A NEW FRAMEWORK FOR WATER CONFLICT RESOLUTION

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Abstract: The recent collapse of the ACT/ACF Compact negotiations discloses significant shortcomings in traditional approaches to resolution of transjurisdictional water conflicts involving multiple stakeholders. Without full acknowledgement of the broader external issues fueling the conflict and without collaboration by the parties to eliminate extraneous sources of intractability, the core dispute is unlikely to be correctly framed and the negotiations may be ill-informed as a consequence. Poor framing can prevent consensus on core objectives and constraints and misdirect the formulation, analysis and evaluation of water management alternatives. Consensus remains elusive, the diligent efforts of the parties notwithstanding. At the core of the ACT/ACF negotiations were models for simulation of operational alternatives, which, while sophisticated, addressed primarily symptoms, e.g. flow deliveries, water consumption, reservoir operations, drought response, etc., as opposed to causes of the conflict. The ACT/ACF conflicts demonstrate that incomplete characterization of the parties, issues, social system, and processes framing the conflict contributes to the difficulty and expense of the core modeling, and more importantly makes disclosure of satisfactory solutions around which consensus can be fashioned unlikely.

The author proposes to synthesize widely-recognized elements of successful conflict resolution to create a new framework for management of water conflicts. The procedure involves the following four steps:

- Identification of sources of intractability in the parties, issues, social system, and process
- Conflict re-framing to eliminate or minimize sources of intractability
- Consensus on core problem definition, core objectives and constraints
- Parameterization of satisficing core models, consensus on management alternative

The author conceptually describes the processes of re-framing and consensus management pending proof-of-concept demonstration. New or existing 'off-the-shelf' models may be applied to analysis of the core problem. The entire conflict management process is iterative; should the core modeling disclose new sources of intractability that prevent consensus, previous steps may be repeated to re-frame the conflict and/or re-define core objectives and constraints. Some components of the proposed conflict management framework may be suitable for integration within computer-aided decision-support or expert systems, depending on the number and complexity of parties and issues involved.

INTRODUCTION

Several ideas for improvement of the water conflict resolution framework and processes embodied in the wake of the failed ACT and ACF Compact negotiations have recently been proposed by some of the participants and academicians involved. Notwithstanding the need and potential for improvements in core simulation models, it is highly likely that the ACT and ACF Compact negotiations failed primarily due to the inability of the parties to recognize the underlying premises of the disputes and external factors preventing consensus. In recent years, researchers and practitioners have identified common characteristics of intractable environmental and resource allocation conflicts with respect to the parties, issues, social system, and processes involved. Potential sources of intractability must be correctly identified, characterized and understood, and the issues re-framed accordingly to remove these obstacles to successful resolution.

The proposed decision support system (DSS) for water conflict management synthesizes three essential elements of successful resolution, i.e. intractability avoidance, consensus measurement, and satisficing models. Four steps are required, the first three of which frame the conflict and establish parameters of the core modeling. The DSS will be

designed to operationalize groundbreaking work in understanding of intractable conflict (Lewicki, et. al., 2003), consensus measurement (Bender and Simonovic, 1997), and operational water management models (Sheer, 2002a; USACE, 1998).

STEP 1: SOURCES OF INTRACTABILITY

The first step in the conflict resolution process involves characterization of the parties, issues, social system, and process to identify factors potentially fatal to negotiation and consensus. The following are among potential sources of intractability:

- Parties – diffuse, disorganized
- Issues – dissensual, i.e. rooted in ideology, culture, group membership, threats to public health and safety (non-negotiable); subjective values
- Social system – ambiguous, in flux, contested
- Conflict process – escalated, unconstructive, violent

Potential sources of intractability requiring disclosure at the outset of conflict resolution are shown in Figure 1. Initial demonstration of proof-of-concept would be performed through participant surveys designed to elicit information on the four source classes shown, to be evaluated and identified by conflict managers. The prototype WRCR-DSS is envisioned to utilize expert systems and relational databases to assist in survey design and interpretation.

STEP 2: CONFLICT RE-FRAMING

The second step in the conflict resolution process involves iterative re-framing and re-structuring of those aspects of the conflict potentially leading to intractability. Figure 2 extends the spectrum of intractability sources depicted in Figure 1 to identify characteristics of resolvable conflicts. Conversion of a conflict from intractable to tractable requires that the parties, issues, social system and process be restructured to eliminate or minimize potential problem areas and avoid negotiations deadlocked by superfluous, ideological, religious or class differences extraneous to the set of core water management/allocation problems to be resolved.

Putting intractable conflicts on a path to successful resolution essentially involves organization of parties, reduction of the subjectivity, complexity and contentiousness of the issues, and provision of a robust framework for negotiations. Characteristics of potentially resolvable conflicts include the following:

- Parties – bounded (limited), well-organized
- Issues – consensual, distributional, quantitative; health and safety assured; objective values
- Social system – prescribed, legitimate, effective
- Conflict process – de-escalated, problem solving, discourse

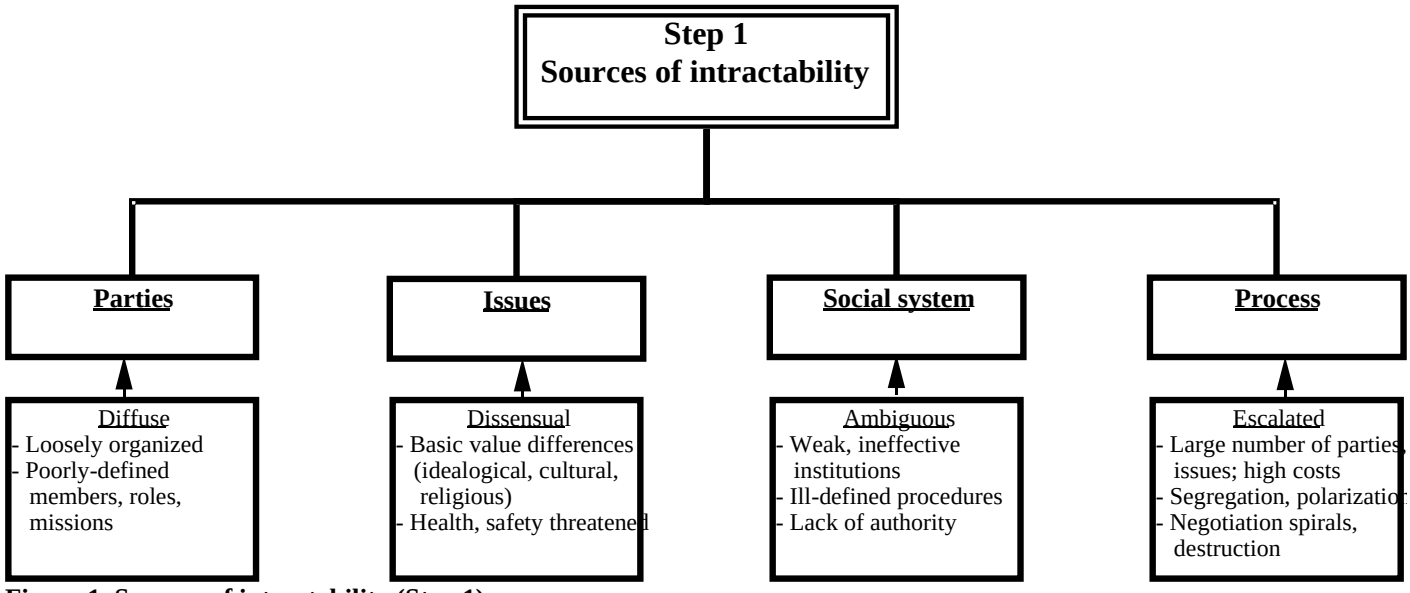

Figure 1. Sources of intractability (Step 1)

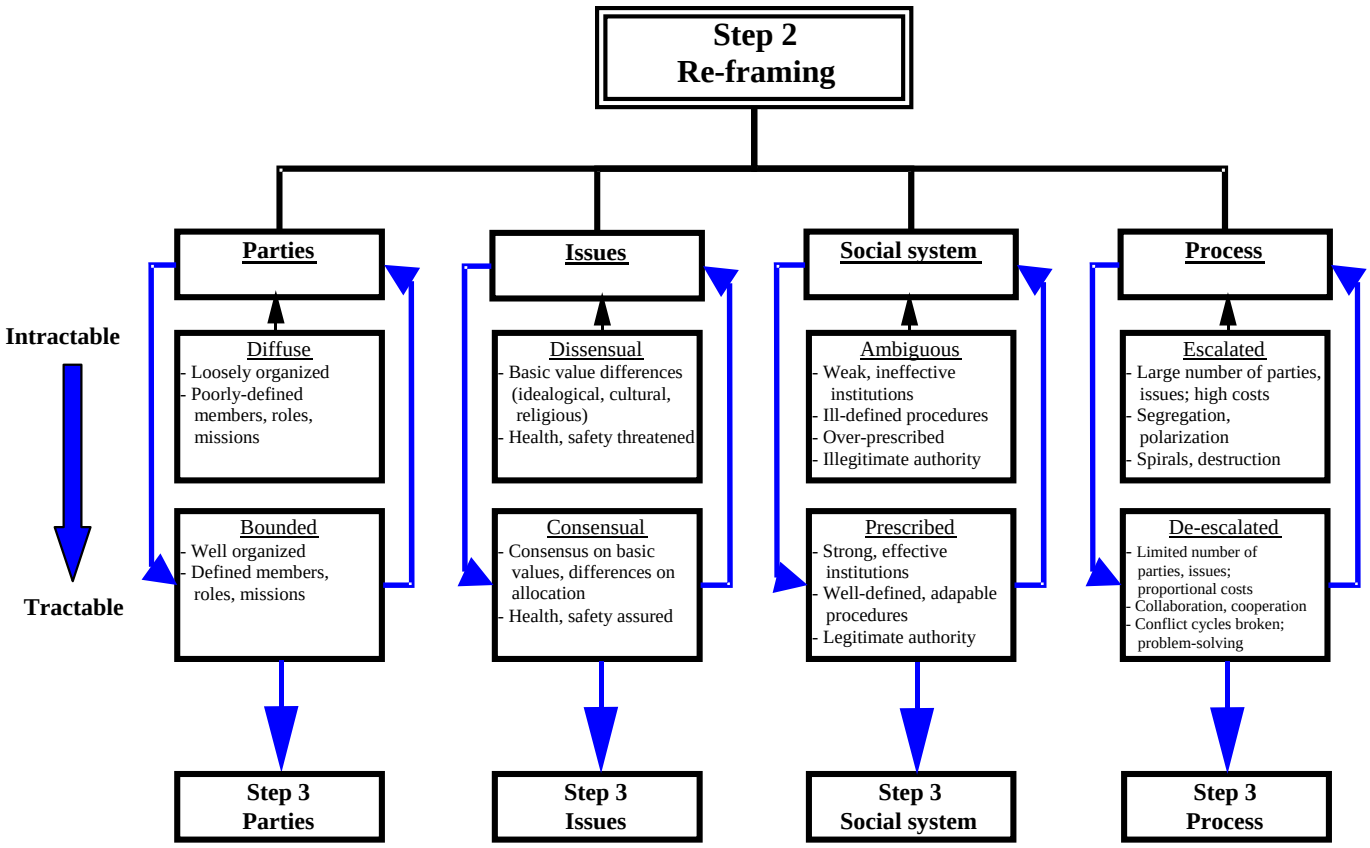

Figure 2. Conflict re-framing (Step 2)

From this discussion it is apparent that characteristics of resolvable conflicts are generally mirror-opposites to those of intractable conflicts with respect to the parties, issues, social system and conflict processes.

For Step 2, proof-of-concept reframing would be performed by a panel of experts representing the parties to the conflict. While the prototype WRCR-DSS might employ expert system approaches to assist in this process, the complexity of the issues and need for value judgments in formulation of workable alternative conflict management frames limits the potential utility of such systems. For example, parties to the conflict may not be well-organized or may draw ideological or group membership distinctions from other parties in ways unrelated to the core water resource management issues, or that cause the conflict process to escalate and spiral out of control. Alternative remedies to such a situation might involve (1) persuading 'offending' parties to set aside differences not germane to the core conflict, (2) grouping parties within a hierarchal organizational structure empowered only to represent group positions on core issues, or (3) exclusion of offending parties from the negotiations as a last resort, when there is no possibility of their cooperation in problem solving and consensus building. The difficulties of project re-framing are immense, and in some cases mediation and/or arbitration of disputes may be necessary. Disputes may arise over the parties to be included in the negotiation and their roles, the issues to be addressed, the need for institutional reform and/or creation of new institutions, establishment of legitimate authority for conflict management and plan implementation (i.e. an existing agency or a new river basin commission), or the need for modification of the process itself.

The outcome of Step 2 is a conflict management framework designed to facilitate problem solving and consensus building. Careful review and analysis of the re-framed conflict management structure (Step 1) will be necessary to ensure against magnification of minor obstacles or creation of new sources of intractability in Step 2.

STEP 3: CONSENSUS-BUILDING

Once the major sources of intractability have been identified in Step 1 and eliminated (if not germane to the core water management problem) or re-framed to allow constructive problem solving to proceed in Step 2, consensus must be developed on the objectives and constraints of the core problem.

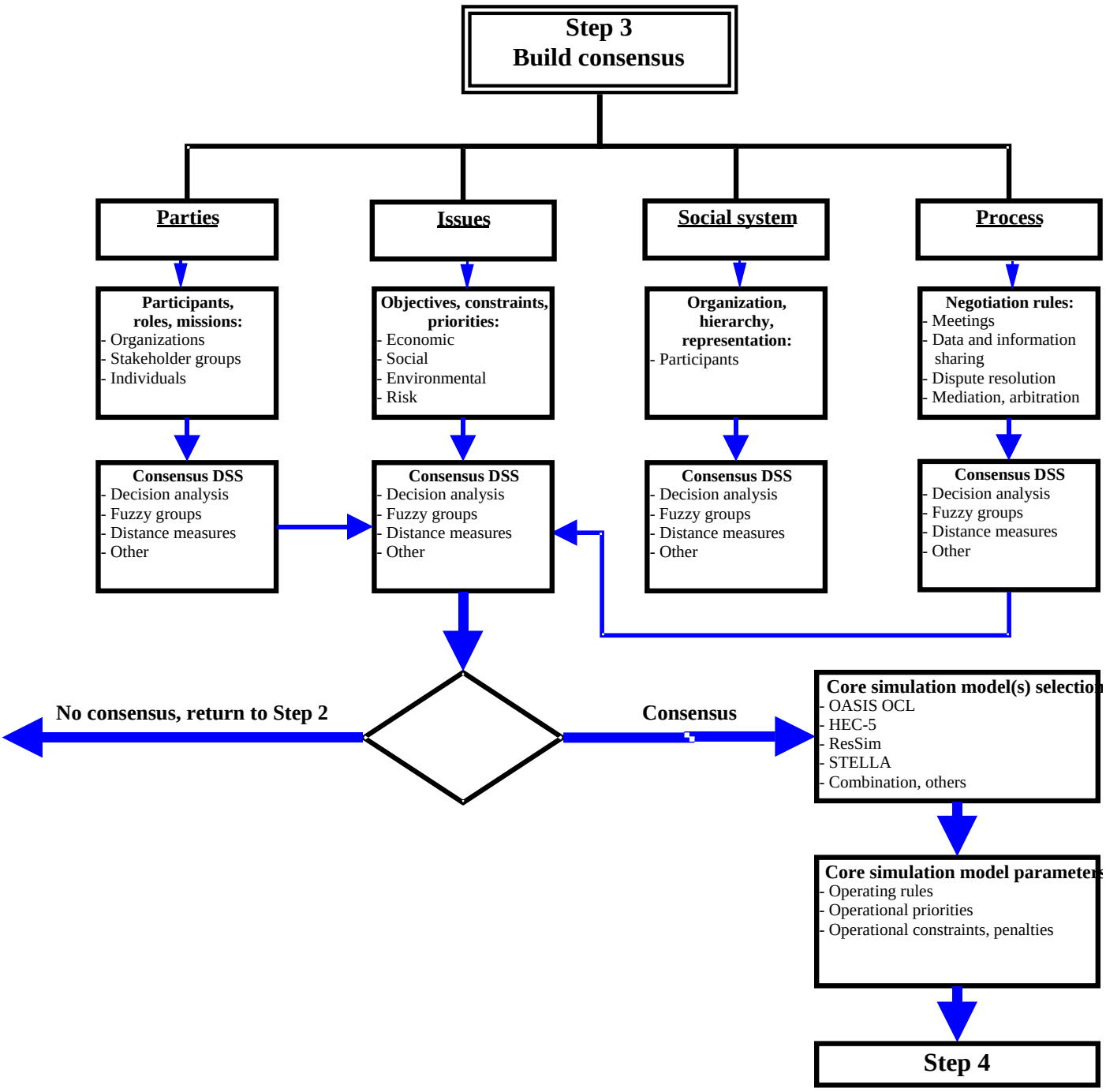

Figure 3. Consensus-building (Step 3)

Figure 3 depicts the process of informing the development of the rules, parameters and measures of performance for the system simulation models in Step 4, in which alternative management plans are analyzed and evaluated, and consensus formed on a recommended plan of action (the resolution of the conflict).

The process of developing and measurement of consensus has been analyzed by Bender and others within the context of integrated and sustainable water resource management, and is applicable to conflict resolution as well. Without going into detailed, consensus may be quantified using compromise programming, various distance measures of coincidence (agreement) and discrepancy (disagreement), and other techniques. Irrespective of the technique applied, one of the more appealing features of consensus DSS in comparison to optimization models is that it is complementary to the value judgments of negotiators made in the full richness of exogenous concerns as well

as those presented by the core problem. Simply stated, application of consensus DSS can be successful whether or not consensus matches the metrics if the parties are guided toward a satisfactory conclusion they might not have reached otherwise.

In addition to the objectives and constraints, Step 3 should also produce agreement on the methods, models and data for the core analysis. To the extent that risks, gains or losses associated with the core analysis can be anticipated and quantified by the parties, consensus measurement techniques may include concepts and applications of risk management, uncertainty, and economic bargaining theory.

Should consensus on the objectives and constraints of the core analysis not be achieved, or new sources of intractability be disclosed in the process of consensus-building, it may be desirable or necessary to repeat Step 2.

STEP 4: CORE ANALYSIS

Step 4 is where traditional conflict resolution often prematurely begins, with much of the effort focused on development and application of data and satisficing models rather than identification and framing of the core issues. The WRCR-DSS approach eliminates or re-frames larger issues potentially leading to intractability prior to evaluation of management alternatives and formation of consensus on the selected plan. Step 4, shown in Figure 4, may combine traditional water resource system simulation, computer-aided negotiation (Sheer, 2002b), 'shared-vision' modeling (Palmer and Keyes, 1993; Werick et. al., 1994), socioeconomic (Flug and Ahmed, 1995) and system dynamics (Jordao et. al., 1997) models, and other approaches to decision support and conflict resolution (Lund and Palmer, 1997; Wurbs, 1997).

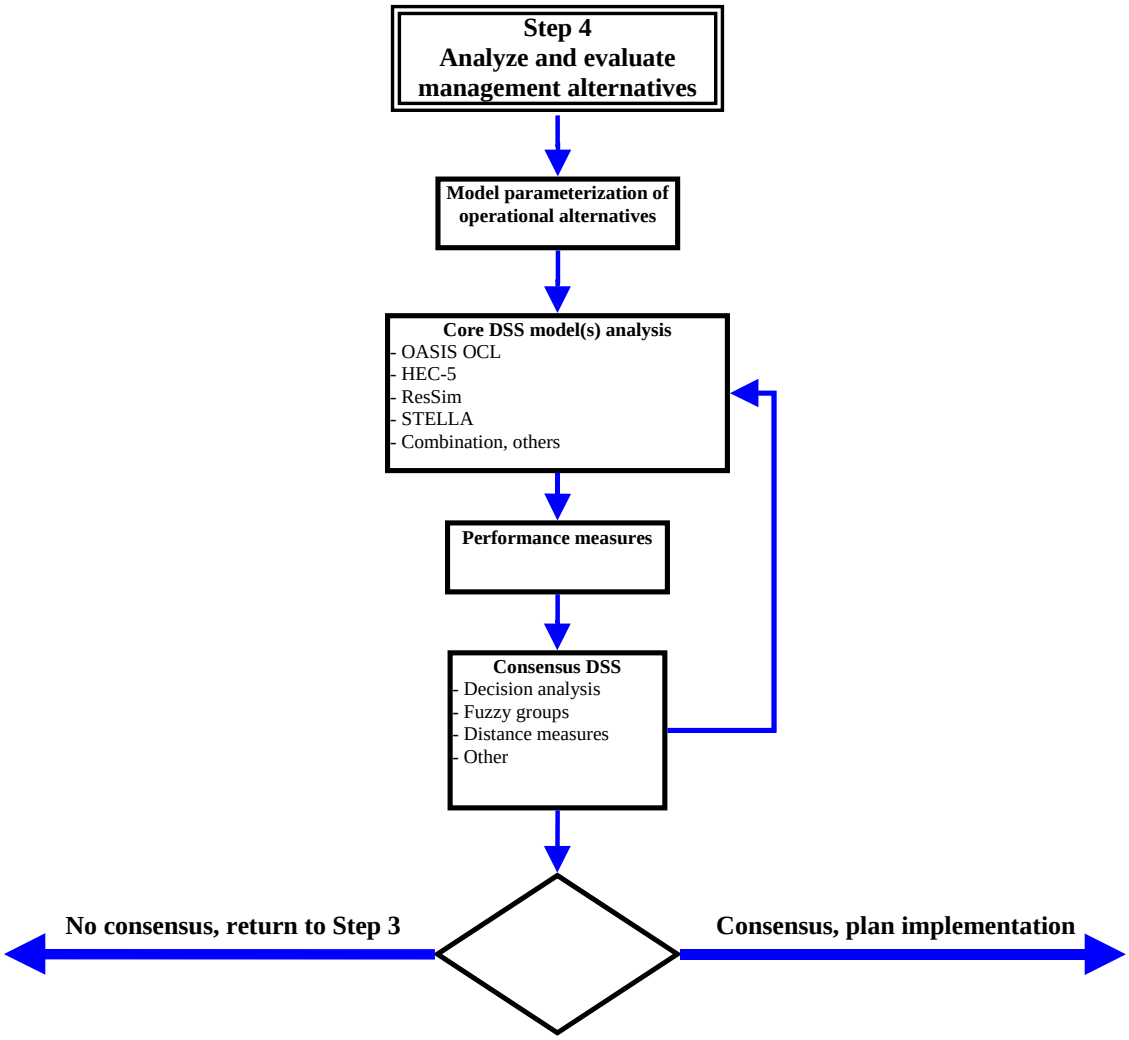

Figure 4. Evaluation of alternatives (Step 4)

Step 4 involves the following sequence of activities:

- Operational simulation of alternative water management strategies using models, objectives, constraints, rules, priorities and model parameters around which consensus was achieved in Step 3
- Consensus on measures of performance for evaluation of operational alternatives
- Evaluation of management alternatives
- Formation of consensus on a recommended alternative, resolving the conflict

If consensus cannot be achieved on management alternatives, the models may be re-run with new rules, priorities and parameters. Alternatively if the analysis discloses larger problems in conflict framing, weaknesses in the chosen objectives and constraints, or the need for application of other methodologies and models, repeat of Step 3 may be desirable.

PROOF OF CONCEPT

Because of the expense of DSS development and testing in connection with Steps 1 – 3, a prototypical application is desirable to demonstrate the feasibility of the approach. A proof of concept application to a bounded (not overly-complex) problem, with the parties limited and one or two sources of intractability present, could be performed relatively quickly and inexpensively. Steps 1 – 3 could be performed 'manually' by a panel of experts, and existing ACT/ACF models and data could be applied to Step 4. The negotiations could be conducted in 'focus group' format, and the outcome would be non-binding on the parties.

SUMMARY AND CONCLUSIONS

The author envisions a computer-aided decision support system working on different levels to improve prospects for non-judicial resolution of environmental and resource allocation conflicts. This proposal is especially well-suited to statewide water planning, interstate water allocation, water resource development, interbasin transfers, and related issues involving multiple jurisdictions and competing uses of water. The approach can also be adapted to a wide variety of developmental, regulatory, and other issues related to management of private and common-property resources by regulatory agencies, local governments, planning agencies, developers, utilities and manufacturers. The proposal calls for (1) conflicts to be reduced to core issues, (2) management of the process and parties to prevent destructive spirals, and (3) collaborative problem solving. The author acknowledges that a robust institutional framework and legitimate authority for conflict management may sometimes be needed, but their structure, organization and composition are left to the parties to decide in view of the stakes and sources of intractability potentially forestalling resolution.

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