetings and Report	The committee should meet regularly and report annually to the Governor and Legislature on the progress in implementation of the comprehensive water plan, success of the coordination efforts between agencies and other accomplishments. The report also should suggest ideas for improving water resource management and making legislative changes. All meetings should be held under the Open Meetings Act, and all reports should meet the guidelines of the Open Records Act.
2012.8.5.1	Single Agency	To ease the burden on citizens with water-related issues and to make water regulation more effective and efficient, the State should consolidate all water quality and quantity regulation, as well as policy issues and enforcement authority, into one agency. This would provide citizens a central place to get information about water issues and would serve as a repository for the filing of applications. The mission of the agency should be to implement the comprehensive water plan. Option A: Develop a new agency Option B: Consolidate water management under an existing agency, possibly the Oklahoma Corporation Commission Funding for the consolidated or new agency would come initially from the appropriate parts of current State agency water regulation and enforcement budgets.
2012.8.7.2	Continuous Funding	Adequate and consistent funding is imperative for the water plan to be successful. Funding for operations must be from a source that does not require a yearly appropriation, for example, by designating a percentage of the gross production tax. Infrastructure funding should be implemented through appropriations, bond issues, grants, etc., but funding for operation and replacement of infrastructure must be continuous.
2012.8.7.3	Planning Horizon	Oklahoma's current water planning regulations require the OWRB to project the State's water needs for the next 50 years. To protect Oklahoma's water, the planning horizon should be changed to 100 years and should be updated every five to ten years.

Reference Code	Abbreviated Recommendation	Full Recommendation
2012.1.4.1	Hydrologic Studies	The State should fund and conduct hydrologic studies on ground and surface waters that examine past, current and future uses and the impacts on water quality and quantity. Studies should also be done on the interaction of ground and stream waters. Statewide basin and sub-basin studies should be conducted. It is important that long-term monitoring of water supply and demand be done, as well as long-term hydrologic monitoring of natural water systems. Making informed decisions requires accurate data; models to predict the impacts of water use on ground and surface water interactions should be developed. These studies should be funded by the State using all options. Funding of these studies should come from annual groundwater permit maintenance fees, similar to surface water permit fees, collected by the State. The money should also be used for enforcement, management and oversight.
2012.1.4.3	Law Revision Concerning Mining Pit Water	The regulation of mining “pit water” (water that comes to the surface when an aquifer is encountered during mining operations) should be placed under the jurisdiction of the OWRB.
2012.1.4.2	Water Law Revision	Once the studies are completed, Oklahoma’s water law should be reformed or redefined based on the results. The law should be changed to recognize the relationship between surface and groundwater where it has been determined to exist. The law should encourage conservation of water resources and be based on sustainable beneficial use. Sustainable and sustainability mean ensuring a safe and sufficient supply of ground and surface water reserves resulting from all present and future ground and surface water beneficial uses through State and local management, and enforcement. Groundwater should remain a: Option A: protected private property right based on an equal proportionate share associated with the amount of property owned over an aquifer. Or Option B: protected and preserved private property right based on an equal proportionate share associated with the amount of property owned over an aquifer. The share cannot be determined until a hydrologic study is completed by the OWRB.
2012.1.3.1	Continue State-Native Am dialogue	The state of Oklahoma shall continue the dialogue between representatives of the State and the Indian Nations with the expectation to proactively resolve water issues. The dialogue should be ongoing and organized through a “regional” approach.

Reference Code	Abbreviated Recommendation	Full Recommendation
2012.1.1.4	Education and Monitoring Water Use	Accurate water use reporting provides important data; however, not all water use is accurately reported. An education program should be established to teach permitted water users how to report their water uses more accurately. The State should review and consider future enforcement options related to data gathering. Another education program should focus on the uses of water. This should address urban/rural issues and educate the public about the economic importance of water other than for drinking and recreation. The Oklahoma Cooperative Extension Service, government agencies, and other organizations could provide these programs. An 800-number should be established that would provide citizens a way to report misuses of water.
2012.6.3.3	Infrastructure Funding	Sources of revenue for a water development fund should be established. These could include “pay its own way” and increasing the state revolving fund for infrastructure perhaps through water sales (revenue from the sale of water should not go into the State’s general fund). Distribution of funds could be modeled after the Rural Electrification Act of 1937 (the REA provided loans to states for rural electrification that furnished electricity to people in rural areas).
2012.6.3.2	Additional Sources	c) Additional emergency water supplies should be developed by using new water treatment technologies to bring lower quality water supplies on-line. d) Research should be conducted on building new multi-purpose dams that provide at least two of the possible uses: additional public water supply, irrigation supply, aquifer recharge, and flood control.
2012.5.1.6	Compensation of Source Regions	The basin-of-origin, which may encompass multiple counties, should be fully compensated for any water transfer. Revenue could include, but not be limited to, monies received from water sales or leasing, usage taxes or fees such as from recreation, and gray water use. Fee distribution should be tied to related land sales and shoreline development, with the basin-of-origin having priority.
2012.5.1.1	Definition of Surplus Water	The transfer or marketing of water should be restricted to “surplus” waters. “Surplus water” should be redefined in a way that protects the 50- or 100-year projected needs of the State. The projections should include, but not be limited to, consumptive and non-consumptive uses, including environmental/in-stream flows and the economic foundation of the local area. The definition should also take into consideration historic available trends with particular emphasis on drought considerations and minimal availability during these times.

Reference Code	Abbreviated Recommendation	Full Recommendation
2012.5.1.3	Infrastructure	Infrastructure is an important consideration any time water is transferred (infrastructure is defined as intake, pumping, and conveyance facilities necessary to move water from one location to another for the next 50 years). The State should determine the capacity and condition of existing water transfer infrastructure and use it whenever possible. If existing infrastructure is not adequate to meet water transfer needs of the importing basin, then new infrastructure alternatives should be identified (these should address environmental impacts). The water plan should set guidelines to (1) determine who pays the cost of new infrastructure construction, operation, maintenance and replacement, and (2) designate ownership of and legal access to the infrastructure.
2012.5.1.2	Water Management Entity	The State should establish a single statewide entity to issue permits related to sales and transfers of excess or surplus water. The goal of the entity should be to protect the interests of both the basins-of-origin and Oklahoma's long-term needs. Any determination to sell water should take into consideration the differences in moving groundwater and surface water. The entity should oversee revenue generated from any sale of water with input from local planning and development authorities. The State should develop and enforce rules to prevent water market speculators from profiteering. The marketing of groundwater should be limited to the extent it is legal and feasible.
2012.5.1.4	Water Quality	When water is moved from one area to another, it can affect water quality. Controls should be provided that protect the quality of water in both the basin-of-origin and the importing basin within Oklahoma. While transferring high quality water can enhance lower quality water, the effects of mixing or blending on both human consumption and the fish and wildlife of the area should be considered.
2012.5.1.5	Conservation/Best Practices	In case of drought and other water shortages, enforceable controls should be established that protect the basin-of-origin. The importing basin must use conservation/best practices as developed and enforced by the State.
2012.10.2.1	Ag Mediation Program as Model	It is recommended the state adopt the Oklahoma Agriculture Mediation Program model to assist parties with resolving their disputes and / or improve negotiations concerning water issues, and to continue its funding in the future. Also voted on: It is recommended that the adoption of Alternative Dispute Resolution, as demonstrated by the Oklahoma Agriculture Mediation Program, is an effective alternative to court action for to landowner disputes with other landowners, state agencies and other water related interests such as "basin shareholders."
2012.7.2.11	Education Funding	It is recommended that the State funding should be increased for research and development along with education on the issue of water conservation on a local, regional and state level. The relevant state agencies shall serve as a clearing house for water conservation information.
2012.7.1.8	Mandatory Leak Reporting	It is recommended that public water supply and waste water operators be required to identify and report water losses in order to qualify for government funding.

Reference Code	Abbreviated Recommendation	Full Recommendation
2012.7.1.8	Water System Leakage Assessments	Support exists for grants and loans for "leakage surveys or assessments" by municipalities or rural water districts could be made available. Substantial conservation of wasted water treatment dollars can be achieved if system leakage is addressed.
2012.2.5.1	BMP Demonstrations	It is recommended the state create a competitive grant program for the State's 13 watershed planning areas. The purpose is to demonstrate "best practices" that incorporate the spirit and practice of the Oklahoma Water Plan approved by the Oklahoma legislature.
2012.2.1.1	Source Protection	It is recommended the state, through DEQ, OWRB and the Oklahoma Conservation Commission, provide technical assistance to public water supply systems in developing source water protection plans and wellhead protection plans, in order to protect water supplies from potential pollution sources.
2012.2.3.2	Roadside Erosion	It is recommended that the Oklahoma Conservation Commission emphasize roadside erosion as a major contribution to water quality degradation by sediment. The State should work with county commissioners to improve or fund proper construction and maintenance of roads to reduce sediment contribution from roadsides.
2012.8.1.1	Watershed Planning Authorities Incentivize Regional Cooperation	It is recommended that the local and regional authorities should be encouraged to have cooperative, integrated relationships and through inter-local agreements, create synergistic water resource planning and emergency response coordination. These efforts should be rewarded by the watershed planning authority by using incentives for funding technical assistance, loans and grants for future water resource planning and implementation.
2012.8.2.4	Failure modes and effects analysis	It is recommended that the State perform a failure modes and effects analysis for Oklahoma water emergencies. This will identify sources of water emergencies, their consequence, and suggest responses. Response accountabilities and responsibilities can then be suggested or assigned.
2012.8.2.5	Training for Emergencies	It is recommended that the State include water and wastewater emergency planning in the State and municipality water system operator training programs.
2012.8.7.1	Include Town Hall in future water planning	It is recommended that each ten year update of the Oklahoma Comprehensive Water Plan include a Town Hall (or similar) meeting and an annual updating session at Governor's Water Conference (open forum for discussion).
2012.8.3.2	Inform Land-use practices	It is recommended the state establish and promote connections between riparian buffers and wetlands and water filtration, to inform land-use practices in both rural and urban areas.

Reference Code	Abbreviated Recommendation	Full Recommendation
2012.6.3.3	1 cent sales tax	It is recommended the state provide additional funding for water related infrastructure, water conservation, land-use, water emergency management planning, drought planning, water supply increase and water related education in the context of existing programs at the state level. The increased funding for this recommendation will be provided by a temporary one cent sales tax increase levied over five years with extension reconsideration thereafter.
ES.2.3.12	Agents visit farms that show signs of overgrazing	This proposal attempts to reduce phosphorus entering the lakes due to overgrazing of pasture lands by cattle. Staff from county extension or conservation district offices would visit with landowners who have overgrazed pastures. They would discuss ways to reduce overgrazing and encourage them to participate in cost-share programs to improve land management practices.
ES.2.3.11	County Extension or Conservation District personnel would implement	This proposal attempts to reduce phosphorus entering the lakes due to overgrazing of pasture lands by cattle. Staff from county extension or conservation district offices would visit with landowners who have overgrazed pastures. They would discuss ways to reduce overgrazing and encourage them to participate in cost-share programs to improve land management practices.
ES.2.3.8	Financial assistance for changing farm practices	This proposal calls on state conservation officials to help row crop farmers learn how to reduce fertilizer runoff and provide economic incentives for doing so. The funds for this voluntary program would be provided by the State conservation commission through existing programs.
ES.2.3.8	Financial incentives for buffer protection	This proposal would ask landowners to sign a 15-year agreement to prevent livestock access and allow a return of natural vegetation or restrict planting to forage grasses that can be hayed in exchange for payments from the state conservation commission.
ES.2.3.7	Half of land in buffers would be taken out of ag production	This proposal would ask landowners to sign a 15-year agreement to prevent livestock access and allow a return of natural vegetation or restrict planting to forage grasses that can be hayed in exchange for payments from the state conservation commission.
ES.2.3.15	Mandatory septic system repairs at home owner's expense	This proposal concerns residential septic tanks and drain fields. County health officials would inspect septic tank systems to make sure that they are functioning properly, and if not, landowners would be required to make repairs.
ES.2.3.7	Outreach program to reduce P fertilizers	This proposal calls on state conservation officials to help row crop farmers learn how to reduce fertilizer runoff and provide economic incentives for doing so. The funds for this voluntary program would be provided by the State conservation commission through existing programs.

Reference Code	Abbreviated Recommendation	Full Recommendation
ES.2.3.10	Reduce overgrazing through education and cost-share	This proposal attempts to reduce phosphorus entering the lakes due to overgrazing of pasture lands by cattle. Staff from county extension or conservation district offices would visit with landowners who have overgrazed pastures. They would discuss ways to reduce overgrazing and encourage them to participate in cost-share programs to improve land management practices.
ES.2.3.6	Riparian Area Enhancement along Spavinaw Creek	This proposal would ask landowners to sign a 15-year agreement to prevent livestock access and allow a return of natural vegetation or restrict planting to forage grasses that can be hayed in exchange for payments from the state conservation commission.
ES.2.3.14	Septic system inspection and repair	This proposal concerns residential septic tanks and drain fields. County health officials would inspect septic tank systems to make sure that they are functioning properly, and if not, landowners would be required to make repairs.
ES.2.3.6	State works with row crop farmers and provides economic incentives	This proposal calls on state conservation officials to help row crop farmers learn how to reduce fertilizer runoff and provide economic incentives for doing so. The funds for this voluntary program would be provided by the State conservation commission through existing programs.
ES.2.3.9	Voluntary participation	This proposal would ask landowners to sign a 15-year agreement to prevent livestock access and allow a return of natural vegetation or restrict planting to forage grasses that can be hayed in exchange for payments from the state conservation commission.
ES.2.3.9	Voluntary participation	This proposal calls on state conservation officials to help row crop farmers learn how to reduce fertilizer runoff and provide economic incentives for doing so. The funds for this voluntary program would be provided by the State conservation commission through existing programs.
ES.8.1.3	Representative from all interested groups	This proposal recommends that a watershed management commission be formed, made up of citizens living in the Eucha-Spavinaw basin from both Oklahoma and Arkansas. The commission would monitor land use change and would require use of best management practices to prevent degradation of water quality. Funding would be sought from existing sources within the federal government and the two states.
ES.8.1.4	Require landowners to implement BMPs	This proposal recommends that a watershed management commission be formed, made up of citizens living in the Eucha-Spavinaw basin from both Oklahoma and Arkansas. The commission would monitor land use change and would require use of best management practices to prevent degradation of water quality. Funding would be sought from existing sources within the federal government and the two states.



Reference Code	Abbreviated Recommendation	Full Recommendation
ES.8.1.2	Watershed management commission of OK and AR citizens	This proposal recommends that a watershed management commission be formed, made up of citizens living in the Eucha-Spavinaw basin from both Oklahoma and Arkansas. The commission would monitor land use change and would require use of best management practices to prevent degradation of water quality. Funding would be sought from existing sources within the federal government and the two states.
IR.12.1.1	Alcohol and behavior control - overall	<p>Alcohol and Behavior Control</p> <p>Goals: 1. Reduce socially undesirable behavior as much as practicable 2. Reduce alcohol-related littering</p> <p>Means:</p> <ol style="list-style-type: none"> <li>1. Control alcohol consumption on the river via an increased number of law enforcement officers (River Rangers within OSRC)</li> <li>2. Educate floaters regarding river safety and appropriate behavior by requiring each floater to watch an instructional video prior to floating the river.</li> <li>3. Establish a communication hotline to the OSRC River Rangers via riverside phones or easy to remember phone number</li> </ol> <p>[Note: No recommendations for placement of trash receptacles along river were made]</p> <p>Responsible Agency: Oklahoma Scenic Rivers Commission</p> <p>Funding Source: 1. Charge a fee of \$0.50 to \$1.00 per floater (per person not per boat)</p> <ol style="list-style-type: none"> <li>a. Increase (double) this fee during peak times with the money going to law enforcement, litter control, and more bathrooms.</li> <li>b. Increase the cost of canoe and raft permits (charged to outfitters) from \$5 to \$15 or \$20 per boat per year</li> </ol>
IR.12.1.2	Increased surveillance of and fines for unruly behavior	Control alcohol consumption on the river via an increased number of law enforcement officers (River Rangers within OSRC)
IR.12.1.3	River-side hotline phones connected to River Rangers	Establish a communication hotline to the OSRC River Rangers via riverside phones or a easy to remember phone number
IR.12.1.4	Assess floating fees by the person rather than by the craft	Charge a fee of \$0.50 to \$1.00 per floater (per person not per boat)

Reference Code	Abbreviated Recommendation	Full Recommendation
IR.12.1.5	Encourage off-peak floating by doubling peak-time fees	Increase (double) this fee during peak times with the money going to law enforcement, litter control, and more bathrooms.
IR.12.1.6	Increase craft permit fees from \$5 to \$15-\$20 per year	Increase the cost of canoe and raft permits (charged to outfitters) from \$5 to \$15 or \$20 per boat per year
IR.12.1.7	Mandatory 8' video viewing about safety and behavior	Educate floaters regarding river safety and appropriate behavior by requiring each floater to watch an instructional video prior to floating the river.
IR.3.1.3	All sewage plants must comply with the P discharge limit	Definition and enforcement of a water quality standard accomplished through: a. mandatory point source effluent limits on phosphorus, existing mandatory non-point source programs, and voluntary non-point source programs b. definition and implementation of TMDLs
IR.2.3.3	Landowner education about responsibility and assistance	Participatory, multi-channel education of: a. landowners, b. legislators, and c. children about: • personal responsibility, • importance of wildlife, • waste management alternatives, • availability of assistance programs (landowners and legislators only)
IR.2.3.4	OSRC ombudsman to assist dealing with regulatory agencies	Establish an ombudsman position within OSRC to assist citizens in getting permits or information.

Reference Code	Abbreviated Recommendation	Full Recommendation
IR.2.3.1	Riparian area protection - overall	<p>Riparian Area Protection</p> <p>Goals:</p> <ol style="list-style-type: none"> <li>1. Minimize future damage to riparian areas (dimensions have been set by the NRCS) within the entire IRW, especially its tributaries, so as to filter pollutants from runoff, protect wildlife habitat, shade water, improve aesthetic appeal, and reduce erosion</li> <li>2. Restore previously damaged areas</li> </ol> <p>Means:</p> <ol style="list-style-type: none"> <li>1. Coordinated and centralized implementation of riparian area protection programs by one agency located in the basin, in partnership with other agencies – with three-year evaluations of program effectiveness and revision, concerning: a. education, b. technical assistance, c. incentives – including: <ul style="list-style-type: none"> <li>• adequate compensation for land use restrictions and improvements</li> <li>• participation in a land bank (a conservation reserve program or wetland reserve program to take land out of production)</li> <li>• tax abatement</li> <li>• incentives for diversified land use</li> <li>• pollution credit trading, including regulatory credits for program participation</li> </ul> </li> <li>2. Participatory, multi-channel education of landowners, legislators, and children about personal responsibility, importance of wildlife, waste management alternatives, and the availability of assistance programs (landowners and legislators only)</li> <li>3. Establish an ombudsman position within OSRC to assist citizens in getting permits or information.</li> </ol> <p>Responsible Agencies: 1. OSRC 2. Partner organizations include OK Scenic Rivers Commission, OK Department of Agriculture, OK Conservation Commission, Natural Resources Conservation Service, OK Farm Bureau, and OK Farmers Union among others</p> <p>Funding Sources:</p> <ol style="list-style-type: none"> <li>1. EQUIP Program, funded by the NRCS</li> <li>2. Education funded by federal and state government and corporate sponsors</li> <li>3. [Others may be necessary]</li> </ol>

Reference Code	Abbreviated Recommendation	Full Recommendation
IR.2.3.4	Technical assistance to poultry farmers about litter management	<p>Coordinated and centralized implementation of riparian area protection programs by one agency located in the basin, in partnership with other agencies – with three-year evaluations of program effectiveness and revision, concerning:</p> <ul style="list-style-type: none"> <li>a. education</li> <li>b. technical assistance</li> <li>c. incentives – including: <ul style="list-style-type: none"> <li>• adequate compensation for land use restrictions and improvements</li> <li>• participation in a land bank (a conservation reserve program or wetland reserve program to take land out of production)</li> <li>• tax abatement</li> <li>• incentives for diversified land use</li> <li>• pollution credit trading, including regulatory credits for program participation</li> </ul> </li> </ul>
IR.2.3.5	Three-year review of effectiveness	<p>Coordinated and centralized implementation of riparian area protection programs by one agency located in the basin, in partnership with other agencies – with three-year evaluations of program effectiveness and revision, concerning:</p> <ul style="list-style-type: none"> <li>a. education</li> <li>b. technical assistance</li> <li>c. incentives – including: <ul style="list-style-type: none"> <li>• adequate compensation for land use restrictions and improvements</li> <li>• participation in a land bank (a conservation reserve program or wetland reserve program to take land out of production)</li> <li>• tax abatement</li> <li>• incentives for diversified land use</li> <li>• pollution credit trading, including regulatory credits for program participation</li> </ul> </li> </ul>
IR.2.3.2	Voluntary but compensated 30-year conservation easements	Voluntary, 30-year, compensated, renewable, conservation easements along the river and lake
IR.2.4.5	Determine whether current P limits and litter practices work	Increase research into: d. whether land use practices adhere to best management practices

Reference Code	Abbreviated Recommendation	Full Recommendation
IR.2.4.2	Oklahoma & Arkansas jointly develop and enforce P standards	Establish consistent standards in OK and AR in state and federal agencies
IR.2.4.1	Phosphorus management - overall	<p>Phosphorus Management</p> <p>Goals:</p> <ol style="list-style-type: none"> <li>1. Phosphorus load reduction for water quality protection in the river and the lake</li> <li>2. Establish consistent standards in OK and AR in state and federal agencies</li> </ol> <p>Means:</p> <ol style="list-style-type: none"> <li>1. Definition and enforcement of a water quality standard accomplished through: <ol style="list-style-type: none"> <li>a. mandatory point source effluent limits on phosphorus, existing mandatory non-point source programs, and voluntary non-point source programs</li> <li>b. definition and implementation of TMDLs</li> <li>c. voluntary 30-year, compensated, renewable, conservation easements along the river and lake</li> <li>d. periodic (2-5 years) auditing of this program to determine its effectiveness in meeting the water quality standard and, if the standard is not met, a decision will be made either to increase compensation or replace it with a mandatory program</li> </ol> </li> <li>2. Increased technical assistance and regulatory oversight of existing animal waste disposal laws</li> <li>3. Increase research into: <ol style="list-style-type: none"> <li>a. concentrations of phosphorus in the river and lake</li> <li>b. movement of phosphorus in the environment</li> <li>c. cost-effective alternatives for animal waste handling</li> <li>d. whether land use practices adhere to best management practices</li> </ol> </li> <li>4. Begin implementing solutions immediately</li> </ol> <p>Responsible Agency: OSRC</p> <p>Funding Source: Use local, state, federal and tribal agency programs to provide cost-share and technical assistance with landowners providing some of the funding.</p>

## APPENDIX B

This appendix lists the recommendations showing the results of the filters applied to identify those that are appropriate for case comparisons.

Reference Code	Category	Abbreviated Recommendation	Process Dependent?	Context Independent ?	Filter Result	Notes
1975.3.1.1	Water & Wastewater	Development fund	No	No	Exclude	
1975.3.1.2	Water & Wastewater	Form regional organizations	Yes	Yes	Include	
1975.5.3.1	Water Marketing and	Constitutional guarantee to protect source areas	Yes	Yes	Include	
1975.5.1.3	Water Marketing and	Interconnected system	Yes	Yes	Include	
1975.5.1.2	Water Marketing and Transfer	Meet local needs first	Yes	Yes	Exclude	Same as 1975.5.3.2
1975.5.1.1	Water Marketing and Transfer	Protect source areas	Yes	Yes	Exclude	Same as 1975.5.3.1
1975.5.1.5	Water Marketing and	Redistribution of state waters	Yes	Yes	Include	
1975.5.1.4	Water Marketing and	Surplus water definition	Yes	No	Exclude	Also in 2012
1975.8.1.1	Water Resource Planning	Special purpose districts	Yes	Yes	Include	
1975.8.1.2	Water Resource Planning	Studies of local needs	Yes	No	Exclude	
1975.8.6.5	Water Resource Planning	Continue funding federal water agencies in OK	No	Yes	Exclude	
1975.8.6.6	Water Resource Planning	Fed. gov. recognize Plan as THE guide for OK	No	Yes	Exclude	
1975.8.6.2	Water Resource Planning	Plan should be flexible	No	Yes	Exclude	
1975.8.6.7	Water Resource Planning	State water plans in national interest	No	Yes	Exclude	
1975.8.6.1	Water Resource Planning	Federal construction of Interconnected System	Yes	Yes	Include	
1975.8.6.3	Water Resource Planning	Investigate methods of financing Interconnected System	Yes	Yes	Include	
1975.8.6.4	Water Resource Planning	State underwrite portions of Federal projects	Yes	Yes	Include	
1980.9.1.1	Floodplain Management	Floodplain management legislation for fed insurance	Yes	No	Exclude	
1980.3.2.1	Water & Wastewater	Continue and expand Financial Assistance Program	No	Yes	Exclude	

Reference Code	Category	Abbreviated Recommendation	Process Dependent?	Context Independent ?	Filter Result	Notes
1980.7.2.1	Water Conservation	State sponsored education of citizens regarding water matters	No	Yes	Exclude	
1980.7.1.1	Water Conservation	Promote water conservation to reduce impact of future	No	Yes	Exclude	
1980.5.3.2	Water Marketing and	US ACE continue feasibility study of water conveyance	Yes	No	Exclude	
1980.8.5.1	Water Resource Planning	Fed recognize primary authority and responsibility is the	No	No	Exclude	
1980.8.5.2	Water Resource Planning	Gov'r & legislature support OWRB	Yes	No	Exclude	
1980.8.6.3	Water Resource Planning	Fed recognize plan as establishing priorities for federal	No	Yes	Exclude	
1980.8.6.1	Water Resource Planning	Gov'r & Leg. accept as general guidance document	No	Yes	Exclude	
1980.8.6.2	Water Resource Planning	State agencies cognizance of plan	No	Yes	Exclude	
1980.6.4.1	Water Supply	Continue chloride control	Yes	No	Exclude	
1980.6.1.1	Water Supply	Develop a comprehensive weather modification program	Yes	No	Exclude	
1995.11.4.2	Data Collection &	Education regarding MESONET	Yes	Yes	Include	
1995.11.4.1	Data Collection &	Expand MESONET	Yes	Yes	Include	
1995.11.1.2	Data Collection &	Continued financial support of stream gaging network	Yes	Yes	Include	
1995.11.1.1	Data Collection &	Partnerships and defraying costs of stream gaging network	Yes	Yes	Include	
1995.11.3.1	Data Collection &	Fund water quality assessment of lakes	Yes	Yes	Include	
1995.11.5.3	Data Collection &	Establish a water quality and quantity data program	Yes	Yes	Include	
1995.11.5.2	Data Collection &	Water quality and quantity monitoring network	Yes	Yes	Include	
1995.11.5.1	Data Collection &	Water resource computer network	Yes	Yes	Include	
1995.11.2.1	Data Collection &	Restrict water well measurement network to wells with good	Yes	Yes	Include	
1995.9.1.2	Floodplain Management	Enact a State Emergency Disaster Response and Recovery	Yes	No	Exclude	
1995.9.1.3	Floodplain Management	Enact legislation to mitigate stormwater diversion impacts on	Yes	Yes	Include	
1995.9.1.1	Floodplain Management	Unified statewide flood control plan	Yes	Yes	Include	
1995.10.3.1	Problem	Rely on interstate stream compacts to address problems	Yes	Yes	Include	
1995.10.3.2	Problem	Review current interstate stream compacts and propose	Yes	Yes	Include	

Reference Code	Category	Abbreviated Recommendation	Process Dependent?	Context Independent ?	Filter Result	Notes
1995.10.2.1	Problem	Greater control of water resources by locals	No	Yes	Exclude	
1995.10.2.2	Problem	Task force assessment of water programs	Yes	Yes	Include	
1995.10.1.1	Problem	Dispute resolution Training for state agencies	Yes	Yes	Include	
1995.10.1.2	Problem	Identify impediments to dispute resolution techniques	Yes	Yes	Include	
1995.8.1.2	Reservoir Operations	Mechanism to implement modified system operating plans	Yes	Yes	Include	
1995.4.1.4	Reservoir Operations	Non-consumptive use management and administration	Yes	Yes	Include	
1995.4.1.2	Reservoir Operations	Participation in the floodplain Hazard Mitigation Grant	Yes	Yes	Include	
1995.4.1.3	Reservoir Operations	Reallocation of reservoir storage based on original costs	Yes	Yes	Include	
1995.4.1.1	Reservoir Operations	Reservoir operation re-evaluation	Yes	Yes	Include	
1995.4.2.1	Reservoir Operations	Identify candidate reservoirs for physical modification	Yes	Yes	Include	
1995.4.2.2	Reservoir Operations	Support construction of Montgomery Point Lock and Dam	Yes	No	Exclude	
1995.3.2.2	Water & Wastewater	CDBGs prioritize water projects that address health and	Yes	Yes	Include	
1995.3.2.3	Water & Wastewater	Fed funding and flexibility for Clean Water Act mandates	Yes	Yes	Include	
1995.3.2.1	Water & Wastewater	Increase SWDRF to meet water development needs	Yes	Yes	Include	
1995.3.1.2	Water & Wastewater	Financial incentives for local involvement in regional	Yes	Yes	Include	
1995.3.1.1	Water & Wastewater	Increase SWDRF to provide for higher quality infrastructure	Yes	Yes	Include	
1995.3.1.4	Water & Wastewater	Promote private/public partnerships to reduce costs	Yes	Yes	Include	
1995.3.1.3	Water & Wastewater	Technical assistance to promote regionalization of treatment	Yes	Yes	Include	
1995.7.2.1	Water Conservation	Public education regarding Oklahoma Leak Detection	No	Yes	Exclude	
1995.7.1.3	Water Conservation	Enforce conservation measures to prevent waste	No	Yes	Exclude	
1995.7.1.5	Water Conservation	Incentivize individual water systems conservation plans	Yes	Yes	Include	
1995.7.1.6	Water Conservation	Price structuring that encourages conservation	No	Yes	Exclude	
1995.7.1.4	Water Conservation	State water conservation plan	Yes	Yes	Include	
1995.7.1.6	Water Conservation	Technical assistance to industries regarding conservation	Yes	Yes	Include	



Reference Code	Category	Abbreviated Recommendation	Process Dependent?	Context Independent ?	Filter Result	Notes
1995.7.1.1	Water Conservation	Water conservation programs	No	Yes	Exclude	
1995.7.1.2	Water Conservation	Water conservation programs	No	Yes	Exclude	
1995.5.3.1	Water Marketing and	Identify barriers to and facilitate water marketing	Yes	Yes	Include	
1995.5.3.2	Water Marketing and	State water marketing and transfer policy	No	Yes	Exclude	
1995.5.2.1	Water Marketing and	State water bank	Yes	Yes	Include	
1995.5.1.3	Water Marketing and	Identify and utilize untapped water sources	Yes	Yes	Include	
1995.2.1.1	Water Quality	Aquifer classification based on vulnerability to contamination	Yes	Yes	Include	
1995.2.1.5	Water Quality	Communities relying on groundwater participate in	Yes	Yes	Include	
1995.2.1.4	Water Quality	Comprehensive water quality and quantity data collection	Yes	Yes	Include	
1995.2.1.2	Water Quality	Groundwater utilization plan including priorities and property	Yes	Yes	Include	
1995.2.1.3	Water Quality	Risk assessment for groundwater protection and cleanup	Yes	Yes	Include	
1995.2.2.1	Water Quality	Groundwater quality standards	Yes	Yes	Include	
1995.2.3.1	Water Quality	Nonpoint source pollution management practices	Yes	Yes	Include	
1995.2.4.3	Water Quality	Continue refinement of TMDLs	Yes	Yes	Include	
1995.2.4.4	Water Quality	Field validation of discharge permits	Yes	Yes	Include	
1995.2.4.1	Water Quality	Stream water quality standards	Yes	Yes	Include	
1995.2.4.2	Water Quality	Water quality standards at the state not federal level	Yes	Yes	Include	
1995.8.1.1	Water Resource Planning	Planning and management based on watershed boundaries	No	Yes	Exclude	
1995.8.2.1	Water Resource Planning	State Water Resource Drought Coordinator	Yes	Yes	Include	
1995.8.4.3	Water Resource Planning	Improved agency coordination during assessment of water	Yes	Yes	Include	
1995.8.4.1	Water Resource Planning	Increased public involvement in the Endangered Species Act	Yes	Yes	Include	
1995.8.4.2	Water Resource Planning	Water quality standards revisions balance protection of T&E	Yes	Yes	Include	
1995.8.3.1	Water Resource Planning	Comprehensive wetlands protection and management strategy	Yes	Yes	Include	
1995.1.4.2	Water Rights	Complete and update hydrologic surveys	No	Yes	Exclude	

Reference Code	Category	Abbreviated Recommendation	Process Dependent?	Context Independent ?	Filter Result	Notes
1995.1.4.1	Water Rights	Identify and quantify impacts of groundwater stream water	Yes	Yes	Include	
1995.1.2.1	Water Rights	Instream flow protection for scenic rivers	Yes	Yes	Include	
1995.1.2.2	Water Rights	Manage reservoir releases to protect downstream aquatic life	Yes	Yes	Include	
1995.1.3.2	Water Rights	Appointment of Indian reps to appropriate state boards	Yes	Yes	Include	
1995.1.3.1	Water Rights	Permanent Committee to address Indian water rights issues	Yes	Yes	Include	
1995.1.1.4	Water Rights	Administrative fines for permit violations	Yes	Yes	Include	
1995.1.1.5	Water Rights	Checks on accuracy of water use reports	Yes	Yes	Include	
1995.1.1.6	Water Rights	Education of permit holders on use and conservation	No	Yes	Exclude	
1995.1.1.3	Water Rights	More realistic and fair determinations of "beneficial use" and	Yes	Yes	Include	
1995.1.1.1	Water Rights	Permit suspension period for marketing rights	Yes	Yes	Include	
1995.1.1.2	Water Rights	Permitting that accounts for seasonal availability	Yes	Yes	Include	
1995.6.4.1	Water Supply	No support for Red River Chloride Control Project	Yes	Yes	Include	
1995.6.2.2	Water Supply	Address water rights and quality considerations of artificial	Yes	Yes	Include	
1995.6.2.1	Water Supply	Identify artificial recharge areas	Yes	Yes	Include	
1995.6.3.2	Water Supply	Conservation plans that include return flows and treated	Yes	Yes	Include	
1995.6.3.1	Water Supply	Guidelines for use of recycled wastewater	Yes	Yes	Include	
1995.6.1.1	Water Supply	Cloud seeding demonstration program	Yes	No	Exclude	
2012.11.1.1	Data Collection &	Decision Support System	Yes	Yes	Include	
2012.10.3.1	Problem	Interstate committees for regional water planning	Yes	Yes	Include	
2012.10.3.2	Problem	Surface-groundwater interactions at state borders	Yes	Yes	Include	
2012.10.1.1	Problem	State creates a Water Conflict Resolution Center	Yes	Yes	Include	
2012.4.2.2	Reservoir Operations	Increased Water Storage	Yes	Yes	Include	
2012.3.3.1	Water & Wastewater	System Interconnections	Yes	Yes	Include	
2012.7.2.4	Water Conservation	Education Concerning Conservation and the Value of Water	No	Yes	Exclude	

Reference Code	Category	Abbreviated Recommendation	Process Dependent?	Context Independent ?	Filter Result	Notes
2012.7.2.2	Water Conservation	Education Coordinator	No	Yes	Exclude	
2012.7.2.3	Water Conservation	Emergency Communication	Yes	Yes	Include	
2012.7.2.1	Water Conservation	Water Information Office	No	Yes	Exclude	
2012.7.1.3	Water Conservation	Adaptive Crop Selection and Xeriscaping	Yes	Yes	Include	
2012.7.1.7	Water Conservation	Agricultural Reuse	Yes	Yes	Include	
2012.7.1.14	Water Conservation	Evaluation of Water Conservation Measures	Yes	Yes	Include	
2012.7.1.12	Water Conservation	Incentivize Conservation	Yes	Yes	Include	
2012.7.1.8	Water Conservation	Infrastructure Maintenance	No	Yes	Exclude	
2012.7.1.5	Water Conservation	Local Food Promotion	Yes	Yes	Include	
2012.7.1.2	Water Conservation	Management of Stormwater Runoff-Green Roofs	Yes	Yes	Include	
2012.7.1.2	Water Conservation	Management of Stormwater Runoff-Soil Amendments	Yes	Yes	Include	
2012.7.1.4	Water Conservation	Municipal Irrigation Regulation	Yes	Yes	Include	
2012.7.1.6	Water Conservation	Urban Water Reuse	No	Yes	Exclude	Include portions not included in other plans
2012.7.1.1	Water Conservation	Water Capture Systems	Yes	Yes	Include	
2012.7.1.13	Water Conservation	Water Pricing	Yes	Yes	Include	
2012.7.1.9	Water Conservation	Well Metering	Yes	Yes	Include	
2012.2.5.1	Water Quality	BMP Czar	Yes	Yes	Include	
2012.2.5.1	Water Quality	Minimum BMP for development and education	Yes	Yes	Include	
2012.8.6.1	Water Resource Planning	Coordinating committee plans transition to single agency	Yes	Yes	Include	
2012.8.6.4	Water Resource Planning	Single agency develops stakeholder groups	Yes	Yes	Include	
2012.8.6.3	Water Resource Planning	Single agency improves customer service	Yes	Yes	Include	

Reference Code	Category	Abbreviated Recommendation	Process Dependent?	Context Independent ?	Filter Result	Notes
2012.8.6.2	Water Resource Planning	Single agency rewrites rules	Yes	Yes	Include	
2012.8.1.1	Water Resource Planning	Basin (intergovernmental) advisory committees	No	Yes	Exclude	
2012.8.1.4	Water Resource Planning	Coordinated Planning Policy	Yes	Yes	Exclude	Exclude as it is all part of 2012.8.1.2
2012.8.1.3	Water Resource Planning	Incentives for Regional Cooperation in Conservation and Storage	Yes	Yes	Exclude	Exclude as it is all part of 2012.8.1.2
2012.8.1.5	Water Resource Planning	OWRB Assistance and Review	Yes	Yes	Include	
2012.8.1.2	Water Resource Planning	State develops a template for planning	Yes	Yes	Include	
2012.8.2.2	Water Resource Planning	Contents of the Plan	Yes	Yes	Include	
2012.8.2.1	Water Resource Planning	Drought Management Plan Update	Yes	Yes	Include	
2012.8.2.3	Water Resource Planning	State Water Emergency Management Coordinator	Yes	Yes	Include	
2012.8.5.1	Water Resource Planning	Establishment of Coordination Committee	Yes	Yes	Include	
2012.8.5.2	Water Resource Planning	Cabinet-level Advisor	Yes	Yes	Include	
2012.8.5.3	Water Resource Planning	Meetings and Report	Yes	Yes	Include	
2012.8.5.1	Water Resource Planning	Single Agency	Yes	Yes	Include	
2012.8.7.2	Water Resource Planning	Continuous Funding	Yes	Yes	Include	
2012.8.7.3	Water Resource Planning	Planning Horizon	Yes	Yes	Include	
2012.1.4.1	Water Rights	Hydrologic Studies	No	Yes	Exclude	
2012.1.4.3	Water Rights	Law Revision Concerning Mining Pit Water	Yes	Yes	Include	
2012.1.4.2	Water Rights	Water Law Revision	Yes	Yes	Include	
2012.1.3.1	Water Rights	Continue State-Native Am dialogue	Yes	Yes	Include	
2012.1.1.4	Water Rights	Education and Monitoring Water Use	Yes	Yes	Include	

Reference Code	Category	Abbreviated Recommendation	Process Dependent?	Context Independent ?	Filter Result	Notes
2012.6.3.3	Water Supply	Infrastructure Funding	Yes	Yes	Include	
2012.6.3.2	Water Supply	Additional Sources	Yes	Yes	Include	
2012.5.1.6	Water Transfer	Compensation of Source Regions	No	Yes	Exclude	
2012.5.1.1	Water Transfer	Definition of Surplus Water	Yes	Yes	Include	
2012.5.1.3	Water Transfer	Infrastructure	Yes	Yes	Include	
2012.5.1.2	Water Transfer	Water Management Entity	Yes	Yes	Include	
2012.5.1.4	Water Transfer	Water Quality	Yes	Yes	Include	
2012.5.1.5	Water Transfer	Conservation/Best Practices	Yes	Yes	Include	
2012-	Problem	Ag Mediation Program as Model	Yes	Yes	Include	
2012-	Water Conservation	Education Funding	No	Yes	Exclude	
2012-	Water Conservation	Mandatory Leak Reporting	No	Yes	Exclude	
2012-	Water Conservation	Water System Leakage Assessments	No	Yes	Exclude	
2012-	Water Quality	BMP Demonstrations	Yes	Yes	Include	
2012-	Water Quality	Source Protection	Yes	Yes	Include	
2012-	Water Quality	Roadside Erosion	Yes	Yes	Include	
2012-	Water Resource Planning	Watershed Planning Authorities Incentivize Regional	No	Yes	Exclude	
2012-	Water Resource Planning	Failure modes and effects analysis	Yes	Yes	Include	
2012-	Water Resource Planning	Training for Emergencies	Yes	Yes	Include	
2012-	Water Resource Planning	Include Town Hall in future water planning	Yes	Yes	Include	
2012-	Water Resource Planning	Inform Land-use practices	Yes	Yes	Include	
2012-	Water Supply	1 cent sales tax	Yes	Yes	Include	
ES.2.3.12	Water Quality	Agents visit farms that show signs of overgrazing	Yes	Yes	Exclude	Combined with ES.2.3.10

Reference Code	Category	Abbreviated Recommendation	Process Dependent?	Context Independent ?	Filter Result	Notes
ES.2.3.11	Water Quality	County Extension or Conservation District personnel would implement	Yes	Yes	Exclude	Combined with ES.2.3.10
ES.2.3.8	Water Quality	Financial assistance for changing farm practices	Yes	Yes	Exclude	Combined with ES.2.3.6
ES.2.3.8	Water Quality	Financial incentives for buffer protection	Yes	No	Exclude	
ES.2.3.7	Water Quality	Half of land in buffers would be taken out of ag production	Yes	No	Exclude	
ES.2.3.15	Water Quality	Mandatory septic system repairs at home owner's expense	Yes	Yes	Exclude	Combined with ES.2.3.14
ES.2.3.7	Water Quality	Outreach program to reduce P fertilizers	Yes	Yes	Exclude	Combined with ES.2.3.6
ES.2.3.10	Water Quality	Reduce overgrazing through education and cost-share	Yes	Yes	Include	
ES.2.3.6	Water Quality	Riparian Area Enhancement along Spavinaw Creek	Yes	No	Exclude	
ES.2.3.14	Water Quality	Septic system inspection and repair	Yes	Yes	Include	
ES.2.3.6	Water Quality	State works with row crop farmers and provides economic	Yes	Yes	Include	
ES.2.3.9	Water Quality	Voluntary participation	Yes	No	Exclude	
ES.2.3.9	Water Quality	Voluntary participation	Yes	No	Exclude	
ES.8.1.3	Water Resource Planning	Representative from all interested groups	No	Yes	Exclude	
ES.8.1.4	Water Resource Planning	Require landowners to implement BMPs	No	Yes	Exclude	
ES.8.1.2	Water Resource Planning	Watershed management commission of OK and AR citizens	No	No	Exclude	
IR.12.1.1	Recreation	Alcohol and behavior control - overall	Yes	No	Exclude	
IR.12.1.2	Recreation	Increased surveillance of and fines for unruly behavior	Yes	No	Exclude	

Reference Code	Category	Abbreviated Recommendation	Process Dependent?	Context Independent ?	Filter Result	Notes
IR.12.1.3	Recreation	River-side hotline phones connected to River Rangers	Yes	No	Exclude	
IR.12.1.4	Recreation	Assess floating fees by the person rather than by the craft	Yes	No	Exclude	
IR.12.1.5	Recreation	Encourage off-peak floating by doubling peak-time fees	Yes	No	Exclude	
IR.12.1.6	Recreation	Increase craft permit fees from \$5 to \$15-\$20 per year	Yes	No	Exclude	
IR.12.1.7	Recreation	Mandatory 8' video viewing about safety and behavior	Yes	No	Exclude	
IR.3.1.3	Water & Wastewater	All sewage plants must comply with the P discharge limit	Yes	Yes	Include	
IR.2.3.3	Water Quality	Landowner education about responsibility and assistance	Yes	Yes	Include	
IR.2.3.4	Water Quality	OSRC ombudsman to assist dealing with regulatory agencies	Yes	Yes	Include	
IR.2.3.1	Water Quality	Riparian area protection - overall	Yes	Yes	Include	
IR.2.3.4	Water Quality	Technical assistance to poultry farmers about litter	Yes	Yes	Include	
IR.2.3.5	Water Quality	Three-year review of effectiveness	Yes	Yes	Include	
IR.2.3.2	Water Quality	Voluntary but compensated 30-year conservation easements	Yes	Yes	Include	
IR.2.4.5	Water Quality	Determine whether current P limits and litter practices work	Yes	Yes	Include	
IR.2.4.2	Water Quality	Oklahoma & Arkansas jointly develop and enforce P	Yes	Yes	Include	
IR.2.4.1	Water Quality	Phosphorus management - overall	Yes	Yes	Include	

## APPENDIX C

This appendix shows the recommendation categories and the codes used in the survey instrument. The recommendations from the cases that were used to draft the recommendations in the survey instrument are shown next to the corresponding survey instrument code. Case recommendations were gathered by topic and edited for clarity and brevity, and in some instances they were combined with similar cases.

Recommendation Category	Survey Instrument Code	Recommendation
Groundwater/Stream Water Relationships	5.1.4.1	1995.1.4.1
Groundwater/Stream Water Relationships	1.1.4.2	2012.1.4.2
Groundwater/Stream Water Relationships	1.1.4.3	2012.1.4.3
Water Rights	5.1.3.1	1995.1.3.1
Water Rights	5.1.3.2	1995.1.3.2
Water Rights	1.1.3.1	2012.1.3.1
Water Rights	5.1.1.1	1995.1.1.1
Water Rights	1.1.1.4	2012.1.1.1
Nonpoint Source Pollution	5.2.3.1	1995.2.3.1
Nonpoint Source Pollution	1.2.3.2	2012.2.3.2
Nonpoint Source Pollution	ES.2.3.10	ES.2.3.10
Nonpoint Source Pollution	ES.2.3.14	ES.2.3.14
Nonpoint Source Pollution	ES.2.3.6	ES.2.3.6
Nonpoint Source Pollution	IR.2.3.1-5	IR.2.3.1
Nonpoint Source Pollution	IR.2.3.1-5	IR.2.3.2
Nonpoint Source Pollution	IR.2.3.1-5	IR.2.3.3
Nonpoint Source Pollution	IR.2.3.1-5	IR.2.3.4
Nonpoint Source Pollution	IR.2.3.1-5	IR.2.3.5
Nonpoint Source Pollution	1.2.5.1	2012.2.5.1
Nonpoint Source Pollution	5.2.4.1	1995.2.4.1
Nonpoint Source Pollution	5.2.4.2-4	1995.2.4.2
Nonpoint Source Pollution	5.2.4.2-4	1995.2.4.3
Nonpoint Source Pollution	5.2.4.2-4	1995.2.4.4
Nonpoint Source Pollution	IR.2.4.1-5	IR.2.4.1
Nonpoint Source Pollution	IR.2.4.1-5	IR.2.4.2
Nonpoint Source Pollution	IR.2.4.1-5	IR.2.4.3



Recommendation Category	Survey Instrument Code	Recommendation
Nonpoint Source Pollution	IR.2.4.1-5	IR.2.4.4
Nonpoint Source Pollution	IR.2.4.1-5	IR.2.4.5
Water Transfer	0.5.1.5	1980.5.1.5
Water Transfer	0.5.1.3	1980.5.1.3
Water Transfer	1.5.1.4	2012.5.1.4
Water Transfer	1.5.1.3	2012.5.1.3
Water Transfer	1.5.1.2	2012.5.1.2
Water Transfer	1.5.1.1	2012.5.1.1
Water Transfer	5.5.1.3	1995.5.1.3
Water Transfer	1.5.1.5	2012.5.1.5
Water Transfer	5.5.2.1	1995.5.2.1
Water Transfer	5.5.3.1	1995.5.3.1
Water Transfer	0.5.3.1	1980.5.3.1
Water Conservation	5.7.1.4	1995.7.1.4
Water Conservation	5.7.1.5	1995.7.1.5
Water Conservation	5.7.1.6	1995.7.1.6
Water Conservation	1.7.1.1-2	2012.7.1.1
Water Conservation	1.7.1.1-2	2012.7.1.2
Water Conservation	1.7.1.3,12,13,3	2012.7.1.3
Water Conservation	1.7.1.3,12,13,3	2012.7.1.12
Water Conservation	1.7.1.3,12,13,3	2012.7.1.13
Water Conservation	1.7.1.3,12,13,3	2012.7.1.3
Water Conservation	1.7.1.3	2012.7.1.3
Water Conservation	1.7.1.4	2012.7.1.4
Water Conservation	1.7.1.6-7	2012.7.1.6
Water Conservation	1.7.1.6-7	2012.7.1.7
Water Conservation	1.7.1.9	2012.7.1.9
Water Conservation	1.7.1.14	2012.7.1.14
Basin/Watershed Management	5.8.1.2	1995.8.1.2
Basin/Watershed Management	0.8.1.1	1980.8.1.1
Basin/Watershed Management	1.8.1.2	2012.8.1.2
Drought and Emergency Preparedness	5.8.2.1	1995.8.2.1
Drought and Emergency Preparedness	1.8.2.1	2012.8.2.1
Drought and Emergency Preparedness	1.8.1.4	2012.8.1.4

Recommendation Category	Survey Instrument Code	Recommendation
Water Supply Augmentation	5.6.3.1	1995.6.3.1
Water Supply Augmentation	1.6.6.2	2012.6.6.2
Data Collection and Management	1.11.1.1	2012.11.1.1
Data Collection and Management	5.11.5.1	1995.11.5.1

## APPENDIX D

This appendix contains the survey instrument used in the interviews.

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### **Questionnaire Instructions**

Please rate the following policy recommendations according to your understanding of how acceptable they would be to most Oklahomans.

The rating scales range from 5 to 1 with “5” being most acceptable and “1” being least acceptable.

Many of the recommendations have multiple parts. For these, you are provided with a scale for each part. You only need rate the parts of the recommendations separately *if your opinion of a part differs from your opinion of the recommendation as a whole*. In other words, you can just rate the recommendation overall unless you wish to express a different opinion about a particular part.

Please realize that some components of some recommendations have been removed for various reasons. Please rate the recommendations for what is listed here and not based on anything that may be lacking.

## WATER RIGHTS: GROUNDWATER/STREAM WATER RELATIONSHIPS

		Acceptability
		Most    Least
<p>5.1.4.1</p> <p>The Oklahoma Water Resources Board should:</p> <ol style="list-style-type: none"> <li>1. identify and quantify impacts that can result from the interaction between groundwaters and stream waters, especially the quality and quantity effects of groundwater withdrawal on stream water base flow;</li> <li>2. identify the potential benefits of the joint management and conjunctive use of state stream and groundwater supplies and develop potential management schemes which consider opportunities for watershed planning; and</li> <li>3. identify specific areas or watersheds/basins that could potentially benefit from conjunctive management and promote the formation of local advisory committees to guide management programs.</li> </ol> <p style="text-align: right;"><b>OVERALL</b></p>		<p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p>
<p>1.1.4.2</p> <p>Once the studies are completed, Oklahoma’s water law should be reformed or redefined based on the results. The law should be changed to recognize the relationship between surface and groundwater where it has been determined to exist. The law should encourage conservation of water resources and be based on sustainable beneficial use. Sustainable and sustainability mean ensuring a safe and sufficient supply of ground and surface water reserves resulting from all present and future ground and surface water beneficial uses through State and local management, and enforcement. ....</p> <p>Groundwater should remain a:</p> <p style="padding-left: 20px;">option A: protected private property right based on an equal proportionate share associated with the amount of property owned over an aquifer. Or .....</p> <p style="padding-left: 20px;">option B: protected and preserved private property right based on an equal proportionate share associated with the amount of property owned over an aquifer. The share cannot be determined until a hydrologic study is completed by the OWRB. ....</p> <p style="text-align: right;"><b>OVERALL</b></p>		<p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p>
<p>1.1.4.3</p> <p>The regulation of mining “pit water” (water that comes to the surface when an aquifer is encountered during mining operations) should be placed under the jurisdiction of the OWRB.</p>		<p>5-4-3-2-1</p>

## WATER RIGHTS: NATIVE AMERICAN WATER RIGHTS

5.1.4.1

Acceptability  
Most      Least

<p>The Oklahoma Water Resources Board should request the Oklahoma Water Law Advisory Committee and selected tribal representatives to explore Indian water rights and quality issues in Oklahoma. Specifically, the group should:</p> <ol style="list-style-type: none"> <li>1. study formation of a permanent committee consisting of local, state, federal and Indian representatives to address appropriate water rights issues;</li> <li>2. develop a mutually acceptable negotiation system or process to fairly resolve current and future water rights issues; and</li> <li>3. identify water resource projects warranting cooperative action.</li> </ol> <p style="text-align: right;"><b>OVERALL</b></p>	<p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p>
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5.1.3.2

<p>The State Legislature should consider appointing qualified Indian representatives to appropriate boards, commissions and other governing bodies of the State of Oklahoma.</p>	<p>5-4-3-2-1</p>
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1.1.3.1

<p>The state of Oklahoma should continue the dialogue between representatives of the State and the Indian Nations with the expectation to proactively resolve water issues. The dialogue should be ongoing and organized through a “regional” approach.</p>	<p>5-4-3-2-1</p>
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## NONPOINT SOURCE POLLUTION

		Acceptability	
		Most	Least
<b>5.2.3.1</b>			
The State Secretary of Environment should:			
1.	encourage implementation of innovative nonpoint source reduction and management practices while also stressing use of proven measures; .....	5-4-3-2-1	
2.	assure that state programs incorporate an adequate level of watershed planning, best management practice design, water quality monitoring and assessment of progress;.....	5-4-3-2-1	
3.	assure that state projects are focused on identified nonpoint source priority areas;.....	5-4-3-2-1	
4.	study implementation of a comprehensive state program that accentuates voluntary nonpoint source control measures through development and implementation of appropriate management plans for operations which manage nonpoint pollution sources; and.....	5-4-3-2-1	
5.	encourage development of technical assistance programs that promote establishment of pollution prevention plans by landowners.....	5-4-3-2-1	
<b>OVERALL</b>		5-4-3-2-1	

### 1.2.3.2

The Oklahoma Conservation Commission should emphasize roadside erosion as a major contribution to water quality degradation by sediment. The State should work with county commissioners to improve or fund proper construction and maintenance of roads to reduce sediment contribution from roadsides.	5-4-3-2-1
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### ES.2.3.10

In order to reduce phosphorus entering lakes and streams due to overgrazing of pasture lands, staff from county extension or conservation district offices should visit with landowners who have overgrazed pastures. They should discuss ways to reduce overgrazing and encourage them to participate in cost-share programs to improve land management practices.	5-4-3-2-1
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### ES.2.3.14

County health officials should inspect septic tank systems to make sure that they are functioning properly, and if not, landowners would be required to make repairs.	5-4-3-2-1
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### ES.2.3.6

State conservation officials should help row crop farmers learn how to reduce fertilizer runoff and provide economic incentives for doing so. The funds for this voluntary program would be provided by the State Conservation Commission through existing programs.	5-4-3-2-1
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## NONPOINT SOURCE POLLUTION

IR.2.3.1-5

Acceptability  
Most      Least

<p>In order to minimize future damage and to restore already damaged areas, the Oklahoma Dept. of Agriculture and Oklahoma Conservation Commission (along with federal agencies such as the Natural Resources Conservation Service, US Geological Survey, and the US Army Corp of Engineers) should begin a coordinated and centralized implementation of riparian area protection programs. The programs that should be coordinated include their efforts concerning education, technical assistance, and incentives including:</p> <ol style="list-style-type: none"> <li>1. adequate compensation for land use restriction and improvements.....</li> <li>2. participation in a land bank (taking agricultural land out of production).....</li> <li>3. tax abatement .....</li> <li>4. incentives for diversified land use .....</li> <li>5. regulatory credit for program participation (pollution credit trading).....</li> </ol> <p>Furthermore, the program should include participatory, multi-channel education of landowners, legislators, and children about personal responsibility, importance of wildlife, waste management alternatives, and availability of assistance programs (landowners and legislators only).....</p> <p>Every three years, this program should be evaluated for effectiveness and revised as necessary.....</p> <p>Funding from existing federal, tribal, state, and local agency programs for restoration and protection incentives.....</p>	<p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p>
<b>OVERALL</b>	

1.2.5.1

<p>A statewide coordinator (“czar” type position) should be established with sufficient authority to encourage collaborative, comprehensive planning and avoid duplication of efforts in implementing best management practices. To achieve this, the coordinator should work with watershed coalitions and appropriate state agency personnel, which may include cabinet level secretaries, to coordinate best management practices and facilitate the work of the state agencies to address the issues and recommendations from the coalitions. Watershed coalitions should submit their action plans and annual reports to the coordinator for dissemination to the appropriate agencies.</p>	<p>5-4-3-2-1</p>
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## NONPOINT SOURCE POLLUTION

5.2.4.1	Acceptability	
	Most	Least
<p>The Oklahoma Water Resources Board should:</p>		
<p>1. increase efforts to implement water quality standards, especially biological criteria and total maximum daily loads, on a watershed basis,.....</p>	5-4-3-2-1	
<p>2. including additional protection for Outstanding Resource Waters; and.....</p>	5-4-3-2-1	
<p>3. utilize the input of appropriate environmental and natural resource agencies to evaluate the use of risk assessment methodology as a water resource protection and cleanup tool.....</p>	5-4-3-2-1	
<b>OVERALL</b>	5-4-3-2-1	
<p>5.2.4.2-4</p>		
<p>Oklahoma's Congressional Delegation should:</p>		
<p>1. encourage the federal government to limit federally mandated actions and promote promulgation of water quality standards by individual states to allow states greater flexibility in addressing state-identified priorities and regional and/or local standards issues. ....</p>	5-4-3-2-1	
<p>2. should encourage the federal government to continue refinement of the Total Maximum Daily Loads concept. ....</p>	5-4-3-2-1	
<p>3. encourage the federal government to require water quality standards implementation procedures that consider not only criteria and permit development, but also field validation of discharge permits which protect human health and aquatic life. ....</p>	5-4-3-2-1	
<b>OVERALL</b>	5-4-3-2-1	
<p>IR.2.4.1-5</p>		
<p>In order to reduce phosphorus loads entering streams and lakes and to establish consistent standards in Oklahoma and Arkansas state and federal agencies, Oklahoma should immediately:</p>		
<p>1. Define and enforce a water quality standard accomplished through:</p>	5-4-3-2-1	
<p style="padding-left: 20px;">a. mandatory point source effluent limits on P, existing mandatory non-point source programs, and voluntary non-point source programs,.....</p>	5-4-3-2-1	
<p style="padding-left: 20px;">b. definition and implementation of TMDLs,.....</p>	5-4-3-2-1	
<p style="padding-left: 20px;">c. voluntary 30-yr, compensated, renewable, conservation easements along rivers and lakes, and.....</p>	5-4-3-2-1	
<p style="padding-left: 20px;">d. periodic (2-5 years) auditing of this program to determine its effectiveness in meeting the water quality standard and, if the standard is not met, a decision will be made either to increase compensation or replace it with a mandatory program.....</p>	5-4-3-2-1	
<p>2. Increase technical assistance and regulatory oversight of existing animal waste disposal laws.....</p>	5-4-3-2-1	
<p>3. Increase research into:</p>		
<p style="padding-left: 20px;">a. concentrations of P in the river and lake.....</p>	5-4-3-2-1	
<p style="padding-left: 20px;">b. movement of P in the environment.....</p>	5-4-3-2-1	
<p style="padding-left: 20px;">c. cost-effective alternatives for animal waste handling.....</p>	5-4-3-2-1	
<p style="padding-left: 20px;">d. whether land use practices adhere to best management practices.....</p>	5-4-3-2-1	
<p>Funding should be provided through local, state, federal and tribal agency programs to provide cost-share and technical assistance with landowners providing some of the funding.....</p>	5-4-3-2-1	
<b>OVERALL</b>		



## WATER MARKETING AND TRANSFER

		Acceptability	
		Most	Least
0.5.1.5	The state should establish as policy that areas of surplus water must be balanced with areas of short supplies. Redistribution of State waters should be made so that no areas are left water deficient.	5-4-3-2-1	
0.5.1.3	The state should develop an Interconnected System that will transport water from southeastern Oklahoma to central and southwestern Oklahoma.	5-4-3-2-1	
1.5.1.4	The state should enact controls that protect the quality of water in both the basin-of-origin and the importing basin within Oklahoma. While transferring high quality water can enhance lower quality water, the effects of mixing or blending on both human consumption and the fish and wildlife of the area should be considered.	5-4-3-2-1	
1.5.1.3	<p>The State should determine the capacity and condition of existing water transfer infrastructure and use it whenever possible. If existing infrastructure is not adequate to meet water transfer needs of the importing basin, then new infrastructure alternatives should be identified (these should address environmental impacts).</p> <p>The water plan should set guidelines to: .....</p> <ol style="list-style-type: none"> <li>1. determine who pays the cost of new infrastructure construction, operation, maintenance and replacement, and .....</li> <li>2. designate ownership of and legal access to the infrastructure. ....</li> </ol> <p style="text-align: right;"><b>OVERALL</b></p>	5-4-3-2-1	5-4-3-2-1 5-4-3-2-1 5-4-3-2-1 5-4-3-2-1
1.5.1.2	<p>The State should establish a single statewide entity to issue permits related to sales and transfers of excess or surplus water. The goal of the entity should be to protect the interests of both the basins-of-origin and Oklahoma's long-term needs.....</p> <p>Any determination to sell water should take into consideration the differences in moving groundwater and surface water.....</p> <p>This entity should oversee revenue generated from any sale of water with input from local planning and development authorities.....</p> <p>The State should develop and enforce rules to prevent water market speculators from profiteering.....</p> <p>The marketing of groundwater should be limited to the extent it is legal and feasible.....</p> <p style="text-align: right;"><b>OVERALL</b></p>	5-4-3-2-1	5-4-3-2-1 5-4-3-2-1 5-4-3-2-1 5-4-3-2-1 5-4-3-2-1

## WATER MARKETING AND TRANSFER

	Acceptability	
	Most	Least
<b>1.5.1.1</b>		
The transfer or marketing of water should be restricted to “surplus” waters. “Surplus water” should be redefined in a way that protects the 50- or 100-year projected needs of the State. ....	5-4-3-2-1	
The projections should include, but not be limited to, consumptive and non-consumptive uses, including environmental/in-stream flows and the economic foundation of the local area. ....	5-4-3-2-1	
The definition should also take into consideration historic available trends with particular emphasis on drought considerations and minimal availability during these times. ....	5-4-3-2-1	
<b>OVERALL</b>	5-4-3-2-1	

<b>5.5.1.3</b>		
The OWRB should identify and investigate methods to utilize untapped sources of usable water in Oklahoma through:		
1. development of system operating plans;.....	5-4-3-2-1	
2. reallocation of reservoir storage;.....	5-4-3-2-1	
3. utilization of sediment storage;.....	5-4-3-2-1	
4. administrative actions, such as the cancellation and reduction of unused water rights;.....	5-4-3-2-1	
5. greater consideration of reservoir storage yield that will vary according to proposed use in the receiving area; and.....	5-4-3-2-1	
6. consideration of additional reservoir project construction.....	5-4-3-2-1	
<b>OVERALL</b>	5-4-3-2-1	

<b>1.5.1.5</b>		
In case of drought and other water shortages [in a source area], enforceable controls should be established that protect the basin-of-origin. The importing basin must use conservation/best practices as developed and enforced by the State.	5-4-3-2-1	

<b>5.5.2.1</b>		
The OWRB should study the feasibility of creating a state water bank to:		
1. locate and purchase sources of available or surplus water rights and storage;.....	5-4-3-2-1	
2. evaluate all opportunities for water importation and transfer; .....	5-4-3-2-1	
3. coordinate the sale and/or loan of available supplies and water rights to prospective customers, including transfers through the establishment of regional systems; and.....	5-4-3-2-1	
4. coordinate efforts to educate the public on water transactions.....	5-4-3-2-1	
<b>OVERALL</b>	5-4-3-2-1	

## WATER MARKETING AND TRANSFER

5.5.3.1

Acceptability  
Most    Least

<p>The State Legislature and Oklahoma Water Resources Board should review existing water statutes and identify barriers to water marketing and measures that could be instituted to better facilitate voluntary water marketing and transfers and protect affected parties, including negotiations with the federal government to avoid purchasing reservoir storage at updated costs.</p>	<p>5-4-3-2-1</p>
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0.5.3.1

<p>The state should pursue a constitutional guarantee to protect the areas of origin so they shall never be made water deficient as a result of transfer of water outside the area.</p>	<p>5-4-3-2-1</p>
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## WATER CONSERVATION

5.7.1.4	Acceptability	
	Most	Least
<p>The State Secretary of Environment should appoint a task force of appropriate state agencies to develop a state water conservation plan that incorporates all aspects of public, agricultural and industrial water use. The plan should identify educational opportunities as well as potential incentives to encourage conservation.</p>	5-4-3-2-1	

<p>5.7.1.5</p> <p>The OWRB, Rural Development, Oklahoma Department of Commerce, Indian Health Service and other appropriate funding entities should incorporate incentives for development of individual water system conservation plans into their requirements for water/wastewater project financial assistance.</p>	5-4-3-2-1	
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<p>5.7.1.6</p> <p>The OWRB and other appropriate state agencies should study establishment of a technical assistance program to assist industries in implementing water conservation measures.</p>	5-4-3-2-1	
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1.7.1.1-2		
<p>The state should take steps to promote water conservation such as:</p>		
<p>1. Rainwater capture including green roofs, constructed rainwater capture systems, and soil infiltration. A review of and changes to building codes may be required.</p>	5-4-3-2-1	
<p>2. Better management of concrete and street surfaces should be done by using permeable surfaces to allow lawn-watering runoff and pool drainage to seep into the soil instead of running down the street.....</p>	5-4-3-2-1	
<p>3. Growing local food (food that is adapted to the region) uses less water and thus conserves resources for other needs. ....</p>	5-4-3-2-1	
<b>OVERALL</b>	5-4-3-2-1	

1.7.1.3,12,13,3		
<p>The state should implement monetary incentives for water conservation including:</p>		
<p>1. tax credits for home and business owners who utilize xeriscaping, .....</p>	5-4-3-2-1	
<p>2. incremental increases to water rates to nudge water users and public water suppliers to comply with water conservation requirements. ....</p>	5-4-3-2-1	
<p>3. The state should mandate, and then enforce, that public water suppliers develop a realistic pricing structure. State funding for improvement projects should be tied to the mandate to help with enforcement. Education and outreach to customers should be done so they understand why water rates are rising. ....</p>	5-4-3-2-1	
<p>4. The state should encourage matching the use of the land to the various soil types, landscapes, and climate of the area for more efficient use of water. State subsidies for crops not sustained by the natural weather conditions of an area should be discontinued to promote change and encourage crop selection that is adapted to natural weather conditions. These subsidies should be replaced with education about climate-appropriate crops. ....</p>	5-4-3-2-1	
<b>OVERALL</b>	5-4-3-2-1	

## WATER CONSERVATION

	Acceptability	
	Most	Least
<b>1.7.1.3</b>		
The state should promote no-till farming through more research to make it more successful for agriculture producers. The research should focus on ways to reduce chemical applications to protect water quality. ....	5-4-3-2-1	
Research funds should be made available to universities and private companies to identify and promote the growth of drought resistant crops. The information should be made available to families, independent growers, and small diverse agriculture producers – not just large-scale producers. ....	5-4-3-2-1	
<b>OVERALL</b>	5-4-3-2-1	
<b>1.7.1.4</b>		
Local governments should implement permitting programs for citizen water systems such as lawn irrigation systems. ....	5-4-3-2-1	
Local governments should also require soil moisture monitoring through a program like the MesoNet’s Simple Irrigation Plan (SIP) program to help ensure that watering is based upon soil moisture needs. ....	5-4-3-2-1	
Further, local governments should mandate that citizens be allowed only to water between dusk and dawn to reduce evaporation. ....	5-4-3-2-1	
<b>OVERALL</b>	5-4-3-2-1	
<b>1.7.1.6-7</b>		
The State should encourage the increased use of treated wastewater and gray water by:		
1. municipalities by educating officials on new technologies and reuse possibilities, ..	5-4-3-2-1	
2. the industrial and business sectors through the use of reclaimed water in landscape irrigation, cooling systems, and car washes, .....	5-4-3-2-1	
3. businesses and industries to reuse water by implementing rate structures based on charges for the amount of wastewater generated above what is considered normal for that particular industry or business, .....	5-4-3-2-1	
4. agribusinesses by providing tax credits for recharging groundwater with treated clean effluent, or collecting water and then reusing it for all types of irrigation (not just crops),...	5-4-3-2-1	
5. neighborhoods who should be encouraged to retrofit with a purple pipe system, .....	5-4-3-2-1	
6. households by encouraging re-piping to use gray water outdoors and for toilet flushing, and.....	5-4-3-2-1	
7. monitoring water savings through metering to ensure targeted usage amounts are not exceeded.....	5-4-3-2-1	
<b>OVERALL</b>	5-4-3-2-1	
<b>1.7.1.9</b>		
The state should monitor water use and supply; meters should be installed on all wells, both domestic and non-domestic. Implementation of a well metering program should be phased-in. Meters must be installed anytime property changes ownership, otherwise owners would have between five and ten years to install a meter. The program could be funded through rates and fees paid by end users.	5-4-3-2-1	

## WATER CONSERVATION

1.7.1.14

Acceptability  
Most      Least

<p>No matter what water conservation practices are adopted, research should be conducted to evaluate the outcomes of those conservation programs. The findings should be communicated to the public and State officials. Also, conservation measures and information should remain current; new resources should be researched.</p>	<p>5-4-3-2-1</p>
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## WATER RESOURCE PLANNING: BASIN/WATERSHED MANAGEMENT

Acceptability  
Most Least

5.8.1.2

<p>The OWRB, Corps of Engineers, Bureau of Reclamation, Natural Resources Conservation Service and other appropriate federal, state and local entities should develop a mechanism - such as creation of advisory committees, consisting of representatives of appropriate water uses, or development of agency memorandums of understanding – to facilitate the implementation of modified system operating plans, where needed, and address disputes related to reservoir operations.</p>	5-4-3-2-1
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0.8.1.1

<p>The state should encourage the formation of special purpose districts as needed to purchase local and transported water, operate and maintain facilities and to properly manage the water available to the district. These districts would have adequate powers to contract with the State or federal Governments for water supply and other purposes, to raise revenue necessary to repay the reimbursable costs involved and to take other actions needed to put the water to beneficial use.</p>	5-4-3-2-1
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1.8.1.2

<p>The state should facilitate the establishment of local and regional planning processes. A template or model based on existing state frameworks should be developed for these planning processes.....</p>	5-4-3-2-1
<p>The State should provide technical assistance and funding.....</p>	5-4-3-2-1
<p>Planning efforts should take into account future needs for population growth and economic development, fire protection, improving sub-standard distribution systems, developing consistent standards, and regional cooperation.....</p>	5-4-3-2-1
<p>These local and regional plans should be included in future statewide planning.....</p>	5-4-3-2-1
<b>OVERALL</b>	5-4-3-2-1

**WATER RESOURCE PLANNING: DROUGHT AND EMERGENCY PREPAREDNESS**

5.8.2.1	Acceptability	
	Most	Least
The Secretary of Environment should appoint a State Drought Coordinator to coordinate federal, state and local drought response efforts. The Drought Coordinator should be charged with developing a comprehensive drought preparedness plan that includes: .....	5-4-3-2-1	
1. a monitoring/early warning system -- including the development and implementation of drought indices that signal various stages of drought; .....	5-4-3-2-1	
2. techniques to assess the probable impacts of prospective drought episodes; .....	5-4-3-2-1	
3. approaches to coordinating governmental activities including information exchange and drought declaration/revocation criteria and procedures; .....	5-4-3-2-1	
4. assistance programs with pre-determined eligibility and implementation criteria; ...	5-4-3-2-1	
5. financial/research resources needed to implement drought assessment and response activities; and .....	5-4-3-2-1	
6. educational programs designed to promote drought mitigation/preparedness among the economic sectors most impacted by drought. ....	5-4-3-2-1	
<b>OVERALL</b>	5-4-3-2-1	

1.8.2.1		
The Oklahoma Drought Management Plan has not been updated since it was developed in 1996.		
1. The Plan should be strengthened and updated every five years, with final approval by the Legislature and Governor. ....	5-4-3-2-1	
2. Consistent funding should be provided for plan updates and administrative costs of the plan should be minimized. ....	5-4-3-2-1	
3. Plan administrators should submit annual reports to the Legislature and the public for accountability.....	5-4-3-2-1	
4. The plan should be renamed the Oklahoma Water Emergency Management Plan or the Oklahoma Water Disaster Management Plan to make clear that floods, terrorism, and contamination are included. ....	5-4-3-2-1	
<b>OVERALL</b>	5-4-3-2-1	

1.8.1.4		
Oklahoma should adopt a reverse 911 program, which could be used to notify and encourage citizens to take appropriate action during an emergency. An Amber Alert-type system using multimedia communications should be established for use by municipalities, television stations, schools and others, keeping in mind that parts of the State receive their news from bordering states.	5-4-3-2-1	



## WATER SUPPLY AUGMENTATION

5.6.3.1

Acceptability  
Most    Least

<p>The State Department of Health and/or Department of Environmental Quality should take an active role in establishing guidelines for the safe and authorized use of recycled wastewater, identifying programs where reuse should be automatically considered as an alternative, investigating technological opportunities for efficient water reuse and examining the effects of an expanded reuse program which considers the effects of water withdrawals on downstream users.</p>	<p>5-4-3-2-1</p>
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1.6.6.2

<p>Additional emergency water supplies should be developed by using new water treatment technologies to bring lower quality water supplies on-line.</p>	<p>5-4-3-2-1</p>
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## WATER RIGHTS

5.1.1.1

Acceptability  
Most    Least

<p>The Oklahoma Water Resources Board should, within current statutory guidelines, seek to emphasize conservation and efficient use of stream water resources through improvement of the current system of water rights forfeiture/reduction and schedule of use. The OWRB should consider:</p> <ol style="list-style-type: none"> <li>1. allowances for a permit suspension period, rather than actual cancellation of water rights, if a concerted effort is demonstrated to market the rights; .....</li> <li>2. forfeiture exemptions for conserved water, perhaps through allowing water users to use, sell or lease the water they conserve; .....</li> <li>3. establishment of more stringent limitations on the state's schedule of use provision, unless a significant investment is made, to prevent delays in putting water to beneficial use; and .....</li> <li>4. implementation of administrative fines, criminal charges, or compelling meter installation for failure to report water use or falsification of water report forms. ....</li> </ol> <p style="text-align: right;"><b>OVERALL</b></p>	<p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p> <p>5-4-3-2-1</p>
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1.1.1.4

<p>The state should establish an education program to teach permitted water users how to report their water uses more accurately. The State should review and consider future enforcement options related to data gathering.</p>	<p>5-4-3-2-1</p>
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## DATA COLLECTION AND MANAGEMENT

1.11.1.1	Acceptability Most      Least
<p>The state should develop a computer-based decision support system (DSS) to conduct technical analyses of water quality and quantity data by watershed to ensure supply and demand remain balanced over the long term. The analyses should include water demand changes in population growth, industrial growth, agriculture uses and practices, recreation, and tourism and wildlife. The DSS should undergo proper peer review. The DSS should be used to prioritize the development of infrastructure to meet the demand for present and future use on a regional and statewide basis.</p>	5-4-3-2-1

5.11.5.1	
<p>The Oklahoma Water Resources Board should coordinate the development of a coordinated water resource computer network and data bank that is compatible with the state Geographic Information System. The computer network should include information on water quality and quantity. Other agencies involved should include Oklahoma Department of Environmental Quality, Oklahoma Conservation Commission, U.S. Geological Survey, Bureau of Reclamation, U.S. Army Corps of Engineers. This committee should also coordinate public education efforts related to availability and accessibility of this water resource data.</p>	5-4-3-2-1

## APPENDIX E

This Appendix contains the Approval Letter from the Oklahoma State University Institutional Review Board, a typical email used to solicit volunteers for interviews, and the Informed Consent Form.

## Oklahoma State University Institutional Review Board

Date: Friday, May 20, 2011  
IRB Application No: AS1159  
Proposal Title: Comparison of Water Planning Methods in Oklahoma

Reviewed and Processed as: Exempt

**Status Recommended by Reviewer(s): Approved Protocol Expires: 5/19/2012**

Principal Investigator(s):

Michael A. Langston	William J Focht
003 LSE	003 LSE
Stillwater, OK 74078	Stillwater, OK 74078

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The IRE application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 C.F.R. 46.

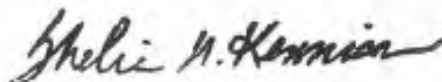
\* The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research, and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRE and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, [beth.mcternan@okstate.edu](mailto:beth.mcternan@okstate.edu)).

Sincerely,



Shelia Kennison, Chair  
Institutional Review Board

## Typical Email Soliciting an Interview

Dear <FirstName>,

As you know, I am a Ph.D. candidate at OSU. I am currently gathering data for my dissertation and would like to ask you to participate in this research by agreeing to an interview. The subject of my research is a comparison of the methods used by the state in preparing their three comprehensive water plans. Each planning effort employed public participation to a different extent. My research will investigate how these differing levels of public participation affected the acceptability to the public of the resulting recommendations. In the interview, you will be asked to rate policy recommendations from these plans based on how acceptable you think they would be to the public.

The interview should take about 90 minutes.

Would you have a time in the next two weeks when I could come by your office for an interview?

Thanks,

Mike Langston  
Ph.D. Candidate  
Environmental Science Graduate Program  
Oklahoma State University



## INFORMED CONSENT FORM

**Project Title:** Comparison of Water Planning Methods in Oklahoma

**Investigators:** Michael A. Langston, Ph.D. Candidate, Oklahoma State University  
Will Focht, Ph.D., Oklahoma State University

**Purpose:** The purpose of this research study is to compare the methods used in creating Oklahoma's three Comprehensive Water Plans. The planning efforts will be compared based on the extent of public participation and how acceptable the recommendations in the plans are to the public. You are being asked to participate because you are familiar with the water policy issues in Oklahoma and Oklahoman's perspectives on these issues. We are asking for your opinion of how acceptable to the public various policy recommendations are.

**Procedures:** You will be asked to rate 39 policy recommendations on a 5 to 1 scale (5=most acceptable and 1=least acceptable). After rating the recommendations, you may be asked to explain your answers. Your explanations will be written in the interviewer's notes.

The interview should take about 90 minutes.

**Risks of Participation:** There are no known risks associated with this project which are greater than those ordinarily encountered in daily life.

**Benefits:** You will help the state to better understand the value of public participation in water planning. The results of this research study will be shared with you.

**Confidentially:** The records of this research study will be kept private. Any written results will discuss group findings and will not include information that will identify you. Your response sheet and consent form will be stored separately and held in locked file cabinets (at OSU in 003 Life Sciences East) and only researchers and individuals responsible for research oversight will have access to the records. Written records that associate a participant with a particular set of answers will be destroyed before July 2012.

**Compensation:** No compensation will be offered for participating in this project.

**Contacts:** If you have questions about this research project contact:

Mike Langston  
003 LSE, OSU  
Stillwater, OK 74078-3011  
405.744.9994

Will Focht, Ph.D.  
003 LSE, OSU  
Stillwater, OK 74078-3011  
405.744.9994

If you have questions about your rights as a research volunteer, you may contact Dr. Shelia Kennison, IRB Chair, 219 Cordel North, Stillwater, OK 74078, 405-744-3377 or [irb@okstate.edu](mailto:irb@okstate.edu)

**Participant Rights:** This is strictly a voluntary interview. You may stop it or withdraw your answers at any time without reprisal by contacting one of the people listed above.

**Signatures:** I have read and fully understand the consent form. I sign it freely and voluntarily. A copy of this form has been given to me.

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

I certify that I have personally explained this document before requesting that the participant sign it.

\_\_\_\_\_  
Signature of Researcher

\_\_\_\_\_  
Date



## APPENDIX F

This appendix contains the contingency Table Analysis output tables from SPSS statistical software (IBM, 2009).



Contingency Table for public participation by acceptability using both overall recommendation and provision ratings

Categories: All			Acceptability					Total
			1.0	2.0	3.0	4.0	5.0	
Public Participation	1980 OCWP	Count	11	11	30	15	21	88
		% within Acceptability	5.7%	3.5%	4.8%	1.2%	2.3%	2.7%
	1995 Update	Count	65	103	256	422	364	1210
		% within Acceptability	33.9%	33.0%	40.7%	35.1%	40.4%	37.4%
	IRW	Count	25	24	76	233	104	462
	% within Acceptability	13.0%	7.7%	12.1%	19.4%	11.6%	14.3%	
	E/S	Count	0	7	16	26	17	66
		% within Acceptability	0%	2.2%	2.5%	2.2%	1.9%	2.0%
	2012 Update	Count	91	167	251	505	394	1408
		% within Acceptability	47.4%	53.5%	39.9%	42.0%	43.8%	43.5%
Total		Count	192	312	629	1201	900	3234
		% within Acceptability	100%	100%	100%	100%	100%	100%

Categories: All	Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.	
Ordinal by Ordinal	Gamma	-.011	.023	-.499	.618
N of Valid Cases		3234			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Contingency Table for public participation by acceptance without overall ratings  
(provisions only)

Categories: All			Acceptance					Total
			1	2	3	4	5	
Public Participation Level	1980 OCWP	Count % within Acceptance	11 6.5%	11 4.2%	30 5.7%	15 1.5%	21 2.7%	88 3.2%
	1995 Update	Count % within Acceptance	56 32.9%	82 31.7%	208 39.4%	352 34.9%	314 40.1%	1012 36.8%
	IRW	Count % within Acceptance	24 14.1%	20 7.7%	72 13.6%	206 20.4%	96 12.3%	418 15.2%
	E/S	Count % within Acceptance	0 .0%	7 2.7%	16 3.0%	26 2.6%	17 2.2%	66 2.4%
	2012 Update	Count % within Acceptance	79 46.5%	139 53.7%	202 38.3%	411 40.7%	335 42.8%	1166 42.4%
Total	Count % within Acceptance	170 100.0%	259 100.0%	528 100.0%	1010 100.0%	783 100.0%	2750 100.0%	

Categories: All	Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Ordinal by Ordinal Gamma	-.013	.025	-.517	.605
N of Valid Cases	2750			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Contingency table for public participation by acceptability using only overall ratings

Categories: All			Acceptability					Total
			1	2	3	4	5	
Public Participation Level	1980 OCWP	Count	11	11	30	15	21	88
		% within Acceptability	18.6%	10.6%	13.1%	3.8%	7.3%	8.2%
	1995 Update	Count	19	30	84	142	99	374
		% within Acceptability	32.2%	28.8%	36.7%	35.8%	34.3%	34.7%
	IRW	Count	1	4	4	27	8	44
	% within Acceptability	1.7%	3.8%	1.7%	6.8%	2.8%	4.1%	
E/S	Count	0	7	16	26	17	66	
	% within Acceptability	.0%	6.7%	7.0%	6.5%	5.9%	6.1%	
2011 Update	Count	28	52	95	187	144	506	
	% within Acceptability	47.5%	50.0%	41.5%	47.1%	49.8%	46.9%	
Total		Count	59	104	229	397	289	1078
		% within Acceptability	100%	100%	100%	100%	100%	100%

Categories: All	Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Ordinal by Ordinal Gamma	.073	.039	1.846	.065
N of Valid Cases	1078			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Contingency table for public participation by acceptance using only overall ratings and only the 1980 OCWP, 1995 Update, and 2012 Update data

Categories: All			Acceptability					Total
			1	2	3	4	5	
Public Participation	1980 OCWP	Count % within Acceptability	11 19.0%	11 11.8%	30 14.4%	15 4.4%	21 8.0%	88 9.1%
	1995 Update	Count % within Acceptability	19 32.8%	30 32.3%	84 40.2%	142 41.3%	99 37.5%	374 38.6%
	2012 Update	Count % within Acceptability	28 48.3%	52 55.9%	95 45.5%	187 54.4%	144 54.5%	506 52.3%
Total		Count % within Acceptability	58 100%	93 100%	209 100%	344 100%	264 100%	968 100%

Categories: All	Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Ordinal by Ordinal Gamma	.089	.045	1.982	.047
N of Valid Cases	968			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Contingency table for public participation by acceptance using only overall ratings analyzed by category

Category				Acceptability					Total
				1	2	3	4	5	
Water Rights	Public Participation Level	1995 Update	Count	7	12	28	25	16	88
		% within Acceptability	63.6%	63.2%	62.2%	40.3%	41.0%	50.0%	
		2012 Update	Count	4	7	17	37	23	88
		% within Acceptability	36.4%	36.8%	37.8%	59.7%	59.0%	50.0%	
	Total	Count	11	19	45	62	39	176	
% within Acceptability	100%	100%	100%	100%	100%	100%			
Nonpoint Source Pollution	Public Participation Level	1995 Update	Count	5	7	16	23	15	66
		% within Acceptability	45.5%	26.9%	33.3%	27.1%	30.0%	30.0%	
		IRW	Count	1	4	4	27	8	44
		% within Acceptability	9.1%	15.4%	8.3%	31.8%	16.0%	20.0%	
		E/S	Count	0	7	16	26	17	66
		% within Acceptability	.0%	26.9%	33.3%	30.6%	34.0%	30.0%	
	2012 Update	Count	5	8	12	9	10	44	
% within Acceptability	45.5%	30.8%	25.0%	10.6%	20.0%	20.0%			
Total	Count	11	26	48	85	50	220		
% within Acceptability	100%	100%	100%	100%	100%	100%			
Water Transfer	Public Participation Level	1980 OCWP	Count	6	10	24	8	18	66
		% within Acceptability	42.9%	45.5%	45.3%	9.2%	27.3%	27.3%	
		1995 Update	Count	1	4	13	31	17	66
		% within Acceptability	7.1%	18.2%	24.5%	35.6%	25.8%	27.3%	
		2012 Update	Count	7	8	16	48	31	110
% within Acceptability		50.0%	36.4%	30.2%	55.2%	47.0%	45.5%		
Total	Count	14	22	53	87	66	242		
% within Acceptability	100%	100%	100%	100%	100%	100%			
Water Supply	Public Participation Level	1995 Update	Count	0	1	1	12	8	22
		% within Acceptability	0%	100.0%	16.7%	63.2%	44.4%	50.0%	
		2012 Update	Count	0	0	5	7	10	22
% within Acceptability		0%	.0%	83.3%	36.8%	55.6%	50.0%		
Total	Count	0	1	6	19	18	44		
% within Acceptability	0%	100%	100%	100%	100%	100%			
Water Conservation	Public Participation Level	1995 Update	Count	2	5	12	29	18	66
		% within Acceptability	18.2%	15.2%	26.7%	33.0%	27.7%	27.3%	
		2012 Update	Count	8	25	30	52	39	154
		% within Acceptability	80.0%	83.3%	71.4%	64.2%	68.4%	70.0%	
Total	Count	10	30	42	81	57	220		
% within Acceptability	100%	100%	100%	100%	100.0%	100%			
Water Resource Planning	Public Participation Level	1980 OCWP	Count	5	1	6	7	3	22
		% within Acceptability	41.7%	50.0%	24.0%	18.9%	8.8%	20.0%	
		1995 Update	Count	4	1	10	13	16	44
		% within Acceptability	33.3%	50.0%	40.0%	35.1%	47.1%	40.0%	
		2012 Update	Count	4	3	12	24	23	66
% within Acceptability		30.8%	60.0%	42.9%	54.5%	54.8%	50.0%		
Total	Count	13	5	28	44	42	132		
% within Acceptability	100%	100%	100%	100%	100%	100%			
Data Collection and Management	Public Participation Level	1995 Update	Count	0	0	4	9	9	22
		% within Acceptability	0%	.0%	57.1%	47.4%	52.9%	50.0%	
		2012 Update	Count	0	1	3	10	8	22
% within Acceptability		0%	100.0%	42.9%	52.6%	47.1%	50.0%		
Total	Count	0	1	7	19	17	44		
% within Acceptability	0%	100%	100%	100%	100%	100%			

Gamma statistics for public participation by acceptance contingency table using only overall recommendation ratings analyzed by category (shading indicates statistical significance)

Category		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Water Rights	Ordinal by Ordinal N of Valid Cases	Gamma .285 176	.106	2.637	.008
Nonpoint Source Pollution	Ordinal by Ordinal N of Valid Cases	Gamma -.064 220	.084	-.758	.449
Water Transfer	Ordinal by Ordinal N of Valid Cases	Gamma .189 242	.084	2.213	.027
Water Supply	Ordinal by Ordinal N of Valid Cases	Gamma .010 44	.251	.038	.970
Water Conservation	Ordinal by Ordinal N of Valid Cases	Gamma -.163 220	.106	-1.532	.125
Water Resource Planning	Ordinal by Ordinal N of Valid Cases	Gamma .221 132	.108	1.990	.047
Data Collection and Management	Ordinal by Ordinal N of Valid Cases	Gamma -.071 44	.251	-.282	.778

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Contingency table for public participation by acceptance using only overall ratings and only the 1995 update, and 2012 update data

Categories: All			Acceptability					Total
			1.0	2.0	3.0	4.0	5.0	
Public Participation	1995 Update	Count % within Acceptability	19 40.4%	30 36.6%	84 46.9%	142 43.2%	99 40.7%	374 42.5%
	2012 Update	Count % within Acceptability	28 59.6%	52 63.4%	95 53.1%	187 56.8%	144 59.3%	506 57.5%
Total		Count % within Acceptability	47 100%	82 100%	179 100%	329 100%	243 100%	880 100%

Categories: All	Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Ordinal by Ordinal Gamma N of Valid Cases	.013 880	.051	.263	.793

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Contingency Table for Public Participation by Acceptance Using Only Overall Ratings and Only the 1995 Update, and 2012 Update Data for Only the Water Transfers Category

Category: Water Transfers			Acceptability					Total
			1.0	2.0	3.0	4.0	5.0	
Public Participation	1995 Update	Count % within Public Participation	1 1.5%	4 6.1%	13 19.7%	31 47.0%	17 25.8%	66 100%
	2012 Update	Count % within Public Participation	7 6.4%	8 7.3%	16 14.5%	48 43.6%	31 28.2%	110 100%
Total		Count % within Public Participation	8 4.5%	12 6.8%	29 16.5%	79 44.9%	48 27.3%	176 100%

Category: Water Transfers	Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.	
Ordinal by Ordinal	Gamma	-.011	.121	-.093	.926
N of Valid Cases		176			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.



Contingency table for public participation by acceptance using only overall ratings and only the 1995 update, and 2012 update data for only the water resource planning category

Category: Water Resource Planning			Acceptability					Total
			1.0	2.0	3.0	4.0	5.0	
Public Participation	1995 OCWP	Count	4	1	10	13	16	44
		% within Acceptability	50.0%	25.0%	45.5%	35.1%	41.0%	40.0%
	2012 Update	Count	4	3	12	24	23	66
		% within Acceptability	50.0%	75.0%	54.5%	64.9%	59.0%	60.0%
Total		Count	8	4	22	37	39	110
		% within Acceptability	100%	100%	100%	100%	100%	100%

Category: Water Resource Planning	Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Ordinal by Ordinal      Gamma	.032	.151	.213	.831
N of Valid Cases	110			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

VITA

Michael Alan Langston

Candidate for the Degree of

Doctor of Philosophy

Thesis: THE VALUE OF THE ANALYTIC-DELIBERATIVE FRAMEWORK  
IN ENVIRONMENTAL DECISIONMAKING: THE CASE OF OKLAHOMA WATER  
PLANNING

Major Field: Environmental Science

Biographical:

Education:

Completed the requirements for the Doctor of Philosophy in Environmental Science (Environmental Policy and Conflict Management Specialization) at Oklahoma State University, Stillwater, Oklahoma in July, 2011.

Completed the requirements for the Master of Science in Biology (emphasis in Ecology) at University of Central Florida, Orlando, Florida in 1995.

Completed the requirements for the Bachelor of Science with Honors in Wildlife Ecology at Oklahoma State University, Stillwater, Oklahoma in July, 1984.

Experience:

Served as Assistant Director, Oklahoma Water Resources Research Institute, Stillwater, Oklahoma from 2006 to present.

Served as Research Associate, Department of Political Science, Oklahoma State University, Stillwater, Oklahoma from 2000 to 2006.

Served as Research Assistant, Department of Biological Sciences, University of Central Florida, Orlando, Florida from 1991 to 1995.

Served as Assistant Scientist, Azurea, Inc., Rockledge, Florida from 1986 to 2000.

Name: Michael A. Langston Date of Degree: July, 2011

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: THE VALUE OF THE ANALYTIC-DELIBERATIVE FRAMEWORK  
IN ENVIRONMENTAL DECISIONMAKING: THE CASE OF OKLAHOMA WATER  
PLANNING

Pages in Study: 203 Candidate for the Degree of Doctor of Philosophy

Major Field: Environmental Science

Scope and Method of Study: This study investigates the relationship between the level (robustness) of public participation and the social acceptability of policy recommendations that emanate from environmental decision-making processes. In particular, the study investigates the ability of analytic-deliberative processes to increase social acceptability of watershed planning recommendations over those generated in processes that employ less robust participation processes such as consultation. Three statewide comprehensive water-planning efforts and two regional planning efforts in Oklahoma, USA, were included in this study. Robustness of participation processes were judged using Sherry Arnstein's ladder of public participation. Social acceptability of plan recommendations was judged by elites familiar with water planning and public preferences across the State. Their judgments were validated by comparison to large random sample surveys of citizens in two of the five planning efforts. Analysis of the relationship between participation robustness and recommendation acceptability was conducted for individual recommendations and categories of similar recommendations.

Findings and Conclusions: Elite judgments compared favorably with those obtained directly from citizens in the two random sample telephone studies, which indicate that their judgments could be used as a proxy for public preferences - although elite judgments proved to be somewhat more pessimistic. A weak but statistically significant positive relationship between the level of public participation and recommendation acceptability was found. In particular, a positive relationship was found between plans that involved no public participation and those that involved at least some. The relationship was strongest for those recommendations that were more salient, controversial, and populist (seen by citizens as appropriate for public discourse). A model developed by Will Focht can be used to explain this relationship as the outcome of trust judgments: citizens prefer to be more involved when both government and social trust are lower and facts are less certain.

ADVISER'S APPROVAL: Will Focht, Ph.D.

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