Shared Vision Planning

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How to Conduct a Shared Vision Planning Process

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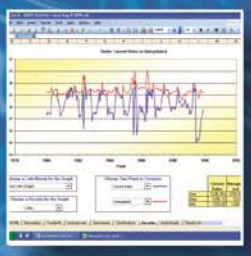

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The Institute for Water Resources (IWR) is a Corps of Engineers Field Operating Activity located within the Washington D.C. National Capital Region (NCR), in Alexandria, Virginia, and with several satellite centers across the U.S. IWR was created in 1969 to analyze and anticipate changing water resources management conditions, and to develop planning methods and analytical tools to address economic, social, institutional, and environmental needs in water resources planning and policy. Since its inception, IWR has been a leader in the development of strategies, methods, and models for planning and executing water resources programs.

IWR strives to improve the performance of the Corps water resources program by examining water resources problems and offering practical solutions through a wide variety of technology transfer mechanisms. In addition to hosting and leading Corps participation in national forums, these include the production of white papers, reports, workshops, training courses, guidance and manuals of practice; the development of new planning, socio-economic, and risk-based decision-support methodologies, improved hydrologic engineering methods and software tools; and the management of national waterborne commerce statistics and other Civil Works information systems. IWR serves as the Corps expertise center for integrated water resources planning and management; hydrologic engineering; collaborative planning and environmental conflict resolution; and waterborne commerce data and marine transportation systems.

The Institute's Hydrologic Engineering Center (HEC), located in Davis, CA specializes in the development, documentation, training, and application of hydrologic engineering and hydrologic models. IWR's Navigation Data Center (NDC) and its Waterborne Commerce Statistical Center (WCSC) in New Orleans, LA, is the Corps data collection organization for waterborne commerce, vessel characteristics, port facilities, dredging information, and information on navigation locks. The Institute's newest center is the Dam Safety Risk Management Center (RMC).

Other enterprise centers at the Institute's NCR office include the International Center for Integrated Water Resources Management (ICIWaRM), which is a distributed, intergovernmental center established in partnership with various Universities and non-Government organizations; and the Conflict Resolution and Public Participation Center (CPC) which includes a focus on both alternative dispute resolution processes (ADR) and the integration of public participation techniques with decision support and technical modeling – Computer Assisted Dispute Resolution (CADRe) – such as manifested in the technique known as Shared Vision Planning (SVP). The Institute plays a prominent role within a number of the Corps technical Communities of Practice (CoP), including the CoP's for Planning; Economics; Operations and Regulatory; Hydrologic, Hydraulics & Coastal Engineering; Environmental; and Strategic Planning.

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How to Conduct a Shared Vision Planning Process

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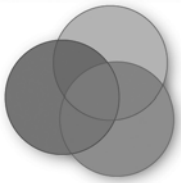

Shared Vision Planning

The Shared Vision Planning program at the Institute for Water Resources (IWR) uses an innovative, collaborative approach to solve water resources management issues. It integrates traditional water resources planning methods, structured public participation, and collaborative computer modeling into a multifaceted planning process. This program is unique because it emphasizes public involvement in water resources management and the use of collectively developed computer models along with tried-and-true Corps planning principles.

Shared Vision Planning aims to improve the economic, environmental and social outcomes of water management decisions. By involving stakeholders throughout the planning process, the Shared Vision Planning process can facilitate a common understanding of a natural resource system and help stakeholders reach a management consensus that satisfies multiple interests. Shared Vision Planning allows IWR scientists to work directly with stakeholders to find acceptable solutions to issues surrounding the management of water resources.

Collaborating for Improved Water Resources Management

Through its Shared Vision Planning Program, IWR is applying the principles of public involvement and collaborative computer modeling to a series of water resources management case studies across the United States. Analyses, documents, and an enhanced web presence are being developed to impart the method and lessons of Shared Vision Planning to the wider planning community. Occasionally, the program publishes workshop summaries in order to advance the state of the art, but the views expressed in these publications do not necessarily reflect those of the Institute for Water Resources or the Army Corps of Engineers. All of these initiatives are designed to help planners and stakeholders use a collaborative approach to natural resources management.

By recognizing the importance of multiple stakeholder interests and the value of innovative technological support, Shared Vision Planning can make a positive impact on the current and future management of our nation's water resources. The Shared Vision Planning Program at IWR is developing partnerships with other organizations to more effectively implement this approach. The Program has already helped numerous stakeholders in previous projects to find acceptable water management solutions, and IWR looks forward to the continued spread and success of this planning approach.

For further information on the Shared Vision Planning program, please contact Hal Cardwell, 703-428-9071, Hal.E.Cardwell@usace.army.mil.

To learn more, please visit the Shared Vision Planning web site:
www.svp.iwr.usace.army.mil

IWR Shared Vision Planning Publication Series

This report is part of IWR's Shared Vision Planning publication series. Publications in this series serve two primary purposes: (1) To provide general information about what Shared Vision Planning is and recommendations for how best to apply it, and (2) To document case studies and research to advance the field. This report serves the first purpose. The publications in this series are categorized as the following:

Guidance on Applying Tools and Leading Processes

For those looking for basic information about what Shared Vision Planning is, as well as guidance on how to conduct a Shared Vision Planning process, IWR has available:

Creighton, J. 2010. A Guide to Conducting a Shared Vision Planning Process. IWR Report 09-R-6. *A complete manual for those who are leading the process.*

Cardwell, H., Langsdale, S. and Stephenson, K. 2009. A Shared Vision Planning Primer. IWR Report 08-R-02. *Introduces the reader to the three pillars of Shared Vision Planning, and how it can help address current challenges in water resources decision making today.*

Lorie, M. 2006. A short guide to interactive decision support tools using Microsoft Excel. IWR Report 06-R-02. *A primer that describes how Excel can support a collaborative modeling process.*

Case Studies and Research to Advance the Field

Michaud, W. 2009. Performance Measures to Assess the Benefits of Shared Vision Planning and Other Collaborative Modeling Processes. IWR Report 09-R-7.

Creighton J. and Langsdale, S. 2009. Analysis of Process Issues in Shared Vision Planning Case Studies. IWR Report 09-R-05. *Summarizes process documentation in Shared Vision Planning cases to date, and provides guidance for future case study authors.*

Stephenson, K., Shabman, L., Langsdale, S., and Cardwell, H. 2007. Computer Aided Dispute Resolution: Proceedings from the CADRe Workshop. IWR Report 07-R-6. *A definitional paper, eight case studies, and documentation of working group efforts.*

Imwiko, A., Kiefer, J.C., Werick, W.J., Cardwell, H.E., and Lorie, M.A. 2007. Literature Review of Computer Aided Collaborative Decision Making. IWR Report 2007-R-01. *An annotated bibliography for 52 case studies that used a computer model in a collaborative decision making process.*

Lorie, M. 2006. Shared Vision Planning Applied to Regulatory Decisions. IWR White Paper, dated July 31, 2006. *Discusses Shared Vision Planning and its relation to the Corps' regulatory role under Section 404 of the Clean Water Act.*

All of the above reports were published by IWR and are available at: www.sharedvisionplanning.us or www.iwr.usace.army.mil/inside.

Additional materials have been developed, including conference proceedings papers, journal articles, fact sheets, and brochures, many of which are also available at www.sharedvisionplanning.us.

Future Work

The above documents lay the foundation for contributions to other work that is currently in progress by the Shared Vision Planning program. Documents in process include:

- Bourget, E., (ed). *In Review*. Finding Common Ground: Integrating Collaborative Modeling with Participatory Processes to Make Water Resources Decisions. A book on Computer Aided Dispute Resolution that defines the field, offers case study examples, and explores opportunities and challenges for its use to improve water resources planning.
- A document of Principles and Best Practices for Collaborative Modeling document, being generated through an ASCE Environmental Water Resources Institute Task Committee (Expected 2011)
- As a companion to Michaud (2009; IWR Report 09-R-7), A guide to reporting collaborative modeling survey data, with an emphasis on how to synthesize the results of the survey.

The completed publications in this series to date all focus on the use of Shared Vision Planning; however, the new Conflict Resolution and Public Participation Center of Expertise, of which the Shared Vision Planning program is a part, is also considering the use of other technical tools to support Environmental Conflict Resolution processes. Therefore, future reports produced by the Center may address a wider array of tools.

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Section 1
Introduction

Disputes over water resources are increasingly common. They are likely to become even more so as water becomes an increasingly scarce resource.

Disputes frequently produce stalemates that block water conservation resources development, preservation of natural habitats, and protection of communities from hurricanes and floods. They become a *no win* situation, where no needs get met.

This guide describes a dispute resolution technique called Shared Vision Planning that is designed to help move past these impasses and produce agreement on a course of action. To accomplish this, Shared Vision Planning addresses fundamental problems that exist in many disputes: (1) people cannot agree on the basic facts about how the natural system actually operates; (2) people understand only one part of the water resource puzzle, and do not understand how decisions in one part of the system affect other parts of the system; (3) people do not trust water management agencies to evaluate alternatives fairly, believing they use study methodologies with hidden assumptions that favor the approaches these agencies favor, and (4) they are not confident that agencies are considering all the alternatives.

Shared Vision Planning (SVP) addresses these issues by actively engaging stakeholders in collaboratively developing one or more computer models that will then be used to analyze the issues of greatest concern to stakeholders. In the process, participants develop a *shared vision* of how the natural system operates, begin to understand the linkages between the various parts of the system (water supply, flood risk management, habitat, etc.), actually participate in developing the tools that will be used to evaluate the alternatives, and can generate alternatives that can be *tested* using the model.

The Institute for Water Resources (IWR), a policy think-tank for the U.S. Army Corps of Engineers (Corps), developed and is a proponent of Shared Vision Planning. The Shared Vision Planning approach was established and refined during the course of a very large study known as *National Study of Water Management during Drought*, completed in 1992.[1] The overall study included several regional case studies referred to collectively as the *Drought Preparedness Studies*. Shared Vision Planning has been used in a number of circumstances since then, and a number of case studies are available for download at an IWR web site at www.svp.iwr.usace.army.mil.

In this guide, Shared Vision Planning is described as a process for resolving water management disputes, because that is the context in which it is used by the Corps of Engineers. But the technique can be and has been used to address issues in other fields such as transportation and energy planning. IWR believes the approach has broad applicability.

[1] Werick, William J., *National Study of Water Management During Drought*, September 1995, IWR Report 94-NDS-12.

This guide discusses what Shared Vision Planning is, and how to set up and conduct a Shared Vision Planning process. Much of this guide focuses on *process* issues. By *process*, we mean the steps that are followed, the institutional relationships, the mechanisms for involving stakeholders, the dispute resolution tools used, and so forth. Process has to do with *how* everybody works together, not the content of the discussion.

This guide is intended for two audiences: (1) people with facilitation skills who would like to learn how to conduct a Shared Vision Planning process and have access to computer modeling expertise, or (2) people with skills in modeling who would like to learn how to use their modeling in a collaborative process. This guide assumes the reader already has or can gain access to modeling skills, so it concentrates on the collaborative elements of the shared vision process. This guide is not written exclusively for the Corps of Engineers, but for anyone interested in Shared Vision Planning.

Readers do not need modeling background or technical training to understand this guide. There is a discussion of modeling in Section 3, but only so facilitators can talk knowledgeably with their modeler colleagues, and modelers can understand the particular kind of modeling suitable for use in Shared Vision Planning.

Section 2
What is Shared Vision Planning?

Shared Vision Planning (SVP) is a collaborative approach to developing water management solutions that combines three practices: (1) traditional water resources planning, (2) structured public participation and (3) collaborative computer modeling. Although each of these elements has been successfully applied in the past by the Corps and other water resource professionals, what makes Shared Vision Planning unique is the integration of all three elements.

William Werick and Richard Palmer, the developers of the approach, describe the three pillars as follows:[2]

- "A traditional planning process based on Federal water planning principles, but expanded to address multiple decision makers and (in some cases) an operational and adaptive management phase."
- "The engagement of stakeholders, experts and decision makers in the development of a shared vision computer model that encompasses all the important impacts of possible decisions."
- "A rigorous but efficient form of public involvement called *circles of influence* that is used to assure that the concerns of the public are addressed."

Shared Vision Planning is part of a class of methodologies known generically as *computer-aided dispute resolution* (CADRe). These tools go by numerous names, among them Shared Vision Planning, Collaborative Modeling, Participatory Modeling, Group Model Building, Computer-Aided Negotiation, and Mediated Modeling.

Differences between Shared Vision Planning and other CADRe approaches mainly revolve around the context in which the tool is applied. Shared Vision Planning has primarily been used in support of decisions about how to operate existing water control facilities or whether to construct new facilities. In most of these situations the Corps must satisfy multiple criteria. It may, for example, need to operate a dam so that flows of water satisfy objectives related to flood risk management, water supply, power production, recreation *and* protection of fisheries. Meeting all these different objectives can be challenging, particularly within the constraints of the actual situation on the ground. Other CADRe applications focus more on a plan for a river basin without a impending operational or investment decision.

Shared Vision Planning is a tool for making implementable decisions. This means that the analysis of alternatives must be of sufficient depth to be useful as a basis for decision making, as well as meeting all relevant Federal planning rules and regulations.

Shared Vision Planning involves stakeholders in all phases of model development, and considers participation throughout the entire planning process as the fundamental

[2] Werick, William and Richard Palmer, *When Should Shared Vision Planning Be Used?*, page 2, available at: www.svp.iwr.usace.army.mil/docs/IsSharedVisionPlanningRightforYou.pdf

philosophy behind the approach. It uses a collaboratively developed model or suite of models to support problem identification, objective and criteria determination, and tradeoff analysis. Although the remainder of the document will frequently refer to a model, it is understood that a suite of models are likely used within a Shared Vision Planning process.

2.1 The Three Pillars of Shared Vision Planning

The following subsections provide a more detailed discussion of the three pillars of Shared Vision Planning.

2.1.1 Use of a Traditional Planning Process Based on Federal Water Planning Principles

Federal water planning conforms to a detailed set of rules called the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (1983); often referred to simply as "the Principles and Guidelines."

Werick and Palmer describe the Principles and Guidelines as "supported by decades of practical experiences and numerous books, reports and papers with consistent and sound advice on the application of these guidelines."[3] However, they note, "there is no *bible* for three newly important forms of water resource planning – watershed planning, reservoir control studies, and the environmental impact studies associated with the issuance of permits for water projects."

Werick and Palmer see the Principles and Guidelines requirements as embodying many sound principles of planning. So they recommend that entities that are not legally bound by the Principles and Guidelines adopt the fundamentals of that planning approach.

The six planning steps in the Principles and Guidelines are shown below, along with a short summary of the purpose of each step:

1. Identifying Problems and Opportunities

   The process begins with an extended problem definition phase (identifying problems and opportunities) before any consideration of alternatives, to ensure that the problem is properly defined, and the process is not driven by preconceptions about the alternatives that should be considered. This step includes the identification of objectives and criteria.

2. Inventorying and Forecasting Resources

   Planners next identify the present conditions/availability of the resource and forecast future conditions based on what would occur if no (Federal) action is

[3] Werick, William and Richard Palmer, *When Should Shared Vision Planning Be Used?*, page 2, available at: <www.svp.iwr.usace.army.mil/docs/IsSharedVisionPlanningRightforYou.pdf>

taken. In Step 4, a comparison is made between this baseline (forecasted without project condition) and the future conditions produced by each alternative action or solution.

3. Formulating Alternative Plans

   Planners are required to develop an array of alternatives, not just a single alternative, and these alternatives should reflect different approaches or philosophies.

4. Evaluating Alternative Plans

   The Principles and Guidelines require a rigorous evaluation of the impacts of each alternative, as compared to the forecasted without project condition, from the perspective of national and regional economics, environmental impacts, and social/cultural impacts.

5. Comparing Alternative Plans

   The alternatives are compared based upon a variety of values/performance characteristics to ensure that the benefits/impacts associated with each alternative are visible to people with different perspectives.

6. Selecting Recommended Plan

   The agencies identify a recommended plan and go through a public comment period before a final decision is reached.

2.1.2 The Engagement of Stakeholders, Experts and Decision Makers in the Development of a Shared Vision Computer Model

At the end of a study, the results or recommendations are valuable only if they are credible to stakeholders and decision makers. That is also true of models. The credibility of the technical analysis is the key issue.

When pre-existing models are taken *off the shelf* and used to evaluate alternatives, stakeholders sometimes fear that these models do not really fit their specific circumstances. The model may be a *black box* they do not understand. After all the work is over, they can simply challenge the validity of the model. If this is the situation you find yourself in, you need a different way of evaluating alternatives - you need the type of collaborative modeling that Shared Vision Planning advocates.

To gain credibility, in Shared Vision Planning potential stakeholders involved in the decision are invited to be part of the team that develops and uses the model or models. While there is often a core team that includes experts from participating agencies and stakeholders with the expertise to understand the technical complexities of the actual model(s), there are also opportunities for those who are not technical experts to participate in identifying the underlying assumptions, defining the issues that need to be

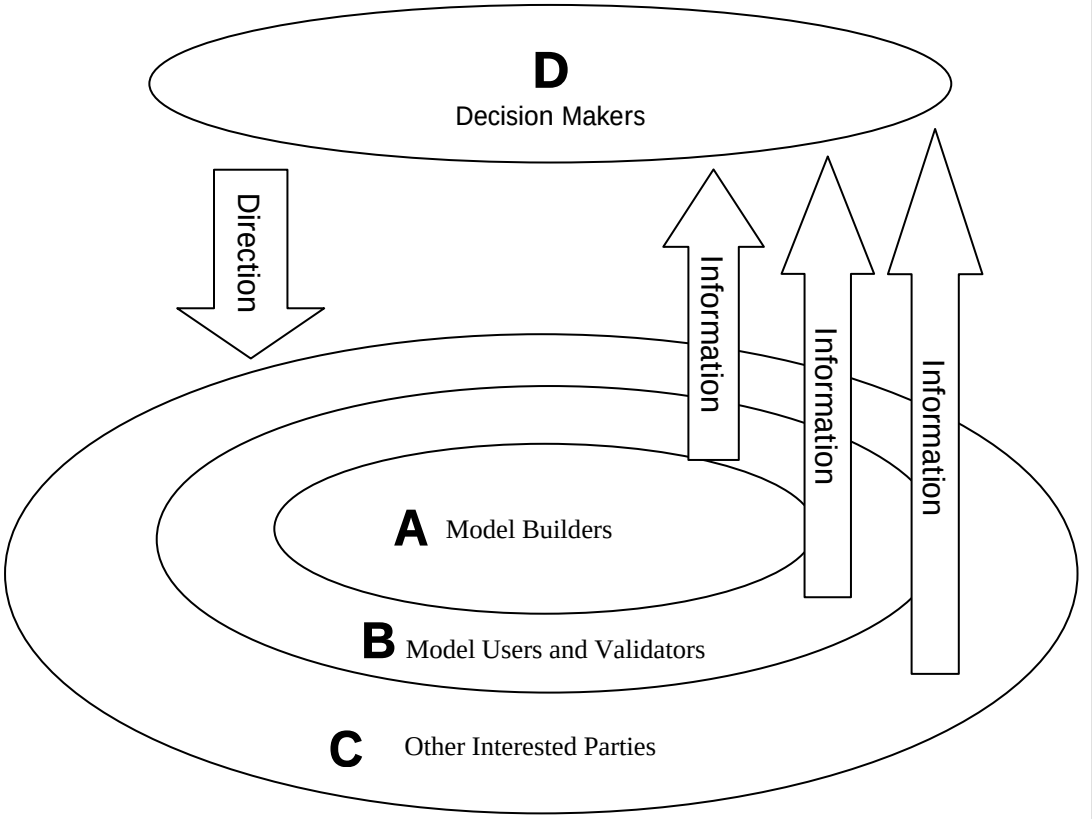


Figure 1
Circles of Influence

addressed by the model(s), and using the model(s) to evaluate numerous scenarios and alternatives. The whole point of engaging in a transparent process to develop a model is so that people will trust it when it comes time to evaluate alternatives.

When we talk about "developing" a model in a collaborative way, this may take different forms that reflect the needs of the situation. In some situations of low trust or lack of consensus on the technical aspects of the water resource system, a single integrated model may be built from scratch. In other cases, where existing models are (or will be) widely accepted and trusted, stakeholders can collaboratively develop the application of the model for their context – debating the values of different parameters for example - to accurately reflect the physical, biological or economic interactions. Regardless, in Shared Vision Planning the model or models must be constructed (or selected) specifically to answer the issues being addressed in the decision making or negotiation process for which it is being used. This adds to the credibility of the model. If the issue under discussion is fisheries, the model might be very different than if the model is about downstream flood risk reduction.

2.1.3 Use of a *Circles of Influence* Form of Public Involvement

Werick and Palmer specify the use of a *circles of influence* form of public involvement. Werick states that: "Trust is developed in concentric circles; the planner works to deserve the trust of the leaders other stakeholders already trust."

The *circles of influence* concept recognizes that there are different levels of participant interest. Decision makers, scientists, people with a strong personal stake in the outcome, or interested citizens are willing or able to invest different levels of time or energy. Some people – like agency scientists – are paid to spend their time working on an issue. For others, participation in a Shared Vision Planning process is in addition to job and family life. So it is unreasonable to expect that they can or want to participate equally.

For simplicity's sake, these different levels of interest or participation can be portrayed as three concentric circles representing different levels or kinds of participation, plus another circle (D) which includes the actual decision makers, to whom Circles A through C communicate information and from whom overall direction is received (see Figure 1).

- Circle A: Model builders
- Circle B: Model users and model validators
- Circle C: Other interested parties
- Circle D: Decision makers

In Shared Vision Planning, the people who will have to commit the most time and energy are the model builders (and other agency staff involved in managing the process). They will need to commit concentrated blocks of time, and they will need to have considerable technical expertise to participate in actually developing the model.

The next circle of influence is people who will review the model to be sure it is accurate and usable. These people may be technical experts, they may be representatives of organized interests or groups, or they may be staff of regulatory agencies or water management agencies who will be using the model. Whatever their background, these are people who will help verify that the model does a sufficiently good job of portraying how the natural system operates and that they are willing to use it to evaluate and compare alternative solutions. They will not put in the same time as the professional modelers, but they will invest enough time and energy so that they can validate the model, and they should have sufficient expertise to understand the details of the model.

The next outer circle is other interested parties. This includes organized groups as well as interested members of the public who are concerned about how the decision could affect them or their community. Typically these people can invest only a limited amount of time. In addition, they usually do not have the technical expertise to get involved in the workings of the model itself, but they are very interested in the assumptions underlying the models and the results generated by the model.

The final circle is decision makers. These are people who by virtue of their organizational or political position will actually be making the decision about how to manage operations of a facility, or whether and where to build a new facility. Typically, decision makers have general expertise in whatever topic is being discussed, but do not have the time to get involved in the inner workings of the model. Instead they will rely on their technical staff to tell them whether they can trust the results of the model.

The credibility of the model is the key issue. The whole point of engaging in a transparent process to develop a model is so that people will trust it when it comes time to evaluate alternatives. Getting stakeholders involved in the model development not only builds trust by helping them to understand what is in the model at the end, but it provides additional quality control. A model built under the supervision of multiple parties is more likely to produce a more complete, representative model that produces the needed results with fewer errors than one that is only developed by technical experts.

The challenge is that the people actually making the decision, and the interested parties, normally do not have the time or the expertise to get involved during the development process or in investigating how the model was constructed.

But there is a communication flow between the circles. Modelers communicate with reviewers, who communicate in turn with other interested parties. Decision makers may communicate with any of the parties. So each person in an inner circle is linked with (or represents) others in the next outer circle. In turn, these people are linked to people in a circle still further out from the center. In this manner, credibility can be transported to the outer circles. But for this to work, everybody in an outer circle must feel represented by or trust someone in a more inner circle. It also requires an active program of communication between the circles.

The fundamental premise of the circles of influence concept is that *people in the outer circles will be willing to trust a model if it is developed by people in the inner circles who are people they trust and with whom they are in regular communication*.

The actual participatory mechanisms used will depend on the circumstances of the individual study. But to illustrate how the concept might work: Modelers would likely participate in a working group or regular series of workshops. Reviewers could be reached through occasional workshops. They may also be involved in working groups on specific topics. Interested parties could be reached in larger *open to the public meetings* either oriented towards the general public, laypeople, or specific sub-publics (e.g., lakefront homeowners, chamber of commerce). Frequently the model is demonstrated at meetings of interest groups, with opportunities for comments. Decision makers may participate throughout the process, but typically participate in periodic meetings, particularly at the beginning of the process and during evaluation of alternatives.

Section 3
The Benefits and Costs of Shared Vision Planning

3.1 The Benefits of Shared Vision Planning

The fundamental premise of Shared Vision Planning is that as stakeholders participate in developing a model, they will first develop a common understanding of how the natural resource system operates, and the linkages between the many attributes and outputs of the system. Once common ground is established around the facts of the system, the stakeholders can discuss values and interests and their desires for the future, ideally leading to a *shared vision*.

Advocates of Shared Vision Planning believe that:

- The process of working together to build a model, or at least verifying its inner workings, creates opportunities for clarifying, communicating, and understanding each others' mutual interests and values
- Transparency and participation in developing the model increases trust and credibility for the model itself
- If the model itself is trusted, many issues of *fact* can be agreed upon quickly, removing these issues from the negotiating/planning table and focusing attention on more critical issues of interests and values
- By jointly developing creative alternatives, participants increase the probability of finding a mutually acceptable solution or plan and develop a *shared vision* of the future.

Shared Vision Planning may help resolve disputes by removing unnecessary conflicts from the discussion, or by bringing them to the forefront early in the process, so they can be addressed before they derail the process. Conflicts are based on many things: misunderstanding and poor communication, different assumptions about how the natural system works, and different values or beliefs about what really is most important in the situation. Shared Vision Planning can take disputes over how the system actually operates, *what is* (cognitive conflict), off the table. It can also reduce relationship barriers (such as mistrust, lack of communication, control issues) by bringing stakeholders together to work on a common task and develop shared understanding. This leaves the challenge of resolving differences about *what ought to be*, but with improved conditions for resolution.

A review of 20 applications of Shared Vision Planning, found that people involved in those cases reported two primary advantages for using computer modeling for dispute resolution:[4]

1. *The ability to portray the linkages between elements of extremely complex systems.*

   In a majority of Shared Vision Planning cases analyzed, the motivation for using computer modeling was to be able to develop plans or make decisions about highly complex systems with competing elements. In some cases, the motivation was to simultaneously evaluate two or more elements of a system that previously had been evaluated in isolation from each other – for example, evaluating both freshwater and wastewater supplies, or surface water, runoff and groundwater. Systems modeling provided an opportunity to incorporate all the complexity of the system yet evaluate performance of the system in a timely manner. For example, to understand what water is available for a community you must consider changing patterns of rainfall, changing patterns of usage as communities grow or adopt conservation practices, how much water is being removed from underground aquifers, and how much water is being returned by infiltration into aquifers or returning in downstream flows. All these factors interact with each other, and a computer model can help track these interactions.

2. *The ability to simulate alternative plans or scenarios in very short periods of time.*

   Another major motivation for the use of high level computer modeling was the ability to minimize the time needed to evaluate scenarios or plans. In three cases, there were existing models, but so much time was spent waiting for results that they were not useful for real-time decision making. The ability to simulate alternative plans or decisions in very short periods of time allows planners to perform numerous *what if…* exercises that are informative for decision makers and stakeholders. This increases the value of the model for shared education and open decision making.

Shared Vision Planning has been highly successful in a number of cases, but not all. In some cases that were originally considered a success, participants ultimately turned instead to politics or the courts to try to win more for their *side*. There were also cases where Federal funds were available to pay for modeling, but the Shared Vision Planning process had difficulty getting launched due to a lack of enthusiasm or participation by potential stakeholders.

3.2 The Costs of Using a Shared Vision Planning Process

There are also costs associated with conducting a Shared Vision Planning process. Each of the three pillars of Shared Vision Planning–a rigorous planning process; development of a computer model that encompasses all the important aspects of possible decisions;

[4] Creighton, James L., 2009. *Analysis of Shared Vision Planning Case Studies*, Institute for Water Resources, IWR Report 09-R-05, p 10-11.

and the engagement of partner agencies, stakeholders, experts and decision makers in the development of the model–adds to the cost of conducting a Shared Vision Planning process. But there are off-setting savings that may significantly shrink the additional net cost of a Shared Vision Planning process.

Below are some of the significant costs and some of the off-setting savings.

3.2.1 Costs to the Sponsoring Agencies

Typically there is a core team of agencies – possibly including Federal, state and local agencies – that convene and manage the process. They are referred to here as the sponsoring agencies.[5] They may be resource management agencies or regulatory entities, but each is expecting to exercise some decision making responsibility for how water and related land resources should be managed.

3.2.1.1 Rigorous Planning Process

If your normal planning process does not incorporate the kind of systematic analysis recommended in Federal planning requirements, there will be costs associated with a more extensive planning process than normal. Not only will the process itself be more prolonged and complex, you may need to retain consultants who can advise you on how to create a more rigorous planning process.

But if the rigorous nature of the decision making process results in greater credibility for the decision, there may be considerable long-term savings. Furthermore, better solutions may be proposed and implemented because of the structured nature of the planning process and the insights gained from stakeholder involvement.[6]

3.2.1.2 Development of a Computer Model

There are costs involved in constructing the computer model itself. Many water planning entities do not have the modeling capability needed to construct a model that incorporates all the factors that need to be considered in decision making. If they have the modeling capability, they may not have prior experience building models collaboratively and may not have the skills to work with the public or build highly transparent models. This means hiring consultants to construct the model or facilitate the collaborative process.

How much additional the model will cost depends not just on the absolute cost of constructing the model, but also the deferred costs associated with whatever evaluation methodology you would use otherwise. Some of the costs of constructing the model may be recouped during the evaluation stage. If you are going to try to evaluate a number of different alternative scenarios or plans without a computer model, the costs of

[5] "Sponsoring agencies" are those as defined in the text, and should not be confused with the USACE definition of "local cost-share sponsors."

[6] For a discussion of the empirical evidence that participatory processes lead to *better* solutions, see Beierle, Thomas C. and Jerry Cayford, *Democracy in Practice: Public Participation in Environmental Decisions*, Washington: Resources for the Future, pgs. 27-28, 52-53.

evaluating these alternatives without a model may be considerable, and in some cases may be greater than the costs of building the computer model.

Similarly costs will need to be evaluated for collaboratively building an integrated model from scratch versus using and or modifying existing models. Building a model from scratch will allow the model or modeling suite to be customized to the needs and interests of stakeholders, but may result in "reinventing the wheel" if broadly accepted and validated models are readily available.

The benefits of constructing a model are not just in handling the complexity of a system, or the ability to rapidly perform what if analyses. In the absence of a computer model, all participants are walking around with mental models. These models are often simplistic or inaccurate representations of the natural system. But participants will continue to argue positions based on these mental models. This may greatly extend the time needed to arrive at an acceptable plan of action. In planning, added time usually means added cost. The process of building the model is an opportunity to expose all the participants' mental models and jointly learn a more complete and accurate representation of the natural system. This process of collaboration takes time upfront, and has an expense associated with it, but is often the critical factor in achieving agreement.

One cost that should be taken into account is the cost of maintaining, updating and using the model after the immediate decision or plan has been reached once created. In addition, some models developed for decision-making purposes may not be perfectly suited as-is for use in day-to-day operations. Additional time and cost may be required for conversion to an operational model.

The model has value for adaptive management, to make adjustments in implementation plans based on actual outcomes, and may have usefulness for other future decisions. But its future value depends on maintaining and updating the model. In a number of Shared Vision Planning cases, no plan was developed for who would host and maintain the model following the Shared Vision Planning.[7] As a result, a valuable asset was allowed to sit on a shelf or atrophy until it was no longer a valuable tool. In addition, the trust and shared understanding that had been built between agencies and stakeholders dissipated and was lost.

3.2.1.3 Engagement of Partner Agencies, Stakeholders, Experts and Decision Makers

Shared Vision Planning is by nature a collaborative process. Collaboration means more meetings, more discussions, and more people involved in making decisions. This usually means that the planning or decision making process is more time-consuming and expensive than a non-collaborative process.

This does not mean that this collaboration is economically foolish. Agencies that develop plans without collaboration often pay the price in many years of reviews, appeals, and

[7] William Werick, personal communication, 2008.

reconsiderations.[8] The overall cost to the agencies may be significantly higher without collaboration. But if decision makers are focusing solely on the costs of the planning process, or do not see the potential for post-decision delays and controversy associated with a unilateral decision, a collaborative planning process will seem to cost more.

Finally, you may want to obtain the services of a facilitator, a public participation consultant, or dispute resolution consultant. Conducting meetings with multiple organizations, or with numerous stakeholders, requires skills that not every agency has. Even if an agency does have staff with those skills, there is still the issue of credibility. If the convening agency is also the meeting leader, there may be questions about the neutrality of the meeting leadership. A facilitator should not only have exceptional meeting leader skills but should be perceived by all as neutral on the outcome of the process.

3.2.2 Costs for the Participants

Frequently, the costs for the participants are not considered. If groups or individuals want a voice in how a decision is made, they need to participate. But this has a cost in time and energy.

In an optimal Shared Vision Planning methodology, the development of the model is stakeholder-driven. Stakeholders–including decision makers, interested groups and individuals, staff of other agencies, and non-agency experts–participate in developing the requirements for the model, in identifying the scientific information on which the model relies, and in identifying the range of alternatives considered. As a result, it is hoped, they will accept the projections generated by the model as adequate for the decision or negotiation at hand.

But this participation by stakeholders takes time. Just as there are costs associated with the involvement of agency staff, there are costs to other agencies, organizations or individuals participating in the process. Even if the time is unpaid volunteer time, there is still the issue of *opportunity costs*. The individual could be spending his/her time doing something else that has value. In addition, there may also be travel costs to attend meetings, sometimes in distant cities.

The development of a model is a technically sophisticated process despite efforts to make it *user-friendly*. Even if an initial *mock* model is simple and can be understood relatively easily, as the study progresses the modeling becomes more complex as more interactions and more detail are included. Some stakeholders feel unable to participate in what they see as a highly technical activity. There is not just the cost of the time to participate directly, but also the added time needed to master the technical complexities.

[8] For a discussion of the link between participation and implementation see Beierle, Thomas C. and Jerry Cayford, *Democracy in Practice: Public Participation in Environmental Decisions*, Washington: Resources for the Future, Chapter 6, pg. 55 – 62. See also Shabman, Leonard and Kurt Stephenson, *Environmental Valuation and Decision Making for Water Investment and Operations: Lessons Learned from the FERC Experience*, 2007, IWR Report 2007-VSP-01.

3.3 Balancing Benefits and Costs

Are the additional costs of a Shared Vision Planning process justified? That depends on what you are comparing the Shared Vision Planning process with, your beliefs about the outcome that will occur without using Shared Vision Planning, and your beliefs in the value of democratic process.

If you are comparing a Shared Vision Planning process with another collaborative process, but one that does not include model building, then many of the costs of meetings, facilitators, etc. will be comparable for both processes. The primary additional cost of Shared Vision Planning will be the actual costs of building the model(s). Again, those additional costs should be contrasted with costs you will incur in any planning or decision making process. Arguably a Shared Vision Planning approach may lead to a more efficient mechanism for evaluation, and might result in quicker agreement on a decision, producing overall cost savings.

When you compare a Shared Vision Planning process to a process that is not collaborative, (e.g., the agency simply does a study and makes a decision, sometimes after a public comment period), then the question is what you think will happen as a result of the unilateral decision. If you are convinced that a unilateral decision will be implemented without significant controversy or delay, then a Shared Vision Planning process may seem an unnecessary expenditure. If you think that a unilateral decision is likely to result in continued controversy, litigation, or could even mean that a few years from now you will be redoing the study in an effort to find a solution that is acceptable, then Shared Vision Planning may look like a very reasonable investment. Finally, if you believe that a shared vision results in a kind of *social capital* that has benefits beyond the immediate decision, then Shared Vision Planning may be a good investment in the future.

Section 4
What You Need to Know About Modeling

If you have not participated in or conducted a process using Shared Vision Planning, there are some basic concepts about modeling you need to know to be able to converse intelligently with modelers or explain Shared Vision Planning to the public. If you understand conventional modeling, but have not participated in a Shared Vision Planning process, you may find Shared Vision Planning type models more transparent and responsive to the audience than you are accustomed to. This section addresses basic concepts of modeling and the qualities of models that are appropriate for Shared Vision Planning.

4.1 Basic Concepts of Modeling

Shared Vision Modelers may use a variety of types of models to support the project purpose. However, any Shared Vision Planning model should be acceptable and trusted by the participants. Its assumptions, limitations, and uncertainties should all be transparent. And, it needs to be able to respond to stakeholders' inputs and to be flexible as their preferences changes. The following subsections address some of the important terms and concepts that are commonly used by modelers.

4.1.1 Systems Models

Water resources models may include any number of components – physical features (lake, reservoir, river), water quantity, water quality, surface water, groundwater, rainfall, downstream flows, instream flow requirements, and so forth. A *system model* integrates many of these components and portrays the relationships between them.

A *dynamic* model or *simulation* model shows how those relationships between the components play out over time. In natural or social systems, there are numerous cause and effect relationships. These relationships do not act independently but interact and may create dampening or reinforcing *feedback loops*. Without fully understanding the system, an action may cause unintended consequences. Simulation models are able to track this complex behavior easily, allowing the users to learn about the system, to evaluate alternative actions or policies, and thus, to support group decision processes.

4.1.2 Level of Detail - Model Tiers

Models can serve a number of different functions, and the model can be tailored to meet different needs. One of the key upfront questions in any Shared Vision Planning process is what kind of model you need to address a particular challenge or set of issues.

Figure 2 shows three tiers, along a continuum. Tier I models have wide breadth, but shallow depth, while Tier III models have narrow breadth but extensive depth. A Tier I model helps people understand all the relationships between variables, and may even generate some rather gross outputs, but not at a sufficient level of detail that you would want to base important decisions about operations or investments upon them. Such a

model captures all the elements of the system, and shows there are linkages between these elements, but usually cannot predict how all these linkages interact over time with a high degree of accuracy.

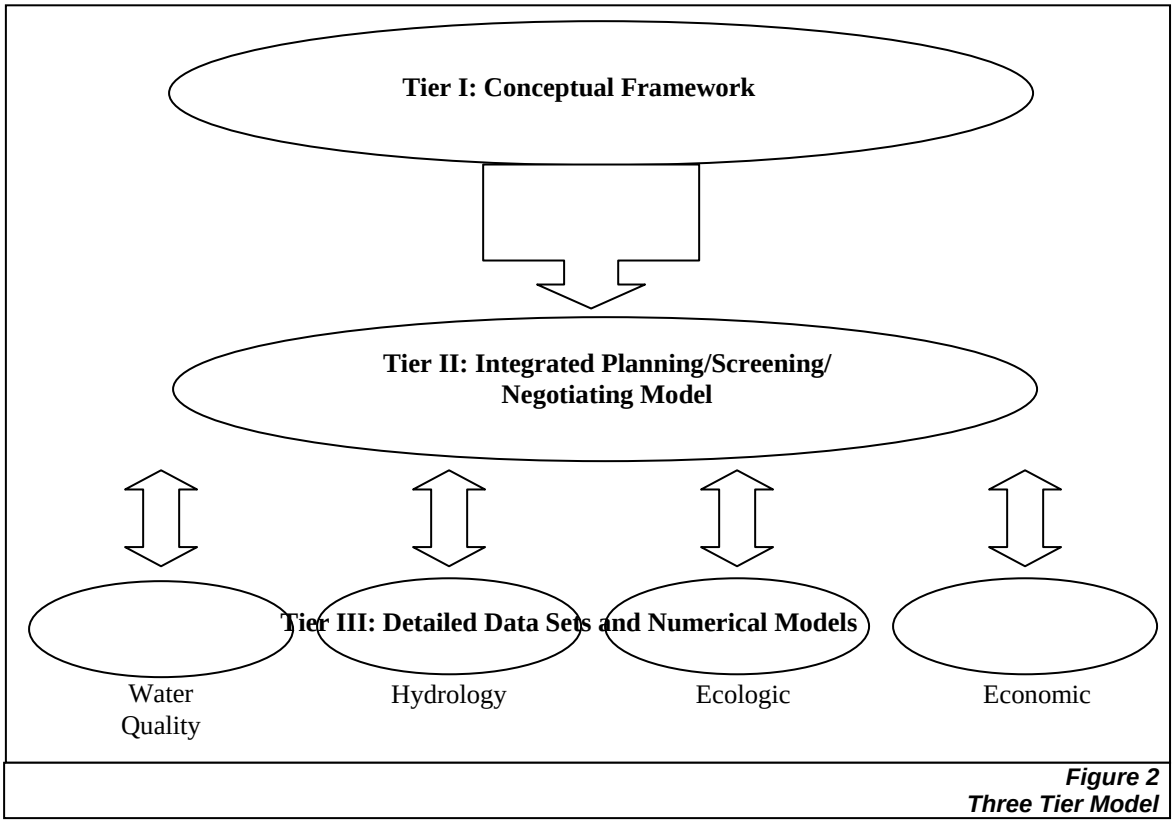


Figure 2
Three Tier Model

At the other end of the spectrum, Tier III, there are a number of very specific and detailed models that evaluate just one or two things, such as economics, fish habitat, or water quality. So a particular model might be useful in predicting the impact of an action upon fisheries, but tell you nothing about the cost, the water quality, or the impact on recreation. Tier III models often require significant time and resources to develop and may require hours or days to run.

Along this continuum, the simplest Tier I models may consist solely of non-quantitative mental models displayed as bubble diagrams. A simple quantitative model may fit between Tiers I and II. Tier II includes both simple screening models developed early in a Shared Vision Planning process over several days or weeks, as well as highly detailed screening models developed over several years. Models can become more detailed as participants include new and refine existing inter-relationships.

Most models developed specifically for Shared Vision Planning fall in Tier II. They include interrelationships between many different variables (capturing breadth rather than depth), but they do provide sufficient detail so that they can be used for decision making. Information from Tier III models, when available, can be incorporated into Tier II models by establishing simple mathematical relations from their output, or may be

externally linked. Integrating the information into a single model can improve identification of feedbacks and keep use of the model faster and simpler. However, when the Tier III model output cannot be easily and sufficiently replicated, linking the models may be a better option. Either way, the Tier III models can always be used in later stages when a higher degree of fidelity is warranted.

Thus, you can choose anywhere along the spectrum to create your model. The key is determining what level of detail is relevant and useful for your purposes, and investing only the level of resources required.

4.1.3 Graphical User Interface

The *graphical user interface* (sometimes called *GUI*) is what users see when interacting with the model, including testing alternatives by running simulations. A well designed graphical user interface can be navigated intuitively and is easy to use without training.

Software that supports graphical user interfaces typically has options for displaying input adjusters and model output, like a dashboard display. These may include slider bars or knobs to increase or decrease an input variable, and graphs and tables to review output.

The advancement of user-friendly graphical user interfaces truly opened the door for collaborative modeling processes. Through being accessible and transparent, stakeholders can review model structure, data and output, and therefore, learn from and develop trust in the model.

Figure 3 shows the three layers of a system dynamics software package called STELLA™. The top level contains the graphical user interface, while the model structure is developed using the *model construction* and *equations* layers. This type of software is often

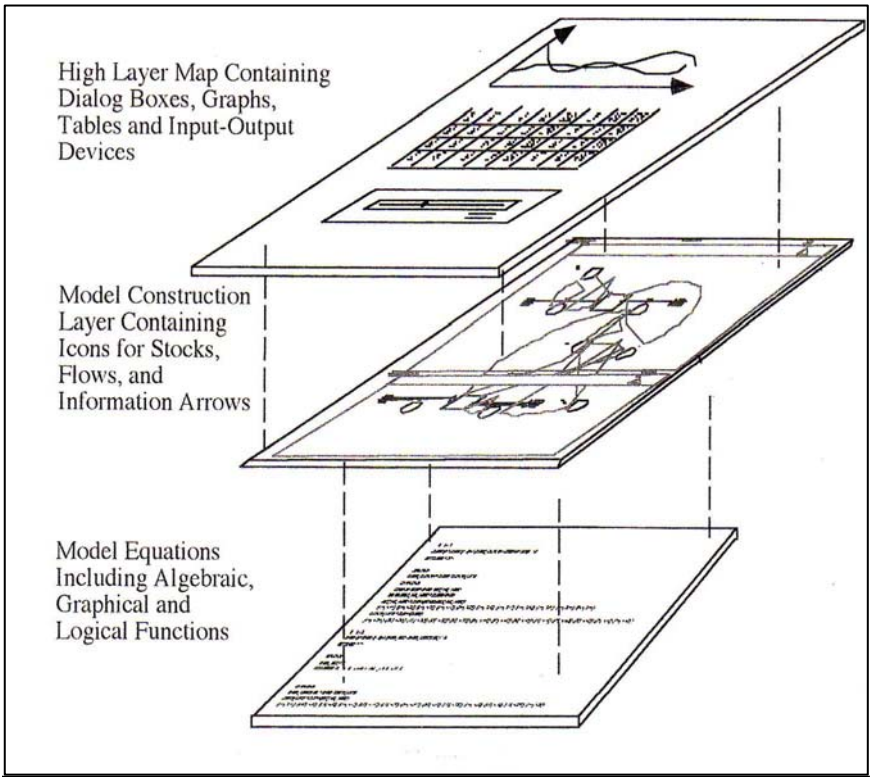


Figure 3
STELLA Modeling Environment

Source: Costanza and Ruth, 1998.

used for collaborative modeling because the model construction layer is also graphical and easier to understand than conventional lines of code.

4.1.4 Calibration

Once the modeler has constructed a working model, he/she will test the model against known data. If, for example, the model is trying to predict instream flows of a river over time, a comparison might be made between actual historic records of instream flows and the instream flows the model would have predicted for the same time period. If they do not match well, the modeler will modify relationships or insert/delete variables until the model does a good job of matching actual data. This process of adjusting the model until modeled reality does a good job of matching measurable reality is called *calibration*.

4.1.5 Sensitivity & Uncertainty Analysis

Sensitivity analysis is using the model to determine how much impact a change in any one variable has upon other variables. Take the price of gasoline. When the price first begins to rise, people may simply absorb the rise, with few if any aspects of the *system* changing substantially. But further price increases start producing changes in many other variables, e.g., decreases in consumption, bankruptcies in fuel-sensitive industries, political upheavals, investment in alternative technologies, etc. Sensitivity analysis is used to understand how sensitive the other variables are to a change. In some instances, small changes can produce dramatic impacts upon other variables. Occasionally, major changes in a variable will have little impact on other variables (which could mean that that variable does not need to be in the model).

A related task is uncertainty analysis. Each input variable has associated uncertainties from sources such as natural variability, data measurement. The combination of these uncertainties is calculated and informs the level of uncertainty in the output. All Corps planning models should include uncertainty analysis.

4.1.6 Time Step

When modelers talk about the *time step* they are talking about the units of time in which data is displayed. If you are studying reactions among sub-atomic particles, then you need to know what is happening in very small fractions of a second. If you are studying geologic events, things happen very slowly so you may need to know only what is happening every few thousand years. In one situation you may be satisfied to know annual rainfall. But if you need to know about flows during dry months and wet months, you need to know at least monthly flows and would thus want a model with a monthly (or shorter) time step. If you are studying flooding you may need to know flood levels on an hourly basis.

The general rule is that the time step should be determined by what you are trying to learn. But there may be limits based on what data has been collected. Maybe you would like to know hourly instream flows, but nobody has ever measured hourly flows. Then there is no data that you can use in your model to reflect hourly flows.

> Tip from an Old Pro
>
> Dan Sheer from HydroLogics, and one of the first to used computer-aided negotiation, says his groundrule is that the model needs to be simple enough that during a workshop it takes no longer than 30 minutes maximum (and shorter if possible) to get usable results from the model for a new scenario or alternative action. Any longer than that, and people will begin to leave the workshop. You can hold things over until the next workshop, but by then some of the enthusiasm and energy is lost.

The other constraint is that the shorter the time step (which means that the computer must process much more data) the longer it takes for a computer to give you answers when you want to compare scenarios or alternatives. The goal in Shared Vision Planning is to be able to provide results from the model in a time frame that makes it possible to get results during the course of a workshop. If the time step is too short, the computer will not be able to provide results in a timely manner. On the other hand, the time step has to be short enough to provide the answers you need to resolve the dispute. So the modeler has to identify a time step that will provide the answers you need without unduly increasing the time it takes to run the computer model. The time step can also influence cost. A smaller time step often requires more data and generates more output needing more evaluation, with a resulting cost increase.

4.2 How Accurate Does a Model Have To Be?

"All models are wrong, but some models are useful." All models reflect reality imperfectly, but the challenge of modeling is to represent the system only to the extent that it is informative. Albert Einstein once said: "The best explanation is as simple as possible, but no simpler." The same logic applies to models.

Shared Vision Planners typically use models for screening, planning, and/or negotiating. This means the model needs to run quickly, show big picture effects, and allow for "what if" analysis. It should also support changing assumptions on the fly and testing different ideas in a group setting. Because many Tier III detailed numerical models were not designed with this use in mind, they may be less useful than a model that is specifically designed for "what if" scenarios in a collaborative setting. A good Shared Vision Planning model will be as simple as possible (leaving out some of the complexities of the actual system) while still doing a good job of predicting how the system actually operates. The information from the model needs to be at the level that decision makers and the public can use and understand. Participants must also be satisfied that the model includes all the critical elements. In cases like these, the more precise Tier III models can be used to support the development of Shared Vision Planning models or to verify results after a collaborative working session. The information and understanding derived from these models is not discarded, simply repackaged in a form that is more conducive to a collaborative screening, planning and/or negotiating process.

A major advantage of collaborative modeling is the opportunity for more people – both experts and lay people to "look under the hood" of the technical analysis. Not only does

this increase the knowledge of stakeholders about the issues and the system, it also provides extensive review of the technical analysis. Because of the focus on transparency, Shared Vision Planning emphasizes documentation of model data sources and assumptions, and advocates frequent model review by lay people and by experts. If the assumptions are deemed too simplistic, more detail can be included in the analysis (moving closer to Tier III); if a sensitivity analysis shows no effect of added model complexity, the technical analysis can focus on the parameters and processes that matter the most. In Shared Vision Planning the highest value is placed on the ability to produce suitable results in a timely and transparent manner.

Below are some general criteria for how detailed the model must be:[9]

- Ability to model physical features with sufficient accuracy and precision to address the questions being discussed
- The time-step must be appropriate to the questions being discussed
- Ability to model changes to the physical system
- Ability to model human operations
- Reasonable run times and ease of use
- Withstand frequent review by technical and lay stakeholders

4.3 Characteristics of an SVP Model

There are certain criteria that the model must meet for use in Shared Vision Planning:

- The model must be user-friendly, with an intuitive interface;
- The model must be interactive and transparent to people who are not programmers;
- The model must execute quickly, permitting *real time* evaluation of options and scenarios,
- The output must address all the interests of the stakeholders, and
- The model must be sufficiently reliable and detailed that it can provide a basis for actual decision making.

There are a number of existing software applications that can be used for developing the kind of computer models used in Shared Vision Planning. Two of the most frequently used applications are STELLA[10] and OASIS[11]. For some simple models, it is possible to use Microsoft Excel. The choice of software depends on both the type of model needed and the expertise/preferences of the modeler.

[9] Adapted from Daniel P. Sheer, *A Process for CADRe and Requirements for Tools to Support CADRe*, Proceedings of CADRE conference, Albuquerque New Mexico, September 13, 2007.
[10] Available at: <http://www.iseesystems.com>
[11] Available at: <http://www.hydrologics.net/oasis.html>

Section 5
Building and Using a Model as Part of a Planning Process

A primary characteristic of Shared Vision Planning is that it combines a rigorous planning (or decision making) process with the use of a computer model that is developed with extensive stakeholder participation. Both the planning process and the development of a computer model require a series of steps that must be blended to produce an effective single process. This section describes the sequence of steps followed in building a model and how the model is then used during the planning process.

5.1 The Planning Process

There is no single *best* planning process used by all planners. Each organization seems to have its own version. Just because the terminology is different does not mean that the process is not rigorous.

But the series of steps is not random. There are fundamental principles of planning embedded in those steps, whatever language is used to describe them.

Charles Yoe and Kenneth Orth have contrasted the Corps of Engineers' planning process with a generic model that incorporates similar planning principles. This is shown in the table below:[12]

Generic Model	Corps Model
1. Problem diagnosis	1. Identify problems and opportunities
2. Goal articulation.	2. Inventory and forecast resources
3. Prediction and projections	3. Formulate alternative plans
4. Alternative development	4. Evaluate plan effects
5. Feasibility analysis	5. Compare effects of alternative plans[13]
6. Evaluation	6. Select best plan
7. Implementation	

Table 1
Two Planning Models

In this guide, the Corps terminology is used. However planners in other organizations should adapt the underlying concepts to their own planning context.

[12] Yoe, Charles E. and Kenneth D. Orth, *Planning Manual*, Institute for Water Resources, IWR Report 96-R-2, Nov. 1996, page 12. <http://www.iwr.usace.army.mil/inside/products/pub/iwrreports/96r21.pdf>

[13] In the Corps planning process, *the evaluate plan effects* and *compare alternatives* steps are discrete. During the *evaluate* step, each alternative is analyzed to determine how well it performs in each of four *accounts* as compared to the forecasted without project condition: National Economic Development, Environmental Quality, Regional Economic Development, and Other Social Effects. Only after each alternative has been evaluated using the same criteria, are the plans compared.

5.2 Steps in Building a Model

The four steps of model development are defining objectives and performance measures (problem definition), building the qualitative model, quantification and data gathering, and calibration and validation.

5.2.1 Defining Objectives and Performance Measures (Problem Definition)

Before building a model you first need a fundamental understanding of what it is the model is supposed to be modeling, what questions are being asked. This includes very basic questions such as the geographic scope of the model, what level of model is needed (e.g., Tier I, II or III), and the basic components that need to be included in the model. Do you need to look at economic impacts, recreation, ecology, groundwater, surface water, etc.?

Typically the starting point is to learn how participants will measure success. How do they measure what it is they are trying to achieve? If they want to improve fisheries, how do they measure *improvement*? If they want to improve water quantity, what are the measures of how much of (and when) those quantities are needed? By discussing these questions it is possible to identify both the objectives and the performance measurements.

The goal in building a model for a Shared Vision Planning process is to produce information that stakeholders and decision makers will trust and use. This means that you need to clarify and get agreement on what information is wanted and how it will be presented. Stakeholders and decision makers may not be comfortable with the quantitative results familiar to modelers, so extra effort is required to portray the information in ways they understand and will use. They may even require some information that cannot be modeled. Knowing what information is needed, and how it needs to be presented, is necessary for designing the model appropriately.

The planning process could be fully integrated with the modeling effort, or could operate in a parallel process. If they are separate, make sure that the objectives defined in both are aligned. See Section 6.2 for more on how to define objectives.

5.2.2 Building the Qualitative Model

This step involves building agreement on a conceptual model. This process starts with getting agreement on all the variables that have to be in the model, and identifying the linkages and feedback loops between them. If there was a discussion of performance measures in the step above, you have already begun to establish some of the cause/effect relationships people think exist.

The relationships between the variables do not have to be quantified yet – that takes place in the next step – but you need to know that changes in Variable A result in changes in Variables B, C, and D, and you need to know the general direction of those changes. At the end of this step you have built the diagram that constitutes the middle

level of the model. Because different stakeholders come to the activity with different conceptual models in their heads, getting agreement on the conceptual model requires a large amount of dialogue.

5.2.3 Quantification and Data Gathering

The third step is to develop a quantitative model. This entails coming up with ways of quantifying or otherwise expressing the relationships between the variables. Typically this is done by using as much existing data, studies and expert knowledge as is available. Sometimes this information has been collected in specific Tier III models, but just has not been put together with all the other variables and interactions in a more integrated Tier II model. Sometimes new data needs to be collected. Again, additional effort may need to go into how model results will be displayed. Visual graphics can help stakeholders and decision-makers interpret key results quickly.

5.2.4 Calibration and Validation

The fourth step is to calibrate the model, i.e., the model is tested against historical information to be sure that the historical predictions from the model are close to the actual data. If there are differences, the model is fine-tuned until the differences are largely removed. Similarly, future model predictions must be validated to ensure the model behavior is reasonably accurate.

5.3 Using the Model in the Planning Process

Once the model is believed to be valid, i.e., there is general agreement among the stakeholders that the model seems to reliably predict the interaction between all the variables, it is ready for use in developing and evaluating scenarios in the planning process. The following subsections describe how to use the model in each planning task:

5.3.1 Running *What if* Scenarios and Sensitivity Analysis

The first use of the model in the planning process is to establish a baseline against which other scenarios and alternatives can be compared. Typically this baseline is a *no action* alternative, an alternative that projects out over time what will happen if no action is taken or current operations are continued. Then the model can be used to test other scenarios of the future or run sensitivity analyses to learn the impacts associated with changes in each variable.

This is an important opportunity for learning. Now there is a chance to experiment with all sorts of variations just to learn how the variables are related/interact. This can be done fairly simply by changing the settings on the sliders on the top level of the model. This experimentation can be an important step in identifying possible alternative solutions or courses of action.

5.3.2 Generating Alternatives

One of the principles of a rigorous planning process is to consider a wide range of alternatives. Part of the value of using a model is the ability to *try out* possibilities, and

learn which ones contribute and which ones do not. The model can be used to begin to define which options are workable and move towards a finite set of alternatives.

Unquestionably, people have been getting ideas about possible alternatives throughout earlier steps. The last step and this step, in particular, blur into each other. As people experiment with scenarios and sensitivity analysis they come up with new ideas for alternatives. As people experiment with alternatives they come up with new *what if* questions they would like to see addressed. They may also come up with useful and sometimes innovative ways to present results, or the modeler may work with them to develop more understandable ways to present results. Generating and evaluating alternatives is iterative.

5.3.3 Evaluating Alternatives

It is when you start evaluating alternatives that the shared vision modeling effort really pays off. The model can be used to evaluate alternatives in a visible way that permits all participants to see the impacts associated with each alternative. Using the model to test the alternatives in a consistent manner is a way of making the evaluation a more objective process. This may also be where a fuller or more rigorous evaluation is performed on the smaller number of alternatives that emerged from the natural winnowing of many options. Be aware, however, that even if people can agree on the impacts, they still may disagree sharply on the importance of those impacts. People's values or political philosophies will cause them to value some impacts more highly than others. The business community, for example, may believe that financial impacts are far more important than ecological impacts. Environmental groups may prefer a reverse weighting. Depending on the type of model and evaluation technique you choose, you may include these weightings in the model, or simulate alternatives and analyze tradeoffs in a transparent discussion.

5.3.4 Selecting and Refining a Course of Action

Selecting a course of action is part of the planning process, not modeling. The highly participatory nature of the Shared Vision Planning process suggests that the decision making should be highly participatory as well, although agencies may reserve the prerogative of making the final decision. Once a decision is reached, one of the values of using a model is that it is possible to refine the selected course of action by making minor modifications to enhance positive impacts or minimize negative impacts. This refinement is a further example of the iterative nature of the entire process, with results sparking new ideas to be tested. Remember, though, that the participants in the process will want to know about and be consulted about these changes; what seems minor to the decision makers may not seem minor to some of the participants.

5.3.5 Monitoring and Adaptive Management

After a course of action has been selected and implemented two questions remain: (1) Did the model serve as a useful predictor of outcomes? And, (2) did the selected course of action result in the anticipated benefits and impacts? Models don't always accurately predict outcomes, so it is wise to monitor what actually happens, and where the model

is faulty, modify the model so that it does a better job of prediction. But sometimes the problem is not the model, but the decision itself. Things don't always work out the way we plan them. The decision may not result in the anticipated benefits and impacts, or may have unexpected consequences.

This is where Adaptive Management is useful. The underlying premise of Adaptive Management is, rather than making decisions once and for all time, to engage in continued monitoring with a willingness to revisit and revise decisions based on what is learned in the monitoring. Once again, the participants in the Shared Vision Planning Process will want to participate in discussions about changes in the original decision.

5.4 Integrating the Planning Process with Development and Use of a Model

Figure 4 shows the interaction between the SVP planning process and the computer model. The four steps of model development–defining objectives and performance measures (problem definition), building the qualitative model, quantification and data gathering, and calibration–occur simultaneously with the first two steps of the planning process (identifying problems and opportunities, and inventorying and forecasting). They share common activities. Step 1 in the planning process, *Identify problems and opportunities,* is also the first step in model development. So the same activities can accomplish both the needs of the planning process and the needs of model development. Similarly, the activities involved in *Inventory and forecast* (planning process) and *Quantify and gather data* (model development) overlap substantially.

Once the model is developed, the model is used as a tool to formulate, evaluate and compare alternatives or relationships.[14] Discussions that take place during these steps may, however, make modelers aware of changes they need to make in the model to incorporate more detail and identify additional alternatives. Documentation of assumptions in the model should be continuous, as should review by technical and lay stakeholders. If desired, external peer review can be added throughout the collaborative modeling process. As a plan is being selected, the model can be used to refine the plan and maximize benefits from the plan. This highly iterative process is greatly facilitated by the use of the model.

[14] Models used for Corps planning processes may need to be certified or approved to comply with Federal standards.

The model also serves as an important tool during monitoring and adaptive management. As the agencies monitor the on-the-ground results of implementing the selected course of action, this monitoring information can be fed into the models to further define relationships between elements and re-calibrate the model. Then the model can be used to test changes that may need to be made as part of adaptive management.

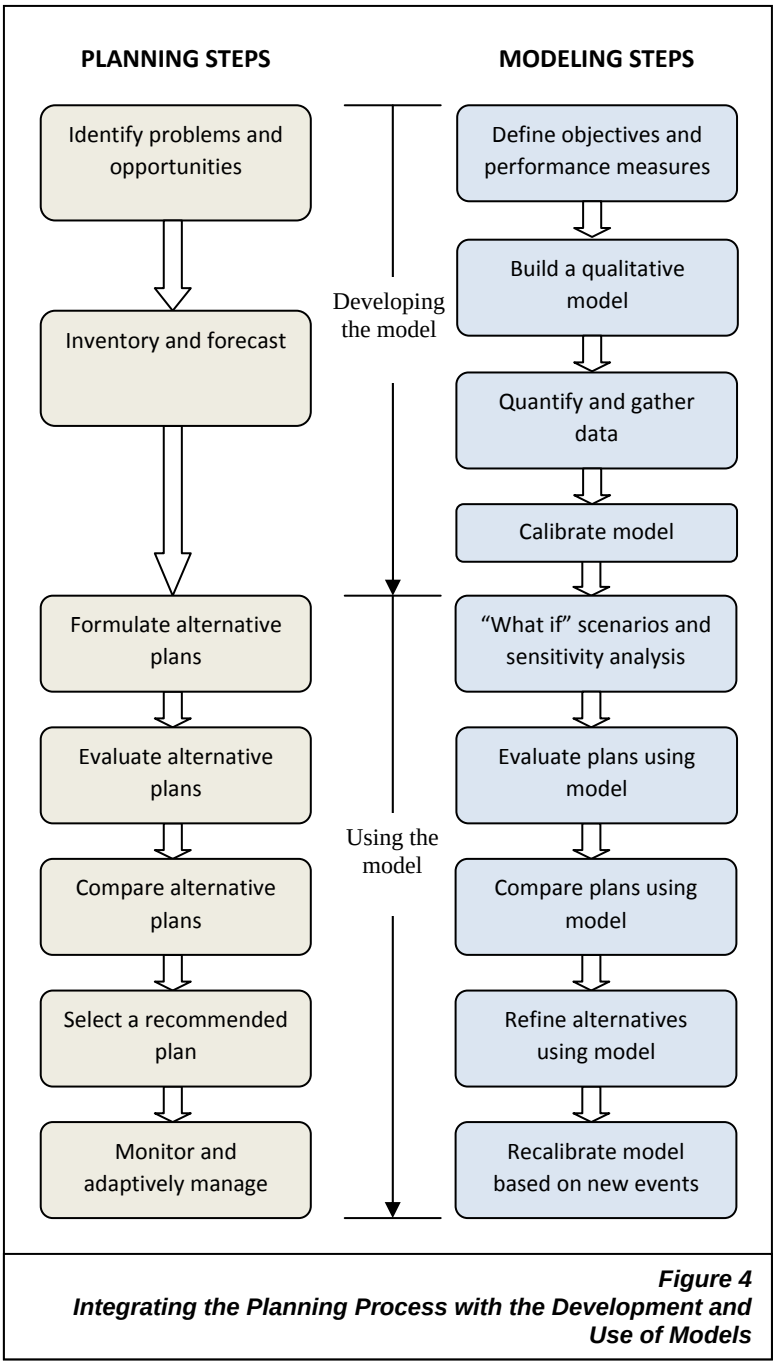


Figure 4
Integrating the Planning Process with the Development and Use of Models

Section 6
Managing a Shared Vision Planning Process

This section provides guidance for actually setting up and managing a Shared Vision Planning process from beginning to end. Appendix A provides an example of a stakeholder involvement program for the entire Shared Vision Planning process.

6.1 Getting Started

6.1.1 Deciding to Initiate the Process

The process begins when one or more agencies with responsibility to decide upon a plan of action (sponsoring agencies) decide they may want to use Shared Vision Planning to reach that decision. This first decision is not whether you will use Shared Vision Planning, but whether you want to suggest the possibility of using Shared Vision Planning. The decision to actually use Shared Vision Planning should take place only after you have done a careful assessment of the circumstances and the willingness of stakeholders (interested parties who see themselves as having a stake in the decision) to participate in the process. Shared Vision Planning is a bit like negotiations; you do not enter into it unless all the key parties are willing to commit to a good faith effort to make it work.

Deciding to use Shared Vision Planning is not a casual decision, but should be based on a careful analysis of your situation. The first step is to decide who needs to be involved in making the decision to use Shared Vision Planning. If you are working on a Corps of Engineers' project, the Corps may be taking the lead, but typically there is a local sponsor who is a co-decision maker. In some situations there may be other agencies, such as regulators, who are so central to your ability to implement any plan that they should be at the table with you throughout the process. One way to identify these organizations is to ask, "Who could veto implementation of a decision?" If they can veto the decision, they are a decision maker. One characteristic of decision makers is that they typically do not represent just a single interest, but must balance out a number of interests. Particularly if this is the first time you have used Shared Vision Planning, you want to have all the sponsoring agencies on board. You do not want a key agency criticizing you from the sidelines throughout the process.

A distinction needs to be made between the designated decision maker for each sponsoring agency, who might be a Governor, a District Commander, an agency head, and the staff of those organizations. Often the initial discussions of whether to use Shared Vision Planning takes place at a staff level, although–as a team–you need to engage senior decision makers in that decision as well. Usually the sponsoring agencies will set up a planning team consisting of the key staff from those agencies with the technical and planning expertise to conduct the study on a day-by-day basis. So sponsoring agencies are involved both through a staff team managing the everyday effort and a decision making team consisting of the designated senior management person from each sponsoring agency.

Here are some questions you need to address within the sponsoring agencies team:

- *Are you willing to work towards a mutually acceptable course of action?*

  The whole thrust of Shared Vision Planning is to create the conditions for arriving at a mutually acceptable decision which the sponsoring agencies then embrace as their own. Most agencies are used to making decisions unilaterally, so they may be uncomfortable working with other stakeholders in a collaborative way. Some agencies see this as a loss of control. Others see this as gaining the support they need to come up with implementable plans. If the sponsoring agencies are not comfortable with working towards mutual agreement, Shared Vision Planning is not for you.

- *Does the potential for a higher level of conflict resolution justify the possible added cost and time required for a Shared Vision Planning process?*

  A rigorous SVP planning process can require upfront investment of time and resources, but may generate options that better meet the needs of the stakeholders, and are more widely accepted. A collaborative process will almost always take longer and will usually cost more than making a unilateral decision. However, if the unilateral decision does not lead to genuine resolution of the conflict, a quick decision may result in considerable delays and costs when you try to implement that decision. Building a model can add cost. But if it allows you to develop a shared vision of how the natural system operates thereby removing many arguments over *the facts*, it might make the difference in whether or not you can achieve agreement. You need to make a judgment call as to whether possible added time and cost are justified by the potential for a more supportable agreement. Section 3 discusses the potential benefits and costs associated with Shared Vision Planning.

A recent study of Shared Vision Planning cases[15] concluded that participants are more likely to participate enthusiastically if the planning process is clearly and unambiguously linked to a decision or outcome. Interest in participation is higher when the planning process could result in concrete outcomes such as investment in water infrastructure, changes in operations, or regulatory permit requirements. Models developed primarily for operational decision making did not provide sufficient incentive.

The next "Tips from the Old Pros" text box provides additional questions to use to determine if Shared Vision Planning is appropriate.

Once you have made the decision that you would like to propose using Shared Vision Planning, you need to assess the willingness of stakeholders to participate. But before you can do that, you will need to identify who the participants are likely to be.

[15] Creighton J. and Langsdale, S. 2009. Analysis of Process Issues in Shared Vision Planning Case Studies. IWR Report 09-R-05.

Tips from the Old Pros: Questions to Ask Potential Participants in Order to Evaluate Whether to Use Shared Vision Planning

Werick and Palmer suggest that the following series of questions should be included in any assessment of whether to initiate Shared Vision Planning:[1]

1. *How can planning improve water management?*

   Ask potential participants to imagine that the planning study is over and they are very happy. Then ask them to explain how the planning study changed things, and why they consider the process a success. This will help define goals for the process. If people are unable to imagine success, the conditions may not be ripe for Shared Vision Planning.

2. *Is the planning effort likely to be subverted by lobbying or adjudication?*

   This is an important question to ask all those who are knowledgeable about water politics in your area. Their answers will provide you greater understanding about the political context in which the planning would take place, but it may also help assess the likelihood that parties may choose to walk away from the process at a later date believing they can accomplish more through lobbying or lawsuits. Remember that participants will always compare what they can get from participating in the Shared Vision Planning process with what they think they can accomplish by not participating.

3. *Is the necessary openness of Shared Vision Planning contrary to the interests of any stakeholder?*

   Some participants may feel that their interests are better served by not having everybody understand every aspect of current operations and water supply, for example. They may believe their interests are better served by remaining outside the process, or undermining the process.

4. *Is water the issue or the stage for other conflicts to play out?*

   Water is often the battleground for larger debates having to do with issues such as the rate of growth in an area, protection of traditional culture or traditional economic base (such as family farming), or power struggles between factions in the community. These issues cannot always be avoided, but your chances of leaving the battlefield without visible wounds increase if you know these issues underlie people's attitudes and behavior.

5. *Does the planning process (including schedule and budget) provide for a careful identification of criteria against which alternatives will be measured, and a thorough process for evaluating the alternative performance on each of these criteria?*

   There is a tendency in many planning processes to skip over the process of carefully identifying criteria for success. The assumption seems to be that *once we see the data, we will know what to do to make everyone happy*. One of the reasons the Federal water planning process is so successful is because there is rigor for defining criteria for success. When people work together to identify criteria they learn about each other's preferences and often learn things about the resource system itself. This may lead to modification of the criteria that are being evaluated. Werick and Palmer believe that alternatives need to be formulated and carefully evaluated using the model for a more objective basis for decision making. Getting people to identify objective criteria and measure alternatives against those alternatives also has the potential to help stakeholders let go of preconceptions and fixed positions.

6.1.2 Identifying Potential Participants

Identifying potential participants is a multi-step process. During the first step, staff from the sponsoring agencies will identify stakeholders or *interested parties* based on staff knowledge of the issue or experience with similar issues in the past. Subsequently – during the situation assessment – participants who have already been identified will be asked who else needs to be involved, and then you will reassess your lists.

The goal is to ensure that no significant interested parties are left out of the process. Shared Vision Planning is the kind of a process where you would like to secure continued participation throughout the entire process, not have people joining the process mid-stream.

The *interested parties* for a particular planning study or decision making process will change with the issue you are addressing. Depending on which components are included in a model, the list of interested parties may change. For example, a model for a water-related issue might include the basic components (or in modeling terminology, *sectors*) shown in Figure 5.

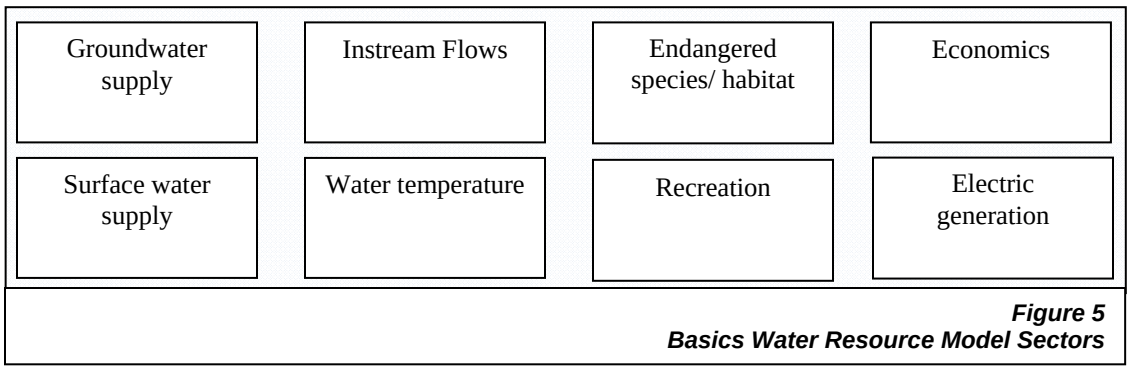


Figure 5
Basics Water Resource Model Sectors

Each of these sectors has agencies, organizations and individuals who see themselves as impacted by decisions that affect that sector. Whenever a sector is added to the model – perhaps you decide that you also needed to account for wastewater in the model – there will be additional agencies, groups and individuals who see themselves as potentially impacted who may want to participate in model development. In the same way, if it was decided that one of the sectors above was unnecessary to address the issue under discussion, then some stakeholders might decide they no longer need to participate.

To start with, have the planning team identify the sectors for your particular issue based on your initial understanding of the situation. Then, using the list of sectors as a checklist, have the team identify the people, organizations or agencies that are likely to be interested in your project or issue.

Then you will need to go one step further. You also need to think about the probable level of interest or involvement. A simple way to do that is to organize your list of people and organizations into the *circles of influence*.

As you will remember from Section 2, the circles of influence are defined as follows:

- Circle A: Model builders
- Circle B: Model users and model validators
- Circle C: Other interested parties
- Circle D: Decision makers

Presumably, when you identified the *sponsoring agencies* team you already identified Circle D, the decision makers. These are people who, by virtue of an organizational or political position, will be making the decision to adopt or implement a course of action at the end of the Shared Vision Planning process. But you cannot expect a Governor, for example, to sit down and help develop a model. These are people who will use the results from the model, so it is important that they believe the model is credible. They will develop their attitudes towards the model by talking with people they know in Levels A through C. Some staff from the same agencies may also be modelers (Circle A) or reviewers/model users (Circle B).

Below is more information about building the circles.

6.1.2.1 Circle A: Model Builders

Typically the membership of Circle A will be modelers from the sponsoring agencies (or consultants retained by the agencies), modelers who are staff (or hired consultants) of major stakeholders such as industry groups or environmental groups, and possibly some modelers from nearby universities. These are people with training and expertise in modeling or with extensive scientific background in technical subjects related to the modeling. Typically these are people who are getting paid to participate by an agency or an organization they represent. They will participate in all the details of building the model. Their participation requires a lot of time and a lot of expertise.

6.1.2.2 Circle B: Model Users, Reviewers

The membership of Circle B is likely to consist of modelers or technical people from organizations that use models in their own decision making. The big difference is that they are not being asked to actually develop the model, but only to review it (or the parts of it related to their expertise). Acting as a technical reviewer requires substantially less time than developing a model. Reviewers could be technical staff of a regulatory group, a scientist for an environmental group, or a university professor with substantial technical background in modeling or in a particular scientific area. Many of the regulatory agencies with responsibilities for water quality, endangered species, etc., have staff who have developed and are highly conversant with models, but they are more likely to be part of Circle B. They may be actively involved in sub-elements of the model related to their regulatory interest–and be considered part of Circle A for that particular sub-element–but not be directly involved in modeling other elements of the model. As can be seen, the lines between Circle A and Circle B may be blurry, depending on what part of the model is being developed. Circle B is often crucial in

establishing the credibility of the model. People in Circle C depend on people in Circle B to tell them that the model is acceptable.

6.1.2.3 Circle C: All Interested Parties

These are people or organizations who perceive the decisions being made as touching their lives or a significant interest. Sometimes the term *stakeholders* is used to describe these people and organizations. Interested parties know how a problem or decision affects their lives, and represent their own interest. Typically these people will not have the technical expertise or the time to participate in actually developing the model, but they may have very strong interest in how the problem is defined, what alternatives are considered, and how they are evaluated. When motivated, they can be active politically and can impact decision makers. Membership in Circle C is always pretty loose and changeable. Some within this group will choose to participate actively. Others will simply want to be kept informed and are likely to stay uninvolved unless they hear from others, such as people in Circle B, that there is a concern to which they should be paying attention. Then they may mobilize and get involved.

The next step combines the identification of interested parties with the identification of circles of influence. In Figure 6, the horizontal axis at the top will be the sectors you have already identified, and the vertical axis along the side will be the circles of influence. Do another round of staff analysis identifying which people or organizations fit in each box. During this second round of analysis you may find you are identifying specific individuals, not just organizations. This is particularly true for Circles A and B, since they include people with well-defined technical expertise.

Matrix of Participants						
	Flood Risk Mgt	**Hydropower**	**Navigation**	**Water Supply**	**Instream Flows**	**???**
Circle A: Modelers						
Circle B: Reviewers/model users						
Circle C: Other Interested Parties						

Figure 6
Matrix of Participants and the Circle of Influence

6.1.3 Assessing Willingness to Participate

So far you have decided that you at least want to propose using Shared Vision Planning. You have also developed a list of interested parties who may want to participate in the process. The next step is to find out whether they are willing to commit to working collaboratively, and will spend the time and effort needed to participate in the Shared Vision Planning process.

Tip from an Old Pro

Werick suggests that you hire a political scientist who is knowledgeable about the local political situation to help you evaluate the situation. In particular, this person may be able to help you understand how the various constituencies relate to each other (and why). Werick says that by doing this he has always learned important things about the situation that he himself had not recognized or learned through his own situation assessment.

A core premise of Shared Vision Planning is that if people participate in building the model they are more willing to believe the outputs from the model. But building or reviewing a model requires an expenditure of time and effort. If people are not willing to make that commitment, then most of the value of constructing a *shared* model is lost. Unless key actors are sufficiently motivated that you can expect high levels of involvement, it might be wise not to use Shared Vision Planning.

Why would people not want to participate? There are a number of reasons.

All planning studies take place in a broader political context. Many times there are political considerations that overwhelm the immediate issues being considered. Among these political considerations are:

- An agency or stakeholder may feel they cannot be seen as weak by the electorate or its constituency.
- Organizations have defended fixed positions for so many years that there are political consequences to admitting those positions are no longer the best possible outcomes.
- An agency or interest believes its legal position is so strong that it does not need to accommodate others' interests.
- There is so much mistrust or ill-will between agencies or parties that they cannot imagine working collaboratively.
- Having a grievance is more important politically than finding an immediate solution.
- People fear incurring some sort of legal liability.
- For Federal entities, legal issues associated with the Federal Advisory Committee Act (FACA)

In some instances, people are defending other considerations that are only indirectly related to the issue being addressed in your planning study. On water issues, for example, people may participate in a decision of water when their real interests are connected to:

- Protecting agriculture or protecting family farms
- Avoiding dependence on foreign food supply
- Avoiding additional impacts on economically disadvantaged or ethnic groups (environmental justice)
- Reducing economic disparities (social justice)

- Local control

Sometime these values or concerns are seen as absolutes, not susceptible to resolution by negotiation.

Participants will make a judgment about whether participating in a collaborative process is in their best interests. In the dispute resolution field there is a concept called *best alternative to a negotiated agreement* or *BATNA*.[16] This simply means that when people are considering the possibility of a negotiated agreement, they will compare what they think they can get through negotiation (which is not always everything they want) with what they think they can get by other means, such as through political influence, lawsuits, or simply walking away from any agreement. In the same way, before organizations are willing to enter into Shared Vision Planning, they mentally assess whether they can get more through Shared Vision Planning than they can by alternative means.

Of course this is all based on perceived or projected outcomes. Stakeholders may have an unrealistic estimate of the strength of their position. They may underestimate the potential controversies and delays associated with trying to overwhelm the opposition.

Timing is also important. When assessing disputes, dispute resolution experts sometimes talk about the *maturity* or *ripeness* of an issue. What they mean is that an issue is *mature* when the parties to a dispute finally realize they have battled each other to a stalemate, and recognize that more can be achieved by negotiation than continuing to fight on. So long as major parties think they can still get more by trying to bloody the other parties, the issue is not *mature* or sufficiently *ripe* to attempt resolution.

This concept applies to Shared Vision Planning. One of the considerations in proposing Shared Vision Planning is the timing of the proposal. While it is preferable to use Shared Vision Planning before sides are highly polarized, it cannot be used until parties recognize the value of working collaboratively. Shared Vision Planning is not just model-building, it is collaborative planning. One of the challenges in proposing the use of Shared Vision Planning is timing the proposal to use Shared Vision Planning so it coincides with when people are ready to work collaboratively.

The first key issue is whether the participants see Shared Vision Planning as providing sufficient additional value that it justifies the extra time and energy to participate. That is something you can only know by asking potential participants once they have been given sufficient information to assess the value of Shared Vision Planning.

Most potential participants will not know much, if anything, about Shared Vision Planning, so the sponsoring agencies will need to educate potential participants about the process and then assess their willingness to participate in such a process.

You will need to prepare an initial description of Shared Vision Planning that can be distributed to potential participants. As part of this education process you may want to

[16] Fisher, Roger and William Ury, *Getting to Yes: Negotiating Agreement Without Giving In*, New York: Penguin Books, 1981, page 104.

refer people to the Shared Vision Planning website at www.sharedvisionplanning.us. There are many resources on that site, including primers, case studies, and sample models.

You also need to decide who within the sponsoring agency team who should act as the convener of the process. The convener's job is to bring together the major participants and get agreement to proceed with a Shared Vision Planning process. The convener may be someone from the Corps, or someone from one of the other sponsoring agencies. Because legitimacy is an important consideration, the convener is often a person who is well-known and respected by the other participants, or is someone who holds a high position in one of the sponsoring agencies. In selecting the convener, consider whether potential participants are more likely to respond if the invitation to participate comes from someone representing a Federal agency, or someone from a local entity (such as the local sponsor). Often a senior management person, such as a District or Division Commander, acts as the official convener, even though agency staff may be doing the day-to-day work.

The convener must make very clear that his or her agency is not committed to a particular solution or outcome, but is willing to enter into a collaborative process to jointly identify the preferred course of action. The convener is advocating for a process, not a specific outcome.

Once you have prepared explanatory materials and selected a convener, there are two primary mechanisms for finding out the willingness of stakeholders to participate in a Shared Vision Planning process, (1) assessment interviews; and (2) a kickoff workshop.

6.1.3.1 Assessment Interviews

In the dispute resolution field it is normal practice to conduct a *situation assessment* before beginning a process such as mediation. The goal of situation assessment is to determine whether the appropriate conditions actually exist for a successful resolution of the dispute. Typically this is done by conducting in-depth interviews with all the major parties before preparing a formal agreement to enter into a dispute resolution process.

A situation assessment can also be very helpful in deciding whether to proceed with Shared Vision Planning. The use of Shared Vision Planning does not guarantee success, but you can reduce your chances of failure by doing a careful upfront analysis of whether the conditions for success are present.

Conducting interviews with key stakeholders is somewhat time-consuming, but a worthwhile investment in order to avoid an even greater consumption of time in a failed process. If participants are unwilling to spend the time giving an interview, it is pretty likely they will be unwilling to participate enthusiastically in a Shared Vision Planning process.

You may want to have someone who is perceived as neutral conduct this assessment. There is a danger that if the person doing the interviewing is from a sponsoring agency, the people being interviewed may tell you what you want or expect to hear. People are more likely to give objective information with a neutral interviewer.

Typically an assessment requires 15 to 25 interviews.[17] The planning team should develop the list of potential people to be interviewed. Be sure to flag those people or organizations you believe are essential to be included in the interviews. It is not essential to interview every environmental group (or industry group) to get a good understanding of the situation, but be sure that you do not leave out those representing significantly different positions or perspectives. You may also want to expand your list of people being interviewed to include people who are knowledgeable about water politics in the area even if they are not a direct party to this issue.

Typically the convener (the agency or organization selected by the sponsoring agencies to convene the process) will send out a letter requesting an interview, identifying the interviewer and indicating that potential interviewees will be contacted by phone to set up an interview. The mailing should also include a description of Shared Vision Planning.

Often it works best if the actual interviewer makes the call to set up the interview– people are more likely to agree to an interview with the interviewer than with a clerical person. If someone else is setting up the interviews, be sure you spend sufficient time with them so they understand the purpose of the interview. Once the interview has been set up, follow-up with a letter (or e-mail) confirming the appointment and attaching a short description of the potential study and of Shared Vision Planning.

Some of the information you want from the interviews is:

- What is their understanding of the situation or issue being addressed?
- What is the history of the issue?
- Who have been the key actors on the issue?
- Are there existing groups/organizations to which all the key stakeholders belong? Are there any key stakeholders left out of those organizations?
- What issues could derail the study?
- Who would use the model and how would it be used?
- Are there existing models? What is their purpose and history? If they are not sufficient, then why not?
- Who (which stakeholders) would need to participate in the process in order for the new model to be credible?
- Who are the modelers associated with key organizations or interests?

[17] Federal agencies conducting structured interviews may need OMB approval. However, informal interviews by facilitators are exempt from this requirement.

- Will they participate? With what level of enthusiasm?

Once the interviews are completed, the interviewer should write up a summary of the interviews. Normally there are two versions of the summary, driven by the need to protect the confidentiality of the people being interviewed. The summaries of individual interviews should be tightly held by the planning team and decision makers from the sponsoring agencies. A summary written in a manner that protects confidentiality should be written for sharing with the people who were interviewed and other interested publics.

Once the interviews are completed, it is time to sit down and do a realistic evaluation of the situation. Does it look like developing a model could contribute to resolution? Do key potential participants show enough interest to justify putting additional energy into setting up the process? If there are several sponsoring agencies, the evaluation of the information from the interviews should be done as a team that includes all the sponsoring agencies.

6.1.3.2 Kickoff Workshop

A second option is to conduct a kickoff workshop at which participants will be asked if they want to participate in a Shared Vision Planning process. This is not necessarily an alternative to conducting interviews. Often sponsoring agencies will conduct the interviews first, and then proceed to a kickoff workshop if the interviews suggest people are willing to consider participating in a Shared Vision Planning process.

To publicize the kickoff workshop, send a mailing/invitation to everybody already identified as a potential participant – and ask them to tell you who else needs to be invited. Also ask organizations to publicize the event to their own members, including publicizing the event through their own announcements and newsletters.

The purpose of the Kickoff Workshop is to bring together the major stakeholders you have already identified, give them a briefing on Shared Vision Planning and present a summary from the interviews (in such a way that protects the confidentiality of the people who were interviewed). Then have a frank discussion of whether to proceed with Shared Vision Planning. If there is agreement to proceed with Shared Vision Planning, this workshop provides an opportunity to begin a discussion about ground rules (see below).

The kickoff workshop is also an opportunity to discuss who needs (and may be willing) to be included in Circle A (modelers) and who needs to be in Circle B (model users/reviewers). Since everybody does not have the time and energy, nor the expertise, to participate in actually constructing the model, it is important that all the interested parties are confident that the people in Circles A and B represent the range of expertise and interests so that they can be confident of the product produced.

Tips from the Old Pros

Several of the *old pros* suggest that you begin the exercise of developing objectives, performance measures, and methods of display in small groups. The first small group exercise can be conducted in homogenous groups, that is, with participants who share similar interests. The second round would then be heterogeneous, with the groups combining people of disparate interests. This accomplishes several things. People of similar interest may be able to help each other clarify their objectives and measures. People get to *try out* developing objectives and measures in a relatively safe environment. In the second round of the exercise, people with different perspectives begin to educate each other about their interests and values, and begin to test their ideas with people from other perspectives.

Once the kick-off meeting is over, you need to hold a workshop with decision makers from the sponsoring agencies to get a final go-ahead to proceed with Shared Vision Planning.[18]

If you are going ahead with a Shared Vision Planning process–and if you have not already–you need to select a process facilitator and a modeler. Often these individuals are selected *before* the kickoff workshop or assessment interviews. The facilitator might be the person to conduct the assessment interviews. You may decide to ask the facilitator to facilitate the kickoff workshop, and the modeler needs to be there to answer questions. They should be retained with the understanding that following the kickoff workshop the sponsoring agencies still have the option of deciding not to use Shared Vision Planning if there is insufficient interest from key stakeholders.

The following provides more information on these two roles.

6.1.4 Roles of Facilitators and Modelers

6.1.4.1 Facilitator

The facilitator's job is to guide the process while remaining neutral on the outcome of the process. The facilitator will be involved in helping design workshop or meeting formats, will lead these workshops or meetings, and will oversee the preparation of meeting summaries.

The facilitator needs to be trained in facilitation skills and be acceptable to all major parties. If the Corps is the implementing agency, participants may be suspicious of a Corps facilitator, fearing he/she will not be neutral, even though he/she is well trained in facilitation. The participants need to be confident that any proposals or interventions the facilitator makes are on behalf of an effective process, not any particular outcome.

The facilitator should also be well-versed in the subject area enough to be able to follow and guide the conversation. Experience with similar contexts is also helpful.[19]

[18] This would also be a good time to get their commitment to participate in a mock decision-making meeting (see page 60) that would take place in several months.

[19] The U.S. Institute for Environmental Conflict Resolution has published guidelines, "Choosing an Appropriate Neutral." Available at: http://roster.ecr.gov/reference/documents/ChoosingaNeutral.pdf

ATTRIBUTES OF AN EFFECTIVE FACILITATOR

- Perceived as neutral
- Trained in facilitation
- Respects the decision making authority of the participants
- Knowledgeable about planning processes
- Experience designing and conducting workshops in public setting
- Sufficiently familiar with the subject matter to be able to follow and guide the discussion
- Sufficiently familiar with modeling to discuss the modeling process with the modeler

The facilitator needs to be very clear that the participants are the ultimate decision makers. Deciding on a course of action will always involve making choices between competing objectives (values). These choices need to be made by the participants, not the facilitator.

There are a few modelers who have acquired facilitation skills over the years, so may serve as both facilitator and modeler. The number of facilitators who can also serve as modeler is extremely small, although the number of facilitators who have some understanding of modeling and the role it can play in conflict resolution is growing.

6.1.4.2 Modeler

The modeler's job is to determine what people want and then develop a way to model and display the information they need to determine how to get it. Preferably the modeler is familiar with modeling in a collaborative setting, and is also familiar with user-friendly, integrative and transparent models such as STELLA or OASIS.[20] The modeler needs to understand that user-friendliness often trumps ultimate precision. Ideally the modeler is familiar with multiple methods of portraying information, as not all information the participants want is likely to be incorporated in a single model.

The modeler must also remain neutral on the outcome, and be constantly striving to help participants figure out how to get the information they want. The modeler may try to assist the group by taking the objectives the group has outlined and developing alternatives that meet these objectives more completely. But having explained these options to the participants, the modeler accepts the decision of the participants and does not become an advocate for any particular course of action. As noted above, a few modelers also have facilitation skills.

Modelers have different styles. Some modelers work by meeting with participants then going off and doing the modeling essentially alone, then bringing draft products back to the participants for review. Other modelers work very much as part of a team effort, although ultimately the detailed work of writing code is going to be done by individuals within the team.

When there is both a facilitator and a modeler they should work together to design workshops and meetings, and work with each other to clarify their distinct roles during meetings.

[20] The group should retain flexibility to hire the most suitable modeler for the job. After defining performance measures is the best time to design the model, identify the most suitable software, and then determine if the current modeler is fluent in the software.

Once you have completed the assessment interviews and/or the kickoff meeting, you will need to spend a little time getting organized. You will need to contact the potential members of Circle A and Circle B to determine if they are willing to make the commitment of time needed to participate in those roles. Once you have begun to finalize that list, circulate it (electronically) to all the interested parties, to determine whether they are comfortable with the composition or feel that other people need to be included.

6.1.5 Setting Ground Rules

Ground rules (or *terms of engagement*) are rules of conduct that participants agree to follow while engaged in the Shared Vision Planning process.

There is no requirement that ground rules must be established, but most people who have conducted Shared Vision Planning processes, or similar processes such as mediation, strongly recommend it. If, after you are already into the process, someone engages in behavior that is upsetting to others but there are no ground rules addressing that behavior, it is hard then to establish new ground rules after the fact. Everybody is upset, so it is hard to get agreement on new ground rules without seeming to criticize or judge someone's behavior.

On the other hand, participants may show resistance to spending much time setting up ground rules at the beginning. It is only after you run into problems in the middle of the process that you realize it would have been helpful to set up the ground rules at the beginning.

Ground rules may cover interpersonal behavior, how decisions will be made, how the model will be used, the role of the facilitator or modeler, the technical support that will be provided to the group, or access to or use of the model once it is developed. An example of a set of ground rules is shown on the next page. This example addresses only interpersonal behavior.

Many facilitators try to expedite the process by presenting participants with a *mock* or *strawman* set of ground rules. The facilitator makes clear that he/she recommends that participants agree upon a set of ground rules, and presents an example. The participants can then choose to accept the ground rules presented by the facilitator, modify them, or add additional ground rules. One way to avoid appearing to impose ground rules is to present several examples of ground rules, so that participants can pick and choose between them.

The delicate balance the facilitator must walk is to avoid getting the group so frustrated with talking about ground rules instead of *substance* that they become negative towards the process. On the other hand, if approval of the ground rules is too superficial, people will not have made the emotional commitment necessary so that they will stick to the ground rules.

Agreeing on ground rules can be part of the kickoff workshop or part of the first workshop after participants have agreed to participate in a Shared Vision Planning process.

Examples of Ground Rules*

Interpersonal Ground Rules

1. We agree to take turns speaking and not interrupt each other.
2. We agree to listen respectfully and sincerely try to understand the other person's needs and interests.
3. We agree to not blame, attack, or engage in put-downs and will ask questions of each other for the purposes of gaining clarity and understanding.
4. We agree to stay away from establishing hard positions and express ourselves in terms of our personal needs and interests and the outcomes that we wish to realize.
5. We agree to make a conscious, sincere effort to refrain from unproductive arguing, venting, or narration, and agree to use our time to work toward what we perceive to be our fairest and most constructive agreement possible.
6. We will not dwell on things that did not work in the past, but instead will focus on the future we would like to create.
7. We will speak up if something is not working for us during the process.

Process Ground Rules

1. The job of the facilitator is to assist the group to work effectively while being impartial as to person and neutral as to result.
2. The job of the modeler is to model the situation in such a way that provides the group the information it needs to make decisions while being impartial as to person and neutral as to result.
3. While in the Shared Vision Planning process, we will refrain from adversarial legal proceedings (except in the case of an emergency necessitating such action).
4. The goal is to reach decisions by mutual agreement. Whenever that does not seem possible, the group will discuss how to resolve the dispute in a way that allows the process to continue.

* Based on mediation guidelines developed by James Melamed, but applicable to Shared Vision Planning. See (http://www.mediate.com/articles/melamed7.cfm)

Checklist 1 – Getting Started

- [ ] Identify sponsoring agency or agencies and planning team
- [ ] Make initial decision whether to propose the use of Shared Vision Planning
- [ ] Planning team identifies potential participants
- [ ] Planning team develops a list of people to be interviewed
- [ ] Select interviewer
- [ ] Develop written description of Shared Vision Planning
- [ ] Select convener
- [ ] Convener sends out interview invitation letters with the description of Shared Vision Planning
- [ ] Set up interviews
- [ ] Conduct interviews
- [ ] Prepare summary of interviews
- [ ] Decide whether to hold kickoff meeting
- [ ] Select facilitator and modeler (if not done previously)
- [ ] Conduct kickoff meeting
- [ ] Begin setting ground rules
- [ ] Make decision whether to proceed with Shared Vision Planning
- [ ] Begin organization of Circle A and Circle B

6.2 Defining Objectives and Performance Measures

By the end of this step you want to have agreement from the participants on planning objectives and performance measures.

Objectives are changes that people want to see, usually by increasing something they consider desirable or decreasing something perceived as undesirable. Examples might include:

- Provide increased flood protection
- Improve fisheries
- Increase recreation opportunities
- Reduce the *mud-ring* around a reservoir when drawdowns occur
- Minimize erosion
- Increase hydropower generation

Objectives are specific to each participant. Some participants have objectives that other participants do not share. But if you hope to come up with a plan that meets everybody's needs, you need to identify everybody's objectives and strive to address them in your alternative plans.

Often participants come up with a broad general objective such as *increase hydropower generation* and you need to work with them further to define the objective more specifically. For example, *increasing hydropower production* might actually be defined further as *increase hydropower generation during months when the market value of electricity is highest*.

> Tip from an Old Pro
>
> Palmer, co-inventor of Shared Vision Planning, stresses the need to constantly ask questions at this stage. If people mention a concern about drought, for example, find out the causes of the drought, how much water they are talking about, how often, who is short of water, where, and when.

Often the best way to get more definition about objectives is to have participants focus on performance measures. Performance measures are the way you measure how well an objective is being met. For a performance measurement to be useful, it must provide a way to measure present or future conditions – a baseline – and a way to measure changes (increases/decreases) from that baseline. If the objective is to *increase generation releases during months when the market value of electricity is highest*, then you need to be able to measure releases, but you also need some measure of the historical value of sales of electricity. The performance measurement for releases could be the amount of water released past XYZ dam during a specific time period, as shown in Figure 7(a). You would need historical information to establish a baseline, and the objective would define how much you wanted to increase generation in months where electricity sales were most profitable, as shown in Figure 7(b). Using graphs – even just mock-ups with historical or fabricated data, can help people to clarify and communicate

their performance measures. In the process of clarifying exactly which measures are appropriate, you may also clarify the actual objective.

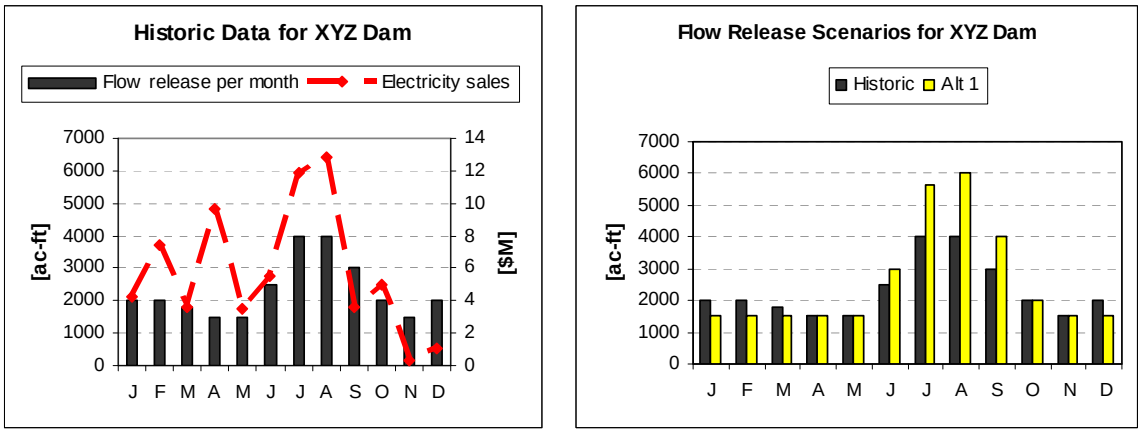


Figure 7: Sample Graphs of Performance Measures, including (a) showing historic data and (b) comparing flow release scenarios (data for illustration only)

Each participant has their own set of objectives and measures. The modeler works with them to understand and clarify what each wants to have happen, and how they think that can be measured. Typically this is done as a group exercise, because in the process of clarifying both objectives and measures, participants are also educating other participants about their interests and values. Throughout this process, both the facilitator and modeler must start on the assumption that each objective being proposed is valid, and may even have to *protect* objectives that are proposed by only one or two people from ridicule by others who do not think a particular objective *matters*. The only objectives that are invalid are objectives that are clearly extraneous to this particular decision making process, e.g., outcomes in other locations clearly not connected to the natural system under analysis. One of the challenges in any dispute resolution process is that some of the participants will come into the process already committed to a particular course of action, e.g., *build a dam on the Mighty River*. This is at odds with the logic of a collaborative decision making process. In a collaborative decision making process you first develop a common understanding of the problem, then, jointly seek solutions that do the best possible job of meeting the needs of all the participants. That solution might be a dam on the Mighty River, but even the participants who think that is a great idea may discover that there are other solutions that do a better job of meeting everybody's needs. One of the jobs of the facilitator and or modeler is to keep asking: *Why do you want that alternative?* Keep probing until you understand the values and interests underneath that alternative.

Some of what happens during the process of developing objectives and defining performance measures is to help participants suspend their commitment to a particular course of action. This is reinforced later in Shared Vision Planning as participants jointly evaluate scenarios and compare a wide range of alternatives. That process helps people see that there are multiple ways of meeting participants' needs. Participants often learn

that the solutions they came in proposing are not the most effective way of meeting their own needs, let alone all the participants' needs.

Once there is a shared understanding of all the participants' objectives and performance measures, then the modeler works with the group to define the set of performance measures that can be used to meet the objectives described by the participants. Typically there will be agreement on a common set of measures that will address all the objectives. The goal is to get a consensus agreement on the minimum number of performance measures that address everyone's objectives.

Tip from an Old Pro

Sheer concentrates not just on performance measures but on how the participants want the data displayed so that they understand it and it is usable. He sees one of the jobs of the modelers as being able to offer options for how information should be displayed. He does not believe that all the data has to come from the model. The critical thing is that participants have the information they think they need, wherever it comes from.

Sheer may spend an entire workshop talking with participants about the best ways to visualize the data. He sees the final answers as part art, part the science of display, and part communications. The critical issue is to help the group find meaning in the data.

One constraint on performance measures is whether anybody (such as an agency, university, or individual scientist) has or could measure the things people want measured. Particularly as you get into biological performance measures related to endangered species there are a number of performance measures it would be useful to include for which there is no data. Or, the cost involved in measuring it is prohibitive or would delay the process for years. In cases like these it is necessary to work with the participants to find useful surrogates for the data they would like, but which does not exist. The issue becomes not what is ideal, but what can actually be done.

It is equally important that the modeler work with the participants on how to display results so that the information is presented in a form that participants understand and can use. For example, modelers often display statistical information in ways that only someone with a Ph.D. in the subject matter can understand. For the information to be useful to the public it has to be displayed in ways that are readily understood by people without training in reading statistical displays. So beyond creating a model that provides the needed information, the modeler also needs to know how to display that information in a way participants can use.

Information from the Shared Vision Planning model is only one source of information the public may want to use to make its evaluation. There may be qualitative information or expert opinion that doesn't fit in the model, or you may want to compare data from more than one model. The critical issue is that participants can see all the information on how well each alternative meets their objectives, and can understand that information.

In Shared Vision Planning most of the work gets done in workshops or workgroups.

- Workshop

  A workshop is a type of meeting in which the participants work together to produce an actual product or complete a task. That task might be to identify objectives and performance measures, develop a set of scenarios or alternative plans, or evaluate alternative plans. A workshop is highly interactive. For optimal discussion the number of participants should be held under 25. However, in larger groups, participants can also be given breakout group assignments, with small groups completing an assignment and then reporting back to the larger groups. Part of the art of workshop design is to carefully structure the assignments given the group(s) so that you get the needed product.

- Workgroup

  A working group is just what the name suggests: a group of people who actually perform work together on one or more specific tasks. Typically the group has a relatively defined membership and the members are sufficiently committed to provide continuity of participation. If the working group members are not located in immediate proximity to each other, a great deal of communication may take place using e-mail or meetings may be held using virtual meeting rooms through the Internet using a program such as WebEx or NetMeeting. But normally the working group will get together face-to-face periodically.

Typically the members of Circle A become a workgroup, a defined group of people who meet on a regular basis to work on developing and refining the model. The Circle A workgroup may also set up subgroups, smaller groups that work on one specific aspect of the model. For example, there might be subgroups on fisheries, hydropower, or recreation. People who would normally be considered part of Circle B (model users, reviewers) might be part of these subgroups. Someone from an agency whose job it is to protect fisheries might have valuable technical expertise needed by the fisheries subgroup, even though that person may not choose to be part of the Circle A workgroup that is working on the entire model.

Identifying objectives and performance measures is sufficiently general that virtually all circles of influence can participate in it. Typically during this phase of Shared Vision Planning there will be a series of workshops and workgroup meetings, each to serve a different purpose. This series of meetings might include:

- A first workshop with modelers (Circle A), model users/reviewers (Circle B) and other interested parties (Circle C) to begin identifying objectives, performance measures, and display methods.
- A workgroup meeting, an initial meeting of modelers (Circle A) and reviewers (Circle B), to discuss in more detail what information is available that could be used to provide the information needed for the performance measures.
- A follow-up workshop (Circles A to C) to spend more time developing objectives, performance measures and displays, and to begin work on the conceptual model.

- A workgroup meeting to further refine the performance measures and displays, and develop a draft (sometimes described as a *mock* conceptual model).

The actual number of meetings will depend on the circumstances and participants' responses. This is influenced by the number of participants, the degree of controversy, and the relationships between the participants. There is not a way to prescribe the exact number of meetings that will be needed in advance. The reality is that *it takes as many meetings as it takes.*

Checklist 2 – Defining Objectives and Performance Measures
☐ Conduct a series of workgroup meetings and workshops with Circles A to C to accomplish the following tasks:
☐ If not completed during the prior step, get agreement on a set of groundrules
☐ Work with participants to identify their individual objectives
☐ Consolidate the individual objectives into a single list
☐ Identify ways to measure (performance measures) how well each objective is met
☐ Get agreement on how to display information in ways that is useful to participants
☐ Participants regularly inform their members/constituencies about what has been learned and conclusion reached
☐ Keep decision makers (Circle D) informed about what has been learned and what conclusions have been reached

6.3 Developing a Conceptual Model

The next major step is to develop the conceptual model. This involves getting agreement among the participants on the key factors that must be included in the model and the linkages between those factors. These linkages do not yet need to be quantified.

A conceptual model is sometimes described as a *bubble diagram*, a schematic diagram of what will be addressed in the subsequent quantitative model. Basically a conceptual model does two things: (1) it shows all the basic factors, e.g., water temperature, instream flows, power generation, recreation, fisheries that need to be included in the quantitative model; (2) it shows that there are linkages between these factors, e.g., it might show that instream flows have an impact on water temperature, power generation, fisheries, etc. The conceptual model does not quantify the exact nature of these linkages. So, for example, you may know that increases in instream flows reduce water temperature, but in a conceptual model you do not have any rule or curve which shows exactly how much impact instream flows have on temperature. The conceptual model just shows that there is one.

Figure 8 shows the *beginning* of a conceptual model using some of the examples mentioned above. In this conceptual model the amount of rainfall is a major factor in determining how much water is available in the reservoir, how much capacity in the reservoir is needed for flood risk management, how much power could be generated, and how much water will be needed for irrigation. The reservoir is operated for electric power generation, flood risk management, and irrigation. Electric power generation is sensitive to the market value of electricity, which varies seasonably. Instream flows have an impact on fisheries, power generation, and water temperature. Water temperature also has an impact on fisheries.

If participants were working with this diagram they would undoubtedly add many more factors and linkages before they were satisfied that the diagram includes everything that needs to be captured in the model.

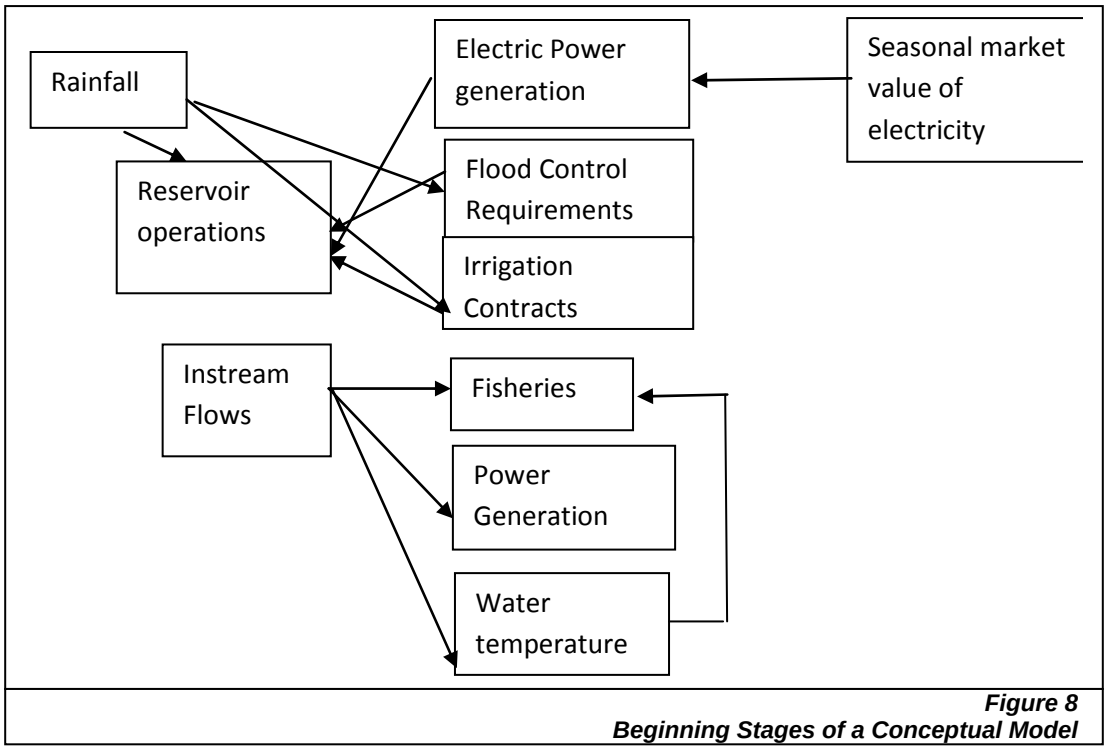


Figure 8
Beginning Stages of a Conceptual Model

The minute participants begin discussing objectives and performance measures they are already providing information that can contribute to the development of a conceptual model. As participants talk about objectives they are indirectly discussing what factors need to be in the model. As they discuss how to measure performance on each objective they will begin to discuss how one factor causes an effect in another. For example, people may discuss how instream flows in certain months may be critical to recovery of fisheries. Or they may discuss how much storage must be retained in the reservoir to provide flood protection during wet months.

Some modelers start the development of the conceptual model by presenting a *mock* conceptual model to participants in a workshop. This *mock* conceptual model is based on

what the modeler has heard during prior workshops. Participants are asked to *correct* the mock conceptual model, instead of trying to build the conceptual model from scratch. The ultimate goal is simply to make sure that the model contains a box for everything that is important.

Frequently modelers will take the rough drawings of a conceptual model produced in a workshop and refine them between workshops, while retaining the fundamental relationships they heard described by participants. They then check back with participants to be sure the participants feel the more refined version captures what the participants intended.

It may take several iterations before participants are satisfied the conceptual model has captured the critical elements and linkages. Often as participants discuss the conceptual model they will also clarify objectives or identify additional performance measures.

Getting agreement on the conceptual model may require several rounds of interaction between the different circles of influence. This is a step in which Circles B and C can participate easily, contributing their thinking about what elements need to be included in the model, and the linkages between those factors. Typically there will be several workshops that can include Circles A to C. Then the time may come when the modelers (Circle A) need to work alone for awhile to put all the pieces together. When they have developed a draft conceptual model for Circle B and C, they then meet with Circles B and C, providing opportunities for comments and changes before the conceptual model is finalized. There should also be opportunities for Circle D to comment on the conceptual model before it is considered *final*.

Developing a conceptual model is a very *visual* activity – people need to draw elements and linkages so others can see them. One way to do this is to cover the walls with large sheets of paper so that the model can be drawn large enough so that the whole group can see the model as it grows. Another possibility, if people are working in small groups, is to have paper that covers the small tables like a tablecloth so that participants at each table can draw their ideas on the paper tablecloths. An ideal tool is a wall-sized electronic whiteboard that allows you to draw the model with a flow pen, erase and re-draw, and then when you are done, print out the final result and store the final result as a computer file.

Once agreed-upon, the conceptual model is not fixed in stone. It is common and expected to learn things in subsequent steps that require revisiting and modifying the conceptual or qualitative model.

Checklist 3– Developing a Conceptual Model	
☐	Conduct a series of workgroup meetings and workshops with Circles A to C to accomplish the following:
	☐ Identify all the factors (*sectors*, in modeler language) that need to be included in the conceptual model
	☐ Identify which factors change or interact with (positively or negatively) other factors that will be included in the model
	☐ Get agreement on a conceptual model showing all the factors to be included in the model and the linkages between them
	☐ Begin to identify objective information or research results upon which to quantify the linkages between the factors
☐	Participants regularly inform their members/constituencies about what has been learned and conclusion reached
☐	Keep decision makers (Circle D) informed about what has been learned and what conclusions have been reached

6.4 Developing the Quantitative Model

The purpose of the conceptual model is to define all the basic elements of the model and show that there are linkages between these elements. Put another way, you want to have a box for everything that is important, and you want to have arrows between everything that influences something else. But that does not tell you *how much* each factor influences the other. If Factor A is doubled, does that increase Factor B by 5 percent, 100 percent, or 500 percent?

> Tip from an Old Pro
>
> Dan Sheer says he does not insist that all the data be quantitative. He often uses non-quantitative displays, and some of them have proven to be the most important information for decision making. Not imposing uniform quantification can give the public more "wiggle-room," and this can lead to better alternatives. But again, this means that the models and other displays are designed to help resolve the dispute, not to be perfect science.

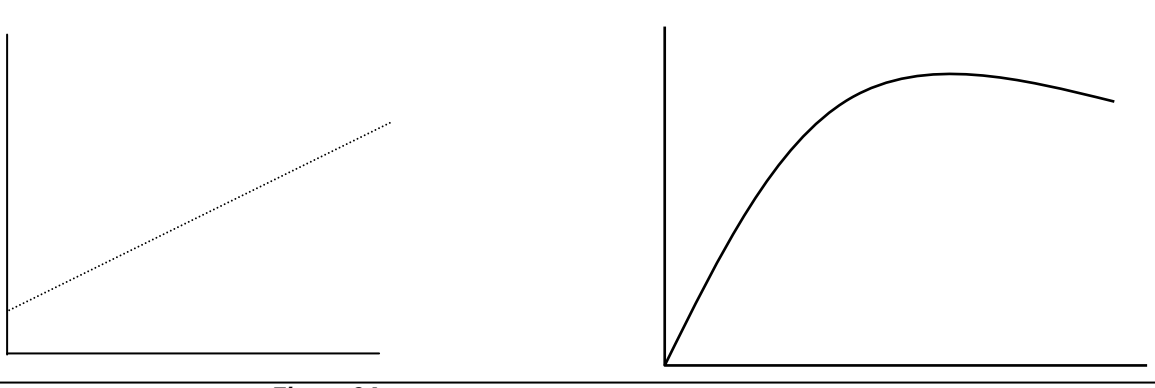


Figure 9A
Straight-line Relationship

Figure 9B
Curvilinear Relationship

The major task in constructing the quantitative model is to quantify (assign numbers to) all these relationships. Some of these relationships are linear, meaning that each time one factor changes, the other factors changes by the same predictable amount (See Figure 9A). Others are non-linear (Figure 9B). Some have a *threshold*, i.e., nothing changes until the amount of change reaches a certain threshold, then everything changes significantly (Figure 10A). There are even cases where the relationship is negative until it reaches a certain threshold when it changes to positive, then can revert back to negative (Figure 10B). This is true of certain habitat conditions, for example. Too little river water depth and fish will get stuck in among the exposed rocks and woody debris, too much flow and the strength of the current will overwhelm them.

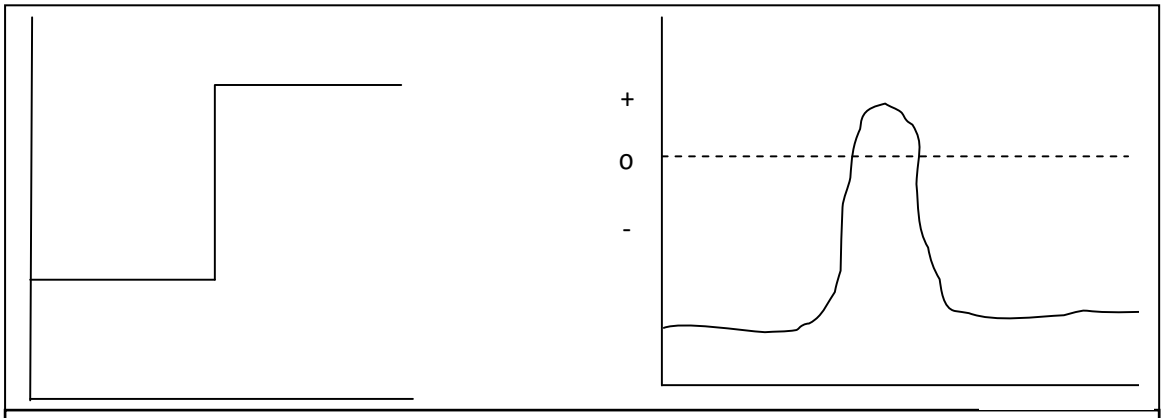


Figure 10A
Threshold Relationship

Figure 10B
Window Relationship

During the development of the quantitative model you *put in the science.* You define relationships between all the elements in the model using the best science available. However, there can be constraints. In some cases the data that you would like to have to address a particular performance measure simply does not exist. Nobody has studied it, nobody knows how to study it, or the cost is prohibitive. In those cases you simply have

to ask whether there are other *surrogate* measures that are the best that can be done given the available data.

There may also be disagreements among the participants about which research is considered reliable and which is not. People tend to prefer research results that support their own interests and values. When there is disagreement over which research is usable, you may have to rely on Circles A and B, the professional modelers and scientists who use and review the models, to resolve the issue. While average citizens may be able to understand the conclusions of studies, they are often not able to understand all the questions about methodology that need to be addressed before study results can be considered reliable. Some studies appear to produce answers, but the research design may be so flawed that the results of the study may be misleading or wrong. Basically the goal is to get a high enough level of agreement in Circles A and B, so that the people in those circles will tell the people in Circles C and D that the data being used is as good and as unbiased as can be achieved with available data.

Tip from an Old Pro

Palmer estimates that building the model in a collaborative manner takes about four times as long as it would take for an individual programmer to develop a comparable model.

So how is this extra expenditure of time justified? First, when you're done people trust the model. As a result, the results derived from the model are believable even to people who don't like the answers. Many expert-developed models never get used. They may be fine technically, but since nobody believes in them nobody uses them. You also get information displayed in a manner that is useful and understandable by the people who need to use this information, because you've gotten agreement on what information is wanted and how to display it throughout the process.

Keep in mind that all that extra time is also an investment in the future, beyond this immediate decision-making model. Once people have confidence in a model it may be used in a number of decision-making processes.

One word of caution: our *old pros* remind us that in Shared Vision Planning the model is designed to meet the needs of the dispute resolution process rather than to do "perfect" science. Perfect science might push the model into being incredibly detailed and complicated. Often this level of complexity adds little or nothing to understanding the basic relationships, and can make the model so *unfriendly* that normal people cannot understand it. Sometimes the price of perfect science is that it is ignored because decision makers do not understand it or know how to use it.

The process of developing the quantitative model is very much a trial and error, or iterative, process. Your first efforts at developing a quantitative model are likely to require significant modification. Changes are made until you have a model that participants agree is satisfactory; that is, that it can simulate events occurring in the real world, just well enough for the purposes of the decision at hand.

Part of this trial and error is a process called calibration. As discussed in Section 5, often there is actual historic data for an extended period of time for things like rainfall, flood frequency and level, number of animals of particular species, etc. If you run the

quantitative model for the same time period, it should approximate the events that actually occurred. If it does not, you have to figure out why not, and fix it so it does. This process of refining your model until it approximates known data is described as *calibrating* your model.

When you are calibrating the model to fit historic data you have historic data to provide a comparison. But when the model has to predict human behavior (which could affect water usage, energy usage, or willingness to modify behavior) it is often more difficult. Sometimes there is not any good data. Other times you have historical data that seems adequate, but humans are both unpredictable and adaptable, so the historical data may not predict actual behavior. Calibrating human behavior is often simply checking the model results to make sure the model is doing what you think it is going to do. You can make comparisons against critical periods, or spot check the code, but you cannot calibrate the human behavior elements of the model in the same way you can the natural system.

During this phase, much of the work will be done by the modelers (Circle A) and reviewers (Circle B). This is a highly technical phase, and requires a lot of knowledge either of modeling or the scientific/technical studies that can be used to quantify the relationship between factors in the model.

The mechanics of involving stakeholders in this process include the following:

- Developing the quantitative model may be kicked off by a meeting of Circles A to C in which there is a discussion of what research might be used. People from agencies or organized interests may be able to guide the modelers to prior studies and databases of which the modelers are unaware.

- Modelers may also want to conduct interviews or hold small group meetings with various participants to discuss in detail the studies they know about that might be useful. Many agencies will have access to detailed studies of some specific aspect of the model, such an endangered species, or irrigation patterns.

- Once the modelers have identified the studies and databases that are available, much of the work will need to be done by the Circle A working group, or by subgroups. There does have to be an overall architecture to the model within which all the subgroups work. There must also be some follow-up work to get all the pieces from the subgroup to mesh into a workable model.

- Once modelers have put together something tentative, they then need to meet with the reviewers to get feedback. This will generate further refinements for the modelers, and this cycle should be repeated until both modelers and reviewers believe they have a workable model. Once there is a potentially workable model, it is appropriate to reassemble Circles A to C for a demonstration of the model. Based on feedback from this workshop the model may need more work, or may be ready for use.

- Typically, because of the technical nature of this phase, decision makers (Circle D) are not likely to be involved much during this phase unless they participate in a mock decision making meeting (see textbox on Mock Decision Making, p. 60). It is important, however, that modelers and reviewers provide periodic briefings to decision makers so that decision makers are apprised of how model development is progressing.

Checklist 4 – Developing the Quantitative Model	
☐	Circles A and B identify objective information/research studies upon which to base quantification of linkages between factors in the model
☐	Conduct interview with key participants who may know of information/research to use in quantification
☐	Conduct workshop with Circles A to C to identify information/research to use in quantification
☐	Circle A constructs a draft quantitative model
☐	Compare results using the quantitative model with available historical information on performance measures
☐	Workshop with Circle B to identify changes needed to calibrate data
☐	Circle A revises quantitative model to get good correspondence with historical data
☐	Workshop with Circles A to C to present corrected model for review/approval
☐	Participants inform their members/constituencies about what has been learned and conclusion reached
☐	Keep decision makers (Circle D) informed about what has been learned and what conclusions have been reached

6.5 Scenarios Analysis and Developing Alternative Plans

Once the model has been constructed, with general agreement that it is usable in this decision-making process, you will begin to experience the pay-off from all the hard work engaging of everybody in developing the model. Now you have a tool that will allow you to quickly test out numerous scenarios and alternative plans.

But first, what is the difference between a *scenario* and an *alternative plan?* A scenario is a description–a *word picture*–of future conditions. Alternative plans are different actions, or sets of actions, you could take to meet the objectives in the future. Alternative plans consist of courses of action you might take. You might build a dam or levees. You might time the releases from a dam differently. You might develop a water conservation program. You might change economic incentives. You might issue a regulation. Or you might combine these in various ways.

What is the value of developing scenarios? You could assume that the world 20 years from now is going to be pretty much the same, just a little bit more so. But when it comes to issues related to water, the onset of global warming means that there are other possible future conditions that may be just as likely as *more of the same*. In some places, the amount of available water could drop as a result of warming. Or water may be flowing in rivers earlier in the year as the snow pack melts earlier due to warming. Or instead of slow constant warming, there may be extremes of drought and flooding. Nobody really knows which set of assumptions is more probable. But depending on which future conditions actually occur, there could be significant changes in water availability, need for flood protection, quality and quantity of fisheries and habitat, recreation demands, etc.

Just as there can be changes in the natural system, there can also be significant changes in human behavior. People may change their consumption patterns, switch to drip irrigation, start buying more locally-produced produce, or even start using more energy and water.

There can also be changes in the macro-socioeconomic conditions. For example, your plans might be affected by a drying up of credit markets, a rapid increase/decrease in fuel costs, worldwide shortages of food, etc. These factors are not in the control of the people doing the planning, but they could have a material effect upon the effectiveness of various alternatives plans.

Developing alternative scenarios of future conditions is a way of coping with these uncertainties. Rather than just guess which version of the future is most probable, in good planning you test your alternative plans against multiple scenarios.

Some alternative plans may work well in some scenarios but work poorly in others. Some may work reasonably well in all or most scenarios. Part of decision making may be to decide how to compare an alternative plan that works extremely well in a few scenarios but not at all well in others, with a plan that works pretty well, but not exceptionally, in any of the scenarios. As you can see, if you have multiple scenarios and

Tip from an Old Pro

In the final analysis, most plans assume a set of likely future conditions and are designed to satisfy the objectives in those conditions. But, over time, the predicted future conditions may not occur. One use of scenarios is to determine whether the plan you choose is sufficiently flexible that it can adapt in case future conditions are different than predicted.

But once you understand that predictions of future conditions can be wrong, the logical conclusion is that you should track over time how conditions are changing and have mechanisms in place that allow you to adapt your plan to address those changing conditions.

In some cases it is necessary to set up a new institution – such as a water authority or district – whose job it is to continuously monitor conditions and take action to adjust plans as needed.

alternative plans, that means the number of possible combinations becomes extremely large. One of the compelling advantages of developing a computer model is that computer models allow you quickly identify probable outcomes for numerous alternative plans tested against numerous alternative scenarios. If you had to analyze all the combinations without the computer the task could become overwhelming.

Just as it makes sense to evaluate alternative scenarios of future conditions, it makes sense to consider a range of alternative plans. Too often agencies jump to a single plan of action, without consideration of alternatives. When they do, they often select a plan that is not the best in terms of meeting all the objectives of the interested parties. As a result they create opposition from interested parties.

The alternative plans should represent a range of assumptions or values orientations. If all the plans are simply variations on a central theme, some or many of the interested parties may feel unrepresented by the alternatives being considered, seeing none that represents their values or philosophy. When this happens they may decide the decision making process is not legitimate. The general rule is: if stakeholders cannot see any alternative being considered that portrays their values and interests, they will opt out of the process (and may resort to litigation or political pressure to get their values and interests addressed). If you develop alternatives representing the full spectrum of values, some of the alternatives may be dropped once these alternatives are subjected to evaluation. But interested parties want to see that these alternatives were considered and dropped only after thorough analysis. They will also want to see that at least some of the remaining alternatives address their concerns. Throughout this stage, make sure to thoroughly document decisions on what alternatives were dropped and why, and have these available to anyone who missed meetings, or questions decisions later.

One way to select the first set of alternatives is to identify five or six basic sets of values of participants in the process. You can determine these *values* by looking at the different sets of performance measures that people wanted considered.

Examples of *values* are:

- Value A: Protection of environmental values – such a protection of endangered species, open space, naturalness, and aesthetics – is the dominant consideration.

- Value B: Economic considerations – such as power sales, maintaining (or expanding) agricultural production, and urban development – are the dominant considerations.
- Value C: Protection of the agricultural way of life, including water availability for irrigation, prevention of urban sprawl, and adequate flood protection of irrigated fields.

> Tip from an Old Pro
>
> The modeler, like the facilitator, has to be a neutral party. It is all too easy for the modeler to become infatuated with an alternative that he/she thinks does an exceptionally good job of meeting all the objectives. The modeler does have the responsibility to point out how well each alternative meets the objectives, and which alternatives are "non-inferior" solutions. But the modeler must remember that his/her job is to educate the participants, and create options for the participants, but the participants are the ultimate decision makers. If you advocate too strongly for any particular alternative you may lose your perceived "neutrality" and thereby lose your credibility as a source of objective information.

Next, develop one alternative for each value set that will do the best possible job of meeting the objectives for people holding those values. This is a straight-forward way to generate alternatives, and may even include those "intuitive" alternatives that people think will best meet their objectives. Then evaluate all of the alternative plans (showing them side-by-side) using all the performance measures developed earlier. Often the *pure* values–driven alternatives will do a good job of meeting some objectives, but a poor job of meeting many others.

This will start people thinking about which alternatives do the best job of meeting all the performance measures. The modeler or the facilitator should not argue for or against any particular values orientation, but may legitimately point out that some alternatives do a better job of meeting a lot of needs than do others. At this point, people may also begin to recognize that more balanced alternatives may meet their own – and others' – objectives most effectively.

To the extent possible, you want to engage participants in generating new alternatives. As they generate alternatives they not only see new possibilities, they also lose some of their original attachment to the idea that there is only one solution that is good for them and their interests.

There are differences among modelers in how they generate alternatives. Werick, Palmer, and Sheer provide participants with direct access to the model so they can run the model on their own computers to test new options.[21] Others have participants submit alternatives to the modelers to run. To motivate the participants, Palmer once offered a $500 prize to anyone that could find a better alternative than those generated by his graduate students. (The students still won.)

Mock Decision Making Meeting

Bill Werick and Rick Palmer have begun holding a "mock decision making meeting" somewhere towards the end of the development of the conceptual model and the early development of the quantitative model.

In those cases where they've used this approach, the client has been a decision- making board with multiple members representing a wide range of interests.

The idea of the meeting is to emulate what an actual decision making meeting would look like. The modelers prepare "mock" data similar to that which would be produced when the actual model is completed.

The mock meeting serves several purposes. One thing that modelers look at is what information decision makers actually use when they make a decision. This can be instructive by showing which information is most important, which information is not understood, etc.

Participants also learn by engaging in the mock meeting. Frequently the most important thing they learn is that they – like the planning process itself – need to follow a structured decision making process. When consultants tell them this they often will not accept it. Many decision makers seem to assume that the solution will just emerge from the data and they'll "know it when they see it."

But after observing themselves in action, they often become believers in using a structured process. Some decision makers start out thinking the mock decision making meeting will be just a silly exercise and a waste of time, but they often end up believing it was an important step in getting ready for the real decision making process

Sheer also has the modelers create new alternatives based on stakeholder discussion of the pros and cons of previously run alternatives. New alternatives can be developed to illustrate or study what happens when you attempt to maximize for individual objectives, or get the best mix for meeting multiple objectives. When results of early alternatives are different than expected, new alternatives can be developed to learn what it is about the water system that is producing the counterintuitive result. The stakeholders' understanding of how particular features in alternatives help to improve or degrade performance on each objective helps to focus the process on objectives rather

[21] If you allow stakeholders direct access to the model itself, allowing them to make changes and run their own scenarios, you will need to establish quality control procedures to avoid development of renegade versions, insertion of viruses, or other changes that violate the fundamental logic of the model. There are established techniques in the open source software community for maintaining these quality controls. Allowing access to the model on a central server can make quality control much easier and facilitate the sharing of alternatives between participants.

than alternatives. The modelers gain new understanding as to the nature of the objectives, which helps them to create more acceptable alternatives.

Developing scenarios and alternative plans is typically not something you do just once. You may go through several rounds of developing scenarios and you will almost certainly go through several rounds of developing alternative plans.

In reality, the process of developing alternatives is a cycle which includes evaluation (covered in the next section). You will develop a set of alternative plans, you will do runs of the model to test the alternatives in a variety of scenarios, you will learn something important, and you will use what you have learned to guide you in developing another set of alternative plans.

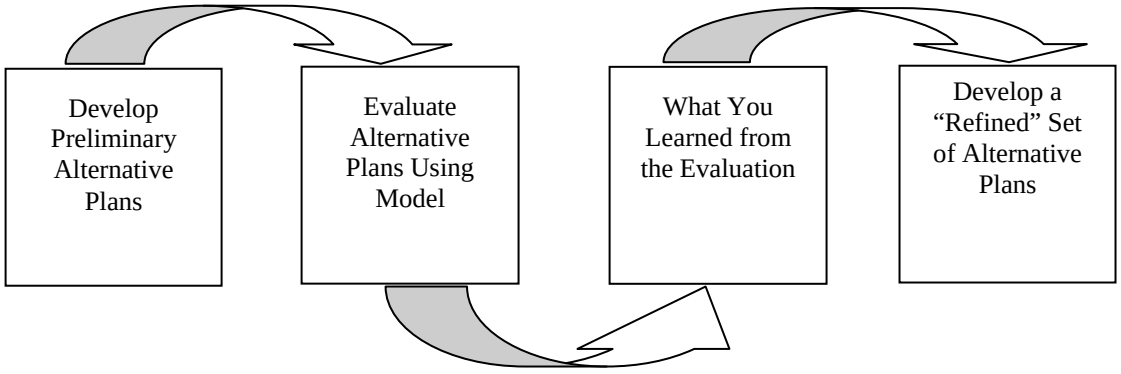


Figure 11
Alternate Plans Process

The participatory process echoes these cycles. Once again there will be a series of workshops, with the number depending on circumstances. The first workshop will typically be open to Circles A to C, so that everyone can contribute ideas about what alternative plans need to be developed. The planning team and the modelers will work together to develop alternative plans, based on the ideas suggested in the workshop. These plans will contain sufficient detail that the plans could be tested in the model. But the planners/modelers will want to be sure that these alternative plans do, indeed, capture the ideas presented in the original workshop. So they will present these alternatives in another workshop, and revise the plans as needed.

Then they will use the model to test these alternative plans in a variety of scenarios, using the performance measures developed in earlier steps. This information will be summarized, in a form participants can understand, and presented at yet another workshop. Typically the discussion of the results from the model runs will lead to dropping some of the alternative plans, modifying others, and creating new plans. The cycle of workshop -> refining of plans -> model runs -> workshop, will continue until you come up with a final set of alternative plans.

The following pages provide examples of a workshop format for developing scenarios and a workshop for developing alternative plans based in values.

Workshop Format: Developing Scenarios

Here is a relatively simple workshop format for developing scenarios:

1. Break the participants in the meeting into workgroups of 5 to 8 people.

2. Ask the workgroups to complete the following activities:

    a. Brainstorm[22] a list of any changes in the natural system (air, water, earth) that you believe could occur over the next 25 years that could significantly affect the issue being discussed.

    b. Once brainstorming is concluded, scan back through the list and make sure everybody understands what each item means BUT DO NOT ARGUE THE MERITS OF EACH ITEM. The group should also discuss whether there are items that needed to be consolidated because they are essentially the same idea.

    c. Give each participant 3 colored dots of one color, 3 colored dots of another color. Tell them they will be assigning priority to the items on the brainstorming list by voting using the colored dots, evaluating the significance of the factor if it did occur, and evaluating the likelihood that it will occur. They should use one color (you will need to specify which) to evaluate the significance of the factor if it did occur, and the other to evaluate the likelihood that it will occur.

    d. Following the scoring, ask the group to use the major factors as the basis for selecting unifying themes around which scenarios of the future should be built. If a key factor is *global climate change*, one theme might stress slow gradual change, another might suggest periods of heavier than normal rainfall followed by periods of greater drought than normal. One important consideration in proposing themes is to *bracket* the most important possibilities.

    e. Have each small group present its proposed themes to the entire workshop.

    f. There will be quite a bit if overlap and duplication, so consolidate the list.

    g. If the list is very long, give the participants 5 dots each and have them vote for which ones they think need to be developed into scenarios.

    h. Once you have a list of reasonable length, the modeler will want to ask questions about each item on the list to help identify how to turn the theme into something the model can analyze.

[22] The rules of brainstorming are that there should be no evaluation while people are generating ideas, and way-out ideas are encouraged. The value of brainstorming is to help the group break out of group-think.

Workshop Format: Developing Alternatives Plans

1. Divide participants into homogenous workgroups, that is, workgroups of people with similar interests, e.g., environmental community, agriculture community, development interests, etc. Let participants *self-identify* which group they belong in, so long as people are clearly not just joining an opposing group to try to influence the outcome in that group.

2. The assignment is for each group to develop one or two alternative plans based on the interests/values of their group.

3. Ask each group to identify the 3 most important things they want to achieve in each plan.

4. Ask them to describe how they would measure whether these goals were achieved using the performance measures previously developed, e.g., how much would constitute success?

5. Reassemble to participants and have each group share the plan(s) they developed.

6. Allow the modeler the opportunity to ask questions.

Checklist 5 – Scenario Analysis and Developing Alternative Plans

- ☐ Conduct workgroup meetings and workshops with Circles A to C to accomplish the following tasks:
  - ☐ Identify assumptions about the natural resource system, human behavior, and macroeconomic conditions that need to be included in scenarios
  - ☐ Develop scenarios that capture a range of assumptions
  - ☐ Identify values premises that can be used for developing alternative plans
  - ☐ Complete computer runs showing outcomes on all performance measures for alternative plans tested in a variety of scenarios
  - ☐ Identify additional scenarios or alternative plans based on modeling results
  - ☐ Continue to add, delete or modify plans until there is agreement on a set of alternatives plans that represents a range of values
  - ☐ Begin discussion of how alternative plans would be implemented, particularly if implementation differs markedly from one plan to another and might affect decision-making
- ☐ Participants inform their members/constituencies about what has been learned and conclusions reached
- ☐ Keep decision makers (Circle D) informed about what has been learned and what conclusions have been reached

6.6 Trade-off Analysis and Decision Making

The overall goal of a Shared Vision Planning process is to get agreement on a mutually acceptable course of action and how to implement it. Trade-off analysis and decision making are the final payoff for all the hard work in previous steps. This is where you may be able to achieve the overall goal.

By this point you should have:

- Well-defined objectives and performance measures
- A computer model that is perceived as reliable and useful by all parties
- A set of scenarios defining the range of reasonable conditions under which your alternative plans could be expected to perform
- A set of alternative plans that represent a range of values held by interested parties

Now the job is to evaluate how well these alternative plans perform, and begin the process of moving towards agreement on a course of action that is sufficiently acceptable that it can be implemented. Finding an alternative that can be implemented means there is either complete agreement, or a high enough agreement on a course of action by the critical actors that it can overcome any residual disagreement by a few (not particularly powerful) people who hold out for something else.

Tips from an Old Pro

People often enter the process with a particular alternative in mind. They may be surprised to find that their preferred alternative isn't acceptable to everybody, and may not even do the best job of meeting their own needs. But participants quickly learn that for there to be any agreement, they have to come up with an alternative that meets everybody's needs if not perfectly, at least pretty well. Our old pros tell us that once participants get engaged in the search for a non-inferior solution (see text box), you're well on the way to an agreement. It may take awhile, but at least they're searching for a solution that meets everybody's needs.

6.6.1 Evaluating Alternative Plans

You will rarely start with a set of alternative plans and move immediately to a single solution. Instead, you will evaluate the first set of plans, learn quite a bit about which features are most significant, develop a second set of alternative plans, learn from them, develop another round of alternatives, and so on until you begin to converge on a single course of action that everybody accepts (or will at least *live with).*

You may be able to identify a non-inferior solution (see next page)--a plan that is at least as good as any of the plans for all criteria, and better than the other plans on some criteria. Sometimes you cannot find one. But the closer you can come to finding a non-inferior solution, the easier it is to get agreement on a course of action.

What is a *Non-Inferior* Solution?

When you are trying to pick the *best* plan you quickly find that *best* is a question of values or political philosophy. It is defined by what people think is most important to accomplish. If you have environmental goals, then some alternatives will be better than others at achieving those goals. If your goals are economic, an entirely different set of alternatives may look more attractive. *Best* is in the eye of the beholder.

In most water management situations there are a number of criteria that need to be met. If you develop an alternative that is the absolute best for one criterion, it may not perform well for the other criteria. Since you are trying to find an alternative that is acceptable to a number of parties, an alternative that is wonderful for one criterion, but does not perform well for others, is not likely to be acceptable.

This is the same problem you have when you buy a car. You may want a car that you consider highly attractive or says something about what kind of person you are. You may want a car that has great gas mileage. And of course you want that car to be reasonably priced. Rarely is there a car that achieves all three goals optimally. There may be cars that are sexy and not too badly priced, but they are gas-guzzlers. Or a car has the looks you want, and gets good gas mileage, but is way out of your price range.

You are facing the same dilemma that decision makers face in trying to find a water management solution that provides the best possible balance between competing criteria. The prime difference is that the various criteria are represented by powerful individuals, groups and agencies, and typically there are many more than three criteria.

But what if you could find an alternative that was also better than or as good as any of the other alternatives in meeting all the other criteria? This alternative would have a very good chance of being acceptable to all interested parties.

In modeler's language, this is a *non-inferior solution*. It is non-inferior because it is at least as good for all criteria, and better than the other alternatives on some criteria. Figure 11 illustrates the concept of a non-inferior solution. Alternative A satisfies Criteria 3 at about the same level as Alternative B, and better than does Alternative C. But the scores for Alternative A are lower than the scores for Alternative B for both Criteria 1 and Criteria 2. Similarly, Alternative C, meets Criteria 1 as well as does Alternative B, but does less well (or no better) than Alternative B for both Criteria 1 and Criteria 2. Put another way: In all cases Alternative B meets the three criteria as well or better than the other alternatives. Both Alternative A and C are not as good as Alternative B at meeting one or more criteria.

So, while you should avoid saying Alternative B is the *superior* alternative – that is a question of values or politics – you can say that Alternative B is never the inferior alternative. So it is referred to as the *non-inferior* solution.

Occasionally participants will decide to select a plan other than the non-inferior solution, even when a non-inferior plan exists. They might, for example, pick a plan that was almost as good but requires a less complicated operating regime. They might also pick an alternative that for some reason was easier to sell politically. When this happens, they are really bringing in new performance measures–management simplicity and political acceptability–that were not included in the original evaluation, but may be important to successful implementation.

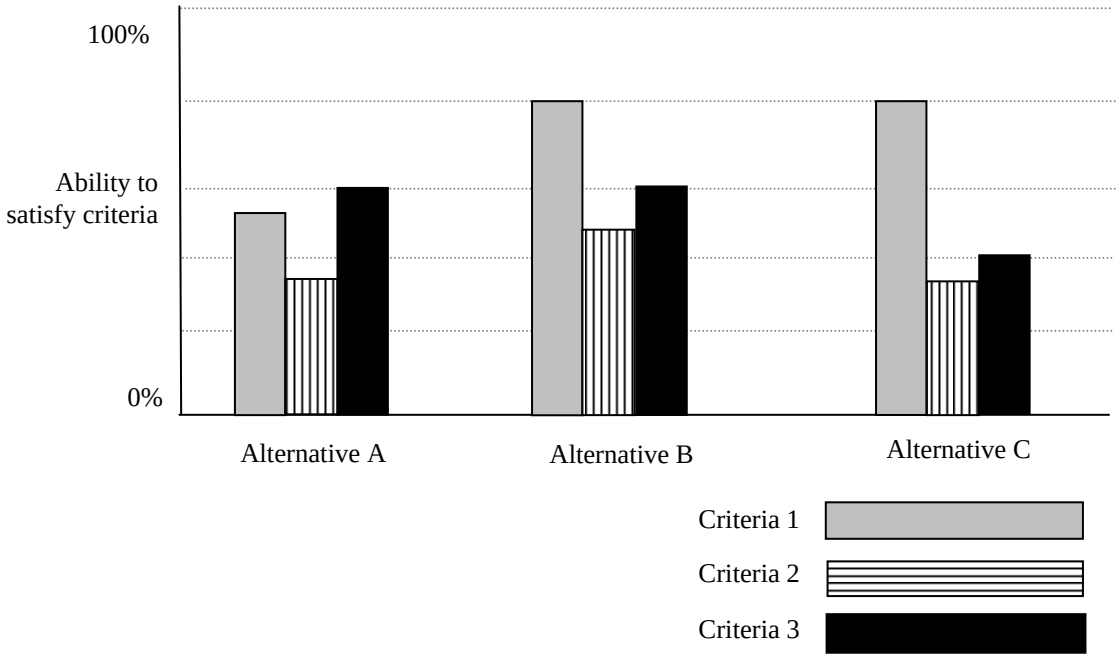


Figure 12
Comparison of Alternatives

The Evaluation/Decision Making phase is likely to consist of a series of workshops. Early in the process these may be held primarily for interested parties (Circle C), but as you move closer to a decision, the workshops will be with decision makers (Circle D). The more involvement of decision makers, and the earlier the involvement of decision makers, the better. This reduces the danger that Circles A-C begin to arrive at a consensus solution, only to have decision makers come up with a different answer.

The nature of the workshops with Circle C will depend on circumstances, but are likely to consist of reports from the modeler on computer runs done since the last workshop, followed by discussion and agreements on additional steps that need to be taken. This is also where you may want to begin discussions regarding implementation. Although the heavy lifting for implementing the decision comes later, some consideration needs to be given to how implementation (including adaptive management) will occur for the narrowing list of alternatives. This consideration may raise issues that need to be taken into account by decision-makers. Framing in a broad sense who needs to do what and when also provides potential implementers with lead time to identify resources for carrying out likely needed actions after a decision is made. This lead time can be particularly important for new actions by organizations with long budgetary cycles (for example, Federal agencies typically identify funding needs a year and a half in advance).

It is extremely important, as alternatives are refined and winnowed, that participants in Circle C take additional responsibility to communicate with those decision makers with whom they are linked. It is important that the decision makers be drawn into some of

the learning that is taking place and not begin the decision making process as if nothing had been learned since the process began. By this time, participants in Circle C may be highly invested in the process, while those in Circle D may be just beginning to pay more attention. Deliberate efforts to bridge this difference are crucial.

If they have not been kept involved in the process until now, decision makers will need to go through some sort of education process before they can begin actual deliberations. The most effective way to educate them is to design an activity using the model and let them actually interact with the model. Simply telling them what has been learned is not a particularly effective mechanism for education until they have become engaged emotionally.

The next step is to expose decision makers to the results from the computer runs for each alternative plan. If they start to suggest changes in the plans, do computer runs based on their suggestions. This will get them engaged in the process, even if their suggestions represent a step back from the refined plans developed by Circles A to C. They will quickly learn what works and what does not. Particularly if there are changes from what Circles A-C developed, you will also need to consider whether and how to keep people from those circles informed. This becomes more important for larger changes and longer timeframes.

Because it takes time for decision makers to get fully engaged with the process, avoid trying to resolve everything in one big event. As a *minimum*, schedule at least two workshops, for decision makers. In the first decision maker workshop, expose them to the trade-off analysis of alternatives using the model. Do not expect them to come up with a decision in the first workshop, as they are still mastering the information about the alternatives. [You may need more than one workshop to accomplish this.] Then the second workshop can be a decision-making workshop. Ideally, each workshop would be a full day.

To begin the evaluation process, report out exactly the same information–how well each alternative satisfies all the performance measure – for each alternative plan. Then engage participants in discussing and learning from this information.

You may find that all the alternative plans perform about the same on some performance measures. If this is the case, those performance measures *fall off the* table or are no longer a significant factor in the decision. Instead, concentrate on modifying plans to improve performance on those remaining measures where improvement can be achieved and which clearly discriminate between alternatives.

You will also need to report how well the alternatives perform in several scenarios. It is particularly important to look at whether some plans perform well in all scenarios, while some perform well in only some.

This may be a point at which you will discover some hidden agendas. For example, some people may represent agencies that have a history of supporting one of the alternatives. They may have great difficulty acknowledging the results from the model

because they will be criticized by people in their own agency for not defending their agency's preferred alternative. The agency may feel there is a loss of political standing to admit there might be better solutions than the ones they have been advocating for some time. Sometimes these issues can be dealt with only when you engage higher-lever decision makers within those agencies, because lower-level agency representatives may feel they cannot change positions without management direction.

6.6.2 Decision Making

In most cases you will go through several rounds of developing alternative plans with Circles A-C, analyzing them, and then refining them to get each plan as close to a non-inferior solution as you can. Occasionally, you will arrive at a non-inferior solution that enjoys broad support. In other cases, you will arrive at a set of plans that have been refined/improved as much as you can, but there are still fundamental choices to be made. Typically these involve making trade-offs regarding which value/objective is most important in these circumstances. That is what making a decision is all about.

Ideally you have found ways to keep your decision makers engaged throughout the process. But that is not always possible. People like Governors and agency heads are unlikely to attend most of your workshops. In fact, a significant challenge during previous steps is to keep decision makers informed and at least somewhat engaged.

It is hard to write a prescription for how to do this. Some decision makers are willing to commit the time and focus needed to keep engaged throughout the process. Others are not. It depends in large measure on the relationship you have with your decision makers.

One way this is done is to encourage participants to communicate about the process with decision makers with whom they have established relationships. Another approach is periodic briefings. The problem is that actually experiencing the use of the model in a workshop is a far more powerful form of engagement than simply informing a decision maker about what is going on. The ideal involvement of decision makers is to engage them in occasional workshops throughout the process of evaluating alternatives. This way they understand the process both intellectually and emotionally.

One critical issue is that the decision makers should agree–before the decision making process begins–on what are the decision making process requirements. Will the members of Circle D vote? Will they need mutual agreement? Does that mean that everyone has a veto right, or does it mean that there must be a preponderance of agreement, even though some cannot support the decision? Will they use a structured or unstructured decision making process? (See box on mock decision-making meeting on page 60.)

The problem, if there is something less than total agreement, is that the dissenters may block implementation. If a dissenting party agrees to simply remain neutral you may be able to proceed with implementation. But if a key decision maker opposes the decision actively, that may doom implementation. If a key regulatory agency will not grant a

needed permit, for example, then there is a major problem with your plan. If a key funding agency will not provide financial support, you have got a non-starter. Opposition from environmental groups may result in lawsuits and continuing litigation.

The shift from participation by interested parties to decision makers is also significant because there is an accompanying shift in attitude. The job of interested parties is to represent their values and interests as well as they can. But decision makers have a responsibility to integrate a number of criteria in their decision. Once they understand the concept, decision makers are likely to be receptive to the concept of non-inferior solutions, because it gives them a way to resolve conflicting objectives.

There is a tendency to assume that decision makers can arrive at a decision quickly, in just a few meetings. The process leading up to this may have taken months, possibly years, but now decision making is compressed into a very short time. The problem is that those months or years were not just spent performing work, they also produced learning and shifts in attitudes that allowed participants to be receptive to plans they would not have considered previously. They may even have a radically changed understanding of what is important and what is not (see the ACT-ACF example in the sidebar, page 72). So it is important not to give short shrift to decision-making. Sometimes this will entail convincing decision-makers themselves to schedule sufficient time.

Decision makers normally hope that the answer will simply emerge from the data. This happens occasionally, and everybody can agree on a non-inferior solution. But frequently, even once you have learned a great deal and refined the alternatives as much as you can, there are still hard decisions to be made. The ground covered by Circles A-C greatly helps to identify supportable options and their implications, but it does not replace the need for decision makers to *dig in* together. As occurred with those in Circles A-C, those in Circle D will need time to understand each others' values and perspectives, and the implications of the various alternatives.

The specter of a real decision with real impacts also tends to draw attention, and sometimes action, from those who may not have shown interest previously. Care must be taken to address issues ranging from public communication to political pressures. Decision makers are not unaccustomed to these issues, and they cannot be ignored in a Shared Vision Planning process. However, this is when the impacts of crucial early decisions regarding stakeholder participation and subsequent sustained participation throughout the process may become most apparent. When the right people have participated in a meaningful process, key people respected by those with widely ranging interests and values are more likely to be giving shared answers.

Once a plan is selected, a specific implementation plan can be developed. Ideally, this is a refinement of earlier work identifying a general framework for implementation.

6.7 Developing an Implementation Plan

In the majority of cases, the point of going through the Shared Vision Planning process is to come up with a plan or solution that enjoys sufficient support that it can be implemented. In fact, people who are experienced with Shared Vision Planning recommend that you think of the whole process as an implementation study from the very beginning.

Ideally, you will have been discussing implementation as the alternatives were developed. It is not reasonable to develop a detailed implementation plan for every alternative being considered. At the same time, it is important to at least begin the conversation about implementation before a final plan is selected. Sometimes the issues raised in thinking about implementation may actually affect the choice between alternatives. In other cases, the decision itself provides the direction that allows needed refinement to the implementation plan. In either case, those in Circles A-C should be aware up-front of the likely timing and need for any further work on their part after the decision has been made.

As a result, the decision making process is not over when a plan is selected. You also need to develop a detailed implementation plan that spells out which parties are going to do what to make the plan happen. If you put off developing the implementation plan, the process will lose energy, and there can even result in recriminations if agencies assumed other agencies were going to take action and they did not.

The level of detail and amount of expertise required to develop an implementation plan will usually mean that you need to engage people from Circles A-C in developing the implementation plan. You will certainly need to involve them in reviewing the plan. You may need to draw on people who have not been involved so far in the process, such as agency staff from other specialties or those who will be involved in actual implementation.

Some of the questions that need to be addressed in the implementation plan include:

- Who is responsible for implementing which elements of the plan?
- How will implementation be funded? Who is responsible for obtaining that funding? How long will it take to obtain funding?
- What regulatory approvals are required; How long will it take to get those approvals, and how will the sponsoring agencies work together to make those happen?
- What policy changes or new regulations are needed to implement the plan, how long will they take to achieve, and who is responsible for making those changes?
- Is any technical work required to put the decision into effect? If so, who will do it, are the funds available, and how long will it take?
- If implementing the decision entails making organizational changes, how and when will those take place?

The ACT-ACF Example[23]

The water supply for Georgia, Alabama and Florida comes from a system of multiple rivers (with very long names) that go by the shorthand of ACT-ACF. Alabama and Florida are particularly concerned about urban growth in the Atlanta area, fearing that water taken out of the Chattahoochee River to accommodate that growth would affect the water supply for Florida and Alabama.

A model of the system was developed as part of a Shared Vision Planning process. This model showed that most of the water used in Atlanta ultimately returned to the river as return flows. Urban growth in Atlanta did not have a significant impact on downstream water supply. But the model also showed that groundwater pumping in southwest Georgia had a highly significant impact on downstream flows in the Flint River, which is another significant component in the water supply in Florida and Alabama. This would really hurt Florida and Alabama.

Initially participants were very excited about this discovery and wanted to study it further. But gradually over time they reverted back to their complaints about urban growth in Atlanta. It's not known whether this was because it was an effective argument politically, or because the belief in the evils of Atlanta growth was so strong it persisted in the face of evidence showing the belief was based on a misunderstanding of the natural system.

This example illustrates several things: The initial understanding of the physical system may be wrong. People may learn that things they thought were important really aren't, but other things are. Political factors may sometimes outweigh good science.

- How will the agencies work together to gain the political support they need for implementation?
- How will we monitor the results from implementation of the plan? Who will do the monitoring? How will it be funded?
- What is the decision making mechanism by which implementation will be adapted based on the monitoring? How often will adaptation be considered, and under what circumstances? How will this analysis and decision making be funded, and who obtains that funding? (See subsequent section on Adaptive Management.)

You are not likely to walk out of the meeting at which a plan is selected with all of these questions answered. You may need the answers to some of these questions before the selection of the plan. But you may be able to answer others only after a decision has been made.

Make sure the decision makers are aware of the major issues associated with implementation, and make sure there is agreement on how the implementation plan will be finalized.

You will need information about implementation not only for making the decision, but for managing communications. This information is especially important if considerable funding or time will be required to implement a decision, so that expectations and

[23] Alabama-Coosa-Tallapoosa (ACT) and Apalachicola-Chattahoochee-Flint (ACF) River Basins

reality remain aligned. Those who participated in Circles A-C, whether or not actively involved after the decision, should have a common understanding of what is happening, for what reason, and when it is expected to occur. Communications with the public will also need to address these issues.

Checklist 6 – Tradeoff Analysis and Decision Making	
☐	If not completed previously, get decision makers (Circle D) to agree on how they will make a decision (e.g., mutual agreement? Voting? Etc.?)
☐	Conduct workgroup meetings and workshops with Circles A to C as needed in effort to identify a non-inferior solution and raise general questions about implementation, including adaptive management
☐	Design and conduct education sessions for decision makers (Circle D)
☐	Conduct decision making workshops with Circle D
☐	Get agreement (or however Circle D decides) on plan of action
☐	Develop/refine an implementation plan for the selected plan (Circles A-B or others as appropriate)
☐	Identify monitoring program to occur during and following implementation (Circles A-C or others as appropriate)
☐	Identify institutional mechanisms and funding for adaptive management
☐	Participants inform their members/constituencies about what has been learned and conclusions reached

6.8 Adaptive Management

Any decisions you make will necessarily be based on assumptions about future events and the best available science at the time. One of the values of having a computer model is that as plans are implemented, events occur and new data is provided, you can quickly adapt the model and revise your projections. This lends itself to adaptive management.

Adaptive management is an effort to continue to modify the actions you take based on new data. Some institutional mechanism, such as a multi-agency steering committee, needs to be established to ensure that information is updated and there is a way to make decisions to modify things based on the new information. For example, based on the model and data available at the time, you may expect a certain response to a given action. If the actual response to that action is beyond the range of what was reasonably expected, change may be warranted. Over time, there may be limits on how much you modify. If you build a new dam, for example, you may not be able to modify the dam.

But you may be able to revise operations of the dam to get additional benefits based on what you have learned since the dam was built. The computer model can continue to be a powerful tool to help decision makers with adaptive management. This is particularly true if it is kept updated and used regularly. An adaptive management plan will ideally identify who will continue to use the model, when, and in what setting. Participants from Circles B and C may be interested in regular opportunities to review how the model addresses new information, even if these opportunities are infrequent (a year or more apart).

As discussed earlier, the implementation plan should contain a monitoring plan and an institutional arrangement for reporting results and making decisions based on the monitoring results. If the monitoring results suggest the need for decision making, it may be useful to conduct a workshop with Circles A to C to discuss the changes that are needed. Since participants will undoubtedly change in the long-term, regular (even if infrequent) workshops may also serve to inform new participants and keep a finger on the pulse of how well the implemented decision continues to meet the varying and changing needs of key stakeholders.

Checklist 7 – Adaptive Management	
☐	Set up institutional mechanism for adaptive management decision making
☐	Perform monitoring identified in monitoring plan
☐	Report monitoring results
☐	Possible Circles A to C workshop to discuss monitoring results and alternative modifications to plan
☐	Decision making on changes needed based on monitoring results

Appendix A

Example of a Stakeholder Involvement Process for Shared Vision Planning

This is an example of a hypothetical stakeholder involvement process in which there is high interest and a willingness to participate. This example is not intended to serve as a template, but only to illustrate what an integrated stakeholder involvement process might look like.

- The sponsoring agencies (a water management agency, two regulatory agencies, and their modeling consultants) met and developed a preliminary list of key stakeholders they thought would be interested in Shared Vision Planning to address a continuing issue having to do with flows in an important river.
- A consultant was hired to conduct interviews with each of the key stakeholders, including the sponsoring agencies, with the interviews designed to identify each stakeholder's perspective on the issue, willingness to consider Shared Vision Planning, and ideas about which other stakeholders had to be involved for the process to be credible.
    - The consultant contacted each person by phone to set up the interview
    - Once an appointment was set up, the consultant followed up with an e-mail confirmation letter, attaching a short description of Shared Vision Planning
    - Each interview was documented, and the consultant prepared a summary review for the sponsoring agencies
- The sponsoring agencies reviewed the results of the interviews and identified another 7 to 10 people who needed to be interviewed.
- Since the idea of employing a Shared Vision Planning process was well received, the sponsoring agencies decided to conduct a kickoff meeting.
    - The purpose of the meeting was to brief stakeholders on Shared Vision Planning, get buy-in to proceed with Shared Vision Planning, and get suggestions about who else needed to be involved in model development if the model was to be credible
    - The meeting was publicized through a mailing, supplemented with phone calls to important stakeholder groups
- Participants in the meeting were supportive of Shared Vision Planning, agreed to participate in a Shared Vision Planning workshop, made suggestions for modelers from several agencies and groups they wanted to see involved in model development, and recommended that the sponsoring agencies add three representatives from other organizations to a core group that would be called the Process Steering Group
- The sponsoring agencies met with decision makers from their agencies (Circle D), briefing them on the proposed process and the response of stakeholders, and received approval to proceed and to establish a Process Steering Group with the

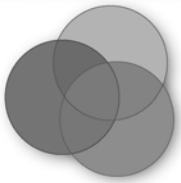
composition proposed in the stakeholder meeting. Decision makers also reached an agreement that final decisions would be made by mutual agreement of the sponsoring agencies.

- The newly-constituted Process Steering Group organized an initial Shared Vision Planning Workshop
  - The agenda items for the workshop included: (1) a discussion of the *problem* the model would address, a discussion of the major components of the model, and the variables that needed to be addressed by the model; (2) an exercise in which participants identified what the *desired state* would be; and (3) a discussion of who needed to be in modeling team (Circle A) and who should be technical reviewers (Circle B)[24]
  - The workshop was publicized by e-mail, and organizations were asked to notify their members about the workshop
  - Because nearly 50 people said they wished to participate in the workshop, the workshop format included breaking into small work groups to complete assignments, followed by reports to the full group
  - Participants were able to agree on a team of people that would constitute the modeling team, although the sponsoring agencies had to find funding to cover the participation of a modeler proposed by environmental groups
- The Modeling Team (Circle A) met and began work on a high level conceptual model using the information received in the workshop, and agreed to meet weekly (3 times a month electronically, and once a month face-to-face)
- Once the Modeling Team completed a first draft of the conceptual model they convened a meeting with the technical reviewers (Circle B), who made suggestions for changes and also identified existing data bases that were credible and could be used to populate different sectors of the model
- The Modeling Team revised the conceptual model and, in consultation with the Process Steering Group, scheduled another workshop with other interested stakeholders (Circle C)
  - The workshop was designed to review the draft conceptual model and discuss how to quantify the relationships between the various elements of the model
  - The participants suggested a few minor changes in the conceptual model and recommended ways to quantify the conceptual model
- The Modeling Team then met for several months to work on the quantification of the model
- The Modeling Team met twice with the Technical Reviewers to discuss the proposed methods for quantifying the model and for calibrating the model
- The Process Steering Group published two e-newsletters during this period to inform all interested parties about what was going on

[24] Another format for a first workshop would be to invite comments on a "strawman" conceptual model developed by the modeling team. This has the advantage of giving the audience something to react to, and communicates what a conceptual model is. But it could lead to criticism that "you've already made up your mind."

- During this time tech reviewers, Circle B, updated Circle D once a month to keep them updated on the progress
- Once the Modeling Team had completed quantification, it met several times to calibrate the model by comparing its outputs with historical data, adjusting the model based on those results
- Once the Modeling Team felt they had achieved reasonable calibration they held a workshop with the Technical Reviewers in which they ran several scenarios and discussed changes they needed to be made based on these dry runs
- Using e-mail, the Process Steering Group scheduled a workshop for interested parties (Circle C) and invited them to send in proposed scenarios to be addressed in the workshops
    - Based on the suggestions, the Process Steering Group and Modeling Team developed a set of alternative scenarios for use in the workshop
    - The Modeling Team also ran a series of sensitivity analyses, identified those that showed significant results, and presented these during the workshops
    - The workshop concluded with participants suggesting ideas for alternative plans
- The Process Steering Group, in consultation with its planning consultant and the Modeling Team, formulated an initial set of alternatives
- The draft alternatives were sent to all stakeholders by e-mail, with an invitation to make e-mail comments on additions or changes to the alternatives
- The Process Steering Group made revisions based on the comments received
- The Process Steering Group met with the decision makers from the sponsoring agencies (Circle D) to get approval on the set of proposed alternatives
- The Modeling Team did the programming necessary to run the alternatives through the model.
- The Modeling Team and Technical Reviewers participated in a joint workshop during which they ran the model for each alternative, confirming that the model did an adequate job of identifying the impacts of each alternative
- Access to the model was provided to all interested groups so that they could verify the results of the model runs and try out variations
- A workshop was conducted with all interested parties (Circle C) to run the models and discuss the results associated with each alternative
    - Participants suggested several modifications to the alternatives based on seeing the results from model runs
    - Participants requested changes in how results were displayed
- The Process Steering Group reviewed the suggestions made during the workshop and made several changes to the alternative plans and displays
- The Modeling Team did another set of runs of the model portraying the modified alternatives

- The Process Steering Group and Modeling Team created a web page where interested parties could interact with the model and see the outcomes resulting from various scenarios
- The Process Steering Group and the Modeling Team conducted a workshop with decision makers (Circle D) during which they discussed the results of the model runs for each alternative
- The Process Steering Group oversaw the preparation of other engineering, environmental and economic impact studies, and the results of these studies, in combination with the results of the model runs, were put into a draft report comparing the alternatives and their impacts
- The Process Steering Group distributed a draft report to all interested parties describing the alternatives and comparing the impacts of each
- The Process Steering Group conducted a series of open houses throughout the area to discuss the alternatives and their impacts
- The Process Steering Group also conducted a final public comment meeting to permit comments, and created a mechanism so that comments could be submitted electronically
- The Process Steering Committee prepared a summary of all the comments received and a final version of its summary of the impacts associated with each alternative, and submitted these to the decision making group
- The decision making group is currently in the process of deciding which plan to implement.



Shared Vision Planning

The History of Shared Vision Planning

The Shared Vision Planning approach began in response to the U.S. Army Corps of Engineers need to revise water management strategies on the Potomac River in the late 1970s. The Interstate Commission on the Potomac River Basin made public participation a key feature of its planning process to more effectively manage water supplies in the D.C. metro area.

In 1988, in response to severe droughts across the United States, the Corps undertook the National Study of Water Management During Drought (known as the National Drought Study) to examine and improve water management practices nationwide. The method developed in this project's case studies evolved into the planning approach now known as Shared Vision Planning. The "Drought Preparedness Method," as it was named during the National Drought Study, emphasized preparedness, stakeholder involvement, and the use of collaboratively developed computer models, which remain the core aspects of Shared Vision Planning today.

Shared Vision Planning and its particular method have been applied to a number of case studies since the National Drought Study, thereby refining the process and increasing Corps scientists' familiarity with it. The Lake Ontario-St. Lawrence River Study, the James River Basin Study, and the Rappahannock River Basin Commission Water Supply Planning Project are just a few of the projects that have benefited from the Corps use of Shared Vision Planning.

To further explain the concept and method of Shared Vision Planning, and educate the wider resources planning community, IWR has created a new Shared Vision Planning web site. We invite you to visit the site at http://www.svp.iwr.usace.army.mil to learn more about this collaborative planning approach.

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