RESOLVING WATER DISPUTES

Conflict and Cooperation in the United States, the Near East, and Asia

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EXECUTIVE SUMMARY

Introduction

As competing demands for water cause increasing discord within and between countries around the world, efforts are underway to develop innovative solutions to water disputes. Some of the most promising opportunities for effective water resources management involve the entire basin rather than just localities downstream. Approaches include implementing conservation measures, developing and implementing strategies for demand management and conjunctive use, permitting easier water transfers, and making the recognized value of instream water uses a matter of standard operating policy.

However, while these strategies are important, they are unlikely alone to resolve conflicts over scarce water resources. Successful solutions will require a renewed emphasis on both regional cooperation and the participation of a broader range of affected interests, which in turn will require more effective processes for dealing with differences. Comprehensive water management will only work if all significant interests and their concerns are recognized and a greater diversity of management options are considered to meet their varying needs.

The satisfactory resolution of water disputes requires both improved conflict resolution methods and innovative measures such as water marketing and conservation. This combination of decision-making processes and technical or policy solutions is critically important to creating workable solutions to controversial water resource problems.

The purpose of this paper is to provide an understanding of the theory and practice of water dispute resolution approaches.

Dispute Resolution

As used in this report, dispute resolution refers to a wide variety of consensual approaches with which the parties in conflict voluntarily seek to reach a mutually acceptable settlement. These approaches differ from strategies that use judicial or political methods. Dispute resolution is an inherent part of social interaction, something that is practiced far beyond conflicts over natural resources. However, the systematic application of these approaches to water disputes is relatively recent in the United States and certainly innovative elsewhere, significantly modifying the processes most parties have used in the past.

Successful negotiations depend on balancing the forces of cooperation and competition among disputants and on creating a problem-solving process that realistically addresses the role of power. Guidelines for negotiations include:

- Focus on the interests that underlie each party's position
- Share information

- Devise strategies for joint fact-finding
- Generate multiple options
- Ensure that all constituencies are being kept adequately informed
- Use objective criteria for evaluating options
- Seek joint gains
- Plan for implementation

The Nature of Water Conflicts

Some characteristics of water resource conflicts that are particularly relevant to analyzing the dynamics of water disputes and designing negotiation processes that have some likelihood of success include the following:

- Water flows across legal and political boundaries, increasing the potential for competition among users.
- Although water resources are renewable, the amount of water available to competing users varies seasonally and year to year, adding a factor of instability.
- Controversial water resource issues often are made more difficult to resolve by associated intraorganizational and institutional complexities.
- The large number of issues and parties that are involved in most water resource disputes makes organizing any negotiation process difficult.

Water conflicts arise in a variety of contexts. They can be transnational, where no overarching legal authority exists except at the volition of the parties, or intranational, where multiple decisionmakers may play a role or where parties with different needs or values place competing demands on water resources.

Water conflicts revolve around a diverse set of issues, including water allocation decisions for surface and groundwater and water quality matters that include effluent standards, drinking water treatment, and instream habitat needs of fish and other aquatic life. Port development, hydropower projects, flood control, and wetlands protection can all generate controversy.

The barriers to resolving these conflicts can differ greatly. Controversies develop at different stages in the decision-making process and with different degrees of polarization, from early recognition that a decision may be controversial to an intense crisis with the threat of violence. Information about the resource and about proposed options varies greatly at different stages, as do the number and type of concerned parties.

This report provides an overview of current conflict resolution principles and procedures, describes the characteristics and dynamics of water resource conflicts, and presents the conflict resolution process in theory and practice in the United States and efforts to resolve transnational

conflicts in Europe, the Near East, and Asia. The transnational cases discussed involve the Danube, Nile, Jordan, Indus, Ganges, and Mekong river basins, and offer generic lessons that may be applied elsewhere. The report concludes with thoughts about the degree to which U.S. water resources dispute resolution processes can be applied internationally and measures that might facilitate their adoption and use.

Water Conflict Resolution Cases

Four cases are presented describing conflicts over the allocation, quality, or use of water in the United States, where conflicts arose even when collaborative measures had been designed into large watershed planning efforts. In one case, a dispute that involved a smaller, stream-sized basin resulted in violence. The cases focus on the creative decision-making processes that enabled the concerned parties to find technical, political, and legal solutions.

The report also presents efforts to resolve water conflicts in six major international basins in Europe, the Near East, and Asia. These efforts share a number of common weaknesses:

- International water laws are ambiguous and often contradictory.
- Attempts to develop clear, general guidelines to resolve conflicts usually fail because the guidelines do not have the force of law.
- No mechanism exists to enforce principles that have been agreed upon.
- International law concerns only the interests of sovereign states, so the claims of stateless groups go unaddressed.
- Efforts usually focus on the disputants' needs rather than their rights.

There has been almost no systematic application of dispute resolution principles to water conflicts in Asia and the Near East.

Approaches to Resolving Water Conflicts

Two basic conclusions emerge from the examination of U.S. and international water disputes presented in the report:

- **When to negotiate.** Negotiation-based processes and other tools for consensus building can and should be used more often to address conflicts over water resources, both transnationally and within different countries.
- **How to negotiate.** Both the process and the outcome of efforts to resolve water conflicts can be qualitatively enhanced through the application of interest-based dispute resolution principles and processes.

When to Negotiate

In certain circumstances, dispute resolution approaches offer a number of advantages over other legitimate, nonconsensual strategies such as litigation, political action, or, in the case of transnational conflicts, appeal to international authorities. The direct participation of parties increases their ability to shape the decision and thus the likelihood that it will satisfy their interests. Also, parties involved in water conflicts tend to be well informed about the technical issues of the conflict. Their better understanding of these issues can allow a deeper and more creative exploration of potential solutions.

Similarly, negotiating parties tend to be highly sensitive to implementation concerns, and because parties voluntarily participate, they are likely to be more committed to reaching a positive outcome. As a result, dispute resolution processes enhance the possibility that the substantive issues in a dispute will be addressed effectively and that the agreements reached in a dispute resolution process will be implemented successfully.

Despite the advantages of consensus-building strategies, at many times other approaches may be needed to create the conditions required for dispute resolution processes to work. At a minimum, interest-based dispute resolution processes require the political commitment to encourage public participation in decision-making, the willingness to permit the open interchange of views, and the necessary transparency to ensure adequate information exchange.

How to Negotiate

Seven factors contribute to improving the quality of negotiations, including assessing whether a water resource conflict is "ripe" for negotiation. Because of the dynamic nature of the negotiation process, these factors must be continually reassessed:

- Each side's best alternatives to a negotiated agreement.

What would each side do if it did not negotiate, and what are its incentives to negotiate? Could it successfully bring a lawsuit or lobby politically to get what it wants? Does it have any reasonable alternatives? What are the costs, benefits, and likelihood of success of each alternative? If one side depends on others to obtain its goals, then negotiation may be needed.

- The parties who will be affected by any agreements reached and the best way to involve them in the process.

How can these parties best be represented? Implementation of agreements is a general measure of success of any dispute resolution process. Thus the appropriate involvement of those who are affected by or who can influence the implementation of agreements is an important factor. How this decision is made can vary; most often consultation among the parties about the role they wish to play is desirable.

- The basic interests of each side involved in the dispute.

A careful analysis of each side's interest can clarify the needs and concerns that underlie the potentially conflictual positions. In addition, interest analysis can help point out which groups have common or competing interests, which can be useful in developing creative options.

- Options for solution of the problem that could be presented at the negotiation table.

Parties often enter into negotiations over water resources with only one solution in mind. This can quickly lead to an impasse. Any party can place itself in a stronger negotiating position if, after identifying the fundamental interests it wishes to defend, it develops a range of options for satisfying them. This implies flexibility about the way in which basic needs are satisfied, not about whether they should be satisfied.

- Balancing competition and cooperation with other stakeholders.

All too often, parties to a negotiation believe that the discussions must be entirely competitive. In fact, competition can be balanced with cooperation over some aspect in virtually any negotiation, without either side making unacceptable concessions. Joint fact-finding and analysis is a particularly promising form of cooperation in many settings.

- Ensuring implementation of an agreement.

The implementation of agreements needs to be discussed early in a dispute resolution process rather than being left to the end. Technical feasibility, political viability, financial requirements, and mechanisms for ensuring compliance by all sides are important topics that need to be addressed.

- Structuring the process for reaching an agreement.

What will be the "rules of the game" for a dispute resolution process? Will one side be willing to underwrite the participation of a less well financed side? In what order will issues be addressed? Do all sides want to reach a decision or is some intermediate step, such as information exchange or narrowing options, the only one acceptable to all sides? Consensus-based processes, by definition, look to the eventual resolution of an issue, but small steps toward that goal are often positive.

Transferability of Conflict Resolution Procedures

A fundamental question addressed in this report is whether experiences with dispute resolution in the United States can be applied to water conflicts within and between other countries. Despite differences in politics, economics, law, and culture, many of the barriers that U.S. water managers and other stakeholders face in reaching agreement are similar to those faced by their counterparts in other countries.

Many general lessons for overcoming these barriers will be helpful regardless of the sociopolitical context. However, if dispute resolution measures are to be employed in other countries, they

cannot be exported unchanged. It will be important to examine existing approaches and experiences with conflict resolution in those countries to gain insights into how the imported measures might best be adapted and used.

In addition, one key factor that complicates the applicability of conflict resolution techniques from one country to another must be noted. These processes have no meaning without a recognition of the validity and importance of differences in opinion and a willingness to allow the open airing of conflicting views and the involvement of those with differing views in decision-making. In many countries, participatory decisionmaking is discouraged. By providing a framework for analyzing current and future water resource conflicts, this report attempts to define a set of tools that will contribute to greater success in resolving the disputes where stakeholders are willing and able to deal with their differences.

The Need for Capacity-Building

The productive use of dispute resolution measures will require a variety of capacity-building measures to provide a base for negotiation. Institution-building activities can make a profound difference in the likelihood of success of dispute resolution processes. When considering similar capacity-building and institutional mechanisms for dispute resolution abroad, it is critical to remember that these mechanisms will need to reflect the unique circumstances in each country. For instance, norms about conflict, the acceptability of change in society, the roles of different stakeholders in public decisionmaking, and the degree to which public participation is valued by society vary dramatically between nations.

To assist the capacity-building process, educational activities could play an important role in disseminating the ideas and insights developed. Publications could be developed and translated. Workshops could be convened in which a variety of experts could discuss and critique case studies and policy papers and develop new questions and directions for research and action. Curriculum and training materials could be developed for use in universities and educational settings or in training workshops for water resource managers. Training could be focused on skills either for potential negotiators or for potential mediators or negotiation facilitators.

Finally, initiatives to resolve specific water resource conflicts can be introduced. Human and financial resources can help parties evaluate the potential for consensus-building processes, fund joint fact-finding efforts, develop creative options, and implement agreements.

Chapter 1

INTRODUCTION

Primary Needs and Opportunities for Resolving Water Resources Conflicts

In river basins around the world, water supplies are increasingly limited, valuable, and vulnerable. Competing demands for water exist between countries and between sectors within countries.

As a result, countries are seeking innovative solutions to reconcile water supply disputes and improve wastewater treatment. Water resource managers increasingly recognize that management on a watershed basis provides some of the most promising opportunities for managing water resources effectively and efficiently. In addition, many advocate implementing conservation measures and strategies for demand management and conjunctive use, permitting easier water transfers, and recognizing the value of instream water uses as a matter of standard operating policy.

Although these strategies are important, used alone they will not eliminate the number and intensity of water conflicts. Regional cooperation and broader participation of affected interests within countries also will be needed, requiring more effective ways of dealing with differences.

If more comprehensive water management is to work, all significant interests and their concerns must be recognized, and a greater diversity of management options needs to be considered to meet varying needs. The procedures through which water conflicts are resolved can be improved, and substantive innovations (such as water marketing or conservation measures) can help address the interests that produce stalemates. A combination of innovative decision-making processes and technical or policy solutions can be critical to creating workable solutions to controversial water resource problems.

Purpose and Scope

This report describes the characteristics and dynamics of water resource conflicts. It draws lessons from water conflicts in North America as well as Asia and the Near East. It also examines the degree to which U.S. experience in resolving domestic resource disputes can apply internationally, both within and between countries.

This paper focuses on water resource conflicts, not on an idealized process of conflict resolution (defined as voluntary, consensus-based processes in which parties seek a mutually acceptable resolution of issues). The characteristics and dynamics of water issues are so diverse that no single process of conflict resolution will be applicable.

Conflicts can arise transnationally, where no overarching legal authority exists except at the volition of the parties, and intranationally, where multiple decision makers may play a role or where those with different needs or values may place competing demands on water resources.

Conflicts can revolve around a diverse set of issues including water allocation decisions for surface and groundwater as well as water quality matters ranging from effluent standards to drinking water treatment to instream habitat for fish and other aquatic life. Controversial issues include port development, hydropower projects, flood control, and wetlands protection.

The barriers to resolving these conflicts can differ greatly. Controversies can develop early in the decision process, or they can turn into an intense crisis threatening violence. Information about the resource and proposed options varies greatly at different stages, as do the number and type of concerned parties. Thus, those with a role in resolving water resource conflicts need a strong basis for identifying and analyzing the relevant characteristics and dynamics of the disputes they face and a repertoire of tools from which to select.

The paper is organized into four parts. Chapter Two describes the basic principles of conflict resolution theory, highlighting several specific characteristics of water resource conflicts that make their resolution more complex and difficult. It provides examples of practical experience in applying conflict resolution principles to water conflicts. Chapter Three provides four, more extensive examples of specific attempts to apply these principles to resolving water conflicts in the United States. Chapter Four contains five international case studies that describe and analyze water conflicts in selected basins where water resource management has transboundary implications and where attention to conflict resolution would be of great benefit to those who are affected by these conflicts. Each case study in Chapters Three and Four concludes with lessons that illustrate the characteristics and dynamics of water conflicts and processes used for resolving them.

Finally, Chapter Five discusses how dispute resolution might be used more often to address water resource conflicts and what are some of the issues surrounding institutionalization of dispute resolution practice in other countries.

International Relevance

A fundamental hypothesis of the paper is that lessons drawn from experience with dispute resolution in the United States and from controversies in international river basins can be generally applied in to water conflicts within other countries and between countries. The authors are keenly aware of the differences in politics, economics, law, and culture in these countries, but have found many of the barriers that water managers and other stakeholders face in reaching agreements are similar, whether the problem is domestic or transnational. Thus, although the specific solutions or strategies may differ, the general lessons about what to look for will be helpful regardless of the socio-political context.

That said, a number of factors certainly complicate the applicability of conflict resolution techniques from one country to another. For instance, these processes have no meaning without

a recognition of the validity and importance of differences in opinion and a willingness to allow conflicting views to be expressed and those with differing views to be involved in decision-making. In many countries, such participatory decision-making processes are discouraged.

By providing a framework for analyzing current and future water resource conflicts, however, this report attempts to define a set of tools that will assist water resource managers in resolving such conflicts. One of the first of these tools is the belief, however cautious, that the resolution of water conflicts is possible. We hope this report substantiates that belief.

Chapter 2

CONFLICT RESOLUTION PRINCIPLES AND PRACTICE AS APPLIED TO WATER RESOURCES CONFLICTS

Background

Negotiation is not new. For as long as anyone knows, people have attempted to resolve their differences through face-to-face exchanges. However, just as mankind's efforts to provide shelter from the elements have improved through advances in construction technology, its abilities to resolve conflicts have advanced through self-examination and experimentation. One identifiable period of innovation, applied specifically to environmental and natural resource conflicts, began 20 years ago with the first, formally mediated water resource dispute in the United States—a long-standing impasse over a proposed flood control dam in Washington State. Since that time, hundreds of environmental disputes have been successfully negotiated with and without the assistance of mediators, and many of them have involved water resources.

For example, in the early 1980s when construction of the Two Forks water storage dam along the Platte River became a high priority for the Denver Water Board, the governor of Colorado asked that opponents and proponents of the dam consider negotiating a settlement. Eventually, 31 parties formed the Denver Metropolitan Water Roundtable and met through many months of negotiations. This case illustrates several important themes discussed in this paper.

The initial obstacle was agreeing on the question to be negotiated. Proponents were willing to discuss ways to build the dam in the most environmentally sensitive manner. Opponents felt the central question was whether the dam was needed. Reaching agreement on the eventual question framing the negotiation—how Denver would meet its water demands projected to the year 2010—was difficult but essential to getting the parties to work together.

Getting the parties in water resource disputes to the table is itself a major accomplishment. In addition to establishing common premises that will "frame" the issues for negotiation, parties must agree on the specific issues that will be on or off the table, who will be at the table, who will chair or mediate the negotiations, what the intended mechanisms will be for implementing any agreements, whether the meetings will be open to observers or not, and many other ground rules that will organize the process.

This case also provides an example of how agreements on nonstructural solutions and linkages among issues may assist in meeting multiple interests. This process resulted in a series of linked agreements on water storage projects, water use efficiency, groundwater use, and collaboration on a subsequent, systemwide environmental impact assessment process conducted by the U.S. Army Corps of Engineers.

The case also shows that controversies of this magnitude may never be fully resolved. This mediation did not resolve the need for the Two Forks dam, and the Environmental Protection Agency (EPA) vetoed Two Forks' application for a wetlands permit, triggering further litigation. As with other decision-making processes, negotiations are often only one part of a much more complicated series of public decisions and strategies parties use to achieve their goals.

While the Denver Metropolitan Roundtable did not resolve the entire problem, it allowed the parties to more clearly focus issues and plan for subsequent decision-making steps. One participant noted that the Roundtable provided a forum for anticipating and avoiding problems that might have arisen in the subsequent, systemwide environmental impact statement (EIS) process, and provided a valuable learning experience for members of the diverse constituencies involved.

Characteristics of Water Conflicts

Negotiators in water conflicts will be more effective if they understand the special dynamics complicating water resources controversies and the needs that organizations bring to the negotiating table. Eight characteristics of water resources conflicts are particularly relevant to analyzing the dynamics of disputes that arise and designing successful negotiation processes (often these are also the factors that induce negotiators to seek the assistance of mediators):

- Water flows; therefore, increased competition for "ownership" is possible.
- Even when frequently renewed, amounts fluctuate seasonally and year to year.
- Parties often have more than one forum for decision-making, and no "supra-national" legal body exists that can impose decisions if the parties do not agree.
- These are disputes not among individuals but among organizations, institutions, constituencies, and nations.
- Multiple parties have a stake in the outcome—there usually are more than two sides.
- Issues involve considerable technical complexity, scientific uncertainty, or disputes over information.
- A disparity of power and resources often exists among stakeholders.
- These are public issues, not private matters; laws, press, and governmental institutions all play a significant role.

Water flows across legal and political boundaries, thus increasing the potential for competition among potential users. Thus, claims of rights to the same water are made by multiple units of local government, agencies, private interests, and even nations. Also, the impacts of certain water-related activities, whether they be diversions, discharges, or physical disruption of the watershed, are often borne by downstream or offstream users, so diverse needs and interests must be considered if conflicts are to be avoided.

Although water resources are renewable, the amount of water available to competing users varies seasonally and year to year, contributing to increased instability. Although the needs of water users remain constant or, as is more often the case, only increase over time, nature's contribution to available water supplies is anything but constant. Because rainfall varies, competing users must not only divide available supplies but develop protocols for allocating water during periods of short supply.

Within and between countries, parties often have more than one forum available; thus successful negotiators need to create sufficient incentives for all participants to choose negotiation as the forum for dealing with their differences. Negotiated resolution of most water disputes is done on a case-by-case basis. In contrast to administrative or judicial proceedings, few, if any, established procedures are available to shape the negotiating process in a routine manner. Thus, parties are as likely to approach a suggested negotiation with different assumptions on how to shape the negotiating relationship, such as who will be at the table and what issues will be on the agenda, as they are to have different views on the issues. Because these assumptions can rarely (and probably should not) be dictated, one cannot simply convene a meeting. All of these assumptions must first be negotiated. To establish the proper framework, all the affected interests must be involved and agree on the objective, the agenda, a timetable and deadlines, and the choice of a mediator if one is involved.

Controversial water resource issues often are made more difficult to resolve by associated interorganizational and institutional complexities. Water resources conflicts generally are between institutions and organizations. The individuals at the table must get proposals ratified by others who are not participating directly before a meaningful agreement can exist. Each negotiating organization has its own internal decision-making process; therefore it is important to know the degree to which negotiators can speak for their constituency or organization and the freedom each has to make proposals and to commit to an agreement. Negotiators must keep their organizations informed about progress and problems on a regular basis. The role that settlement approval and ratification will play is an important element to understand from the beginning of the negotiation.

For example, in national policy decisions, such as the disinfectants and disinfection byproducts negotiated rulemaking described in Chapter 3, most of the constituencies affected by the proposed rule were represented by national organizations and associations. This created a mechanism for selecting the individual negotiators and for ratification of agreements by boards of directors or issue-specific committees selected by each constituency.

Technical complexity and scientific uncertainty make evaluating settlement options more difficult. The technical component of water resource conflicts can exacerbate controversies particularly when policy disputes are waged through "battles of the experts." What negotiators usually need is to devise strategies for obtaining and analyzing useful data. Often joint fact-finding can provide a common basis of information for negotiated decisions. Integrating technical information into policy discussions and vice versa poses significant challenges for communication and problem solving because scientific and policy negotiators often speak different languages.

Recognizing where the parties need to seek common terminology also is important to deal with technical questions in negotiations.

The following are useful steps in this task:

- Define the problem(s) before seeking solutions.
- Identify what is and is not known.
- Identify what is in dispute.
- Articulate and discuss the underlying assumptions in the technical information.
- Devise methods for sharing and reviewing information.
- Develop a strategy for how to handle decisions that must be made in spite of technical uncertainty.

In Virginia, for example, a nuclear power plant that had been constructed adjacent to a manmade lake used the lake for cooling purposes. Everyone acknowledged that the cooling waters discharged into the lake were at a higher temperature than allowed in the plant's water discharge permit. However, environmentalists, state and federal regulators, and the power company disagreed about whether the ecosystem functions, fishing, and other recreational values of the lake were negatively affected. Each side had data that supported its views, but the data were complex, gathered using different assumptions and methods, and left much unknown. Much of the dispute revolved around predictions of future consequences rather than actual, measured effects. In contrast to most cases of this kind, the parties' scientists negotiated a jointly designed study, agreed on an acceptable research team, and sought the answers together. The process did require a mediator, but it moved the problem-solving process forward.

The large number of issues and parties that are involved in most water resource disputes makes organizing any negotiation process difficult. The number of parties involved in water resource negotiations, coupled with the fact that each party is concerned about several issues, creates a need to structure the negotiation carefully. Sometimes coalitions can be formed, as in the Mono Lake case where several parties were represented by one negotiator. (The Mono Lake case is described on page 14.) Subcommittees or working groups also can be formed to address subsets of issues and analytical or drafting tasks. Steering committees can be useful in larger groups for developing initial proposals on process and substance. However, the work of subcommittees must be linked to the larger, decision-making group. Opportunities also must be preserved to link issues between subgroups so that inconsistencies and trade-offs can be analyzed.

Water Quality 2000 was a national effort to build consensus among 80 organizations on a long-term vision for water policy in the United States. To manage the ambitious scope of issues and the 100-200 participants, subcommittees were formed to analyze issues and develop options papers on agriculture, pollution prevention, and aquatic resources, among others. A steering committee of about 20 then integrated subcommittee products into proposed policy statements for discussion, revision, and eventual agreement by the larger group.

These processes can require significant time commitments. To be effective, negotiators need to plan to devote the time necessary to allow full discussion and reach resolution. Although the time required for negotiation is often cited as a disincentive for parties, a decision forced through the courts or other authoritative bodies is more likely to be resisted or appealed, which can extend the overall timetable much more. Even the time that passes before a judicial system hears and decides a case may be longer than the negotiation.

Differences in the power and resources negotiators have available can create negotiation problems. Parties to negotiations should never forget that agreements are less likely to be stable if one party agrees to less than it would have achieved through other legitimate means. (This is not an argument endorsing violent means of achieving one's ends, however, both because the legitimacy of such means can be questioned and because the costs associated with such alternatives can greatly reduce the value of the ends achieved.) Generally, the axiom that the lion gets the lion's share holds true. It is also true, however, that weaker parties whose needs are not met will continue to work to build sufficient power to satisfy their interests more effectively in the future—i.e., the lamb will never be content to stay eaten!

More and more often, traditionally powerful parties are realizing that they need the cooperation of others who may have fewer resources but who can or will in the future be able to influence the outcome. Enlightened self-interest causes many not only to participate in negotiations with ostensibly weaker parties but, occasionally, to underwrite their participation expenses. In the disinfection byproducts negotiated rulemaking case, the EPA contributed nearly $40,000 toward travel expenses for state and local government and environmental and consumer groups and another $30,000 for technical consultants available to the committee, particularly for those who did not have their own technical resources.

Obviously, all parties want to maximize their power, but it may not be quite so obvious that the stability of settlements is increased if all parties obtain and use as many kinds of power as possible. Power can come from nontraditional sources, such as alliances, information or technical abilities, precedents and models, creative alternatives, and from subjective sources such as the power of persuasion. The Mono Lake settlement may illustrate the power of a good idea in its use of water market transfers to discourage other less benign methods of water acquisition.

Public decisions require public, not private, decision-making forums. A final characteristic complicating water resource conflicts is that the issues in dispute are public issues that need to be resolved in public forums. An important part of a negotiation can be to find ways to inform and involve the public and obtain its approval. Negotiators must deal with the press and open meeting laws sensitively and arrive at outcomes that can withstand public scrutiny and comment. Maximizing the flexibility within public institutions while holding negotiated solutions to the same legal and regulatory standards to which any decision would be subject is also a challenge.

Concepts and Vocabulary of Conflict Resolution

Definitions

Conflict is a normal social phenomenon that occurs because individuals and groups have different needs and perspectives, and it can be an important force for positive change when handled constructively. Most dispute resolution literature urges that specific disputes be managed to allow people to express their views. Underlying conflicts should not be avoided, because without understanding and accepting their differences, people can't jointly solve problems. This is not to say, however, that all modes of expressing conflicts are constructive. Dispute resolution methods focus on structuring incentives to deal with differences and on improved communication to better identify options that satisfy different interests and values.

Negotiation is not the only constructive approach to conflict resolution. It has been suggested that three different modes of conflict resolution can be distinguished (see Ury et al. 1988): power based, rights based, and consensual. Within each type, one can describe more and less costly modes, e.g., both voting and war are based on relative power, but the former is obviously less costly.

In this paper, we use the terms "dispute resolution" and "conflict resolution" broadly (and interchangeably) to refer to a wide variety of consensual approaches in which parties seek a mutually acceptable resolution of issues through a voluntary process. Negotiation—the foundation of most of these processes—is not new. Although many specific dispute resolution models or procedures used in the United States reflect the politics, culture, and biases of their origin, human efforts to deal with differences through negotiation are as old and as widespread as the species itself.

Because of the diversity of sociopolitical conditions as well as the circumstances in each case, no one standard method or script will be effective in all situations. Choosing an overall strategy for addressing a particular controversy is, by definition, a strategic choice. Parties to a dispute must first decide whether to seek resolution through an adversarial process or a dispute resolution process. Parties must then diagnose the specific barriers to success in each situation and understand the advantages and disadvantages of alternative approaches for overcoming those barriers. In that way, parties (or those seeking to assist them) can assess how best to tailor a specific strategy for that particular situation.

The generic types of conflict resolution methods from which individualized processes are often tailored include conciliation, negotiation, mediation, and arbitration. Conciliation is when a neutral third party communicates separately with disputing parties to reduce tensions and resolve a dispute. Negotiation is a voluntary process in which parties meet face to face to reach a mutually acceptable resolution of the issues. Mediation involves the assistance of a neutral third party to a negotiation process. However, a mediator, unlike a judge, has no power to direct the parties. Instead, the mediator helps parties reach their own agreement. In an arbitration process, the parties voluntarily submit their case to a neutral party for a decision, often negotiating a tailored set of rules of procedure which they agree to follow.

Negotiation and mediation have been used successfully to resolve many conflicts over water resources. Negotiation is probably the most common dispute resolution strategy used for all kinds of conflicts. Negotiations are often difficult processes, however, especially when they involve such public issues as water policy questions, which are both politically and technically complex. The large number of parties, disagreements about the facts, and other complicating factors often create circumstances in which the negotiators give up or reach an impasse. Mediators have increasingly been called upon to help parties convene negotiations, to prevent impasse during the negotiations, or to assist parties to continue negotiating when their discussions have broken down.

In mediated negotiations, the mediator does not make a decision about who is right or wrong or what the best settlement for a conflict should be. Instead, the mediator helps the negotiating parties to hold constructive discussions by calling meetings, establishing a framework for the negotiation within which all parties agree to participate, and facilitating communication in meetings and between meetings. Mediators often assist the parties in identifying where they may be able to agree or ways in which they can address their disagreements (for example, through joint fact-finding). They also assist by drafting, facilitating discussion of, and refining agreement language that all parties review for implementability. Professional mediators hold as a matter of ethics the view that mediators should have no direct interest in the outcome of the dispute. Frequently, however, a party with a stake in achieving a solution or with power or resources to assist the parties may take on mediation functions.

Both mediation and negotiation involve processes in which the parties have significant control over the end result of the negotiation. Decision-making power stays in the parties' hands and is not passed on to a judge or arbitrator.

Success in Conflict Resolution Processes

Experience shows that parties consider many factors important in characterizing a negotiation as successful. Generally, these factors fall into three categories: substance, process, and relationships. Examples of common measures of success include the following:

- Substance
  - An agreement is reached.
  - An agreement that satisfies the parties' interests or solves real problems is reached.
  - An agreement that is better than what could have been achieved through other means is reached.
  - Agreements are implemented.
- Process
  - The process is fair.
  - All affected parties are represented.
  - There is no undue delay.
  - Adequate consultation with constituencies occurs.
  - The process is not overly costly in time or money.

- It is consistent with applicable procedures and laws (e.g., open meeting laws).
- It does not set precedent for other parties not at the table.

- Relations

  - Relations are civil.
  - Parties treat one another with mutual recognition and respect.
  - Parties gain an improved capacity to solve problems together.

Implementation of agreements reached is probably the most important measure of success, but factors such as improved relationships among the parties or the development of an improved information base or an array of options for later consideration can also be valued outcomes.

Interests Versus Positions

Commonly accepted assumptions about negotiation are that each side takes a position, they trade concessions, and agree (sometimes) at a point in the middle. This is an accurate description of how many people negotiate and, thus, one can't ignore these dynamics in dealing with certain issues. However, there are disadvantages to this kind of "horsetrading." It becomes a battle of wills and creates bad feelings, it takes longer, and agreements reached often are less satisfactory because of the lack of focus on the parties' real needs and concerns.

The principle of focusing on interests, not positions, underlies most dispute resolution theory and practice. One way to understand this concept is to understand issue(s) as the question(s) to be answered, a position as one party's answer to these questions, and their interests as the reasons they hold that position. First articulated in the book *Getting To Yes* by Roger Fisher and William Ury, the authors champion the view that the essence of successful negotiations is to avoid bargaining over positions. They outline important principles to accomplish this, all of which shift the dynamics to more creative problem solving.

Discuss and address interests. It is critical to ask why one side is asserting a particular position on the issues to understand their underlying interests or what they need to achieve. Interests can be met in many ways; positions are much more rigid.

In the first, formally mediated environmental dispute in the United States, parties had been in conflict over the siting of a proposed flood control dam on the middle fork of the Snoqualmie River east of Seattle, Washington, for over a decade. The Army Corps of Engineers had proposed the dam, with the support of farmers in the Snoqualmie Valley, to protect farms in the floodplain from periodic flood damage. Unfortunately, the proposed dam would also flood the entrance to the first, hard-won wilderness area in the state as well as eliminate a popular white-water rafting recreation area. As with most disputes, the dialogue had narrowed to two mutually exclusive positions, one for the dam and the other against.

In the early 1970s, the governor of Washington invited mediators to explore whether a negotiated settlement could be organized. One of the early breakthroughs was simple but had a profound effect on the parties. The mediators succeeded in changing the conversation to interests—the

farmers were able to communicate to the environmentalists that their purpose was not to harm the wilderness area, and the environmentalists communicated to the farmers that they had no interest in the continuation of flood damage. The question for discussion was reframed so that the parties could search for an alternative flood control scheme that included a combination of a new dam site and set-back levees along the river.

Understand the role of interpersonal dynamics in negotiations and help people move on. Fisher and Ury call this "separating the people from the problem," meaning that it is important to understand the role that emotions play in a dispute but not to allow such emotions to prevent one from addressing each problem on its merits. Personal prejudices and prior history need to be understood (they may themselves constitute problems people want to solve), but parties should not be so motivated by bad interpersonal feelings that it becomes a barrier to self-interest.

Generate a wide range of options, minimizing judgments at first. People are less likely to develop fixed, adversarial positions when many options are being evaluated. Somehow, it creates at least a partial perception of everyone being on the same "side of the table," evaluating the pros and cons of options more collaboratively. Brainstorming is a common example. Participants list all possible ideas for resolving a problem, regardless of practical feasibility. Many feasible and creative options have originated from these first, sometimes whimsical ideas.

Agree on criteria by which to judge options for resolution. It may be easier in early negotiation sessions to list the general requirements that a potential agreement must satisfy than to develop the details of specific options. Such criteria help to maintain the sense of common endeavor in evaluating options as they emerge, for two reasons. First, the legitimacy of each side's needs is at least tacitly accepted, because these criteria are often surrogates for parties' underlying interests. In using these criteria, parties deal with solving others' problems and experience their own concerns given relevancy by others. For example, parties in the disinfection byproducts negotiated rule (see Chapter Three) evaluated policy options on many parameters simultaneously, including their effect on household water bills as well as the level of risk reduction that would be achieved. Second, where parties agree on objective criteria, it can help break impasses.

Integrative Versus Distributional Bargaining

There are many criticisms of the Fisher and Ury approach. (To be fair, these authors are quite aware of the "dirty tricks" that can be played in a negotiation.) The fact is that not every negotiation can be entirely interest based—eventually the pie can't be made any larger and parties are faced with deciding who will get what. Nor can the effect that political power plays in negotiation dynamics be ignored. Both of these factors create a competitive edge to negotiations. But Fisher and Ury's principles do allow negotiating parties to maximize the creativity needed to create more "joint gains"—an essential ingredient in sound policy solutions to complicated water problems.

In analyzing negotiations, it is important to distinguish between integrative and distributional dynamics. Integrative bargaining, also called positive-sum games in game theory or "win/win"

in common parlance, refers to dynamics that enable parties to develop solutions that benefit all sides. Distributional bargaining, also called zero-sum games or "win/lose," describes negotiation dynamics when parties are competing for a "fixed pie." (Some natural resources disputes, such as management of ocean fisheries in U.S. coastal waters, have become negative-sum games or a "lose/lose" situation for all sides.)

The ongoing efforts to resolve the Mono Lake disputes, which involve streams that provide 17 percent of Los Angeles' water supply, illustrate the search for an integrative solution through creative options. Composed of a group of California environmentalists, the Mono Lake Committee sued the Los Angeles Department of Water and Power over increasing environmental damage to the Mono Lake ecosystem. The goal of the suit was to address diminishing lake levels and the impact of those declines on salinity of the lake and fragile wildlife habitats.

As the litigation progressed, a multi-interest committee, the Mono Lake Group, was formed to provide a forum to negotiate agreement on future directions for policies affecting the lake. The group included representatives of the Los Angeles Department of Water and Power, the Mono Lake Committee plaintiffs, the Los Angeles City Council, the Los Angeles mayor, the U. S. Forest Service, the Mono County Supervisors, and the California Department of Water Resources, with the Environmental Defense Fund (EDF) acting as a consultant on innovative solutions.

The members of the negotiating group agreed on an overriding principle for any settlement they developed. They sought a settlement that would not transfer the environmental problems at Mono Lake to some other area or ecosystem, and thus rejected more traditional settlements based on political competition for water supply that might transfer the ecosystem damage elsewhere.

As a result of this principle, the negotiating group searched for solutions that produced gains with minimum losses for all concerned. They used their EDF consultants to identify alternative sources of water for Los Angeles that did not require structural solutions or environmental impairment. EDF sought opportunities to purchase water rights from agricultural interests for both Los Angeles and Mono Lake restoration. The agricultural interests could use the funds they obtained from the sale to enhance and improve their current water conservation strategies, so that crop productivity would diminish as little as possible.

A similar example of a joint gains (or win/win) settlement is an agreement between Imperial Valley water users and the Metropolitan Water District of Southern California in which Metropolitan agreed to pay for irrigation improvements that would enhance water conservation in exchange for rights to the water that was conserved. In this example, a nontraditional technical solution—lining irrigation ditches to promote conservation—was coupled with negotiated trading to promote an efficient and effective settlement.

In both of these situations, a combination of creativity regarding technical solutions and a problem solving approach to negotiations increased the options available. Negotiated processes, when conducted well, can create benefits by focusing on interests (such as avoiding environmental harm and ensuring water supply for a metropolitan area) and by allowing participants opportunities to generate solutions.

Several contributors to current negotiation theory (Raiffa 1982, Lax 1986, and Lewicki 1985) focus on the "tension between cooperation and competition," distinguishing between creating value and claiming value. While urging parties to seek ways to expand the pie (i.e., to invent solutions that achieve joint gains), they also caution parties that if one side cooperates—for example, by sharing information—and others compete, the more competitive often win.

Stages of Negotiation

Too often, those involved in negotiations limit their attention to the middle stage of what is actually a three-stage process: prenegotiation, negotiation, and implementation.

Negotiations generally begin long before a first meeting. Someone has to make the first move to suggest negotiations and to contact other parties and persuade them to participate. During the prenegotiation stage, decisions are made about who will be invited to participate; how the objective of the negotiation will be defined; what the scope of issues will include; where, when, and under whose auspices meetings will be conducted; who will chair or mediate negotiation sessions; whether meetings will be open or closed, and to whom; what deadlines will be set, if any; and what other ground rules will be established. These decisions affect the negotiation's potential to satisfy each party's interests and, thus, the likelihood that negotiations will produce lasting agreements.

The negotiation phase, where parties address their substantive issues, is in some ways more readily understood because it is a commonly shared experience. Yet it often appears more difficult to analyze. This stage generally is bounded at the beginning by the first face-to-face meeting among parties and concludes with an agreement. Within the negotiation stage one should pay attention to several discrete functions—information sharing, the development of options, and closure.

Finally, parties are not usually satisfied with an agreement on paper that does not result in real actions. (At times, the appearance of an agreement can forestall escalation of hostilities, at least temporarily, but this is rarely a stable situation.) Thus, implementation, and planning for implementation during each of the preceding stages, becomes a critical stage in the overall negotiation process. Anticipating common obstacles to successful implementation, creating incentives for all sides to comply with the terms of an agreement, and establishing mechanisms for ongoing communication and negotiation will be discussed.

Getting Started - Prenegotiation

Negotiations never spring to life fully organized. Someone needs to suggest the process in the first place, and too often no one does so because they are concerned about others inferring that their position is weak. All parties need to be contacted but who approaches whom and in what order can affect their perceptions of the process.

Incentives are a key to the success of eventual negotiations. All parties should believe they have something to gain, and no one should think the negotiation process would harm their current standing. Thus, parties need to understand the outcomes they could achieve without negotiating and use this information to decide whether to participate in negotiations as well as when to settle. If they could achieve better results in another forum, they should not settle for less in negotiation. For example, under certain circumstances, groups choose not to negotiate because it would conflict with a successful strategy of litigating or seeking legislation on a particular topic. Under other circumstances, negotiations can help settle litigation or develop legislative or administrative proposals. Thus, an early goal is to assess how potential negotiation results would compare with the parties' alternatives.

Fisher and Ury call this alternative outcome a BATNA, "the best alternative to a negotiated agreement." Of course, the certainty of what can be achieved elsewhere varies, so probability and risk analysis need to play a role in this determination. Parties also can act to increase their own or decrease others' likelihood of prevailing in the absence of a negotiated agreement. In addition, how the negotiation process is structured often will significantly affect the potential of the process to satisfy parties' interests. Thus, one can affect the potential benefits of negotiation by the design of the process.

Many negotiations are convened with insufficient analysis of incentives and, as a result, are unsuccessful. Mediators generally conduct such analyses, often called feasibility assessments or convening processes. Parties should invest time in making such assessments themselves, with or without the assistance of a mediator. Negotiation situations are dynamic; it is often possible to modify incentives. Thus, a key product of any feasibility assessment will be general agreement among the parties as to who will participate and in what way, what the scope of issues will be, deadlines, frequency of meetings, information needed to make sound decisions, who the mediator will be (if any), and other ground rules.

Negotiations are likely to be more promising if the following conditions are met:

- The parties agree on a manageable number of interdependent or related issues. There must be a sufficiently well-developed factual base to permit meaningful discussion and resolution of the issues. There should be several ways to resolve the issues.
- Those participants interested in or affected by the outcome of the negotiation are readily identified and few enough in number to allow representation of all affected interests in a committee of manageable size. Participants should be able to represent and reflect the interests of their constituencies.
- All parties should have a genuine interest in participating in good faith negotiations. They should believe themselves at least as likely to achieve their overall goals through negotiations as opposed to the alternatives.
- The parties can obtain adequate resources to negotiate, including technical support.
- There is a legislative or judicial deadline, or some other mechanism requiring a decision within a reasonable amount of time.

- The negotiation will not cause unreasonable delay.
- A mechanism exists to implement a consensus, if reached.

The assessment or convening process is fairly simple. In practice, a convener (whether a neutral mediator or a stakeholder in the process) generally talks to the parties individually to understand how each side perceives the problem and to develop a shared understanding of how to go about resolving it, as different ways of organizing a negotiation process may give an advantage to one side or another. The fundamental objective of the process, scope of issues involved, who convenes and who participates in the process, and timetables set all play a significant role in whether the process actually is or is perceived as a level playing field for all sides.

Because parties usually define the problem differently, a key to success may be reframing the central question for negotiation so that all sides agree on its purpose. In the Denver Metropolitan Water Roundtable, neither of these two apparently reasonable questions were acceptable: How can the Two Forks Dam be sited in as environmentally sensitive a way as possible, or is Two Forks dam needed? Ultimately, the parties did agree to negotiate on how the city of Denver would obtain the water it needed over a 30-year period. This allowed multiple options reflecting the underlying interests and preferences of each side, including consideration of the Two Forks dam option and of water conservation as an alternative source of supply, along with a joint analysis of the city's future water needs.

A further result of consultation during the prenegotiation phase should be an agreement on who will convene the process and what will be the consequence of an agreement, if reached. It also is essential to ask parties to identify who could legitimately represent their interests and how their internal decision-making processes work so that negotiators can be given sufficient opportunity during the substantive negotiations to share information and options and to receive ongoing instructions. Parties also need to agree on other ground rules for establishing communication, defining issues to be addressed, identifying information needs, agreeing on a timetable or frequency of meetings, and whether to use a neutral convener or facilitator.

Negotiation

Negotiation is something people do. Negotiators must make choices—What do I do next? What do I say next? What do I offer? What do I accept? These choices can be informed by the principles described above. In addition, negotiators must understand and accomplish the following steps:

- confirm the "organizational" assumptions established during the prenegotiation phase
- exchange information to understand all parties' interests and criteria for making decisions and to analyze the problem and options being proposed
- generate creative options to seek joint gains and evaluate these alternatives
- move toward closure and draft agreements

Confirm "organizational" assumptions established during the prenegotiation phase. At their first meeting, parties usually discuss how the process should proceed. They either confirm their preliminary agreements on the ground rules which were developed during the convening process, or parties can negotiate these matters face to face. The latter is often required in polarized situations. In extremely polarized situations, however, one might want to proceed with a mediator engaged in shuttle diplomacy until the parties agree on one or more procedural matters, to increase the likelihood that a first meeting will achieve some success.

In the disinfection byproducts (DBP) negotiated rulemaking, an organizational meeting to confirm the structure of the process was a formal part of the required public comment period. Those 17 individuals who had been proposed as representatives of the various stakeholders sat at the table with another 60-70 observers, some of whom wished to be added as negotiating parties or who had other comments. The agenda for this two-day meeting included a discussion of negotiated rulemaking procedures (e.g., decision-making meetings were required to be open but working groups were not), representation, scope of issues, technical support for the committee, the intended end product (a signed agreement to support the proposed rule), and ground rules. In addition, parties discussed their criteria for a sound regulation and the substantive background of the rulemaking.

Exchange information. The beginning of a negotiation is an ideal time to listen and learn, to check assumptions, to understand why others hold certain positions, to exchange information, and to clarify any proposals others may be presenting. Parties often make the mistake of trying to sell their positions too soon when they can achieve more by listening. Listening does at least three things: it sets a positive tone for the negotiation, it gives the listener new information that might correct misconceptions, and it gives the smart negotiator information on which to base proposals that are more likely to be accepted by the other side.

To achieve a successfully implemented agreement, dispute resolution processes rely on accurate and ample information. That is, they depend on more than improved communication between parties. Analysis of technical, scientific, social/cultural, and economic information also is essential.

An interesting illustration of strategies for handling technical information is the mediation of a dispute between upstream and downstream governments over nitrogen and phosphorous levels in the Patuxent River in eastern Maryland. The state of Maryland had issued a draft "nutrient control strategy" in an attempt to comply with guidelines for obtaining EPA construction grant funds. However, the strategy was challenged by downstream users of the Patuxent River. Upstream, suburban counties were persuaded by those scientists who believed that the principal problem was nutrient impacts from phosphorus in effluent from upstream urban sewage facilities. Downstream, rural counties believed those scientists who said that nitrogen levels from nonpoint sources were the real problem.

In October 1981, with a funding deadline approaching at the end of the year and the state at risk of losing all its federal construction grant funds, the mediator was asked to help the parties resolve their dispute. He formed a steering committee representing key interests to help guide the consensus-building effort and with its help devised a two-stage process. In the first stage, the

scientists and technical representatives who were credible to the various parties met to discuss what was clearly known, not known, and in dispute about the water quality of the Patuxent. This gave the policy-makers their first common picture of the river and narrowed the issues requiring discussion. Everyone gained a more complete picture of how much agreement actually existed. The results of the technical meeting were then presented to a group of 40 representatives of various governmental, industrial, and environmental interests from both the upstream and downstream communities. After three days of meetings, during which the technical experts were available for consultation, a new nutrient control strategy was drafted and agreed upon. The agreement called for nutrient loading reductions by upstream treatment facilities through an experimental land disposal method for treated waste. The downstream communities agreed to develop a nonpoint source pollution control plan to further reduce nutrients placed in the river. The state of Maryland issued this plan, and funding for its sewage treatment facility was assured.

Even the best efforts don't always produce the intended outcome, however, whether the policy is set through negotiated agreement, legal action, administrative decision, or legislation. Nutrient loadings in the Patuxent were reviewed five years after the agreement and were found to be only somewhat reduced. Additional information collection and analysis may be required, and mechanisms for doing so cooperatively can be written explicitly into agreements (see the implementation section below).

Generate creative options to seek joint gains. As discussed above, water resource negotiations have both a "distributional" dimension (dividing a fixed amount of the resource) and an "integrative" dimension (expanding the pie by inventing creative solutions to overcome existing constraints). Although it is self-evident that more efficient or creative uses of the same amount of water makes it possible for all sides to be better off with a negotiated agreement, it is not always clear how to achieve this, both technically and strategically.

Water conservation, importation of supplies, and conjunctive uses are the most common technical means. Although the solutions are unique to each situation, the Truckee Carson case provides an inspiring example of conservation and conjunctive use. After decades of hostility, two of the parties—the Pyramid Lake tribe and the private water company supplying the urban communities on the Truckee River—began talking privately. They were able to shift from competition over who would get how much of the flow of the river each year to an allocation of water between years, based on the unique characteristics of their interests. The tribe's goal was to reestablish the endangered cui ui fish, a principal source of food and cultural identity. The water company's goal was to provide drought protection to the residents of their service area. Because the cui ui are a particularly long-lived fish, with a reproductive period of generally over 20 years, they could survive without spawning those years that the cities needed water due to drought. And the water company could store and send more water downstream for cui ui spawning purposes in wet years.

Often, people think of building agreements on common interests, and this can be true. However, building on differences can be a particularly effective way to create joint gains. Such differences can include time preferences, predictions about the future, willingness to bear risks, resources, capabilities, and relative priorities among issues. Lack of trust is a major impediment to

creativity, however. The process of searching for joint gains requires sharing information about needs and priorities. Creating joint gains requires cooperation, but if one cooperates to create value and others compete to claim value, the latter wins. One specific solution to this dilemma is to break the negotiation into stages, separating inventing from committing and asking parties to share information.

Narrow options, move toward closure, and draft agreements. Ultimately, the rhythm of the negotiation process moves from exchanging information and inventing options to reaching decisions. Two techniques for narrowing options are common.

The first involves identifying areas of agreement and disagreement. Matrices can be helpful, particularly when the issues are complex or the parties are dealing with a large number of issues. In a National Wetlands Policy Forum convened by The Conservation Foundation in the late 1980s, the parties identified 27 specific issues within one of seven broad areas of concern. The mediators developed a matrix of the parties' positions on each issue, which helped them group the issues into three categories: 1) those where most parties were in general agreement (for these issues tentative language was drafted for negotiation purposes), 2) those where parties were deeply divided (these were put on future agendas for further discussion and multiple options were bracketed in the emerging agreement document), and 3) those where parties differed but didn't care deeply (these were deferred for later consideration and eventually dropped). A similar matrix of comparison between options was developed for the disinfection byproducts negotiated rulemaking from which the EPA staff drafted a single text document for further negotiation.

A second technique, although less frequently used, can help identify possible avenues for discussion when parties have reached an impasse involving two competing options. In a dialogue to develop a statewide groundwater policy for the state of Tennessee, parties had reached substantial agreement on all issues except groundwater quality standards. Industry leaders advocated a policy based on point source controls while environmental leaders advocated ambient standards. The key elements of each strategy were summarized, and a spokesperson from each side agreed to identify specific changes (other than the fundamental premise) that would make the other side's option more attractive. A hybrid option emerged at a later meeting that incorporated many of those suggestions.

Final concessions can be very difficult. Parties must evaluate whether a less than ideal offer is still better than no agreement at all. Often, some individuals on each side will be willing to consider compromises before other members of their group. Thus, it is common to see parties caucus amongst themselves more frequently toward the latter stages of a negotiation than at the beginning or middle stages. In the disinfection byproducts negotiated rulemaking, each side spent considerable time in caucus toward the end, with the mediators relaying messages and clarifying proposals between the groups in caucus. Individuals who had participated in the joint analysis of options through the technical working group also provided links between groups. At some point, each side also needed to clarify EPA's position or confirm its support for one set of issues before agreeing publicly to a concession on other parts of the package.

Increasing the Likelihood of Implementing Agreements

Reaching an agreement is a formidable accomplishment that can help stabilize a potentially volatile situation. However, an agreement on paper is only a temporary milestone on the road to action. If parties' needs and concerns are to be satisfied, agreements must be implemented.

Three principal implementation tasks should be noted: ratification of the agreement by the entity represented, compliance with the terms of the agreement, and renegotiation or resolution of implementation issues (including interpretation of the terms and response to unanticipated, external events).

Parties face numerous challenges during the implementation phase. Planning for successful implementation requires consideration of the reasons agreements fail to be implemented.

- lack of clarity about the terms of the agreement
- an agreement that is not technically feasible
- an agreement that is not institutionally, economically, or politically feasible
- an extended time period for ratification and/or implementation
- changes in circumstances
- bad faith
- not all parties were involved
- new parties emerged
- an inability of the negotiators to bind the entity they represented

Many of the tools available to negotiators for overcoming these implementation challenges fall into three categories: avoidance, self-enforcing mechanisms, and mechanisms to resolve future problems.

Anticipate and avoid common implementation problems. Many of the most common implementation problems are fairly simple to identify and, therefore, can be avoided. Parties should insist on taking the time needed for adequate technical analysis (preferably jointly). For example, the negotiated agreement on the Snoqualmie River flood control dam and levees ran into trouble when detailed geological analysis revealed that the proposed dam site was not strong enough. Parties also should ask how much the agreement will cost, who will pay, whether the funds are currently available, and, if not, whether those who must appropriate the funds have been consulted. Are sufficient personnel resources available for the actions contemplated or can a plan for obtaining them be part of the agreement? Do all parties have the legal authority for the actions contemplated? Who can (or might) act to block implementation, what are their interests, and how can these concerns be met?

Mediators can often assist parties in addressing a variety of constraints. An example of institutional barriers occurred in a mediation over water quality in Sheridan, Wyoming. Several

residential water users in Sheridan had access to and used untreated water from a water conduit leading to the municipal water treatment system. The EPA sued these individuals because the water did not meet EPA health and safety standards. Bringing treated water to their homes was expensive, however, and the homeowners could not pay the costs involved. The issue remained a stalemate.

A mediator was called in because the lawyers on the case saw an opportunity to explore some creative solutions that would not be available if the case proceeded to trial. The mediator met with the parties and learned that in a nearby town there was a need for a new water treatment facility. He obtained the agreement of the parties to broaden the negotiations to include regional and local government representatives for both towns, and the negotiation concluded with a plan for a new water treatment plant that could meet the needs of the larger region while providing water that met EPA standards to the Sheridan residences. Costs for the new facility were apportioned among a much larger group of water users, making it more affordable, and EPA did not have to proceed with what was likely to be an unproductive lawsuit.

Genuinely satisfying the interests of all affected parties is the single most important way to increase the likelihood that an agreement will be implemented successfully. The second is being explicit about who has agreed to do what when.

Create self-enforcing mechanisms. All agreements are more likely to be implemented if parties see a reward for compliance and a negative consequence for failure to comply. These often are called compliance incentives or self-enforcing mechanisms. Some are subtle, as in creating a reason for ongoing relationships. People are less likely to act in "bad faith" in such situations. Others are procedural, as in monitoring committees, renegotiation clauses (a kind of ongoing relationship), structured timetables, or contingent agreements. Even in situations where parties have a high degree of trust, it is generally not wise for one side to implement all the actions to which it made a commitment before the other side implements any of its commitments.

In the disinfection byproducts negotiated rulemaking case, the parties included several procedural agreements into their agreement. One of the biggest obstacles to agreement in this case was disagreement over the scientific facts, i.e., uncertainty over the nature and magnitude of the health effects. As a positive incentive, the American Water Works Association Research Foundation offered to contribute $15 million over five years to a research fund, contingent on matching government funds. They also suggested that this research fund be jointly managed by a committee of water providers, government officials, public health professionals, consumers, and environmentalists, creating an ongoing relationship among the parties to the negotiated rulemaking.

Establish mechanisms to resolve future problems. Water resource problems take years, if not decades, to solve, whether the decisions are made through negotiation or administrative, legal, or political action. Inevitably, circumstances change and new problems arise. Thus, it can help to structure procedures for reopening and resolving issues explicitly in the original terms of an agreement. These can include arbitration and mediation clauses, monitoring by outside technical bodies, and entering an agreement into the "docket" of a higher authority (e.g., as a consent decree in the courts for disputes within a country).

Water resource problems also may not be amenable to a comprehensive solution in a single agreement. In the disinfection byproducts negotiated rulemaking, the parties dealt with their scientific disagreements, in part, by setting standards in two phases. The stage one levels were based on current information and were contingent on an information collection rule and on establishing a five-year health effects research program on which "stage two" regulations would be based. The parties agreed that a second negotiated rulemaking would be convened for resolving issues remaining after the additional data became available. (They also agreed to a "fall-back" provision for stage two requirements in the event that parties were reluctant to return to the table, the planned second negotiated rulemaking was not convened, or they did not reach an agreement.)

Ultimately, the timetable for implementing solutions to water resources problems can be daunting. In the disinfection byproducts case, technical drafting and ratification took nearly a year, and the parties' working relationships were severely strained by an intervening political battle over the reauthorization of the Safe Drinking Water Act in the U.S. Congress. Actual implementation of the three agreed-upon regulations is not expected for at least a decade. New circumstances will clearly arise, and parties will need mechanisms for ongoing dialogue.

Chapter 2 draws on research and educational materials previously done by RESOLVE, including negotiation training materials.

Chapter 3

WATER CONFLICT RESOLUTION EFFORTS IN THE UNITED STATES

This chapter describes four U.S. case studies where negotiations were used to resolve conflicts over the allocation, quality, or use of water. Although the specific issues of each case vary, the lessons drawn from each example apply to most if not all multi-party water controversies. This chapter focuses on the creative decision-making processes that led to technical, political, and legal solutions to the conflicts.

The first case involves a watershed planning effort that was intended to be collaborative and designed to prevent conflict. In this example, however, a bi-state regional planning effort for development and conservation in the Columbia River estuary grew into a highly polarized conflict over the appropriate use of the estuary and its shorelines.

The Swan Lake case shows how disputes in smaller, stream-sized basins can escalate into divisive conflicts that may turn violent. In this case, a small-scale hydropower developer clashed with the townspeople of Swan Lake over the level at which the lake should be maintained. The details of the negotiation process used to settle the dispute reveal negotiation dynamics that may be magnified in larger scale and international water conflicts.

Of the four cases presented, the third case, the Truckee-Carson river basin, most closely resembles international water conflicts. Recently, a second round of negotiations began for this highly complex case, which involves water allocation between two river basins. Among those competing for the water are two Native American tribes, a federally endangered fish, several metropolitan areas, a farming community, and an important wetland ecosystem. Although litigation has settled some matters, due to the number of issues and stakeholders involved, the expanse of the area affected, and the acrimonious history of the conflict, many of the underlying conflicts remain unresolved. The parties involved hope that negotiations will lead to more creative and lasting solutions than those offered through traditional approaches.

Negotiations in the final case illustrates a negotiation led to the development of a national policy to regulate the chemical byproducts of drinking water disinfection. Although not centered on a river basin, this case describes the unique process of getting stakeholders to negotiate to reach agreement on a policy or regulation before that rule is proposed by the rulemaking agency. Because of the number and complexity of parties and issues generally involved in disputes over water policy, such consensus-building efforts may lead to more implementable and higher quality regulations.

A case summary of each of the four examples will precede the detailed description.

Case I

The Crest Mediation

Case Summary

River Basin:	Columbia River, Washington and Oregon
Dates of Negotiation:	1980-81
Relevant Parties:	Four local jurisdictions Oregon Dept. of Economic Development Oregon Dept. of Fish and Wildlife U.S. Fish and Wildlife Service National Marine Fisheries Service Environmental Protection Agency Army Corps of Engineers Oregon Dept. of Land Conservation and Development Oregon Division of State Lands
Issues:	Plans for five potential port development sites as part of a long-range regional development plan
Problem:	Disagreement over the balance of conservation and development that could occur at each port site
Incentives:	Bi-state, estuary-wide plan was determined to be inconsistent with Oregon Land Conservation and Development Commission (LCDC) goals and guidelines Permits were required by LCDC and Army Corps of Engineers
Obstacles:	Polarization of positions between pro-development and pro-conservation forces Complexity of state and federal development guidelines and regulations Participation of state and federal authorities in the negotiations without compromising their official positions in subsequent permitting processes
Status:	Agreement was reached on specific kinds of development that could occur at each site and the off-setting mitigation measures that would have to take place.

Background

Responding to new state and federal rules regulating environmental impacts, in 1974 local governments and ports near the mouth of the Columbia River in Washington and Oregon began a unique bi-state watershed planning process. Elected officials and their staff, port authorities, counties, and communities formed the Columbia River Estuary Task Force (CREST) and, after five years of study, published a long-range regional management plan in 1979.

Although issues on the Washington side of the Columbia estuary were satisfactorily resolved by the CREST planning effort, certain conflicts concerning appropriate use of the estuary and its shoreline persisted in Clatsop County, Oregon. In particular, parts of the CREST plan were inconsistent with the statewide planning goals and guidelines of the Oregon Land Conservation and Development Commission (LCDC). In 1981, CREST formally requested mediation assistance to resolve the remaining issues that prevented approval of the management plan by the LCDC.

The Problem

Oregon state planning laws require that local plans be evaluated and approved by LCDC in order to ensure that they conform to statewide goals and guidelines. The CREST plan was to be adopted by the communities and incorporated into local plans on the south side of the river in Oregon where port development was to occur. In 1980, LCDC rejected the CREST plan specifying in a 136-page document how the plan failed to meet statewide goals and guidelines at five specific sites. At issue was whether sufficient economic justification existed for proposed exceptions from requirements for water-dependent users at the five sites.

Stakeholders to the conflict fell into three groups: the "pro-development" faction, which included four local jurisdictions and the Oregon Department of Economic Development; the "pro-protection" faction, which included the Oregon Department of Fish and Wildlife, U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the Environmental Protection Agency; and "unaligned" organizations, which included the Army Corps of Engineers, LCDC, and the Oregon Division of State Lands. This third group leaned toward pro-development or pro-protection alliances on an issue-by-issue basis.

Attempts at Conflict Management

Late in 1980, it became evident that the plan would have to be revised, but parties had already adopted strong and conflicting positions on what changes should be made. Wide disagreement existed on the scope and nature of port development, the locations most suitable for development, and mitigation measures that might be taken to offset negative impacts. In January 1981, CREST formally requested a mediator to assist in settling the remaining issues preventing approval of the CREST plan.

Prenegotiation Analysis

The mediators began by conducting a convening process, or analysis of the nature and dynamics of the conflict. Their objective in the convening process was to determine if the dispute was appropriate for mediation, learn what issues needed to be addressed, find out who should be involved in the negotiations, and obtain the necessary background to intervene effectively. This involved talking with individuals from several federal and state government agencies, representatives of CREST, landowners, environmental leaders, and many others. Some of the more productive information-gathering sessions took place in informal settings. For instance, the mediators reported that they learned a great deal about Oregon's planning process while throwing darts at a bar with the author of the economic justification document. These meetings confirmed that mediation should be undertaken, and a June 30, 1981, deadline was set for reaching agreement.

The prenegotiation analysis also revealed the importance of state and federal agency involvement in the mediation. Local representatives felt strongly that because the conflict existed largely between themselves and the permitting agencies, the agencies should be full participants. This presented a problem: how could agencies who have the authority and responsibility to approve or reject permits for port development or a mandate to balance conservation and development interests (such as LCDC) participate in the negotiations? Would signing an agreement compromise their official positions in subsequent permitting processes? The mediators considered asking individuals from these organizations to participate as "reviewers," which would give them a role somewhere between an observer and a negotiator. In the end, however, all parties that the local representatives believed should be at the table agreed to fully participate as negotiators.

Negotiating the Process Design

In April 1981, the parties negotiated several important process design issues during two 2-day meetings. Instead of addressing the estuary issues, the parties focused on process questions like who would be allowed to participate and in what capacity, which issues would be negotiated and how would they be defined, which issues would not be addressed, and what expectations the parties should hold for agreement implementation.

From the convening analysis, the mediators surmised that the parties' expectations differed: some sought LCDC's "acknowledgement" of their local plans while others wanted to address problems they expected to encounter during the permitting process. To avoid starting out with widely differing expectations, the mediators included this as a process design issue. In the end, all parties agreed that the purpose of the negotiations was two-fold: to increase predictability in the permit process, and to arrive at a package that could be recommended to LCDC for acknowledgement.

The parties decided to address two broad substantive issues in the negotiation: 1) suitable activities, facilities, and dimensions for the five sites and 2) conditions under which such development could occur in a manner compatible with living estuarine resources.

Once the process matters were resolved the parties had difficulty with other issues because the five sites stretched over seven miles of the Oregon side of the estuary. Determining the most appropriate use for each of the five sites and the most appropriate site for each potential use required trade-offs between and within each site. The LCDC helped to spur the negotiations along by agreeing that some amount of development could occur at each site, provided that the total development acreage in the estuary did not exceed a certain level and that the various specific uses (such as log, grain, and coal export and containerized cargo) remained within a minimum acreage per site.

Negotiations of the Issues

At the start of formal negotiations, all negotiators were authorized by their respective constituents to sign whatever agreement was reached as long as there was complete concurrence by all parties. The positions of the two factions (pro-development and pro-conservation) were so polarized that the mediators had them sit on opposite sides of the table to facilitate caucusing. The "unaligned" parties sat at one end of the table and could join a coalition on either side as necessary. The mediators sat at the other end.

In May, the first two sessions (both two-days in duration) focused on information gathering and sharing. Technical advisors played a leading role in these meetings. CREST staff prepared information notebooks for each participant and, throughout the sessions, agency personnel, landowners, and other technical experts provided information that was added to the growing database.

On the second day of the second meeting, although the parties were ready to begin negotiations, each side perceived a disadvantage to make the first move. No significant proposals were made. Finally, the mediators threatened to pull out if substantial progress was not made that day. The mediators pointed out that although each party had clearly stated its needs, interests, and concerns, it had been unwilling to deal with those of the other parties. The mediators said that it was critical to reach preliminary agreement on at least one site that day; otherwise there would be little hope of resolving the dispute by the June 30 deadline.

Responding to the mediators' concerns, the parties reached a tentative agreement for the Tongue Point site. They then used the pattern established in this case for the other sites. This involved listing a series of findings, determining planning designations for the site, and designing subarea policies for the conditions under which the site might be developed. Following this pattern at the third session in early June, the negotiators reached tentative agreements on the other four sites.

The media also played an important role in the negotiating process, appearing to help move the negotiations toward agreement. A newspaper reporter who attended all of the meetings published detailed reports of each session. This extensive coverage seemed to effectively create a large unseen audience at the local, state, and federal level to which the negotiators responded. Negotiators realized that taking an unreasonable stance would open them up to criticism, especially if the negotiations stalled as a result.

During the fourth session in mid-June, the negotiators set aside unresolved issues to work on refining the language of the agreement and creating appropriate subarea policies. The final session, June 29 and 30, was aimed at settling these unresolved points. The final agreement was signed at 10:30 pm on June 30, the day CREST would officially cease to exist. By the end of the summer, all agencies and elected bodies had ratified the agreement signed by their representatives, and it was incorporated into the local plans for the cities of Clatsop County.

Lessons

Early consensus-building efforts through watershed planning can be effective in anticipating conflict, but conflict resolution strategies will still be needed to manage the issues that emerge.

Much of the negotiation and mediation work takes place between negotiation sessions and in caucuses.

During the two-month negotiation period, the mediators played a critical role by helping negotiators communicate with their constituents, checking with the technical advisors about specific proposals, and making sure all interests were represented at the table. For every hour spent at the table, the mediators spent more than eleven hours working behind the scenes. During one eight-hour negotiation session, the parties spent 7 ½ hours in caucuses, with mediators playing a "shuttle diplomacy" role, and only a half hour spent in joint sessions.

Preliminary agreements provided the structure for later agreements.

If they had not been able to agree to consider settlement options on a preliminary basis, the parties would have reached an impasse.

By helping to make the negotiations more transparent, the media acted as a force in pressing the sides toward agreement.

The media expanded the potential observers to the process, creating a "constituency" for settlement, thus inducing parties to be more flexible about their positions.

Participation in the negotiations did not by itself compromise the authority of the government agencies.

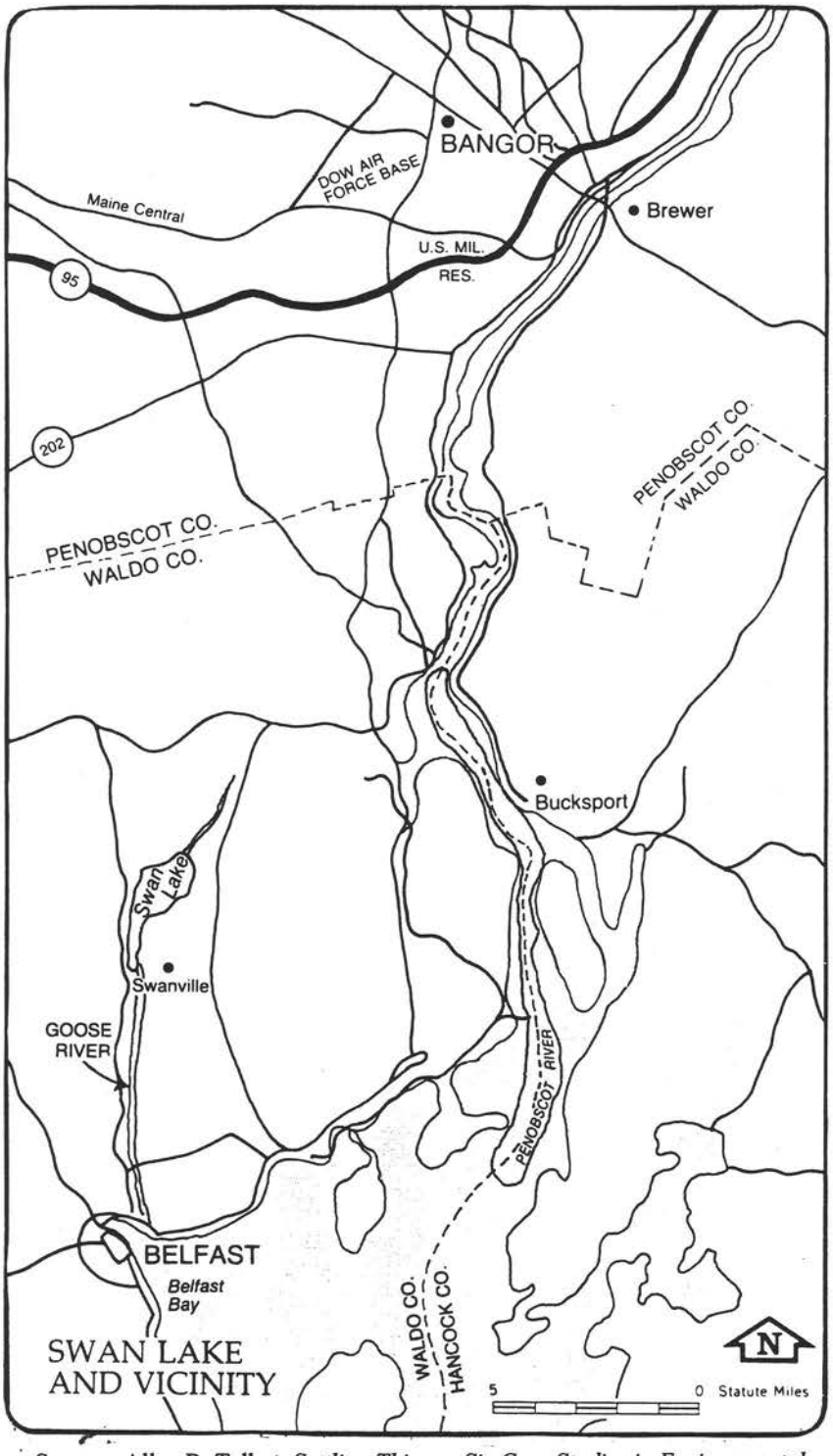
By electing to play an active role, the state and federal government agencies provided stakeholders with a greater incentive to participate.

Case II

Small-Scale Hydropower Development: The Swan Lake Conflict

Case Summary

River Basin:	Goose River, Maine
Dates of the Negotiation:	1978-79
Relevant Parties:	Maine Hydroelectric Development Corporation Town of Swanville Federal Energy Regulatory Commission (FERC)
Issues:	Water levels of lake used for recreational and power production purposes Maintenance of recreation area adjacent to Swan Lake dam
Problem:	Disagreement over the lake level needed to provide recreational opportunities and generate hydropower
Incentives:	High cost of litigation for Swanville, delay of FERC review of hydro license caused by Swanville litigation Threat of vandalism and violence Mediation would allow access to private information regarding hydrological patterns
Obstacles:	Animosity between sides
Breakthroughs:	Shared information and joint fact-finding (tour of the lake) defined areas of possible agreement Public meeting revealed issue most important to Swanville residents
Status:	Agreement was signed in August 1979 and subsequently incorporated into FERC license.



Source: Allan R. Talbot, *Settling Things: Six Case Studies in Environmental Mediation*, The Conservation Foundation and The Ford Foundation, Washington, D.C., 1983.

Background

In the late 1970s, with the passage of federal legislation designed to encourage small-scale energy generation, the development of small-scale hydropower projects became more attractive to entrepreneurs. In 1978, Congress passed the Public Utility Regulatory Policies Act obligating private utilities to purchase electricity from small-scale producers at the same price they would pay for their highest cost alternative source. Congress also provided for a 21 percent tax credit to small-scale producers as an additional incentive to generate electricity and use available resources. The response was rapid. In 1979, the FERC, which reviews hydroelectric proposals, received 90 applications from developers seeking claims on old hydro systems. By the end of 1980, the FERC had been flooded with more than 900 applications.

The reactivation of systems that had been dormant for decades inevitably produced a variety of conflicts. Streams and reservoirs that had risen and fallen naturally would once again be managed for power production. One of the first disputes arose in 1978 at Swan Lake in Maine.

Swan Lake, which is about two miles wide and three and a half miles long, sits at 200 feet above sea level. The lake is drained by the Goose River, which winds about six miles before emptying into Belfast Bay on the Atlantic Ocean. The lake and river drain about 21 square miles of land along the Maine coast.

In the mid 1800s, the Goose River ran through 15 dam sites where water flow was converted into mechanical power for a variety of small industries. In 1880, the Sherman Leatherboard Company began acquiring and consolidating all the water rights in the drainage system, including those of property owners around Swan Lake. By 1976, the company operated four dams. The first, where Swan Lake drains into Goose River, is 250 feet long and 10 feet high and makes Swan Lake into a reservoir.

In 1976, Larry Gleeson, an individual who recognized the potential of small-scale hydropower development, formed his own company to acquire the water rights needed for the power business. Gleeson began negotiating with the recently closed Sherman Leatherboard Company for the water rights to the Goose River system. He believed Goose River could be kept flowing during dry periods because of the 7,500 acre-feet of water stored in Swan Lake. If he installed turbines at the other three dam sites, he calculated he could generate enough electricity to provide for the annual electrical needs of 400 households. Based on Sherman's century-old hydrological records, the combination of the area's average rainfall and the storage capacity of Swan Lake could keep the system operating for almost 300 days a year. In June 1977, Gleeson completed his negotiations with the Sherman Leatherboard Company and filed for the FERC license.

The Problem

Swan Lake is the centerpiece of the town of Swanville. Almost a third of the town's 950 permanent residents live on lakefront property. Nearly everyone in Swanville uses the lake for swimming, boating, and fishing. When the leatherboard plant closed in 1976, regulation of the lake levels switched from the FERC to Maine's Soil and Water Commission. In the spring of

1977, the Soil and Water Commission ruled that the owner of the company would have to maintain lake levels within a 4 foot range. The lake level could go no higher than 2 ½feet from the top of the Swan Lake dam and no lower than 6½ feet below the top.

But local control over the lake lasted only six months. Once Gleeson filed for his FERC license, jurisdiction for dam operations switched back to the federal agency. Gleeson assured Swanville's selectmen that he would maintain lake levels set by the Soil and Water Commission until the FERC ruled on his license. His gesture did little to win the townpeoples' support, however, when he asked for a reduction in his taxes for the maintenance of a strip of land next to the dam, something the leatherboard company had always done. Swanville's anger over the return of Swan Lake to power production was further aggravated by their perception of Gleeson as a newcomer to the community. Many of the townspeople questioned whether he really knew what he was doing.

Distrust of Gleeson grew through the winter of 1977-78. It turned to vandalism when someone pulled rocks from the gate area of Swan Lake dam causing the release of millions of gallons of water. The leakage, and an unusually dry spring, combined to produce a drop in the lake level to feet below the top of the dam. Rocks, water intake pipes, and stretches of mud and sand began to appear, further incensing the people of Swanville. Relations between Gleeson and the town selectmen continued to sour.

Attempts at Conflict Management

In the fall of 1978, the townsfolk voted to retain a lawyer to intervene in the FERC permit process and authorized the lawyer to hire a hydrologist to help prepare his case. The dispute took a violent turn when a firebomb was ignited at the wooden gates of the Swan Lake dam. The escalation of the conflict attracted the attention of the governor's office, which in turn led to the first consideration of the idea of mediating the controversy.

FERC officials who were reviewing the case agreed to support mediation but made it clear that the initiative would have to come from Gleeson and Swanville. Swanville's attorney discussed the case with a mediator known to the state's director of the Office of Energy Resources. At the attorney's urging, the selectmen agreed to meet with the mediator. The attorney explained that the least mediation could do would be help Swanville learn more about Gleeson's plans and gain access to his data. At best, mediation could help the parties reach agreement on the operation of the system, which was everyone's goal.

After the selectmen of Swanville agreed to the mediation, the mediator had to get Gleeson's acceptance. Gleeson favored negotiation as a way of avoiding a protracted FERC hearing but wanted assurance that the mediation would take place in "good faith" and not be merely a stalling tactic. The mediator then negotiated a participation agreement requiring the two sides to participate in at least three sessions, after which they could decide whether to continue or not.

As the process commenced, the interests of the two sides emerged more clearly. Swanville sought minimal fluctuation of the lake levels to preserve it for recreational use and as a source of

drinking water. Gleeson wanted maximum flexibility to draw from Swan Lake to operate the downstream generators most efficiently. He also wanted the town to maintain the small recreation area adjacent to the Swan Lake dam.

Most of the people of Swanville suspected the feasibility of Gleeson's plans. The selectmen were convinced that Gleeson would have to significantly drain Swan Lake to make a profit if he received the operating license. The town's hydrologist bore out these fears. Based on recent flow data, the hydrologist felt that Gleeson's claims about water flows in the watershed were too high. With the agreement to proceed with mediation, the hydrologist would now have access to Gleeson's data and assumptions and could more thoroughly test the town's argument.

Negotiations began on May 2, 1979. Following a tour of the lake and dam, Gleeson, the three selectmen, their attorney, the town's hydrologist, the mediator, and several FERC officials began discussing lake levels. The selectmen wanted an upper limit of 5 feet below the top of the dam. Gleeson wanted a top limit of two feet, a summer low level of 5 feet, and no lower limit at all for the rest of the year so he could drain the water as needed. After two days of discussion, all the group could agree to was a continuation of discussions on May 15.

Prior to the May 15 meeting, Gleeson and the town's hydrologist met to compare data. After examining Gleeson's records, which included 100 years of data from the leatherboard company's use of the river, the hydrologist changed his mind. The company's data were far more detailed than the publicly available information. The news of the hydrologist's reversal nearly broke the mediation. Swanville had expected the hydrologist to be an advocate for them. So far, the mediation had not produced anything but a change in their hydrologist's position. The mediator told the selectmen that while the hydrologist's switch might be upsetting, the more complete data was an important factor. He persuaded them that it was not in their interest to break off negotiations.

The May 15 meeting opened with a plea by Gleeson for the selectmen's help. Gleeson told them the dispute was taking a toll on him and his family and he wanted to work out an agreement to end the hostility. Gleeson's sincerity impressed the selectmen and set a tone of cooperation for the negotiation.

The mediator then helped the two sides focus on "optimum levels" rather than a fixed upper level. After some discussion, the selectmen began to understand Gleeson's need to allow water to rise up to two feet from the top to avoid sudden releases that could negatively affect downstream property, especially in the spring. Gleeson agreed to a summer lower limit of no more than 5 feet from the top of the dam and was willing to shut down the hydro system until Labor Day to ensure this level. As for the nonsummer lower limit, Gleeson wanted no limit at all so he could recover any summer loss in power production and prepare the lake for the next spring's runoff. By the end of the day, Gleeson had moved his position to a 7 foot from the top lower limit while the selectmen held to 6 ½ feet.

To test Swanville's response to their positions, and against the mediator's advice, Gleeson and the selectmen decided to hold a public meeting. The mediator felt that the two sides needed to further hammer out their agreement before taking it to the public, but he agreed to support their

decision. Despite his fears, the mediator noted later that the June 14 meeting marked a turning point in the negotiations. The angry residents who attended the meeting demonstrated that the issue of greatest concern to them was the upper limit. At 2 feet from the top of the dam, they argued, the lake level would result in damage to adjacent property. Gleeson and the selectmen found themselves on the same side, pleading with the residents for patience to allow the mediation to produce a sound agreement.

Following the public meeting, the mediation panel toured the lake to check the effects of a 2 foot upper limit. Based on their investigation, the panel found that the residents were correct and agreed that 2 ½ feet from the top of the dam would be a safe upper limit. The selectmen now agreed to the low nonsummer levels suggested by Gleeson based on the residents lesser interest in low lake levels. They agreed the lake could fall no lower than 7 ½ feet from the top of the dam in the fall.

The final issue remaining was maintenance of the small park next to the Swan Lake dam. At the next meeting, on July 20, Gleeson asked the town to provide trash barrels and picnic tables, cut the grass, pay the annual premium on his liability insurance, and install a guard rail around the area. Before the selectmen became too angry with Gleeson's demands, the mediator called a break in the session. During a brief meeting with Gleeson, the mediator convinced him that the selectmen would never accept his demands and that he might threaten the entire agreement if he pushed them. He asked Gleeson to be more flexible and respond favorably to a counterproposal he would solicit from the selectmen.

The mediator then met with the selectmen and warned them that the agreement would be jeopardized by inflexible positioning. After some talking, he suggested that the two sides might form a committee to develop a plan for the detailed management of the site. The town also agreed to ask the Maine Department of Transportation to install the guard rail.

On August 2, 1979, the two sides met to sign an agreement that was subsequently incorporated into Gleeson's FERC license.

Lessons

Focusing on the interests behind the two sides' positions on lake levels facilitated the development of an agreement.

Initially, negotiations centered on lake levels with each side taking a position on upper and lower limits. Only when the parties began to explore the reason behind their positions did they discover room for agreement.

Objective information played a leading role in bringing the two sides together.

The sharing of hydrological data and the mediation panel tours of the lake served as joint fact-finding sessions that led to cooperation between the parties.

Governmental assurance of implementation may facilitate reaching agreement.

FERC endorsement of the mediation created incentives for the parties and the opportunity to ensure implementation of the agreement through the FERC permit.

Timeline

December 1976	Sherman Leatherboard Company closes down following a fire; regulation of lake levels changes from FERC to Maine Soil and Water Commission
Spring 1977	Swanville public hearings take place with Maine Soil and Water Commission to establish lake levels for leatherboard company to maintain
June 1977	Larry Gleeson completes negotiations with owner of Sherman Leatherboard Company for water rights to system of dams on Swan Lake and Goose River; Gleeson files for FERC license; regulation of lake levels switches back to jurisdiction of FERC
1978	Congress passes Public Utility Regulatory Policies Act
Spring 1978	Heavy rains cause lake to rise to permitted maximums reaching the foundations of some lakeside homes; gate area of Swan Lake dam is vandalized causing leakage of millions of gallons of water and major drop in lake level
Fall 1978	Swanville residents decide to retain attorney to intervene in Gleeson's FERC application
Jan. 5, 1979	Swan Lake dam wooden gates are firebombed
Spring 1979	Mediation is proposed and mediator selected
May 2/3	First meeting of parties is held; following the session, Gleeson meets with Swanville's hydrologist
May 15	Second meeting of parties takes place, discuss of flexible limits to lake levels
June 14	Public meeting of parties is held; tour lake to inspect potential for damage of upper lake levels
July 20	Third meeting is held to discuss maintenance of recreation area
August 2	Agreement is signed

Case III

Truckee-Carson River Basin Conflicts

Case Summary

River Basins:	Truckee and Carson River Basins, California and Nevada
Dates of Negotiation:	1970s to present (particularly 1989-90 and 1994)
Relevant Parties:	U.S. Senator Harry Reid (sponsor) Pyramid Lake Paiute Indian Tribe Newlands Project farmers Fallon Paiute-Shoshone Tribe Sierra Pacific Resources Cities of Reno, Sparks, Carson City, Fallon, and Fernley, and various counties, including Churchill, Douglas, and Washoe Conservation organizations, including The Nature Conservancy, Environmental Defense Fund, and Lahontan Valley Environmental Alliance U.S. Department of the Interior State of Nevada
Issues:	Interstate water allocation Native American water claims Allocation for municipal and agricultural uses, endangered species, and wetland protection Groundwater water quality
Problem:	Disagreement over the allocation of water between users
Incentives:	Increasing water demands and drought conditions Creative options proposed by various sides Political leadership
Obstacles:	Historic tensions among competing water users and high levels of distrust Different perspectives on scope of issues and parties
Status:	Because the consensus on the 1990 Settlement Act included many, but not all, of the parties, conflicts continued and created barriers to the implementation of the act. Senator Reid appointed a mediator in May 1994 with the consent of the parties. The convening phase concluded in August and negotiations began in September 1994.

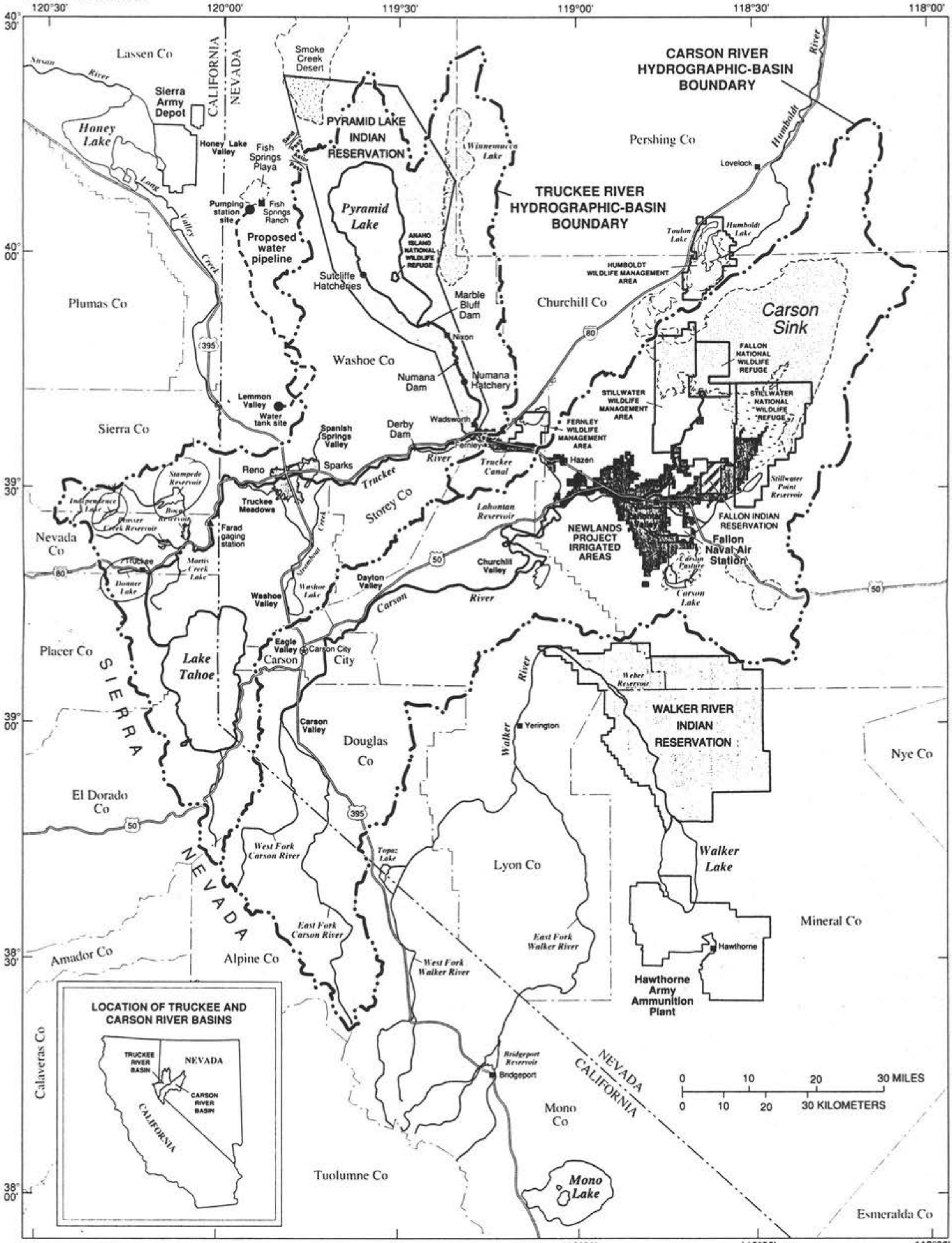
HYDROLOGIC FEATURES OF THE TRUCKEE AND CARSON RIVER BASINS AND ADJACENT AREAS, WESTERN NEVADA AND EASTERN CALIFORNIA

By
Jeffrey V. Trionfante and Lorri A. Peltz

1994

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

OPEN-FILE REPORT 93-368



Base from U.S. Geological Survey digital data 1:100,000, 1977-85
Albers Equal-Area Conic projection
Standard parallels 29°30' and 45°30', central meridian -119°00'

For additional information, contact
District Chief / U.S. Geological Survey
333 W. Nye Lane / Carson City, NV 89706

A product of the Truckee-Carson Program

Background

Disputes over water from the Truckee and Carson rivers in western Nevada can be traced at least as far back as the early 1900s with the construction of the Newlands Irrigation Project, a federal program to convert one of America's most arid regions into productive farmland. Throughout this century, the region's inhabitants have been embroiled in disputes over interstate water transfers; agricultural and municipal water use; Native American water rights; and water for endangered species, wetlands preservation, and migratory waterfowl.

Authorized by Congress in 1903, primary storage features of the Newlands Project include Lake Tahoe Dam, where the Truckee River originates, and Lahontan Reservoir on the mainstream of the Carson. Derby Dam and the 32-mile Truckee Canal divert Truckee River water out of the Truckee basin to Newlands Project lands in the Carson basin. A small portion of the diverted Truckee water is released to irrigate 10 percent of the project's lands in the Truckee Division near Fernley, Nevada. The remainder contributes, along with Carson River water, to the project's Carson Division near Hazen and around Fallon, Nevada. Irrigation drainage and return flows, distribution system losses, and occasional overflow during high-runoff periods provide incidental recharge to aquifers used by area residents for domestic water needs. These sources are also the principal source of inflow to the Lahontan Valley wetlands.

Since completion of the Newlands Project, water levels at Pyramid Lake have dropped approximately 70 feet, adversely affecting the lives of the Pyramid Lake Paiute Tribe and posing a threat to the federally endangered cui-ui (pronounced "kwee wee," Chasmistes cujus), which is central to the cultural heritage of the Pyramid Lake Paiute. In the 1960s, in an effort to protect the fish, and fulfill their trust responsibilities to the tribe, the federal government began requiring efficiency measures and restricting the amount of water diverted from the Truckee basin to the Fallon farmers in the Newlands Project. In addition to spawning 25 years of conflict between the communities dependent upon Newlands Project water and the Pyramid Lake tribe, decreasing Truckee River flows to the project lands resulted in a reduction in the water flowing to the Lahontan Valley wetlands, resulting in a dramatic loss of an important wetland habitat and generating what was perceived as a Solomon's choice between saving an endangered species or a vital wetland. Proud of their pioneer heritage and community values, the irrigators, the Fallon Paiute-Shoshone Tribe, and other residents of the Lahontan Valley also increasingly felt that their way of life was threatened by competing demands for water.

In the late 1980s, newly elected Senator Harry M. Reid sought to end these conflicts by bringing the various parties together to negotiate a comprehensive agreement. This effort led to the Fallon Paiute Shoshone Tribal Settlement Act (Public Law 101-618, "Settlement Act") passed by Congress in November 1990. The Settlement Act did the following:

- Provided for the resolution of allocation disputes between California and Nevada;
- Created a mechanism for water sharing among upper Truckee River parties through the Truckee River Operating Agreement;
- Settled long-standing claims of the Fallon Paiute-Shoshone;

- Authorized federal money to purchase irrigation rights and promote agricultural water conservation to deliver water for cui-ui recovery and wetlands protection; and
- Specified that certain actions be taken regarding management of the Newlands Project.

The controversy has continued, however. Although the 1990 act contained provisions important to many parties in the region and nationally, implementation issues remain to be resolved before the full benefits of the act can be realized. In addition, residents of the Lahontan Valley remained generally opposed to the terms of the legislation, and some concerns were not resolved in the provisions of the act.

After holding hearings on the implementation of the act in December 1993 and April 1994, Senator Reid created an opportunity for affected interests to enter into a new round of negotiations aimed at a long-term resolution of the remaining issues. The first step was a convening process during the summer of 1994 to assess the feasibility of second round settlement negotiations on issues related to the implementation of P.L. 101-618 and to determine whether parties could agree on how to structure the process. Formal negotiations began in September 1994.

The Problem

Truckee and Carson River Basins

The headwaters of the Truckee and Carson rivers spring from the snowfields of the eastern Sierra Nevada along the border of California and Nevada. Flowing down separate but parallel watersheds, both rivers terminate in closed basins in Nevada's arid western plains. The key issue in these two river basins, which are joined by the Truckee Canal, is allocation of water to competing users in this desert climate.

The 110-mile journey of the Truckee River carves a rough backwards S as it courses between two of the largest lakes in the west. Flowing north from the California side of Lake Tahoe and then bending to the east as it runs through the cities of Reno and Sparks, Nevada, the river abruptly turns north again near the town of Wadsworth. At its terminus, the Truckee River feeds into Pyramid Lake, Nevada's largest body of water and one of several enduring Pleistocene-epoch lakes. This high desert lake, measuring about 25 miles in length and 4 to 10 miles in width, is home to the last remaining population of the federally endangered cui-ui and the federally threatened Lahontan cutthroat trout *(Salmo clarki henshawi)*. In addition, the largest breeding colony of white pelicans *(Pelecanus erythrorhynchos)* and several piscivorous bird species rely on the Anaho Island National Wildlife Refuge in the middle of Pyramid Lake for nesting, rearing, and feeding habitat. Pyramid Lake also serves as the ancestral home and cultural nucleus of the Pyramid Lake Paiute Tribe of Indians whose reservation completely surrounds the lake.

South of Lake Tahoe, melting Sierra Nevada snow feeds the east and west forks of the Carson River, which unite west of Gardnerville, Nevada. The Carson then winds in a north-easterly direction past Carson City and into the Lahontan Reservoir. Here, Carson water mingles with water diverted from the Truckee basin to supply the Newlands Project. Historically, the Carson River fed extensive marshes in the Carson Sink, whose remnants make up the present day Stillwater National Wildlife Refuge, Wildlife Management Area, and other Lahontan Valley wetlands. These wetlands continue to serve as a critical stopover point for nearly two-thirds of the Pacific Flyway's migratory waterfowl and shorebirds.

The Truckee provides the primary source of water for irrigation, municipal, industrial, and domestic uses in the Reno-Sparks metropolitan area; supplements water to the Newlands Project near Fallon, Nevada; and is the only significant source of water for Pyramid Lake. The Carson supplies water for irrigation and some municipal use in California and communities upstream of the Lahontan Reservoir; is the principal source of water for the Newlands Project irrigation lands; and through groundwater recharge, provides the drinking water for communities in the Lahontan Valley.

Western U.S. Water Rights

The current doctrine for allocation of most western states' surface waters resulted from the gold-rush era scramble for limited streamflows in the late 1800s. At that time, the water demands of the unprecedented influx of immigrants moving into the west gave rise to the "first in time, first in right" concepts of western water law. This doctrine, called "prior appropriation," holds that a water right is granted to those who first appropriate surface waters and that the right provides permanent access to the water source as long as the water is put to "beneficial" use. Later or "junior" appropriators are entitled only to the amount of water not needed to satisfy senior rights. In times of shortage, senior rights are satisfied fully before junior rights are addressed.

Appropriation and beneficial use of water was established by diversion of the water from its natural streamcourse. Thus, there was little or no incentive for protecting instream water uses. The prior appropriation doctrine promoted extensive investment in water diversion projects and led to the full appropriation of surface water supplies throughout the desert west. By the 1950s, concerns began to be expressed about the impacts of diversions and depletions on downstream water-dependent environments. In addition, greater attention began to be paid to the hydrologic connection between surface and groundwaters. This led many states to more closely regulate groundwater pumping, encourage conservation, and enact laws to protect instream flows for fish and wildlife protection.

In addition, although federal policies specifically defer to state laws in matters of water rights administration, in recent years the federal government has played a greater role in western water management through statutes such as the federal Endangered Species Act and the Clean Water Act. Broader judicial interpretations of federal statutes have also altered the water policy context.

Federal Reserved Water Rights - The Winters Doctrine

Indian water rights claims involve the blending of state doctrine of prior appropriation with federal reserved water rights doctrine. Known as "Winters" rights from a 1908 Supreme Court ruling, the doctrine is based on the principle that when Indian reservations were created, the United States implicitly reserved sufficient water to fulfill reservation needs. The priority date of these rights coincides with the date the reservation was established. Thus, Winters rights tend to be senior to other claims. Moreover, because reserved rights are not established by state law, Winters rights retain their validity regardless of whether the tribes have put the water to beneficial use.

In many areas throughout the West, states continued to recognize the appropriative rights of non-Indian water users to the point of allocating most or all of the surface water to them. Recently, however, with federal assistance made available to Indian tribes for developing their reserved rights, Indian tribes have begun asserting their claims thus placing state-granted water rights and Winters rights in competition for limited water supplies.

Stakeholders and Issues

Pyramid Paiute. In 1859, the Secretary of Interior established the 475,000 acre Pyramid Lake Paiute Indian Reservation around the historic homeland of the Pyramid Lake Paiute Tribe. Prior to construction of the Newlands Project in the early 1900s, Pyramid Lake supported abundant populations of the cui-ui fish and Lahontan cutthroat trout, which the tribe relied on for consumption and commerce. In fact, the tribe's traditional name, *kuyui-dokado*, translates as "cui-ui eaters." Presently, the cutthroat trout and cui-ui hatchery is the largest employer of the tribe's 3,000 members. Eighty percent of the Tribe's annual income comes from the once world famous (and now slowly recovering) cutthroat trout sports fishery.

Newlands Project water diversions at Derby Dam of over half of Truckee river inflows have resulted in the decline of Pyramid Lake elevations by more than 70 feet over the past century. Lake Winnemucca, a neighboring ancient lake that depended upon Pyramid Lake overflows, dried up in 1939 shortly after being declared a National Wildlife Refuge. In 1962, Winnemucca earned the inauspicious distinction of being the first National Wildlife Refuge de-authorized due to lack of water.

Once diversions into the Carson watershed began having a noticeable affect upon Pyramid Lake water levels and the lake's fish populations, the tribe initiated what was to become decades of litigation to restore lake and stream levels. In 1972, on behalf of the tribe, the United States filed suit against upper Truckee water users arguing that the tribe's decreed irrigation rights under the Orr Ditch Decree (a 1944 ruling that allocated river flows) were not sufficient to maintain Pyramid Lake or the lower reaches of the river. In 1983, following 10 years of litigation, the Supreme Court rejected the Tribe's reserved water rights claim ruling that its reserved water rights had been previously quantified in the Orr Ditch litigation and could not be redetermined. Nevertheless, the ruling left open other avenues for the tribe, and they have successfully litigated

numerous issues, including limitations on water use in the Newlands Project and subsequent claims to unappropriated flows.

Lahontan Valley Wetlands. Prior to the project diversions, wetlands area in the Carson River basin averaged between 100,000-150,000 acres. Over the last few decades, Newlands Project irrigation return flows and conveyance losses sustained an average of 44,000 wetlands acres in the Lahontan Valley. However, recent back-to-back droughts and federally mandated reductions in upstream irrigation diversions to increase project efficiencies and reduce Truckee River diversions have occasionally dried the wetlands completely. In addition to dwindling water inflows, 75 percent of the water received by Lahontan Valley wetlands is agricultural drain water containing high levels of dissolved salts, minerals, and pesticides. As the siege of the wetlands has been decreased, naturally occurring trace elements such as arsenic, boron, lithium, molybdenum, mercury, and selenium have become concentrated. These water-quality problems have been held partially responsible for outbreaks of avian cholera and botulism and episodic bird, fish, and wildlife kills.

Despite water pollution and habitat fragmentation and loss, the remnant wetlands of the Lahontan Valley continue to serve as vital resting, feeding, and breeding areas for Pacific Flyway waterfowl. Based on peak migration totals and their overall importance to the Pacific Flyway, Lahontan Valley was named to the Western Hemispheric Shorebird Reserve—only one of four sites in the United States. Stillwater National Wildlife Refuge has been nominated as a wetland of international importance under the Convention on Wetlands of International Importance.

Sierra Pacific Resources. Truckee River water was first used by Sierra Pacific Resources (Sierra Pacific) for hydropower generation in California and Nevada on the Truckee above Reno. In addition, Sierra Pacific provides the rapidly growing Reno-Sparks metropolitan area in Nevada with water for municipal and industrial use. Waste supplies during drought years is of special concern to the company.

In an early 1970s Endangered Species Act case (Carson-Truckee Water Conservancy District v. Clark), the Supreme Court reserved Stampede Reservoir, a California federal storage facility located upstream on the Truckee, solely for cui-ui spawning. Sierra Pacific had been expecting to use this water to meet the expanding municipal and industrial needs of the Reno-Sparks area. This decision strengthened the Pyramid Lake Tribe's negotiating position with Sierra Pacific and Reno-Sparks.

Lahontan Valley. A diverse community in Lahontan Valley relies on Newlands Project water, including the city of Fallon, the town of Fernley, the Fallon Paiute-Shoshone Tribe, the Fallon Naval Air Station, and numerous farmers. The Truckee-Carson Irrigation District (TCID), created by the state of Nevada, operates the Newlands Project. Although the economic importance of irrigated agriculture in the area has diminished over time, the agricultural sector still serves as a cornerstone to the project area economy and culture. Many Lahontan Valley farmers trace their roots back to the pioneer settlement of the region. Thus, the struggle over water in the Valley threatens a beloved way of life for many in the community.

Lahontan Valley is also home to the Fallon Paiute-Shoshone Tribe, whose reservation is located about 10 miles east of Fallon. According to the Fallon Tribes, their Winters rights have never been adjudicated despite federal obligations to provide the tribe with water from the Newlands Project.

Attempts at Conflict Management

After years of litigation, negotiation, and legislative attempts to resolve the many claims to the use of Truckee River water, Senator Harry M. Reid brought together a number of interest groups to negotiate agreements on a series of Truckee River storage, management, and conservation issues. As a result of these talks, a broad coalition of stakeholders from the region formed to support the agreements and provide the impetus for legislative proposals that eventually concluded in the enactment of the 1990 Settlement Act (P.L. 101-618). These stakeholder groups included the states of California and Nevada, Sierra Pacific, the Pyramid Lake Paiute Tribe, the Fallon Paiute-Shoshone Tribe, conservation organizations, and the U.S. Department of the Interior. The interested parties in the Lahontan Valley opposed the provision of the legislation as passed.

An important first step prior to the negotiations was a preliminary agreement reached between the Pyramid Lake Tribe and Sierra Pacific. Since cui-ui do not need to spawn every year, during drought years, Stampede Reservoir water could be used to meet the needs of the Reno-Sparks metropolitan area. Among the conditions for using Stampede water for drought protection was that the Reno-Sparks area develop water conservation plans, which would include using water meters and increasing user fees, and thereby reduce water demands in drought years by 10 percent.

The preliminary settlement and P.L. 101-618 direct the Secretary of Interior to develop an "Operating Agreement" that will modify the existing system of Truckee storage with the ultimate goal of achieving the best coordination possible of reservoir operations. The agreement allows the Secretary to permit storage of nonproject water in federal facilities on the Truckee basin in exchange for fees and provides revenues for a fund to benefit Lahontan Valley and Pyramid Lake fish and wildlife.

Three settlement funds were established under the Settlement Act to satisfy some of the federal trust responsibilities. These include the Pyramid Lake Paiute Fisheries Fund ($25 million), for the operation and maintenance of the tribal fisheries facilities; the Pyramid Lake Paiute Economic Development Fund ($40 million); and the Fallon-Paiute Shoshone Tribal Settlement Fund ($43 million) to rehabilitate and improve the existing irrigation system and acquire lands with active water rights.

To protect the Lahontan wetlands, P.L. 101-618 also authorizes a program for acquiring water rights from willing sellers to supplement irrigation return flows. The program aims to sustain an average of 25,000 acres of primary wetland habitat in the Valley.

Outcome

The Settlement Act addresses a number of issues involving quantitative aspects of water use in the Truckee Basin, including interstate allocations, wetlands restoration, recovery of federally listed fish in Pyramid Lake, and some of the Pyramid Lake and Fallon Paiute-Shoshone water claims. However, the act did not settle several important issues related to the Newlands Project, nor did it specifically deal with water quality concerns.

In December 1993 and April 1994, Senator Reid and Senator Bill Bradley, chairman of the Senate Subcommittee on Water and Power, held hearings on the implementation of the 1990 Settlement Act. Based on the parties' interest expressed in a second round of negotiations, Senator Reid appointed a mediator to assess the feasibility of such negotiations and to develop recommendations on how to proceed. The convening phase was completed in August 1994, and formal negotiations began in September. Senator Reid has expressed his intent to introduce legislation in early 1995 to address implementation issues, with a willingness to base such legislation on any agreements emerging from this second round of negotiations.

Lessons

Parties can, and may need to, enhance their ability to satisfy their needs by developing other alternatives before they negotiate.

Indian water rights and environmental concerns were not addressed earlier in the century until advocates for these interests developed sufficient power through litigation and national environmental laws during the 1960s and 1970s.

Technical options play a vital role in broadening the "zone of agreement" in complex water negotiations.

Creative options for water-sharing agreements between upstream Truckee water users and the Pyramid Lake Paiute Tribe formed the basis of portions of the 1990 Settlement Act.

Commitment to the conflict resolution process by an influential leader can enable collaborative negotiation.

Political leadership such as that of Senator Reid can create the venue and incentives for negotiation.

Lack of a consensus among all of the critical parties can destabilize the process and require subsequent negotiations.

Timeline

March 1903	Newlands Reclamation Project authorized by Congress
1913	United States initiates suit to settle Truckee River water rights (U.S. v. Orr Water Ditch Company);, final decree issued in 1944
1925	United States brings similar action in Carson basin (U.S. v. Alpine Land and Reservoir Company); final decree issued in 1980
1935	Truckee River Agreement, eventually adopted by the court as part of the Orr Ditch decree, specifies flow rates to be maintained in the Truckee
1944	Orr Ditch Decree awarded United States a water right for Pyramid Lake reservation with priority date of 1859 and a water right for Newlands Project with 1902 priority date
1956	Congress authorizes construction of Washoe Project by Bureau of Reclamation. Project leads to construction of Stampede and Prosser Creek dams in Truckee basin and Watasheamu dam in the Carson
1962	Bureau of Reclamation assigns operation of Lake Tahoe Dam to the TCID
1970s	Secretary of Interior decides to use Stampede Reservoir exclusively for benefit of cui-ui listed under the Endangered Species Act. Ninth circuit upholds decision in Carson-Truckee Water Conservancy District v. Clark
1973	United States and Pyramid Lake Paiute Tribe bring suit against all persons claiming water rights to Truckee River in Nevada arguing that Orr Ditch decree only quantified the reservation's right to water for agricultural purposes(Nevada v. U.S.)
1983	Supreme Court rejects U.S. and Pyramid Paiute claim in Nevada v. U.S. citing principle of *res judicata*
1987-1992	Severe drought conditions cause significant reduction in Lahontan Valley wetlands habitat; waterfowl die-offs heighten anxieties and elevate sense of crisis
1989	"Preliminary Settlement Agreement" established between Sierra Pacific Power Company and Pyramid Lake Paiute Tribe
November 1990	Congress approves Settlement Act

Dec. 1993 and 1994	Senator Reid holds hearings on implementation of Settlement April Act
May 1994	Mediator chosen to assess feasibility of resolving outstanding issues
Sep. 1994	Formal negotiations began for a "second round" settlement process

Gail Bingham was appointed as mediator in this case just as work on this paper had begun. Thus, this case study has been written from secondary sources and contains no confidential information obtained in her role as mediator.

Case IV

Negotiated Rulemaking on Disinfectants and Disinfection By-Products in Drinking Water

Case Summary

Dates of Negotiation:	June 1992-June 1994
Relevant Parties:	U.S. Environmental Protection Agency (EPA) (sponsoring) State health and regulatory agencies Water suppliers Consumer advocates Environmental organizations
Issues:	New regulatory requirements to limit levels of disinfectants and disinfection by-products (DBPs) in drinking water
Problems:	Disagreement over standards for drinking water treatment
Incentives:	EPA commitment to publishing for public comment an agreed-upon draft rule Common goal to protect public health
Obstacles:	Scientific uncertainty regarding health effects of DBPs led to disagreement about the nature and magnitude of risks Technical complexity in variation of chemical constituents, source water, and treatment technologies being used
Breakthroughs:	Joint fact-finding and analysis done by technical working group Agreement to two-staged regulations, with additional research and data collection prior to second stage
Status:	Agreement reached on the regulatory language for three rules, which are now receiving public comment

Background

Disinfection byproducts (DBPs)[1] are formed when naturally occurring organic materials come into contact with the breakdown products of disinfectants. Drinking water is typically treated with disinfectants to inactivate pathogens (such as protozoa, viruses, and bacteria). Waterborne pathogens cause a variety of illnesses, including diarrhea, cramps, organ damage, as well as death (through cholera, hepatitis, and giardiasis). All disinfected water contains residual disinfectants and DBPs. Some DBPs are implicated as possible carcinogens. Regulating DBPs is challenging because of the need to balance control of DBPs with protection of the public against waterborne pathogens.

More than 220 million people in the United States receive disinfected water from public drinking water supplies. Disinfectants and DBPs appeared on EPA's priority list of drinking water contaminants for regulation in 1988 and 1991. Trihalomethanes (THMs), a category of DBPs, have been subject to EPA regulation since 1979—though only in water systems with more than 10,000 customers (accounting for 190 million people). Data suggested that other DBPs, including dichloroacetic acid and bromates, may present a greater risk than THMs at current occurrence levels. As a consequence, more than half of the U.S. population may be exposed to greater than a one in 10,000 lifetime risk of cancer due to exposure to DBPs in drinking water.

In 1992, the EPA decided to develop a proposed, new DBP regulation through a negotiated rulemaking process. A negotiating committee of 18 organizations affected by or interested in drinking water quality, selected by EPA's Office of Groundwater and Drinking Water and based on an assessment conducted by the mediators, participated in 10 meetings over 10 months. The committee agreed on three measures to be issued as draft regulations by EPA: the DBP Rule, the Enhanced Surface Water Treatment Rule (ESWTR), and the Information Collection Rule (ICR).

Negotiated Rulemaking

In the United States, negotiated rulemakings are conducted under the auspices of the Federal Advisory Committee Act (FACA), the Negotiated Rulemaking Act of 1990, and the Administrative Procedures Act. Today, EPA has more experience with this procedure than any other federal agency. EPA established the Consensus and Dispute Resolution Program to involve affected parties at an earlier stage of the process of regulatory development and thereby reduce the number of rules being litigated.

Negotiated rulemaking procedures begin with an assessment of the feasibility of negotiations (a convening process). Potential parties are consulted, and recommendations about whether and how to proceed are published for public comment. Upon deciding to proceed with a negotiated rulemaking, a federal agency develops an FACA charter, specifies membership on a negotiating committee, and holds negotiating meetings. All meetings of the negotiating committee are open

[1] A list of acronyms used in this discussion is located at the end of Case IV.

to the public. With the assistance of a mediator, the committee directs the negotiations, which includes establishing agendas and creating working groups.

If the committee succeeds in reaching consensus on all or part of a proposed rule, members of the negotiating committee are expected to sign an agreement on behalf of the organization they represent. The sponsoring agency then uses the agreement as the basis of a proposed rule for public comment as required by administrative procedures. All committee members solicit the views of their constituencies throughout the negotiating process and before finalizing the agreement. Agency representatives seek to enlist the support and represent the views of concerned individuals in their agency and other federal agencies.

Attempts at Conflict Management

Convening the Negotiating Committee

To assess the feasibility and usefulness of convening the negotiated rulemaking, during the summer of 1992 the mediators interviewed more than 40 representatives of state health and regulatory agencies, water suppliers, manufacturers of equipment and supplies used in drinking water treatment, and consumer and environmental organizations. These interviews revealed the following:

- The entities interested in or affected by the rulemaking were readily identifiable and manageable in number.
- The rulemaking required resolution of a limited number of interdependent issues, which appeared to have a sufficiently well-developed factual base to permit meaningful discussion. Further, there appeared to be several ways to resolve these issues, providing a potential basis for productive joint problem-solving.
- The parties expressed some common goals and a strong determination to resolve the issues through good-faith negotiation.
- The agency had adequate staff and technical resources and was willing to commit such resources to the negotiated rulemaking.

Based on those findings, the mediators recommended that the negotiated rulemaking take place. EPA concurred and in September 1992 published a notice of intent to proceed with a negotiated rulemaking, proposing 17 parties as negotiating committee members. In general, public comments on this notice indicated positive support for the negotiated rulemaking.

The convening process, however, revealed that reaching consensus on the proposed rule would be a challenge. The interviews indicated that parties differed widely in their perceptions about the nature and magnitude of the risks associated with DBPs, and many expressed strong doubts about the adequacy of available scientific and technical information. Some parties stated that only marginal improvements in disinfection technology should be done until the relative risks were

better understood, while others said that a fundamentally new approach focusing on precursor removal should be considered.

During the public comment period at the end of the convening process, an organizational meeting was held. Participants discussed negotiating committee composition and organizational protocols. In addition, participants addressed the need to develop accurate scientific and technical information. From comments expressed at the meeting and submitted in writing, 11 parties—including water suppliers, public interest groups, and chemical and equipment suppliers—asked to be added to the committee. Only one party was added, representing a unique category of water utilities that rely on watershed management. EPA decided that the interests of the others requesting membership were already represented on the committee and that additional parties would create an imbalanced group. All chemical and equipment suppliers who had requested direct representation were invited to join a technologies working group.

Building Scientific and Technical Information

Based on comments received at the organizational meeting, a technical workshop was organized and conducted in early November. It comprised presentations and panel discussion from 23 of the nation's leading experts on drinking water treatment. Workshop participants had the opportunity to familiarize themselves with the technical elements in this rulemaking and to explore the range of scientific opinions on the following issues:

- The nature and magnitude of potential health effects from exposure to DBPs and microbial contaminants in drinking water;
- Available information on the cost and efficacy of precursor removal and drinking water disinfection technologies; and
- EPA's efforts to model and compare chemical and microbial risks in drinking water.

Additional presentations were given throughout the rulemaking process as new information became available and participants raised more questions.

Late in November, at the first formal negotiating session, participants formed a technologies working group to develop reliable and consistent information about the cost and efficacy of drinking water treatment technologies. This approach provided a forum for participants to arrive at a shared understanding of the complex issues in the rulemaking, setting a cooperative tone for the rest of their discussions.

In addition, three experts were hired to provide ongoing scientific advice and technical support to participants on the committee and on the technologies working group. They were an environmental engineer, a microbiologist, and a chemical risk assessment expert.

Developing Regulatory Options

Based on the scientific data presented and discussed at the November workshop and at initial meetings, participants agreed that some type of DBP rule was warranted. In discussing criteria for a good DBP rule, members agreed to develop a flexible and affordable rule to protect public health from chemical and microbial risks. They suggested that a rule needed to be the following:

- Protective of human health;
- Affordable;
- Flexible (allowing suppliers to choose compliance strategies consistent with the quality of their source water and characteristics of their treatment and delivery systems);
- Feasible for smaller states and communities to implement;
- Grounded in sound science;
- Explainable to the public;
- Protective of environmental equity;
- Sensitive to the needs of susceptible populations;
- Consistent with present and future EPA requirements; and
- Protective of other environmental media.

Although different parties placed varying weights on the criteria, the committee informally used the full list to evaluate regulatory options.

Next, committee members and other participants were invited to present regulatory options as a starting point for discussion. Sixteen options were introduced at the December meeting and further discussed at the January 1993 meeting. These were merged into three consolidated options and discussed through an early February meeting. At this point, areas of disagreement included the following:

- Should DBPs be regulated through Maximum Contaminant Levels (MCLs) or through a treatment technique (i.e., by exceeding DBP "action levels," systems would trigger additional steps to minimize chemical and microbial risks)?
- Should the formation of DBPs be minimized by establishing a regulatory limit for their naturally occurring organic precursors (i.e., Total Organic Carbon) in the water prior to the point of disinfection?
- Should there be greater protection against microbial contaminants in drinking water, in conjunction with new DBP limits, by developing more stringent requirements for removal of microbial contaminants?
- Should a second round of DBP controls be developed (assuring broad improvements in drinking water quality), or should there first be better scientific information available?

Concurrently, the technologies working group modelled the nation's diverse water supply systems' potential compliance choices under several regulatory scenarios and presented revised household and national compliance cost estimates at several meetings.

Formulating an Agreement

Using a "strawman" developed by EPA staff as a new starting point for negotiation, the committee worked out an "agreement in principle" on a first round of DBP controls (Stage I) at its second February meeting. This was conditioned on an agreement concerning Stage II. The Stage I agreement set MCLs for THMs and haloacetic acids at levels the committee deemed protective of public health, based on current information. To limit DBP precursors, the committee agreed to develop a series of "enhanced coagulation" requirements, to vary according to systems' influent water quality and treatment plant configurations. Stage I also included an agreement to reconvene in several years to negotiate a second stage of DBP controls, when the results of more health effects research and water quality monitoring would be available.

A drafting group was named at the February meeting. Assisted by the technologies working group, these members drafted the "agreement in principle" for presentation and discussion at the March meeting. The committee also developed a preliminary agreement on Stage II levels and devised a regulatory "backstop" at this meeting to assure those favoring further DBP controls that other members would return for the Stage II negotiation. The committee also agreed to recommend that EPA propose several ESWTR options for comment, developed a collaborative process to guide the health effects research program, and agreed to formulate short-term water quality and technical data collection provisions within an information collection rule.

The drafting group introduced regulatory language for the DBP Rule, the Enhanced Surface Water Treatment Rule, and the information collection rule at each of the committee's last two meetings held in May and June. These texts provided a framework for further discussion and the resolution of remaining issues, which included: limits for residual disinfectants and individual byproducts; public notification and affordability provisions; and timing, applicability, and conditions under which systems might qualify for exemptions from various requirements.

The drafting group continued working through the summer of 1993, and drafts were mailed to the full committee for comment in July 1993, September 1993, and February 1994. The agreement on an ICR was signed in February and an agreement on the DBP and ESWTR in June 1994.

Outcome

This rulemaking process experienced an extraordinary degree of good-faith negotiation and creative problem-solving. Among the conditions leading to the success of this regulatory negotiation were a willingness by the participants to respect one another's goals and the availability of a range of potential solutions. Environmental advocates and the regulated industry also approached the rulemaking with a common interest—protecting public health. EPA's Office

of Drinking Water Protection had the foresight to recognize that this process could provide the basis for affected parties to enter into constructive dialogue with one another, despite wide differences in their stated positions.

By focusing participants on a process of collaborative problem-solving (such as establishing criteria for a good rule and evaluating multiple regulatory options), the mediators succeeded in getting committee members to view one another as partners rather than adversaries. Moreover, the committee turned the technical complexity of the issues and lack of complete information available into an opportunity for solving problems, building trust, and sharing a sense of purpose. The mediators conceived of the technologies working group as a vehicle for providing the committee with a collective source of technical information (and a basis for understanding its limitations) for use in developing options and making decisions.

The committee was composed of highly motivated and exceptionally talented individuals representing complementary backgrounds, perspectives, and areas of expertise. This balance was instrumental in providing the basis for thorough discussion of the issues and regulatory options and was an important ingredient in the success of this rulemaking. Many others played important roles as well, providing the committee with supporting documents and technical information and participating in the discussion whenever time permitted.

Several procedural measures also kept the committee moving forward to its final agreement: careful management of the committee's time by the mediators (for example, keeping participants focused, recording agreements, and providing reminders of recent progress in the form of meeting summaries); the introduction of "straw" regulations to focus further discussion; and the use of an interest-balanced drafting group to expedite the process of codifying the committee's agreements and identifying issues requiring further clarification. The EPA regulatory manager also played a critical role as a consensus-builder and drafter of regulatory language that accurately reflected the concerns of the parties.

The value of this process can be measured by the results. Besides reaching an agreement that had been considered unlikely, the committee developed plans to cooperate on setting priorities for health effects research and unanimously supported development of Stage II of the DBP Rule through another negotiated rulemaking.

Lessons

An implementing agency can establish valuable incentives for reaching agreement through its commitment to a negotiated process.

EPA's commitment to convene a regulatory negotiation for disinfection byproducts provided the much-needed incentive for opposing parties to participate.

A highly structured process encourages participation by providing predictability and objectivity.

The negotiated rulemaking statute provided a clear structure for the process that all parties considered to be predictable and fair.

Trade-offs in risks created a need to focus on the problem, not just positions.

Participants recognized that limiting some DBPs could encourage changes in treatment that might increase the formation of other DBPs, or compromise protection against microbial contaminants. They negotiated before an impasse occurred over any specific proposal.

Scientific uncertainty may require an agreement to revisit the issue at a future date.

The committee dealt with scientific uncertainty by including data collection and two renegotiation stages in the agreement. If the committee continued meeting during the relatively long period for ratification (required due to the complexity of the agreement), it would have avoided confrontations in other forums.

Acronyms

DPB	disinfection by-products
EPA	U.S. Environmental Protection Agency
ESTWR	Enhanced Surface Water Treatment Rule
FACA	Federal Advisory Committee Act
ICR	Information Collection Rule
mcl	maximum contaminant level
Thm	trihalomethanes

Chapter 4

EFFORTS TO RESOLVE INTERNATIONAL WATER DISPUTES

Introduction

As the global population continues to grow exponentially and as environmental change threatens the quantity and quality of natural resources, the ability for nations to peacefully resolve conflicts over internationally distributed water resources will increasingly be at the heart of stable and secure international relations. There are more than 200 international rivers in the world, whose basins cover more than one-half of the total land surface, and untold numbers of shared aquifers. Water has been a cause of political tensions between Arabs and Israelis, Indians and Bangladeshis, Americans and Mexicans, and all 10 riparian states of the Nile River. Water is the only scarce resource for which there is no substitute and over which there is poorly developed international law.

International water conflicts will be more frequent and intense as water resources become relatively scarcer and as their use within nations has ever-growing impacts on neighboring states. It has been suggested that more conscious attention to the art and science of negotiation, mediation, and arbitration can provide useful insights for resolving these transborder conflicts without recourse to the limited solutions possible in international courts of law or, worse, the devastating possibility of armed conflict.

This chapter examines lessons learned through attempts at resolving water conflicts in Europe, Asia, and the Near East as applied to the future of international water conflict resolution. The chapter is not meant to provide a definitive typology for a generic watershed conflict or a checklist for a hypothetical mediator. Rather, it presents the observations of the authors about the resolution of conflicts over a vital resource.

Criteria for Water Allocations

One problem at the heart of the international water conflicts examined in this chapter is the absence of internationally accepted criteria for allocating shared water resources. International water law is ambiguous and often contradictory, and no mechanism exists to enforce those principles which have been established. This section describes some criteria for water sharing which do exist, their strengths, and their weaknesses.

International Water Law

International water law was not substantially formulated until after World War I. Since then, organs of international law have tried to provide a framework for increasingly intensive water use. The concept of a "drainage basin," for example, was accepted by the International Law Association in the Helsinki Rules of 1966, which also provide guidelines for "reasonable and equitable" sharing of a common waterway. Article IV of the Helsinki Rules describes the overriding principle:

> Each basin State is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of the waters of an international drainage basin.

Article V lists no fewer than 11 factors which must be taken into account in defining what is "reasonable and equitable."[2] There is no hierarchy to these components of "reasonable use"; they are to be considered as a whole. One important shift in legal thinking in the Helsinki Rules is that they address the right to "beneficial use" of water, rather than to water *per se*. The Mekong committee is the only institution to use a definition of "reasonable and equitable" in an international agreement, based on the Helsinki Rules.

The International Law Commission, a body of the United Nations, was directed by the General Assembly in 1970 to study "Codification of the Law on Water Courses for Purposes other than Navigation." The general principles under consideration include:

- Common water resources are to be shared equitably between the states entitled to use them, with related corollaries of
  - limited sovereignty,
  - duty to cooperate in development, and
  - protection of common resources.
- States are responsible for substantial transboundary injury originating in their respective territories.

Problems arise in applying this reasonable but vague language to specific water conflicts. In the Middle East, for example, riparian positions and consequent legal rights shift with changing borders, many of which are still not recognized by the world community. Furthermore, international law only concerns itself with the rights and responsibilities of *states*. Some political entities that might claim water rights, therefore, would not be represented, such as the Palestinians along the Jordan or the Kurds along the Euphrates.

International law seeks to develop general principles that can then be applied to specific problems. It is testimony to the difficulty of marrying legal and hydrologic intricacies that the International

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[2] The factors include a basin's geography, hydrology, climate, past and existing water utilization, economic and social needs of the riparians, population, comparative costs of alternative sources, availability of other sources, avoidance of waste, practicability of compensation as a means of adjusting conflicts, and the degree to which a state's needs may be satisfied without causing substantial injury to a co-basin state.

Law Commission, despite an additional call for codification at the U.N. Water Conference at Mar de Plata in 1977, has not yet completed its task. Also, most legal emphasis has been on surface water. Groundwater as a separate topic, and particularly the connection between groundwater and surface water, is more ambiguous. Once the details are worked through, the principles would not have the force of law until approved by the U.N. General Assembly. Even then, cases are heard by the International Court of Justice only by consent of the parties involved, and no practical enforcement mechanism exists to back up the court's findings, except in the most extreme cases. A state with pressing national interests could therefore disclaim entirely the court's jurisdiction or findings.

Parties can always agree to allocate a resource arbitrarily, based on relative power or by an exchange of concessions from stated positions or aspirations. Throughout human existence, however, this approach has caused stalemates or, worse, led to armed conflict. Negotiation theory suggests that disputes are more easily resolved where parties can agree to use common criteria for decision making. Obviously, this isn't always possible, but it may be illuminating to review the criteria that have been used for water-sharing agreements, with their corresponding strengths and weaknesses.

Geography vs. Chronology—Rights-Based Criteria

Many of the initial claims for water rights are based either on geography, i.e., origination point of a river or aquifer and the proportion of the drainage area which falls within a certain state, or on chronology, i.e., the historic use of water. The extreme positions of these criteria have been referred to as "the doctrine of absolute sovereignty," stating that a state has absolute rights to water flowing through its territory, and "prior appropriation," that is, "first in time, first in right."

The doctrines of geography and chronology clash along all of the international rivers surveyed, with positions usually defined by relative location along the river. Downstream riparians, such as Iraq and Egypt, often receive less rainfall than their upstream neighbors and therefore have depended on river water for much longer historically. As a consequence, modern "rights-based" disputes often take the form of upstream riparians, such as Ethiopia and Turkey, arguing in favor of the doctrine of absolute sovereignty, with downstream riparians taking the position of prior appropriation. Because the two criteria favor opposing parties, agreement based on either is unlikely.

Needs-Based Criteria

In many water disputes that have been resolved, in contrast, the paradigms used for negotiations have been "needs-based' rather than "rights-based." In agreements between Egypt and Sudan signed in 1929 and in 1959, for example, allocations were arrived at on the basis of local needs, primarily agriculture. Egypt argued for a greater share of the Nile because of its larger population and extensive irrigation works. Current allocations reflect these needs.

Likewise along the Jordan River, the Johnston Accord, although not ratified, emphasized the needs rather than the inherent rights of each of the riparians. Johnston's approach, based on a report prepared under the direction of the Tennessee Valley Authority, was to estimate, without regard to political boundaries, the water needs for all irrigable land within the Jordan Valley basin which could be irrigated by gravity flow. National allocations were then based on these in-basin agricultural needs, with the understanding that each country could then use the water as it wished, including to divert it out of basin. This formula proved acceptable to the parties at the time.

An interesting pattern emerges: most international water negotiations begin with differing legal interpretations of geography or chronology. Yet all of the international basins surveyed, with the exception of the Mekong, rely to some extent on a needs-based measure for water allocation. Another interesting note about the dynamics of negotiations over water allocation is that while time and energy in the early stages of negotiations tend to focus on the geography/chronology principles for allocation, once both sides are assured that their minimum quantitative needs will be met, talks usually turn to straightforward bargaining over numbers (see Table 1).

Table 1

CRITERIA FOR WATER ALLOCATIONS

Ganges	Percentage of flow during dry season.
Indus	Historic and planned use (for Pakistan), plus geographic allocations (western vs. eastern rivers).
Jordan	Amount of irrigable land within the watershed; countries could then use water how and where they wished, including outside the basin.
Mekong	Allocations have not been an issue; "reasonable and equitable use" for the basin has been defined in detail since 1975.
Nile	Acquired rights plus even division of any additional water resulting from development projects.

Economic Criteria

A newly emerging principle, which some suggest be incorporated into water conflict resolution, is the allocation of water resources according to economic value. The idea is that different uses and users of the water along a given waterway may place differing values on the resource. Therefore, equitable water sharing should take into consideration the possibility of increasing the overall efficiency of water utilization by allocating the water according to its economic value. This principle alone may not be accepted as equitable by the parties involved. However, inclusion of economic aspects in water resource allocation may enhance better cooperation and future collaboration in joint projects in the region of concern. One study, by a Harvard University team led by MIT economist Franklin Fisher, is attempting to monetize the water dispute on the Jordan River, arguing that it will be easier to negotiate responsibility for a sum of money than a scarce and emotion-laden natural resource.

Some recent studies,[3] however, have questioned the equity and justice associated with market allocations. The conclusion from these studies is that economic considerations alone may not provide an acceptable solution to water allocation problems, especially to solve water allocation disputes between nations. The market approach assumes the existence of many parties in the region, each acting independently, so that the market price for water reflects its true value for each party. If, in that market, one party's decision does not affect the outcome for other parties, then the self-interest of all the parties leads to an efficient outcome for the whole region. In the case of water, one party's decision may affect another party's outcome, creating what is called an externality or third-party effect. If the externality effect (cost) is not included in the supply curve of water, the market mechanism collapses. This introduces inefficiency into the system and results in what economists call market failure. In the case of water, the externality effects might be multidirectional. This is particularly true for water basins shared by more than one country and for water used for more than one purpose. Also, water allocation problems are not exactly like other market arrangements with which we are familiar (e.g., the market for cars), because they are characterized by a relatively small number of agents with different objectives and water-related perspectives.

Case Studies: International Water Conflict Resolution in Europe, the Near East, and Asia

In the following case studies, the reader will note that the dynamics of international water conflicts are intricate, with many, apparently non-water-related factors pervading the presumed central issue, be it allocation or development plans. The reader might also note the contrast between the national cases, presented in Chapter 3, and these cases between sovereign nations.

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[3] See, for example, Margat, Jean. "The Sharing of Common Water Resources in the European Community (EEC)." Water International, 14:59-61, 1989; London, James B. and Harry W. Miley, Jr. "The Interbasin Transfer of Water: An Issue of Efficiency and Equity." Water International, 15:231-235, 1990; Tsur Yaakov and William Easter, *in*: Dinar, Ariel and Edna Loehman, eds. Water Quantity/Quality Management and Conflict Resolution, Westport, CT: Preager Publishers, 1994.

As described earlier, notable contrasts include different institutional settings, the lack of legally binding criteria or enforcement mechanisms, and the potential for military confrontation in the international arena. Perhaps the most striking distinction between these cases and those presented in Chapter 3, however, is an almost total lack of the application of the principles of alternative dispute resolution.

The case studies presented include instances of water conflict resolution along the Ganges, Indus, Jordan (including the Johnston and Yarmuk negotiations and the Multilateral Working Group on Water Resources), Mekong, and Nile rivers. A description of the Environmental Programme for the Danube River Basin is included as an example of inclusive, integrated watershed planning.

Case I

The Danube River

Background

The Danube River basin is the heartland of central Europe. The main river is 2,857 km long and drains 817,000 sq. km including all of Hungary, most of Romania, Austria, Slovenia, Croatia and Slovakia and significant parts of Bulgaria, Germany, the Czech Republic, Moldova, and Ukraine. Territories of the Federal Republic of Yugoslavia—Bosnia and Herzegovina. Small parts of Italy, Switzerland, Albania, and Poland are also included in the basin. The Danube River discharges into the Black Sea through a delta which is the second largest wetland area in Europe.

The river is shared by a number of riparian states that for decades were allied with hostile political blocs; some states in the basin are locked in intense national disputes. As a consequence, conflicts in the basin have tended to be both frequent and intricate, and their resolution especially formidable.

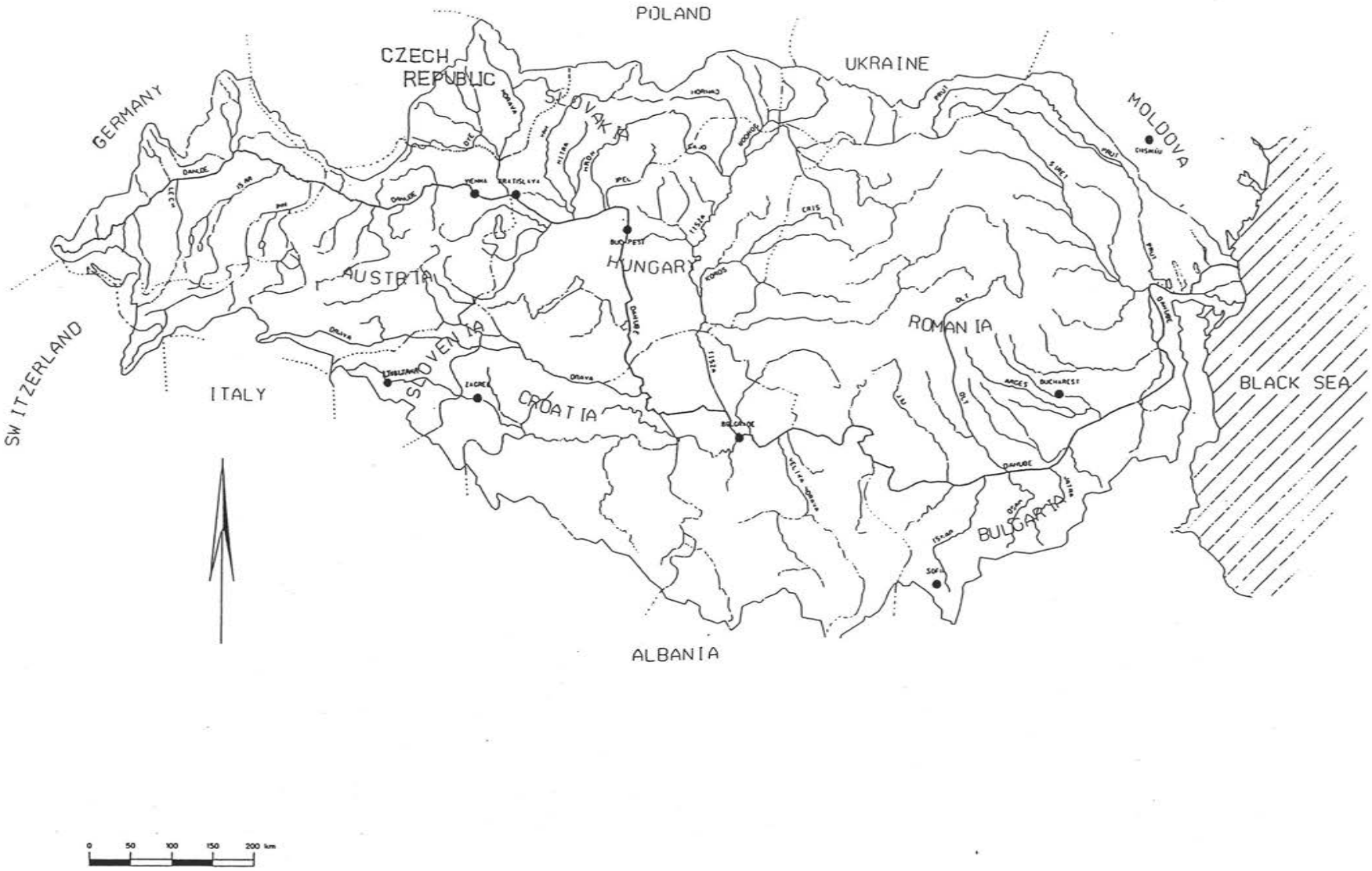
Nevertheless, in recent years, the riparian states of the Danube River have established an integrated program for the basinwide control of water quality which, if not for the first such program, has claims to probably being the most active and the most successful of its scale. The Environmental Programme for the Danube River Basin is also the first basinwide international body which actively encourages public and NGO participation throughout the planning process, which, by diffusing the confrontational setting common in planning, may help preclude future conflicts both within countries and, as a consequence, internationally.

As an example of international basinwide watershed management, the Environmental Programme for the Danube River Basin merits inclusion in this study, despite its being outside of the geographical region covered.

The Problem

Prior to World War II, the European Commission of the Danube, with roots dating back to the 1856 Treaty of Paris and made up of representatives from each of the riparian countries, was responsible for administration of the Danube River. The primary consideration at the time was navigation, and the Commission was successful at establishing free navigation along the Danube for all European countries. World War II resulted in new political alliances for the riparians, resulting in a new management approach. At a 1948 conference in Belgrade, the East Bloc riparians—a majority of the delegates—shifted control over navigation to the exclusive control of each riparian. The Belgrade Convention also gave the Commission semi-legislative powers, but only regarding navigation and inspection.

CATCHMENT OF THE DANUBE RIVER



Source: Danube Programme Coordination Unit, *Environmental Programme for the Danube River Basin: Annual Report, September 1993*, Danube Programme Coordination Unit, Brussels, 1993.

The main task of the Danube Commission has historically been to assure navigation conditions along the river. In addition, the Commission has also developed regional plans for river projects, dissemination of country proposals to all the riparians for comment, and developing unified systems for regulations, channel marking, and data collection. The Commission meets once a year or in special session and, though a majority vote is sufficient to pass a proposal, in practice unanimity is solicited. The Commission has no sovereign powers and its decisions take the form of recommendations to the governments of its members.

By the mid-1980s, it became clear that issues other than navigation were gaining in importance within the Danube basin, notably problems with water quality. The Danube passes by numerous large cities, including four national capitals (Vienna, Bratislava, Budapest, and Belgrade), receiving the attendant waste of millions of individuals and their agriculture and industry. In addition, 30 significant tributaries have been identified as "highly polluted." The breakup of the USSR has also contributed to water quality deterioration, with nascent economies finding few resources to resolve environmental problems. National management issues have been internationalized because of re-drawn borders. Recognizing the increasing degradation of water quality, the (at the time) eight riparians of the Danube signed the Declaration of the Danube Countries to Cooperate on Questions Concerning the Water Management of the Danube, commonly called the Bucharest Declaration, in 1985.

Attempts at Conflict Management

The Bucharest Declaration reinforced the principle that the environmental quality of the river depends on the environment of the basin as a whole, and committed the riparians to a regional and integrated approach to water basin management, beginning with the establishment of a basinwide unified monitoring network. Basinwide coordination was strengthened at a meeting in Sofia in September 1991, in which the riparians elaborated on a plan for protecting the water quality of the Danube. At that meeting, the countries and interested international institutions met to draw up an initiative to support and reinforce national actions for the restoration and protection of the Danube River. The initiative is called the Environmental Programme for the Danube River Basin.

The countries set up a Task Force[4] to oversee the program, which covers monitoring, data collection and assessment, emergency response systems, and pre-investment activities. A Program Coordination Unit was established to monitor the day-to-day activities of the Environmental Programme.

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[4] Members of the Task Force include the Danube countries of Austria, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Moldova, Romania, Slovakia, Slovenia, and Ukraine, the European Commission (EC), European Bank for Reconstruction and Development (EBRD), European Investment Bank (EIB), Nordic Investment Bank, the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), the World Bank, Austria, The Netherlands, and the United States, nongovernmental organizations, World Conservation Union (WCU), World Wide Fund for Nature (WWF), the Regional Environmental Centre, and the Barbara Gauntlett Foundation.

Along with the technical aspects, the Environmental Programme also established several key principles for coordination and participation which make it unique in integrated planning on this scale. While the program's work plan describes its overall strategy in terms fairly common in watershed management—"...to provide an operational basis for strategic and integrated management of the Danube River Basin environment while focusing initially on priority environmental issues"—specific strategic principles add a new dimension:

> The approach should protect and enhance environmental values and promote a mix of actions in the public and private sectors. In addition, the strategy should be integrated, participatory, and coordinated.

In establishing the principles of "integration" and "coordination," the Danube Environmental Programme establishes the same approach as the Mekong Committee 40 years earlier—that internal issues within each nation are not particularly amenable to international management, and that the most important contribution a unit responsible for integrated planning can make is to coordinate between the national representatives and between nations and donor organizations. The Danube Environmental Programme goes one crucial step further, though, by including the principle of "participation." This inclusion explicitly recognizes the vital link between internal politics among different sectors and political constituents within a nation on the one hand, and the strength and resilience of an agreement reached in the international realm on the other.

Outcome

The principle of "participation" has been taken seriously in the work of the Environmental Programme and the Program Coordination Unit. Initially, each riparian country was responsible for identifying two individuals to help coordinate activities within their country and the basin. The first, a "country coordinator," usually a senior official, would act as a liaison between the work of the program and the country's political hierarchy. The second, a "country focal point," would coordinate the actual work plan being carried out.

In July 1992, the Task Force held a workshop in Brussels to help facilitate communication among the coordinators, the focal points, and the donor institutions. Representatives from each of the 11 riparians and 15 donor and NGO organizations attended. An important outcome of the workshop was that the participants themselves designed a plan for each issue covered. One issue, for example, was an agreement to produce National Reviews of data availability and priority issues within each country. This information would be used by prefeasibility teams funded by donors who were to identify priority investments in the basin. During the workshop, participants developed the criteria for the National Reviews and agreed on a schedule for completion.

The principle of participation was carried one level deeper at the third Task Force meeting in October 1993 in Bratislava. At that meeting, the Task Force agreed to prepare a Strategic Action Plan for the Danube basin, with the provision that "consultation procedures should be strengthened." In moving from planning to implementation, it was determined that the proposed Strategic Action Plan (SAP) should include the following concerns, raised during informal consultations between members of the Coordination Unit and riparian countries:

- Measures detailed must be "concrete" and aim to achieve results in the short term.
- Major environmental threats to the basin must be clearly addressed with realistically costed actions and constraints to problem-solving together with proposals for overcoming them.
- The SAP should be updated regularly to allow amendments and additions as circumstances develop.
- Wide consultation during preparation of the SAP is desirable, in particular with parties who would be responsible for its implementation.

This last point is particularly noteworthy because it is the first time public participation has been required during the development of an international management plan. This concept rejects the principle that internal politics within nations ought to be treated as a geopolitical "black box," whose workings are of little relevance to international agreements, and instead embraces the vital need for input at all levels to ensure that the plan has the support of the people who will be affected by its implementation.

The 11-member drafting group that was identified to prepare the Strategic Action Plan included representatives of four riparian countries, Austria, Hungary, Bulgaria, and Rumania, each of whom were also to represent bordering nations. The World Bank, UNDP, and the Danube Environmental Programme Coordination Unit also provided individuals to work on the drafting group.

During late 1993 and early 1994, another major Danube River activity was being carried out in the basin. The riparian countries were developing the Convention on Cooperation for the Protection and Sustainable Use of the River Danube (the Danube River Protection Convention) at the same time that the Danube Environmental Programme was developing the Strategic Action Plan for the Danube River Basin. The Danube River Protection Convention is aimed at achieving sustainable and equitable water management in the basin.

When the drafting group for the Strategic Action Plan held its first meeting in Vienna in January 1994, members agreed that the SAP should be designed as a tool to support the implementation of the new Danube Convention that the riparian countries were planning to ratify in June 1994. During the first drafting group meeting, a schedule was drawn up for the drafting and adoption of the Danube Strategic Action Plan. Public consultation was built into the process from the beginning.

The public consultation process consisted of two steps.

- Each of the nine downstream riparian countries was requested to designate a "country facilitator," whose task would be to facilitate a public consultation meeting. This individual was to ensure that public input was solicited and then fed back to the drafting group for possible incorporation into the SAP.

- In order to guarantee a level of uniformity in the process, a training-of-trainers workshop was held in Vienna in February 1994.

The proposed participants in each of these consultation meetings consisted of 30 to 35 people, including representatives from the following institutions (with the ideal number from each in parenthesis):

- Government ministries, including:
  - environment (3)
  - water (1)
  - forestry (1)
  - tourism (1)
  - agriculture (1)
  - industry (1)
  - finance (1)
  - health (1)
  - transportation/navigation (1)
- Mayors of municipalities and managers of public utilities involved in basin studies (2 from each basin study area)
- Consultants from private sector firms who have worked on basin studies or other Danube-related activities (2)
- Managers of research institutions or organizations responsible for monitoring laboratories and data collection (3)
- Danube-focused NGO representatives, to be coordinated with the NGO Danube Forum (3)
- Environmental journalists—representatives of mass media who have reported on Danube issues in the past (3)

In principle, the individuals who participated in the workshops would form a nucleus which would not only have input into drafting the SAP but would be involved in reviewing future activities that would be implemented as part of the plan.

By July 1994, two consultation meetings had been held in each of the nine countries. The first round of meetings, held in March 1994, described the purpose of the proposed Strategic Action Plan and sought input on major issues facing the basin. The second round, held during June 1994, solicited comments on the first draft of the SAP. A training-of-trainers workshop also preceded the second round of consultation workshops.

Following the public consultation meetings, the country facilitators each prepared a workshop report containing recommendations for the drafting group. A number of revisions have been incorporated into the SAP in response to recommendations from the consultation process.

On 29 June 1994, in Sofia, the Danube River basin countries and the European Union signed the Convention on Cooperation for the Protection and Sustainable Use of the River Danube (the Danube River Protection Convention).

The Convention notes that the riparians of the Danube, "concerned over the occurrence and threats of adverse effects, in the short or long term, of changes in conditions of watercourses within the Danube River Basin on the environment, economies, and well-being of the Danubian States," agree to a series of actions, including:

- striving to achieve the goals of a sustainable and equitable water management, including the conservation, improvement, and rational use of surface waters and groundwater in the catchment area as far as possible
- cooperating on fundamental water management issues and taking all appropriate legal, administrative, and technical measures, to at least maintain and improve the current environmental and water quality conditions of Danube River and of waters in its catchment area and to prevent and reduce as far as possible adverse impacts and changes occurring or likely to be caused
- setting priorities as appropriate and strengthening, harmonizing, and coordinating measures taken and planned to be taken at the national and international level throughout the Danube basin aiming at sustainable development and environmental protection of the Danube River

The Danube Convention is a vital legal continuation of a tradition of regional management along the Danube dating back 140 years. As a political document, it provides a legal framework for integrated watershed management and environmental protection along a waterway with tremendous potential for conflict.

The Strategic Action Plan of the Environmental Programme for the Danube River Basin provides the direction and a framework for achieving the goals of regional integrated water management and riverine environmental management expressed in the Danube River Protection Convention. The Action Plan supports the process of cooperation and collaboration set out in the Convention to address transboundary problems. It will be revised and developed to take into account changing environmental, social, and economic conditions in the basin.

The Strategic Action Plan was formally adopted by the Task Force on 28 October 1994. Ministers of Environment or Water or their designates will sign a Ministerial Declaration supporting the Strategic Action Plan in Bucharest on 6 December 1994.

The Action Plan describes a framework for regional action, which will be implemented through National Action Plans. It contains four goals for the environment of the Danube River basin; strategic directions, including priority sectors and policies; a series of targets within a timeframe; and a phased program of actions to meet these targets. The four goals concern improving of aquatic ecosystems and biodiversity in the Danube River Basin and reducing pollution loads entering the Black Sea; maintaining and improving the quantity and quality of water in the Danube River Basin; controlling damage from accidental spills; and developing regional

cooperation in water management. These goals can only be achieved by means of integrated and sustainable management of the waters of the Danube River basin.

The public participation and collaborative problem-solving approach used in the development of the Action Plan significantly shortened the time of preparation and approval. The Action Plan is addressed to the officials of national, regional and local levels of government who share responsibility for implementing the Danube River Protection Convention and the national environmental action programs under the Environmental Action Programme for Central and Eastern Europe. Industry, agriculture, nongovernmental organizations, and the public will play important roles. The regional strategies set out in the Action Plan are intended to support national decision making on water management and on the restoration and protection of vulnerable and valuable areas in the Danube River Basin.

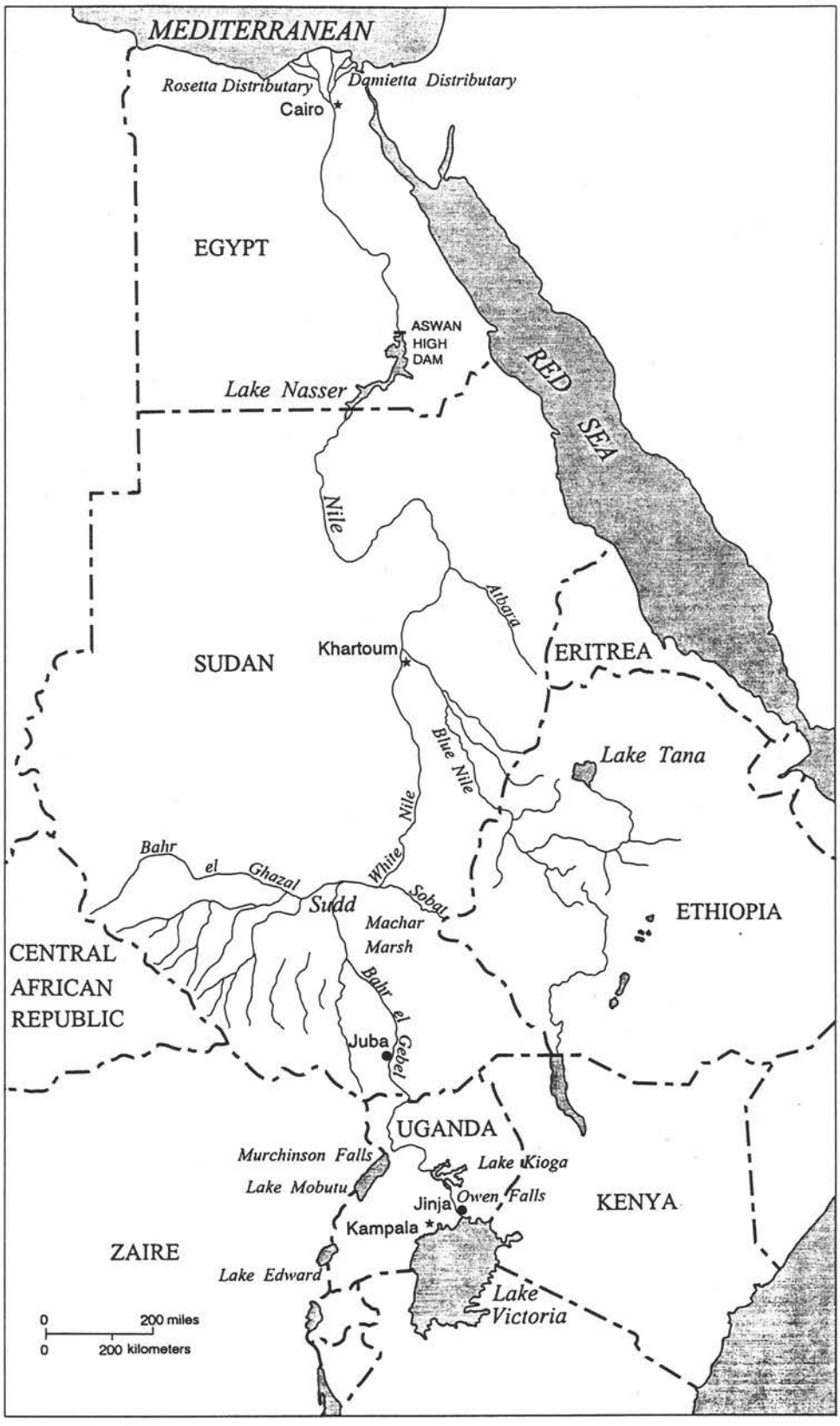
The degree of cooperation among representatives of participating governments, and the importance given to public participation in developing the Action Plan, mark significant achievements in promoting regional cooperation in water resources management. Ultimately, the success of this process will be revealed by the degree to which the goals, strategies, and targets set in the agreement are implemented "on the ground." It is one thing to agree to goals and targets in timeframes; it is another thing to, for example, agree to shut down a polluting factory, or to create and enforce industrial wastewater pretreatment standards, or to develop rigorous monitoring and enforcement regimes. Additionally, because agreement signatories are at the ministerial level in the water sector (vs. at the level of the Foreign Minister), it is not clear if the agreement has the force of an international treaty behind it.

Case II

The Nile Waters Agreement

Case Summary

River Basin:	Nile River
Dates of Negotiation:	1920-1959—Treaties signed in 1929 and 1959
Relevant Parties:	Egypt, Sudan (directly); other Nile riparians (indirectly)
Flashpoint:	Plans for a storage facility on the Nile
Issues:	
Stated Objectives:	Negotiate an equitable allocation of the flow of the Nile River between Egypt and Sudan
	Develop a rational plan for integrated watershed development
Additional Issues:	
Water-related:	Upstream vs. downstream storage
Non-water:	General Egypt-Sudan relations
Excluded issues:	Water quality Other Nile riparians
Criteria for Water Allocations:	Acquired rights plus even division of any additional water resulting from development projects.
Incentives/Linkage:	
Financial:	Funding for Aswan High Dam
Political:	Fostered warm relations between Egypt and new government of Sudan
Breakthroughs:	1958 coup in Sudan by pro-Egypt leaders made agreement possible
Status:	Ratified in 1959. Allocations between Egypt and Sudan upheld till today. Other riparians, particularly Ethiopia, are planning development projects which may necessitate re-negotiating a more inclusive treaty


MEDITERRANEAN
Rosetta Distributary
Damietta Distributary
Cairo
EGYPT
ASWAN
HIGH
DAM
Lake Nasser
RED
SEA
Nile
Atbara
Khartoum
SUDAN
ERITREA
Lake Tana
Blue Nile
White Nile
Bahr el Ghazal
Sudd
Sobat
Machar Marsh
ETHIOPIA
CENTRAL
AFRICAN
REPUBLIC
Bahr el Gebel
Juba
UGANDA
Murchinson Falls
Lake Kioga
Lake Mobutu
Owen Falls
Jinja
KENYA
Kampala
ZAIRE
Lake Edward
Lake
Victoria
0
200 miles
0
200 kilometers

Background

In the early 1900s, a relative shortage of cotton on the world market put pressure on Egypt and the Sudan, then under a British-Egyptian condominium, to turn to this summer crop, requiring perennial irrigation over traditional flood-fed methods. The need for summer water and flood control drove an intensive period of water development along the Nile, with proponents of Egyptian and Sudanese interests occasionally clashing within the British foreign office over whether the emphasis for development ought to be further upstream or down.

With the end of World War I, it became clear that any regional development plans for the Nile basin would have to be preceded by some sort of formal agreement on water allocations. In 1920, the Nile Projects Commission was formed with representatives from India, the United Kingdom, and the United States. The Commission estimated that, of the river's average flow of 84 BCM/yr., Egyptian needs were estimated at 58 BCM/yr. Sudan, it was thought, would be able to meet irrigation needs from the Blue Nile alone. The Nile flow fluctuates greatly, with a standard deviation of about 25 percent. In recognition of this fact, an appendix was added which suggested that any gain or shortfall from the average be divided evenly between Egypt and Sudan. The Commission's findings were not acted upon.

The same year saw publication of the most extensive scheme for comprehensive water development along the Nile, now known as the Century Storage Scheme. The plan, put forth by the British, included:

- A storage facility on the Uganda-Sudan border
- A dam at Sennar to irrigate the Gezira region south of Khartoum, and
- A dam on the White Nile to hold summer flood water for Egypt.

The plan worried some Egyptians and was criticized by nationalists, because all the major control structures would have been outside Egyptian territory and authority. Some Egyptians saw the plan as a British means of controlling Egypt in the event of Egyptian independence.

The Problem

As the Nile riparians gained independence from colonial powers, riparian disputes became international and consequently more contentious, particularly between Egypt and Sudan. The core question of historic versus sovereign water rights is complicated by the technical question of where the river ought best be controlled—upstream or down.

Attempts at Conflict Management

In 1925, a new water commission made recommendations based on the 1920 estimates which would lead finally to the Nile Waters Agreement between Egypt and Sudan on 7 May 1929. Sudan was allocated 4 BCM/yr., but the entire timely flow (from January 20 to July 15) and a total annual amount of 48 BCM/yr. were reserved for Egypt. Egypt, as the downstream state, had its interests guaranteed by:

- Having a claim to the entire timely flow. This meant that any cotton cultivated in Sudan would have to be grown during the winter months.
- Having rights to on-site inspectors at the Sennar dam, outside of Egyptian territory.
- Being guaranteed that no works would be developed along the river or on any of its territory which would threaten Egyptian interests.

In accord with this agreement, one dam was built and one reservoir raised, with Egyptian acquiescence.

The Aswan High Dam, with a projected storage capacity of 156 BCM/yr., was proposed in 1952 by the new Egyptian government, but debate over whether it was to be built as a unilateral Egyptian project or as a cooperative project with Sudan kept Sudan out of negotiations until 1954. The negotiations which ensued, with Sudan's struggle for independence as a back-drop, focused not only on what each country's legitimate allocation would be, but whether the dam was even the most efficient method of harnessing the waters of the Nile.

The first round of negotiations between Egypt and Sudan took place between September and December 1954, even as Sudan was preparing for its independence, scheduled for 1956. The positions of the two sides can be summarized as follows:

Egyptian Position

- Existing needs should take priority. These were described as being 51 BCM for Egypt and 4 BCM for Sudan, out of an average flow of 80 BCM as measured at Aswan.
- Any remainder from development projects should be divided as a percentage of each country's population after subtracting 10 BCM for evaporation losses. The respective population and growth rates led to an Egyptian formula for 22/30 of the remainder, or 11 BCM for Egypt, and 8/30, or 4 BCM for Sudan.
- There should be one large storage facility, a high dam at Aswan.
- Total allocations would therefore be 62 BCM for Egypt and 8 BCM for Sudan.

Sudanese Position

- Sudan insisted on using the standard value of 84 BCM for average Nile discharge and insisted that Egypt's acquired rights were 48 BCM, not 51 BCM that Egypt claimed.
- Sudan also suggested that its population was actually 50 percent larger than Egypt estimated and that resulting population-based allocations should be adjusted accordingly, giving Sudan at least one third of any additional water.
- Storage facilities should be smaller and upstream, as envisioned in the Century Storage Scheme. Consequently, if Egypt insisted on one large project, with comparatively high evaporation losses, these losses should be deducted from Egypt's share.
- Total allocations, therefore, should be approximately 59 BCM (69 BCM less evaporation) for Egypt and 15 BCM for Sudan.

Negotiations were broken off inconclusively and then briefly, but equally inconclusively, resumed in April 1955. Tension threatened to escalate into military confrontation in 1958 when Egypt sent an unsuccessful expedition into territory in dispute between the two countries. In the summer of 1959, Sudan unilaterally raised the Sennar dam, effectively repudiating the 1929 agreement.

Sudan attained independence on 1 January 1956, but it was with the military regime which gained power in 1958 that Egypt adopted a more conciliatory tone. Negotiations were resumed in early 1959. Progress was speeded in part by the fact that any funding which would be forthcoming for the High Dam would depend on a riparian agreement. On 8 November 1959, the Agreement for the Full Utilization of the Nile Waters (Nile Waters Treaty) was signed.

Figure 1

WATER ALLOCATIONS FROM NILE NEGOTIATIONS

POSITION	Egypt	Sudan
Egyptian[1]	62 BCM/yr.	8
Sudanese[2]	59	15
Nile Waters Treaty (1959)[3]	55.5	18.5

[1] The Egyptian position assumed an average flow of 80 BCM/yr. and divided approximately 10 BCM/yr. in evaporation losses equally.

[2] The Sudanese position assumed an average flow of 84 BCM/yr. and deducted evaporation from the Egyptian allocations.

[3] The treaty allowed for an average flow of 84 BCM/yr. and divided evaporation losses equally.

Outcome

The Nile Waters Treaty had the following provisions:

- The average flow of the river is considered to be 84 BCM/yr. Evaporation and seepage were considered to be 10 BCM/yr., leaving 74 BCM/yr. to be divided.
- Of this total, acquired rights have precedence and are described as being 48 BCM for Egypt and 4 BCM for Sudan. The remaining benefits of approximately 22 BCM are divided by a ratio of 7½ for Egypt (approx. 7.5 BCM/yr.) and 14½ for Sudan (approx. 14.5 BCM/yr.). These allocations total 55.5 BCM/yr. for Egypt and 18.5 BCM/yr. for Sudan.
- If the average yield increases from these average figures, the increase would be divided equally. Significant decreases would be taken up by a technical committee, described below.
- Since Sudan could not use its full allocation, the treaty provided for a Sudanese water "loan" to Egypt of up to 1,500 MCM/yr. through 1977.
- Funding for any project to increase Nile flow (after the High Dam) would be provided evenly, and the resulting additional water would be split evenly.
- A Permanent Joint Technical Committee would be established to resolve disputes and jointly review claims by any other riparian. The committee would also determine allocations in the event of exceptional low flows.
- Egypt agreed to pay Sudan £E 15 million in compensation for flooding and relocations.

Egypt and Sudan agreed that the combined needs of other riparians would not exceed 1,000 to 2,000 MCM/yr., and that any claims would be met with one unified Egyptian-Sudanese position. The allocations of the treaty have been held to until the present.

Ethiopia, which had not been a major player in Nile hydropolitics, served notice in 1957 that it would pursue unilateral development of the Nile water resources within its territory, estimated at 75-85 percent of the annual flow, and suggestions were made recently that Ethiopia may eventually claim up to 40,000 MCM/yr. for its irrigation needs both within and outside of the Nile watershed. No other state riparian to the Nile has ever exercised a legal claim to the waters allocated in the 1959 treaty.

Lessons Learned

Shifting political boundaries can turn intranational disputes into international conflicts, exacerbating tensions over existing issues.

Similar to the Indus situation, the disappearance of British colonialism in the Nile basin turned national issues international, making agreement more difficult.

Downstream riparians are not necessarily at a political disadvantage to their upstream neighbors.

While in many cases relative riparian positions result in comparable power relationships, with upper riparians having greater hydropolitical maneuverability, Egypt's geopolitical strength helped to forestall upstream attempts to sway its position.

The individuals or governments involved can make a difference in the pace of the negotiations.

Negotiations made little progress between 1954 and 1958, despite Sudan's attaining independence in 1956. It was only after pro-Egyptian General Ibrahim Abboud took power in a coup in 1958 that negotiations moved toward resolution, finally gaining for Sudan water allocations greater than those of its initial bargaining point.

Creative Outcomes Resulting from Resolution Process

- The elements used for water allocations were rather elegant, incorporating existing uses as well as providing a measure (population) for allocating additional sources.
- Some financing arrangements were creative, with Egypt agreeing to finance water enhancement projects in Sudanese territory in exchange for the water which would be made available. Provisions were made for Sudan to pick up responsibility for up to 50 percent of costs in exchange for up to 50 percent of the water, when its water needs required.

Timeline

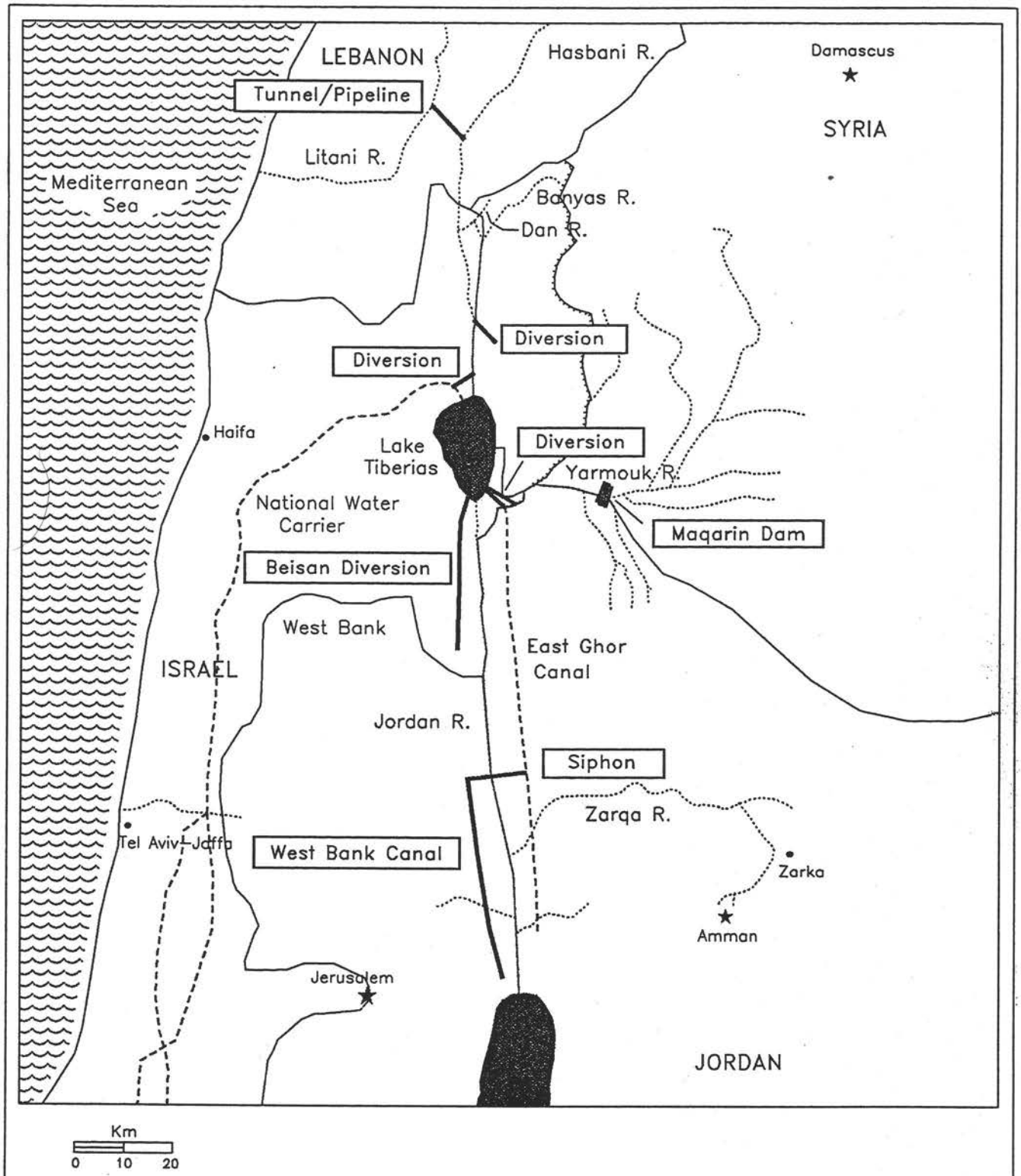
1920	Nile Projects Commission formed, offers allocation scheme for Nile riparians. Findings were not acted upon. Century Storage Scheme put forward, emphasizing upstream, relatively small-scale projects. Plan is criticized by Egypt.
1925	New water commission is named.
7 May 1929	Commission study leads to Nile Waters Agreement between Egypt and Sudan.
1952	Aswan High Dam proposed by Egypt. Promise of additional water necessitates new agreement.
Sep-Dec 1954	First round of negotiations between Egypt and Sudan. Negotiations end inconclusively.
1956	Sudan gains independence. Egypt is more conciliatory with government after 1958 coup.
8 Nov 1959	Agreement for the Full Utilization of the Nile Waters (Nile Waters Treaty) signed between Egypt and Sudan.

Case III

Johnston Negotiations, 1953-55, and Yarmuk Mediations, 1980s

Case Summary

River Basin:	Jordan River and tributaries (directly); Litani (indirectly)
Dates of Negotiation:	1953-1955; 1980s
Relevant Parties:	United States (sponsoring); Riparian states: Israel, Jordan, Lebanon, Syria; Non-riparian: Egypt
Flashpoint:	1951 and 1953 Syrian/Israeli exchanges of fire over water development in demilitarized zone
Issues:	
Stated Objectives:	Negotiate an equitable allocation of the flow of the Jordan River and its tributaries between the riparian states Develop a rational plan for integrated watershed development
Additional Issues:	
Water-related:	Out-of-basin transfers Level of international control ("water master") Location and control of storage facilities Inclusion or exclusion of the Litani River
Non-water:	Political recognition of adversaries
Excluded issues:	Groundwater Palestinians as political entity
Criteria for Water Allocations:	Amount of irrigable land within watershed for each state—countries could then use water how and where they wished, including out-of-basin
Incentives/Linkage:	
Financial:	United States agreed to cost-share regional water projects if agreement was reached
Political:	None



JOHNSTON PLAN

Breakthroughs:	Harza study of Jordan's water needs (allowed for more room in bargaining mix)
Status:	Unratified (political considerations superseded during Sinai campaign), although adhered to unofficially for years by Jordan and Israel

Background

In 1951, several states announced unilateral plans for the Jordan River watershed. Arab states began to discuss organized exploitation of two northern sources of the Jordan—the Hasbani and the Banias. The Israelis made public their "All Israel Plan" which included draining Huleh Lake and swamps, diversion of the northern Jordan River and construction of a carrier to the coastal plain and Negev Desert—the first out-of-basin transfer for the watershed in the region.

Jordan announced a plan to irrigate the East Ghor of the Jordan Valley by tapping the Yarmuk. At Jordan's announcement, Israel closed the gates of an existing dam south of the Sea of Galilee and began draining the Huleh swamps, which infringed on the demilitarized zone with Syria. This action led to a series of border skirmishes between Israel and Syria which escalated over the summer of 1951.

In March 1953, Jordan and the U.N. Relief and Works Agency for Palestine Refugees (UNRWA) signed an agreement to begin implementing the "Bunger Plan," which called for a dam at Maqarin on the Yarmuk River with a storage capacity of 480 MCM, and a diversion dam at Addassiyah which would direct gravity flow along the East Ghor of the Jordan Valley. The water would open land for irrigation, provide power for Syria and Jordan, and enable resettlement of 100,000 refugees. In June 1953, Jordan and Syria agreed to share the Yarmuk, but Israel protested that its riparian rights were not being recognized.

In July 1953, Israel began construction on the intake of its National Water Carrier at the Bridge of Jacob's Daughters, north of the Sea of Galilee and in the demilitarized zone. Syria deployed its armed forces along the border, and artillery units opened fire on the construction and engineering sites. Syria also protested to the United Nations and, though a 1954 resolution for the resumption of work by Israel carried a majority, the USSR vetoed the resolution. The Israelis then moved the intake to its current site at Eshed Kinrot on the northwestern shore of the Sea of Galilee.

Against this tense background, President Dwight Eisenhower sent his special envoy Eric Johnston to the Mideast in October 1953 to try to mediate a comprehensive settlement of the Jordan River system allocations and to design a plan for regional development.

The Problem

The Jordan River flows between four particularly contentious riparians, two of which rely on the river as the primary water supply. By the early 1950s, there was little room for any unilateral development without impacting other riparian states. The initial issue was an equitable allocation of the annual flow of water within the Jordan watershed among its riparian states—Israel, Jordan, Lebanon, and Syria. Egypt was also included, given its preeminence in the Arab world. Since water was (and is) deeply related to other contentious issues of land, refugees, and political sovereignty, the negotiations took on vital importance to relations among these new neighbors.

Attempts at Conflict Management

Johnston's initial proposals were based on a study carried out by Charles Main and the Tennessee Valley Authority at the request of UNRWA to develop the area's water resources and provide for refugee resettlement. The TVA addressed the problem with a regional approach, pointedly ignoring political boundaries in its study. In the words of the introduction, "the report describes the elements of an efficient arrangement of water supply within the watershed of the Jordan River System. It does not consider political factors or attempt to set this system into the national boundaries now prevailing."

The major features of the Main Plan included small dams on the Hasbani, Dan, and Banias; a medium size (175 MCM storage) dam at Maqarin; additional storage at the Sea of Galilee; and gravity flow canals down both sides of the Jordan Valley. Preliminary allocations gave Israel 394 MCM/yr., Jordan 774 MCM/yr., and Syria 45 MCM/yr. (see Figure 1). In addition, the Main Plan:

- described only in-basin use of the Jordan River water, although it conceded that "it is recognized that each of these countries may have different ideas about the specific areas within their boundaries to which these waters might be directed";
- excluded the Litani River.

Israel responded to the "Main Plan" with the "Cotton Plan," which allocated Israel 1,290 MCM/yr., including 400 MCM/yr. from the Litani, Jordan 575 MCM/yr., Syria 30 MCM/yr., and Lebanon 450 MCM/yr. In contrast to the Main Plan, the Cotton Plan:

- called for out-of-basin transfers to the coastal plain and the Negev;
- included the Litani River;
- recommended the Sea of Galilee as the main storage facility, thereby diluting its salinity.

In 1954, representatives from Lebanon, Syria, Jordan, and Egypt established the Arab League Technical Committee under Egyptian leadership and formulated the "Arab Plan." Its principal difference from the Johnston Plan was in the water allocated to each state. Israel was to receive 182 MCM/yr., Jordan 698 MCM/yr., Syria 132 MCM/yr., and Lebanon 35 MCM/yr. in addition to keeping all of the Litani. The Arab Plan:

- reaffirmed in-basin use;
- excluded the Litani;
- rejected storage in the Galilee, which lies wholly in Israel.

Johnston worked until the end of 1955 to reconcile these proposals in a Unified Plan amenable to all of the states involved. His dealings were bolstered by a U.S. offer to fund two-thirds of the development costs. His plan addressed the objections of both sides and accomplished no small degree of compromise, although its neglect of groundwater issues would later prove an important oversight. Though they had not met face to face for these negotiations, all states agreed on the need for a regional approach. Israel gave up on integration of the Litani, and the Arabs agreed to allow out-of-basin transfer. The Arabs objected, but finally agreed, to storage at both the (unbuilt) Maqarin Dam and the Sea of Galilee, so long as neither side would have physical control over the share available to the other. Israel objected, but finally agreed, to international supervision of withdrawals and construction. Allocations under the Unified Plan, later known as the Johnston Plan, included 400 MCM/yr. to Israel, 720 MCM/yr. to Jordan, 132 MCM/yr. to Syria, and 35 MCM/yr. to Lebanon.

Figure 1

WATER ALLOCATIONS FROM JOHNSTON NEGOTIATIONS (in MCM/yr.)

PLAN	Israel	Jordan	Lebanon	Syria
Main	394	774	-	45
Cotton (Isr.)[1]	1,290	575	450	30
Arab	182	698	35	132
Unified	400[2]	720[3]	35	132

[1] Cotton Plan included integration of the Litani River into the Jordan Basin.

[2] Unified Plan allocated Israel the "residue" flow, what remained after the Arab States withdrew their allocations, estimated at an average of 409 MCM/yr.

[3] Two different summaries were distributed after the negotiations, with a difference of 15 MCM/yr. on allocations between Israel and Jordan on the Yarmuk River.

Outcome

The technical committees from both sides accepted the Unified Plan, and the Israeli Cabinet approved it without vote in July 1955. President Nasser of Egypt became an active advocate because Johnston's proposals seemed to deal with the Arab-Israeli conflict and the Palestinian problem simultaneously. Among other proposals, Johnston envisioned the diversion of Nile water to the western Sinai Desert to resettle two million Palestinian refugees.

Despite the forward momentum, the Arab League Council decided not to accept the plan in October 1955 because of the political implications of accepting, and the momentum died. Although the agreement was never ratified, both sides have generally adhered to the technical details and allocations even while proceeding with unilateral development. Agreement was encouraged by the United States, which promised funding for future water development projects only as long as the Johnston Plans allocations were adhered to. From 1955 to the present, Israeli and Jordanian water officials have met several times a year, as often as every two weeks during the critical summer months, at the so-called "Picnic Table Talks" near the Jordanian town of Adasiyah along the Yarmuk River, to discuss flow rates and allocations.

Negotiations over the Yarmuk River

Although the watershed-wide scope of the Johnston negotiations has not been taken advantage of, the allocations which resulted have been at the heart of ongoing attempts at water conflict resolution, particularly along the Yarmuk River, where a dam for storage and hydroelectric power generation has been suggested since the early 1950s.

In 1952, Miles Bunger, an American attached to the Technical Cooperation Agency in Amman, first suggested the construction of a dam at Maqarin to help even the flow of the Yarmuk River and to tap its hydroelectric potential. The following year, Jordan and UNRWA signed an agreement to implement the Bunger plan the following year, including a dam at Maqarin with a storage capacity of 480 MCM and a diversion dam at Addassiyah; Syria and Jordan agreed that Syria would receive two-thirds of the hydropower generated, in exchange for Jordan's receiving seven-eighths of the natural flow of the river. Dams along the Yarmuk were also included in the Johnston negotiations—the Main Plan included a small dam, 47 meters high with a storage capacity of only 47 MCM, because initial planning called for the Sea of Galilee to be the central storage facility. As Arab resistance to Israeli control over Galilee storage became clear in the course of the negotiations, a larger dam, 126 meters high with a storage capacity of 300 MCM, was included.

While the idea faded with the Johnston negotiations, the idea of a dam on the Yarmuk was raised again in 1957, in a Soviet-Syrian Aid Agreement, and at the First Arab Summit in Cairo in 1964, as part of the All-Arab Diversion Project. Construction of the diversion dam at Mukheiba was actually begun, but was abandoned when the borders shifted after the 1967 war—one side of the projected dam in the Golan Heights shifted from Syrian to Israeli territory.

The Maqarin Dam was resurrected as an idea in Jordan's Seven-Year Plan in 1975, and Jordanian water officials approached their Israeli counterparts about the low dam at Mukheiba in 1977, which would have provided a more even flow of the river to the benefit of all riparians. While the Israelis indicated an interest at a ministerial-level meeting in Zurich, the Israeli government later showed less interest in the project.

This stalemate might have continued except for strong U.S. involvement in 1980, when President Carter pledged a $9 million loan toward the Maqarin project, and Congress approved an additional $150 million, provided that all of the riparians agree. Philip Habib was sent to the region to help mediate an agreement. While Habib was able to gain consensus on the concept of the dam, on separating the question of the Yarmuk from that of West Bank allocations, and on the difficult question of summer flow allocations (25 MCM would flow to Israel during the summer months), negotiations were hung up over winter flow allocations, and final ratification was never reached.

Syria and Jordan reaffirmed mutual commitment to a dam at Maqarin in 1987, whereby Jordan would receive the water stored in the proposed dam, and Syria would receive the hydropower generated. With the treaty in hand, Jordan applied to the World Bank for financing. The Bank, which generally insists that all riparians agree to a project before it can be funded, informed Jordan that Israel's acquiescence would be necessary. Jordan then approached the U.S. Department of State for help in securing Israel's assent.

Against this backdrop, Ambassador Richard Armitage was dispatched to the region in September 1989 to resume indirect mediation between Jordan and Israel, where Philip Habib had left off a decade earlier. The points raised during the following year were as follows:

- Both sides agreed that 25 MCM/yr. would be made available to Israel during the summer months but disagreed as to whether any additional water would be specifically earmarked for Israel during the winter months.
- The overall viability of a dam was also open to question: the Israelis still thought that the Sea of Galilee ought to be used as a regional reservoir, and both sides questioned what effects ongoing development by Syria at the headwaters of the Yarmuk would have on the dam's viability. Since the mediation team had no mandate to approach Syria, its input was missing from the mediation.
- Israel eventually wanted a formal agreement with Jordan, a step which would have been politically difficult for the Jordanians at the time.

By fall of 1990 an agreement seemed to be taking shape. Israel had relented in its demand for a formal agreement and Jordan had agreed that the "25 MCM" allocation for Israel referred only to summer irrigation water. The Mediator believed that Israel could give the World Bank its blessing for construction of the dam at Maqarin, a process that would take about five years to complete. During that time the parties could continue to discuss the division of waters that would actually occur downstream at Adasiyah.

Two issues held up any agreement. First, the lack of Syrian input left questions of the future of the river unresolved, a point noted by both sides during the mediations. Second, the outbreak of the Gulf War in 1991 overwhelmed other regional issues, finally preempting talks on the Yarmuk. The issue was not brought up again until recently in the context of the Arab-Israeli peace negotiations.

In the absence of an agreement, both Syria and Israel are currently able to exceed their allocations from the Johnston accords, the former because of a series of small storage dams and the latter because of its downstream riparian position. Syria began building a series of small impoundment dams upstream from both Jordan and Israel in the mid-1980s, while Israel has been taking advantage of the lack of a storage facility to increase its withdrawals from the river. Syria currently has 27 dams in place on the upper Yarmuk, with a combined storage capacity of approximately 250 MCM (its Johnston allocations are 90 MCM/yr. from the Yarmuk), and Israel currently uses 70-100 MCM/yr. (its Johnston allocation are 25-40 MCM/yr.). This leaves Jordan approximately 150 MCM/yr. for the East Ghor Canal (as compared to its Johnston allocations of 377 MCM/yr.).

Lessons Learned

In highly conflictual settings, separating resource issues from political interests may not be a productive strategy.

Eric Johnston took the approach that the process of reaching a rational watershed management plan: 1) may, itself, act as a confidence-building catalyst for increased cooperation in the political realm, and 2) may help alleviate the burning political issues of refugees and land rights. By approaching peace through water, however, several overriding interests remained unmet in the process. The plan finally remained unratified mainly for political reasons.

Issues of national sovereignty which were unmet during the process included:

- The Arab states saw a final agreement with Israel as recognition of Israel, a step they were not willing to make at the time.
- Some Arabs may have felt that the plan was devised by Israel for its own benefit and was "put over" on the United States.
- The plan allowed the countries to use their allotted water for whatever purpose they saw fit. The Arabs worried that if Israel used their water to irrigate the Negev (outside the Jordan Valley), that the increased amount of agriculture would allow more food production, which would allow for increased immigration, which might encourage greater territorial desires on the part of Israel.

Issues of national sovereignty can manifest themselves through the need for each state to control its own water source and/or storage facilities.

The Johnston Plan provided that some winter flood waters be stored in the Sea of Galilee, which is entirely in Israeli territory. The Arab side was reluctant to relinquish too much control of the main storage facility. Likewise, Israel had the same kinds of control reservations about a water master.

Ignoring a riparian party, even one without political standing, can hamper agreement.

There was some concern over whether the plan was designed to "liquidate the Palestinian refugee problem rather than to give the refugees their right of return." In fact, Palestinians were not addressed as a separate political entity.

Along with political entities, many interests affected by river management were not included in the process. These included NGOs, public interest groups, and environmental groups. Perhaps as a consequence, the entire river was allocated, leaving no water at all for instream uses.

Including key nonriparian parties can be useful to reaching agreement; excluding them can be harmful.

Egypt was included in the negotiations because of its preeminence in the Arab world, despite its nonriparian status. Some observers attribute the accomplishments made during the course in part to President Nasser's support.

In contrast, pressure after the negotiations from other Arab states not directly involved in the water conflict may have had an impact on the plan's eventual demise. Iraq and Saudi Arabia strongly urged Lebanon, Syria, and Jordan not to accept the plan. Perhaps partially as a result, Lebanon said it would not enter any agreement that split the waters of the Hasbani River or any other river.

All of the water resources in the basin ought to be included in the planning process. Ignoring the relationship between quality and quantity and between surface- and groundwater, ignores hydrologic reality.

Groundwater was not explicitly dealt with in the plan and is currently the most pressing issue between Israel and the Palestinians. Likewise, tensions have flared over the years between Israel and Jordan over Israel's diverting saline springs into the lower Jordan, increasing the salinity of water on which Jordanian farmers rely.

Even in the absence of an explicit arrangement, some degree of implicit cooperation may be possible, perhaps leading to fairly high stability, if also to suboptimum water management.

While the lack of a ratified agreement left a legacy of unilateral and generally suboptimum water development in the basin, the implicit arrangement which resulted, particularly between Israel and Jordan, decreased tensions and added a certain stability between these most active riparians. The "Picnic Table" talks have allowed a venue for some level of technical agreement and an outlet for minor disputes for more than 40 years.

Creative Outcomes Resulting from Resolution Process

- The plan called for water allocations to be determined according to the amount of irrigable land each state had within the basin, then allowed each country to do what it wished with its water, including out-of-basin transfers.
- The development plan was created without regard to political borders, guaranteeing a degree of objectivity and engineering efficiency.
- The plan incorporated issues of hydrologic variability. For example, Israel was to receive the "residue" after Arab withdrawals, sometimes more, sometimes less from the average flow.

Timeline

1948	"TVA on the Jordan, Proposals, for Irrigation and Hydro-electric Development in Palestine" by James B. Hays; first Israeli plan for developing Jordan water.
Mar 1951	First formal plan put forward by Jordan during post- 1948 period, presented by Sir M. McDonald and Partners.
1953	The United States becomes actively involved in Jordan water management planning. Johnston is appointed by Eisenhower, and given the rank of ambassador.
Oct 1955	Johnston presents "The Unified Development of the Water Resources of the Jordan Valley Region" to Israel, Jordan, Syria, Lebanon and Egypt—was initially poorly received. Counterproposals put forward: the Cotton Plan for Israel and the Arab Plan for the Arab countries.
1955	Engineering study conducted by Michael Baker, Jr., Inc. and Harza Engineering (American firms); concludes that less water is needed by Jordan than is thought; more water is therefore available for negotiations. An agreement is reached by technical committees.
11 Oct 1955	Unified Plan fails to win approval by Arab League, is sent back until plan better protects Arab interests.
15 Oct 1954	Letter from Johnston to Assistant Secretary of State Byroade urging that any financial aid in support of the project be in addition to existing aid.
Jan-Feb 1955	Johnston returns to the Middle East for talks. 2/19/55 (Beirut) Johnston reaches a "preliminary understanding" concerning major elements of the proposed plan with Jordan, Lebanon, Syria, and Egypt. Tentative agreement reached on: 300 MCM dam on the Yarmuk and diversion of Yarmuk floodwaters to Sea of Galilee for release to Jordan. Israel would receive approximately 409 MCM/yr.

10 Mar 1955	Discussion w/Israel begins concerning the arrangement; Johnston reassures Israel about its main concern, the nature of the neutral authority which would be established to oversee the allocations of Galilee water.
14 Mar 1955	Meeting between Assistant Secretary of State Allen and Ambassador Eban of Israel; Eban says that Allen threatened to withhold aid from Israel if the Israelis did not come to terms with Johnston. In a meeting later that same day w/ Secretary of State Dulles, Governor Stassen, Assistant Secretary Allen, and Arthur Gardiner, Johnston brings the issue up for discussion. Allen states that he had "advised Mr. Eban that agreement on the Jordan River problem would furnish a useful basis for aid."
June 1955	Israel agrees to the basic terms of the plan Johnston had set up with the Arabs in Beirut.
1955-56	Events begin overtaking chances of agreement. Jordanian press reported several times in May 1955 that the project is intended to resettle Palestinian refugees. Public opposition springs up in August 1955; the Jordan National Socialist Party puts out a memo listing several points of opposition.
27 July 1955	Lebanon expresses its intent not to allow any water from the Hasbani to be distributed.
Aug 1955	Johnston returns to Middle East for talks with representatives from the Arab states.
30 Aug 1955	Jordan states that it would accept Jordan Valley proposals on economic grounds given certain modifications, but that a political decision would have to be decided by a subcommittee of Arab states.
Sep 1955	Meeting with Arab representatives continue, but no decision is reached.
1956	Israel indicates it would be willing to wait and see if Arab states would accept the plan before beginning work on a system to divert water from the upper Jordan.
Oct 1956	War in Sinai Desert effectively ends any explicit chance of agreement. Implicit agreements managed through ongoing discussions through the good offices of the United Nations Truth Supervision Organization and, later, the "Picnic Table Talks" between Israel and Jordan.

Negotiations over the Yarmuk:

1952	Maqarin Dam first proposed by Miles Bunger, an American attached to the Technical Cooperation Agency in Amman.

1953	Jordan and UNRWA sign an agreement to implement Bunger Plan, including a dam at Maqarin with a storage capacity of 480 MCM. Syria and Jordan agree that Syria will receive two-thirds of the hydropower generated, in exchange for Jordan receiving seven-eighths of the natural flow of the river.
1953-55	Johnston Negotiations. Main Plan included a dam 47 meters high with a storage of 47 MCM, to be managed in conjunction with storage in the Sea of Galilee. Arab position argued for the hydropower that a higher dam would produce, and that, "...the water needed for Arab crops should be under direct Arab control." Therefore, a high dam was agreed to, 126 meters high with a storage capacity of 300 MCM. Negotiations never ratified.
28 Oct 1957	Soviet-Syrian Aid Agreement, including provisions for a hydroelectric project in the Yarmuk basin.
1964	Concept of a dam on the Yarmuk reaffirmed at the First (and subsequent) Arab Summit(s) in Cairo, as a component in the All-Arab Diversion Project. Construction begun on lower dam at Mukheiba.
1967	Construction halted as a result of June 1967 war. One side of projected dam site would now abut on Israeli-occupied Golan Heights.
1975	Jordanian Seven Year Plan includes a dam at Maqarin with a storage capacity of 486 MCM, which would generate 20 MW of power.
1977	Jordanian water officials approach their Israeli counterparts through U.S. intermediaries and discuss re-building the low dam at Mukheiba. Israelis agree, but elections in that country, and the resulting shift in government, put further negotiations on hold.
1980	President Carter pledges a $9 million USAID loan towards Jordan's plan, in addition to $10 million which had already been allocated. Congress commits $150 million, on condition that all riparians agree to resolve their differences over the river. U.S. mediation efforts led by Philip Habib prove fruitless, although some agreement is reached on summer flow allocations, and the plan is indefinitely postponed.
Mid-1980s	In absence of an agreement, Syria begins a series of small impoundment dams on the headwaters of the Yarmuk within Syrian territory. By August 1988, 20 dams were in place with a combined capacity of 156 MCM. That capacity has grown to 27 dams with a combined capacity of approximately 250 MCM and is projected to grow to total storage of 366 MCM by 2010. Israel, meanwhile, increases its Yarmuk withdrawals from the 25 MCM allocated in the Johnston negotiations, to 70-100 MCM/yr.
1987	Agreement signed by Jordan and Syria, whereby Jordan receives the water stored in the proposed dam, while Syria receives all of the 46 MW of

hydropower to be generated. World Bank insists that all riparians agree to project before funding is provided—Israel refuses.

1989-90 Indirect negotiations on the Maqarin Dam are renewed, mediated by Richard Armitage of the U.S. Department of State, with talks focusing on winter flows. Negotiations are put on hold during Gulf War and are not renewed.

Case IV

The Multilateral Working Group on Water Resources

Case Summary

River Basin: All water resources of the Middle East

Dates: 1992 to present

Relevant Parties: United States and Russia (sponsoring); Bilateral parties (except Syria and Lebanon): Israel, Jordan, Palestinians, Egypt; Periphery: Arab States from Gulf and Maghreb; Observer and donor parties.

Flashpoint: None

Issues:

Stated Objectives: Help develop capacity for greater efficiency in water supply, demand, and institutions throughout the Middle East, in support of bilateral peace negotiations

Additional Issues:

Non-water: Personal ice-breaking and confidence-building

Excluded issues: Water rights
Multi-riparian agreements
Water quality (handled by Working Group on Environment)

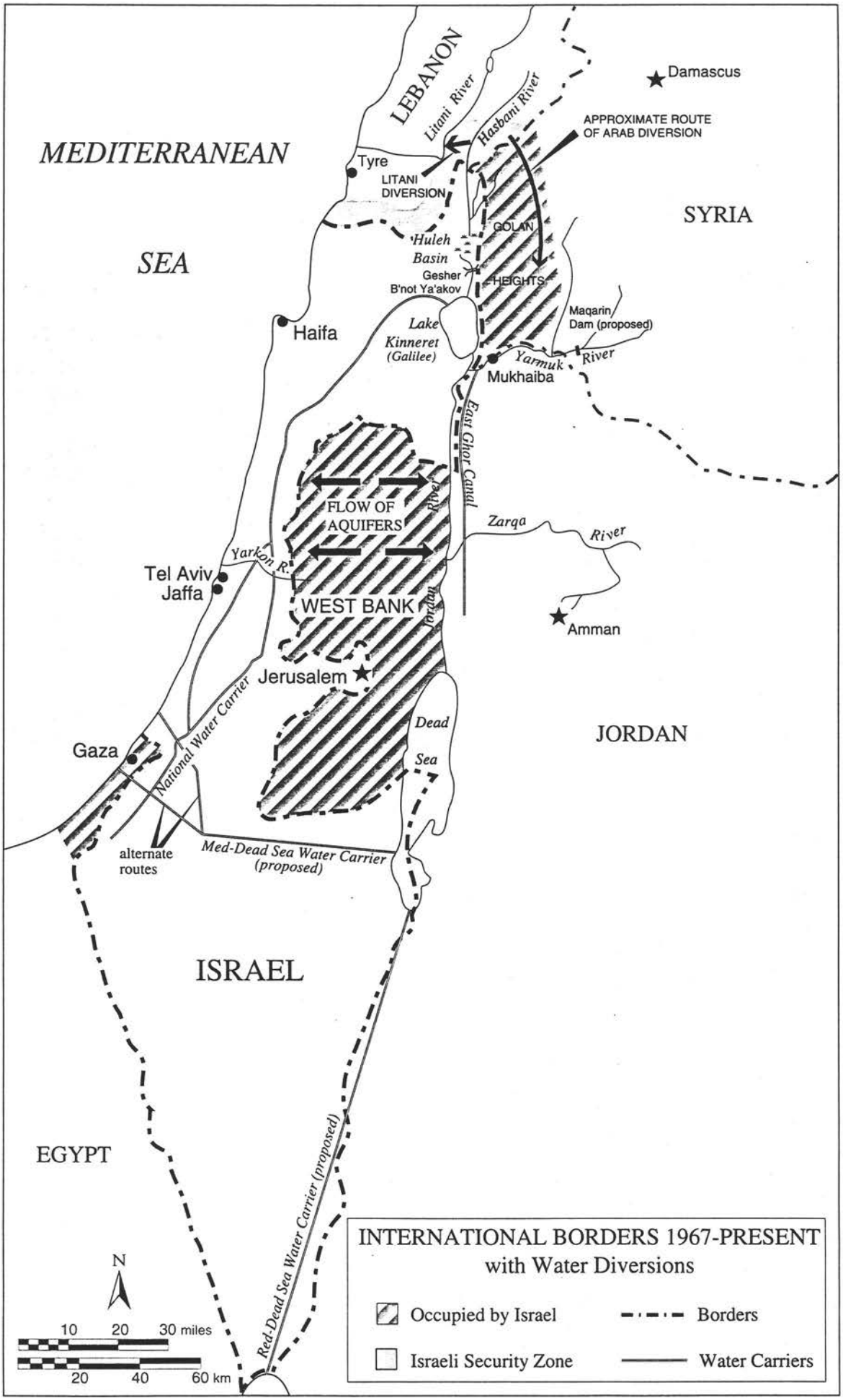
Criteria for Water Allocations: None

Incentives/Linkage:

Financial: Donor parties helping to finance feasibility studies and implementation as agreements take place

Political: Talks help pave the way for progress in bilateral negotiations

Breakthroughs: Announcement of the creation of the Palestinian Water Authority welcomed by all parties; first Arab proposal for water group and first Israeli proposal for any working group, accepted by consensus.


LEBANON
Litani River
Hasbani River
Damascus
APPROXIMATE ROUTE OF ARAB DIVERSION
MEDITERRANEAN
SEA
Tyre
LITANI DIVERSION
SYRIA
GOLAN
HEIGHTS
Huleh Basin
Gesher B'not Ya'akov
Haifa
Lake Kinneret (Galilee)
Maqarin Dam (proposed)
Yarmuk River
Mukhaiba
East Ghor Canal
FLOW OF AQUIFERS
Zarqa River
Yarkon R.
Tel Aviv
Jaffa
WEST BANK
Jordan River
Amman
Jerusalem
Dead Sea
JORDAN
Gaza
National Water Carrier
alternate routes
Med-Dead Sea Water Carrier (proposed)
ISRAEL
EGYPT
Red-Dead Sea Water Carrier (proposed)
N
10 20 30 miles
20 40 60 km
INTERNATIONAL BORDERS 1967-PRESENT
with Water Diversions
Occupied by Israel
Israeli Security Zone
Borders
Water Carriers

Status: Meetings are ongoing, occurring approximately every six months.

Background

By 1991, several events combined to shift the emphasis on the potential for "hydro-conflict" in the Middle East to the potential for "hydro-cooperation." The first event was natural, but limited to the Jordan basin. Three years of below-average rainfall caused a dramatic tightening in the water management practices of each of the riparians—Israel, Jordan, Lebanon, Palestinians and Syria—including rationing, cutbacks to agriculture by as much as 30 percent, and restructuring of water pricing and allocations. Although these steps placed short-term hardships on those affected, they also showed that, for years of normal rainfall, there was still some flexibility in the system. Most water decision-makers agree that these steps, particularly regarding pricing practices and allocations to agriculture, were long overdue.

The next series of events were geopolitical, and regionwide, in nature. The Gulf War in 1990 and the collapse of the Soviet Union caused a re-alignment of political alliances in the Mideast which finally made possible the first public face-to-face peace talks between Arabs and Israelis, in Madrid on 30 October 1991. During the bilateral negotiations between Israel and each of its neighbors, it was agreed that a second track be established for multilateral negotiations on five subjects deemed "regional." These are water, environment, economic development, arms control, and refugees. Because these negotiations are ongoing, they are not covered in as much detail as are other case studies in this publication.

The Problem

Until the current Arab-Israeli peace negotiations began in 1991, attempts at Middle East conflict resolution had endeavored to tackle either political or resource problems, always separately. By separating the two realms of "high" and "low" politics, some have argued, each process was doomed to fail. In water resource issues—the Johnston Negotiations of the mid 1950s, attempts at "water-for-peace" through nuclear desalination in the late 1960s, negotiations over the Yarmuk River in the 1970s and 1980s, and the Global Water Summit Initiative of 1991—all addressed water *qua* water, separate from the political differences between the parties. All failed to one degree or another.

While political tensions have precluded any comprehensive agreement over the waters of the Middle East, unilateral development in each country has tried to keep pace with the water needs of growing populations and economies. As a result, demand for water resources in most of the countries in the region exceeds at least 90 percent of the renewable supply, the only exceptions being Lebanon and Turkey. All of the countries and territories riparian to the Jordan River—Israel, Syria, Jordan, and the West Bank—are currently using between 95 percent and more than 100 percent of their annual renewable freshwater supply. Gaza exceeds its renewable supplies by 50 percent every year, resulting in serious saltwater intrusion. In recent dry years,

water consumption has routinely exceeded annual supply, the difference usually being made up through overdraft of fragile groundwater systems.

In water systems as tightly managed and exploited as those of the Middle East, any future unilateral development is likely to be extremely expensive if based on technology, or politically volatile if threatening the resources of a neighbor. It has been clear to water managers for years that the most viable options include regional cooperation as a minimum prerequisite.

Attempts at Conflict Management

Since the opening session of the multilateral talks in Moscow in January 1992, the Working Group on Water Resources, with the United States as gavel-holder, has been the venue by which problems of water supply, demand, and institutions has been raised among three of the five parties to the bilateral negotiations (Israel, Jordan, and the Palestinians participate in the Working Group; Lebanon and Syria do not). Many Arab states from the Gulf and the Maghreb also participate, as do non-regional delegations, including representatives from governments (for example, Canada, China, the European Union, Japan, and Turkey) and from donors such as the World Bank.[5]

The two tracks of the current negotiations, the bilateral and the multilateral, seek to use progress in each as a "positive feedback loop." The idea is that the multilateral working groups provide forums for relatively free dialogue on the past and future of the region and, in the process, allow for ice-breaking and confidence-building to take place, thus helping to smooth the way for progress in the bilateral talks. Additionally, while political considerations are clearly important factors in the multilateral talks, innovative, creative ideas can be exchanged and discussed more openly, outside of the heavy political constraints of the more formal bilateral negotiations.

[5] Representatives from the following parties have participated in all or some of the meetings: Algeria, Australia, Austria, Bahrain, Belgium, Canada, China, Denmark, European Union, Egypt, Finland, France, Germany, Greece, India, Ireland, Israel, Italy, Japan, Jordan, Kuwait, Luxembourg, Mauritania, Morocco, Netherlands, Norway, Oman, Palestinians, Portugal, Qatar, Russia, Saudi Arabia, Spain, Sweden, Switzerland, Tunisia, Turkey, Ukraine, United Arab Emirates, United Kingdom, United Nations, United States, Yemen.

As of mid-1994, the Working Group on Water has met five times:

Meeting	Dates	Location
Multilateral organizational meeting	28-29 January 1992	Moscow
Water Talks, Round 2	14-15 May 1992	Vienna
Water Talks, Round 3	16-17 September	Washington, DC
Water Talks, Round 4	27-29 April 1993	Geneva
Water Talks, Round 5	26-28 October 1993	Beijing
Water Talks, Round 6	17-19 April 1994	Muscat

The pace of success on each round has varied but, in general, has been increasing. The third round in Washington, D.C., in September 1992 reached consensus on the following area of focus for future multilateral talks:

- enhancement of water data;
- water management practices;
- enhancement of water supply; and
- concepts for regional cooperation and management.

By July 1993, inter-sessional activities had begun, with about 20 activities as diverse as a study tour of the Colorado River basin and a series of seminars on semi-arid lands. Subsequent capacity-building activities included a U.S./EU training needs assessment, conducted in conjunction with many regional parties, producing a series of 14 courses, covering subjects as broad as concepts of integrated water management and as detailed as groundwater flow modelling. There is a commitment from the donor community to fund each of these courses.

On September 15, 1993, the Declaration of Principles on Interim Self-Government Arrangements was signed between Palestinians and Israelis, which called for Palestinian autonomy in, and the removal of Israeli military forces from, Gaza and Jericho. The following provisions in the Declaration of Principles pertain to water resources:

> Article VII. 4, Interim Agreement: In order to enable the Council to promote economic growth, upon its inauguration, the Council will establish, among other things, a Palestinian Electricity Authority, a Gaza Sea Port Authority, a Palestinian Development Bank, a Palestinian Export Promotion Board, a Palestinian Environmental Authority, a

Palestinian Land Authority and a Palestinian Water Administration Authority, and any other Authorities agreed upon, in accordance with the Interim Agreement that will specify their powers and responsibilities.

Annex III. 1: The two sides agree to establish an Israeli-Palestinian Continuing Committee for Economic Cooperation, focusing, among other things, on the following:

Cooperation in the field of water, including a Water Development Program prepared by experts from both sides, which will also specify the mode of cooperation in the management of water resources in the West Bank and Gaza Strip, and will include proposals for studies and plans on water rights of each party, as well as on the equitable utilization of joint water resources for implementation in and beyond the interim period.

Annex IV. 2, B: The Regional Economic Development Program may consist of the following elements:

(3) The Mediterranean Sea (Gaza) - Dead Sea Canal.

(4) Regional Desalinization and other water development projects.

Annex IV. 3: The two sides will encourage the multilateral working groups, and will coordinate towards their success. The two parties will encourage intersessional activities, as well as prefeasibility and feasibility studies, within the various multilateral working groups.

While a bilateral agreement, the Declaration of Principles helped streamline a logistically awkward aspect of the multilateral talks, as the PLO became openly responsible for representing the Palestinians (previously, the Palestinian delegation had been affiliated with the Jordanian delegation).

Outcome

Water Working Group activities conducted and agreements reached:

Enhancement of Data Availability

- agreement reached on need for regional water data banks, and implementation plan under development

Water Management Practices (Including Conservation)

- terms of reference under development for a study of regional supply and demand;
- Israeli proposal for rehabilitation of municipal water distribution system networks accepted, and initial meeting to occur in Oslo in October 1994 (this was the first Israeli proposal to be accepted by any working group);

- U.S.-led project on design of small community wastewater treatment systems is under way;
- World Bank completed a study of conservation opportunities in the West Bank and Gaza Strip.

Enhancing Water Supply

- an Omani proposal to establish a desalination research and technology center in Muscat was accepted, the first Arab proposal to be accepted by any working group;
- a Canadian effort to install rainwater catchment systems in Gaza is under way, marking the first "hardware" project to be accepted by the working group.

Concepts of Regional Water Management and Cooperation

- a series of 14 training courses for the water sector is being conducted by the U.S., EU, U.N., France, Japan, Spain, Israel, Canada, and the Netherlands;
- the U.N. conducted a workshop on models for regional cooperation and management.

Progress has been made in bilateral negotiations between Jordan and Israel as well. On 7 June 1994, the two states announced that they had reached an agreement on a sub-agenda for cooperation, building on an agenda for peace talks which had been agreed to on 14 September 1993, which would lead eventually to a peace treaty. This sub-agenda included several water-related items, notably in the first heading listed in the document (in advance of security issues, and border and territorial matters).

Given the length of time the region has been enmeshed in bitter conflict, the pace of accomplishment has been impressive, no less so in the area of water resources. This may be due in part to the structure of the peace talks, with two complementary and mutually reinforcing tracks—the bilateral and multilateral. The working group has played a crucial role during the critical early stages of negotiations as a vehicle for venting past grievances, presenting various views of the future, and allowing for personal "de-demonization" and confidence building. Now that the peace process has advanced dramatically, the challenge is to find new ways for the multilateral working group to build on this contribution, and foster additional progress towards a "just and lasting peace." This is a difficult challenge, because the thorniest water issues (for example, water allocations and water rights) are being handled in the bilateral negotiations. Nonetheless, there is still an acute need for a forum in which innovation and creativity can thrive, and in which concrete activities and projects can be realized. The Working Group on Water provides such a forum. In fact, the Declaration of Principles specifically calls for the bilateral parties (Israelis and Palestinians) to encourage the multilateral working groups, as well as encourage inter-sessional activities and feasibility studies.

Though not a part of the multilateral working group activities, "Track II" efforts in resolving water disputes in the region deserve mention here. The term "Track II" refers to those activities outside of the official negotiations, i.e. outside of the bilateral and the multilateral talks. As noted earlier, past attempts at resolving water issues separately from their political framework, dating from the early 1950s through 1991, have all failed to one degree or another. Once the taboo of Israelis and Arabs meeting openly in face-to-face talks was broken in Madrid in October 1991, the floodgates were open, as it were, and a flurry of long-repressed activity on water resources began to take place outside of the official peace process. This included several academic conferences on Middle Eastern water resources in, among other places, Canada, Turkey, Illinois, Washington D.C. (three), and, notably, the first Israeli-Palestinian conference on water resources in Geneva; unofficial "Track II" dialogues in Nevada, Cairo, and Idaho; the establishment by the IWRA of the Middle East Water Commission to help facilitate research on the subject; and organization of the Middle East Water Information Network (MEWIN) to coordinate regional data collection. While this flurry of water-related activity may have been moderately helpful in generating ideas outside of the constraints of the official process, and more so in fostering better personal relations between the water professionals of the region, many negotiators involved with the official process suggest limited influence, usually because no mechanism exists to encourage dialogue between the tracks.

Lessons Learned

In attempts at resolving particularly contentious disputes, solving problems of politics and resources can be facilitated through two mutually reinforcing tracks.

The most useful lesson of the multilateral working group on water resources is the handling of water and political tensions simultaneously, in the bilateral and multilateral working groups respectively, each track helping to reinforce the other. This lesson has been learned after a long history of failing to solve water problems outside of their political context.

The first task of water negotiations between particularly hostile reparians may be simply to get individuals together talking about relatively neutral issues.

The working group has performed admirably in the crucial early stages of negotiations as a vehicle for venting past grievances, presenting various views of the future, and, perhaps, most important, fostering personal relation and confidence-building. Where traditional negotiations might have tried to tackle issues of water rights and allocations initially, those directing the working group negotiations recognized the greater initial value of seminars, field trips, and workshops on relatively neutral issues. These activities also provided practice in reaching consensus as a group.

Inclusion of donor and observer parties can generally be helpful, although coordination is necessary.

Both donor and observer parties have helped the process by funding and/or performing feasibility studies, holding workshops, and organizing field trips. The World Bank has also helped to prioritize the needs of the core basins through a series of questionnaires and country reports.

Track II dialogues would have greater utility if there were a mechanism for feeding ideas generated into the main negotiating track.

Despite a flurry of water-related studies, conferences, and alternative track dialog, and despite some creative ideas and thinking which result outside of the pressures of official negotiations, sponsors of the multilaterals report little influence of this activity on the official talks, probably because few meetings have a mechanism for feeding the ideas generated directly to the parties concerned.

Creative Outcomes Resulting from Resolution Process

- The most creative outcome of the current negotiations is probably the structure of the two tracks of the negotiations: the bilateral negotiations which deal with explicitly political issues including those from the past, and the multilateral working groups which help define a common vision of the future. Each track helps reinforce the other, catalyzing the pace toward a comprehensive peace settlement.
- Early emphasis of the working group on water resources was on comparatively neutral topics and workshops, not on contentious political aspects of the water conflict.
- The talks foster a relatively open exchange of ideas by, for example, having no publicly distributed record and relying on consensus for all decision-making. The consensus approach ensures a level of egalitarianism in the working group by giving each party an effective veto over each issue. This encourages dividing issues into small, manageable portions on which all parties will agree, but also discourages attempts at solving larger, more difficult issues.

Timeline

The Multilateral Working Group on Water:

30 Oct 1991	First public, face-to-face peace talks between Arabs and Israelis are held in Madrid. Talks begin as bilateral, between Israel and each of its neighbors.
28-29 Jan 1992	Multilateral organizational meeting in Moscow. Peace process is designed along two tracks—the bilateral

negotiations, involving separate direct negotiations between Israel and each of its neighbors, and the multilateral negotiations revolving around five regional subjects, including water resources. Goal is to allow framework for defining future of the region, as well as to include peripheral Arab states, other countries, and donor NGOs.

14-15 May 1992 First meeting of Multilateral Working Group on Water Resources in Vienna. Palestinians first raise issue of water rights; Israel's position is that water rights are a bilateral issue. World Bank asks each party to compile a program for regional water resources development, following three possible scenarios: no outside investment, current government plans, and unlimited resources. These scenarios would be examined in the United States for any commonalities which could be culled to induce cooperation. Only decision reached is to plan for next round of talks.

16-17 Sep 1992 Second round of water talks in Washington, D.C. Agreement on four general subjects for multilateral talks on water: enhancement of water data, water management practices, enhancement of water supply, and concepts for regional cooperation and management. Role of multilaterals clarified—to plan for future region at peace, not to settle specific disputes.

27-29 Apr 1993 The third Working Group on Water meeting in Geneva proves difficult following a disagreement over a Palestinian request that water rights be included in multilateral talks.

May 1993 Israelis and Palestinians agree to discuss water rights in the Occupied Territories within the framework of the Bilateral Negotiations, and Palestinians agree to participate in intersessional activities. This agreement, which came about in discussions at the Working Group on Refugees meeting in Oslo, also called for American representatives of the water working group to visit the region.

15 Sep 1993 Declaration of Principles signed between Israelis and Palestinians, which includes several water-related items.

26-28 Oct 1993 Fourth round of Working Group on Water Resources meets in Beijing. Presentations are made on each of four topics and several projects are agreed to; priority needs assessment is presented and courses are approved.

17-19 Apr 1994 Fifth round of Working Group meets in Muscat, Oman. The meeting is productive after all parties agree to welcome a Palestinian announcement of the creation of a Palestinian Water Authority in the autonomous territories of Gaza and Jericho (Israel agrees provided it will not be seen as a precedent in other territories). Other endorsements include: an Omani proposal to establish a desalination research and technology center; an Israeli proposal to lead an effort of water conservation and rehabilitation of municipal water systems; a German offer to study regional supply and demand; a U.S. proposal to perform a study of wastewater treatment and reuse; and the United States and European Union would implement a regional water training program to begin in June 1994.

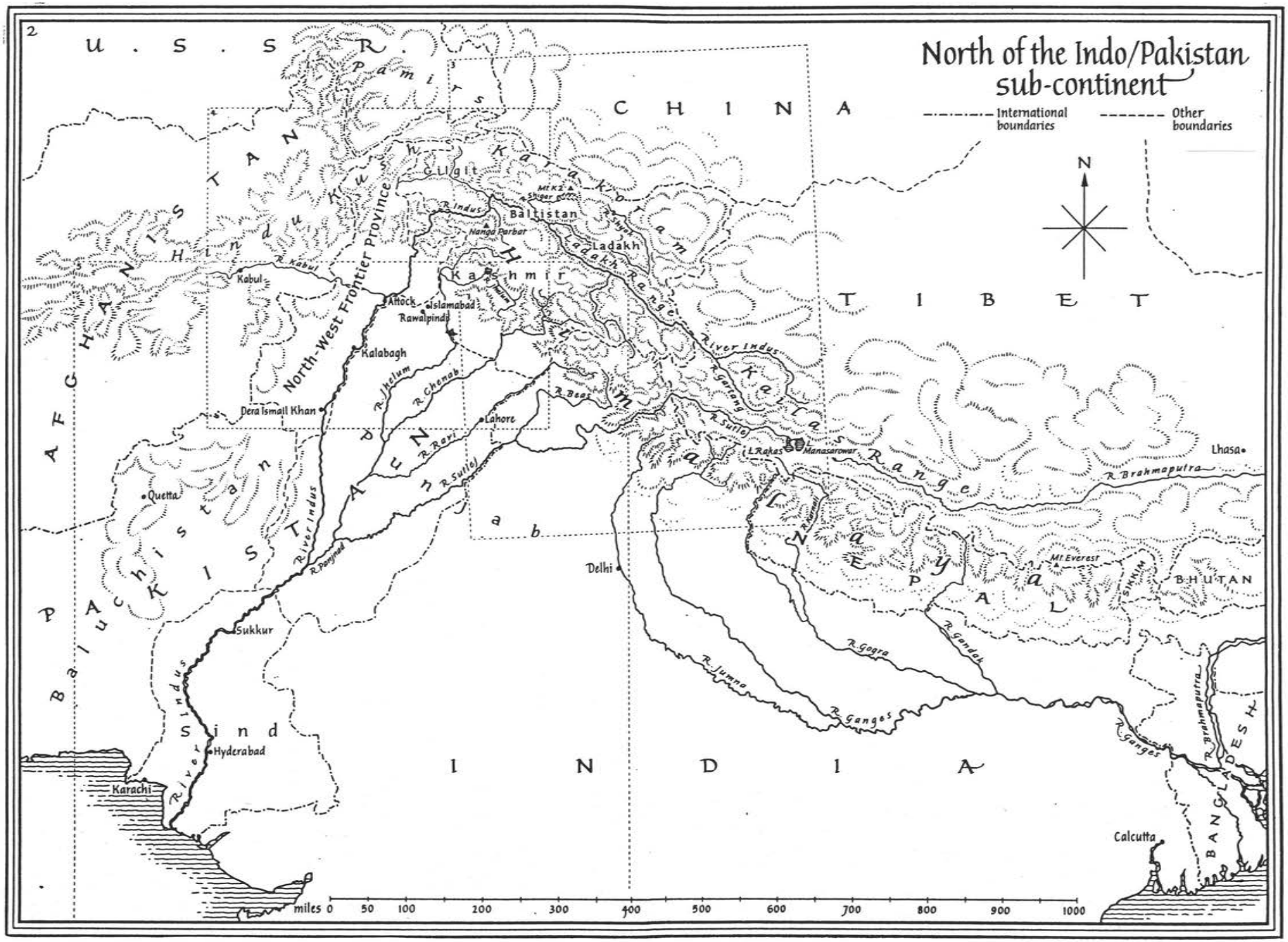
7-9 June 1994 Bilateral talks take place between Israel and Jordan in Washington, D.C. Sub-agenda items are determined for talks leading to a Treaty of Peace, including several water-related topics.

Case V

Indus Water Treaty

Case Summary

River Basin:	Indus River and tributaries
Dates of Negotiation:	1951-1960
Relevant Parties:	India, Pakistan
Flashpoint:	Lack of water-sharing agreement leads India to stem flow of tributaries to Pakistan on 1 April 1948
Issues:	
Stated Objectives:	Negotiate an equitable allocation of the flow of the Indus River and its tributaries between the riparian states Develop a rational plan for integrated watershed development
Additional Issues:	
Water-related:	Financing for development plans Whether storage facilities are "replacement" or "development" (tied to who is financially responsible)
Non-water:	General India-Pakistan relations
Excluded issues:	Future opportunities for regional management Issues concerning drainage
Criteria for Water Allocations:	Historic and planned use (for Pakistan) plus geographic allocations (western rivers vs. eastern rivers)
Incentives/Linkage:	
Financial:	World Bank organized International Fund Agreement
Political:	None
Breakthroughs:	Bank put own proposal forward after 1953 deadlock; international funding raised for final agreement
Status:	Ratified in 1960, with provisions for ongoing conflict resolution. Some suggest that recent meetings have been lukewarm. Physical separation of tributaries may preclude efficient integrated basin management.



Source: Jean Fairley, *The Lion River: The Indus*, S.I. Gillani, Lahore, 1975.

Background

Irrigation in the Indus River basin dates back centuries; by the late 1940s the irrigation works along the river were the most extensive in the world. These irrigation projects had been developed over the years under one political authority, that of British India, and any water conflict could be resolved by executive order. The Government of India Act of 1935, however, put water under provincial jurisdiction, and some disputes did begin to crop up at the sites of the more extensive works, notably between the provinces of Punjab and Sind.

In 1942, a judicial commission was appointed by the British government to study Sind's concern over planned Punjabi development. The Commission recognized the claims of Sind and called for integrated management of the basin as a whole. The Commission's report was found unacceptable by both sides, and the chief engineers of the two sides met informally between 1943 and 1945 to try to reconcile their differences. Although a draft agreement was produced, neither of the two provinces accepted the terms, and the dispute was referred to London for a final decision in 1947.

Before a decision could be reached, however, the Indian Independence Act of 15 August 1947 internationalized the dispute between the new states of India and Pakistan. Partition was to be carried out in 73 days, and the full implications of dividing the Indus basin seem not to have been fully considered, although Sir Cyril Radcliffe, who was responsible for the boundary delineation, did express his hope that "some joint control and management of the irrigation system may be found." Heightened political tensions, population displacements, and unresolved territorial issues all served to exacerbate hostilities over the water dispute.

As the monsoon flows receded in the fall of 1947, the chief engineers of Pakistan and India met and agreed to a "Standstill Agreement," which froze water allocations at two points on the river until 31 March 1948, allowing discharges from headworks in India to continue to flow into Pakistan.

On 1 April 1948, the day that the "Standstill Agreement" expired, in the absence of a new agreement, India discontinued the delivery of water to the Dipalpur Canal and the main branches of the Upper Bari Daab Canal. Several motives have been suggested for India's actions. The first is legalistic—that of an upper riparian establishing its sovereign water rights. Others include an Indian maneuver to pressure Pakistan on the volatile Kashmir issue, to demonstrate Pakistan's dependence on India in the hope of forcing reconciliation, or to retaliate against a Pakistani levy of an export duty on raw jute leaving East Bengal. Another interpretation is that the latter action was taken by the provincial government of East Punjab, without the approval of the central government.

Regardless of the motives for the action and despite the resumption of water delivery less than a month later, Pakistan's awareness of its vulnerability to its upstream neighbor for economic viability was heightened immeasurably.

The Problem

Even before the partition of India and Pakistan, the Indus posed problems between the states of British India. The problem became international after partition, however, and the attendant increased hostility and lack of supralegal authority only exacerbated the issue. The water sources for Pakistani territory now originated in another country, one with whom geopolitical relations were increasingly hostile.

The question over the flow of the Indus is a classic case of the conflicting claims of upstream and downstream riparians. The conflict can be exemplified in the terms for the resumption of water delivery to Pakistan from the Indian headworks, worked out at an Inter-Dominion conference held in Delhi 3-4 May 1948. India agreed to the resumption of flow but maintained that Pakistan could not claim any share of those waters as a matter of right.

This position was reinforced by the Indian claim that, since Pakistan had agreed to pay for water under the Standstill Agreement of 1947, Pakistan had recognized India's water rights. Pakistan countered that it had rights of prior appropriation and that payments to India were only to cover operation and maintenance costs.

Although these conflicting claims were not resolved, an agreement was signed, later referred to as the Delhi Agreement, in which India assured Pakistan that India would not withdraw water delivery without allowing time for Pakistan to develop alternate sources. Pakistan later expressed its displeasure with the agreement in a note, dated 16 June 1949, calling for the "equitable apportionment of all common waters" and suggesting turning jurisdiction of the case over to the World Court. India suggested rather that a commission of judges from each side try to resolve their differences before turning the problem over to a third party. Stalemate on these two positions lasted through 1950.

Attempts at Conflict Management

In 1951, Indian Prime Minister Nehru, whose interest in integrated river management along the lines of the Tennessee Valley Authority had been piqued, invited David Lilienthal, former chairman of the TVA, to visit India. Lilienthal also visited Pakistan and, on his return to the United States, wrote an article outlining his impressions and recommendations. These included steps from the psychological (a call to allay Pakistani suspicions of Indian intentions for the Indus headwaters) to the practical (a proposal for greater storage facilities and cooperative management). Lilienthal also suggested that international financing be arranged, perhaps by the World Bank, to fund the workings and findings of an "Indus Engineering Corporation" and to include representatives from both states as well as from the World Bank.

The article was read by Lilienthal's friend David Black, president of the World Bank, who contacted Lilienthal for recommendations on helping to resolve the dispute. As a result, Black contacted the prime ministers of Pakistan and India, inviting both countries to accept the Bank's good offices. In a subsequent letter, Black outlined "essential principles" which might be followed for conflict resolution. These principles included the following:

- The water resources of the Indus basin should be managed cooperatively.
- The problems of the basin should be solved on a functional rather than political plane, without relation to past negotiations and past claims.

Black suggested that India and Pakistan each appoint a senior engineer to work on a plan for development of the Indus basin. A Bank engineer would be made available as an ongoing consultant.

Both sides accepted Black's initiative. The first meeting of the Working Party included Indian and Pakistani engineers along with a team from the Bank, as envisioned by Black, and met for the first time in Washington in May 1952.

The stated agenda was to prepare an outline for a program, including a list of possible technical measures to increase the available supplies of Indus water for economic development. After three weeks of discussions, an outline was agreed upon, whose points included:

- determination of total water supplies, divided by catchment and use;
- determination of the water requirements of cultivable irrigable areas in each country;
- calculation of data and surveys necessary, as requested by either side;
- preparation of cost estimates and a construction schedule of new engineering works which might be included in a comprehensive plan.

In a creative avoidance of a potential and common conflict, the parties agreed that any data requested by either side would be collected and verified when possible, but that the acceptance of the data or the inclusion of any topic for study would not commit either side to its "relevance or materiality."

When the two sides were unable to agree on a common development plan for the basin in subsequent meetings in Karachi, November 1952, and Delhi, January 1953, the Bank suggested that each side submit its own plan. Both sides submitted plans on 6 October 1953, which mostly agreed on the supplies available for irrigation but varied extremely on how the supplies should be allocated. The Indian proposal allocated 29 MAF/yr[6] to India and 90 MAF to Pakistan, totaling 119 MAF. The Pakistani proposal, in contrast, allocated India 15.5 MAF and Pakistan 102.5 MAF, for a total of 118 MAF.

[6] Since all negotiations were in English units, that is what is reported here. MAF = million acre feet = 1233.48 million cubic meters.

Figure 1

WATER ALLOCATIONS FROM INDUS NEGOTIATIONS[1]

PLAN	India	Pakistan
Initial Indian	29 MAF/yr	90
Initial Pakistani	15.5	102.5
Revised Indian	All of the eastern rivers and 7% of the western rivers	None of the eastern rivers and 93% of the western rivers
Revised Pakistani	30% of the eastern rivers and none of the western rivers	70% of the eastern rivers and all of the western rivers
World Bank Proposal	Entire flow of the eastern rivers[2]	Entire flow of the western rivers[3]

[1] Initial estimates of supplies available differed only slightly, with the Indian Plan totaling 119 MAF and the Pakistani Plan arriving at 118 MAF. The "eastern rivers" consist of the Ravi, Beas, and Sutlej tributaries; the "western rivers" refer to the Indus, the Jhelum, and the Chenab.

[2] India would agree to continue to supply Pakistan with its historic withdrawals from these rivers for a transition period to be agreed upon, which would be based on the time necessary to complete Pakistani link canals to replace supplies from India.

[3] The only exception would be an "insignificant" amount of flow from the Jhelum, used at the time in Kashmir.

The two sides were persuaded to adjust somewhat their initial proposals, but the modified proposals of each side still left too much difference to overcome. The modified Indian plan called for all of the eastern rivers (Ravi, Beas, and Sutlej) and 7 percent of the western rivers (Indus, Jhelum, and Chenab) to be allocated to India, while Pakistan would be allocated the remainder, or 93 percent of the western rivers. The modified Pakistani plan called for 30 percent of the eastern rivers to be allocated to India, while 70 percent of the eastern rivers and all of the western rivers would go to Pakistan.

The Bank concluded that not only was the stalemate likely to continue, but that the ideal goal of integrated watershed development for the benefit of both riparians was probably too elusive a goal at this stage of political relations. On 5 February 1954, the Bank issued its own proposal,

abandoning the strategy of integrated development in favor of one of separation. The Bank proposal called for the entire flow of the eastern rivers to be allocated to India, and all of the western rivers, with the exception of a small amount from the Jhelum, to be allocated to Pakistan. According to the proposal, the two sides would agree to a transition period while Pakistan would complete link canals dividing the watershed, during which India would continue to allow Pakistan's historic use to continue to flow from the eastern rivers.

The Bank proposal was given to both parties simultaneously. On 25 March 1954, India accepted the proposal as the basis for agreement. Pakistan viewed the proposal with more trepidation and gave only qualified acceptance on 28 July 1954; Pakistan's position was that the flow of the western rivers was insufficient to replace existing supplies from the eastern rivers, particularly given limited available storage capacity. To help facilitate an agreement, the Bank issued an aide memoir, calling for more storage on the western rivers and suggesting India's financial liability for "replacement facilities"—increased storage facilities and enlarged link canals in Pakistan which could be recognized as the cost replacement of pre-partition canals.

Little progress was made until representatives from the two countries met in May 1958. Main points in contention included:

- whether the main replacement storage facility ought to be on the Jhelum or Indus rivers. Pakistan preferred the latter, but the Bank argued that the former was more cost-effective.
- what the total cost of new development would be and who would pay for it. India's position was that it would only pay for "replacement" and not for "development" facilities.

In 1958, Pakistan proposed a plan including two major storage facilities (i.e., one each on the Jhelum and the Indus), three smaller dams on both tributaries, and expanded link canals. India, objecting to both the extent and cost of the Pakistani proposal (approximately $1.12 billion), proposed an alternative plan which was smaller in scale, but which Pakistan rejected because it necessitated continued reliance on Indian water deliveries.

By 1959, the Bank saw the main issue still to be resolved as defining which works would be considered "replacement" and which "development." In other words, for which works would India be financially responsible? To circumvent the question, Black suggested an alternative approach in a visit to India and Pakistan in May. Perhaps India and Pakistan could settle on a specific amount for which India would be responsible, rather than arguing over individual works. The Bank might then help raise additional funds within the international development community for watershed development. India was offered help with construction of its Beas Dam, and Pakistan's plan, including both proposed dams, would be looked at favorably. With these conditions, both sides agreed to a fixed payment settlement and to a 10-year transition period during which India would allow Pakistan's historic flows to continue.

In August 1959, Black organized a consortium of donors to support development in the Indus basin, which raised close to $900 million, in addition to India's commitment of $174 million. The

Indus Water Treaty was signed in Karachi on 19 September 1960, and government ratifications were exchanged in Delhi in January 1961.

Outcome

The Indus Water Treaty addressed both the technical and financial concerns of each side and included a timeline for transition. The main points of the treaty included:

- an agreement that Pakistan would receive unrestricted use of the western rivers, which India would allow to flow unimpeded with minor exceptions;
- provisions for three dams, eight link canals, three barrages, and 2,500 tubewells to be built in Pakistan;
- a 10-year transition period, from 1 April 1960 to 31 March 1970, during which water would continue to be supplied to Pakistan according to a detailed schedule;
- a schedule for India to provide its fixed financial contribution of $62 million, in ten annual installments during the transition period;
- additional provisions for data exchange and future cooperation.

The treaty also established the Permanent Indus Commission, made up of one Commissioner of Indus Waters from each country. The two Commissioners would meet annually in order to:

- establish and promote cooperative arrangements for the treaty implementation;
- promote cooperation between the parties in the development of the waters of the Indus system;
- examine and resolve by agreement any question that might arise between the parties concerning interpretation or implementation of the treaty;
- submit an annual report to the two governments.

In case of a dispute, provisions were made to appoint a "neutral expert." If the neutral expert failed to resolve the dispute, negotiators could be appointed by each side to meet with one or more mutually agreed-upon mediators. If either side (or the mediator) viewed mediated agreement as unlikely, provisions were included for the convening of a Court of Arbitration. In addition, the treaty called for either party, if it undertook any engineering works on any of the tributaries, to notify the other of its plans and to provide any data which might be requested.

Since 1960, no projects have been submitted under the provisions for "future cooperation" nor have any issues of water quality been submitted. Other disputes have arisen and been handled in a variety of ways. The first issues arose from Indian non-delivery of some waters during 1965-66, but became instead a question of procedure and the legality of commission decisions. Negotiators resolved that each commissioner acted as a government representative and that their joint decisions were legally binding.

One controversy surrounding the design and construction of the Salal Dam was resolved through bilateral negotiations between the two governments. Other disputes, over new hydroelectric projects and the Wuller Barrage on the Jhelum tributary, have yet to be resolved.

Lessons Learned

Shifting political boundaries can turn intranational disputes into international conflicts, exacerbating tensions over existing issues.

Shifting borders and partition exacerbated what was, initially, an intranational Indian issue. After partition, political tensions, particularly over Kashmir territory, contributed to tensions of this conflict.

Power inequities may delay the pace of negotiations.

Power inequities may have delayed the pace of negotiations. India had both a superior riparian position and a relatively stronger central government than Pakistan. The combination may have acted as disincentive to reach agreement.

Positive, active, and continuous involvement of a third party is vital in helping to overcome conflict.

The active participation of Eugene Black and the World Bank were crucial to the success of the Indus Water Treaty. The Bank offered not only its good offices, but a strong leadership role as well. The Bank provided support staff, funding, and, perhaps most important, its own proposals when negotiations reached a stalemate.

Coming to the table with financial assistance can provide sufficient incentive for a breakthrough in agreement.

The Bank helped raise almost $900 million from the international community, allowing Pakistan's final objections to be addressed.

Some points may be agreed to more quickly, if it is explicitly agreed that a precedent is not being set.

In the 1948 agreement, Pakistan agreed to pay India for water deliveries. This point was later used by India to argue that, by paying for the water, Pakistan recognized India's water rights. Pakistan, in contrast, argued that it was paying only for operation and maintenance. In an early meeting (May 1952), both sides agreed that any data could be used without committing either side to its "relevance or materiality," thereby precluding delays over data discrepancies.

Sensitivity to each party's particular hydrologic concerns is crucial in determining the bargaining mix.

Early negotiations focused on quantity allocations, while one of Pakistan's main concerns was storage; the timing of the delivery was seen to be as crucial as the amount.

In particularly hot conflicts, when political concerns override, a suboptimal solution may be the best that can be achieved.

The plan pointedly disregards the principle of integrated water management, recognizing that between these particular riparians, the most important issue was control by each state of its own resource. Structural division of the basin, while crucial for political reasons, effectively precludes the possibility of increased integrated management.

Creative Outcomes Resulting from Resolution Process

- In a creative avoidance of a potential conflict, the parties agreed that any data requested by either side would be collected and verified when possible, but that the acceptance of the data, or the inclusion of any topic for study, would not commit either side to its "relevance or materiality."
- Water was separated out from other contentious issues between India and Pakistan. This allowed negotiations to continue, even in light of tensions over other topics. Water problems were to be viewed as "functional" rather than political.
- When both sides were unable to agree on a common development plan in 1953, the Bank suggested that each prepare its own plan, which the Bank would then inspect for commonalities. This active strategy to breaking impasses is currently being attempted with the riparians of the Jordan River watershed in conjunction with the multilateral working group on water.

Timeline

Pre-1935	British India has authority to resolve interstate water conflicts by executive order.
1935	Government of India Act makes water a subject of provincial jurisdiction, unless the central government is asked to intervene by states.
Oct 1939	Province of Sind formally requests Governor-General to review new Punjabi irrigation project and potential detriment to Sind.
Sep 1941	Indus Commission established.
July 1942	Commission submits its report suggesting that withdrawals by Punjab would cause "material injury" to inundation canals in Sind, particularly during the month of September. Incidentally called for management of the river system as a whole. Report found unacceptable to both sides.
1943-5	Chief engineers of both states meet informally, finally producing a draft agreement—provinces refuse to sign. Dispute referred to secretary of state for India in London early 1947.

15 Aug 1947	Independent states of India and Pakistan established. Eastern Punjab becomes part of India, western Punjab and Sind become part of Pakistan. Conflict becomes international, British role now irrelevant. Chair of Punjab Boundary Commission suggests that Punjab water system be run as joint venture—declined by both sides.
10 Dec 1947	"Standstill Agreement" negotiated by chief engineers of west and east Punjab, freezing allocations at two points until 31 March 1948.
1 Apr 1948	Without new agreement, India discontinues delivery of water to Dipalpur Canal and main branches of Upper Bari Daab Canal.
30 Apr 1948	India resumes water delivery as negotiations undertaken.
3-4 May 1948	Inter-Dominion conference; an agreement is signed. India assures Pakistan that India will not withdraw water delivery without allowing time for Pakistan to develop alternate sources. Other issues remain unresolved.
16 Jun 1949	Pakistan sends a note to India expressing displeasure with agreement. The note calls for a conference to resolve the "equitable apportionment of all common waters," and suggests giving the World Court jurisdiction over the application of either party. India objects to third-party involvement, suggests judges from each side might narrow dispute first. Stalemate results through 1950.
1951	David Lilienthal, past chairman of the Tennessee Valley Authority, invited to India as Prime Minister Nehru's guest. He later publishes an article with his suggestions, which captures the attention of Eugene Black, president of the World Bank.
Aug 1951	Black invites both prime ministers to meeting in Washington, D.C. Both accept, agree on outline of essential principles.
Jan-Feb 1952	Meetings continue, Black finds "common understanding," at least that neither side will diminish supplies for existing uses.
May 1952	First meeting of working party in Washington, D.C., of engineers from India, Pakistan, and the World Bank. Agreement to: determine future supply and demand; calculate available and desired data; prepare cost estimates and construction schedule of necessary infrastructure.
Nov 1952 & Jan 1953	Meetings continue in Karachi and Delhi without agreement. Bank suggests each side submit its own plan.
6 Oct 1953	Plans submitted with proposed allocations and sources for each state. Agreement on available supplies, not on allocations.
5 Feb 1954	Bank puts forth own proposal, essentially suggesting dividing the western tributaries to Pakistan and the eastern tributaries to India. The proposal also provides for continued deliveries to Pakistan during transition period.
25 Mar 1954	India accepts proposal. Pakistan is less enthusiastic—it would have to replace existing facilities.
28 July 1954	Pakistan delivers a qualified acceptance of proposal.

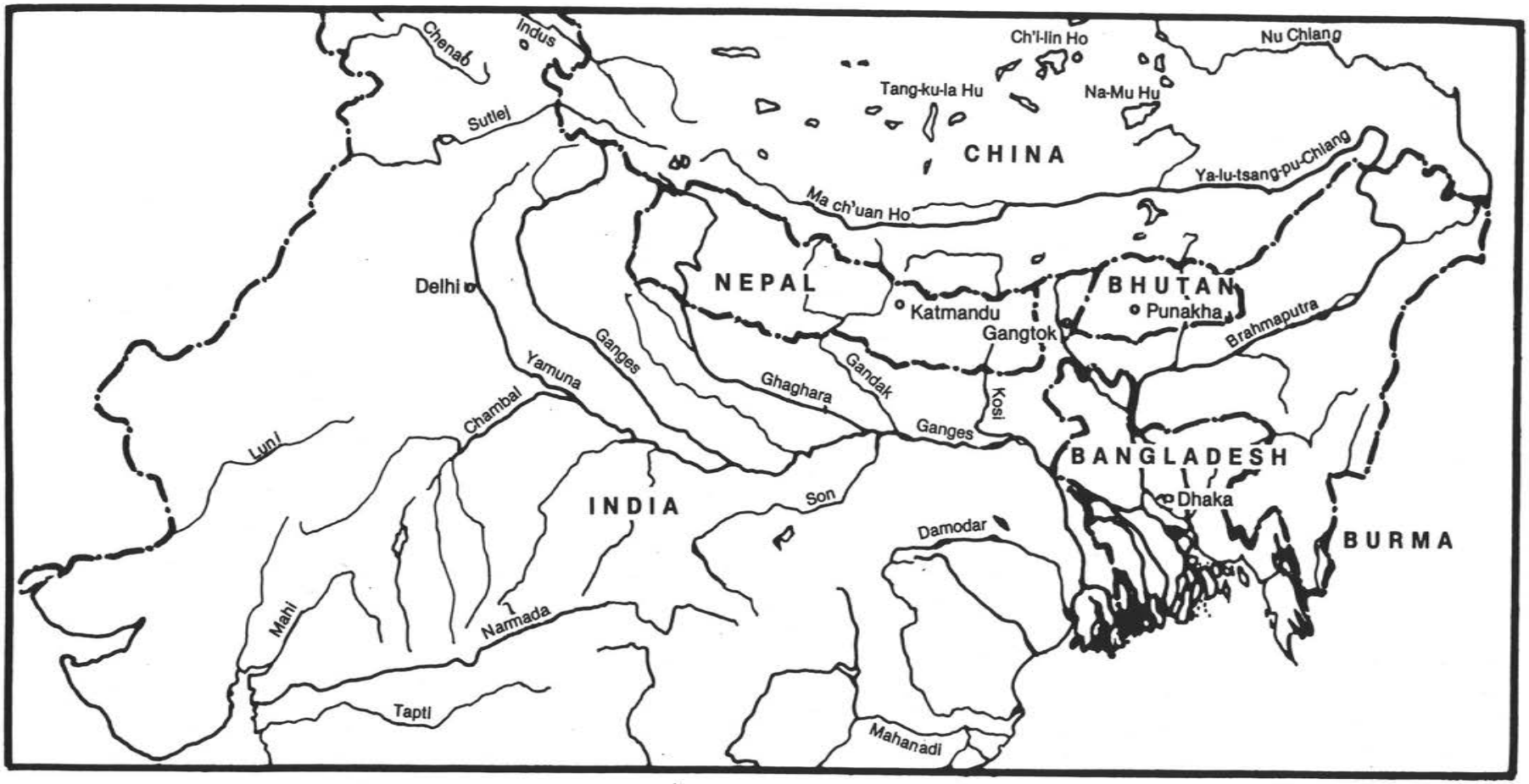
21 May 1956	Bank aide memoir suggests that replacement facilities be financed by India.
May-Nov 1958	Disagreements over which storage facilities are "replacement," for which India would pay, and which are "development," for which Pakistan would be responsible.
May 1959	Black visits India and Pakistan. Suggests that India's share be a fixed cost, rather than by facility, and that the Bank would arrange for additional financing. India agrees, and accepts a 10-year transition period.
Sep 1960	Bank arranges an international Indus Basin Development Fund Agreement. Raises $893.5 million.
19 Sep 1960	Indus Water Treaty signed in Karachi. Provisions call for one Indian and one Pakistani engineer to constitute the Permanent Indus Commission, which will meet at least once a year to establish and promote cooperative arrangements.

Case VI

Ganges River Controversy

Case Summary

River Basin:	Ganges River
Dates of Negotiation:	1960-Present
Relevant Parties:	Pre-1971: India, Pakistan; post-1971: India, Bangladesh
Flashpoint:	India builds and operates Farakka Barrage diversion of Ganges water without long-term agreement with Bangladesh
Issues:	
Stated Objectives:	Negotiate an equitable allocation of the flow of the Ganges River and its tributaries among the riparian states Develop a rational plan for integrated watershed development, including supplementing Ganges flow
Additional Issues:	
Water-related:	Appropriate source for supplementing Ganges flow Amount of data necessary for decision making Indian upstream water development
Non-water:	Appropriate diplomatic level for negotiations
Excluded issues:	Other riparians, notably Nepal, until recently
Criteria for Water Allocations:	Percentage of flow during dry season
Incentives/Linkage:	
Financial:	None
Political:	None
Breakthroughs:	Minor agreements reached, but no long-term solution
Status:	Short-term agreements reached in 1977, 1982, and 1985. Most recent agreement lapsed in 1988 and has not been renewed.



Source: Peter Rogers, Peter Lydon, and David Seckler. *Eastern Waters Study: Strategies to Manage Flood and Drought in the Ganges-Brahmaputra Basin,* Arlington, VA.: ISPAN, 1989.

Map of Ganges-Brahmaputra Basin

Background

While the Indian subcontinent is blessed with an abundance of water resources, much of its management problems result from the dramatic seasonal variations in rainfall. This management problem is compounded with the creation of new national borders throughout the region. So, too, the problems which have developed between India and Bangladesh, initially India and Pakistan, over the waters of the Ganges River.

The headwaters of the Ganges and its tributaries lie primarily in Nepal and India, where snow and rainfall are heaviest. Flow increases downstream even as annual precipitation drops, as the river flows into Bangladesh (pre-1971, the eastern provinces of the Federation of Pakistan) and on to the Bay of Bengal.

On 29 October 1951, Pakistan officially notified India of its concern about reports of Indian plans to build a barrage at Farakka, about 17 kilometers from the border. The barrage would reportedly divert 40,000 cusecs[7] out of a dry season average flow of 50,000 cusecs from the Ganges into the Bhagirathi-Hooghly tributary. The increased flow would provide silt-free flow into Calcutta Bay and thereby improve navigability for the city's port during dry months and keep saltwater from the city's water supply. On 8 March 1952, the Indian government responded that the project was only under preliminary investigation and that concern was "hypothetical."

Over the next years, Pakistan occasionally responded to reports of Indian plans for diversion projects of the Ganges, with little Indian response. In 1957 and 1958, Pakistan proposed that:

(a) the advisory and technical services of a United Nations body be secured to assist in planning for the cooperative development of the eastern river systems;

(b) the projects in the two countries be examined jointly by experts of the two countries before their implementation; and

(c) the Secretary General of the United Nations be asked to appoint an engineer or engineers to participate in the meetings at the expert level.

India turned down these proposals, although it was agreed that water resources experts of the two countries should "exchange data on projects of mutual interest." These expert-level meetings commenced 28 June 1960.

The Problem

The problem over the Ganges is typical of conflicting interests of up- and downstream riparians. India, as the upper riparian, developed plans for water diversion for its own irrigation, navigability, and water supply interests. Initially Pakistan, and later Bangladesh, had interests in protecting the historic flow of the river for its own downstream uses. The potential clash between upstream development and downstream historic use set the stage for attempts at conflict management.

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[7] Since all negotiations were in English units, that is what is reported here. Cusec = cubic feet per second = 0.0283 cubic meters per second.

Attempts at Conflict Management

The first round of expert-level meetings between India and Pakistan was held in New Delhi from 28 June to 3 July 1960, with three more to follow by 1962. While the meetings were still in progress, India informed Pakistan on 30 January 1961 that construction had begun on the Farakka Barrage. A series of attempts by Pakistan to arrange a meeting at the ministerial level was rebuffed with the Indian claim that such a meeting would not be useful "until full data are available." In 1963, the two sides agreed to have one more expert-level meeting to determine what data were relevant and necessary for the convening of a ministerial-level meeting.

The meeting at which data needs were to be determined, the fifth round at the expert level, was not held until 13 May 1968. After that meeting, the Pakistanis concluded that agreement on data, and on the conclusions which could be drawn, was not possible, but that nevertheless enough data were available for substantive talks at the ministerial level. India agreed only to a series of meetings at the secretary level, in advance of a ministerial meeting.

A total of five meetings at the secretary level were held in alternating capitals from 9 December 1968 through July 1970. Throughout these meetings, the different strategies became apparent. As the lower riparian, Pakistan's sense of urgency was greater, and their goal was "substantive talks on the framework for a settlement for equitable sharing of the Ganges waters between the two countries." India, in contrast, whether for valid reasons or as a stalling tactic, professed concern about data accuracy and adequacy, arguing that a comprehensive agreement was not possible until the available data were complete and accurate.

At the third secretarial-level meeting, Pakistan proposed that an agreement should provide for:

- guarantee to Pakistan of fixed minimum deliveries of the Ganges waters on a monthly basis at an agreed point;
- construction and maintenance of such works, if any, in India as may be necessary in connection with the construction of the Ganges Barrage in Pakistan;
- setting up of a permanent Ganges Commission to implement the agreement;
- machinery and procedure for settlement of differences and disputes consistent with international usages.

India again argued that such an agreement could take place only after the two sides had agreed to "basic technical facts."

The fifth and final secretarial-level meeting was held in New Delhi 16-21 July 1970, resulting in three recommendations:

- the point of delivery of supplies to Pakistan of such quantum of water as may be agreed upon will be at Farakka;
- constitution of a body consisting of one representative from each of the two countries for ensuring delivery of agreed supplies at Farakka is acceptable in principle;
- a meeting would be held in three to six month's time at a level to be agreed to by the two governments to consider the quantum of water to be supplied to Pakistan at Farakka and other unresolved issues relating thereto and to eastern rivers which have been the subject of discussions in these series of talks.

Little of practicality came out of these talks, and India completed construction of the Farakka Barrage in 1970. Water was not diverted at the time, though, because the feeder canal to the Bhagirathi-Hooghly system was not yet completed.

Bangladesh came into being in 1971, and by March 1972, the governments of India and Bangladesh had agreed to establish the Indo-Bangladesh Joint Rivers Commission "to develop the waters of the rivers common to the two countries on a cooperative basis." The question of the Ganges, however, was specifically excluded and would be handled only by the two prime ministers.

In leading up to a meeting between prime ministers, a meeting at the ministry level was held 16-17 July 1973, where the two sides agreed that a mutually acceptable solution to issues around the Ganges would be reached before operating the Farakka Barrage. A meeting between foreign ministers on 13-15 February 1974 confirmed this agreement. The prime ministers of India and Bangladesh met in New Delhi 12-16 May 1974 and stated, in a declaration of 16 May 1974, that they:

- observed that during the periods of minimum flow in the Ganges, there may not be enough water for both an Indian diversion and Bangladeshi needs;
- agreed that during low-flow months, the Ganges would have to be augmented to meet the requirements of the two countries;
- agreed that determining the optimum method of augmenting Ganges flow should be turned over to the Joint Rivers Commission;
- expressed their determination that a mutually acceptable allocation of the water available during the periods of minimum flow in the Ganges would be determined before the Farakka project was commissioned.

Two general approaches to augmenting Ganges flow were presented to the Commission. These approaches defined the negotiating stance for years to come:

- augmentation through storage facilities within the Ganges basin, proposed by Bangladesh, and
- augmentation through diversion of water from the Brahmaputra to the Ganges at Farakka by a link canal, proposed by India.

In a series of five Commission meetings between June 1974 and January 1975 and one ministerial meeting in April 1975, the positions of the two sides coalesced into the following:

Bangladesh Position

- There is adequate storage potential of monsoon flow in the Ganges Basin for Indian needs.
- There is additional storage in Nepal along the headwaters of the Ganges tributaries; Nepal might be approached for participation.
- A feeder canal from the Brahmaputra to the Ganges is unnecessary and would have detrimental effects within Bangladesh, including need for massive population resettlement.

- Indian needs would be better met through amending the pattern of diversion of Ganges water into the Bhagirathi-Hooghly and constructing a navigation link from Calcutta to the sea via Sunderban.

India Position

- Additional storage possibilities in India are limited and insufficient for its development needs.
- The most viable option, both to supplement the low flow of the Ganges and for regional development, is a link canal and storage facilities on the Brahmaputra, to be developed in stages for mutual benefit.
- Approaching Nepal or other third countries is beyond the scope of the Commission, as is discussing amending the pattern of diversion into the Bhagirathi-Hooghly.
- Constructing a separate navigation canal is not connected to the question of optimum development of water resources in the region.

At a ministerial-level meeting in Dhaka held 16-18 April 1975, India asked that while discussions were underway, the feeder canal at Farakka be run during that particular period of low flow. The two sides agreed to a limited trial operation of the barrage, with discharges varying between 11,000 and 16,000 cusecs in 10-day periods from 21 April to 31 May 1975, with a guarantee that the remainder of the flow reach Bangladesh. Without renewing or negotiating a new agreement with Bangladesh, India continued to divert the Ganges waters at Farakka after the trial run, throughout the 1975-76 dry season, at the full capacity of the diversion—40,000 cusecs. These diversions brought serious consequences for Bangladesh, including desiccation of tributaries, salination along the coast, and setbacks to agriculture, fisheries, navigation, and industry.

Four more meetings were held between the two states, from June 1975 to June 1976, with little result. In January 1976, Bangladesh lodged a formal protest against India with the U.N. General Assembly. On 26 November 1976, the General Assembly adopted a consensus statement encouraging the parties to meet for urgent negotiations at the ministerial level "with a view to arriving at a fair and expeditious settlement." Spurred by international consensus, negotiations recommenced on 16 December 1976. At a meeting held on 18 April 1977, an understanding was reached on fundamental issues which culminated in the signing of the Ganges Waters Agreement on 5 November 1977.

Outcome

In principle, the Ganges Water Agreement covers:

- sharing the waters of the Ganges at Farakka
- finding a long-term solution for augmentation of the dry season flows of the Ganges

Specific provisions, described as not establishing any general principles of law or precedent, include (paraphrased)

Art. I. The quantum of waters agreed to be released would be at Farakka.

Art. II. The dry season availability of the historical flows was established from the recorded flows of the Ganges from 1948 to 1973 on the basis of 75 percent availabilities. The shares of India and Bangladesh of the Ganges flows at 10-day periods are fixed, the shares in the last 10-day period of April (the leanest) being 20,500 and 34,500 cusec respectively out of 55,000 cusec availability at that period.

In order to ensure Bangladesh's share in the event of any lower availability at Farakka, Bangladesh's share should not fall below 80 percent of the stated share in a particular period shown in a schedule annexed to the agreement.

Art. III. Only minimum water would be withdrawn between Farakka and the Bangladesh border.

Art. IV-VI. Provision was made for a Joint Committee to supervise the sharing of water, provide data to the two governments, and submit an annual report.

Art. VII. Provisions were made for the process of conflict resolution: The Joint Committee would be responsible for examining any difficulty arising out of the implementation of the arrangements of the Agreement.

Any dispute not resolved by the Committee would be referred to a panel of an equal number of Indian and Bangladeshi experts nominated by the two governments.

If the dispute were still not resolved, it would be referred to the two governments which would "meet urgently at the appropriate level to resolve it by mutual discussion and failing that by such other arrangements as they may mutually agree upon."

Art. VIII. The two sides would seek out a long-term solution for the augmentation of dry season flows of the Ganges.

The Agreement was initially to cover a period of five years. It could be extended further by mutual agreement. The Joint Rivers Commission was again vested with the task of developing a feasibility study for a long-term solution to the problems of the basin, with both sides re-introducing plans along the lines described above. By the end of the five-year life of the agreement, no solution had been worked out.

In the years since, both sides and, more recently, Nepal have had years of greater and less success at reaching an agreement. The following events have occurred since the 1977 Agreement:

- A joint communiqué was issued in October 1982 in which both sides agreed not to extend the 1977 Agreement, but to initiate fresh attempts to achieve a solution within 18 months—a task not accomplished.
- An Indo-Bangladesh Memorandum of Understanding was signed on 22 November 1985 on the sharing of the Ganges dry season flow through 1988 and to establish a Joint Committee of Experts to help resolve development issues. India's proposals focused on linking the Brahmaputra with the Ganges, while Bangladesh's centered on a series of dams along the Ganges headwaters in Nepal.
- Although both the Joint Committee of Experts and the Joint Rivers Commission met regularly throughout 1986, and although Nepal was approached for possible cooperation, the work ended inconclusively.

- The prime ministers of Bangladesh and India discussed the issue of water sharing on the Ganges and other rivers in May 1992. They directed their ministers to renew their efforts to achieve a long-term agreement on the Ganges, with particular attention to low flows during the dry season. Subsequent to that meeting, there has been one minister-level and one secretary-level meeting, at which little progress was made.

No new accord has been reached since the last agreement lapsed in 1988. Since that time, India has granted Bangladesh only a portion of the flow of the Ganges, with no minimum flow guaranteed and no special provisions for drought years. Each side has kept roughly to its positions as stated above, with little room for compromise. Regional schemes have been proposed, often providing benefits not only to India and Bangladesh, but also to Nepal, which is landlocked but has tremendous hydro-power potential that might be traded for access to the sea. These incentives have thus far failed to move the parties to overcome their differences.

Lessons Learned

Unequal power relationships, without strong third-party involvement, create strong disincentives for cooperation.

India, the stronger party both geo-strategically and hydro-strategically, has little incentive to reach agreement with Bangladesh. Without strong third-party involvement, such as that of the World Bank between India and Pakistan on the Indus, the dispute has gone on for years.

Requests for increasingly detailed data clarifications can be an effective delaying tactic. Agreeing on the minimum data necessary for a solution, or delegating the task of data gathering to a third party may speed the pace of negotiations.

India used the veracity and detail of data as an effective tactic in postponing a long-term solution with Bangladesh. Interestingly, India was able to surmount this problem on the Indus by stipulating that data could be used in an agreement, without agreeing to its accuracy.

Likewise, insisting on bilateral negotiations, as opposed to watershed-wide negotiations, favors the party with greater power.

India has insisted on separate negotiations with each of the riparians of its international rivers. It was thus able to come to arrangements with Nepal on Ganges tributaries without considering Bangladeshi needs.

Agreeing early on the appropriate diplomatic level for negotiations is an important step in the prenegotiation phase.

Much of the negotiations between India and Pakistan and, later, India and Bangladesh, were spent trying to resolve the question of what was the appropriate diplomatic level for negotiations.

Short-term agreements which stipulate that the terms are not permanent can be useful steps in long-term solutions. However, a mechanism for continuation of the temporary agreement in the absence of a long-term agreement is crucial.

Agreements on the distribution of Ganges waters have been short in duration, providing initial impetus for signing, but providing difficulties when they lapse.

Creative Outcomes Resulting from Resolution Process

- The 1977 Ganges Waters Agreement was reached perhaps more quickly specifically as a short-term agreement, and specifying that it was not establishing any precedents.

Timeline

29 Oct 1951	Pakistan first calls Indian attention to reports of Indian plans to build a barrage at Farakka to divert Ganges water to Calcutta Bay. India responds that the project was only under preliminary investigation.
28 June 1960	Meetings commence at level of "expert" between Pakistan and India to exchange data on regional projects.
1960-1968	Expert-level meetings continue; there are five in all, most focusing on data issues.
30 Jan 1961	India informs Pakistan that construction had begun on the Farakka Barrage.
1968-1970	Five meetings continue at the level of secretary. Fundamental disagreements over approaches to Ganges development and the data required to make policy decisions.
1970	India completes construction of Farakka Barrage.
1971	Bangladesh comes into being, replacing eastern Pakistan.
Mar 1972	India and Bangladesh establish Indo-Bangladesh Joint Rivers Commission, specifically excluding issues of Ganges development.
16 May 1974	Prime ministers of India and Bangladesh sign a declaration agreeing to find a mutually acceptable solution to Ganges development, and to turn the question of the best way of supplementing Ganges flow over to the Joint Rivers Commission.
16 Apr 1975	The two sides agree to a limited trial operation of the Farakka Barrage. India continues to divert Ganges water after the trial run, without renewing or negotiating a new agreement with Bangladesh.
June 1975 to June 1976	Meetings continue, with little result.
Jan 1976	Bangladesh lodges a formal protest against India with the United Nations, which adopts a consensus statement encouraging the parties to meet urgently, at the level of minister, to arrive at a settlement.
5 Nov 1977	Ganges Waters Agreement signed, covering allocation of Ganges water between the two riparians for a period of five years. No long-term solution was found within that time frame.
Oct 1982	Joint communiqué issued, pledging to resolve Ganges issues within 18 months, a task not accomplished.

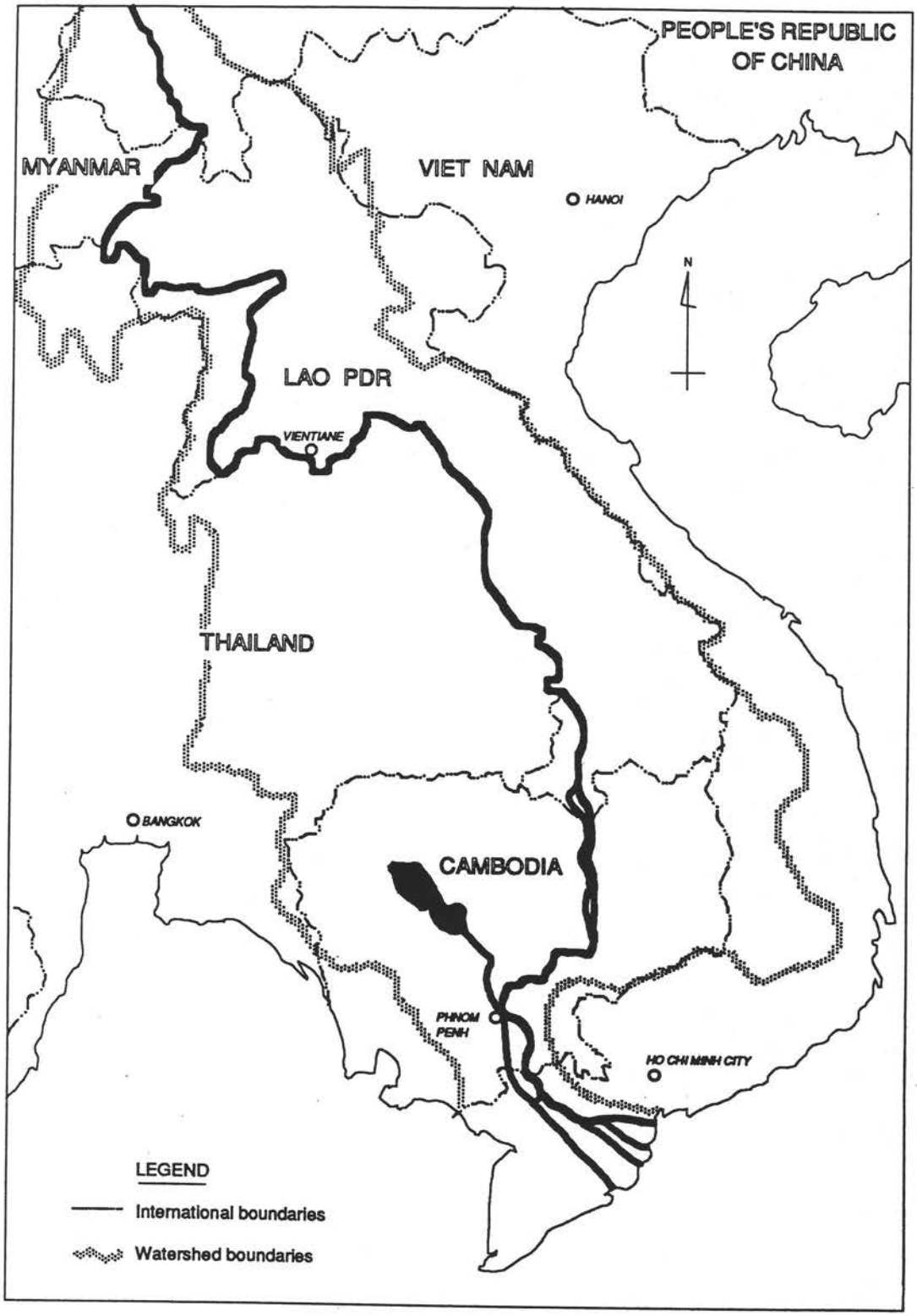
22 Nov 1985 Memorandum of understanding issued on the sharing of Ganges dry season flow through 1988. When accord lapses, no new agreement is signed.

Case VII

Mekong Committee

Case Summary

River Basin:	Mekong River
Dates of Negotiation:	Committee formed 1957
Relevant Parties:	Cambodia, Laos, Thailand, Vietnam (directly); China, Myanmar (indirectly)
Flashpoint:	None—studies by UN-ECAFE (1952, 1957) and U.S. Bureau of Reclamation provide impetus for creation of Mekong Committee
Issues:	
Stated Objectives:	Promote, coordinate, supervise, and control the planning and investigation of water resources development projects in the Lower Mekong Basin
Additional Issues:	
Non-water:	General political relations between riparians
Excluded issues:	China and Myanmar not included since inception; Cambodia not included between 1978-1991
Criteria for Water Allocations:	Allocations have not been an issue; "reasonable and equitable use" for the basin defined in detail since 1975
Incentives/Linkage:	
Financial:	Extensive funding from international community
Political:	Facilitated relations between riparians, aid from both east and west despite political tensions
Breakthroughs:	Studies by UN-ECAFE and U.S. Bureau of Reclamation in 1950s
Status:	Mekong Committee established in 1957, became Interim Committee in 1978 with original members except for Cambodia. Early momentum has dropped off—extensive data networks and databases established, but few extensive projects implemented; none yet on the mainstream



Source: *Mekong Work Programme 1992: Ongoing and Proposed Projects*. Committee for Coordination of Investigations of the Lower Mekong Basin, Mekong Secretariat, Bangkok, Thailand.

THE MEKONG BASIN

Background

The Mekong is the seventh largest river in the world in terms of discharge and tenth in length. It rises in China, flows 4,200 kilometers through Myanmar, Laos, Thailand, Cambodia, and finally through the extensive delta in Vietnam and the South China Sea. The Mekong is also the first successful application of a comprehensive approach to planning development of an international river, and yet it is one of the least developed major rivers in the world, in part because of difficulties inherent in implementing joint management between these diverse riparians.

In 1947, the United Nations Economic Commission for Asia and the Far East (ECAFE) was created to help with the development of Southeast Asia. A 1952 ECAFE study, undertaken with the cooperation of the four lower riparians, Cambodia, Laos, Thailand, and Vietnam, noted the Mekong's particular potential for hydroelectric and irrigation development. These recommendations could not be acted upon until the signing of the Geneva Accords in 1954 ended hostilities in the region.

In 1955-56, the U.S. Bureau of Reclamation prepared a report on planning and development on the lower basin which urged joint management in developing the river, to which the four lower riparians agreed. The study noted the almost total absence of data necessary for river basin planning, emphasized the need to get a program for data collection and analysis underway immediately, and offered suggestions for the types of programs which should be implemented.

A 1957 ECAFE report concurred with the optimistic potential noted in earlier studies. The report noted that harnessing the main stem of the river would allow hydropower production, expansion of irrigated land, a reduction of the threat of flooding in the delta region, and the extension of navigability of the river as far as northern Laos. As had earlier studies, the ECAFE report emphasized the need for comprehensive development of the river and close cooperation between the riparians in coordinating efforts for projects and management. To facilitate coordination, the report suggested the establishment of an international body for exchanging information and development plans between the riparian states. Ultimately, the report suggested, such a body might become a permanent agency responsible for coordinating joint management of the Mekong basin. When the report was presented in the tenth-anniversary meeting of ECAFE in Bangkok in March 1957, representatives from the four lower riparian states themselves adopted a resolution calling for further study.

The Problem

As is common in international river basins, integrated planning for efficient watershed management is hampered by the difficulties of coordinating among riparian states with diverse and often conflicting needs. The Mekong, however, is noted mostly for the exceptions as compared with other basins, rather than the similarities. The Mekong, for example, is not an exotic stream and consequently does not have sharp management conflicts between well-watered upstream riparians and their water-poor downstream neighbors as do the Euphrates and the Nile, for instance. The two uppermost riparians, China and Myanmar, are not participants in basin planning, and they have had no development plans which would disrupt the downstream riparians until very recently. Also, because the region is so well-watered, allocations *per se* are not a major issue. Finally, negotiations for joint management of the Mekong were not set off by a flashpoint, as were all of the other examples presented in this work, but rather by creativity and foresight

on the part of an authoritative third party—the United Nations—with the willing participation of the lower riparian states.

Attempts at Conflict Management

As noted, the 1957 ECAFE study was met with enthusiasm by the lower Mekong riparians. In mid-September 1957, after ECAFE's legal experts had designed a draft charter for a Coordination Committee, the lower riparians convened again in Bangkok as a Preparatory Commission. The Commission studied, modified, and finally endorsed a statute which legally established the Committee for Coordination of Investigations of the Lower Mekong (Mekong Committee), made up of representatives of the four lower riparians, with input and support from the United Nations. The statute was signed on 17 September 1957.

The Committee was composed of "plenipotentiary" representatives of the four countries, meaning that each representative had the authority to speak for his country. The Committee was authorized to "promote, coordinate, supervise, and control the planning and investigation of water resources development projects in the Lower Mekong Basin." The statute included authority to:

- prepare and submit to participating governments plans for carrying out coordinated research, study, and investigation;
- make requests on behalf of the participating governments for special financial and technical assistance and receive and administer separately such financial and technical assistance as may be offered under the technical assistance program of the United Nations, the specialized agencies, and friendly governments;
- draw up and recommend to participating governments criteria for the use of the water of the main river for the purpose of water resources development.

It was determined that all meetings must be attended by a representative from each of the four countries, and each decision must be unanimous. Meetings would be held three to four times a year, and chairmanship would rotate annually in alphabetical order by country.

The first Committee session was on 31 October 1957, as was the first donation from the international community—60 million francs (about $120,000) from France. In late 1957, the Committee, recognizing that data collection was a crucial prerequisite to comprehensive watershed development, asked the UN Technical Assistance Administration to organize a high-level study of the basin. Before the year was out, a mission headed by Lt. General Raymond Wheeler, who had been the deputy commander of the Allied bases in the region during World War II and was later Chief of the U.S. Army Corps of Engineers, arrived in Bangkok.

The principal recommendation of the Wheeler Mission, while reaffirming the great potential of water resources development, suggested that, properly developed, the river "could easily rank with Southeast Asia's greatest natural resources," the absence of data required that a series of detailed hydrographic studies precede any construction. The mission recommended a five-year program of study, to cost approximately $9 million (see Figure 1).

Figure 1

RECOMMENDATIONS OF THE WHEELER MISSION, 1958

Study or Action	Countries/Agencies Participating	Begun
Preliminary reconnaissance of major tributaries	Japan	1959
Hydrologic and meteorologic observations	US, France, Great Britain, India	1959
Aerial mapping and leveling	Canada, Philippines	1959
Soil surveys	France	1959
Geological investigations	Australia	1961
Hydrographic survey	UN, Belgium, US, Great Britain, New Zealand, Netherlands	1961
Related and special studies[1]	UN, US, France, Private agencies, Nordic countries	1962
Preliminary planning of projects on main stem	US, Japan, India, Australia, France	1959
Preparation of basin-wide plan	Mekong Committee, aided by ECAFE Secretariat	1959
Appointment of advisory board		1958

[1] Including studies of fisheries, agriculture, forestry, minerals, transportation, and power markets.

At its second session held 10-12 February 1958, the Mekong Committee adopted Wheeler's program as its own five-year plan. It also accepted another suggestion of the Wheeler Mission, that a permanent advisory board of professional engineers "of worldwide reputation" be established. It likewise noted the desirability of having a full-time director with ancillary staff. ECAFE responded and appointed members to the advisory board, secured Committee approval for the appointment of Dr. C. Hart Schaaf as Executive Agent, who assumed office in mid-1959, and established the Committee Secretariat as an ECAFE adjunct body to which UN staff members could be assigned.

With rapid agreement among the riparians came extensive international support for the work of the Committee. By 1961, the Committee's resources came to $14 million, more than enough to fund field surveys which had been agreed to as priority projects. By the end of 1965, 20 countries, 11 international agencies, and several private organizations had pledged a total of more than $100 million. The Secretariat itself was funded by a special $2.5 million grant made by UNDP. This group of international participants has been dubbed "the Mekong club," which has infused the international community with "the Mekong spirit."

Along with the collection of physical data and the establishment of hydrographic networks, the Mekong Committee early encouraged the undertaking of economic and social studies and the initiation of training programs. In 1961, Prof. Gilbert White headed a mission, sponsored by the Ford Foundation, which found that, while existing and planned projects would provide water for irrigation and power for industry, these resources could be used to their maximum benefit only with extensive training of the local population. In an important shift from a strictly engineering approach, many of the mission's recommendations have been adopted (see Figure 2).

Figure 2

STUDIES RECOMMENDED BY THE FORD MISSION, 1961

Study or Action	Countries/Agencies Participating	Begun
Addition of skilled personnel to deal with economic and social studies	Mekong Committee, riparians, ECAFE	1962
Development of programs to train personnel for economic and social studies, and to use products of river development	Mekong Committee, riparians	1963
Manpower studies	ILO	1966
Fisheries studies	France	1960
Minerals studies	France	1962
Agricultural surveys		n/a
Studies of patterns and levels of living		n/a
Estimates of demands for electric power	France, Resources for the Future, Mekong Committee	1962
Studies of adjustments to floods	UN/TAB, France	1961
Development of agriculture demonstration projects	UN, France, Israel	1962
Establishment of experimental forest		n/a

Outcome

The early years were the most productive for the Mekong Committee. Networks of hydrologic and meteorologic stations have been established and continued to function despite hostilities in the region, as have programs for aerial mapping, surveying, and leveling. Navigation has been improved along the main stem of the river.

The work of the Committee has also helped overcome political suspicion through increased integration. In 1965, Thailand and Laos signed an agreement on developing the power potential of the Nam Ngum River, a Mekong tributary inside Laos. Since most of the power demand was in Thailand, which was willing to buy power at a price based on savings in fuel costs, and since Laos did not have the resources to finance the project, an international effort was mobilized through the Committee to help develop the project. As a sign of the Committee's viability, the mutual flow of electricity for foreign capital between Laos and Thailand was never interrupted, despite hostilities between the two countries.

By the 1970s, the early momentum of the Mekong Committee began to subside for several reasons. First, political and financial obstacles impeded the shift from data gathering and feasibility studies to concrete development projects. A 1970 Indicative Basin Plan marked the potential shift between planning and large-scale implementation, including immense power, flood control, irrigation, and navigation projects, and set out a basin development framework for the following 30 years. In 1975, the riparians set out to refine the Committee's objectives and principles for development in support of the plan in a Joint Declaration on Principles. This document was the first (and so far only) international agreement to include a precise definition of "reasonable and equitable use," based on the 1966 Helsinki Rules. The plan, which included three of the largest hydroelectric power projects in the world as part of a series of seven cascading dams, was received with skepticism by some in the international community. While many projects have been built along the tributaries of the Mekong within single countries, and despite the update of the Indicative Plan in 1987 and a subsequent Action Plan which includes only two low dams, no single structure has been built across the main stem.

Second, while the Committee continued to meet despite political tensions, and even despite outright hostilities, political obstacles did take their toll on the Committee's work. Notably, the Committee became a three-member "Interim Committee" in 1978 with the lack of a representative government in Cambodia. Cambodia rejoined the committee as a full participant in 1991, although the Committee still retains "interim" status. Likewise, funding and involvement from the United States, which had been about 12 percent of total aid to the Committee, was cut off in June 1975 and has not been restored to significant levels.

Finally, some regional politics between the riparians have been played out through the Mekong Committee. Thailand, with the strongest economy and greatest resource needs, has been pushing in recent years for revisions in the Committee's rules which currently allow an effective veto of Thai projects by downstream riparians. Thailand has found its own funding for four Mekong projects within its own territory and has plans for several more, some of which would probably be opposed by downstream riparians if they were brought before the Mekong Committee. In

1992, Thailand canceled a plenary meeting two days before it was scheduled, and later asked the UNDP to remove the Executive Agent, a request to which the UNDP complied.

While the establishment of the Mekong Committee and its work provide an impressive example of the potential of integrated watershed management on an international scale, its actual accomplishments have not kept pace with its early momentum, likewise providing lessons for the international arena.

Lessons Learned

Establishing an international framework for integrated watershed management well before a flashpoint makes the task easier and more likely to succeed during later times of stress.

Both the riparians of the Lower Mekong and the international community saw the potential of a well-managed river well before "water stress" led to a crisis. By establishing and utilizing the necessary management infrastructure before respective senses of urgency had the chance to hamper political decision making, the Mekong Committee had already developed a routine of cooperation which proceeded despite later political tensions.

Emphasizing data collection in advance of any construction projects sets the hydrographic stage for more efficient planning, and may also establish a pattern of cooperation through relatively emotion-free issues.

The insistence of the Wheeler Mission that extensive data gathering precede any construction made both management and political sense.

Solving water-related issues involves technical and social aspects of development.

The importance of the White Mission was a conceptual shift in the basin from a strictly engineering perspective on the challenges of the river to a social view which sought also to address the needs of the riparian population.

The greater the international involvement in conflict resolution, the greater the political and financial incentives to cooperate.

The pace of development and cooperation in the Mekong River watershed over the years has been commensurate with the level of involvement of the international community. Early accomplishments were impressive, impelled in part by strong UN support and a "Mekong Spirit" on the part of the "Mekong Club" of donors. By the 1970s, the pace of cooperative development began to slacken, partly the result of decreasing involvement by an international community daunted by political obstacles and the size of planned projects.

Creative Outcomes Resulting from Resolution Process

- The early accomplishments of the Mekong Committee and the particularly ordered approach to the basin—establishment of joint management, data collection, feasibility studies of both technical and social aspects of development, implementation—provide a useful model for any international basin.
- The legally intricate question of "reasonable and equitable" use of the basin was defined in detail, the first (and so far only) explicit use of the principles of the 1966 Helsinki Rules in any international agreement.

Timeline

1947 United Nations Economic Commission for Asia and the Far East (ECAFE) is created to help with the development of Southeast Asia.

1952 ECAFE study notes Mekong's potential for hydroelectric and irrigation development.

1954 Geneva Accords signed, ending hostilities in the region.

1955-56 U.S. Bureau of Reclamation report on planning and development in the lower basin urges joint management in developing the river. Four lower riparians—Cambodia, Laos, Thailand, Vietnam—agree.

1957 ECAFE report concurs with earlier findings. When the report is presented to an ECAFE meeting in March, the riparians themselves call for further study.

Sep 1957 Riparians negotiate a draft charter for the Committee for Coordination of Investigations of the Lower Mekong. Statute signed on 17 September 1957, bringing Mekong Committee into legal existence.

Late 1957 Wheeler Mission suggests that first priority be data gathering throughout the basin, in advance of any construction. Wheeler's program adopted as Mekong Committee's first five-year plan.

1961 White Mission urges social aspects of development be investigated commensurate with technical aspects. Many of Mission's recommendations for training programs are adopted.

1965 Laos and Thailand sign agreement on power generation project on Nam Ngum River, a Mekong tributary within Laos, by which Thailand agrees to buy surplus power. Exchange of power for foreign capital never discontinued, despite tensions between the two countries.

1970 Indicative Basin Plan describes proposed large-scale development of Mekong basin.

1975 Joint Declaration on Principles signed, including the first precise definition of "reasonable and equitable use," as described in Helsinki Rules, ever used in international agreement.

1978 Mekong Committee becomes a three-member Interim Committee, with the lack of a representative government in Cambodia.

1987 Indicative Plan revised and updated.

1991 Cambodia rejoins as full participant, but Committee remains legally "interim."

1992 Thailand asks UNDP to remove Executive Agent; UNDP complies.

Conclusions for International Case Studies

Three broad themes seem to emerge from the survey of international water conflicts and attempts at managing them. First, conflicts may be more productively managed if institutional structures for dealing with conflict are established before a "flashpoint" ignites a dispute. Viewed as a normal and necessary social phenomenon, conflicts may be expected to occur wherever diverse interest groups are involved in the management of water resources. Conflicts may be less likely to threaten international water management, however, if they are expected and institutional structures for their management are put in place beforehand.

Second, international institutions may not have the laws or authority to enforce solutions on parties engaged in an international water dispute. But such institutions may have other carrots and sticks for inducing voluntary, cooperative conflict management. Creating incentives for the voluntary resolution of water resource conflicts is essential. These incentives may include linkages with resources other than water, including financial, energy, political, and data resources.

Third, the diversity of barriers encountered in each unique conflict means that no single approach will be universally useful. Instead, the critical tools for conflict management will be in analyzing the conflict, diagnosing barriers, and applying the principles of conflict resolution in designing specific strategies to overcome barriers identified. Nevertheless, certain aspects of water resources make them both conducive to international conflict and allow their management to induce cooperation. These three themes are examined in more detail in the following pages.

Involvement in Advance of Conflict

In general, a pattern which seems to emerge is as follows: Riparians of an international basin implement water development projects unilaterally first on water within their territory, in attempts to avoid the political intricacies of the shared resource. At some point, as water demand approaches supply, one of the riparians, generally the regional power,[8] will implement a project which impacts at least one of its neighbors, by decreasing either quantity or quality. This might be to continue to meet existing uses in the face of decreasing relative water availability—as for example Egypt's plans for a high dam on the Nile or Indian

[8] "Power" in regional hydropolitics can include riparian position, with an upstream riparian having more relative strength *vis-à-vis* the water resources than its downstream riparian, in addition to the more conventional measures of military, political, and economic strength. Nevertheless, when a project is implemented which impacts one's neighbors, it is generally undertaken by the regional power, as defined by traditional terms, *regardless* of its riparian position.

diversions of the Ganges to protect the port of Calcutta—or to meet new needs reflecting new agricultural policy, such as Turkey's GAP project on the Euphrates.

All of the Asia/Near East international water conflicts presented here, with the exception of the Mekong, are defined by a flashpoint, a single action on the part of a riparian which led to impending conflict, and only then led to attempts at conflict resolution (see Table 1). It is worth noting that in the case of the sole exception to this pattern, the Mekong, an institutional framework for joint management and dispute resolution was established well in advance of any likely conflict. It is also worth noting the Mekong Committee's impressive record of continuing its work throughout intense political disputes between the riparian countries, as well as the fact that data conflicts, common and contentious in all of the other basins presented, have not been a factor in the Mekong.

Table 1

FLASHPOINTS

Ganges	Farakka Barrage (India)
Indus	Diversion of tributaries (India)
Jordan	Development on border (Israel)
Mekong	None
Nile	Plans for high dam (Egypt)

It might be suggested, drawing both from our sole exception, the Mekong, and from exceptions outside of the region covered here, notably the Danube, that when international institutions are established well in advance of water stress, they help prevent precipitous flashpoints. The single most important lesson, then, which comes out of this survey follows from that pattern.

Lesson: **Integrated, international water management is best implemented before conflicts arise within a watershed. This helps preclude data disputes and provides a pattern of cooperation in the absence of the intense political tensions of a flashpoint.**

Early intervention also benefits the process of conflict resolution by shifting the mode of dispute from costly, impasse-oriented dynamics to less costly, problem-solving dynamics. In the heat of some flashpoints, such as the Nile, the Indus, and the Jordan, when armed conflict seemed imminent, tremendous energy was spent just getting the parties to talk to each other. Hostilities were so heated that negotiations inevitably began confrontationally and usually resulted in, at best, distributive interactions.

In contrast, discussions in the Mekong Committee, the multilateral working group in the Middle East, and on the Danube have all moved beyond the causes of immediate disputes on to actual, practical projects which may be implemented in an integrative framework.

Of course, to be able to entice early cooperation, the incentives have to be made sufficiently clear to the riparians. In all of the cases mentioned above, not only was there strong third-party involvement in encouraging the parties to come together, extensive funding was made available on the part of the international community to help finance projects which would come from the process. This suggests the following observation:

***Lesson*: Not only is third-party involvement vital in bringing about international water conflict resolution, that involvement must be active and backed by both the financial and political support of the international community.**

Incentives and Multiresource Linkages

A recurring topic in international water disputes is the issue of multiresource linkages. Occasionally, water issues are dealt with alone, separate from any other political issues between countries—water *qua* water. This was initially the case, for example, in the early stages of both the Johnston negotiations and negotiations between India and Pakistan on the Indus. By separating the two realms of "high" and "low" politics, some have argued, the process was either doomed to fail, as in the case of the Johnston accords, or to achieve a suboptimum development arrangement, as is currently the case on the Indus.[9] In addition, water negotiations are usually separate from any other resource disputes, which may preclude some creative tradeoffs. In fact, in a quest to generate creative options in water negotiations, the best solution may involve other resources entirely. Some possible multiresource linkages may include the areas discussed below.

Financial resources. Time and again in the cases presented here, an offer of financial incentives was able to circumvent impasses in negotiations. World Bank financing helped resolve the Indus dispute, while UN-led investments helped preclude conflict on the Mekong. A U.S. offer of financial aid to Israel and Jordan created incentives to adhere to the terms of the Johnston negotiations, even in the absence of ratification. Cooperation-inducing financing has not always come from outside of the region. Thailand helped finance a project in Laos as did India in Pakistan, in conjunction with their respective watershed agreements. Egypt paid Sudan outright for water to which they both agreed Sudan had rights but was not able to use.

It should be noted that financial incentives have often not been sufficient to overcome hostilities. Since the late 1970s, the World Bank has offered to help finance the Unity Dam on the Yarmuk River and is currently offering help with a variety of projects in conjunction with the Middle East

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[9] For particularly cogent presentations of this argument, see Lowi, Miriam. *Water and Power: The Politics of a Scarce Resource in the Jordan River Basin*. Cambridge: Cambridge University Press, 1993; and Waterbury, John. "Transboundary Water and the Challenge of International Cooperation in the Middle East." Presented at a symposium on Water in the Arab World, Harvard University, 1-3 October 1993.

multilateral working group. The Bank provision that all riparians agree has so far been enough to preclude any large-scale development project.

Energy resources. One increasingly common linkage being made is that between water and energy resources. As noted above, Thailand helped fund a hydroelectric project in Laos in exchange for a proportion of the power to be generated. In a particularly elaborate agreement, South Africa agreed to help finance a hydroelectric/water diversion facility in Lesotho—South Africa acquired rights to drinking water for Johannesburg, and Lesotho receives all of the power generated. Similar arrangements have been suggested in China on the Mekong, Nepal on the Ganges, and between Syria and Jordan on the Yarmuk.

Aside from hydroelectricity projects, energy and water resources can be linked in other ways as well. It has been suggested, for example, that a possible Saudi contribution to the Middle East peace process might come in the form of oil or natural gas to help lower the cost of desalination in the region. Another link might come in the form of energy infrastructure. The Trans-Arabian Pipeline from the Gulf to Lebanon has been unused since the early 1970s. While the pipe itself is corroded, the parallel access road still exists and, it has been suggested, might be used to reduce the costs of piping water in the opposite direction, from Lebanon towards the Gulf.

One policy question which is inevitably raised with the question of linkages is whether increased integration of infrastructure between nations leads to increased potential for political conflict or, rather, to greater impetus for cooperation. In support of the latter interpretation, it might be noted that the flow of electricity between Laos and Thailand and of water between Lesotho and South Africa was never interrupted, despite dramatic political changes in both regions.

Political linkages. Political capital, like investment capital, might likewise be linked to water negotiations. This linkage might be done implicitly, as for example the parallel but interrelated tracks of the Middle East peace talks relating water and politics, or explicitly, as talks between Turkish acquiescence on water issues have been linked in a quid pro quo with Syrian ties to Kurdish nationalists.

Data. As water management models become more sophisticated, water data are increasingly vital to management agencies. As such, data itself can be used as a form of negotiating capital. Data sharing can lead to breakthroughs in negotiations—an engineering study allowed circumvention of an impasse in the Johnston negotiations when it was found that Jordan's water needs were not as extensive as had been thought, allowing for more room in the bargaining mix. In contrast, the lack of agreed-to criteria for data in negotiations on the Ganges has hampered progress over the years.

Data issues, when managed effectively, can also allow a framework for developing patterns of cooperation in the absence of more contentious issues, particularly water allocations. For one, data gathering can be delegated to a trusted third party or, better, to a joint fact-finding body made up of representatives from the riparian states. Perhaps the best international example of this is on the Mekong, where the Mekong Committee's first five-year plan consisted almost entirely of data-gathering projects, allowing the riparians to get used to cooperation and trust and effectively precluding data disputes in the future.

Increasingly, linkages are made between water and other resources. Awareness of options outside the specific water issues being discussed may offer more opportunities for creative solutions to be generated. This suggests the following:

***Lesson*: Creating incentives for voluntary resolution of water resource conflicts is key. While international institutions may not have the laws or authority to enforce solutions, they often have access to other carrots and sticks which can help induce agreement by capitalizing on differences and common interests, and by creating trades or linkages.**

Water Resources, Conflict, and Cooperation

While including resources other than water in the bargaining mix may help achieve an agreement, it is perhaps more important to be aware of some aspects particular to water which, if excluded, could impede the durability of the agreement. To be viable over time, an agreement must incorporate mechanisms for any future misunderstandings to be resolved. This is a final, but crucial, step which has to be taken for a negotiated arrangement to last beyond the signing ceremony. The circumstances that brought about a conflict to begin with are seldom static, nor are the conditions of agreement. This is particularly true for hydrologic conflicts, where supply, demand, and understanding of existing hydrologic conditions all change from season to season and year to year.

Water managers in general are relied upon to implement national policy within the limits imposed by:

- normal seasonal and annual variability;
- dramatic fluctuations in quantity (droughts and floods);
- groundwater pumping and recharge rates within "safe yield";
- delivery system capability;
- adequate water quality for each use;
- economic efficiency;
- ecosystem (in-stream) needs, in some countries;
- political considerations.

While the international agreements which have been reached often include some understanding of these parameters, including mechanisms explicitly dealing with aspects of hydrologic variability, most are weaker in considering other ways in which a basin may change over time. The Nile Waters Agreement, for example, has sections concerning natural variability of the river as well as guidelines for allocating unanticipated gains and losses between Egypt and Sudan. The agreement, however, also counts on the gains of implementing a canal through the Sudd wetlands—the negotiators could not have foreseen years of civil strife in Sudan and new concerns about possible environmental impact, precluding such an extensive development.

Some parameters of water resources which are often inadequately addressed in international agreements include the areas listed below.

Physical Parameters

Fluctuations in seasonal, annual, and long-term water supply. This aspect of water resources is often included in international agreements, with varying degrees of success. One method of dealing with quantity fluctuations is to assign one state the "remainder," or "residue" flow, after other states have received a set quantity. This method, used in the Johnston agreement which assigned Israel the "residue" flow, has the drawback of assigning all of the stochastic risk to one riparian. A variation is to allow for fluctuation, but to assign each riparian a minimum absolute amount—important in arid and monsoon regions, both of which are particularly susceptible to seasonal fluctuations. Minimum quantities are guaranteed, unofficially, on the Euphrates and the Yarmuk. An alternative is to divide quantity by a percentage of actual flow, which effectively spreads risk among riparians but puts downstream users at particular risk if changes occur upstream. Such is the case on the Ganges, where Bangladesh sees decreasing flows due to greater upstream use by India. (This situation is due, in part, to the lapse of a watersharing agreement.)

The Colorado compact between upper and lower riparians provides an example of the consequences of not incorporating quantity fluctuations. The agreement calls for a set amount to each of the two parts of the basin; however, by overestimating the quantity to be divided, as well as initially neglecting Mexico's claims regarding the need for adequate quality, shortfalls have occurred in more years than not.

Groundwater. The relationship between groundwater and surface water is rarely codified into law or international agreements. The results of excluding groundwater can include strains on existing relations between riparians, e.g., planned deep wells in the West Bank strained relations between Israelis, who undertook the project, and Palestinians, who thought the wells would undercut their own water supplies; excluding groundwater can also put strains on existing agreements, e.g., Israel and Jordan got into a brief "pumping war" in competition over two sides of an aquifer that underlies the Yarmuk. An illustrative example of the inter-relationship between groundwater, surface water, and international relations can be found in the Rio Grande basin, on the border of the U.S. and Mexico.

Fossil aquifers that straddle borders are likewise poorly dealt with. Fossil aquifers underlie joint borders throughout the Middle East, for example, between Israel and Jordan, Jordan and Saudi Arabia, and Israel and Egypt. As they are increasingly turned to as alternative sources of water supply, shared aquifers may create increased friction between states. Complicating the issue is the fact that surface- and groundwater watersheds are not necessarily identical.

Water quality. While much focus in agreements is often placed on the amount due each riparian, less attention is usually paid to the quality expected of the water. The Colorado agreement between the U.S. and Mexico provides a good example of initially ignoring quality issues; after formal Mexican protest, the U.S. agreed to build one of the most extensive desalination plants in the world to meet Mexican quality needs. In contrast, water quality is explicitly delineated in

the Johnston accords, which defines salinity standards, in parts per million, for each branch of the Jordan.

The physical environment. This vital parameter has almost invariably been given perfunctory treatment in international agreements, when it is dealt with at all. Treaties often allocate the entire average flows of river systems between users, leaving no water at all for in-stream needs. Development projects, such as the Jonglei Canal on the Nile tributaries and the cascade dams on the Mekong, have historically paid little attention to the potential impact on the physical environment. Increasing concern for in-stream flows and riparian habitats—for native plants and wildlife and for the culture and livelihoods of people who have traditionally relied on fishing—will likely become an important aspect of international water negotiations, as they have already become in the United States. This trend will be reinforced by international development agency estimations of the environmental impacts of projects as a measure of project viability.

Changes in understanding of the physical system. With greater modeling precision and more statistical information, physical systems are being better understood over time. This change in information availability can result in easing negotiations, as was the case when Jordan found it needed less water for its future needs than was thought, allowing for a break in the Johnston negotiations, or in strains on an agreement, as is the case in the Colorado compact's allocation of less water than usually exists.

Technical breakthroughs. One interesting question in light of potential technical breakthroughs is how each might affect an international agreement for water resources development. For example, who would have borne the cost of implementing and maintaining extensive water projects had the early promise of nuclear desalination or cold fusion resulted in dramatically inexpensive water?

It is as common to ignore the link between these physical parameters as it is to exclude them separately. This suggests a lesson about approaching a watershed at conflict:

***Lesson*: Watershed management links quality and quantity, surface- and groundwater. Expanding the scope of negotiations to include all of these parameters makes the final agreement more resilient.**

Political Parameters

General hydropolitics. While some international agreements make some provision for dealing with hydrologic variation, none surveyed here deal explicitly with the possibility of any political variation whatsoever. What is interesting in this exclusion is that this survey suggests that political change is a major catalyst in either provoking disputes or bringing about their resolution. Political change has already been mentioned as an indicator of possible water conflict, as many of the conflicts presented here, including those on the Ganges, the Indus, and the Nile, took on international complications as the British empire gave way to local rule. The Mekong Committee became an "interim" committee when the Khmer Rouge gained control in Cambodia. In contrast,

other agreements were hastened when new governments resulted in friendlier relations within basins. Such was the case with Sudan on the Nile and India on the Ganges.

Along with changes in government, other political considerations can be taken into account in international negotiations. These might include:

- changing levels of hostility between riparians
- changing power relationships, including
  - riparian position (e.g., Israel and Pakistan have each shifted riparian relations with their neighbors)
  - military power shifts
  - legal changes (e.g., clarity of water rights)
  - economic growth and stability
- the social environment, e.g., population movements (refugees, immigrants, resettlement because of water developments)

Enforcement mechanisms. Most of the agreements presented have some description of a feedback mechanism for ongoing conflict resolution. Many of these are innocuous—requiring little more than meetings at progressively higher political levels—and, probably as a consequence, ineffectual. What is notably lacking in all of the agreements is any real mechanism for enforcing the terms which were negotiated. While abrogated agreements can be brought before the International Court of Justice, this venue has practical limitations, mentioned above, which preclude it as a common method for resolving conflicts.

Ironically, many of the same aspects of water resources which make them conducive to conflict also allow for their management to induce cooperation. These characteristics include:

- physical parameters—The fluctuations inherent in the hydrologic cycle result in countries having disparate quantities at differing times, allowing options for trade, as explored earlier.
- "wheeling"—Water resources, like energy resources, can be traded step-wise over great distances. Any addition to the water budget in the Jordan watershed, for example, can be "wheeled" anywhere else. Litani or Turkish water diverted into the Jordan headwaters in Israel, for instance, can be "credited" for Yarmuk water to Jordan, which in turn might allow more water in the lower Jordan for the West Bank, which might result in surplus West Bank groundwater being diverted to Gaza, and so on. However, this cost-saving practice of "wheeling" can be achieved only when infrastructure is designed for future cooperation from the beginning.
- structural considerations—Just as water resources infrastructure can be designed for possible future cooperation, topographic and hydrographic differences between countries can also be taken advantage of for trade between countries. Upstream riparians such as China, Nepal, and Ethiopia might have better access to good dam sites, for example, which might be developed cooperatively with downstream riparians. The Sea of Galilee

has likewise been suggested as a storage facility for the Jordan riparians in the absence of a Unity Dam.

- economic factors—Water has different value to different people, again allowing incentives for trade once property rights to the resource have been established.

- training of water managers—Perhaps more than the managers of any other resource, water managers think regionally, beyond their borders, by training and practice. It is not surprising, therefore, that water managers have often been able to reach agreements well in advance of their political counterparts.

- water science—Countries within a watershed develop different levels of water technology, often with different emphases. While Israel has emphasized drip irrigation and genetic engineering, Gulf states have invested heavily in desalination. Trade of existing technologies and joint research and development projects provide ideal venues to enhance regional cooperation.

Many aspects peculiar to water resources provide properties which can both provoke conflict and induce cooperation. The water conflicts presented here suggest that, with early planning, one can help guide riparians along the latter path. To do so, however, takes foresight and awareness of the options throughout the negotiating process. The following lesson is therefore suggested:

Lesson: **In planning for implementation, it is important to look for situations where positions may be mutually exclusive but underlying interests are not. It is also imperative to do it early and iteratively, throughout the process. Awareness and incorporation of links to other issues is vital. Water and politics cannot be separated.**

Chapter 5

HOW APPROPRIATE ARE INTEREST-BASED, DISPUTE RESOLUTION PROCESSES INTERNATIONALLY?

Introduction

An examination of international and domestic water conflict cases has shown that conflicts arise in a variety of instances, under diverse cultural and political circumstances, and they involve numerous technical issues. The obstacles to resolving these water resource disputes are as diverse as the conflicts. Therefore, a specific strategy for addressing a conflict in one instance may not be appropriate in another instance. Our survey of international and U.S. cases suggests that a more effective approach would be to use a methodology that carefully analyzes individual conflicts and to apply general conflict resolution principles in a manner tailored to each situation.

Examining the collection of cases assembled here in light of conflict resolution theory leads to three basic conclusions:

- Negotiation-based processes and other tools for consensus building can and should be used more often to address conflicts over water resources, both transnationally and within different countries.
- The process and the outcome of efforts to resolve water conflicts can be qualitatively enhanced through the application of interest-based, dispute resolution principles and processes.
- Attempts at resolving water conflicts would benefit from a variety of capacity-building activities and the greater institutionalization of dispute resolution processes.

When to Negotiate: Using Interest-Based, Dispute Resolution Processes to Address Water Resource Conflicts

The dispute resolution processes discussed in this report represent a subset of a broader spectrum of possibilities for dealing with conflict. This spectrum ranges in intensity from complete avoidance to ever-increasingly confrontational approaches that include coerced decision-making and violence. These possibilities can be organized into three, qualitatively different categories: power-based processes, rights-based processes, and consensus or interest-based processes.[10] This report focuses on consensus-based processes, i.e. those that seek to reach a mutually acceptable resolution of issues in a conflict through a voluntary agreement among the parties. Power-based and rights-based processes (such as elections or legal action) can also be appropriate and

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[10] Ury, William L., Jeanne M. Brett, and Stephen B. Goldberg. *Getting Disputes Resolved: Designing Systems to Cut the Costs of Conflict.* Jossey-Bass Publishers, San Francisco, 1988.

legitimate means of addressing disputes. Consensus-based dispute resolution approaches complement these other strategies, broadening the range of available tools.

As is evident from the case studies, in certain circumstances, dispute resolution approaches offer a number of advantages over other legitimate, nonconsensual strategies such as litigation in the courts, political action, or, in the case of transnational conflicts, appeal to international authorities. When interested parties participate in conflict resolution, they are better able to shape the decision to satisfy their interests. Also, parties involved in water conflicts tend to be well informed about the technical issues of the conflict. This approach allows a more in-depth and creative exploration of potential solutions, whereby all parties may believe they have attained their goals (as in a "win-win" solution). Similarly, negotiating parties tend to be highly sensitive to implementation concerns. Because they volunteer to participate, they are likely to be more invested in ensuring a positive outcome. As a result, dispute resolution processes enhance the possibility that the substantive issues will be well addressed and the agreements reached will be successfully implemented.

Despite the advantages of consensus-building strategies, at times other approaches may be needed to create the conditions required for dispute resolution processes to work. At a minimum, interest-based, dispute resolution processes require the political commitment to encourage public participation in decision-making, the willingness to permit the open interchange of views, and the necessary transparency to ensure good information exchange. Rights-based and power-based decisions (e.g. through judicial or political processes) can often establish these conditions.

Much can be accomplished if water managers and other stakeholders in water resource decisions simply consider talking to one another. Such a consideration can and should include an evaluation of whether the minimum conditions above are present. In addition, such consideration can and should include efforts to deal with the prenegotiation issues outlined in Chapter Two, such as reaching agreement on who will participate in the process or on what the objectives for the process will be (an exchange of view, development of options, or agreement on a course of action). Thus, the use of dispute resolution processes is a way to attain success more frequently. Experience has shown that this is both possible and productive.

How to Negotiate: Improving the Quality of Dispute Resolution Processes and Outcomes

Throughout this report, general principles or lessons for successful negotiation have been suggested to improve the quality of the process followed and the outcome reached during water conflict resolution. Many of these were discussed in Chapter Two, and the cases examined in Chapters Three and Four illustrated different aspects of the use (or lack of use) of these principles.

Seven factors stand out as useful for improving the quality of negotiations and assessing whether negotiations are probable. Because of the dynamic nature of the negotiation process, these factors must be continually reassessed.

- **What does each side see as the best alternatives to a negotiated agreement?** In other words, what would each side do if it did not negotiate and, thus, what are the incentives

to negotiate? Could it successfully bring a law suit or lobby politically to get what it wants? Does it have any reasonable alternatives? What are the costs, benefits, and likelihood of the success of each alternative?

- **What are the basic interests of each of the sides involved in the dispute?** A careful and sophisticated analysis of each side's interest can clarify to what extent, if any, one side needs the others to achieve what it wants. If one side depends on others to obtain its goals, then negotiation may be needed. An analysis of their interests can determine which groups have common or competing interests.

- **Who are the parties who will be affected by any agreements reached, and how can they best be involved in the process?** How can these parties best be represented? Implementation of agreements is a general measure of success of any dispute resolution process. Thus, it is important to have those who are affected by or who can influence the implementation of agreements involved. How this decision is made can vary; most often consultation among the parties about the role they wish to play is desirable.

- **What are several options for solutions to the problem that could be presented at the negotiation table?** As can be seen in several of the case studies, parties often enter into negotiations over water resources with only one solution in mind. This can quickly lead to an impasse. Any party will be in a stronger position to negotiate if, after identifying the fundamental interests it wishes to defend, it offers a range of options for protecting those interests. This requires flexibility about how basic needs are satisfied—not about whether they should be satisfied.

- **How can competition with other stakeholders be balanced with some degree of cooperation?** All too often, inexperienced parties to a negotiation believe that the discussions must be entirely competitive. However, competition can be balanced with cooperation in virtually any negotiation without either side making unacceptable concessions. Joint fact-finding and analysis is a particularly promising form of cooperation in many settings.

- **Can implementation of an agreement be ensured?** Early in the dispute resolution process, the parties must discuss how any agreements will be implemented. Technical feasibility, political viability, financial requirements, and compliance mechanisms are all important topics that need to be addressed.

- **How should the process of reaching an agreement be structured?** What will be the "rules of the game" for a dispute resolution process? Will one side be willing to underwrite the participation of a side with less finances? In what order will issues be addressed? Do all sides want to reach a decision or is some intermediate step, such as information exchange or narrowing options, the only one acceptable to all sides? Consensus-based processes, by definition, look to the eventual resolution of an issue, but small steps toward that goal are often positive.

The following summarizes the lessons learned from the case studies and other experiences in dispute resolution. These lessons are those most frequently included in training for negotiators. The overall challenge is to balance the tension between cooperation and competition and to create a problem-solving process that is also realistic about the role of power (parties' "alternatives" to negotiation).

"Rules of thumb" for negotiation, whether for personal, business, national, or international matters, include the following:

- Focus on the interests that underlie each party's position (yours and theirs);
- Share information (and ask questions and listen);
- Devise strategies for joint fact finding;
- Generate multiple options (be creative);
- Ensure that all constituencies are kept adequately informed (yours and theirs);
- Use objective criteria for evaluating options;
- Seek joint gains;
- Plan for implementation.

A common assumption of negotiating parties is that agreement may be reached only if the parties have much in common. In reality, capitalizing on the differences among the parties—their interests or priorities, their financial and water resources, and their political positions—may actually facilitate agreement. By making trades that are mutually beneficial and by linking water conflicts with other issues, parties may expand the pie of potential benefits and discover joint gains.

Finally, many of the U.S. negotiations discussed in this paper were mediated by a person or entity neutral to the issues of the dispute. Depending on the intensity level of the conflict, we believe mediators can be a valuable tool in improving the likelihood of success.

Although the vast majority of our daily negotiations take place without a third party, by their nature, water conflicts tend to have many barriers to successful, unassisted negotiation. Generally, at the early stages of recognizing that a water issue is emerging, those involved will seek to find mutually acceptable solutions themselves. At the point a true conflict emerges, simply suggesting negotiation as a strategy may be seen as naive because previous negotiations had been unsuccessfully attempted, and the difficulties that were originally encountered remain. However, a mediator can assist with many of these difficulties. Difficulties include large numbers of parties, parties that do not recognize one another as having a legitimate role, parties that are fragmented internally, a high degree of polarization or distrust among parties, large numbers of issues, and technical complexity or scientific uncertainty.

Mediators can serve a number of important functions:

- Help design consensus-building processes;

- Establish communication and set an atmosphere for negotiation;
- Help with people problems;
- Help to convene large numbers of parties;
- Negotiate agendas and clarify issues to be addressed in the negotiation;
- Help parties obtain data they need to make decisions;
- Clarify interests, priorities, and alternatives to negotiated agreement;
- Help parties explore ideas for creative solutions;
- Identify overlapping interests or areas of potential agreements;
- Help parties agree on criteria to evaluate solutions;
- Record agreements as they develop;
- Bring parties to an understanding of each other's negotiating flexibility;
- Anticipate implementation problems and address future conflicts.

Although mediators are usually neutral, with no stake in the outcome of a dispute, individuals that do have a stake can also play a mediative role. The more that interested parties can play a mediative role, the better the quality of a negotiation. However, because a truly neutral mediator may be needed in some cases and because parties to more polarized disputes will rarely accept the claimed "neutrality" of another party, we believe it is important to preserve the term "mediator" for those who can remain neutral in the dispute.

Capacity Building: Institutionalizing Interest-Based, Dispute Resolution Processes Abroad

Institution-building activities can make a profound difference in the likelihood of success of consensus-building processes. Although not documented directly in this report, environmental dispute resolution emerged as a specialized, professional discipline in the United States 20 years ago. In the last decade, the practice has evolved from the resolution of disputes on a case-by-case basis to the institutionalization of procedures through federal and state legislation (e.g. the Negotiated Rulemaking Act of 1991) and through the development of private sector organizations that specialize in the provision of mediation services.[11] The specific procedures that have been codified, the formal role of independent mediators, and the emergence of other institutions are the results of the cultural and political circumstances of the United States. Cultural biases remain inherent in the U.S. version and should be considered when the proceedings are applied elsewhere.

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[11] *The Cutting Edge: Environmental Dispute Resolution for the Nineties.* Summary of a March 13 - 15, 1992 symposium held in Charlottesville, Virginia. RESOLVE Center for Environmental Dispute Resolution, Washington, D.C., 1994.

When considering similar capacity building and institutional mechanisms for dispute resolution abroad, it is critical to remember that its evolution elsewhere will need to reflect the unique circumstances in each country. There are dramatic differences among nations in norms regarding conflict, the acceptability of change in society, the roles of different stakeholders (such as the private sector, nongovernmental organizations, international donor agencies, and national and local governments) in public decision-making, and the degree to which public participation is valued by society.

We do not believe that the dispute resolution model as it is practiced in the United States can or should be simply exported to other countries. Nevertheless, some form of capacity building for dispute resolution should be conducted in all countries to support the increased use and success of these processes. Laws that provide clarity of procedure and incentives to negotiate conflicts; organizations (whether private or public sector, for-profit or not-for-profit) that specialize in the mediation of disputes; and centers of information, training, and technical assistance on the practice of dispute resolution all serve to institutionalize the practice. Although not part of the scope of this report, such activities have been initiated and are continuing in many central European countries (i.e., Poland, the Slovak Republic, and Bulgaria), the Commonwealth of Independent States, Latin American countries, and others. Conflict resolution training activities have been conducted for many years in the Middle East, and we believe that several institutions in the region would be good candidates for building increased conflict resolution capability on water matters.

Many opportunities exist to learn more about water resource conflict resolution and to disseminate these ideas. Additional case studies would be valuable in analyzing the obstacles to resolving these conflicts and the creative strategies and water policy options that have been employed. Case studies of water resource negotiations in the region would be particularly helpful. Such case studies could examine processes in more detail, assess the affect of increased integration of infrastructure between hostile neighbors, study the role of information sharing or joint fact finding efforts, examine the role of legal and economic institutions and the good offices of third parties, and evaluate implementation mechanisms and results.

Educational activities also could play an important role in disseminating the ideas and insights developed. Publications could be developed and translated. Workshops where experts could discuss and critique case studies and policy papers and develop new plans of action could be convened. Curriculum and training materials could be developed for use within educational settings or in training workshops for water resource managers. Such training could focus on skills for potential negotiators, mediators, or facilitators of negotiations.

Finally, initiatives to resolve specific water resource conflicts can be taken. Resources, both human and financial, can help parties evaluate and organize consensus-building processes, fund joint fact-finding efforts, develop creative options, and implement agreements.

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